The pillars of corruption control worldwide: differences between rich and poor countries

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ABSTRACT

Corruption is a multidimensional phenomenon associated with several causes and effects. It critically undermines the economic and social development of nations. The scope of this paper is to examine the basic pillars of corruption control worldwide. More specifically, our analysis focuses on the study of the effects that the level of economic development, as we approach it by the gross national income per capita in purchasing power parities or current international dollars, the political system, as we approach it by the "freedom rating", an index comprising both political rights and civil liberties, and the level of government effectiveness, as we approach it by the "government effectiveness indicator" and the non-income level of human development, as we approach it by the non-income "human development index", exert on the perceived level of corruption. By investigating 178 countries all over the world using 2010 data we find that government effectiveness is the most critical factor determining the scale of corruption worldwide. Therefore, the single most important means to reduce corruption is to improve government effectiveness. Moreover, our analysis also reveals that the level of economic development is an important factor negatively correlated with the level of corruption only in relatively high economic development countries, while in the case of relatively low economic development

countries the political system seems to be another important factor determining the level of corruption.

Keywords: Corruption, government effectiveness, economic development, political system

JEL classification: D72, D73, H11, O11, O57

1. INTRODUCTION

Corruption is a universal, complex and multifaceted phenomenon (Aidt, 2003) associated with all forms of human organization[29]. It is arising in the interaction between the individual economic units and public officials. From the first stages of human civilization it has been acknowledged that whoever is in a position to exercise public power may also be tempted to use his office for individual benefit or interest. Corruption could be characterized as a "disease" inherent to public power and an indication of bad governance (Tiihonen, 2003). It has been identified either as among the greatest obstacles to economic and social development since it distorts the rule of law and weakens the institutional foundations on which economic growth depemds (World Bank, 2014) or at least as a serious obstacle to development (Aidt, 2009). However, although corruption is not limited to public sphere but it is extended to the private sphere as well[30], the major part of economic literature examines only public sector corruption, for two main reasons: first, the phenomenon is traditionally associated with the public sector where it is considered as a socially unacceptable behavior and second, widely recognized private sector corruption indices have not yet been constructed rendering the relevant empirical research extremely difficult and not generally acceptable, while at the same time private sector corruption is more or less socially tolerable.

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[29] The present paper is a revised version of our work "Corruption Control as a Quasi Luxury Good", *Hellenic Open University Discussion Papers*, DEO34, No 16, November 2013. The authors would like to acknowledge the very helpful comments of Professor Yorgos Rizopoulos, Associate Editor of EWJEB and two anonymous reviewers.

[30] For an analysis of private sector corruption, see mainly Transparency International (2009). Private sector corruption manifests itself in various forms, such as the adoption of "bad practices" by many large privately owned corporations in relation to the transparency of their data, publishing false accounting statements and the deception of stock-holders.

Corruption is usually defined as the abuse of public power for private benefit (Tanzi, 1998) or the abuse of public office for private gain (Martinez-Vazquez *et al.*, 2007). Various international organizations have been engaged with corruption. The World Bank defines public sector corruption as the abuse of public authority for private interest (World Bank, 1997). OECD defines public sector corruption as the misuse of public office, roles or resources for private benefit, material or otherwise (OECD, 1996). A definition provided by the nongovernmental organization Transparency International that covers corruption in both the public and the private sectors of the economy is the misuse of trusted power for own profit (Transparency International, 2011). Corruption can take up several facets, such as bribery, embezzlement, fraud, extortion and nepotism (Amundsen, 1999). It should be made clear however that corruption is not always related to personal gain. More often than not the beneficiaries are the so-called third parties, namely the families, friends or the political party to which the individual belongs or is associated.

It is useful to point out that corruption is a complex and a multidimensional phenomenon associated with several causes and effects[31]. The factors affecting corruption are numerous and have been widely discussed in relevant theory and empirical work. Among the most important ones we could include the level of economic development, the type of political authority, the quality of governance, the quality of the institutional framework, the effectiveness of the justice system, the degree of globalization, the level of competition, the structure and the size of public sector, as well as the cultural qualities, the geographic location and history[32]. Widespread corruption largely unveils the existence of institutional and political weaknesses as well as economic and social underdevelopment.

Basically, the level of corruption is determined by the interaction of two basic factors: public authority and morality. As a result, the analysis of this phenomenon should not focus exclusively on its economic, political, social and other exogenous to the individual person or "environmental" aspects. The general attitude towards corruption is also determined by the level of individual morality that is by the system of individual behavioral and moral attributes. However, having stressed this rather individualistic dimension of the phenomenon, we should mention that it is

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[31] For a useful presentation of the various causes and effects of corruption, see in Ata and Arvas (2011).

[32] For an analysis of the determinants of corruption see among others in Misra (2013), Churchill *et al*. (2013), ElBahnasawy and Revier (2012), Lambsdorff (2006), Knack and Azfar (2003) and Treisman (2000).

generally accepted that corruption is mainly considered as a social problem depending less on the individual psychological or personality characteristics of public employees and more on the cultural, institutional and political basis on which the specific nation is constructed (Sung, 2002), The determinants of corruption could be therefore distinguished between those that affect the motivations or incentives of agents to engage in corruption and those that create opportunities for developing corrupt activities (Martinez-Vazquez *et al.*, 2007).

The empirical analysis has established that the single most important factor affecting corruption is the stage or the level of economic development[33]. In this context, corruption could be considered to be both a cause as well as a consequence of poverty. The direction of causality between corruption and income per capita as an approximation of the level of economic development has already been under scrutiny in relevant empirical literature. It has been established that the extent of the impact of corruption on economic growth depends on the existing institutional environment (de Vaal and Ebben, 2011). Recent studies show that the direction of causality is mainly from income towards corruption. In this manner, one can reach the conclusion that the levels of corruption become lower when countries become richer and that there can be a transition from poverty to honesty and straightforwardness (Gundlach and Paldam, 2008). However, corruption control should not be considered as a good that individuals demand automatically once their incomes reach a certain threshold level. It is achieved only through the adoption and the efficient implementation of the appropriate long-run policies[34]. Moreover, we must point out that corruption is extensive in low income countries, not because their inhabitants present a natural proclivity towards the said phenomenon, but because the conditions of life make them prone to that (Lalountas *et al.,* 2011). That is it is not because people in low income countries are more corruptible than their counterparts in high income countries, but it is simply because conditions in poor countries are more conducive for the growth of corruption (Myint, 2000). The motive for the increase of personal income is indeed intense and is becoming more so due to widespread poverty and the low public sector salaries (Gray and Kaufmann, 1998). In low income economies, corruption can prove to be a "survival strategy" (Rose-Ackerman, 1999).

It is also acknowledged that there exists a strong interconnection between the level of corruption and the existing political system. Corruption is widely considered to be both a symptom and a cause for the malfunctioning of democratic institutions (Warren, 2004). A functioning democracy strengthens the control of corruption (Treisman, 2000). According to the mainstream view, political development and,

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[33] See mainly in Serra (2006), Lederman et al. (2005) and Treisman (2000).

[34] See further in Rontos *et al.* (2012a).

especially, democracy prove restrictive for the proliferation of corruption, especially political corruption, mainly because of the competition they set as a precondition for the acquisition of political office, which in turn presupposes widespread democratic participation. Moreover, democracy and the consequent accountability raise the costs of corrupt behavior limiting therefore the opportunities presented for corruption (Bohara *et al.*, 2004). In a sense, the political system or the "political macrostructure" is responsible for determining the political motivation of all players in a state system and it is the very reaction of these factors that determines the behavior of state bureaucracy (Lederman *et al.*, 2005). The relevant empirical analysis has established the view that democracy reduces corruption, without necessarily immediate results. In this context, one can easily assume that it is the democratic tradition or the time exposure to democracy and not just the adoption of a democratic regime that reduces corruption.

Moreover, we accept that corruption is also associated with the degree of government effectiveness that determines the opportunities open to corruption activities in a given country. Government effectiveness generally refers to governance quality and performance or to the degree that the public sector achieves the objectives it is supposed to meet. We argue moreover that corruption is also affected by the degree of human development that is by the level of health, the degree of access to knowledge and the level of well-being prevailing in a given country, as a wider notion than economic development. Human development refers to the expansion of people's freedoms and capabilities to live their lives as they choose (UNDP, 2009).

In spite of the large bulk of the existing empirical work the issue of the main determinants of corruption remains widely debated and no real consensus has emerged (ElBahnasawy and Revier, 2012). The scope of the paper is to provide some further insight into the question of what are the main factors that determine the level of corruption worldwide. More analytically, the first objective of the paper is to examine the factors discussed above that is low level of economic development, restricted political freedom, low government effectiveness and low level of human development, as the main causes of corruption in the world. Our analysis indicates that government effectiveness is of crucial importance in determining the extent of corruption worldwide, while economic development is a factor affecting corruption only in countries of relatively high level of economic development. However, in countries of relatively low economic development, the extent of political rights seems to be a critical factor affecting the level of corruption.

2. DATA AND METHODOLOGY

To explore the main factors that determine the phenomenon of corruption worldwide, regression modeling was used with corruption as the expected dependent variable. Concerning the regression approach, a multiple linear regression model of the following general specification was used: $Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + e$. The dependent variable (Y) is corruption while the explanatory variables (X_1, X_2, X_3 and X_4) are the indexes of the level of income, the level of democracy, the degree of government effectiveness and the level of human development associated with each individual country and e is the error term. Equations' goodness of fit is examined according the Coefficient of determination R^2 multicollinearity problems according to the correlation between independent variables, Tolerance statistics, VIF conditional index, and Eigenvalue, while linearity is examined according the correlation between dependent and each independent variable. Normality is examined according to skewness and kurtosis statistics of studentized deleted residuals and Kolmogorov-Smirnov statistic, while heteroscedasticity according to the scatter-plot of studentized deleted residuals versus standardized predicted value. Autocorrelation problems are examined according Durbin-Watson test.

The cases under consideration were 178 countries all over the world that is all countries for which data on all the above variables existed, while the data for all variables refer to the most recent year 2010. Our analysis is based on four explanatory variables that have been selected following the relevant theoretical and empirical research.

To express corruption, the corruption perceptions index (CPI) has been used as a predicted variable. The CPI is an international index provided annually by the nongovernmental organization Transparency International since 1995. It should be acknowledged that CPI is the most extensively used index for relevant empirical studies[35]. It is a composite indicator, based on a variety of data derived from 13 different surveys carried out by 10 independent and reputable organizations. It measures corruption in a scale from 0 to 100 (until 2011 from 0 to 10), where 0 represents the highest possible corruption level, while as the scale increases there is the perception that corruption does not exist in a given country. The index as it is expected by its nature is not the outcome of an objective quantitative measurement of corruption. However, it is of great importance since it reveals how this phenomenon is being perceived. The major strength of the CPI lies in the combination of multiple data sources in a single index, a fact that increases the

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[35] For a comprehensive evaluation of the CPI, see mainly in Andersson and Heywood (2009).

reliability of each country's score (Lambsdorff, 2006 and Lambsdorff, 2004)[36]. The data used for the CPI refer to the year 2010 and as it has already been stated are provided by Transparency International (2010) and for that year cover 178 countries or territories. These are the economies included in our analysis.

The explanatory variables selected according to the relevant theory were the following:

1. Gross National Income per capita in purchasing power parities (or current international dollars- GNIpc,ppp) in 1000 $ is used to approximate the level of economic development in each country. GNIpc,ppp is gross national income (GNI) converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GNI as a U.S. dollar has in the United States[37]. GNIpc,ppp is very useful in economic analysis when the objective is to compare broad differences between countries in living standards since, as we have stated, purchasing power parities take into account the relative cost of living in various countries, while nominal GNI or GDP per capita that is widely used does not incorporate any such considerations. The data used refer to the year 2010 and are provided by the World Bank (2010) and for that year cover 215 economies.

2. The "Freedom Rating" index (FR) as a measure of the democracy level in each country. The FR index is estimated by the organization Freedom House (2012). It is the average of the political rights (PR) and civil liberties (CL) ratings and determines the overall status of each country as far as the associated level of democracy. The PR ratings are based on the evaluation of three sub-indexes, namely electoral process, political pluralism and participation and functioning of government, while the CL ratings are based on the evaluation of four sub-indexes, namely freedom of expression and belief, associational and organizational rights, rule of law, and personal autonomy and individual rights. The FR index measures from 1, which ranks a country as very free, up to 7, which ranks a country as not free. Freedom House classifies countries according to FR index in 3 categories, namely free countries (F) with score 1.0-2.5 in the 1-7 scale, partly free countries (PF) with score 3.0-5.0 in the 1-7 scale and not free countries (NF) with score 5.5-7.7 in the 1-7 scale. The data used for the FR index refer to the year 2010 and are provided by the organization Freedom House (2010) and for that year cover 194 countries and 14 territories.

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[36] For a comparative analysis of the various corruption indices, see UNDR (2008).

[37] See http://data.worldbank.org/indicator/NY.GNP.PCAP.PP.CD.

3. To express government effectiveness the relevant World Bank government effectiveness indicator (GE) has been used. This indicator is very useful because it aims at capturing the quality of public services provided, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies (Kaufmann *et al.* 2010). The aim of the indicator is therefore to capture the capacity of the public sector to implement sound policies. GE is one of the six composite indicators of broad dimensions of governance, the so called worldwide governance indicators (WGI) covering over 200 countries since 1996 and produced by the World Bank (2010). The values of GE lie between -2.5 and 2.5. Actually, the variable has been transformed to a standard normal one (with mean 0 and standard deviation 1), so that cross-country and over time differences in the measurement scale are avoided. Higher values correspond to better governance. Although this indicator measures subjective perceptions regarding government effectiveness and it is not the outcome of a quantitative objective measurement, it is of a great importance since it reveals how government effectiveness is being perceived.

4. The value of the human development index (HDI) is used as a summary measure of the level of human development since one would expect that corruption is also affected by the degree of human development. The HDI is estimated by the United Nations Development Programme (UNDP) and it measures the average achievements in a given country in three dimensions of human development: a long and healthy life, access to knowledge and a decent standard of living. It is a composite index with life expectancy in birth, mean years of schooling, expected years of schooling and gross national income (GNI) per capita as its main components. Despite its inherent limitations it is a useful comparative measure of the level of well-being of population. According to this index countries are classified in four categories: Very high human development if they belong to the top quartile of all countries, high human development if they belong to the percentiles 51-75, medium human development if they belong to the percentiles 26-50 and low human development if they belong to the bottom quartile. The closer the value of the index is to 1 the higher the level of human development is considered to be associated with the relevant country. As GNI is included in the regression models as a separate explanatory variable, the non-income HDI value was used. The data used for the non-income HDI refer to the year 2010, are provided by the UNDP (2010) and for that year cover 169 countries and 25 territories.

All dependent and explanatory variables of the regression models are quantitative, measured in the scales suggested by the organizations that produce them. The

normality of the dependent variable was tested, while linearity, multicollinearity, heteroscedasticity and autocorrelation checks were also carried out for each model tested. The explanatory power of the model was expressed by the adjusted coefficient of determination (R^2). The stepwise procedure used by the SPSS package was employed for building the models, with a probability of F equal to 0.05 as a criterion to enter a variable and equal to 0.10 as a criterion to remove a variable. The economic significance (the direction of the effect) of each variable was also a criterion for its approval.

3. EMPIRICAL MODELS AND RESULTS

Following the basic determinants of corruption described and discussed above we construct our empirical models. Namely, by using GNIpc.ppp, FR, GE and non-income HDI as predictors, we obtained the following regression results for all countries:

CPI = 4.514 + 1.109 GE + 0.061 GNIpc.ppp – 0.17 FR – 1.046HDI   (1)
     (t=15.540**)   (t=9.685**)   (t=8.695**)   (t=-4.024**)   (t=-2.479*)

where **represents $p<0.001$ and * represents $p<0.05$)

$R^2 = 0.845$ and DW = 2.174.

Model 1 suggests that the higher the income per head, the better the government effectiveness and the higher the level of democracy is associated with each country the lower the perceived level of corruption is associated with the specific country. However, non-income human development seems to be associated with a statistically significant negative impact on the level of corruption. This outcome that could be attributed to the great heterogeneity of the counties as far as this factor is concerned. It must be stressed therefore that our analysis does not confirm the prevailing hypothesis that more corrupt countries tend to have lower levels of human development (Akçay, 2006) and that higher levels of human development correspond to lower levels of corruption. It seems that the relationship between corruption and human development may not be very straightforward.

As a result the variable HDI is omitted from our models since its b coefficient presents no economic significance. Having removed the HDI as an explanatory variable we obtain the following regression results:

CPI = 3.921 + 1.073 GE + 0.053 GNIpc.ppp – 0.161FR   (2)
     (t=23.441**)   (t=9.311**)   (t=8.439**)   (t=-3.77**)

where **represents p<0.001

$R^2 = 0.839$ and DW $= 2.133$.
Relative contribution of each explanatory variable to the total variation of the dependent variable is presented below:

$R^2_{GE} = 0.767$
$R^2_{GNI} = 0.059$
$R^2_{FR} = 0.013$

According to the statistics mentioned in the methodology section, we can conclude that the model follows linearity criteria ($r_{Y,Xi}>0.8$ - With the correlation between CPI and FR as an exception where $r = -0.616$) and in the same time does not present multicolleniarity ($r_{Xi,Xj}\leq0.7$, Tolerance Statistics are high, VIF<10, Conditional Index=0.475<15, Eigenvauue is near but not equal to it)), heteroscedasticity or autocorrelation (d=2.133) problems.

Since the level of income per head appears to be highly associated with the degree of corruption we reformulate model (2) by introducing a dummy variable that takes the value 1 if the country is considered as being of relatively low economic development and 2 if the country is considered as being of relatively high economic development by using the median gross national income in purchasing power parities (GNIpc.ppp) in 1000 $ (M= 7.025$) as the criterion of division. We obtain the following regression results:

CPI=4.51 + 1.1 GE + 0.061 GNIpc.ppp −0.17 FR -0.449GNI.LEVEL   (3)
   (t=15.630**)   (t=9.646**)   (t=8.656**)   (t=-4.018**)   (t=-2.479*)

where **represents p<0.001 and * represents p<0.05)

$R^2 = 0.845$ and DW $= 2.156$. Relative contribution of each explanatory variable to the total variation of the dependent variable is presented below:

$R^2_{GE} = 0.767$
$R^2_{GNI} = 0.059$
$R^2_{FR} = 0.013$
$R^2_{GNI\ LEVEL} = 0.006$

All tests made for the equation 3 indicate that we have to keep it as appropriate to describe the relation between dependent and independents variables.

It seems therefore that the classification of countries in relatively rich and relatively poor has an important significance when we try to investigate the factors affecting the degree of perceived corruption associated with each individual country. We proceeded therefore our analysis by dividing all countries into two groups i.e. relatively rich and relatively poor and we used all our initial explanatory variables in order to explore possible differences between the two groups in the factors that determine corruption in each group. We obtained the following results for each group of countries:

HIGH INCOME: CPI = 3.415 +1.915 GE + 0,029 GNIpc.ppp $\quad$ $R^2 = 0.885$ $\quad$ (4)

LOW INCOME: CPI = 4.028 +1.098 GE - 1.25 FR $\quad\quad\quad$ $R^2 = 0.664$ $\quad$ (5)

In model 4, that is in the case of relatively high income countries, b coefficients (1.915 and 0.029) suggest that GE and GNIpc.ppp are in the expected direction, indicating that in a certain country of the group studied, the higher the income per capita and the government effectiveness the lower the corruption and vice versa. Stepwise procedure did not include FR and non-income HDI into the model as these variables do not add to the explanatory power of the model in a statistically significant level. The b's coefficients of GE and GNIpc,ppp are statistically significant ($t_{GE} = 15.858$, $p = 0.00 < 0.001$ and $t_{GNI} = 3.9$, $p = 0.00 < 0.001$). Additionally, the constant coefficient is of a significant level as well ($t = 21.42$, $p = 0.00 < 0.001$). The relative importance of b coefficients is revealed by their standardize value (table 1). % Standard error of estimation is equal to 14.5%, lower than the typical limit of 20%. In the first stage of the stepwise procedure without GNIpc.ppp in the model the standard error of estimation was 15.7 %.

Table 1. Regression model of the high income group of countries

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	3.916	.102		38.542	.000		
	GE.2010	2.236	.096	.930	23.395	.000	1.000	1.000
2	(Constant)	3.415	.159		21.420	.000		
	GE.2010	1.915	.121	.796	15.858	.000	.537	1.861
	GNIpc.ppp.2010	.029	.007	.196	3.900	.000	.537	1.861

Dependent variable: CPI, N = 88

The model has a very good total explanatory performance, as the coefficient of determination $R^2_{GE, GNI}$ = 88.2%. GE is the first explanatory variable which entered to the model, explaining the most of the dependent's variation (R^2_{GE} = 86.1%). GNIpc.ppp adds a 2.1% in the equation's goodness of fit. Additionally, between independent variables a rather weak correlation appeared (table 2), a fact that does not indicate possible multicollinearity problems. On the other hand linearity seems to be very strong between CPI and GE and strong enough between CPI and GNIpc.ppp ($r > 0.7$).

Table 2. Pearson correlations

		CPI.2010	GE.2010	GNIpc.ppp.2010
Pearson Correlation	CPI.2010	1.000	.930	.738
	GE.2010		1.000	.680
	GNIpc.ppp.2010			1.000
Sig. (1-tailed)	CPI.2010		.000	.000
	GE.2010			.000

Tolerance statistics are high and VIF are low (VIF = 1.861 < 10) for all independent variables, indicating no serious multicollinearity problems (table 1). Conditional index for the last dimension is low 5.079 < 15 and Eigenvalue is near to 0 but not equal to it, both indicating not serious multicollinearity. The GNI.pc.ppp variable is the only one associated with high variance proportions in last dimension.

Table 3. Collinearity diagnostics of the final stepwise model

Dimensions of final stepwise model	Eigenvalue	Condition Index	Variance Proportions		
			(Constant)	GE.2010	GNIpc.ppp.2010
1	2.424	1.000	.03	.05	.02
2	.482	2.243	.21	.48	.00
3	.094	5.079	.76	.47	.97

Taking into consideration the above criteria, we could conclude that there are not serious multicollinearity problems in the model. Durbin-Watson test did not indicate autocorrelation as d = 1.931 > d_U = 1.70 and 4-d = 2.069 > d_U = 1.70 with explanatory variables K = 2, a = 0.05 and n = 88. Additionally, studentized deleted residuals seem to follow the normal distribution according to all statistics and tests (skewness statistic = -0.057, std. error = 0.257, kurtosis statistic = -0.297, std. error = 0.508) and Kolmogorov-Smirnov statistic = 0.046, df = 88, p = 0.20). Finally homoscedasticity assumptions seem to be followed. The aforementioned results suggest that the model has a good explanatory performance, the coefficients appear to have statistical and economic significance and the assumptions for the model approval are followed. Because of that we approve the model indicating the existence of linear dependence of CPI on GE and GNIpc.ppp.

In model 5, that is in the case of relatively low income countries, b coefficients (1.098 and - 1.25) suggest that GE and FR are in the expected direction, indicating that in a certain country of the group studied, the higher the degree of government effectiveness the lower the corruption and vice versa and the higher the democracy level the lower the corruption and vice-versa.

Stepwise procedure did not include GNIpc.ppp and non-income HDI into the model as it does not add to the explanatory power of the model in a statistically significant level. The b's coefficients of GE and FR are statistically significant (t_{GE} = 9.624, p = 0.00 < 0.001 and t_{FR} = -3.088, p = 0.003 < 0.01 -table 4). Additionally, the constant coefficient is of a significant level as well (t = 25.337, p = 0.00< 0.001). % Standard error of estimation is equal to 19.8%, just lower than the typical limit of 20%. Relative importance of b coefficients is revealed by their standardize value (table 4). The entrance of FR in the model reduces the Standard Error of Estimation in the above level, as in the first stage (with only the GE) it was   20.8   %.

Table 4. Regression model of the low income group of countries

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.	Collinearity statistics	
		B	Std. error	Beta			Tolerance	VIF
1	(Constant)	3.618	.092		39.466	.000		
	GE.2010	1.266	.105	.792	12.011	.000	1.000	1.000
2	(Constant)	4.028	.159		25.337	.000		
	GE.2010	1.098	.114	.687	9.624	.000	.775	1.290
	FR.2010	-.125	.040	-.220	-3.088	.003	.775	1.290

Dependent variable: CPI, N = 89

The model has a quite good total explanatory performance, as the coefficient of determination $R^2_{GE, FR} = 65.6\%$, indicating however that some other factors not incorporated in the model might affect the level of corruption in low income economies. GE is the first explanatory variable which entered to the model, explaining the most of the dependent's variation ($R^2_{GE} = 62.8\%$). FR adds a 3.8% in the equation's goodness of fit. Additionally, between independent variables a rather weak correlation appeared (table 5), a fact that does not indicate possible multicollinearity problems. On the other hand linearity seems to be very strong between CPI and GE and rather weak between CPI and FR.

Table 5. Pearson Correlations				
		CPI.2010	GE.2010	FR.2010
Pearson Correlation	CPI.2010	1.000	.792	-.546
	GE.2010		1.000	-.474
	FR.2010			1.000
Sig. (1-tailed)	CPI.2010			
	GE.2010	.000		
	FR.2010	.000	.000	

Tolerance statistics are high and VIF are low (VIF = 1.290 < 10) for all independent variables, indicating no serious multicollinearity problems (table 4). Conditional index for the last dimension is low 6.368 < 15 and Eigenvalue is near to 0 but not equal to it, both indicating not serious multicollinearity (table 6). The FR variable and the constant of the regression are associated with high variance proportions in last dimension.

Table 6. Collinearity diagnostics of the final stepwise model

Dimensions	Eigenvalue	Condition Index	Variance Proportions		
			(Constant)	GE.2010	FR.2010
1	2.644	1.000	.02	.04	.01
2	.291	3.012	.13	.83	.02
3	.065	6.368	.86	.13	.96

Taking into consideration the above criteria we could conclude that there are not serious multicollinearity problems in the model. Durbin-Watson test did not indicate autocorrelation as $d = 2.174 > d_U = 1.70$ and $4-d = 1.826 > d_U = 1.70$ with explanatory variables $K = 2$, $a = 0.05$ and $n = 89$. Additionally, studentized deleted residuals seem to follow the normal distribution according to all statistics and tests (skewness statistic = 0.563 with std. error = 0.255, kurtosis statistic = 1.028, std. error = 0.506) and Kolmogorov-Smirnov statistic = 0.087, df = 89, p = 0.092). Finally, our analysis reveals that homoscedasticity assumptions seem not to be considerably violated.

The aforementioned results suggest that the model has a good explanatory performance, the coefficients appear to have statistical and economic significance and the assumptions for the model approval are followed. Because of that we approve the model indicating the existence of linear dependence of CPI on GE and FR.

Concluding the results of our analysis, we could argue that both models of high and low income economies should be accepted from the statistical and economic point of view indicating, at the same time, similarities and differences between countries with several levels of economic performance as far as the explanation of corruption is concerned.

4. DISCUSSION OF THE RESULTS AND CONCLUSION

The above empirical analysis has highlighted that the most critical factor that determines the level of corruption worldwide is government effectiveness and not the level or stage of economic development suggested by the existing empirical analysis highlighted above. A conclusion that has very important policy implications. As a result, the first step or the basic means towards reducing corruption is improving the quality of governance. Moreover, our analysis also reveals that the level of economic development is an important factor reducing the level of corruption. Its impact however is not universal. Its effects are significant only in relatively high economic development countries, while in the case of relatively low economic development countries the political system seems to be a critical factor determining the level of corruption rather than the level of economic development.

Corruption control could therefore be considered as a "quasi luxury good" the demand of which increases once the level of economic development rises to a certain level. However, the control of corruption is not an automatic process that starts only when the level of development rises. It is achieved only through the adoption and effective implementation of the appropriate long-run policies. In low

income countries corruption is to some extent a "survival strategy". In order to survive and support their families, low paid public sector employees may need to moonlight or take small bribes, especially when their jobs are associated with high degree of uncertainty, mainly due to political instability, that reduces the probability of future wages appropriation. According to this line of thought, corruption is a "disease" caused by poverty, or a by-product of poverty that only diminishes when economies develop.

The political system seems to be another critical factor that affects the extent of corruption worldwide. The two variables, namely CPI and FR, are negatively correlated. That is higher values of FR, that is reduced freedom countries, are associated with lower values of CPI, that is higher perceived levels of corruption. Our analysis has shown that the political system as it is approached by the FR index exerts an important impact towards the reduction of the perceived level of corruption mainly in relatively low economic development countries. The more open the democracy is, that is the more free the electoral process, the higher the political pluralism and participation, the more effective the functioning of government, the higher the freedom of expression, association and organization, the better the rule of law and the higher the personal autonomy and individual rights, the more the phenomenon of corruption is perceived as limited. Generally, corruption is considered to be both a symptom and a cause for the malfunctioning of democratic institutions. Political development, however, and democracy in particular, can reduce corruption. Yet, the transition form an autocratic to a democratic political regime does not constitute the critical turning point for controlling corruption, especially when the latter has been present for a considerable period of time and has identified itself as a bad practice of the "institutional" state structure. It is only the long lasting and true democratic form of government and the establishment of a genuine democratic tradition that prove to be factors of critical importance for tackling corruption.

In line to our empirical analysis presented above, it could be argued that the most important guarantee for crushing corruption especially in developing countries is improving government effectiveness and securing the smooth functioning of democratic institutions and civil liberties. Notions such as transparency, collectivism, rule of law, freedom of expression, association and organization etc., constitute but a few of the ingredients to a successful recipe of a smooth operation of a lawful state. Western type democracies owe their prosperity to a great extent exactly to these factors. It goes without saying that one can encounter phenomena of institutional degradation in favor of personal gain, but these take the form of isolated economic scandals rather than large-scale corruption.

Corruption finds fertile ground for growth in countries that find themselves in economic, political and social instability. The more unitary, concrete and stable the

country is, the harder it becomes for phenomena that can paralyze state structures like corruption to prosper. On the contrary, countries that are characterized by a multicultural and mixed national culture, by cultural disparities, by economic instability and social inequalities and a fluid and changing environment in the allocation of political power, are those countries in which corruption is easier to infiltrate and prosper[38]. Moreover, it should not be ignored that in a world that is increasingly globalized corruption cannot always be solely attributed to deficiencies of the domestic political and economic system. On the contrary, imported factors often affect the perceived level of corruption by invading the state mechanisms[39].

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[38] See further in Rontos *et al.* (2012b).

[39] For this line of reasoning, see Sioussiouras and Vavouras (2012).

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