

Dipartimento di Politiche Pubbliche e Scelte Collettive – POLIS
Department of Public Policy and Public Choice – POLIS

POLIS Working Papers n. 182

April 2011

**Democracy, education and the
quality of government**

Piergiuseppe Fortunato and Ugo Panizza

UNIVERSITA' DEL PIEMONTE ORIENTALE "Amedeo Avogadro" ALESSANDRIA

Periodico mensile on-line "POLIS Working Papers" - Iscrizione n.591 del 12/05/2006 - Tribunale di Alessandria

Democracy, Education and the Quality of Government^{*†}

Piergiuseppe Fortunato
UNCTAD

Ugo Panizza
UNCTAD, HEID

April 2011

Abstract

This paper looks at how the interaction between democracy and education affects the quality of government. It models an economy in which politicians of heterogeneous quality can run for office and shows that education has a positive effect on the quality of selected officials only if democratic institutions are in place. The model also finds that democracy has positive effect on the quality of government in countries with high levels of education but that political institutions are not correlated with the quality of government in countries with low levels of education. Cross-country and panel data regressions confirm that the interaction between democracy and education is positively associated with the quality of government.

1 Introduction

The objective of this paper is to contribute to the literature that studies the relationship between the quality of government and each of education and democratic institutions.

We model an economy in which output depends on the quality of elected officials and assume that politicians can expropriate the citizens. We show that more competent politicians adopt endogenously a more honest behavior imposing less distortions on the economy. Next, we develop a simple model of candidate selection in which the outcome of the electoral process is determined by the interplay between the level of democracy and that of education. In our framework, potential politicians decide whether they should run for office by

^{*}Piergiuseppe Fortunato United Nations Conference on Trade and Development (piergiuseppe.fortunato@unctad.org). Ugo Panizza United Nations Conference on Trade and Development and the Graduate Institute, Geneva (ugo.panizza@unctad). The views expressed in this article are the authors' only and need not reflect, and should not be represented as, the views of any of the institutions that the authors are affiliated with.

[†]We thank Alberto Chong and Florencio Lopez-de-Silanes for helpful discussions and comments. All mistakes remain our own.

comparing the cost of entry into politics with its expected return. We assume that entry costs are higher in non-democratic systems and that the probability of winning an election depends on the quality of the politician and the capacity of the electorate of selecting the best candidate. We further assume that a poorly educated electorate is not effective in selecting the best candidate. Therefore, democratic institutions do not guarantee the election of better politicians if the country has a low level of education. At the same time, high levels of education do not affect the quality of the elected officials if the cost of entry into politics is prohibitive. The model, therefore, predicts a positive association between democracy and the quality of government only in countries with high levels of education and a positive association between education and the quality of government only in democratic countries.

The empirical part of the paper shows that the predictions of the model are consistent with the data. In particular, we apply various estimation techniques to cross-sectional and longitudinal data and show that the interaction between democracy and education is positively correlated with the quality of government. Next, we check the behavior of the marginal effect of democracy and education and we find that, as predicted by the model, the correlation between democracy and the quality of government is not statistically significant in countries with low levels of education and is positive and statistically significant in countries with high levels of education. The marginal effect of education is instead positive and often statistically significant in countries with high levels of education.

In discussing our results, we acknowledge that we cannot make any claim of causality because our explanatory variables are likely to be endogenous and we do not have good instruments for education and democracy. We deal with this issue by running a set of Monte Carlo simulations aimed at testing the robustness of our results. We find that our results are fairly robust. Even the presence of extreme endogeneity would not reverse our results. In the worst case scenario, the point estimates of our parameters of interest would be statistically insignificant.

Our paper relates to three strands of the literature on the quality of government. The first strand consists of empirical papers aimed at testing the determinants of institutional quality. In particular, our paper is closely related to the work of La Porta et al. (1999), Chong and Zanforlin (2000), and Panizza (2001). Like these papers, we emphasize the important roles of legal tradition, geography, religion and ethnic fractionalization. Unlike these papers, we also look at time-varying variables with particular emphasis on the role of democracy, education, and the interaction between these two variables. Our paper also qualifies the results of the literature that argues that democracy gives the right incentives to elected officials because it provides an instrument to oust inept and corrupt officials (Sen, 2000, and Rivera-Batiz, 2002). In our model, this mechanism is at work only if the electorate is sufficiently educated and can identify good politicians. More in general, our model suggests that all the variables that (like education) foster the consciousness of the voters, and therefore the accountability of politicians, should have the same positive impact on the quality of the political elites recruited in democratic regimes. Djankov et al.

(2010) collect data on the rules and practices of disclosure by politicians and, consistently with our predictions, find a negative association between public access to disclosed information and perceived corruption.

Our paper is also related to the literature that studies how the quality of government affects economic development. In particular, our model builds on work that shows that high quality policymakers are more likely to implement growth-promoting macroeconomic policies (Bai and Wei, 2001) and that the respect of economic property rights and economic liberties provides the right set of incentives for the accumulation of human and physical capital (Besley, 1995, Gradstein, 2004, and Cervellati et al., 2008). Our paper complements this literature and tries to explain the determinants of governance.

The paper is also related to a third strand of the economic literature which discusses the relative merits of democracy and education in promoting economic development. While Acemoglu et al. (2001) and Persson and Tabellini (2006, 2008 and 2009) emphasize the primacy of political institutions as a fundamental factor to explain cross-country differences in income per capita, other authors find no evidence of a significant effect of democracy on development (Barro, 2000, and Przeworski et al., 2000).¹ Djakanov et al. (2003) suggest that each community faces a set of institutional opportunities determined by the human and social capital of its population which, in turn, affect the quality of government. Glaeser et al. (2004) produce empirical evidence in line with this view, and argue that, as postulated by Lipset (1959, 1960), human capital accumulation and growth cause institutional improvements.^{2,3} We try to reconcile these two views about the primacy of human capital or democratic institutions as the ultimate source of good policies by looking at the interaction between these two variables and find evidence in support of the idea that democracy and human capital complement each other.

By looking at the joint effect of education and democracy our work puts into perspective the findings of Barro (1996) who suggests that the links between democracy and growth are the results of the interplay between democracy and other forces affecting economic performance, such as education. Our results are consistent with the model of Glaeser et al. (2006) who suggest that stable democratic institutions cannot flourish in the absence of a sufficiently educated population because schooling raises the benefits of civic participation, including voting and organizing.

¹Empirical papers that find that transitions to democracy are positively correlated with economic growth include Rodrik and Wacziarg (2005) and Papaioannou and Siourounis (2008). Sunde et al. (2008), instead, find that in unequal societies democracy is negatively correlated with the rule of law. In the political science literature, the effects of democratization on development are still debated (Carbone, 2009).

²Acemoglu et al. (2005) argue that the results of Glaeser et al. (2004) are not robust to using fixed effects. However, Bobba and Coviello (2007) and Castello-Climent (2008) find a positive relationship between education and democracy, even when they control for country fixed effects.

³Chong and Gradstein (2009) use micro data from the World Values Surveys and find a positive association between education and pro-democracy attitudes even after controlling for a variety of personal characteristics.

The remainder of the paper is organized as follows. Section 2 describes a theoretical model of candidate selection. In Section 3, we take our model to the data and look at the association between a standard indicator of the quality of government and the interaction between democracy and education. Section 4 addresses endogeneity. Section 5 offers some concluding remarks.

2 The model

2.1 Set-Up

Production and political rents. Consider an economy populated by a continuum of identical individuals. Each individual disposes of an endowment of physical capital, k , used for production purposes. The production technology $f(\cdot)$ is continuous and exhibits positive but decreasing returns on k . The total factor productivity, however, is not constant and depends on the quality of government (q) provided by the party elected in office. We have,

$$y = qf(k) \tag{1}$$

Only part of the capital endowment can be used for production because individuals are subject to the predatory behavior of the ruling party which can expropriate a fraction τ of their endowment.

In modelling the behavior of politicians, we follow Max Weber (1919) who, in his famous lecture "Politics as a Vocation," claimed:

There are two ways of making politics one's vocation: Either one lives 'for' politics or one lives 'off' politics. [...] He who lives 'for' politics makes politics his life, in an internal sense. Either he enjoys the naked possession of the power he exerts, or he nourishes his inner balance and self-feeling by the consciousness that his life has meaning in the service of a 'cause.' [...] He who strives to make politics a permanent source of income lives 'off' politics as a vocation, whereas he who does not do this lives 'for' politics.

Formally, we assume that politicians choose the level of expropriation that maximizes an utility function which includes both aggregate production and the level of expropriation:

$$u_P = \beta y + (1 - \beta)\tau k \tag{2}$$

We think that the way in which we model the utility of politicians embodies both kinds of making politics a vocation. Politicians derive utility (with weight β) from increasing the welfare of their community (and therefore politicians may be seen as partially living a "life [which] has meaning in the service of a 'cause'") but also (with weight $1 - \beta$) from the pecuniary rents obtained by

expropriating the citizens (and therefore by making "politics as a permanent source of income"). Note that we assume that β (a parameter which could be interpreted as capturing a politician's level of honesty) is independent from q . We therefore assume that all politicians are equally honest (or dishonest). However, we will show that, in equilibrium, high quality politicians will expropriate less than low quality politicians. Therefore, high quality politicians will appear to be more honest than low quality politicians even if, in fact, they have the same preferences.

We can rearrange equation (2) as follows,

$$u_P = \beta q f(\tilde{k}) + (1 - \beta)\tau k \quad (3)$$

where, $\tilde{k} = (1 - \tau)k$. This formulation highlights the central trade-off faced by the ruling political party. Direct appropriation of physical capital through expropriation raises the pecuniary component of the utility function but, at the same time, reduces overall production (and social welfare) and, therefore, negatively affects the benevolent component of utility.⁴

Political parties. There are only two parties, one incumbent of quality q_i (which is common knowledge) and one potential entrant whose quality q_e can take any value on the set $q_e \in [\underline{q}; \bar{q}]$, with $\underline{q} < q_i < \bar{q}$. The type of the potential entrant is realized before the election takes place and is distributed according to a density function $g(q_e) \geq 0$. We assume, however, that the exact realization q_e is private information.

The incumbent can run for a new term at zero cost and therefore will always take part to the electoral competition, independently on the probability of winning. The potential entrant, on the contrary, must decide whether to pay the entry cost c_e and run for office.

Voters. Voters' utility is linear in consumption of the single commodity y . They therefore aim to maximize production and minimize expropriation by trying to select the candidate of highest quality. They observe the quality of the incumbent but not that of the challenger.⁵

If the challenger is better than the incumbent the voters will observe a positive signal. We assume that the strength of this signal, and thus the probability that the electors will vote for the challenger, is positively correlated with the level of education of the voters E . Formally, a challenger will beat a lower quality incumbent with probability $p(E)$, with

$$\frac{\partial p(E)}{\partial E} > 0.$$

⁴For simplicity, we assumed expropriation of endowments rather than production; assuming predation taking place directly on y jointly with a labor/leisure choice by part of the individuals, or the existence of a formal and an informal sector characterized by different productivities, would deliver the same qualitative results.

⁵More generally, we need to assume that voters have imperfect information on the difference between the quality of the incumbent and that of the challenger.

Viceversa, whenever the quality of challenger is lower than that of the incumbent, the voters will observe a positive signal for the challenger with probability $1 - p(E)$. As a break-even rule we also assume that if the two candidates are identical, the incumbent will always win the electoral context.

This set of assumptions implies that a qualified candidate has more chances of being elected when the electorate is well educated. This is in line with the political science literature suggesting that the quality of political participation can affect the quality of political leadership recruited. In poor and uneducated settings ethnic politics tend to prevail (Horowitz, 1985, and Posner et al., 2010) and the electorate tends to exhibit greater preferences for private transfers or clientelism (Hunington and Nelson, 1976, and Finan and Schecter, 2009).

Political regimes. There are two possible political regimes, democracy and oligarchy, which differ only with respect to the barriers to entry into political activity. We assume that under oligarchy political competition is inexistent and potential entrants face prohibitive entry costs, i.e. $c_e \rightarrow \infty$. Under democracy, on the other hand, the entry cost is assumed to be equal to a positive constant $c_e > 0$. This parameter mimics the costs of organizing a political party or sustaining a political campaign in a modern democracy.

This formulation implies that in oligarchic systems the incumbent will always run unchallenged for re-election while political competition can emerge only in democracies.

Timing. The sequence of events and decisions is as follows:

1. The quality of the potential entrant is realized. The potential entrant decides whether to run for office or leave the incumbent unchallenged;
2. If the potential entrant does not run for office the incumbent is re-appointed, otherwise voters observe the signal, elections take place and the winner enters in office;
3. The winning candidate takes the decision regarding expropriation, production takes place and income is realized.

2.2 Entry decisions in Democracy

Preliminaries. We solve the model backward and investigate first the predation decision taken by political parties if elected. Once appointed a political party strikes a balance between predation and production by solving the following maximization problem:

$$Max_{\tau} u_P = \beta q f(\tilde{k}) + (1 - \beta)\tau k$$

where, $\tilde{k} = (1 - \tau)k$. The first order condition reads as follows:

$$\frac{\partial u_P}{\partial \tau} = 0 \implies -k\beta q f_{\tilde{k}} + (1 - \beta)k = 0$$

Therefore, the optimal level of expropriation τ^* is the solution of:

$$f_{\tilde{k}} = \frac{(1 - \beta)}{\beta q}$$

Since, by decreasing returns on physical capital, $f_{\tilde{k}}$ is monotonically decreasing in \tilde{k} and since $\tilde{k} = (1 - \tau)k$, we have:

$$\frac{\partial \tau^*(q, \beta, k)}{\partial q} \leq 0 \quad \forall \beta \in [0, 1] \text{ and } k \in [0, \infty[$$

For any given level of β , an increase in the quality of the political party in office increases the opportunity cost of predation in terms of lost production and therefore reduces politicians' incentives to expropriate the population.⁶ Other things equal, more competent politicians will appear to be more honest than less competent ones (despite sharing the same utility function) because they optimally choose a lower level of expropriation τ .⁷ In the model, therefore, the quality of politicians has a double positive effect on aggregate production: better governance affects production directly since it raises the total factor productivity, but also indirectly by discouraging predatory behaviour.

We are now in a position to study the entry decision. Under democracy, the potential entrant must decide whether to pay the fix cost and run for election or leave the incumbent unchallenged. The solution of this problem depends on the specific realization of q_e . We have to consider separately two different cases, when the entrant's quality is higher than the one of the incumbent, $q_e > q_i$, and viceversa, $q_e \leq q_i$.

(i) High quality entrant. The potential entrant is aware of being of a higher quality than his opponent and knows that he will win the electoral contest, and enjoy the utility described in (2), only if the voters observe the right signal (i.e. with probability $p(E)$). Staying out will conversely entails a null payoff. The potential entrant will therefore decide to challenge the incumbent if and only if the expected utility of entry into politics, net of the entry cost c_e , is greater than zero,

$$E[u_P(\text{entry} \mid q_e > q_i)] = p(E)u_P(q_e, \tau^*(q_e)) - c_e > 0 \quad (4)$$

This entry condition for a high quality potential entrant can be rearranged as follows,

⁶The same negative relation between quality of politicians and tax rate emerges if we model the quality of politicians simply as a differential on the propension to benevolent or pecuniary behavior: $u_P = qy + (1 - q)\tau k$, with $q \in [0, 1]$.

⁷Notice that if we assumed that the quality (q) affects the productivity of politicians in providing public goods (rather than the TFP), the model would predict that more qualified politicians obtain less rents (τ) and provide more public goods. This is in line with the findings of Acemoglu et al. (2011) that document a negative relationship between the relative wages of state employees and the amount of public good provision.

$$p(E) > \frac{c_e}{u_P(q_e, \tau^*(q_e))} \quad (5)$$

Notice that, other things equal, a higher level of education increases the likelihood of having the top quality candidate running for office, this in turn increases the likelihood of observing higher quality of government in equilibrium. Conversely, and quite tautologically, higher barriers to entry discourage political competition.

Notice also that, since $u_P(\cdot)$ is monotonically increasing in q_e (higher quality candidates can always ensure higher payoff by simply replicating the choices of lower quality ones) and since $q_e > q_i$, condition (5) will always hold true independently on the realization of q_e whenever the educational level is such that:

$$p(E) > \frac{c_e}{u_P(q_i, \tau^*(q_i))} \quad (6)$$

This equation implicitly defines a threshold level of education E_{high}^{In} such that for any $E > E_{high}^{In}$ any potential entrant of higher quality with respect to the incumbent will find it optimal to run for office. Analogously, since $q_e \leq \bar{q}$, condition (5) will fail to hold whenever:

$$p(E) \leq \frac{c_e}{u_P(\bar{q}, \tau^*(\bar{q}))} \quad (7)$$

Equation (7) defines a new threshold level of education $E_{high}^{Out} < E_{high}^{In}$, such that for any $E \leq E_{high}^{Out}$ a potential entrant of higher quality with respect to the incumbent will be better off by not participating in the elections.

These results allow us to characterize the decisions of a high quality challenger independently on the actual realization of q_e .

Lemma 1 *For any $E > E_{high}^{In}$ all candidates of higher quality than the incumbent find it optimal to run for office, while for any $E \leq E_{high}^{In}$ they do not take part in the electoral context. Whenever $E \in [E_{high}^{Out}, E_{high}^{In}]$ the entry decision depends on the specific realization of q_e .*

(ii) Low quality entrant. If the potential entrant is of lower quality than the incumbent, in case of candidature he will win the election only if voters observe the wrong signal (i.e. with probability $1 - p(E)$). Not running for office, on the other hand, will entail a payoff equal to zero. The potential entrant will therefore run for election if and only if:

$$E [u_P(\text{entry} | q_e \leq q_i)] = (1 - p(E))u_P(q_e, \tau^*(q_e)) - c_e > 0 \quad (8)$$

The entry condition reads therefore as follows,

$$p(E) < 1 - \frac{c_e}{u_P(q_e, \tau^*(q_e))} \quad (9)$$

When the potential entrant is of lower quality, education discourages entry because it decreases the likelihood of a wrong decision by part of the voters. Notice that, since $u_P(\cdot)$ is monotonically increasing in q_e and since $q_e > \underline{q}$, condition (9) is always verified (i.e. independently on the actual realization of q_e) when education is such that

$$p(E) < 1 - \frac{c_e}{u_P(\underline{q}, \tau^*(\underline{q}))} \quad (10)$$

This equation implicitly defines a threshold level of education E_{low}^{In} such that for any $E \leq E_{low}^{In}$ potential entrants of lower quality than the incumbent will always find it optimal to run for office. Furthermore, since $q_e < q_i$, condition (9) will fail to hold whenever:

$$p(E) > 1 - \frac{c_e}{u_P(q_i, \tau^*(q_i))} \quad (11)$$

This equation defines a fourth threshold level on education $E_{low}^{Out} > E_{low}^{In}$ such that for any $E \geq E_{low}^{Out}$ any potential entrant of lower quality than the incumbent will not run for office. Therefore,

Lemma 2 *For any $E < E_{low}^{In}$ all candidates of lower quality than the incumbent find it optimal to run for office, while for any $E \geq E_{low}^{Out}$ they decide to stay out from the electoral process. Whenever $E \in [E_{low}^{In}, E_{low}^{Out}]$, the entry decision depends on the specific realization of q_e .*

For the sake of expositional simplicity, but without any loss of generality, we assume that c_e is such that $E_{high}^{Out} > E_{low}^{Out}$ and therefore $E_{high}^{In} > E_{high}^{Out} > E_{low}^{Out} > E_{low}^{In}$.⁸

2.3 A comparison between political regimes

We now conduct a comparative statics exercise aimed at comparing the impact of different political institutions on the quality of elected officials, and the way in which these institutions interact with education in determining electoral outcomes.

From conditions (10) and (11) we know that for very low levels of education only potential entrants of quality lower than the incumbent find it optimal to run for office. In this context, imposing prohibitive barriers to entry will raise the average quality of government by discouraging low quality candidates from trying to overthrow high quality incumbents. In well educated countries, instead, only the decisions of potential entrants of quality higher than the incumbent will be affected by changes in the political regime. More democratic and open institutions, in this case, will encourage the best candidates to run for office thereby raising the average quality of government. For intermediate levels of education, it is impossible to make an assessment between the two regimes:

⁸This essentially entails a cost of entry c_e sufficiently high.

democracies will encourage higher competition increasing the likelihood of having incumbents entering into office independently of their type.

Formally, we obtain the following result:

Proposition 3 *The level of education affects the comparison between democratic and oligarchic systems in terms of selection of the politicians:*

(i) *For any $E > E_{high}^{In}$ a democracy is associated with a higher expected quality of elected officials (and lower expropriation) than an oligarchic system;*

(ii) *For any $E < E_{low}^{In}$ an oligarchic system is associated with a higher expected quality of elected officials (and lower expropriation) as compared with a democracy;*

(iii) *For any $E \in [E_{low}^{In}, E_{high}^{In}]$ the two systems are identical ex-ante in terms of expected quality of government.*

Proof. *First consider $E > E_{high}^{In}$. Under democracy, by Lemmata 1 and 2, and since $E_{high}^{In} > E_{low}^{Out}$, only potential entrants of quality $q_i \in]q_i, \bar{q}]$ will run for office. Therefore,*

$$E(QoG | democracy) = \int_{\underline{q}}^{q_i} q_i dg(q_e) + \int_{q_i}^{\bar{q}} [p(E)q_e + (1 - p(E))q_i] dg(q_e)$$

Under oligarchy the incumbent will always run unchallenged implying

$$E(QoG | oligarchy) = \int_{\underline{q}}^{\bar{q}} q_i dg(q_e) = q_i$$

The result (i) follows since $\int_{q_i}^{\bar{q}} q_e dg(q_e) > \int_{q_i}^{\bar{q}} q_i = q_i$ and since higher quality

elected officials optimally impose a lower τ^ .*

Next, consider $E < E_{low}^{In}$. In this region by Lemmata 1 and 2, and since $E_{high}^{Out} > E_{low}^{In}$, we have that under democracy only potential entrants of quality $q_i \in]\underline{q}, q_i]$ will participate to the elections. Thus

$$E(QoG | democracy) = \int_{\underline{q}}^{q_i} [p(E)q_i + (1 - p(E))q_e] dg(q_e) + \int_{q_i}^{\bar{q}} q_i dg(q_e)$$

In oligarchy the incumbent will always run unchallenged implying

$$E(QoG | oligarchy) = \int_{\underline{q}}^{\bar{q}} q_i dg(q_e) = q_i$$

Result (ii) follows since $\int_{\underline{q}}^{q_i} q_e dg(q_e) < \int_{\underline{q}}^{q_i} q_i = q_i$ and since lower quality elected officials optimally impose a higher τ^* .

Finally consider $E \in [E_{low}^{In}, E_{high}^{In}]$. In this intermediate area both high and low quality candidates may decide to run for office (or not) depending on the specific realization of q_e . It is therefore impossible to make a comparison between the expected quality of government in the two systems.

Notice also that in our model the level of education affects the quality of elected officials only under democratic regimes, by encouraging high quality candidates to run for office and discouraging low quality ones, while it plays no role in oligarchies where political participation is restricted to the ruling elite. This is recorded in the following,

Proposition 4 *The type of political regime affects the relationship between education and selection of the politicians:*

(i) *Under a democratic regime, the expected quality of elected officials is monotonically increasing in the level of education. The level of expropriation is instead monotonically decreasing in the level of education.*

$$\frac{\partial E(\text{QoG} \mid \text{democracy})}{\partial E} \geq 0 \quad \text{and} \quad \frac{\partial E(\tau^* \mid \text{democracy})}{\partial E} \leq 0$$

(ii) *Under an oligarchic regime, the expected quality of elected officials and the level of expropriation do not depend on the level of education*

$$\frac{\partial E(\text{QoG} \mid \text{oligarchy})}{\partial E} = 0 \quad \text{and} \quad \frac{\partial E(\tau^* \mid \text{oligarchy})}{\partial E} = 0$$

Proof. *The result (i) follows since by Lemmata 1 and 2 any increase (decrease) in education increases (decreases) the likelihood of having candidates of higher (lower) quality than the incumbent running for office. Furthermore, an increase (decrease) in education also increases (decreases) the probability of winning of a high (low) quality candidate after the entry decision has been taken.*

The result (ii) follows from the definition of oligarchy.

3 Empirical Relevance

In this section we take our model to the data and look at the correlation between the quality of government and each of education and democracy. It should be clear from the outset that we have no convincing way to identify a causal relationship going from our variables of interest to the quality of government. Therefore, the objective of this section is to check whether the partial correlations between the quality of government and each of education and democracy are consistent with the results of our model, without making any claim on the

causality of these partial correlations. In the next section we investigate the endogeneity problem. We show that our results are robust to allowing for a mild form of endogeneity.

3.1 The Data

We measure the quality of government with an aggregate index obtained from the International Country Risk Guide (ICRG) built up by jointly considering corruption and competency indicators. In particular, our quality of government index (QOG) is the simple average of the ICRG variables “Corruption,” “Law and Order,” and “Bureaucracy Quality.” Note that, in line with our model which suggests that less competent politicians endogenously adopt more predatory behaviours, corruption and bureaucracy quality are highly correlated in the data.⁹

The aggregate index of quality of government ranges between 0 and 100, with higher values being associated with higher quality of government. The average value of the index was approximately 52 in the 1980s, 58 in the 1990s and 55 in the 2000s (Table A1). The quality of government index is fairly stable and most of the variance of the index comes from its cross-country variation (the “between,” standard deviation of the index is about 20 and the “within,” standard deviation is approximately 7, Tables A2-A4).

We measure democracy (DEMOC) using an average of the Polity and Freedom House indexes of democracy. Our measure of democracy ranges between 0 and 10 (again, with higher values associated with greater levels of democracy). While the average value of the index increased from 4.8 in the 1980s to 7.1 in the 2000s, the dispersion of the index decreased markedly with the cross-country standard deviation going from 3.5 in the 1980s to 2.8 in the 2000s (Table A1). Again, the cross-country variance of the index is much larger than the within-country variance.

For our third variable of interest we rely on the Barro and Lee (2010) dataset on educational attainment. We measure education (EDUC) with the average number of years of education attained by the adult population. In the data, this variable ranges between 2.8 and 13. Its average value increased from 5.2 in the 1980s to 7.5 in the 2000s. Its standard deviation, instead, remained constant at approximately 2.8. As for the previous two variables, the cross-country standard deviation of education is much larger than the within-country standard deviation (2.9 versus 0.8, Table A3).

In estimating the relationship between quality of government and each of democracy and education, we follow La Porta et al. (1999) and control for the log of GDP per capita, legal origin, religion, ethno-linguistic fractionalization, and latitude. Following Ades and Di Tella (1999), we also control for trade

⁹The correlation between the ICRG index of bureaucratic quality and that of control of corruption is 0.63 (the coefficient is statistically significant at the one percent confidence level). A regression of the index of control of corruption over that of bureaucratic quality yields a coefficient of 0.8 and a t-statistics of 11.8.

openness.¹⁰

3.2 Cross-country estimates

We start by looking at the cross-country relationship between the quality of government (QOG) and each of democracy and education by running separate regressions for the 1980s, 1990s, and 2000s. Columns 1, 3 and 5 of Table 1 show that education ($EDUC$) is never significantly correlated with QOG and that democracy ($DEMOC$) is positively but not always significantly correlated with QOG .

These estimates, however, assume that the effects of democracy and education on the quality of government are independent of each other. Our model, instead, predicts a positive interaction between these variables. It suggests that we should find a positive correlation between democracy and quality of government only in countries with high average levels of education. In countries with intermediate levels of education democracy should not matter and in countries with low levels of education democracy may even be associated with the selection of low quality politicians. The model also predicts that education should have a positive effect on the quality of government in democracies and be irrelevant in non-democratic regimes.

We test for the presence of an interaction between education and democracy by estimating the following model:

$$QOG_i = \alpha + \beta(DEMOC_i - \overline{DEMOC}) + \gamma(EDUC_i - \overline{EDUC}) + \delta(DEMOC_i - \overline{DEMOC})(EDUC_i - \overline{EDUC}) + X_i\lambda + \varepsilon_i$$

Within this set up, $\frac{\partial QOG}{\partial DEMOC} = \beta + \delta(EDUC_i - \overline{EDUC})$, with β measuring the relationship between democracy and the quality of government for the country with average level of education and δ measuring how the level of education affects the relationship between democracy and the quality of government. Similarly, $\frac{\partial QOG}{\partial EDUC} = \gamma + \delta(DEMOC_i - \overline{DEMOC})$, with γ measuring the relationship between education and the quality of government for the country with average level of democracy and δ measuring how the level of democracy affects the relationship between education and the quality of government.

Columns 2, 4, and 6 of Table 1 show that β is always positive and statistically significant, indicating that there is a positive relationship between democracy and the quality of government for the country with the average level of education (in the year 2000 the group of countries with a level of education around the cross-country average of 7.5 included Ecuador, South Africa, Mexico, Jordan, and Sri Lanka). They also show that γ is never statistically significant, indicating that there is no robust relationship between education and the quality of government for the country with the average level of democracy (in the year 2000, the group of countries with a level of democracy around the cross-country average of 7.1 included Thailand, Mozambique, Colombia, Ukraine, and

¹⁰Our control variables and their sources are described in Table A5.

Turkey). Finally, Table 1 shows that δ is always positive and statistically significant, supporting the idea of a positive interaction between democracy and quality of government.

Figure 1 plots the partial correlation between $DEM * EDUC$ and QOG for each of the three sub-periods studied in Table 1 and for all the sub-periods pooled together. It suggests that the the point estimates of Table 1 are not driven by outliers.

The bottom panel of Table 1 evaluates the relationship between democracy and the quality of government for countries with a level of education which is one standard deviation below the cross-country average (examples of such countries are Uganda, Pakistan, Laos, and Haiti) and for countries with a level of education which is one standard deviation above the cross-country average (Russia, Latvia, Romania, and Switzerland). We find no significant relationship between democracy and the quality of government for countries with low levels of education and a strong and significant correlation between democracy and the quality of government for countries with high levels of education. The second result is fully consistent with the predictions of our model. The first result is consistent with the predictions of our model if we assume that countries which are one standard deviation below the average level of education are still above the thresholds below which democracy starts having a negative effect on the quality of government.

We also look at the relationship between the quality of the government and education for different levels of democracy (countries which in the year 2000 had a level of democracy one standard deviation below the cross-country average include Morocco, Kuwait, Chad, and Mauritania and countries that in the year 2000 had a level of democracy one standard deviation above the cross-country average include Greece, Japan, Chile, and Italy). In all cases, we find a negative correlation for low levels of democracy and a positive correlation for high levels of democracy. If we focus on the 1980s, we find that the negative correlation for low levels of democracy is statistically significant at the 5 percent confidence level but the positive correlation for high levels of democracy is not statistically significant. For the 1990s and 2000s, instead, we find that the correlation between education and quality of government is positive and statistically significant in countries with high levels of democracy and negative and insignificant for countries with low levels of democracy. The results of the 1990s and 2000s are thus fully consistent with the predictions of our model which suggest that education should have a positive effect in countries with high levels of democracy and should not matter in countries with low levels of democracy.

Figure 2 uses the results of the 2000s regression to plot the marginal effect of education at different levels of democracy. It shows that the relationship is negative and statistically significant for countries where the democracy index is below 2.5 and positive and statistically significant for countries where the democracy index is above 9.¹¹

¹¹In the 2000s there were 28 countries that in the 2000s had a democracy index below 2.5 (Saudi Arabia; North Korea; Iraq; Turkmenistan; Uzbekistan; Myanmar; Libya; Afghanistan;

Figure 3 uses the results of the 2000s regression to plot the relationship between the quality of government and democracy at different levels of education. It shows that the relationship is negative and statistically significant for countries with extremely low levels of education (below one year of average schooling) and is positive and statistically significant for all countries in which average education is above 7 years.¹² The results are thus fully consistent with the predictions of our model.

In the first two columns of Table 2 we check whether our results are robust to using an alternative measure of education. In particular, we substitute the Barro and Lee (2010) measure of average years of education with the Vanhanen (2003a, 2003b) index of knowledge distribution (*EDUC1*) computed as the simple average of literates as a percentage of adult population and the number of students at universities or other higher education institutions per 100,000 inhabitants of the country. The index is rescaled to range between 0 and 100 (in the 1980s the average value of the index was 43, in the 1990s the average value had increased to 51; the cross-country standard deviation of the index is approximately 21 and the within-country standard deviation is about 4). While this index is not available for the 2000s and is less commonly used than the Barro and Lee measure of the stock of education, it has the advantage of being available at annual frequency (the Barro and Lee measure of education is only available at a 5-year frequency). Therefore, it can be used to estimate panel regressions that use annual data.¹³ We find that substituting *EDUC* with *EDUC1* does not affect our results (this is not surprising since the correlation between the two variables is 0.87).

In the last three columns of Table 2, we re-estimate the models of columns 2, 4, and 6 of Table 1 by using a robust regression method which puts less weight on outliers (in particular, we use the *rreg* command of Stata) and find results which are basically identical to those of Table 1. This confirms that our findings are not driven by outliers.

3.3 Panel regressions

In Table 3, we use ten year averages to estimate random and fixed effects models by pooling the data for the three decades of the regressions of Table 1. We start with a random effects model without the interaction between democracy

Cuba; Syria; Qatar; Laos; China; Sudan; Swaziland; Eritrea; Belarus; Vietnam; United Arab Emirates; Equatorial Guinea; Oman; Bhutan; Azerbaijan; Bahrain; Zimbabwe; Cameroon; Kazakhstan; Egypt) and 39 countries that in the 2000s had a democracy index above 9 (Bulgaria; Latvia; South Africa; Panama; Israel; Taiwan; Greece; Estonia; Japan; Chile; Czech Republic; Slovakia; France; Mauritius; Lithuania; Poland; Belgium; Costa Rica; Hungary; Italy; United Kingdom; Slovenia; Germany; Spain; Ireland; New Zealand; Cyprus; Portugal; Uruguay; Austria; Australia; Finland; Sweden; Norway; Netherlands; United States; Switzerland; Denmark; Canada).

¹²In the 2000s there was only one country with average education below one year (Mozambique) and there were 73 countries with average education above 7 years.

¹³Moreover, by focusing on both the top (tertiary enrollment) and bottom (basic literacy) parts of the distribution of education outcome, this index may do a better job at capturing inequalities in the distribution of education.

and education (column 1) and again we find a positive and significant effect of democracy and a positive but insignificant effect of education. We find similar results when we control for the interaction between democracy and education and estimate the effect of democracy and education at their respective mean value (column 2). As in Table 1, we find that the interactive term is positive and statistically significant, indicating that democracy and education are complementary. In column 3, we estimate the model without interaction but with country fixed effects (this specification does not allow to include time-invariant controls) and find that neither education nor democracy are statistically significant. However, when we allow for an interactive effect we find that democracy is statistically significant (indicating that for the country with the average level of education democracy is positively correlated with the quality of government) and so is the interactive term capturing complementarities between democracy and education. This is a remarkable result if one considers that in the fixed effects model the limited within-country variance of democracy and education amplifies the downward bias brought about by the presence of measurement error.

Figure 4 uses the results of the fixed effects regression to plot the relationship between the quality of government and education at different levels of democracy.¹⁴ It shows that, as predicted by our model, the relationship is insignificant for low and intermediate levels of democracy but it becomes positive and significant when the democracy index surpasses 9. When we plot the relationship between the quality of government and democracy at different levels of education (Figure 5) we find that the relationship is negative (but not statistically significant) for countries with low levels of education (less than 4 years) and becomes positive and statistically significant when average education reaches 8 years.

In Table 4 we estimate panel regressions using 5 year averages instead of 10 year averages and find that the results are qualitatively similar to those of Table 3. As before, we find that the relationship between education and the quality of government is positive and statistically significant for high level of democracy, but now we also find that the relationship between these two variables is negative and significant for extremely low values of democracy (Figure 6).¹⁵

In Table 5 we repeat the experiment using annual data and the Vanhanen (2003a, 2003b) index of knowledge distribution (*EDUC1*). We now find that both education and democracy are positively correlated with *QOG* when they are evaluated at their mean value and, as before, we find a positive and statistically significant coefficient for the interactive term. Figure 8 shows that the relationship between education and the quality of government is always positive and becomes statistically significant for countries with intermediate and high levels of democracy. When we look at the relationship between democracy and quality of government we find the usual result of a negative but insignificant

¹⁴We use the fixed effects regression because a Hausman test rejects the null that the random effects model is consistent ($\chi(6) = 10.75, p = 0.09$).

¹⁵The graph is based on the results of the fixed effects regressions because a Hausman test show that the random effects regression is not consistent ($\chi^2(5) = 13.08, p = 0.02$).

relationship for countries with low level of education and a positive and significant relationship for countries with intermediate and high levels of education (Figure 9).

While many of our explanatory variables are likely to be endogenous, one variable we are particularly worried about is the log of GDP per capita, as there is strong evidence that institutional quality has a causal effect on the level of development (Acemoglu et al., 2001). While we do not have a good instrument for the level of GDP, we do have a good instrument for GDP growth. Recognizing that, with fixed effects and annual data, the level of GDP and GDP growth are closely related concepts, in Table 6 we replace the log of GDP per capita with GDP growth (*GROWTH*) and then instrument GDP growth with the real external shock first used by Jaimovich and Panizza (2006). We find that the results of the IV regressions are essentially identical to those of the standard regressions which, in turn, are similar to those in which we control for the log of GDP instead of GDP growth.

Finally, we recognize that the quality of government is likely to be persistent and we estimate the relationship between *QOG* and each of education and democracy by using a dynamic panel estimator. Column 1 of Table 7 reports the results of the GMM difference estimator originally proposed by Arellano and Bond (1991).¹⁶ The results of the dynamic panel estimations show strong persistence (with the first and second lag being highly significant) and confirm our previous result of a positive and significant effect of education, democracy, and of the interaction between these two variables. The model also passes the standard specification tests: the residuals exhibit first order autocorrelation but no second order autocorrelation and the Sargan test does not reject the null on the appropriateness of our exclusion restrictions. We also used the system GMM estimator proposed by Arellano and Bover (1995) and Blundell and Bond (1998) because, under certain conditions, this model allows to make casual statements, but the Sargan test always rejected our exclusion restrictions (Columns 2 and 3 of table 7).

3.4 Discussion

The model developed in Section 2 yields the following six predictions: (i) Education and democracy are complementary for the quality of government; (ii) Democracy has a positive effect on the quality of government in educated societies; (iii) Education has a positive effect on the quality of government in democratic societies; (iv) Democracy is irrelevant in countries with intermediate levels of education; (v) Education is irrelevant in non-democratic societies; and (vi) Democracy has a negative effect on the quality of government in countries with very low levels of education. We think that our results are fully consistent with the first four predictions. In particular, we always find that the interactive effect γ is positive and statistically significant, that the marginal effect of democracy

¹⁶We use all available lags as instrument and adjust the standard errors using Windmeijer (2005) finite sample correction. We consider a model with two lags because in the model with one lags we could not reject the null of no second order autocorrelation of the residuals.

is positive and statistically significant for countries with high levels of education and not significant in countries with intermediate levels of education, and that the marginal effect of education is positive and significant in democracies. Our results are also broadly consistent with the fifth prediction. Although, we have a couple of specifications in which the marginal effect of education is negative and statistically significant at low levels of democracy, most of our regressions find that education is not statistically significant in non-democratic countries.

Our results, instead, are not consistent with the sixth prediction. In particular, we find that at low levels of education, the marginal effect of democracy is never statistically significant. We think that this is due to a multicollinearity problem caused by the fact that countries with very low levels of education tend to have low levels of democracy. For instance, our sample only includes one country (Mozambique) with very low average education (less than three years) and an index of democracy greater than 7.

4 Non-Robustness Analysis

The main issue with the estimations of Section 3 relates to the endogeneity of our variables of interest and of some of our controls. The quality of government is likely to have a direct effect on education and GDP per capita and also have an either direct or indirect effect on democracy and trade openness. Although, we tried to deal with the endogeneity problem by using panel data and different GMM estimators, we are not convinced to have fully dealt with the problem.

In the absence of proper instruments there is no solution to the endogeneity problem. Therefore, in this Section we follow Bourguignon et al. (2007) and explore the magnitude of the potential bias in the estimation of our parameters of interest. In a sense, we check how "non-robust" our results are under different assumptions on the severity of the endogeneity problem.

Our objective is to estimate the following model:

$$Q_i = \alpha + X_i\beta + W_i\lambda + u_i$$

Where Q is the quality of government, X is a matrix of endogenous variables (democracy, education, the interaction between democracy and education, GDP per capita, and openness) and W is a matrix of exogenous variables (Ethno-linguistic fractionalization, legal origin, religion, and latitude). Because of endogeneity, X and u are not orthogonal and the vector $\hat{\beta}$ will be a biased estimator of β (possibly also causing a bias in $\hat{\lambda}$).

If we had a set of valid instruments (i.e., a set of variables correlated with X but uncorrelated with u), we could use an IV estimator and obtain an unbiased estimator of the vector β . In the absence of such a set of instruments, we can compute how the correlation between u and X affects the bias of $\hat{\beta}$ and then correct for this bias.

To see how this can be done let us start by assuming, without loss of gen-

erality, that all variables are endogenous and have mean zero.¹⁷ The expected value of the OLS estimator will then be:

$$E(\widehat{\beta}) = (X'X)^{-1} X'Q = \beta + (X'X)^{-1} E(X'u) \quad (12)$$

As $E(X'u) = \text{cov}(Xu)N$ (where N is the number of observations), we can write the bias of the OLS estimator as $B = E(\widehat{\beta}) - \beta = (X'X)^{-1} \text{cov}(Xu)N$. By recalling that $\rho_{Xu} = \text{cov}(Xu)/(\sigma_x\sigma_u)$, we have,

$$B = N (X'X)^{-1} \left(\rho_{Xu}\sigma_x \right) \sigma_u \quad (13)$$

Where σ_u is the standard deviation of u and $\rho_{Xu}\sigma_x$ is a $k \times 1$ vector in which each element is the product between the standard deviation of the k^{th} variable in X and the correlation between u and the k^{th} variable in X .¹⁸ In order to evaluate the bias we need a guess about σ_u (which can only be estimated if we have an unbiased estimate of β) and ρ_{Xu} . We can instead estimate σ_x .

Bourguignon et al. (2007) start by observing that:

$$\sigma_u^2 = \frac{E(u'u)}{N} + \frac{E}{N} \left[(\widehat{\beta} - \beta)' (X'X) (\widehat{\beta} - \beta) \right]$$

and suggest that if the expected bias is estimated with enough precision σ_u^2 can be proxied by:

$$\sigma_u^2 \cong \widehat{\sigma}_u^2 + \frac{B'X'XB}{N} \quad (14)$$

By plugging (13) into (14), we can obtain the following estimator for σ_u^2 :

$$\sigma_u^2 \cong \frac{\widehat{\sigma}_u^2}{1 - N (\rho_{Xu}\sigma_x)' (X'X)^{-1} (\rho_{Xu}\sigma_x)} \quad (15)$$

We can now substitute (15) in (13) and have the following expression for the bias:

$$B \cong \frac{N (X'X)^{-1} \left(\rho_{Xu}\sigma_x \right) \widehat{\sigma}_u}{\left(1 - N (\rho_{Xu}\sigma_x)' (X'X)^{-1} (\rho_{Xu}\sigma_x) \right)^{\frac{1}{2}}} \quad (16)$$

Equation (16) allows us to compute the bias of the OLS estimator for any vector of correlation coefficients $\rho_{Xu}\sigma_x$. Although the correlation coefficients are unknown, they need to range between -1 and 1 . We can thus build bounds for the coefficients of our variables of interest by randomly drawing a large number of correlation coefficients and applying them to equation (16).

¹⁷The following discussion is close to that in Bourguignon et al. (2007). We repeat it here for ease of reference.

¹⁸The typical element in this vector is $\rho_{x_k u}\sigma_{x_k}$.

In particular, we start with the cross-sectional OLS model of Table 1 column 6 and associate each of our endogenous variables (education, democracy, the interaction between education and democracy, GDP per capita and trade openness) to a random draw from uniform distribution defined over $(0, c)$, substitute these correlations into Equation (16), and use B to recover β . We replicate this exercise 10,000 times for each value of c allowing c to range between -1 and 1 , with increments of 0.1 (for a total of 200,000 simulations). As in Bourguignon et al. (2007), we also impose some restrictions on the values of β . In particular, we drop all draws for which the impact of GDP per capita, Common law, German law, and latitude is non-positive.¹⁹ We then use the remaining observations to look at how the correlation between the endogenous variables and the error term affects the estimation of our variables of interest.

Figure 10 shows how different assumptions about the possible correlation between the error term and each of the endogenous variables affect the coefficient associated with the interaction between democracy and education (the solid line plots the average value and the dashed lines plot the values at the 5th and 95th percentile of the distribution). When we set $\text{corr}=0$ we obtain the same value (0.564) that we obtained with the OLS estimates of Column 6, Table 1. This is not surprising because the OLS estimator assumes $\rho_{Xu} = 0$. The figure also shows that with correlation equal to 0, the whole distribution of the bias collapses to one point.²⁰

The figure also shows that allowing for a negative correlation would strengthen our result of a positive interactive effect between education and democracy. However, we do not think that this is the likely direction of the bias. It is in fact more likely that our endogenous variables are positively correlated with the error term. The graph shows that the average value of the coefficient for the interaction between democracy and education remains positive if the correlation coefficient is lower than 0.4 and that the coefficient at the bottom 5th percentile of the distribution remains positive if the correlation coefficient is lower than 0.4. Therefore, our results are robust to allowing for a fairly severe endogeneity problem. Moreover, Figure 9 shows that the coefficient at the 95th percentile of the distribution is always positive, indicating that the relationship between the quality of government and the interaction between democracy and education is non-negative even if we assume that our estimation suffer from an extreme endogeneity problem.

We can now look at the marginal effect of education on the quality of government. In Section 3.2 we found that this marginal effect is positively sloped and that the marginal effect is positive when the index of democracy is above 6 and positive and statically significant when the index of democracy is above 7. The

¹⁹The restrictions are never binding when c ranges between -0.2 and 0.2 , but they exclude most observation when we allow c to take larger values. For instance, when $c = 1$, only 175 draws (out of 10,000) are retained. We think that these restrictions are reasonable and well grounded in the existing literature. However, the results are basically identical if we do not include these restrictions.

²⁰This should clarify the fact that Figure 9 plots the distribution of the corrected estimators obtained with the Monte Carlo simulation and not the sum of the distributions of each corrected estimator.

marginal effect of education is instead negative when the index of democracy is below 6 and negative and statistically significant when the index of democracy is below 3. Figure 11 plots the marginal effect of education for different values of the democracy index and different assumptions on the correlation between the error term and the endogenous variables. The figure shows that the results are similar to the OLS estimates when the correlations coefficient ranges between -1 and 0.2 .

Next, we look at the marginal effect of democracy on the quality of government. Figure 3, showed that the OLS regressions found a positive effect when average education surpasses 5 years, and a positive and statistically significant effect when average education surpasses 7 years (this is also the mean of the average level of education in our sample). The effect of democracy was instead negative and statistically significant only for countries in which average education is below one year (and in the sample there is only one country with such low level of average education). Again, we find results which are qualitatively and quantitatively similar to those of the OLS regressions if we allow for correlation coefficients which range between -1 and 0.2 (Figure 12). However, we find that that the slopes of the marginal effects become negative and the coefficients are never significant if the correlation between the error term and the endogenous variables is 0.4 or greater.

Summing up, we find that endogeneity would never reverse our results. In the worst case scenario, endogeneity would lead to statistically insignificant estimates of our parameters of interest.

5 Conclusions

In this paper we start from the assumption that the quality of government is a crucial determinant of economic development and then we look at how the interplay between education and democratic institutions affect the quality of elected officials. In doing so, we synthesize recent research that highlights the importance of political institutions as a fundamental factor explaining cross-country differences in income per capita with work that argues that institutional improvements and development is driven by social and human capital.

We provide this synthetic view by proposing a simple theory of candidate selection in which both education and political institutions matter. In the model, politicians of different quality decide whether they should run for office by evaluating the cost of entry into politics and the probability of winning the electoral context. We show that democratic institutions and education complement each other. Democracy leads to the election of better politicians only if the level of education is above a certain threshold. Improvements in the level of education, in turn, can only affect the quality of the elected officials if the cost of entry into politics is not prohibitive.

We bring our model to the data and provide evidence corroborating its main theoretical predictions. In particular, we show that: (i) the interaction between democracy and education is always a positively and significantly correlated with

the quality of government; (ii) the correlation between democracy and quality of government is statistically significant only in countries with high levels of education; and (iii) that the marginal effect of education is positive and statistically significant in countries with high levels of democracy. We also run a set of Monte Carlo simulations which show that our results are not driven by reverse causality.

By looking explicitly at the interaction between democracy and education, we show how these two variables complement each other in the selection of high quality policymakers which ultimately guarantee good governance.

6 References

Acemoglu, D., and J. Robinson (2000), "Why Did the West Extend the Franchise? Democracy, Inequality, and Growth in Historical Perspective," *Quarterly Journal of Economics*, 115(4), 1167-99.

Acemoglu, D., and J. Robinson (2001), "A Theory of Political Transitions," *American Economic Review*, 91(4), 938-63.

Acemoglu, D., Johnson, S., and J. Robinson (2001), "The Colonial Origins of Comparative Development: An Empirical Investigation," *American Economic Review*, 91(5), 1369-1401.

Acemoglu, D., Johnson, S., Robinson, J. and P. Yared (2005), "From Education To Democracy?," *American Economic Review*, 2005, 95(2), 44-49.

Acemoglu, D., Ticchi, D., and A. Vindigni (2011), "Emergence and Persistence of Inefficient States," *Journal of the European Economic Association* forthcoming.

Ades, A., and R. Di Tella (1999), "Rents, Competition, and Corruption," *American Economic Review*, 89(4), 982-993.

Arellano, M., and S. Bond (1991), "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations," *Review of Economic Studies*, 58(2), 277-97.

Arellano, M., and O. Bover (1995), "Another look at the instrumental variable estimation of error-components models," *Journal of Econometrics*, 68(1), 29-51.

Bai, C.-E., and Wei, S.-J. (2001), "The quality of bureaucracy and capital account policies," *World Bank working paper series*, No. 2575. Washington: World Bank, Development Research Group.

Barro, R.J. (1996), "Democracy and Growth," *Journal of Economic Growth*, 1(1), 1-27.

Barro, R.J. (2000), "Rule of Law, Democracy, and Economic Performance," in *2000 Index of Economic Freedom*, ed. by M. Miles, and et al. The Heritage Foundation, Washington.

Barro, R.J., and J.-W. Lee (2010), "A New Data Set of Educational Attainment in the World, 1950–2010," *NBER Working Paper* No. 15902.

Besley, T. (1995), "Property Rights and Investment Incentives: Theory and Evidence from Ghana," *Journal of Political Economy*, 103(5), 903-937.

- Bobba, M., and D. Coviello (2007), "Weak instruments and weak identification, in estimating the effects of education, on democracy," *Economics Letters*, 96(3), 301-306.
- Blundell, R. and S. Bond. (1998), "Initial conditions and moment restrictions in dynamic panel data models," *Journal of Econometrics*, 87(1), 115-143.
- Bourguignon, F., Ferreira, F., and M. Menendez (2007), "Inequality of Opportunities in Brazil," *Review of Income Wealth*, 53(4), 585-618.
- Carbone, G. (2009), "The Consequences of Democratization," *Journal of Democracy*, 20(2), 123-137.
- Castelló-Climent, A. (2008), "On the distribution of education and democracy," *Journal of Development Economics*, 87, 179–190.
- Cervellati, M., Fortunato, P., and U. Sunde (2008), "Hobbes to Rousseau: Inequality, Institutions and Development", *Economic Journal*, 118(531), 1354-1384.
- Chong, A., and M. Gradstein (2009), "Education and Democratic Preferences", RES Working Papers 4627, Inter-American Development Bank, Research Department.
- Chong, A., and L. Zanforlin (2000), "Law tradition and institutional quality: some empirical evidence," *Journal of International Development*, 12(8), 1057-1068.
- Djankov, S., Glaeser, E., La Porta, R., Lopez-de-Silanes, F., and A. Shleifer (2003), "The new comparative economics," *Journal of Comparative Economics*, Elsevier, vol. 31(4), 595-619.
- Djankov, S., Glaeser, E., La Porta, R., Lopez-de-Silanes, F., and A. Shleifer (2010), "Disclosure by Politicians," *American Economic Journal: Applied Economics*, vol. 2: 179–209.
- Finan, F. and L. Schecter (2009), "Vote-buying and reciprocity," BREAD Working Paper No. 214.
- Glaeser, E.L., La Porta, R., Lopez-de-Silanes, F., and A. Shleifer (2004), "Do Institutions Cause Growth?," *Journal of Economic Growth*, 9(3), 271-303.
- Glaeser, E.L., Ponzetto, M., and A. Shleifer (2006), "Why does democracy need education?," *Journal of Economic Growth*, 12(2), 77-99.
- Gradstein, M. (2004), "Governance and growth," *Journal of Development Economics*, 73, 505–518.
- Horowitz, D. L. (1985), "Ethnic Groups in Conflict," Berkeley: University of California Press.
- Huntington, S., and J. Nelson (1976), "No Easy Choice: Political Participation in Developing Countries," Cambridge, MA: Harvard University Press.
- Jaimovich, D., and U. Panizza (2006), "Procyclicality or Reverse Causality?," *RES Working Papers* 4508, Inter-American Development Bank, Research Department.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., and R. Vishny (1999), "The quality of government," *Journal of Law, Economics, and Organization*, 5(1), 222-279.
- Lipset, S. M. (1959), "Some social requisites of democracy: economic development and political legitimacy," *American Political Science Review*, 53(3),

69-105.

Lipset, S. M. (1960), *Political Man: the Social Bases of Politics*. Garden City, New York: Doubleday.

Papaioannou, E., and G. Siourounis (2008), "Democratization and Growth," *Economic Journal*, 118, 1520-1551.

Panizza, U. (2001), "Electoral Rules, Political Systems, and Institutional Quality," *Economics and Politics*, 13(3), 311-342.

Persson, T. and G. Tabellini (2006), "Democracy and development: The devil in the details." *American Economic Review*, 96, 319-324.

Persson, T. and G. Tabellini (2008), "The Growth Effect of Democracy: Is it heterogeneous and how can it be estimated?," In Helpman, E. ed., *Institutions and Economic Performance*, Harvard University Press.

Persson, T. and G. Tabellini (2009), "Democratic Capital: the nexus of political and economic change," *American Economic Journal: Macroeconomics*, 1(2), 88-126.

Posner, D., Eifert, B., and E. Miguel (2010), "Political competition and ethnic identification in Africa," *American Journal of Political Science*, 54(2), 494-510.

Przeworski, A., Alvarez, M.E., Cheibub, J.A., and F. Limongi (2000), *Democracy and Development. Political Institutions and Well-Being in the World, 1950-1990*, Cambridge: Cambridge University Press.

Rigobon, R., and D. Rodrik (2005), "Rule of Law, Democracy, Openness and Income: Estimating the Interrelationships," *Economics of Transition*, 13(3), 533-564.

Rivera-Batiz, F. (2002), "Democracy, governance and economic growth: Theory and evidence", *Review of Development Economics*, 6(2), 225-247.

Rodrik, D., A. Subramanian, and F. Trebbi (2004), "Institutions Rule: The Primacy of Institutions over Geography and Integration in Economic Development," *Journal of Economic Growth*, 9, 131-165.

Rodrik, D., and R. Wacziarg (2005), "Do Democratic Transitions Produce Bad Economic Outcomes?," *American Economic Review*, 95(3), 50-55.

Sen, A. (2000), *Development as Freedom*, New York: Alfred A. Knopf.

Sunde, U., Cervellati, M., and P. Fortunato (2008), "Are All Democracies Equally Good? The Role of Interactions Between Political Environment and Inequality for Rule of Law", *Economics Letters* 99(3), 552-556, 2008.

Vanhanen, T. (2003a), "Democratization and power resources 1850-2000," University of Tampere. Department of Political Science and International Relations, Finnish Social Science Data Archive, Tampere. Finland.

Vanhanen, T. (2003b), *Democratization: A Comparative Analysis of 170 Countries*, London: Routledge.

Windmeijer, F. (2005), "A finite sample correction for the variance of linear efficient two-step GMM estimators," *Journal of Econometrics*, 126(1), 25-51.

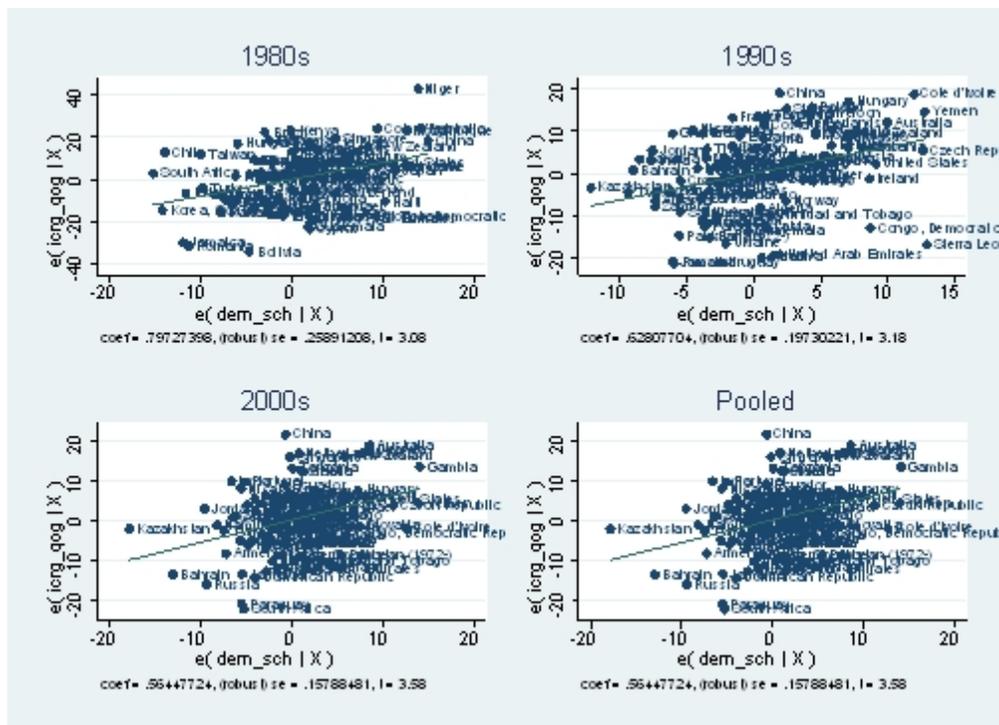


Figure 1. Partial correlation plots.

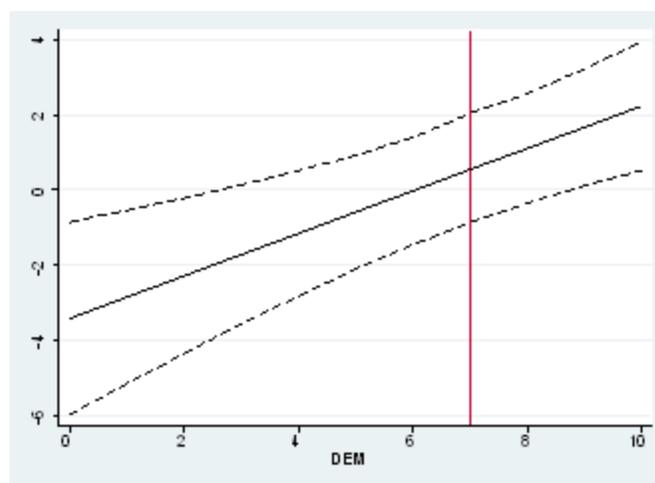


Figure 2. $\partial QOG / \partial EDUC$, cross country regressions, year 2000.

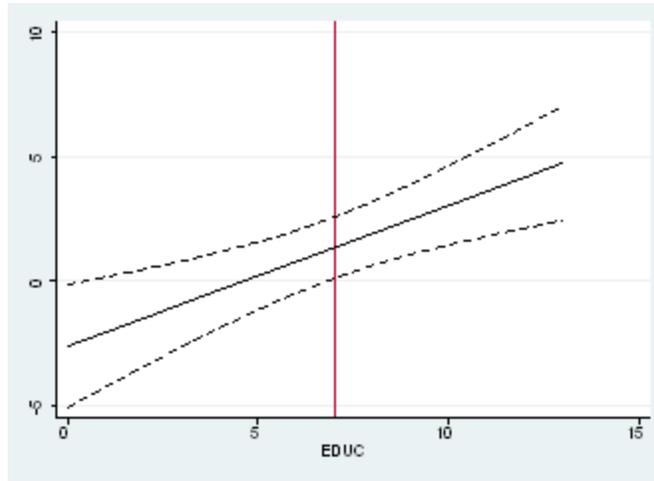


Figure 3. $\partial QOG/\partial DEM$, cross country regressions, year 2000.

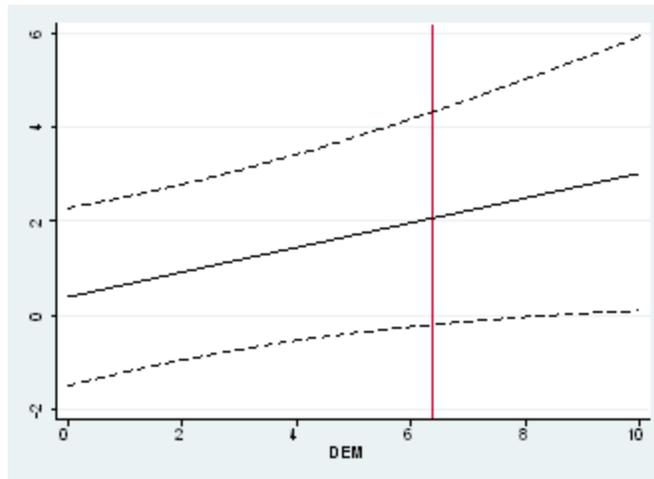


Figure 4. $\partial QOG/\partial EDUC$, Fixed effects panel regression, 10-year.

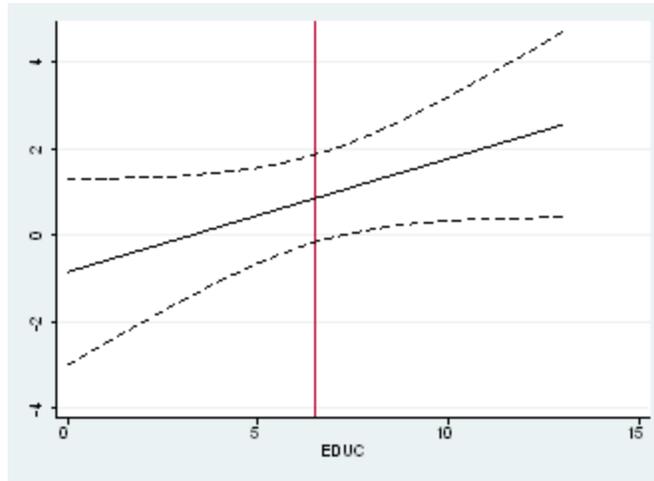


Figure 5. $\partial QOG/\partial DEM$, Fixed effects panel regression, 10-year.

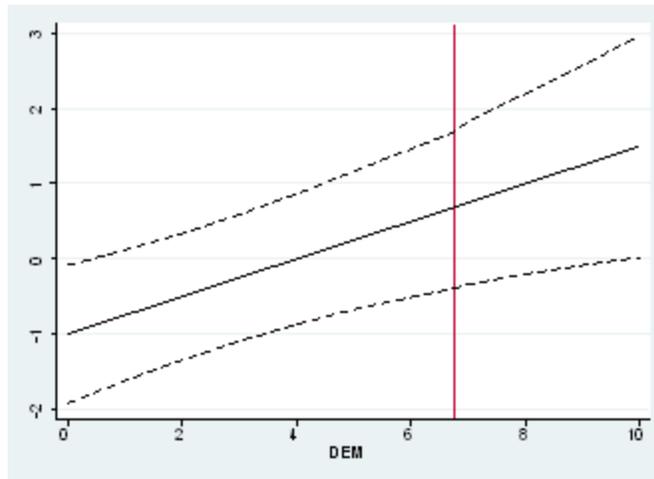


Figure 6. $\partial QOG/\partial EDUC$, Fixed effects panel regression, 5-year.

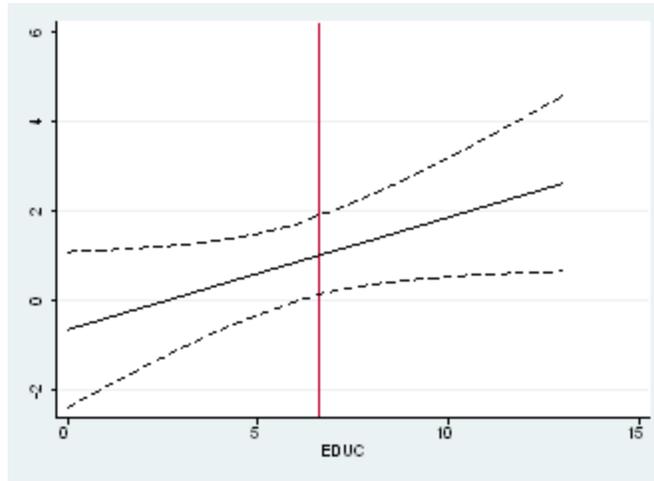


Figure 7. $\partial QOG/\partial DEM$, Fixed effects panel regression, 5-year.

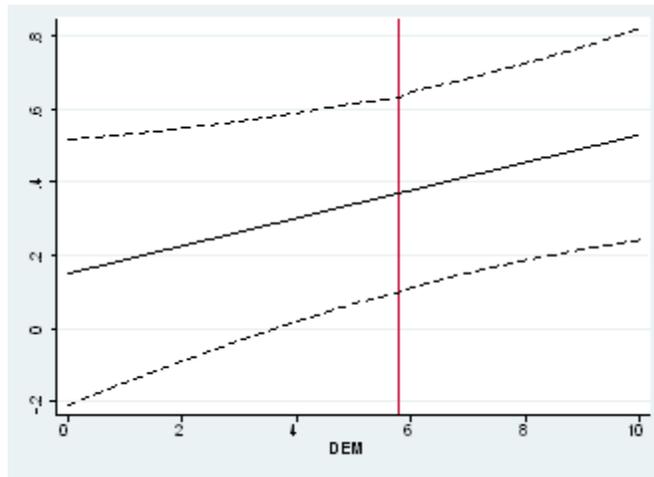


Figure 8. $\partial QOG/\partial EDUC$, Fixed effects panel regression, 1-year.

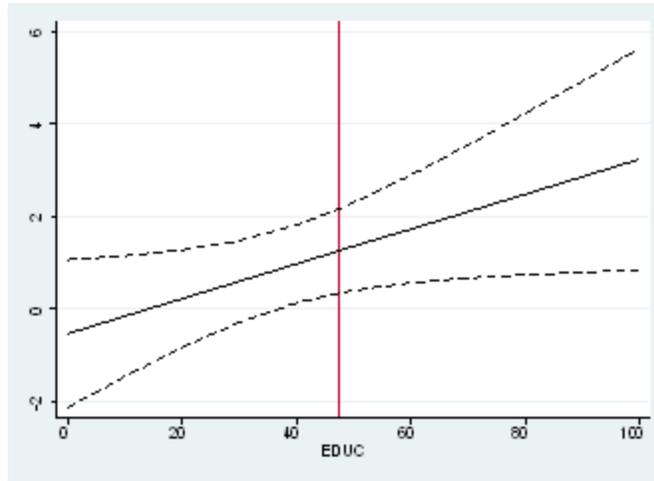


Figure 9. $\partial QOG / \partial DEM$, Fixed effects panel regression, 1-year.

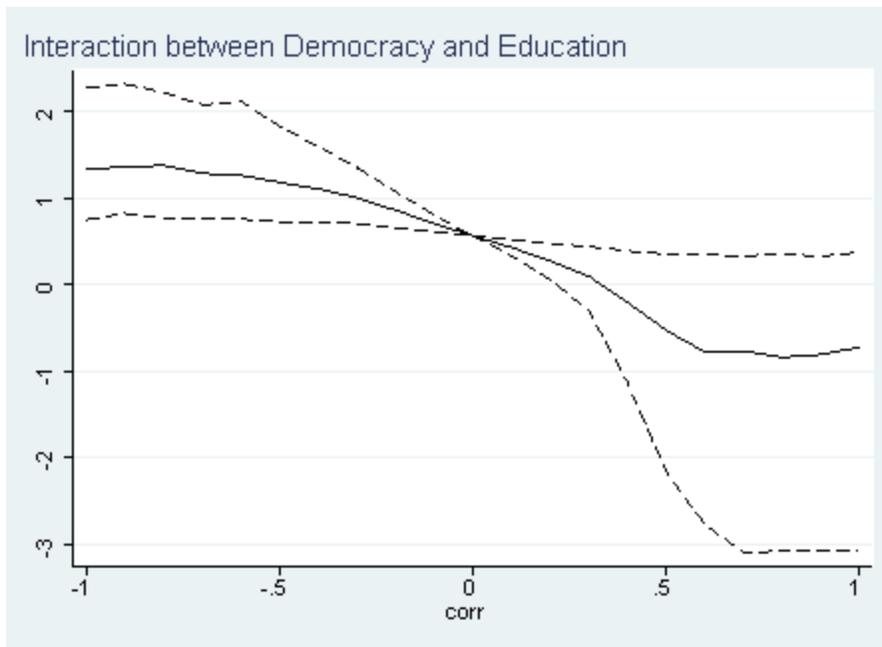


Figure 10.

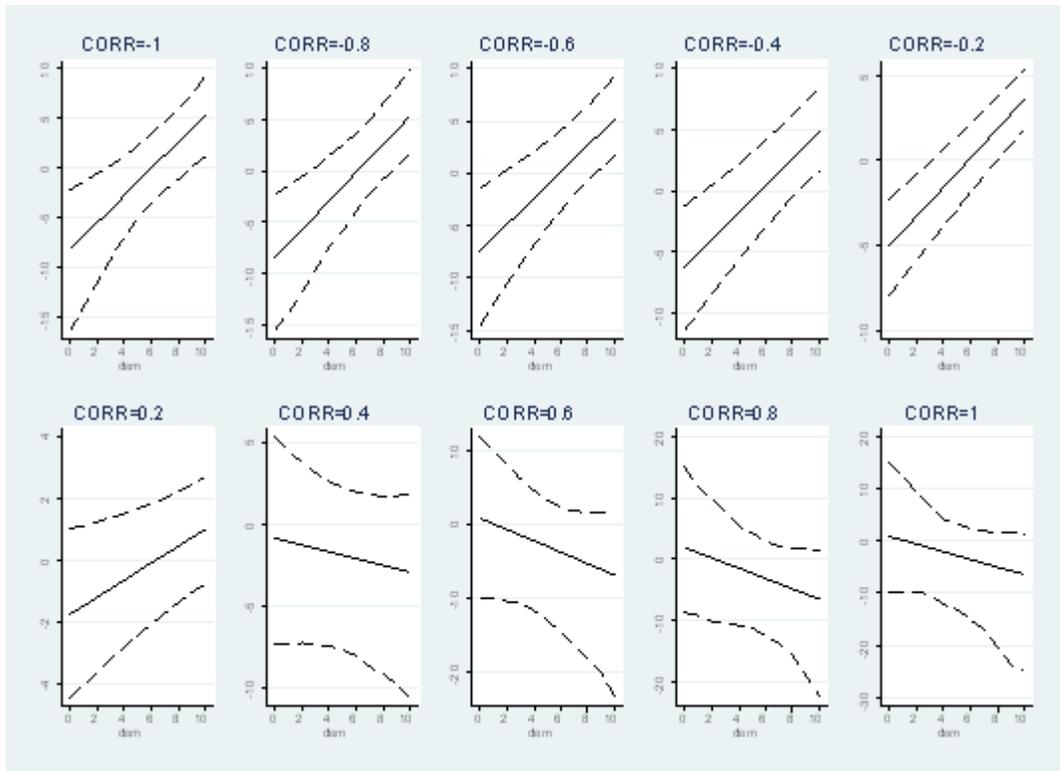


Figure 11.

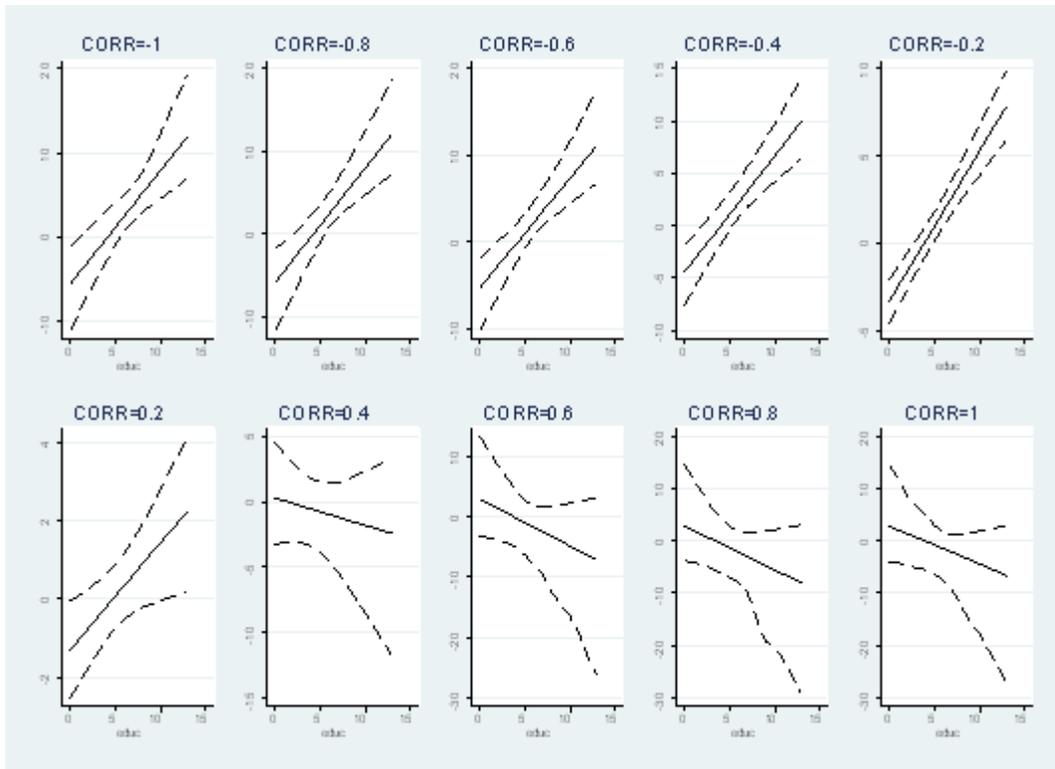


Figure 12.

Dependent variable: Quality of Government						
	(1)	(2)	(3)	(4)	(5)	(6)
	1980s		1990s		2000s	
DEMOC	2.832*** (0.78)	3.260*** (0.79)	1.188 (0.76)	1.661** (0.70)	1.245* (0.63)	1.652*** (0.63)
EDUC	-0.46 (1.41)	-1.684 (1.35)	0.577 (0.89)	0.00494 (0.94)	0.834 (0.71)	0.606 (0.71)
DEM*EDUC		0.797*** (0.26)		0.628*** (0.20)		0.564*** (0.16)
OPEN	0.0637 (0.05)	0.0777* (0.04)	0.0241 (0.03)	0.0362 (0.03)	0.0575* (0.03)	0.0592** (0.03)
ln(GDP PC)	7.972** (3.08)	8.854*** (3.01)	6.389*** (2.00)	7.271*** (2.06)	5.274*** (1.58)	6.294*** (1.62)
ELF	22.01** (9.36)	19.39** (8.35)	0.742 (6.43)	1.221 (5.68)	3.895 (4.99)	5.279 (4.68)
COMMON LAW	-3.017 (11.61)	-18.78* (11.26)	14.11*** (4.43)	10.02** (4.26)	22.89*** (4.05)	19.77*** (4.15)
FRENCH LAW	-3.673 (11.30)	-21.28* (11.01)	7.145 (5.51)	2.642 (5.33)	11.90*** (4.27)	9.029** (4.24)
GERMAN LAW	9.037 (12.29)	-4.954 (11.47)	16.58*** (5.39)	12.58** (4.83)	23.14*** (4.52)	19.17*** (4.45)
SCAND. LAW	-6.176 (20.20)	-11.55 (18.07)	10.55 (8.10)	8.476 (7.20)	30.80*** (7.49)	30.47*** (7.29)
CATHOLIC	-0.129* (0.07)	-0.0925 (0.06)	-0.0371 (0.04)	-0.0253 (0.04)	0.0467 (0.04)	0.0395 (0.04)
PROTESTANT	0.144 (0.19)	-0.0207 (0.18)	0.0779 (0.08)	0.0289 (0.08)	-0.00877 (0.07)	-0.0568 (0.07)
MUSLIM	-0.0662 (0.08)	-0.0702 (0.07)	-0.00809 (0.07)	-0.0222 (0.06)	0.0549 (0.06)	0.0427 (0.05)
abs(Latitude)	42.24*** (14.92)	31.91** (13.77)	37.82*** (9.84)	32.18*** (9.24)	44.88*** (8.72)	36.91*** (8.97)
Constant	-46.68** (21.04)	-27.44 (23.98)	-28.47** (13.81)	-23.54 (15.56)	-44.91*** (11.13)	-36.29*** (11.82)
Observations	88	88	104	104	106	106
R-squared	0.683	0.728	0.77	0.797	0.823	0.844
DEMO+1SD*SCH		5.652		3.545		3.346
p value		0.00		0.00		0.00
DEMO-1SD*SCH		0.868		-0.223		-0.041
p value		0.361		0.81		0.954
SCH+1SDEMOC		0.708		1.889		2.30
p value		0.586		0.036		0.01
SCH-1SDEMOC		-4.076		-1.879		-1.087
p value		0.025		0.151		0.192

Table 1: Cross-country OLS regressions

Dependent variable: Quality of Government					
	(1)	(2)	(3)	(4)	(5)
	Alternative measure of education		Robust regressions		
	1980s	1990s	1980s	1990s	2000s
DEMOC	3.058*** (0.66)	1.270** (0.61)	3.410*** (0.89)	1.641** (0.70)	2.019*** (0.55)
EDUC1	-0.178 (0.12)	0.0267 (0.09)			
DEM*EDUC1	0.103*** (0.02)	0.0490** (0.02)			
EDUC			-1.878 (1.47)	-0.818 (0.88)	0.821 (0.73)
DEM*EDUC1			0.762*** (0.26)	0.764*** (0.19)	0.531*** (0.17)
OPEN	0.0649 (0.05)	0.0106 (0.03)	0.0785* (0.05)	0.0383 (0.03)	0.0536** (0.02)
ln(GDP PC)	8.707*** (2.19)	9.276*** (1.71)	9.515*** (3.02)	8.304*** (1.87)	5.612*** (1.62)
ELF	18.27** (8.26)	0.0596 (5.51)	19.61** (9.06)	0.602 (5.20)	7.179 (4.47)
COMMON LAW	-22.51*** (7.60)	4.608 (4.28)	-19.64 (12.51)	9.313* (5.19)	21.07*** (4.32)
FRENCH LAW	-22.03*** (7.22)	0.826 (4.75)	-22.49* (12.33)	0.28 (5.39)	10.09** (4.47)
GERMAN LAW	-13.26* (6.81)	7.521 (4.85)	-7.76 (12.71)	10.36 (6.30)	20.76*** (5.31)
SCAND. LAW	-22.83* (13.55)	0.445 (7.46)	-15.34 (19.14)	6.246 (9.20)	31.70*** (8.08)
CATHOLIC	-0.106* (0.06)	-0.0655* (0.04)	-0.0954 (0.08)	-0.0224 (0.04)	0.0559 (0.04)
PROTESTANT	0.0818 (0.14)	0.111 (0.08)	0.00408 (0.17)	0.0321 (0.08)	-0.0504 (0.07)
MUSLIM	-0.0801 (0.07)	-0.0452 (0.05)	-0.0795 (0.09)	-0.0451 (0.06)	0.0771 (0.05)
abs(Latitude)	28.46** (12.82)	20.18* (10.69)	31.63* (17.35)	31.51*** (11.03)	38.88*** (9.56)
Constant	-23.88 (16.97)	-31.19** (13.66)	-31.61 (24.80)	-30.25** (14.44)	-33.57*** (12.66)
Observations	109	127	88	104	106
R-squared	0.708	0.773	0.684	0.775	0.834

Table 2: Cross-country regressions: Sensitivity Analysis

Dependent variable: Quality of Government				
	(1)	(2)	(3)	(4)
	Random effects		Fixed effects	
DEMOC	1.121** (0.45)	1.337*** (0.42)	0.708 (0.57)	0.846* (0.51)
EDUC	0.935 (0.71)	0.932 (0.71)	1.871 (1.52)	2.068 (1.47)
DEM*EDUC		0.288** (0.13)		0.263* (0.15)
OPEN	0.0342 (0.03)	0.0371 (0.04)	-0.0217 (0.06)	-0.0257 (0.06)
ln(GDP PC)	6.037*** (1.55)	5.743*** (1.56)	3.781 (3.29)	0.44 (3.35)
ELF	6.061 (5.80)	5.813 (5.45)		
COMMON LAW	18.14*** (4.18)	17.06*** (4.11)		
FRENCH LAW	10.54** (4.97)	9.172* (4.73)		
GERMAN LAW	21.78*** (5.32)	20.61*** (4.94)		
SCAND. LAW	21.24*** (7.93)	22.32*** (7.62)		
CATHOLIC	-0.0128 (0.04)	-0.0073 (0.04)		
PROTESTANT	0.0466 (0.08)	0.00824 (0.08)		
MUSLIM	0.0052 (0.05)	0.00705 (0.05)		
abs(Latitude)	40.55*** (8.92)	37.72*** (8.73)		
Constant	-44.38*** (11.40)	-28.25** (11.80)	8.899 (30.73)	53.42* (28.31)
Observations	298	298	304	304
R-squared			0.189	0.212
Number of countries	106	106	109	109

Table 3: Panel data regressions: 10-year periods

Dependent variable: Quality of Government				
	(1)	(2)	(3)	(4)
	Random effects		Fixed effects	
DEMOC	0.871** (0.436)	1.247*** (0.368)	0.694 (0.512)	1.024** (0.445)
EDUC	0.585 (0.678)	0.601 (0.671)	0.649 (1.378)	0.646 (1.332)
DEM*EDUC		0.292*** (0.109)		0.250* (0.126)
OPEN	0.0135 (0.033)	0.0177 (0.034)	-0.0459 (0.048)	-0.0481 (0.047)
ln(GDP PC)	6.891*** (1.419)	6.503*** (1.416)	5.979* (3.021)	3.729 (2.945)
ELF	3.971 (5.533)	3.93 (5.146)		
COMMON LAW	17.75*** (3.933)	16.41*** (3.837)		
FRENCH LAW	8.755* (4.670)	7.257 (4.468)		
GERMAN LAW	19.82*** (4.850)	18.58*** (4.564)		
SCAND. LAW	19.76*** (7.579)	20.52*** (7.351)		
CATHOLIC	0.00309 (0.037)	0.00778 (0.035)		
PROTESTANT	0.0537 (0.077)	0.0187 (0.074)		
MUSLIM	0.000656 (0.048)	0.00917 (0.045)		
abs(Latitude)	39.65*** (8.710)	36.20*** (8.475)		
Constant	-40.59*** (11.010)	-27.29** (11.590)	-2.276 (28.130)	24.93 (25.210)
Observations	488	488	496	496
R-squared			0.19	0.209
Number of countries	106	106	109	109

Table 4: Panel data regressions: 5-year periods

Dependent variable: Quality of Government				
	(1)	(2)	(3)	(4)
	Random effects		Fixed effects	
DEMOC	1.120*** (0.430)		1.006** (0.452)	1.256*** (0.459)
EDUC	0.233** (0.115)		0.329** (0.141)	0.365*** (0.136)
DEM*EDUC		0.0413** (0.017)		0.0378** (0.018)
OPEN	0.0457** (0.020)	0.0420** (0.020)	0.0584** (0.025)	0.0523** (0.023)
ln(GDP PC)	7.340*** (1.834)	6.498*** (1.755)	7.285** (3.033)	5.998** (2.913)
ELF	7.341 (6.183)	6.226 (5.991)		
COMMON LAW	7.594* (4.569)	4.244 (4.690)		
FRENCH LAW	4.289 (4.437)	0.871 (4.516)		
GERMAN LAW	12.33** (5.578)	8.737 (5.315)		
SCAND. LAW	5.795 (8.118)	1.769 (8.383)		
CATHOLIC	-0.0742* (0.040)	-0.0752* (0.040)		
PROTESTANT	0.133 (0.086)	0.13 (0.091)		
MUSLIM	-0.0171 (0.049)	0.00251 (0.049)		
abs(Latitude)	24.52** (10.750)	18.10* (10.800)		
Constant	-42.29*** (13.560)	-14.56 (14.080)	-32.1 (25.920)	-1.247 (24.710)
Observations	1925	1925	1943	1943
R-squared			0.11	0.128
Number of countries	127	127	129	129

Table 5: Panel data regressions: annual data

Dependent variable: Quality of Government

	(1)	(2)	(3)	(4)
	RE	RE, IV	FE	FE, IV
DEMOC	1.587*** (0.156)	1.721*** (0.293)	1.480*** (0.161)	1.669*** (0.310)
EDUC	0.451*** (0.047)	0.411*** (0.080)	0.518*** (0.052)	0.481*** (0.078)
DEM*EDUC	0.0412*** (0.006)	0.0443*** (0.008)	0.0359*** (0.007)	0.0397*** (0.009)
OPEN	0.0525*** (0.015)	0.0224 (0.058)	0.0599*** (0.018)	0.0136 (0.064)
GROWTH	9.601** (4.330)	17.4 (205.800)	8.829** (4.308)	14.7 (137.400)
ELF	4.661 (5.715)	7.476 (8.016)		
COMMON LAW	11.28** (4.762)	10.80** (4.986)		
FRENCH LAW	4.721 (4.858)	4.89 (5.056)		
GERMAN LAW	18.86*** (6.700)	17.71** (7.144)		
SCAND. LAW	12.01 (10.700)	10.37 (11.310)		
CATHOLIC	-0.0366 (0.050)	-0.0323 (0.053)		
PROTESTANT	0.0916 (0.101)	0.117 (0.116)		
MUSLIM	0.0584 (0.052)	0.0599 (0.055)		
abs(Latitude)	29.93*** (9.753)	29.25*** (10.510)		
Constant	31.18*** (6.680)	30.50*** (7.087)	50.99*** (1.229)	52.72*** (2.675)
Observations	1667	1667	1683	1683
Number of countries	116	116	118	118
R-squared			0.153	

Table 6: Panel data regressions, instrumenting GDP growth

Dependent variable: Quality of Government			
	(1)	(2)	(3)
	DIF-GMM	SYS-GMM	SYS-GMM
L.QOG	1.142*** (0.029)	1.152*** (0.029)	1.145*** (0.030)
L2.QOG	-0.323*** (0.026)	-0.312*** (0.025)	-0.313*** (0.025)
DEMOC	0.318** (0.126)	0.403*** (0.115)	0.392*** (0.133)
DEM*EDUC	0.00703* (0.004)	0.00354 (0.004)	0.0038 (0.004)
EDUC	0.0779** (0.032)	0.0786*** (0.021)	0.0648** (0.028)
OPEN	-0.00143 (0.011)	0.0033 (0.008)	-1.76E-05 (0.010)
ln(GDP PC)	1.045 (0.851)	0.269* (0.143)	0.972 (0.683)
ELF			-0.618 (4.519)
COMMON LAW			0.177 (4.286)
FRENCH LAW			0.0592 (4.306)
GERMAN LAW			-6.057 (5.937)
SCAND. LAW			-3.501 (10.790)
CATHOLIC			-0.0491 (0.032)
PROTESTANT			-0.0148 (0.098)
MUSLIM			-0.0633* (0.034)
abs(Latitude)			-2.498 (9.048)
Observations	1455	1574	1561
Number of countries	118	118	117
AR1 test (pvalue)	0.00	0.00	0.00
AR2 test (pvalue)	0.16	0.13	0.12
Sargan test (pvalue)	0.12	0.02	0.02

Table 7: Panel data regressions, dynamic panel

	Obs	Mean	Std. Dev.	Min	Max
1980s					
QOG	109	51.65	25.02	5.56	100
DEMOC	109	4.79	3.49	0.25	10
EDUC	88	5.15	2.85	0.5	12.04
EDUC1	109	42.81	21.6	3.5	99.5
OPEN	109	64.77	44.57	13.11	359.98
ln(GDP PC)	109	8.54	1.1	6.34	10.85
1990s					
QOG	127	57.9	20.96	10.65	100
DEMOC	127	6.07	3.03	0.08	10
EDUC	106	7.53	2.83	0.98	12.73
EDUC1	127	50.81	21.14	9.5	99.5
OPEN	127	72.4	41.5	2.95	337.88
ln(GDP PC)	127	8.62	1.15	5.73	10.59
2000s					
QOG	106	55.48	20.28	11.11	100
DEMOC	106	7.11	2.83	0.19	10
EDUC	106	7.53	2.83	0.98	12.73
OPEN	106	86.24	47.39	25.14	407.64
ln(GDP PC)	106	8.98	1.15	5.89	10.7
Variables with no time variation					
ELF	127	0.47	0.27	0	1
COMMON LAW	127	0.3	0.46	0	1
FRENCH LAW	127	0.45	0.5	0	1
GERMAN LAW	127	0.05	0.21	0	1
SCAND. LAW	127	0.03	0.18	0	1
CATHOLIC	127	31.25	36.1	0	96.9
PROTESTANT	127	11.69	20.31	0	97.8
MUSLIM	127	24.17	36.56	0	99.8
abs(Latitude)	127	0.3	0.19	0	0.71

Table 8: Summary statistics for cross-country estimates

Variable		Mean	Std. Dev.	Min	Max	Observations
10-year panel						
QOG	overall	57.36	21.8	9.1	100	N = 304
	between		20.38	12.13	99.85	n = 109
	within		7.29	35.52	83.44	T-bar = 2.79
DEMOC	overall	6.38	3.17	0.08	10	N = 304
	between		2.85	0.24	10	n = 109
	within		1.29	1.15	9.68	T-bar = 2.79
EDUC	overall	6.5	2.97	0.44	12.73	N = 304
	between		2.87	0.82	12.38	n = 109
	within		0.91	4.37	8.72	T-bar = 2.79
OPEN	overall	75.63	44.92	13.11	407.64	N = 304
	between		42.54	19.98	368.5	n = 109
	within		12.34	22.24	120.2	T-bar = 2.79
ln(GDP PC)	overall	8.88	1.1	5.89	11.13	N = 304
	between		1.09	6.02	10.94	n = 109
	within		0.19	8.2	9.56	T-bar = 2.79
5-year panel						
QOG	overall	58.13	21.61	9.81	100	N = 496
	between		20.02	12.5	99.82	n = 109
	within		7.27	34.99	89.38	T-bar = 4.55
DEMOC	overall	6.6	3.11	0	10	N = 496
	between		2.87	0.2	10	n = 109
	within		1.17	0.31	10.15	T-bar = 4.55
EDUC	overall	6.76	2.94	0.28	13.09	N = 496
	between		2.87	0.88	12.47	n = 109
	within		0.79	4.56	8.95	T-bar = 4.55
OPEN	overall	76.75	45.69	12.63	443.23	N = 496
	between		42.87	20.27	369.47	n = 109
	within		13.34	15.55	150.52	T-bar = 4.55
ln(GDP PC)	overall	8.9	1.12	5.87	11.03	N = 496
	between		1.1	6	10.82	n = 109
	within		0.18	8.18	9.63	T-bar = 4.55
Annual panel						
QOG	overall	55.76	23.59	4.17	100	N = 1943
	between		21.15	12.83	100	n = 129
	within		9.1	25.15	89.44	T-bar = 15.06
DEMOC	overall	5.58	3.43	0	10	N = 1943
	between		3.09	0.22	10	n = 129
	within		1.45	-0.14	10.87	T-bar = 15.06
EDUC1	overall	47.39	21.63	3.5	99.5	N = 1943
	between		20.96	8.19	99.5	n = 129
	within		4.31	34.15	56.65	T-bar = 15.06
OPEN	overall	67.89	44.26	1.98	376.3	N = 1943
	between		40.76	9.97	338.39	n = 129
	within		16.12	-68.6	246.59	T-bar = 15.06
ln(GDP PC)	overall	8.61	1.16	5.03	11.01	N = 1943
	between		1.13	6.29	10.75	n = 129
	within		0.16	7.35	9.64	T-bar = 15.06

Table 9: Summary statistics for Panel data

Variable	Description and Sources
QOG	ICRG indicator of Quality of Government obtained as the mean value of the ICRG variables "Corruption", "Law and Order" and "Bureaucracy Quality", scaled 0-1. Higher values indicate higher quality of government. Downloaded from www.qog.pol.gu.se (the name of the variable in the QOG dataset is QOG)
DEMOC	Index of democracy obtained as an average of the Polity and Freedom House indexes of democracy. Downloaded from www.qog.pol.gu.se (the name of the variable in the QOG dataset is fh polity2)
EDUC	Average numbers of years of education. Source: Barro and Lee (2010)
EDUC1	Index of Knowledge Distribution (Vanhanen 2003a; 2003b). Downloaded from www.qog.pol.gu.se (the name of the variable in the QOG dataset is van knowdist)
OPEN	Trade openness (source: Penn World tables)
ln(GDP PC)	Log GDP real per capita in PPP (source: Penn World Tables)
ELF	Ethnic Fractionalization from Fearon (2003). Downloaded from www.qog.pol.gu.se (the name of the variable in the QOG dataset is fe etfra)
COMMON LAW	Dummy variable that takes a value of one for countries with a common law legal origin. Source La Porta et al. (1998)
FRENCH LAW	Dummy variable that takes a value of one for countries with a French legal origin. Source La Porta et al. (1998)
GERMAN LAW	Dummy variable that takes a value of one for countries with a German legal origin. Source La Porta et al. (1998)
SCAND. LAW	Dummy variable that takes a value of one for countries with a Scandinavian legal origin. Source La Porta et al. (1998)
SOC. LAW	Dummy variable that takes a value of one for countries with a socialist legal origin. Source La Porta et al. (1998)
CATHOLIC	Share of Catholics in the population. Source La Porta et al. (1998)
PROTESTANT	Share of Protestant in the population. Source La Porta et al. (1998)
MUSLIM	Share of Muslim in the population. Source La Porta et al. (1998)
abs(Latitude)	Absolute value of the latitude of the capital city, divided by 90 (to take values between 0 and 1). Source: La Porta et al. (1998)
RSHOCK	Real external shock. Source: Jaimovich and Panizza (2006)

Table 10: **Definition of variables and sources**

Recent working papers

The complete list of working papers is can be found at <http://polis.unipmn.it/pubbl>

*Economics Series

**Political Theory Series

° Al.Ex Series

†Territories Series

° Quaderni CIVIS

- 2011 n.182* Piergiuseppe Fortunato and Ugo Panizza: *Democracy, education and the quality of government*
- 2011 n.181* Franco Amisano and Alberto Cassone: *Economic sustainability of an alternative form of incentives to pharmaceutical innovation. The proposal of Thomas W. Pogge*
- 2011 n.180* Cristina Elisa Orso: *Microcredit and poverty. An overview of the principal statistical methods used to measure the program net impacts*
- 2011 n.179** Noemi Podestà e Alberto Chiari: *La qualità dei processi deliberativi*
- 2011 n.178** Stefano Procacci: *Dalla Peace Resarch alla Scuola di Copenhagen. Sviluppi e trasformazioni di un programma di ricerca*
- 2010 n.177* Fabio Privileggi: *Transition dynamics in endogenous recombinant growth models by means of projection methods*
- 2010 n.176** Fabio Longo and Jörg Luther: *Costituzioni di microstati europei: I casi di Cipro, Liechtenstein e Città del Vaticano*
- 2010 n.175* Mikko Välimäki: *Introducing Class Actions in Finland: an Example of Lawmaking without Economic Analysis*
- 2010 n.174* Matteo Migheli: *Do the Vietnamese support Doi Moi?*
- 2010 n.173* Guido Ortona: *Punishment and cooperation: the "old" theory*
- 2010 n.172* Giovanni B. Ramello: *Property rights and externalities: The uneasy case of knowledge*
- 2010 n.171* Nadia Fiorino and Emma Galli: *An analysis of the determinants of corruption: Evidence from the Italian regions*
- 2010 n.170* Jacopo Costa and Roberto Ricciuti: *State capacity, manufacturing and civil conflict*
- 2010 n.169* Giovanni B. Ramello: *Copyright & endogenous market structure: A glimpse from the journal-publishing market*

- 2010 n.168* Mario Ferrero: *The cult of martyrs*
- 2010 n.167* Cinzia Di Novi: *The indirect effect of fine particulate matter on health through individuals' life-style*
- 2010 n.166* Donatella Porrini and Giovanni B. Ramello: *Class action and financial markets: Insights from law and economics*
- 2010 n.165** Corrado Malandrino: *Il pensiero di Roberto Michels sull'oligarchia, la classe politica e il capo carismatico. Dal Corso di sociologia politica (1927) ai Nuovi studi sulla classe politica (1936)*
- 2010 n.164^e Matteo Migheli: *Gender at work: Productivity and incentives*
- 2010 n.163^Q Gian-Luigi Bulsei and Noemi Podestà (Eds): *Imprese differenti. Le organizzazioni cooperative tra crisi economica e nuovo welfare*
- 2010 n.162* Claudia Cusinello and Franco Amisano: *Analysis for the implementation of a sustainable transport model in the eastern Piedmont county of Alessandria, Italy*
- 2010 n.161* Roberto Ricciuti: *Accumulazione del capitale e crescita economica tra Italia liberale e regime fascista*
- 2010 n.160* Carla Marchese and Giovanni B. Ramello: *In the beginning was the Word. Now is the Copyright*
- 2010 n.159^e Peter Lewisch, Stefania Ottone and Ferruccio Ponzano: *Free-riding on altruistic punishment? An experimental comparison of third-party-punishment in a stand-alone and in an in-group environment*
- 2009 n.158* Rongili Biswas, Carla Marchese and Fabio Privileggi: *Tax evasion in a principal-agent model with self-protection*
- 2009 n.157* Alessandro Lanteri and Stefania Ottone: *Economia ed etica negli esperimenti*
- 2009 n.156* Cinzia Di Novi: *Sample selection correction in panel data models when selectivity is due to two sources*