Empirical Determinants of Government Efficiency

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28 February 2008

Abstract

This paper is concerned with two things: finding an objective and easily quantifiable measure of government efficiency and testing possible determinants of such quality. As measures of government efficiency we use the ratios of infant mortality rate to health expenditures as a percentage of GDP and the ratios of drop out and illiteracy rates to education expenditures as a percentage of GDP. We assume that government efficiency in providing health and education services depends on economic, political and cultural factors.

FCT Fundação para a Ciência e a Tecnologia
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR Portugal

Ciência.Inovação 2010 Programa Operacional Ciência e Inovação 2010
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

UNIÃO EUROPEIA
FSE

1 Introduction

Now a days there is a consensus that efficient governments can make a difference to a country's economic performance. The high quality of the public institutions (and more generally of governments) is viewed as necessary to assure that policies have a positive and lasting effect on income[34]. Taking for granted the importance of good government other questions naturally arise: how can government efficiency be measured? Why do some countries have better government than others? If we can trace the determinants of government efficiency, hoe can we manipulate them to boost quality and enhance growth? In other words can policy choices affect the quality of government?

Before beginning to answer these questions it is essential to define what government quality is. In [20], good government stands for "good-for-capitalistic development". Following this perspective the authors propose several measures of performance: a good government protects property rights, intervenes little and taxes lightly; it has a small dimension and a well- functioning bureaucracy free of corruption; it is politically free and sustained by a democracy; it provides public goods of high quality and, finally, it is efficient.

Some of these aspects generate controversy as they clearly have an ideological content, as for instance low taxes and little intervention. In addition there is no clear cause/effect relation between size and quality.

As to corruption and limitations to political freedom it can be argued that more than proxies of good governing they determine the existence of good or bad public institutions, which in turn may be able to provide better or worse services. The same reasoning can be applied to bureaucratic systems: a well-functioning bureaucracy can bee seen as a proxy or as a a cause of good government.[1]

The notion that good governments should deliver public goods of superior quality is quite consensual. The problem is that measuring the quality of a public good can be as difficult as measuring the quality of the government. We are interested in a definition of government efficiency that is easily understood as well as quantifiable and objective.

In this paper we use the term good government to stand for a government that provides services, in essential sectors like health and education, in an efficient way, i.e., where the relation between output indicators and the amount of resources necessary to achieve it is high. Then, how can efficiency be measured? As we have already mentioned, the idea is to compare government output in a given sector with the amount of resources/money

[1] Following [11], later in the paper, we will use it as a cause: "Bureaucratically organized systems tend to be less efficient...".

necessary to provide that quantity of output[2]. Health and education are two of the most important sectors of government provision [33]. According to the World Development Indicators, average health expenditure (public and private) in the nineties was around 5,5% of GDP in the United Sates and the United Kingdom, almost 7% in Belgium, Canada, Denmark, Norway or Switzerland and above 7% in Germany, France and Sweden. In what concerns education, the data is as striking. In USA and UK more than 5% of GDP was spent in education; in Canada and Finland this number rises to almost 7% and in Denmark, Norway or Sweden it goes way beyond 7%. In addition, in these two sectors there are ample quantifiable measures of output as well as information on sectorial public spending.[3]

We will now take a brief look at the determinants of quality in [20]. In the paper those determinants are grouped in three categories: Economic, Political and Cultural.

In the first category the main idea is that institutions are created whenever the benefits of their existence are greater than the costs os their creation. Wealth and development would make this trade-off between benefits and costs in favor of good governance, not only because development would make good institutions affordable but also because it would make them more reliable. In [33] the authors suggest that different levels of GDP per capita or educational attainment by the adult population (which could serve as a proxy for the level of development) could be decisive in explaining differences in government efficiency across countries.[4] We will also consider a set of indicators that represent important characteristics that differentiate the way a society is shaped. We include in these characteristics urban population or the population age composition. The first has to do with the proximity to the decision makers. If the population, in general, is located in or around cities, where the number (and sometimes the quality) of hospitals and schools is bigger, will it interfere with the efficiency in which the government is able to

[2]Virtually any specific service can be provided and financed by the state and/or the private sector, so government efficiency needs to take into account the source of the financing.

[3]In [33] the concern of the authors is basically to evaluate the performance of the sectors in question. As the authors point out, "We intend to measure inefficiency and not so much explain it". In our paper we will try to measure and explain government efficiency.

In the paper we try, not so much to explain inefficiencies in the health or educational systems per se, but inefficiencies in the way the government provides services. In general that can be caputared also in these sectors.

[4]There are other variables that could indicate the level of development. In [12] references are made to geographical location as an important factor in explaining the poor performance of some governments.

provide its services? In [13] the authors establish a link between the growth rate of urban concentration and the ability of central authorities to provide adequate public services. Although in [1] the authors defend that the predominant causality is from political factors to urban concentration and not the other way around we will try and see if there is, in fact, urban concentration can interfere in the quality of the services rendered by the state. The second serves also as a proxy of development once it is well known that developed countries have a clearly older population.

In the second category, the basic assumption is that those in power will shape policies and institutions to allow them to remain in power and transfer resources toward themselves. Some groups and some societies allow rent seeking behavior in a more generalized way than others. When this kind of behavior becomes pervasive and/or the groups in power care more about their own interest than the common interest, worse governance is the most likely outcome. In [20] ethnic heterogeneity is used as a proxy for political factors, in the sense that if there are several groups with different interests, the eagerness to stay in power will be bigger. Governments become more interventionist and less efficient ant the quality of public goods falls[5]. A member of a certain group will use its power to generate benefits to the members of his group. In [4] the authors refer to the fact that the reluctance in changing inefficient institutions into more efficient ones has to do (among other things) with the existence of different groups with different bargaining power. In [2] the authors refer to links between inefficient policies and diversity. They claim: "Conflicts of preferences, racism, prejudices often lead to policies which are suboptimal from the point of view of a society as a whole".

Social polarization is an issue related to the existence of groups with different and, often, opposed interests. When polarization is significant, we tend to have worse governments. In [17] the authors refer that this factor alone can diminish the ability of government response to a crisis as well as the stability of its decisions. Inequality in income distribution is another example of what we call social structure factors.

In [22] it is argued that corruption lowers investment (public or private) distorting it (in a worse way than taxes [31]) in such a way that will surely affect efficiency. In [6] this fact is also referred when the authors consider weak and inefficient governments that are built around rent seeking elites. In [14] the authors provide evidence that reducing corruption increases efficiency or at least improves the quality of the outputs measured by infant mortality and primary school drop out rates. In [34] reference is also made to the linkage between corruption vs. health and education, the two sector we will consider in our study. The authors state that corruption may have

[5]This fact is also referred in [9] and in [21].

negative impacts in terms of public spending in education and health if we assume that the amount spent by a given government is the "correct" one, if corrupt agents reduce it than it will necessarily generate inefficiencies. Also concerning corruption and efficiency, the paper [35] shows evidence that corruption may increase public investment but will diminish its productivity.

In a related issue there is also some literature that deals with excessive bureaucracy and inefficiencies of the public sector. In [30] the author mentions about another aspect of good governance: the provision of inputs that are complementary to the private sector. This provision tends to decrease in countries with a non-professional state bureaucracy. Referring also to bureaucracy [11] states that systems with excessive bureaucracy tend to generate less efficient institutions.[6]

We will use some variables related with diversity and others with distortions to the normal functioning of institutions.

The third group of determinants relies on the fact that societies have beliefs that induce collective actions and make certain kind of behaviors more probable. When these beliefs are strongly persistent they tend to be associated with culture. An excessive intolerance or lack of self confidence can make it impossible for a society to have good institutions and consequently good governments [20] . In [19] the authors state that "trust determines the performance of a society's institutions". In [8] the authors discuss the role of religion in a country's institutional development. Religion can be seen as a proxy of cultural characteristics since it strongly influences the individual and social actions. In [19] it is found that there is a negative association between trust and the dominance of the main religion. Referring again to [8] a link is established between religion and corruption. The authors show some evidence that Protestant countries are less corrupt than Catholic ones. It could be argued that if different groups with different power hinder government quality, then the existence of several religious groups would have a negative impact on government quality. We believe that both the arguments put forward, concerning religious diversity, may be true. However, and following the related literature, we believe that the positive effect of religious diversity (which is due to a greater trust and tolerance) may surpass the negative impact (given by the presence of different social groups with different and colliding interests). Nevertheless the direction of the effect of religious fractionalization on government efficiency remains to be seen.

Another possibility to account for the cultural diversity among countries

[6] In [6] the authors sustain this idea when saying: "Africa has stagnated because its governments are weak and inefficient and often times made up of narrow rent seeking elites".

is their legal system The legal system adopted by a country can be very closely related to the kind of habits and practices of its inhabitants [19].

This paper intends to contribute to the literature by providing new and quantifiable measures of government efficiency as well as understanding the determinants of their variability across countries. The paper is structured as follows: in section 2 we will present the data and the indicators that assess government quality as well as the variables that are representative of each of the groups described above. In section 3 we present and discuss the regression results exploring the data in order to find a meaningful relation between efficiency and its determinants. Also in section 3 we will try and explore the relation between government quality and public capital suggested in [24]. Finally in section 4 we conclude.

2 Data

2.1 Definitions and Sources

The analysis presented in this paper uses a set of variables covering up to 208 countries. The definition and sources of all the variables are summarized in Appendix A. We used a data set with five year averages (1970 to 1974; 1975 to 1980, etc.).[7]

2.2 Dependent Variables

In this paper we try to build quantifiable and potentially measures of government performance. We selected Education, one of the fundamental sectors in almost every country around the world and use two measures of output (Drop out rate and illiteracy rate). We decided to confirm our results testing also a measure from the health sector (infant mortality)[8]. Our main focus is the efficiency in the use of government resources, which means that more than being concerned with the output we are interested in its relation with the amount of resources spent to deliver it. For that purpose we do not use output per se but ratios of each of the output variables to public spending in

[7] In most cases there were data missing in between 1970 and 200. We used the maximum number of observations available leading to averages with different number of years. The summary statistics for each variable are presented in appendix B.

[8] As we refered previously this are the two sectors that consume consitently a bigger cut from government budget.

the corresponding sector. We selected the following measures of government performance:

- The ratio of infant mortality rate to public health expenditures as a percentage of GDP (MRIHEPu).
- The ratio of drop-out rate to public education expenditures as a percentage of GDP (DORPSE).
- The ratio of illiteracy rate to public education expenditures as a percentage of GDP (IRPSE).

Notice that , for all measures, if we increase the numerator for the same denominator we are in a worse situation wich means that a higher value means worse performance. However if we increase the denominator mantaining the numerator (for exemple we increase health expenditures and infant mortality rate remains the same) the ratio decreases and we are also worse of. Because it is complicated to have to different readings for the same variation of the measure we decided to redefine our ratios in the follwoing way:

- (100-the ratio of infant mortality rate) to public health expenditures as a percentage of GDP (MRIHEPu).
- (100-the ratio of drop-out rate) to public education expenditures as a percentage of GDP (DORPSE).
- (100-the ratio of illiteracy rate) to public education expenditures as a percentage of GDP (IRPSE).

Now, if the numerator increases the ratio decreases and we are worse of. If the denominator increases (for the same numerator, i.e., for the same infant morality ratio, for exemple) the measure decreases and, in fact, we are also worse of.

The starting point of this paper was the belief that government quality may be important for economic growth. We first try to determine if our measures deliver significant differences in government efficiency across countries. For that purpose we constructed efficiency frontiers in the manner of [33]: let y_i be the output of country i (for example illiteracy rate) and let x_i be the amount of money spent to achieve that output (education expenditures as a percentage of GDP). If the output is positive (i.e. more means better) then a country is said to be inefficient if $y_i < F(x_i)$ Where $F(\cdot)$ is the efficiency frontier. If the output is negative (i.e., more means worse) than a country

is said to be inefficient if $y_i > F(x_i)$. The resulting charts can be seen in Appendix C[9]. As we can easily see there are huge differences of efficiency across countries.

We are interest, also, in analyzing the relation between the ratios used as dependent variables and some of the variables used by [20]. Because that paper uses qualitative measures of government quality some measures can be seen as causes and others as consequences of government efficiency, we are interested in finding whether our indicators are similar (i.e., if they are correlated or not). The results are in table 1. The correlations vary in an interval between 0.01 and 0.4. Although we are in fact talking about similar realities and, in some cases the variables are related there are substantial differences. We believe that our variables are actually capturing new information.

We also analyzed the correlation between the various ratios (Table 1). The correlations are high, particularly when we are talking about variables within the same sector. However, we can easily see that high infant mortality rates are usually associated with higher drop out and illiteracy rates.

Table 1

	pr	*Corr*	*lo*	*Bureau*	*SIRPSE*	*SDORPSE*	*SMRIHEP*
pr	1						
Corr	-0.52	1					
lo	-0.49	0.7	1				
Bureau	-0.53	0.76	0.66	1			
irpse	-0.347515	-0.026098	-0.006285	-0.067858	1		
dorpse	-0.029184	-0.109149	0.0846609	0.0099926	0.6350399	1	
mrihepu	-0.251249	0.2521941	0.3980894	0.3984514	0.3726411	0.2615015	1

2.3 Independent Variables

We consider three groups of government quality determinants - economic, political and cultural. For each of these groups we selected variables that, according to the existing literature, are viewed as proxies.

To test the importance of economic factors in the variability of government quality around the world, we use several variables. Probably the most obvious one is a direct measure of wealth, we will use the logarithm of per capita GDP (logGDPpc). We will also use some measures that are directly related to the level of development, namely the percentage of urban population, the age structure of the population and the sectorial structure of

[9]Data used: 5 year averages

employment (we could eventually consider these factors as a sub-category of social-economic factors). We will also confirm if there is any relation between the degree of openness of a given economy an the quality of its government. We will introduce as regressands trade (as a percentage of GDP) and gross foreign direct investment. At last we will also include total government expenditures as an economic determinant of government efficiency.

To evaluate the relevance of political factors in determining government quality, we use indexes of corruption, political freedom, quality of the bureaucracy and law and order tradition[10]. As proxies of the level of social polarization and fractionalization we will use an index of ethnic fractionalization and the gini index to account for inequalities in income distribution. We will also use two dummy variables to account for the type of political institutions a country has, namely if a country as a presidential or a parliamentary regime and if the electoral rule is majoritarian or proportional.

The proxies of cultural factors are an index of religious fractionalization, dummy variables that account for the legal system (namely English, French, German, Scandinavian and Socialist) and still a dummy for each of the main religious confessions (Catholic, Protestant and Muslim).[11]

[10] We acttualy drop the corruption and the bureaucracy index due to the high correlation with the law and order index.

[11] The correlations between all the variables can be seen in appendix D.

3 Regression Results

3.1 Main Results

The objective of our research is weather a country's economic, political or cultural conditions explain the differences in government performance. We are aware that this is a difficult task because most of the variables considered may be in turn influenced by government quality (this being particularly true in the case of economic factors). A wealthier nation may have the means to provide efficient public services, but an efficient government can foster growth. This issue will be addressed later on.

Having this in mind we will now present our regression results.

We started by checking what our intuition, supported by the related literature, was telling us: wealth has a predominant effect on government performance.

Economic development should be positively related to government efficiency. As it has already been said, wealthier countries should have not only the means to provide better public services but also a greater demand for them. The 9ositive sign on the estimate associated with loggdppc (table 2) confirms this thesis. An increase in per capita income will lead to a decrease in the illiteracy rate or in the drop out rate per dollar spent on education and also to a decrease in the infant mortality rate per dollar spent on health.

Our second concern had to do with government size. Our question was: if a wealthier nation has better performing governments than shouldn't wealthier governments (or at least governments that spend more) be more efficient? In table 2 we can see that general expenditures are determinant to government performance. Not only they are significant at 1% but they do not weaken the importance of loggdppc. The results tell us that the higher the general expenditures are the more efficient a government should be. In the related literature the relation between government size and quality is ambiguous however our data points to a clear positive relation between them.

Tabel 2[12]

	irpse				dorpse				mrihepu			
	Regression1		Regression2		Regression1		Regression2		Regression1		Regression2	
	n	R^2	n	R^2	n	R^2	n	R^2	n	R^2	n	R^2
	560	11,1	418	28.22	459	22.13	380	28.56	328	42.53	231	47.01
	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.
Constant		-0.5594		52.50268		63.49847		62.33876		-41.66377		-31.582
loggdppc	1.84[c]	11.48625	7.69[a]	4.46577	10.91[a]	3.61903	8.29[a]	3.016412	13.22[a]	15.23214	9.60[a]	12.462
ge			4.62[a]	0.17806			4.91[a]	0.212425			3.04[a]	0.4066

[12] a - significant at 1%; b - significant at 5%; c - significant at 10%

We then proceed to see if variables from the other groups (political and cultural) had any relevance in explaining differences in government performance around the world.

Following the literature, we expect that an increase in the number of different groups within a society or an excessive social polarization (wether we are talking about income groups or ethnic ones) will foster inefficiency. In [16] the authors state that: "We find trust and civic norms are strong in nations with higher and more equal incomes, with institutions that restrain predatory actions of chief executives, and with better-educated and ethnically homogenous populations". So, equal incomes and ethnically homogeneous populations built up a trustful society that in turn enhances governance quality[13].

Both the loggdppc and ge survive the introduction of the gini index and of the ethnic fractionalization index. However the results concerning both this indexes are not consistent (table 3). the Gini index is relevant in explaining irpse (although with a sign different of what would be expected) and mrihepu. Ethnic fractionalization is statistically relevant and has a negative effect on mrihepu (which means that an increase in the ethnic fractionalization leads to a decrease in government performance in the health department)

Table 3

	irpse				dorpse				mrihepu			
	Regression1		Regression2		Regression1		Regression2		Regression1		Regression2	
	n	R^2	n	R^2	n	R^2	n	R^2	n	R^2	n	R^2
	217	42.23	413	28.57	220	33.51	380	28.67	149	43.8	227	49.78
	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.
Constant		39.39147		54.63328		46.74347		60.59047		44.87723		-4.773118
loggdppc	6.75[a]	5.298376	6.26[a]	4.33269	4.07[a]	3.979868	5.87[a]	3.145886	4.86[a]	5.950746	8.55[a]	10.84002
ge	3.85[a]	0.2400634	4.60[a]	0.1743101	3.61[a]	0.2698968	4.79[a]	0.213122	2.54[b]	0.2592471	2.91[b]	0.2977736
gini	1.90[c]	0.1515699			0.89	0.1307371			-2.43[b]	-0.354867		
fracethn			-0.8	-2.496764			0.49	1.724462			-4.15[a]	-26.39742

The second type of political variables has to do with distortions to the normal functioning of political institutions. Distortions to the normal functioning of political institutions should have a negative effect on government quality. If a well functioning government offers the "correct" amount of a given service using the proper amount of inputs, any interference in this relation will cause inefficiencies and hence lead to worse governing. These distortions have a negative impact on public spending in general and on public spending in particular[14]. This negative impact doesn't necessarily mean

[13]The link between trust and homogeneity is also referred in [18]: "Trust is higher in more ethnically, socially and economically homogeneous societies and where legal and social mechanisms for constraining opportunism are better developed".

[14]As mentioned in [34]

that there will be less public spending or investment, it can also mean that this investment will be less productive[15]. More commonly corruption and excessive bureaucracy will lead to less investment (public or private) and to the channeling of investment towards the interests of certain groups [31]. The relation between public and private sectors will also be damaged by the prevalence of distortions in the political process [30]. The absence of political or civic liberties themselves can also damage government efficiency as noted by the authors of [36]: "Democracy may also influence the "quality of governance": rulers with discretionary power tend to set up distortionary policies that benefit a small set of insiders at the expense of the general population (...). The exercise of power is potentially more arbitrary in autocratic regimes that lack public scrutiny of policy makers".

Because the correlation between three of the indicators (corruption, bureaucracy and law and order) were so high we decided to use only one. In particular we chose the one that haf more data available. We maintained the political rights index because the empirical correlation with the other indexes was not so high. In table 4 we can see that the introduction of lo or pr does not interfere with the results concerning neither loggdppc nor ge. Both indexes have estimates with the expected sign. An increase in lo means an increase in law and order tradition which in turn leads to an increase in government performance. However this index is only statistically relevant in the first regression. An increase in pr means less political rights which in turn leads to less efficient governments. This index is relevant in two of the regressions presented.

Table 4

	irpse				dorpse				mrihepu			
	Regression1		Regression2		Regression1		Regression2		Regression1		Regression2	
	n	R^2	n	R^2	n	R^2	n	R^2	n	R^2	n	R^2
	405	30.32	262	36.28	374	28.44	215	33.7	222	47.3	190	48.26
	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.
Constant		58.35382		62.13669		64.87332		59.5502	6.98[a]	-16.52437		-28.63463
loggdppc	6.48[a]	4.030884	6.00[a]	2.812565	5.64[a]	2.785337	4.29[a]	3.078843	3.34[a]	11.20125	6.71[a]	11.85463
ge	4.80[a]	0.1795827	3.92[a]	0.1197742	4.97[a]	0.214123	4.31[a]	0.1787851	-1.83[c]	0.4172686	2.51[b]	0.3622814
pr	-3.57[a]	-0.868185			-0.75	-0.220816				-13486158		
lo			3.36[a]	1.673571			1.01	0.6335618			0.29	0.470484

Cultural traditions that favor trust and confidence, that protect the individual against the state and that limit the power of the governors[16] should improve government quality. According to [19] there is a negative association between trust and the dominance of a strong religion. Hence, religious fractionalization may lead to higher government quality if societies are able to overcome differences. A related issue as to do with the influence of a

[15] See [35]

[16] [20]

countries main confession in its government efficiency. Following [20] it is expected that Protestant countries have more efficient countries than Catholic or Muslim ones. The same argument is made in [8]. The results presented in table 5 allow us to conclude that religious fractionalization has, in fact, a positive effect on government efficiency. The case is more clear in the education sector. Now broadly speaking religious dummies seem to have no relevance in determining government performance (there are few but inconsistent exceptions).

We also tried a country´s legal system as possible determinant of government efficiency. Following [20] it is expected that countries with a legal system of a socialist tradition will have the less efficient governments. The higher efficiency will occur in countries with a legal system based on English, Scandinavian or German ones. The French legal system is expected to produce governments with an intermediate level of efficiency. We left out the English legal system and our results (table 6) are not conclusive.

Table 5

	irpse				dorpse				mrihepu			
	Regression1		Regression2		Regression1		Regression2		Regression1		Regression2	
	n	R^2	n	R^2	n	R^2	n	R^2	n	R^2	n	R^2
	415	29.13	418	35.73	380	28.95	380	31.91	229	47.71	231	47.1
	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.
Constant		49.76577		54.44565		61.03994		64.02884		-32.09113		-31.76453
loggdppc	7.60[a]	4.591771	8.11[a]	4.257471	8.34[a]	3.042734	9.36[a]	3.188353	9.58[a]	12.52454	9.27[a]	12.41031
ge	4.69[a]	0.1661647	5.73[a]	0.2162923	4.97[a]	0.2068389	4.40[a]	0.1926522	2.94[a]	0.3945207	3.09[a]	0.4088214
fracreg	2.33[b]	5.043556			1.77[c]	2.987444			0.11	0.688182		
c			0.8	0.8433611			-4.58[a]	-4.996401			0.48	1.750046
m			0.92	1.246345			-0.7	-0.67033			-0.19	-0.631193
p			-4.82[a]	-7.829834			-1.23	-2.294294			0.02	0.1163624

Table 6

	irpse		dorpse		mrihepu	
	Regression1		Regression1		Regression1	
	n	R^2	n	R^2	n	R^2
	418	30.8	380	29.62	231	57.35
	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.
Constant		52.71379		63.78866		-49.61415
loggdppc	7.92[a]	4.37725	7.24[a]	3.03924	10.04[a]	14.9043
ge	4.13[a]	0.1640009	4.50[a]	0.2062664	2.19[b]	0.2678176
lss	6.15[a]	7.587531	0.28	0.7395012	6.32[a]	24.0608
lsf	0.23	0.2959931	-2.12[b]	-2.482199	-0.24	-0.857057
lsg	3.37[a]	4.905761	-0.3	-0.33738	-3.04[a]	-11.7022
lssc		dropped	-2.32[b]	-1.932526	-5.08[a]	-14.87474

In table 7 we can see the results concerning what we previously called social-economic variables.

We can see that in the cases where urban population is statistically relevant it has a positive effect on government efficiency. This means that rater than being a proxy for the level of underdevelopment, urban concentration makes it easier to provide good quality services.

The age structure of the population is only relevant when we are talking about infant mortality rate (with the expected sign in the case of pop0 but with a sign that apparently has no explanation in the case of pop65). Apparently the fact of a population getting younger or older does not affect the quality in which governments provide education services.

The employment structure tells us one interesting thing: the more agricultural oriented a society is the less efficient its governments will be. This can be explained on one hand considering that a concentration of employment in the agricultural sector means less development or, on the other, that it means less urban concentrations. The results concerning the percentage of employment in services has a rater strange result (when significant): it is not good for government efficiency to have high concentration of employment in the services sector. This might have to do with some increasing bureaucracy that emerges when we have to many people providing services.

Once again it should be emphasized that the introduction of these variables does not change the effect of loggdppc nor ge in government efficiency.

Table 7

	irpse				dorpse				mrihepu			
	Regression1		Regression2		Regression1		Regression2		Regression1		Regression2	
	n	R^2	n	R^2	n	R^2	n	R^2	n	R^2	n	R^2
	418	29.62	418	28.98	380	28.79	375	28.94	231	48.44	223	52.334
	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.
Constant		59.62523		53.58429		60.23254		66.34551		-21.4168		81.55463
loggdppc	3.46[a]	2.783349	4.82[a]	4.02854	7.51[a]	3.549473	4.71[a]	3.329085	5.39[a]	9.20704	5.45[a]	8.41625
ge	4.63[a]	0.177197	4.42[a]	0.1625907	4.95[a]	0.2135738	4.66[a]	0.2193035	3.02[a]	0.4509967	4.09[a]	0.6765661
Urban	2.87[b]	0.1105326			-1.34	-0.046513			2.91[a]	0.2545386		
pop0			0.09	0.0129486			-0.89	-0.113009			-5.84[a]	-2.05931
pop65			1.29	0.407374			1.6	-0.42668			-4.41[a]	-3.272017

	Regression3		Regression3		Regression3	
	n	R^2	n	R^2	n	R^2
	221	40.17	191	55.92	194	55.93
	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.
Constant		85.97054		77.88328		89.81988
loggdppc	2.46[b]	1.602377	5.56[a]	3.137539	3.59[a]	6.211544
ge	3.98[a]	0.1340466	4.41[a]	0.146479	1.81[c]	0.1986488
ea	-2.61[a]	-2.054264	-2.46[a]	-0.143205	-6.51[a]	-1.03972
es	-0.86	-0.069742	-3.24[a]	-0.224685	-5.32[a]	-0.7703447

Al last in table 8 we can see the results concerning the degree of exposure to the exterior. The gross foreign direct investment has no particular relevance in explaining government efficiency however trade seems to have a positive effect on the indexes considered.

Table 8

	irpse		dorpse		mrihepu	
	Regression1		Regression1		Regression1	
	n	R^2	n	R^2	n	R^2
	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.
Constant		53.26944		59.97203		-44.13384
loggdppc	10.91[a]	4.493673	7.84[a]	3.109494	9.41[a]	13.26506
ge	3.36[a]	0.1220216	4.50[a]	0.1860698	1.57	0.2436902
t	1.15	0.009575	2.79[a]	0.0271512	2.71[a]	0.1375234
gfdi	1.62[c]	0.1655493	0.54	0.0759711	-0.26	-0.072537

3.2 An alternative regression

In [24] a model of endogenous growth with government quality is presented. In that model the government has to decide wether is going to spend its resources in investment in public capital or in a consumption good. Government quality is presented has being produce through a production function that has as single input per capita: public capital. The idea is that if governments want to achieve a certain level of quality they have to invest. Quality depends on an input that has to be accumulated, it demands an effort from the state whereas physical goods (the consumption good) does not demand such an effort.

We shall now see if this production function is supported by the data.

We used as quality indicators the measures constructed in this paper and also the measures used in [20] to see if the results hold. The data on public capital was taken from [41]. In table 10 we can see the results concerning the direct relation between quality measures and per capita public capital and also the a broader specification where we considered as control variables the ones that preformed consistently better in the previous section.

Table 9

	logirpse				logdorpse				logmrihepu			
	Regression1		Regression2		Regression1		Regression2		Regression1		Regression2	
	n	R^2	n	R^2	n	R^2	n	R^2	n	R^2	n	R^2
	24	81.98	23	98.92	93	72.21	92	98.48	44	75.07	43	99.53
	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.
logKgpc	12.59[a]	2.293127	-2.15[a]	-0.534022	12.38[a]	0.7782233	-3.54[a]	-0.107984	8.91[a]	0.6752071	-2.46[a]	-0.0629
loggdppc			8.23[a]	0.4382453			21.15	0.3601313			33.82[a]	0.2957166
ge			-0.28	-0.002139			-3.78[a]	-0.010638			-0.72	-0.001665

Looking at table 9 we can see that we have a positive and significant relation between government efficiency and per capita public capital. This relation survives the inclusion of the control variables in terms of significance although the sign of the estimate changes. This might be due to multicolinearity between public capital and GDP.

To see if the relation between government quality and public capital was, in fact, robust we also tried different measures of quality[17]. In table 10 we can see that the results are basically the same.

Table 10

	loglo				logcorrup				logbureau				logpr			
	Regression1		Regression2		Regression1		Regression2		Regression1		Regression2		Regression1		Regression2	
	n	R^2	n	R^2	n	R^2	n	R^2	n	R^2	n	R^2	n	R^2	n	R^2
	88	76.95	86	99.57	88	76.82	86	99.14	88	77.1	86	98.5	126	15.53	106	40.32
	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.	tobs	Coeff.
logKgpc	12.34[a]	0.4371	0.61	0.0051	11.98[a]	0.4191	2.86[a]	0.0277	12.53[a]	0.4115	2.0[b]	0.0236	8.32[a]	0.0443	-2.38[b]	-0.0483
loggdppc			34.99[a]	0.1739			27.5[a]	0.1554			23.99[a]	0.1623			2.43[b]	0.0236
ge			0.04	0.00004			3.52[a]	0.0057			1.32	0.0024			-2.72[a]	-0.0068

The basic regression (without the controls) tell us that the bigger the stock of public capital is the bigger will the dependent variable be. Not that with exception of PR an increase in all the other indexes means an improvement in government quality. The results also survive the introduction of the control variables. Although the significance drops we can see that in three of the four cases public capital is still relevant in explaining government quality (in the case of PR the estimate has now the right sign).

3.2.1 Endogeneity Issues

As it has already been said some of the variables included in the model may be endogenous. This could bring some problems in what the reliability of the results is concerned. The issue of endogeneity can be explained in simple terms: what we want to know is weather the variables in the model could reasonably be expected to vary autonomously independently of the other variables in the model.

We used the Hausman test for endogeneity that can briefly be explained as follows :

Suppose that we are running the regression:

$$y_{1i} = \beta_1 + \beta_2 X_{2i} + ... + \beta_k X_{ki} + \delta y_{2i} + \mu_i \quad (1)$$

We suspect that y2 may be endogenous (we assume that all Xi are exogenous). To perform the test we first regress y2 against all the variables X in the previous model and a set of instrumental variables Z.

$$y_{2i} = \beta_1 + \beta_2 X_{2i} + ... + \beta_k X_{ki} + \alpha_1 Z_{1i} + ... + \alpha_j Z_{ji} + \upsilon_i \quad (2)$$

if y_2 is exogenous, than $E(\mu_i, \upsilon_i) = 0$. This would mean that $E(y_{1i}, \upsilon_i) =$

[17] More precisely the ones used by the authors in [20]. We have already seen that this measures capture a different realty and that are different in nature.

0. We can run the regression:

$$y_{1i} = \beta_1 + \beta_2 X_{2i} + ... + \beta_k X_{ki} + \delta y_{2i} + \rho \widehat{\upsilon}_i + \varepsilon_i \quad (3)$$

An test the hypothesis : $H_0 : \rho = 0$. Under H_0 y_2 is exogenous.

So, the first thing we have to do is to find instrumental variables for all the variables we want to test.

Previously we concluded that loggdppc was one of the main determinants of government variability around the world. So we were particularly concerned with the possible endogeneity of this variable. We choose latitude as an instrumental for loggdppc[18] and run the hausman test[19]. Results for regression 3 can be seen in Appendix E. v1 are the residuals of the first regression presented. We can see from the results that loggdppc seem to be exogenous to the model (at least when we are talking about education).

Because of the nature of the variable we were also interested in testing endogeneity of general expenditures. We used as instruments for government expenditures both the electoral rule (Majorit) and the political regime (Pres). The link between electoral institutions and the size and composition of public expenditures can be seen in [23]. In [27] the authors conclude that political institutions (such as electoral rules and political regimes) do shape economic policy and consequently are linked to the size of public expenditures[20]. The results for regression 3 can be seen in Appendix E. The conclusion are not as reasuring as the one we draw for loggpdpc, with the exception of the variable dorpse.

[18] In [15] the authors conclude that there is a strong link between output per worker and social infra-structure using latitude as an instrument.

[19] To run the Hausman teste we chose the variables that were more consistnently signifcant through out the previous analysis.

[20] For more on the relation between political institutions and public spending see also [28] and [29]

4 Conclusion

As it has been said the goal of this paper was to see if there was consistent variability in Government Quality across countries and what were the main determinants of this variability.

The concept used to assess Government Quality was its efficiency in using resources to obtain certain outputs in the health and education sectors. We were interested in objective (consensual and easily quantifiable) measures of Government efficiency. For that purpose we used three different ratios. Each one of them had a measure of output in the numerator and the expenditures of the respective sector as a percentage of GDP in the denominator.

We confirmed that these measures had a significant relation with the measures used in the related literature but were able to capture new and distinct information.

One of our main conclusions was that there is a significant variability of Government Efficiency across countries.

We used three different groups of possible determinants of Government Quality.

This groups followed very closely the literature being: economic determinants; political determinants and cultural determinants. The variables used to represent each of these groups were:

The logarithm of GDP per capita (as a proxy of wealth), Urban population, Age structure of population and sectorial structure of employment (as social-economic factors related to the level of development), trade and gross foreign direct investment (to account for the degree of openness) for the economic category.

Ethnic Fractionalization and gini index to account for the degree of social polarization; indexes of political rights, corruption, bureaucracy and law and order tradition as distortions to the functioning of political institutions and electoral rule and political regime to account for the type of political institutions.

Religious fractionalization, religious dummies and legal system dummies represent the variables in the third group.

The second group has a somewhat different reading than the one found in paper [La Porta et al 1998] and that is due mainly to the way Quality is measured in the referred paper.

We conclude that the most consistent and robust determinants of government efficiency are:

Wealth - Richer countries have on average more efficient governments if income is distributed in an evenly fashion

Government Expenditures - The larger the amount spent by general governments the more efficient they will be. In [20] the authors conclude that better performing governments are also larger ones but do not conclude to the direction of this relation.

Notice that both this variables survived the test for endogenity.

Broadly speaking we found evidence that the existence of several groups in a society had some bearing in government performance but the results were not consistent with the variables used (sometimes income groups was the relevant factor others what matter was ethnic groups).

Political rights or law and order tradition (one of the two) affects in a positive way government performance.

Cultural factors seem to have some importance mainly if we are talking religious fractionalization. In what dominant religion is concerned the conclusions were not consistent. The legal system tradition seems to be irrelevant in determining the variability in government decision around the world.

Urban population seems to have a positive contribution to government quality and the percentage of agricultural employment a negative impact.

We can conclude that all the three groups have some influence in explaining the variability we observe in government efficiency across countries. At least one variable of each group was relevant in determining changes in the quality indexes we constructed.

We did find an interesting and significant relation between the stock of public capital and the government efficiency. This relation survived the introduction of control variables and was valid weather we considered our measures of efficiency weather we used mor subjective and qualitative measures.

Although there are still some lose ends we believe that it has been proven that there is a considerable variability of Government quality around the world and that this variability is determined by differences in a country's economic, political and cultural factors. The new measures of government efficiency presented are objective and easily quantifiable and capture a different reality form the measures used so far (mainly qualitative measures). Besides this differences the measures proposed on this paper are closely related to the proxies used so far in the literature, which points out that we are not talking about a completely different phenomena. In the present economic and social scenario, we have developed countries with limited budgets

and extremely vulnerable to economic cycles. It is harder to come up with more inflows and government expenditures are difficult to restrain. We have governments that cannot expand and that have an urgent need in gaining efficiency. Knowing what's behind such efficiency can be determinant for a government in a developed country in a rapidly changing world.

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Appendix A . Defenitions and Sources

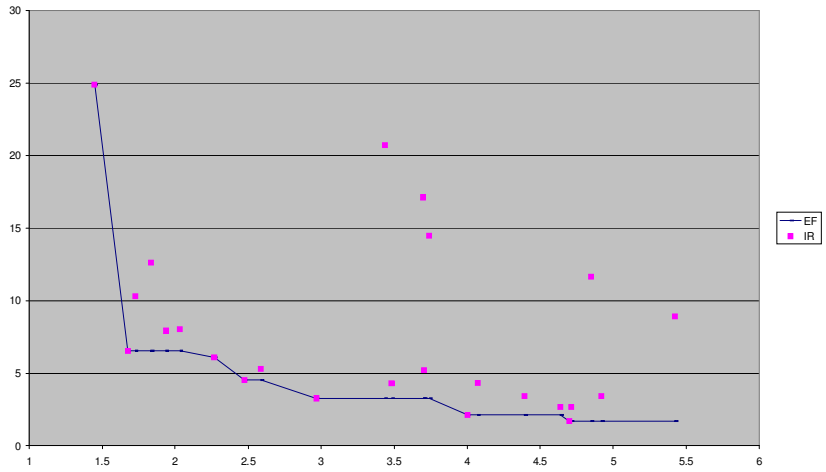
Name	Description	Soruce
Bureau	Index - quality of bureaucracy	Freedom House 2003
c	Dummy - 1 majority population catholic	[23]
Corr	Index - corruption	Freedom House 2003
Dor	drop out rate	[10]
ea	employment agriculture - % total employment	WDI 2000
ei	employment industry - % total employment	WDI 2000
es	employment services - % total employment	WDI 2000
fracethnic	Index - ethnic fractionalization	[2]
fraclang	Index - linguistic fractionalization	[2]
fracreg	Index - religious fractionalization	[2]
gdppc	gdp constant prices 1995 US$, per capita	WDI 2000
ge	central government general expenditures, % gdp	WDI 2000
gfdi	gross foreign direct investment, % gdp	WDI 2000
Hepu	public health expenditures, % gdp	WDI 2000
ir	iliteracy rate, adult (above 15)	WDI 2000
lat	latitude	WDI 2000
lo	Index - law and order	Freedom House 2003
lse	Legal system, english	[23]
lsf	Legal system, french	[23]
lsg	Legal system, german	[23]
lss	legal system, socialist	[23]
lssc	Legal system, scandinavian	[23]
m	Dummy - 1 majority population muslim	[23]
majorit	Dummy - 1 Majoritarian electoral rule	[30]
mri	mortality rate infant	WDI 2000
p	Dummy - 1 majority population protestant	[23]
pop0	population ages 0-14, % total population	WDI 2000
pop15	population ages 15-64, % total population	WDI 2000
pop65	population ages 65 and more, % total population	WDI 2000
pr	Index - political rights	Freedom House 2003
pres	Dummy - 1 Political regime presidential	[30]
pse	public spending on education %gdp	WDI 2000
t	trade %gdp	WDI 2000
urban	urban population, % total population	WDI 2000

Appendix B . Summary Statistics

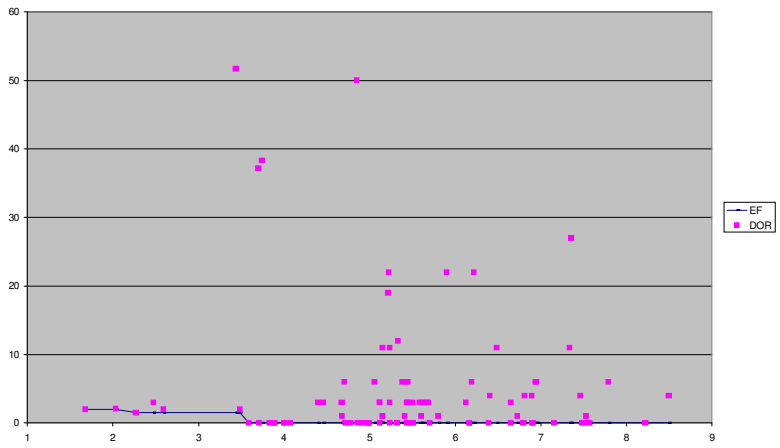
Variable	Obs	Mean	Std. Dev.	Min	Max
ge	678	28.57481	15.26796	0	187.3722
ea	491	28.44898	26.68222	.1	94.4
es	494	46.30527	19.9573	3.95	87.4
t	899	75.90013	46.85494	2.106214	393.7483
gfdi	732	3.109424	5.966065	0	111.3019
lat	1194	.2839417	.1892732	.0111	.8
fracethn	1116	.4402156	.2587782	0	.930175
urban	1224	48.93547	24.59002	2.7022	100
gini	442	40.03798	12.24764	15.4	77.3
pop0	1078	35.96428	9.753376	14.60054	51.1643
pop65	1078	5.908061	3.937475	1.080114	17.87591
pr	951	4.391122	2.350539	1.1	7.7
lo	502	3.481026	1.575984	.5	6
majorit	384	.4375	.4967256	0	1
pres	384	.390625	.488527	0	1
fracreg	1224	.4393764	.2273039	.0022857	.8602599
lse	1194	.3366834	.4727736	0	1
lss	1194	.1708543	.3765393	0	1
lsf	1194	.4371859	.4962466	0	1
lsg	1194	.0301508	.1710737	0	1
lssc	1194	.0251256	.1565722	0	1
c	1194	.3165829	.4653381	0	1
p	1194	.1407035	.3478612	0	1
m	1194	.2211055	.4151653	0	1
loggdppc	923	7.577976	1.540908	4.554719	10.80753
irpse	588	17.15552	142.8423	.0308471	3450.794
dorpse	471	8.604562	12.02159	0	98.57054
mrihepu	334	27.74098	39.01859	.523446	278.1819

Appendix C . Efficiency Frontiers

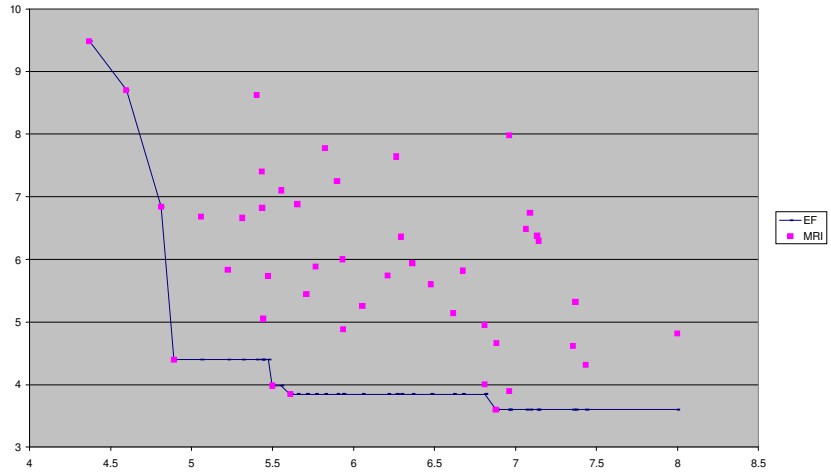
C.1 Illiteracy Rate



C.2 Drop Out Rate



C.3 Infant Mortality Rate



Appendix D . Correlations

	logGDPpc	Urban	Pop0	Pop65	Pop	EA	ES	T	GFDI	GE	fracethn	gini	PR	LO
logGDPpc	1													
Urban	0.8139328	1												
Pop0	-0.747795	-0.6451	1											
Pop65	0.6755087	0.53518	-0.8965	1										
Pop	-0.109515	-0.0614	-0.0662	0.0127	1									
EA	-0.767981	-0.762	0.6274	-0.5288	0.1187	1								
ES	0.7198583	0.71468	-0.5125	0.4553	-0.145	-0.904	1							
T	0.2667571	0.24696	-0.1976	0.0857	-0.232	-0.253	0.194	1						
GFDI	0.1577402	0.12887	-0.1285	0.0917	-0.063	-0.287	0.33	0.4304	1					
GE	0.1783665	0.15248	-0.1945	0.2615	-0.167	-0.198	0.149	0.246	0.103	1				
fracethn	-0.446601	-0.2492	0.4479	-0.46	-0.065	0.4062	-0.319	-0.144	-0.1127	-0.16	1			
gini	-0.227344	-0.2346	0.181	-0.1582	0.0388	0.2466	-0.2	-0.12	-0.0816	-0.22	-0.13751	1		
PR	-0.566941	-0.4105	0.524	-0.574	0.0185	0.534	-0.56	-0.144	-0.108	-0.11	0.372182	0.0504	1	
LO	0.6824961	0.51824	-0.7112	0.6643	0.0071	-0.531	0.457	0.2386	0.3062	0.209	-0.40993	-0.216	-0.497	1
MAJORIT	-0.243336	-0.3043	0.2546	-0.2868	0.1435	0.3012	-0.189	0.0073	0.0532	-0.03	0.152691	0.1486	0.1477	-0.107
PRES	-0.52926	-0.1767	0.5501	-0.5568	-0.062	0.2494	-0.203	-0.331	-0.1604	-0.36	0.238361	0.6214	0.4647	-0.555
LSE	-0.030469	-0.1487	0.1615	-0.185	0.0081	-0.006	0.077	0.2587	0.1065	0.03	0.02746	0.1891	-0.169	-0.003
LSS	-0.092729	0.00205	-0.3175	0.2563	0.0957	0.0659	-0.268	-0.014	-0.0208	0.041	-0.12861	-0.086	0.1646	0.1333
LSF	-0.120113	0.05029	0.275	-0.236	-0.083	0.0705	0.024	-0.195	-0.081	-0.06	0.206721	-0.071	0.1809	-0.306
LSG	0.283693	0.09203	-0.2554	0.2618	0.0392	-0.135	0.093	-0.083	-0.0384	-0.07	-0.14822	-0.038	-0.12	0.2398
LSSc	0.3019616	0.1842	-0.2587	0.3455	-0.036	-0.164	0.186	-0.041	0.0106	0.078	-0.23296	-0.042	-0.245	0.3269
fracreg	-0.037963	-0.0563	-0.0462	0.0231	0.0354	-0.033	0.051	0.0986	0.0632	0.031	0.138627	-0.12	-0.044	0.0255
C	0.1409065	0.12924	-0.1103	0.1677	-0.078	-0.216	0.247	-0.043	0.0589	-0.08	-0.10106	-0.084	-0.24	-0.017
P	0.2090238	0.08195	-0.1462	0.2127	-0.036	-0.13	0.177	0.0298	0.0622	0.081	-0.13695	-0.056	-0.274	0.2505
M	-0.184847	-0.108	0.3553	-0.3812	-0.052	0.2296	-0.246	-0.043	-0.1148	0.084	0.199683	0.3047	0.3883	-0.204
irpse	-0.105194	-0.0781	0.064	-0.0504	-0.004	0.3751	-0.303	-0.04	-0.0818	-0.28	0.080787	0.4945	0.0092	-0.109
dorpse	-0.470478	-0.3599	0.3731	-0.3441	0.0517	0.361	-0.304	-0.271	-0.1376	-0.36	0.198532	0.5447	0.308	-0.442
mrihepu	-0.652123	-0.562	0.55	-0.465	0.0829	0.658	-0.529	-0.326	-0.1332	-0.41	0.388255	0.2456	0.4496	-0.485

	MAJORIT	PRES	LSE	LSS	LSF	LSG	LSSc	fracreg	C	P	M	irpse	dorpse
MAJORIT	1												
PRES	-0.12508	1											
LSE	0.5755742	-0.4359	1										
LSS	-0.156813	0.22324	-0.3234	1									
LSF	-0.322749	0.51509	-0.6279	-0.4001	1								
LSG	-0.135613	-0.1181	-0.1256	-0.08	-0.155	1							
LSSc	-0.225494	-0.2112	-0.1144	-0.0729	-0.141	-0.028	1						
fracreg	0.3643559	-0.2959	0.3628	0.0363	-0.35	0.0779	-0.151	1					
C	-0.284992	0.3575	-0.2464	-0.1342	0.3458	0.0712	-0.109	-0.174	1				
P	0.070014	-0.3108	0.1742	-0.1464	-0.184	0.0128	0.397	0.2397	-0.2754	1			
M	0.2477168	0.08043	-0.043	-0.0823	0.1632	-0.094	-0.086	-0.367	-0.3626	-0.22	1		
irpse	0.2699987	0.19806	-0.0268	-0.0222	0.0423	-0.011		0.0353	-0.0456	-0.01	-0.00579	1	
dorpse	-0.148071	0.57374	-0.1093	0.0202	0.2038	-0.132	-0.146	-0.051	0.1562	-0.16	0.036337	0.6432	
mrihepu	0.2800703	0.2317	0.0108	-0.0697	0.1289	-0.118	-0.123	-0.06	-0.1663	-0.14	0.132258	0.6851	0.452

Appendix E . Hausman Test

Regression E1

```
                                                Number of obs =     363
                                                F(  6,   356) =  336.83
                                                Prob > F      =  0.0000
                                                R-squared     =  0.7929
                                                Root MSE      =   .7215

------------------------------------------------------------------------------
             |               Robust
    loggdppc |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          ge |   .0055515   .0034093     1.63   0.104    -.0011534    .0122563
           t |  -.0000649   .0007987    -0.08   0.935    -.0016358    .0015059
          lo |    .326635   .0370625     8.81   0.000      .253746    .3995241
     fracreg |  -.0402604   .1618272    -0.25   0.804    -.3585178     .277997
       urban |   .0377185   .0020332    18.55   0.000       .03372     .041717
         lat |   .9625099   .3033837     3.17   0.002     .3658603     1.55916
       _cons |   4.160199   .1194474    34.83   0.000     3.925288    4.395111
------------------------------------------------------------------------------

                                                F(  7,   250) =    9.76
                                                Prob > F      =  0.0000
                                                R-squared     =  0.2766
                                                Root MSE      =  10.562

------------------------------------------------------------------------------
             |               Robust
      sirpse |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          ge |  -.3518171   .0929121    -3.79   0.000    -.5348074   -.1688268
           t |  -.0303566   .0141204    -2.15   0.033    -.0581668   -.0025465
          lo |  -1.280169   2.277396    -0.56   0.575    -5.765497    3.205159
     fracreg |  -3.280946   3.124249    -1.05   0.295     -9.43415    2.872258
       urban |   .0618633   .2347117     0.26   0.792    -.4004011    .5241276
    loggdppc |   .3507671   6.089579     0.06   0.954    -11.64265    12.34418
          v1 |   1.859387    5.98213     0.31   0.756    -9.922408    13.64118
       _cons |   38.77566    26.0994     1.49   0.139    -12.62707    90.17838
------------------------------------------------------------------------------

                                                F(  7,   206) =   15.26
                                                Prob > F      =  0.0000
                                                R-squared     =  0.3527
                                                Root MSE      =  9.3155

------------------------------------------------------------------------------
             |               Robust
     sdorpse |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          ge |  -.2885923   .0704097    -4.10   0.000    -.4274082   -.1497764
           t |  -.0025953    .010873    -0.24   0.812     -.024032    .0188414
          lo |  -1.210934   2.414558    -0.50   0.617    -5.971347    3.549479
     fracreg |  -4.312019   3.046446    -1.42   0.158    -10.31823    1.694192
       urban |   .0416756   .2209255     0.19   0.851    -.3938894    .4772406
    loggdppc |  -1.720616   5.958189    -0.29   0.773    -13.46746    10.02623
          v1 |   3.118051   6.237998     0.50   0.618    -9.180453    15.41656
       _cons |   51.58664   25.76654     2.00   0.047      .786703    102.3866
------------------------------------------------------------------------------
```

```
                                                Number of obs =     186
                                                F(  7,   178) =   14.79
                                                Prob > F      =  0.0000
                                                R-squared     =  0.2190
                                                Root MSE      =   17.66

------------------------------------------------------------------------------
             |               Robust
     smrihep |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          ge |   -.279416   .1598553    -1.75   0.082    -.5948714    .0360393
           t |   .1341303   .0249043     5.39   0.000     .0849846    .1832759
          lo |   8.503976    3.83385     2.22   0.028     .9383296    16.06962
     fracreg |  -8.742692   4.338539    -2.02   0.045    -17.30428   -.1811008
       urban |   1.079839   .3070276     3.52   0.001     .4739567    1.685722
    loggdppc |   -24.7287   8.326315    -2.97   0.003    -41.15969   -8.297706
          v1 |   26.15866   7.345639     3.56   0.000     11.66292    40.65441
       _cons |   132.7665   34.41583     3.86   0.000       64.851    200.6821
------------------------------------------------------------------------------
```

Regression E2

```
                                                Number of obs =     187
                                                F(  7,   179) =   18.26
                                                Prob > F      =  0.0000
                                                R-squared     =  0.2468
                                                Root MSE      =  13.349

------------------------------------------------------------------------------
             |               Robust
          ge |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    loggdppc |  -2.984906   2.638616    -1.13   0.259    -8.191701     2.22189
           t |   .0418596   .0362931     1.15   0.250    -.0297577    .1134768
          lo |   -.566773   .9492755    -0.60   0.551    -2.439984    1.306438
     fracreg |  -4.096347   3.951927    -1.04   0.301    -11.89471    3.702012
       urban |   .1841116   .0739836     2.49   0.014     .0381193    .3301038
     majorit |  -3.381105   1.835081    -1.84   0.067     -7.00228    .2400705
        pres |  -18.25131   6.318047    -2.89   0.004    -30.71875   -5.783878
       _cons |   53.45038   24.11813     2.22   0.028     5.857941    101.0428
------------------------------------------------------------------------------
```

```
                                                Number of obs =     113
                                                F(  7,   105) =    8.26
                                                Prob > F      =  0.0000
                                                R-squared     =  0.3551
                                                Root MSE      =  10.564

------------------------------------------------------------------------------
             |               Robust
      sirpse |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          ge |   -.597906   .1520088    -3.93   0.000    -.8993114   -.2965006
           t |  -.0310589   .0326087    -0.95   0.343    -.0957159    .0335981
          lo |  -2.553288   .8090259    -3.16   0.002    -4.157437   -.9491395
     fracreg |  -6.345737   6.018161    -1.05   0.294    -18.27864    5.587163
       urban |  -.1865052   .1109514    -1.68   0.096    -.4065013    .0334908
    loggdppc |   2.734337   1.445601     1.89   0.061    -.1320232    5.600696
          u1 |   .3221762   .1617032     1.99   0.049     .0015487    .6428037
       _cons |   40.43697   6.908688     5.85   0.000     26.73832    54.13562
------------------------------------------------------------------------------
```

```
                                                Number of obs =     125
                                                F(  7,   117) =   13.88
                                                Prob > F      =  0.0000
                                                R-squared     =  0.5133
                                                Root MSE      =  7.2011
------------------------------------------------------------------------------
             |               Robust
    sdorpse |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
         ge |  -.4463547   .1357197    -3.29   0.001    -.7151406   -.1775689
          t |   .0051368   .0213833     0.24   0.811    -.0372118    .0474853
         lo |  -3.740479   .7508782    -4.98   0.000    -5.227554   -2.253404
    fracreg |  -5.528914   2.828693    -1.95   0.053    -11.13099    .0731643
      urban |  -.1164946   .0736698    -1.58   0.117    -.2623938    .0294046
    loggdppc |   2.726509   1.081043     2.52   0.013     .5855604    4.867457
         u1 |   .2179057   .1391374     1.57   0.120    -.0576487     .49346
      _cons |   33.58406   4.875197     6.89   0.000     23.92898    43.23913
------------------------------------------------------------------------------

                                                Number of obs =      92
                                                F(  7,    84) =   14.57
                                                Prob > F      =  0.0000
                                                R-squared     =  0.4824
                                                Root MSE      =  12.135
------------------------------------------------------------------------------
             |               Robust
    smrihep |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
         ge |  -1.046676   .2927116    -3.58   0.001    -1.628765   -.4645867
          t |   .1628042   .0462207     3.52   0.001     .0708893    .2547191
         lo |  -2.168962   2.176393    -1.00   0.322    -6.496958    2.159035
    fracreg |   9.603215   5.402008     1.78   0.079    -1.139271     20.3457
      urban |  -.3581271    .163264    -2.19   0.031    -.6827955   -.0334587
    loggdppc |  -1.823214   3.015232    -0.60   0.547    -7.819333    4.172905
         u1 |   .8273677   .3201935     2.58   0.011     .1906279    1.464107
      _cons |   73.46179   14.06565     5.22   0.000      45.4907    101.4329
------------------------------------------------------------------------------
```