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Electoral Rules and Economic Growth: Is Corruption a Relevant Channel?

Mona Fayed
Faculty of Economics and Political Science
Cairo University, Orman, Giza, Egypt
E-mail: monaesam@feps.edu.eg
Tel: +2 01001461536

Asmaa Ezzat
Faculty of Economics and Political Science
Cairo University, Orman, Giza, Egypt
E-mail: asmaaezzat@feps.edu.eg
Tel: +2 01005038287

Abstract

The underlying study empirically examines whether corruption is a significant channel through which electoral rules affect economic growth. Furthermore, it estimates the direct impact of these electoral rules on growth. This is done by employing (3SLS) estimation on a system of two equations, where both corruption and GDP growth are determined jointly by a set of control variables and electoral rules. Using panel data for a sample of 113 democratic countries over the period (1995-2012), the results suggest that electoral rules are important determinants of economic growth. On one hand, it was shown that mixed electoral rules only have a direct significant positive impact on growth compared to proportional representation. On the other hand, plurality electoral rules are accompanied by higher growth rates – compared to proportional representation- only indirectly through lowering the level of corruption. Moreover, the findings of this study support what is known as "sanding the wheels" hypothesis which presumes a negative effect of corruption on growth. However, this result was not robust to using different measures of corruption and estimation techniques.

Keywords: Electoral Rules, Constitutional Rules, Economic Growth, Corruption, Three Stages Least Squares (3SLS).
JEL Classification: D73, E02, K10, O43, O50

1. Introduction

Designing or redesigning constitutions is considered a difficult task. Different national and international actors keep thinking about the appropriate type of constitutions that should be adopted. In many cases, deciding on the type of constitution is affected by historical experiences. For example, many British ex-colonies decided to follow the British model and opted for parliamentarism and plurality electoral rules. In other cases, political elites chose to adopt a certain constitution based on self-interest, and thus they opted for the political institutions that benefit themselves. However, if actors were to consider what benefits their country as a whole, while choosing the appropriate

constitution, they would take into account the likely economic consequences of institutional choices (Knutsen, 2011).

Many studies showed that political institutions are likely to affect the decision of the government concerning the economic policies to follow (Persson and Tabellini, 2003 and 2004; Rodrik, 1996), as well as the economic institutions to establish (North, 1990; Acemoglu et al., 2001, Acemoglu and Robinson, 2006). Since both economic policies and institutions are important for economic growth, therefore political institutions are likely to be important for growth as well. However, there is no consensus on what specific types of formal political institutions improve growth rates. From these political institutions that proved to be of high importance are the democratic constitutional rules or arrangements that any country adopts (Knutsen, 2011).

Thus, it is so important to analyze the economic effects of different constitutional rules in order to decide on the appropriate democratic constitution to adopt. The economic analysis of constitutions, known as "***constitutional economics***" or "***constitutional political economy***," came to serve this goal. It is considered a young research field, with two broad branches. The first is the normative branch, which is interested in legitimizing the state and its most basic rules by drawing solely on the self-interest of rational individuals. This branch is interested in proposing Pareto-superior rule changes. The second is the positive branch which tries to explain the different economic consequences of alternative constitutional rules, as well as the emergence and modification of constitutional rules. Many scholars pointed that there are sharp differences between the two approaches to constitutional-institutional analysis. Until recently the normative approach to constitutional analysis was much better developed in the literature than the positive one. But over the last two decades, this situation has changed dramatically and many important contributions to the positive branch of constitutional political economy have been presented. Many of these contributions deal with the economic effects of constitutions. There is now substantial evidence that constitutional rules do have important economic effects (Voigt, 2011).

Among the main constitutional institutions or rules that were fairly analyzed in the literature are the ***electoral rules***. Political scientists have long been interested in the potential political consequences of electoral rules, such as nature of the party system and regime stability. Lately, there has also been an increasing focus on the economic effects of the electoral rules (Alfano and Baraldi, 2012; Berggren and Klitgaard, 2002; Blume et al., 2009a; Persson and Tabellini, 2003 and 2004). Accordingly, many theoretical insights and empirical results were presented in this regard. They indicated that these electoral rules may affect economic growth through systematically affecting governments' economic policies and countries' economic institutions (Knutsen, 2011).

It is also worth mentioning that economic policies, economic institutions, and in turn economic growth, differ among countries depending on the extent of ***corruption*** prevailing in the country. Corruption is one cause of government inefficiency and is defined as the use of public power to get personal or private gains (Tanzi, 1998). In fact, the relationship between growth and corruption has attracted the attention of economists trying to understand how corruption affects growth (Azpitarte, 2011). Many recent studies showed a significant negative relation between the two variables (Akai et al., 2006; Anoruo and Braha, 2005; Mauro, 1995 and 1996; Tanzi, 2006). Yet this result still cannot be generalized.

Furthermore, corruption depends on the degree of ***transparency*** and ***accountability*** prevailing in the country which may differ according to the electoral rules adopted. Recently, a new and growing literature has come forward to support this result by addressing and studying the relationship between political institutions, including electoral rules, and corruption (Kunicova and Ackerman, 2005; Menocal, 2011; Persson and Tabellini, 2000).

According to the previous discussion, it can be noted that beside the direct effect that electoral rules could have on economic growth, there could also be an indirect effect through governance quality and corruption. While most research, in this context, is exclusively focused on either this direct effect of electoral rules on growth (e.g. Knutsen, 2011; Persson and Tabellini, 2003 and 2006), or the impact of electoral rules on corruption (e.g. Kunicová and Ackerman, 2005; Persson et al. 2003b), very little is

known in the context of the indirect effect of electoral rules on growth through the channel of corruption. Accordingly, the main objective of this paper is to empirically investigate the direct effect of electoral rules on economic growth, in addition to testing whether corruption can act as a channel of impact in the electoral rules and economic growth nexus.

To the best of our knowledge, this is the first empirical study that tries to examine the role of corruption as a transmission channel for the impact of electoral rules on economic growth. So, it is believed that this study will contribute, with a preliminary value added, to the empirical literature on the economic and institutional effects of electoral rules. It may also help to stand on the appropriate electoral rules that should be adopted to deter corruption and improve growth rates in democratic countries, taking into account different historical, economic and political characteristics that may vary among countries and over time.

To this end, the remainder of the paper is organized as follows: Section 2 introduces the theoretical background of the electoral rules, corruption and economic growth nexus. This is besides highlighting the empirical literature in this context. Section 3 outlines the empirical methodology, main variables used in the analysis and data. Empirical results and analysis are reported in section 4. Finally, section 5 concludes and offers some policy implications.

2. Literature Review

This section starts by giving a theoretical background on the emergence of constitutional economics, as a part of institutional economics, which considers constitutional rules, including electoral rules, as a determinant of economic growth. This is followed by reviewing the theoretical and empirical literature tackling the direct impact of these rules on economic growth, as well as on corruption. Moreover, we shed some light on the literature concerned with the effect of corruption on economic growth.

2.1 Theoretical Background

Despite the fact that neoclassical and endogenous growth theories are still vibrant in economics and have provided many insights on the mechanics of economic growth, it seemed, for a long time, unable to provide a fundamental explanation for economic growth. As North and Thomas (1973) put it: "the factors we have listed (innovation, economies of scale, education, capital accumulation, etc.) are not causes of growth; they are growth". Factor accumulation and innovation are only proximate causes of growth. In North and Thomas's view, the fundamental explanation of comparative growth is differences in institutions. Accordingly, the differences in growth rates between countries were attributed to other variables, beside the traditional variables in growth models (e.g. labor, accumulation of physical and human capital, etc.), including the institutional environment and the quality of institutions (Marneffe et al., 2013). That is why *New Institutional Economics* (NIE) has emerged as a new field which focuses on institutions as one of the main determinants of economic growth.

Scholars working within the NIE usually analyze the (economic) effects of alternative institutions and/or the determinants of institutional change (e.g. North, 1990). Institutions can be defined as commonly known formal or informal rules and regulations used to structure regular interaction situations that have a sanctioning mechanism which can be employed in cases of noncompliance or disregard of a rule, whether the sanctioning is carried out by the state or the society. As long as constitutional rules are viewed as a specific kind of institution, the economics of constitutions can be part of NIE, and the NIE can be interpreted as the more inclusive research field (Voigt, 2011). In addition, constitutional economics can be included as a part of the broader research fields of *Political Economy* (PE) and *Public Choice*, since both study the intersection of economics and political science and illustrate how tools of economics can be applied to the areas traditionally reserved for political science (Acemoglu, 2005).

Economists have analyzed constitutions from different approaches, either as a social contract, as an incomplete contract, as a principal agent relationship, as a precommitment device, as a result of

cultural evolution, or as a bundle of conventions (Voigt, 1997). Many scholars have made major contributions to Positive Constitutional Economics (e.g. Blume et al., 2009a and 2009b; Hicken et al., 2005; Persson and Tabellini, 2003 and 2006). Many of these contributions focus on analyzing the economic effects of constitutional rules and especially those of electoral rules, which are the main focus of this paper.

Electoral rules refer to the way votes translate into parliamentary seats. Under *plurality/majority* rule (MR) (also called first-past-the post or winner-take-all), only the candidate supported by the largest number of voters in a district wins, and all other voters remain unrepresented. On the contrary, under *proportional representation* (PR), votes are translated into seats proportionally - i.e. parties are allocated seats according to the proportion of votes they obtain – to avoid over representing or under representing any parties in the parliament (Lijphart, 1999). Sometimes a distinction is made between electoral rules or formulas and electoral systems, where the latter include more dimensions than the first, such as district size and ballot structure. District size refers to the number of parliamentarians elected per district, and the ballot structure determines whether citizens can vote only for a party, only for an individual, or some combination thereof (Voigt, 2011). The majoritarian system[1] is the oldest electoral system in the world, and was, for a long time, the only system in use, where voters choose between individual politicians in single-member districts. It generally has small districts and it does not assure the representation of political minorities in Parliament. In contrast, in a proportional system, voters choose between lists of candidates presented by parties in multi-member districts. It has large districts and it guarantees the presence of a plurality of political parties in Parliament (Alfano and Baraldi, 2012; Gabel and Hix, 2005).

2.2 Electoral Rules, Corruption and Economic Growth Nexus

2.2.1 Impact of Electoral Rules on Economic Growth

Recently, many theoretical and empirical studies tackled the impact of electoral rules on economic growth. They indicated that these rules can affect growth in many ways. First, political economic literature stresses the importance of *political accountability* for achieving "good" policies and outcomes, including economic growth (Benhabib and Przeworski, 2005; Ferejohn, 1986). Under MR, accountability level is high. This induces office-motivated politicians to enact growth-promoting policies, since a minor improvement in the chance of winning the elections would create a large return in terms of seats in the parliament (Persson and Tabellini, 2004). Also, MR is associated with smaller district magnitudes, which eases voters' monitoring of candidates, thus improving accountability at the district-level. On the other side, PR increases the frequency of coalition governments (Persson et al., 2003a; Powell, 2000), in which political accountability is expected to be lower. This is because voters are not always able to discern who to blame for bad performance and who to appreciate or credit for good performance (Knutsen, 2011).

Second, electoral rules may also affect economic growth through affecting *public sector size*. PR increases taxation and public spending (Persson, 2005; Persson and Tabellini, 2003 and 2004). However, it is unclear whether balanced increases in tax revenues and public spending increase or reduce economic growth. Microeconomic theory points to distortionary effects of high tax-rates. However, more public revenue means better opportunities for investing in infrastructure, education and public health care, which enhance growth (Knutsen, 2011). In addition, PR systems are associated with higher budget deficits, and thereby public debt (Persson and Tabellini, 2004), which is theoretically

[1] There are two types of majoritarian systems: simple majority and absolute majority. The first occurs when the candidate who gets the largest number of votes is elected. The second one combines the effects of both rounds of voting in an absolute majority vote in a single round of voting. The electorate votes for a single candidate and in declining order indicate their preferences for the remaining candidates. If no-one gets the absolute majority in the first election, then the candidate who receives the smallest number of votes is eliminated, and the corresponding second choices are counted (Alfano and Baraldi 2012).

believed to reduce long run growth rates (Aizenman et al., 2007). So, the effect from electoral rule on growth via this channel is uncertain.

Third, *level of stability of government policies and reforms* are higher in PR systems relative to MR systems. This is because there are less abrupt changes in parliamentary seat composition before and after elections (Rogowski, 1987). On the contrary, one of the main problems with "majoritarian democracies" is the sudden and substantive policy-alterations induced by shifting electoral fortunes (Lijphart, 1999). Policy and reform reversals have negative economic effects, as they create instability and make private investments less productive (Rodrik, 1991).

Fourth, under MR, voters in small districts are perhaps more concerned with obtaining government resources or protectionist measures for their main industries. This is even at the expense of promoting nationwide growth. On the other hand, larger districts and more continuous mapping from votes to seats increase the incentives of politicians under PR systems to offer and enact *public policies* and *universal redistributive programs* that benefit broad rather than narrow interests, including *growth enhancing policies* such as provision of education and healthcare for the masses (Mankiw et al., 1992), property rights protection (Bueno de Mesquita et al., 2003) and free-trade policies (Rogowski, 1987).

Empirically, several studies indicated that PR increases the share of public spending going to universal programs, and that MR increases the share going to special interest groups, particularly geographically concentrated groups in electoral districts with tough competition (Persson and Tabellini, 2004; Milesi-Ferretti et al., 2002). Also, Persson (2005) found that PR improves property rights protection and induces trade liberalization. Concerning the direct impact of electoral rules on growth, Persson and Tabellini (2003) found some evidence supporting the hypothesis that PR increases productivity growth compared to MR, but the result was not robust. In some models, Persson (2005) found a positive effect of PR on GDP per capita and total factor productivity. However, these effects again were not robust. Persson and Tabellini (2006) found no significant effect of electoral rules on growth, when studying democratizing countries. Older empirical studies, using smaller samples, generally found a small positive or no effect of PR systems on GDP growth (Lijphart, 1999). Furthermore, empirical results of Knutsen (2011) indicated that PR increase GDP per capita growth with 1 percentage point relative to plural-majoritarian systems.

2.2.2 Impact of Electoral Rules on Corruption

Another important channel through which electoral rules can influence economic growth is the channel of *corruption* and *political rent-seeking* - which is our main interest in this study. Theoretical arguments state that smaller electoral districts raise higher barriers to entry, which is predicted to increase corruption by reducing the choice set of voters. Moreover, electing politicians from party lists (rather than individually) weakens their incentives for good behavior, because it creates a free rider problem and a more indirect chain of delegation from voters to parties to politicians. Thus, voting for individual politicians rather than on party-lists is predicted to reduce the incidence of corruption (Persson and Tabellini, 2003). Accordingly, since PR systems typically combine large districts (which decreases corruption) and party-list ballots (which increases corruption) - while the opposite is true under MR systems - the aggregate effect of electoral rules on corruption is unclear and ambiguous (Alfano and Baraldi, 2012).

Empirically, results of Persson et al. (2003b) and Kunicová and Ackerman (2005), on the effect of these electoral rules on corruption, indicated that countries with proportional systems had much more widespread corruption, compared to countries with majoritarian systems. MR voting, on the other hand, did a better job at controlling corrupt political rent-seeking.

2.2.3 Impact of Corruption on Growth

Corruption resulting from electoral rules may have important implications for economic growth. Theory, generally, suggests that corruption slows economic growth through several channels. Corruption usually leads to inefficient economic outcomes, where it reduces domestic and foreign

investments, and creates more rent seeking activities. It also distorts sectoral policy choices by creating incentives to engage in large public projects, rather than smaller projects, which might be of greater importance to the economy. Corruption also generates economic distortions in the public sector by diverting public investment away from important sectors, such as education and health, to other sectors where it is easier to extract more bribes and with less supervision (e.g. military sector) (Akai et al., 2005; Mauro, 1995; Tanzi, 1998 and 2006).

Nevertheless, other views have found that some types of corruption could be growth enhancing (Leff, 1964; Lui, 1985). In this regard, some studies proved that corruption can have a positive impact on growth in an environment which is characterized by pervasive and cumbersome over regulation and red tape (weak governance). Opponents of this view consider bureaucracy corruption a second best solution that can actually lessen the burden of excessive regulation and hence have positive implications on growth and development (Bardhan, 1997). In other words, in a framework of imperfect competition, where several market failures prevail due to weak governance measures, corruption can induce a positive change by distorting the distorted market hence brining allocative and dynamic efficiencies (Mironov, 2005).This argument has been severely criticized, as it does not have theoretical foundations (Syef, 2001). Furthermore, "greasing the wheels" by "speed money" is considered a wrong argument as it enhances the discretion of corrupt politicians and senior government officials (Kaufmann, 1997).

Some empirical studies indicated the existence of a linear negative correlation between the level of corruption and the average rate of income growth (Brunetti et al., 1998; Hall and Jones, 1999; Méon and Sekkat, 2005; Mauro, 1995 and 1997). Yet, the evidence has not been pervasive or well established, since channels and significance of the effect differed. For example, Mauro (1995) found a significant negative relationship between corruption and growth, but after controlling for other variables, including investment, the effect of corruption became insignificant. Using a larger data set, Mauro (1997) concluded that the effect of corruption on per capita income growth rates was negatively significant. Mauro's results were later confirmed by Mo (2001).

Moreover, Carey and Hix (2009) showed that 'intermediate' electoral rules generate one of the beneficial outcomes of PR systems, which is a relatively accurate representation of various voters' preferences, without reducing much the accountability-benefit of MR systems. Accordingly, semi-PR systems may be expected to produce relatively high growth rates. The reason is simply that semi-PR systems may, to a large extent, possess the different advantages of both PR and MR systems, without having the respective systems' drawbacks. Moreover, Alfano and Baraldi (2012) have empirically confirmed that an intermediate level of proportionality characterizing an electoral rule is more likely to lead to greater rates of economic growth with respect to more "extreme" rules. They also showed that the effect of corruption on economic growth positively depends on the degree of proportionality of the electoral rules adopted, thus implementing a mixed rule characterized by a lower degree of proportionality will allow countries to obtain both a reduction in corruption and an increase in economic growth.

In sum, the aggregate effect of electoral rules on economic growth is ambiguous and uncertain, since each type of electoral rules has its own advantages and drawbacks. As mentioned before, the theoretical and empirical literature indicate that PR tends to increase growth compared to MR. However, MR results in less corruption and rent seeking, which is believed to enhance economic growth consecutively. Ultimately, which effect dominates remains to be an empirical matter.

Accordingly, *our main hypothesis here, based on the previous literature review, is that corruption could be regarded as a transmission channel for the effect of electoral rules on economic growth. Moreover, electoral rules are considered a direct determinant of growth. The direction of both the direct and the indirect effects, however, is left to empirical analysis.*

3. Empirical Methodology, Main Variables and Data

3.1 Empirical Methodology and Estimation Method

To test the validity of our main hypothesis, we follow an empirical methodology similar to that adopted by David de la Croix and Clara Delavallade (2011). This methodology is based on the estimation of a system of two simultaneous equations, one for corruption and another for economic growth, using panel data for a sample of 113 democratic countries during the period (1995 – 2012)[2]. The two equations are represented as follows:

$$Corruption_{it} = \alpha + \beta X_{it} + \gamma Electoral\_Rules_{it} + \varepsilon_{it1} \quad (1)$$

$$Growth_{it} = \delta + \theta Z_{it} + \rho Corruption_{it} + \tau Electoral\_Rules_{it} + \varepsilon_{it2} \quad (2)$$

Where:

$Corruption_{it}$: the level of corruption in country i at time t.

X_{it}: a vector of explanatory variables that includes main determinants of corruption for country i at time t.

$Electoral\_Rules_{it}$: dummy variables representing the electoral rules of country i at time t.

$Growth_{it}$: the annual real GDP per capita growth rate for country i at time t

Z_{it}: a vector of control variables representing the most important and well-known determinants of economic growth.

ε_{it1}, ε_{it2}: the error terms for the first and the second equations respectively, for country i at time t.

In this study, we are interested in calculating the direct and indirect impacts of electoral rules on growth. Thus, following Axel Dreher and Thomas Herzfeld (2005), and by using the decomposition method, the indirect effect is calculated by multiplying the effect of electoral rules on corruption (γ) and the effect of corruption on growth (ρ). On the other hand, the direct effect is captured by the coefficient of electoral rules in the growth equation (τ).

As for the estimation method, we will start by estimating the two equations individually using ordinary least squares (OLS). Then, the system of equations will be estimated using the three-stage least squares method (3SLS) which treats all equations and all parameters jointly and not equation-by-equation and results will be compared[3]. The (3SLS), developed by Zellner and Theil (1962), is considered as a full information method or a system estimation method that provides estimators correcting not only for the residuals' heteroskedasticity, but also for possible correlation between the disturbances of different equations. By taking into account such correlation between the residuals of different equations, (3SLS) yields more efficient estimators than equation-by-equation (2SLS) or classical estimations of panel data. In addition, the (3SLS) method reduces simultaneity biases. Accordingly, if there is a correlation between the regressors and the error terms, (3SLS) estimators will still be consistent, unlike ordinary least-squares estimators. The first stage of this method provides instruments for all endogenous variables. These instruments are the predicted values obtained from a regression of each endogenous variable on all exogenous variables included in the system. The second stage estimates each equation in the model separately, with the (2SLS) method, using instruments from the first stage. This allows retrieving a consistent variance-covariance matrix for the error terms of the model. The third stage performs a generalized-least square estimation using the variance-covariance matrix, estimated in the second stage, and the instruments of the endogenous variables, constructed in the first stage (Greene, 2003).

[2] The reason behind the selection of this period of time is data availability, since the data of corruption indicators used here in this study started to be published and available in the mid 90s - except for the International Country Risk Guide (ICRG) Index which is available for a large number of countries since 1984. That is why we chose 1995 as our start date. However, there are still some missing observations, because these indices were not available for all countries in 1995, and the number of countries included increased afterwards.

[3] All estimations and statistical tests are carried out using STATA statistical package, version 11.

3.2 Main Variables

As previously mentioned the adopted econometric specification is based on a set of two equations determining corruption and growth. In the first equation, corruption is explained by electoral rules and a set of control variables. The chosen set of control variables is based on the empirical results reached by Treisman (2000 and 2007) who examined extensively the robustness of various corruption determinants. Thus, we include in this equation a measure of ethnolinguistic fractionalization (*ETHNIC*), the share of Protestants in the population in 1980 (*PROTMG*), the percentage of parliamentary seats in a single or lower chamber held by women (*WIP*), the logarithm of the level of real per capita GDP (*LogGDPPC*), the share of government consumption expenditure in GDP (*GOVEX*) as a measure of state intervention in the economy, the value of imports of goods and services as a share in GDP (*IMPORTS_SHARE*) as a measure of openness for foreign trade and competition, the level of valuable natural resources endowments measured by the proportion of exports comprising fuels, metals and minerals (*FUEL_METAL_EXPORTS*), and the level of democracy (*DEMOC_LEVEL*) measured by the Freedom House/Polity IV index. In addition, four dummies are included accounting for English common law as the legal origin of the company law or commercial code in the country (*ENG_COMMONLAW*), British colonial heritage (*BRITISH_COLONY*), maintaining democratic institutions for a long time period (1930-1995) (*DEMOC_EXPOSURE*) and federal political structure (*FEDERAL*).

For measuring corruption, we rely on three composite corruption indicators that have been widely employed by several studies. The first is the Corruption Perceptions Index (*TI_CPI*), issued by Transparency International. The CPI focuses on corruption in the public sector and defines corruption as the abuse of public office for private gain. This index is constructed as a 'poll of polls' by drawing on information and ratings from various sources. It has been posted consecutively since 1995 for many countries around the world. It measures perceived corruption rated on a scale from 0 (most corrupt) to 10 (no corruption), i.e. a higher rating implies less corruption. The second is the Control of Corruption Index (*WB_CC*) compiled by the World Bank. It represents the perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. It ranges between –2.5 and 2.5, with higher scores corresponding to better control of corruption (i.e. less corruption). The third is the International Country Risk Guide corruption index (*ICRG*) issued by the Political Risk Services Group. It assesses corruption within the political system. Although it takes into account bribery and demands for special payments as a form of corruption, it is more concerned with actual or potential corruption in the form of excessive patronage, nepotism, job reservations, 'favor-for-favors', secret party funding, and suspiciously close ties between politics and business. The index ranges from 0 to 6, with higher scores indicating lower corruption levels. It is worth mentioning that, since these three subjective measures of corruption are highly correlated, we estimate our model three times using one of them each time to test for the robustness of the findings.

As for the second equation, it is a growth regression, where growth (*GDPPC_GROWTH*), is related to corruption, electoral rules, and a set of other control variables which are acknowledged by the existing empirical literature for their role as major determinants of economic growth. Following Barro (1998 and 2003), this set of control variables includes the logarithm of initial GDP per capita in constant 2005 US dollars in year 1995 (*LogGPPC_initial*). It measures the conditional rate of convergence to the steady state growth rate, which is expected - according to neoclassical models - to have a negative coefficient. It also includes the level of investment measured by gross capital formation as a percentage of GDP (*INV*), government consumption expenditure as a percentage of GDP (*GOVEX*), trade openness (*TRADE*) measured as the summation of exports and imports relative to GDP, average years of primary schooling for population aged 25 and above (*YR_SCHOOLING*) as

an indicator of human capital[4], as well as life expectancy at birth (*LIFEEXP)* to represent the level of health. Furthermore, population growth (*POP_GROWTH*) is included since it is indicated by previous studies (e.g. Barro, 2003; Barro and Sala-i-Martin, 1997) to have a negative effect on the steady-state ratio of capital to effective worker in the neoclassical growth model. Moreover, the equation includes another subjective indicator of the level of democracy (*DEMOC_LEVEL*), which ranges from 0 (least democratic) to 10 (most democratic). This indicator is an average for two indices one issued by Freedom House and the other issued by Polity IV project.

As for the variable of interest, which is electoral rules for legislature, we rely on data of one categorical variable HOUSESYS available from DPI (2012). This variable is coded 1 if Plurality is the electoral rule that governs the majority/all of the Lower House seats, 0 if Proportional Representation, and 0.5 if 50% Plurality and 50% Proportional Representation. Thus, we created three dummy variables. The first one is (*PLURAITY*), it takes the value of 1 if HOUSESYS equals 1, and it takes the value 0 otherwise. The second variable is (*PR*) which takes the value of 1 if HOUSESYS is coded 0, and it takes the value 0 otherwise. The third one is (*MIXED*), it takes the value of 1 if HOUSESYS is equal 0.5, and it takes the value 0 otherwise. In our model, we incorporate only two of these dummy variables, which are (*PLURAITY*) and (*MIXED*), and (*PR*) is considered the reference category. Definitions, descriptive statistics and correlation matrix for all variables used in the model are found in the appendix [Table 1, 2 and 3].

It is also worth mentioning that - following Persson and Tabellini (2003) - we drop autocracies from our sample and include countries of democratic rule only. We rely on two indices issued by Freedom House (political rights index and civil liberties index) in the selection process of the countries to be included in the sample[5]. Each of these indices ranges between 1 (most free) and 7 (least free). Countries whose combined average ratings for political rights and civil liberties fell between 1.0 and 2.5 were designated by Freedom House “Free”; between 3.0 and 5.5 “Partly Free”, and between 5.5 and 7.0 “Not Free”. Thus, in our study we only include countries with an average of the two indices lower than 5.5 during the period (1995 – 2012).

3.3 Data Sources

The primary source of data for institutional, political and historical variables used in our model is the Quality of Government (QoG) Standard Dataset (2013) issued by the QoG Institute – University of Gothenburg (Teorell et al. 2013). This dataset is considered mainly a pool of variables gathered from other original or secondary sources. It provides a wide range of variables on Quality of Government and all things related neatly packed together and instantly usable. The QoG standard dataset used here is the time-series (TS) version, where the unit of analysis is country-year (e.g. Sweden-1946, Sweden-1947 and so on).

The original source of data on electoral rules is the Database of Political Institutions (DPI) (2012) published by the World Bank, and created by Beck et al. (2001). As for corruption, we use data on corruption perceptions index issued by Transparency international, as well as control of corruption index published by the World Bank, which is one of the World Bank Governance indicators (2013). Moreover, we use data on International Country Risk Guide (ICRG) corruption index which is published by the Political Risk Services (PRS) Group (2014).

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[4] Since the data on educational attainment obtained from Barro and Lee Dataset is available for 146 countries in 5-year intervals from 1950 to 2010, we have filled in missing observations by forward and backward extrapolation techniques available in STATA software to get annual data for all countries included in the sample during the period (1995 – 2012).

[5] The Political rights index refers to the rights that enable people to participate freely in the political process, including the right to vote freely for distinct alternatives in legitimate elections, compete for public office, join political parties and organizations, and elect representatives who have a decisive impact on public policies and are accountable to the electorate. As for civil liberties index, it tries to indicate for the freedoms of expression and belief, associational and organizational rights, rule of law, and personal autonomy without interference from the state.

Data for all other economic and socio-economic variables are collected from the World Development Indicators database issued by the World Bank. Finally, data on education attainment is derived from Barro-Lee dataset version (1.3) (Barro and Lee, 2010).

4. Empirical Results and Analysis

The analysis starts by estimating individual regressions for the two dependent variables: corruption and growth (Table 4). In the first three columns we estimate the impact of electoral rules on corruption using the three indicators for corruption (Corruption Perceptions index in column 1 and Control of Corruption index in column 2 and ICRG corruption index in column 3). Results of the three models give strong evidence that corruption level is lower in highly developed countries, with a protestant tradition, a high share of women in parliament, more exposure to competition from imports, and an uninterrupted long history of democratic rule. In addition, the three models also show that corruption level is higher in countries with large endowments of valuable natural resources represented by high share of fuel, metals and minerals exports in total merchandise exports. Moreover, the results – surprisingly - strongly confirm that corruption is lower in countries with greater degree of state intervention in the economy, measured by the share of government consumption expenditure in GDP. This could be explained by the possible endogeneity of this variable. In addition, in democratic countries, state intervention may enhance the level of state supervision and detection of corruption rather than increasing the level of corruption. Besides, results show that corruption tends to be higher in more divided societies with high level of ethnic fractionalization. This is only true when using the corruption perceptions index (*TI_CPI*) to measure corruption, while this effect disappears when we use the other two measures of corruption (*WB_CC* and *ICRG*). Also, countries' colonial histories and level of democracy is very significant in predicting their current levels of perceived corruption when using World Bank control of corruption index (*WB_CC*) and International Country Risk Guide corruption index (*ICRG*) as dependent variables. Countries having former British colonial history and high level of democracy have significantly lower levels of perceived corruption. At the same time, the federal political structure dummy has a significantly negative impact on corruption (at 10% significance level) only when we use (*ICRG*) index. Finally, the dummy variable of English common law legal system indicates mixed results concerning its impact on corruption level. When we use (*TI_CPI*) as a measure of corruption, this common law system variable has a significantly negative impact on corruption, while the relation between the two variables turns into a significantly positive one when using the (*ICRG*) corruption index (only at 10% significance level), and it becomes insignificant when (*WB_CC*) index is used instead.

As for the impact of electoral rules on corruption, results of models 1 and 2 indicate that countries, where MR governs majority/all of the seats in the lower house, have significantly lower levels of corruption compared to countries applying PR rule. This result supports the findings of Persson et al. (2003b) and Kunicová and Ackerman (2005). They found that countries with proportional systems have much more widespread corruption compared to countries with majoritarian or plurality systems, and that plurality voting is associated with better control of corruption and political rent-seeking. However, in model 3 (*PLURALITY*) becomes insignificantly related to corruption when we employ the (*ICRG)* corruption index as the dependent variable. However, all models (1 to 3) show that mixed electoral rule has no significant impact on corruption compared to PR.

In models 4 to 6, we estimate the impact of electoral rules on economic growth, while controlling for corruption (using CPI in model 4, Control of Corruption Index in model 5, and ICRG corruption index in model 6). Results show that investment has a significantly positive impact on real GDP per capita growth rate at all significance levels. Also, human capital, measured by the average years of primary schooling for population aged 25, is significantly positively related to growth. Furthermore, government expenditure has a significantly negative impact on growth at 1% significance level. This supports the argument that a large government sector may induce inefficiencies and crowd out the private sector leading to lower growth rates (Dreher and Herzfeld, 2005). Both initial income

per capita (*LogGDPPC_initial*) and population growth rate (*POP_GROWTH*) have the expected negative signs and are statistically significant. Moreover, trade openness has no significant impact on growth in all models, while life expectancy has a significantly negative impact (at 5% significance level) only in model 4. In contrast, democracy level has a marginal significant effect on economic growth (at 10% significance level) only in model 5.

As for corruption, results in the three models (4 to 6) show that higher levels of corruption significantly lead to lower growth rates for per capita income. All corruption measures (*TI_CPI*, *WB_CC* and *ICRG* indices) have a significant positive coefficient at 5% significance level, except for *ICRG,* which has a significant coefficient at only 10% significance level[6]. This result supports the "sanding the wheels" hypothesis and the findings of several empirical studies that confirmed a linear negative correlation between the level of corruption and the average rate of income growth (Akai et al., 2005; Brunetti et al., 1998; Dreher and Herzfeld, 2005; Hall and Jones, 1999; Méon and Sekkat, 2005; Mauro, 1995 and 1997; Poirson, 1998).

Turning to the impact of electoral rules on growth, in models 4 to 6, both dummies of plurality and mixed electoral rules show no significant impact on growth. This fits with the results of Persson and Tabellini (2006), who found no significant effect of electoral rules on growth, when studying democratizing countries.

We further estimated the variance-covariance matrix for the residuals of the corruption and growth equations. The matrix indicated a correlation between the residuals of the two equations. Accordingly, we employed (3SLS) method to estimate the corruption and growth equations simultaneously. This would result in more efficient estimators and control for the endogeneity of corruption. Table 5, in the appendix, reports the system of the two equations estimated jointly by (3SLS), including (*TI_CPI*) as an indicator for corruption. Moreover, to test for the robustness of our results, we re-estimated the system once using the (*WB_CC)* Index (Table 6) and another time using the (*ICRG)* index (Table 7).

The (3SLS) estimation results (in all tables 5 to 7) are similar to that of (OLS) regarding coefficients' sign and significance of most of the control variables, except for a few of them. For example, life expectancy, in Table 5, no longer has a significant impact on economic growth after it has been a significant determinant of growth in (OLS) results (model 4 in Table 4). Also in Table 7, level of human capital, measured by average years of schooling, has no significant impact on economic growth unlike the (OLS) results, where schooling used to have a significantly positive impact on growth. Moreover, in Table 6 and 7, both corruption indices (*WB_CC)* and (*ICRG)* index have no significant impact on growth compared to a significantly negative impact in (OLS) results (model 5 and 6 Table 4). But the major differences between (OLS) and (3SLS) estimations lay in the results of the electoral rules variables in the growth equation of the system. (3SLS) results show that mixed electoral rule systems are significantly associated with higher rates of income growth compared to PR rule systems. This is unlike the (OLS) findings which supported no significant relation between electoral rules and economic growth.

Focusing on the (3SLS) results, we can see that countries with mixed electoral rule enjoy higher growth rates, by nearly 1.6 percentage points, compared to countries adopting PR rule. This is considered the direct effect of mixed electoral rules on growth, since the indirect impact transmitted through the channel of corruption could not be calculated because of the insignificance of the coefficient of (*MIXED*) variable in the corruption equation. This finding goes along with the results of the empirical study of Alfano and Baraldi (2012) which confirmed that a mixed electoral rule is more likely to lead to greater rates of economic growth relative to more "extreme" rules. As for plurality electoral rule, the empirical findings indicate that it has no significant direct impact on growth. However, according to the results of Table 5, countries adopting plurality electoral rule enjoy lower

[6] Note that higher values of all corruption measures used in this study imply less corruption and rent seeking and better control of corruption. So, the positive sign for the coefficients of these measures means the presence of a negative relationship between corruption and economic growth.

levels of corruption which accordingly results in higher rates of economic growth, by about 0.12 percentage points approximately[7], compared to countries following PR rule. This confirms the idea that beneficial accountability characteristics of MR systems may induce office-motivated politicians to enact growth-promoting policies (Knutsen, 2011). Nevertheless, this finding is sensitive to the measure of corruption. Once we use (*WB_CC*) or (*ICRG*) index of corruption, we could not calculate the indirect impact, because neither the coefficient of (*PLURALITY*) variable in the corruption equation (in Table 7) nor the coefficient of the corruption index in the growth equation (in Table 6 and 7) was significant.

Furthermore, we have performed some other checks to examine the robustness of the main findings of the analysis[8]. Firstly, we ran our model using data for the same number of countries but in three points of time where each point is an average of six years (1995 - 2000), (2001 - 2006), and (2007 - 2012). All the results remain similar to our initial findings in terms of directions and significance level, which confirms the robustness of the results. Secondly, we used the specification test of Hausman (1978) to ascertain whether the system is properly specified and whether the (3SLS) method is more appropriate than the (2SLS) one. The p-value of the test was almost equal to 1, thus failing to reject the null hypothesis of the absence of systemic differences between the coefficients of (2SLS) and (3SLS). As a result, it was better to rely on (3SLS) because it leads to more efficient estimates under the null hypothesis.

5. Conclusion and Policy Implications

In light of the ongoing debate related to the political determinants of economic growth and given the importance of its implications on economic policy, many theoretical and empirical analyses have tackled the economic impacts of different constitutional rules. In this paper, we empirically examined the direct effect of electoral rules on economic growth, as well as their indirect effect through corruption. This was done through estimating a system of two equations, where both corruption and GDP growth are determined jointly by a set of control variables and electoral rules. Each equation was estimated individually by (OLS), and then the whole system was estimated by (3SLS), using panel data for a sample of 113 democratic countries over the period (1995-2012).

Our main empirical findings suggest that electoral rules systematically matter for economic growth and that corruption could work as a transmission channel for the effect of some of these rules on growth. It was shown that mixed electoral rules have a significantly positive direct impact on economic growth compared to PR. However, MR affects growth only through the channel of corruption. According to our results, countries adopting MR tend to be less corrupt compared to countries adopting PR. Low levels of corruption, in turn, are significantly correlated with higher levels of economic growth. But this last result was not quite robust. When using different measures of corruption, it seems to have insignificant effect on growth. Thus, we can draw from these results a preliminary implication that in countries adopting PR electoral rules more efforts should be exerted to improve growth rates. Also, countries adopting MR for elections of the legislature must focus more on fighting corruption in order to achieve better economic growth.

While these results may be contradictory to some theoretical arguments and empirical evidence, they go along with many other studies that reached similar results with regard to how electoral rules relate to economic growth and corruption. However, it must be noted that the results of any empirical study depends heavily on the number of countries, their characteristics, as well as the time period and methodology chosen for the analysis. We are also aware that there may be some limitations concerning the present analysis, that maybe the reason behind our interesting results. These limitations are mainly related to the presence of missing data in the corruption measures, in addition to some explanatory variables (such as government consumption expenditures, share of fuel and metals exports in total merchandise exports, percentage of women in parliament and average years of schooling), likely

[7] This indirect impact is calculated by multiplying the coefficient of (*PLURALITY*) in the corruption equation of the system by the coefficient of corruption indicator (*TI_CPI*) in the growth equation.

[8] Results of robustness checks were not reported for the sake of briefness.

omitted variable bias, as well as the possible endogeneity of some explanatory variables (such as government spending and income per capita). Furthermore, our estimates ultimately rely on the exogeneity of political institutions or electoral rules. However, in reality these institutions are man-made which means that there is always a potential endogeneity problem that needs to be dealt with. Accordingly, our analysis could be improved if we overcome all of these problems. This could be the objective of future research.

Finally, in light of the empirical results reached in this paper, it is quite necessary to highlight some important points. First, different electoral rules may demonstrate varying strengths and weaknesses along different policy dimensions. Thus, they could exhibit different economic effects depending on the cultural, socioeconomic, and historical factors that vary across countries and over time. Second, corruption represents a serious problem that could hamper the economic performance of any country. So, the importance of designing and implementing public policies for fighting corruption should not be neglected. Third, the fact that the economic effects of corruption are not independent of other political and institutional elements is important in itself. It suggests that corruption might not be an innate evil of some economies, but the consequence of other governmental policies, or socio-political circumstances (Méndez and Sepúlveda, 2006). Thus, public policies designed to eliminate corruption alone might not be optimal for growth.

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Annex

Table 1: Variables Description and Sources of Data

Variable	Description and data source	Source
GDPPC_ GROWTH	Growth (%): Annual percentage growth rate of GDP per capita based on constant local currency. Aggregates are based on constant 2005 U.S. dollars. GDP per capita is gross domestic product divided by midyear population.	WDI
LogGPPC _initial	Initial income: logarithm of GDP per capita in year 1995. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. Data are in constant 2005 U.S. dollars.	WDI
LogGDPP C	Income per capita: logarithm of GDP per capita. Data are in constant 2005 U.S. dollars.	WDI
INV	Investment (% of GDP): gross domestic investment as a share of GDP. Domestic investment consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Also, net acquisitions of valuables are also considered capital formation.	WDI

Variable	Description and data source	Source
GOVEXP	Government expenditures (% of GDP): General government final consumption expenditure as a share of GDP. General government final consumption expenditure includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation.	WDI
TRADE	Trade openness (% of GDP): Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.	WDI
LIFEEXP	Life expectancy (years): Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.	WDI
YR_SCHOOLING	Average years of schooling (years): average years of primary schooling for population aged 25 and over.	Barro and Lee (2010)
POP_GROWTH	Population growth rate (%): It is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage.	WDI
FUEL_METAL_EXPORTS	Fuel and metals export (% of merchandise exports): It includes fuel, metals and minerals exports as a share of total merchandise exports.	WDI
IMPORTS_SHARE	Total imports (% of GDP): the value of imports of goods and services represent the value of all goods and other market services received from the rest of the world. It is calculated as a share of gross domestic product.	WDI
ETHNIC	Ethnic fractionalization: Reflects probability that two randomly selected people from a given country will not belong to the same ethnic group. The higher the number, the more fractionalized society. The definition of ethnicity involves a combination of racial and linguistic characteristics.	QoG Dataset
PROTMG	Percent of Protestants (%): Protestants as percentage of population in 1980.	QoG Dataset
WIP	Women in Parliament (%): Percentage of parliamentary seats in a single or lower chamber held by women.	QoG Dataset
DEMOC_LEVEL	Level of Democracy: A scale ranges from 0-10 where 0 is least democratic and 10 most democratic. Average of Freedom House and Polity indices.	QoG Dataset
ICRG	International Country Risk Guide Corruption Index: This is an assessment of corruption within the political system. The index ranges from 0 to 6, with higher scores indicating lower corruption levels.	PRS Group
TI_CPI	Corruption Perception Index: The CPI Score relates to perceptions of the degree of corruption as seen by business people, risk analysts and the general public and ranges between 10 (highly clean) and 0 (highly corrupt).	Transparency International
WB_CC	Control of Corruption Index: Measures perceptions of corruption. The particular aspect of corruption measured by the various sources differs somewhat, ranging from the frequency of "additional payments to get things done", to the effects of corruption on the business environment, to measuring "grand corruption" in the political arena or in the tendency of elite forms to engage in "state capture". Scores lie between –2.5 and 2.5, with higher scores corresponding to better control of corruption.	World Bank Governance Indicators
ENG_COMMONLAW	English Common Law dummy: It takes the value 1 if the legal origin of the Company Law or Commercial code of each country is the English Common Law (0 otherwise).	QoG Dataset
BRITISH_COLONY	Former British colony dummy: It takes the value 1 if the country was colonized by UK (0 otherwise). The British settler colonies (the US, Canada, Australia, Israel and New Zeeland) were excluded, only countries located in the non-Western hemisphere "overseas" (e.g. excluding Ireland & Malta), have been coded. Each country that has been colonized since 1700 is coded.	QoG Dataset
FEDERAL	Federal political system dummy: Countries classified as federations by Elazar (1995) plus Ethiopia, Serbia-Montenegro, Bosnia-Herzegovina, which became federal after the article, coded 1 (0 otherwise).	QoG Dataset
DEMOC_EXPOSURE	Uninterrupted democracy dummy: Countries democratic all years from 1930 to 1995, by classification of Beck et al. 2001, coded 1 (0 otherwise).	QoG Dataset
MIXED	Mixed electoral rules dummy: It takes the value 1 if Plurality is the electoral rule that governs	QoG

Variable	Description and data source	Source
	50% of the Lower House seats and 50% Proportional Representation (0 otherwise).	Dataset
PLURALITY	Plurality electoral rule dummy: It takes the value 1 if Plurality is the electoral rule that governs the majority/all of the Lower House seats (0 otherwise).	QoG Dataset
PR	Proportional presentation electoral rule dummy: It takes the value 1 if Proportional Representation is the electoral rule that governs the majority/all of the Lower House seats (0 otherwise).	QoG Dataset

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GDPPC_GROWTH	1999	2.526346	4.716702	-33.98336	91.67289
LogGPPC_initial	1980	8.065945	1.659675	3.912867	10.95791
LogGDPPC	1990	8.261923	1.655688	3.912867	11.38187
INV	1969	22.3012	6.213516	-2.424358	63.9402
GOVEXP	1950	15.57133	5.340808	3.587854	38.83615
TRADE	1970	84.34716	49.62552	14.93285	439.6567
LIFEEXP	2016	69.08663	9.921467	35.82012	83.0961
YR_SCHOOLING	1872	4.686151	1.647627	0.4282799	8.99722
POP_GROWTH	2011	1.319453	1.229476	-3.820174	7.83583
FUEL_METAL_EXPORTS	1823	21.5373	25.39246	0	99.66927
IMPORTS_SHARE	1970	43.92809	24.10972	7.697124	209.3877
ETHNIC	2016	0.4271428	0.2591489	0.001998	0.930175
PROTMG	2034	14.00442	22.68446	0	97.8
WIP	1721	16.1817	10.14779	0	47.3
DEMOC_LEVEL	2034	7.486872	2.443403	1	10
ICRG	1995	2.952967	1.247854	0	6
TI_CPI	1655	4.687814	2.331153	0.4	10
WB_CC	1469	0.1503652	1.057312	-1.81587	2.585612
ENG_COMMONLAW	2034	0.2920354	0.4548103	0	1
BRITISH_COLONY	2034	0.2389381	0.4265397	0	1
FEDERAL	2016	0.1428571	0.3500139	0	1
DEMOC_EXPOSURE	2034	0.1415929	0.3487179	0	1
MIXED	1969	0.0132047	0.1141794	0	1
PLURALITY	1969	0.4728288	0.499388	0	1
PR	1969	0.5139665	0.4999319	0	1

Table 3: Correlation Matrix of Variables used in the Model

	GDPPC_GROWTH	LogGPPC_initial	LogGDPPC	INV	LIFEEXP	YR_SCHOOLING	POP_GROWTH
GDPPC_GROWTH	1.0000						
LogGPPC_initial	-0.1821	1.0000					
LogGDPPC	-0.1427	0.9909	1.0000				
INV	0.3277	-0.1167	-0.0601	1.0000			
GOVEXP	-0.1630	0.5358	0.5349	-0.0507			
TRADE	0.0685	0.2212	0.2462	0.1422			
LIFEEXP	-0.0928	0.7926	0.8063	-0.0260	1.0000		
YR_SCHOOLING	0.0256	0.5406	0.5693	0.0344	0.4959	1.0000	
POP_GROWTH	-0.1685	-0.3781	-0.4270	-0.1103	-0.4798	-0.5454	1.0000
FUEL_METAL_EXPORTS	0.0641	-0.1314	-0.1245	0.0345	-0.2211	-0.1333	0.2012
IMPORTS_SHARE	0.0957	0.1140	0.1442	0.2120	0.1365	0.1834	-0.0593
ETHNIC	0.0435	-0.5492	-0.5670	0.0062	-0.6455	-0.4058	0.4990
PROTMG	-0.1060	0.3882	0.3818	-0.0766	0.1157	0.2318	-0.0981
WIP	-0.1228	0.3762	0.3864	-0.1064	0.2399	0.1901	-0.0991
DEMOC_LEVEL	-0.0897	0.5822	0.5861	-0.0743	0.4794	0.5420	-0.4319
ICRG	-0.1816	0.7307	0.7157	-0.0815	0.5201	0.3269	-0.1562
TI_CPI	-0.1584	0.8366	0.8355	-0.0639	0.6117	0.3978	-0.2218

	GDPPC_GROWTH	LogGPPC_initial	LogGDPPC	INV	LIFEEXP	YR_SCHOOLING	POP_GROWTH
WB_CC	-0.1483	0.8423	0.8398	-0.0603	0.6122	0.4117	-0.2307
ENG_COMMONLAW	-0.0128	-0.1365	-0.1450	-0.0099	-0.3048	-0.0213	0.3561
BRITISH_COLONY	0.0557	-0.3897	-0.3964	0.0090	-0.5154	-0.2473	0.4635
FEDERAL	-0.1010	0.2791	0.2555	-0.0851	0.2158	-0.0274	-0.0399
DEMOC_EXPOSURE	-0.1635	0.5824	0.5713	-0.1692	0.3322	0.2860	-0.0816
MIXED	0.0657	-0.0912	-0.0994	-0.0490	-0.1132	-0.0536	-0.0515
PLURALITY	0.0122	-0.2296	-0.2371	0.0487	-0.2771	-0.2164	0.3226
PR	-0.0288	0.2516	0.2611	-0.0360	0.3044	0.2289	-0.3078
	FUEL_METAL_EXPORTS	***IMPORTS_SHARE***	***ETHNIC***	***PROTMG***	***ICRG***	***TI_CPI***	***WB_CC***
FUEL_METAL_EXPORTS	1.0000						
IMPORTS_SHARE	-0.2120	1.0000					
ETHNIC	0.2602	-0.0233	1.0000				
PROTMG	0.0418	-0.0629	-0.1820	1.0000			
WIP	-0.0306	0.0152	-0.1254	0.5466			
DEMOC_LEVEL	-0.3166	-0.0334	-0.4252	0.3282			
ICRG	-0.1772	0.1108	-0.3814	0.5850	1.0000		
TI_CPI	-0.2144	0.2013	-0.4625	0.5739	0.8793	1.0000	
WB_CC	-0.2342	0.1937	-0.4701	0.5559	0.8830	0.9815	1.0000
ENG_COMMONLAW	-0.0842	0.0125	0.3138	0.0437	0.0292	0.0678	0.0533
BRITISH_COLONY	0.0366	0.0734	0.3884	-0.0470	-0.1763	-0.2031	-0.2054
FEDERAL	0.0386	-0.1839	0.0809	0.0029	0.1694	0.1732	0.1683
DEMCO_EXPOSURE	-0.0724	0.0033	-0.1745	0.5274	0.6388	0.6909	0.6756
PRESIDENTIAL	0.2686	-0.2298	0.4165	-0.2751	-0.5307	-0.6247	-0.6306
PARLIAMENTARY	-0.2686	0.2298	-0.4165	0.2751	0.5307	0.6247	0.6306
MIXED	0.0709	-0.0370	0.0435	-0.0740	-0.1078	-0.1194	-0.1085
PLURALITY	0.1123	-0.0833	0.2307	-0.1158	-0.1470	-0.0962	-0.1239
PR	-0.1298	0.0923	-0.2406	0.1340	0.1736	0.1260	0.1508
	ENG_COMMONLAW	***BRITISH_COLONY***	***FEDERAL***	***DEMOC_EXPOSURE***	***MIXED***	***PLURALITY***	***PR***
ENG_COMMONLAW	1.0000						
BRITISH_COLONY	0.6698	1.0000					
FEDERAL	0.0666	-0.0763	1.0000				
DEMOC_EXPOSURE	0.1814	-0.1638	0.1788	1.0000			
MIXED	-0.0772	-0.0636	0.0705	-0.0618	1.0000		
PLURALITY	0.4677	0.4349	-0.0078	-0.0421	-0.1072	1.0000	
PR	-0.4456	-0.4165	-0.0102	0.0576	-0.1473	-0.9676	1.0000

Table 4: OLS Estimation Results for Impact of Constitutional Rules

Dependent Variable	*Corruption*			Dependent Variable	*GDPPC_GROWTH*		
	TI_CPI	***WB_CC***	***ICRG***				
Explanatory Variables	**(1)**	**(2)**	**(3)**	**Explanatory Variables**	**(4)**	**(5)**	**(6)**
ETHNIC	-0.5034206*** (0.1349509)	-0.0615493 (0.0700967)	-0.0592679 (0.114068)	*LogGPPC_initial*	-0.530358** (0.1672775)	0.6867721** (0.2393742)	-0.4698016*** (0.1593955)
PROTMG	0.020286*** (0.0012268)	0.0076247** (0.0006262)	0.0144869*** (0.0011627)	*INV*	0.183625** (0.0188888)	0.176867*** (0.0315251)	0.1767939*** (0.0237372)
ENG_COMMONLAW	0.4144804** (0.0920698)	0.0349988 (0.041702)	-0.1346156* (0.0687011)	*GOVEXP*	-0.1054684** (0.0244068)	-0.1313181** (0.0311535)	-0.0881997***(0.0227923)
BRITISH_COLONY	0.0483676 (0.1057817)	0.1614267** (0.0480196)	0.2647615*** (0.0776963)	*TRADE*	0.0026665 (0.0020073)	0.0002636 (0.0024353)	0.0019073 (0.0021411)
FUEL_METAL_EXPORTS	-0.0102403*** (0.0013017)	-0.0056544** (0.0006718)	-0.0068982*** (0.0009023)	*LIFEEXP*	-0.0368316* (0.0185528)	-0.0300182 (0.021514)	-0.0195872 (0.0190572)
IMPORTS_SHARE	0.0098547*** (0.0013252)	0.003477** (0.0007509)	0.0021208** (0.0009373)	*YR_SCHOOLING*	0.1470192* (0.0740216)	0.2707536** (0.0855893)	0.1691057* (0.0725827)
LogGDPPC	0.8262053*** 0.033289	0.3713154** (0.0163977)	0.2599979*** (0.0221267)	*POP_GROWTH*	-0.8449402** (0.1313048)	-0.7149854*** (0.1568405)	-0.6783986*** (0.1345298)
FEDERAL	0.0529678 (0.078009)	0.0013137 (0.0423558)	0.111709* (0.0597788)	*DEMOC_LEVEL*	-0.0664698 (0.0608305)	-0.1476698* (0.0760688)	-0.0304724 (0.0561242)
WIP	0.0212025** (0.003184)	0.0082823** (0.001755)	0.005879** (0.0025267)	*PLURALITY*	0.0262877 (0.2062937)	-0.3065025 (0.2984829)	0.0034524 (0.2201448)
GOVEXP	0.0239799** (0.0068576)	0.01596*** (0.0032809)	0.0089272** (0.0045406)	*MIXED*	1.153491 (0.8464848)	0.9710996 (1.054861)	0.8235145 (0.9107218)
DEMOC_EXPOSURE	0.976018** (0.0931691)	0.480939*** (0.0454088)	0.6483619*** (0.0786103)	*TI_CPI*	0.2343933*** (0.0806822)		
DEMOC_LEVEL	0.0253911 (0.0181109)	0.0411362*** (0.0091112)	0.0671336*** (0.0130859)	*WB_CC*		0.7829819*** (0.2738607)	
PLURALITY	0.4678358** (0.0713592)	0.1889751** (0.0357838)	0.0621923 (0.0545587)	*ICRG*			0.2020804* (0.1135815)
MIXED	-0.1135068 (0.1973758)	0.0475741 (0.1400975)	-0.2096785 (0.1679507)				
Constant	-4.037968** (0.2809769)	-3.924625*** (0.1419961)	-0.2796454 (0.1890119)	*Constant*	6.541549*** (1.250254)	9.184752*** (2.637056)	4.68951*** (1.426741)
Obs.	1324	1125	1460	*Obs.*	1454	1247	1679
Number of countries	105	105	105	*Number of countries*	100	100	100
F- statistic	923.68***	725.96***	291.73***	*F- statistic*	22.23***	16.64***	23.39***
R^2	0.8442	0.8290	0.6234	R^2	0.1909	0.1565	0.1502

Notes:
All equations are estimated individually using OLS.
Robust standard errors in parentheses.
The symbols ***, **, * indicate a significance level of 1%, 5% and 10% respectively.
We have tested for multicollinearity using Variance Inflation Factor (VIF) in all models, and no multicollinearity was detected.

Table 5: 3SLS Estimation Results for Impact of Constitutional Rules, Using Corruption Perceptions Index

TI_CPI		*GDPPC_GROWTH*	
Explanatory Variables		**Explanatory Variables**	
ETHNIC	-0.7432195*** (0.1506094)	*LogGPPC_initial*	-0.5525214*** (0.1910777)
PROTMG	0.0202542*** (0.001473)	*INV*	0.1897055*** (0.0188181)
ENG_COMMONLAW	0.454514*** (0.0940889)	*GOVEXP*	-0.1127918*** (0.0261763)
BRITISH_COLONY	0.1041982 (0.1071072)	*TRADE*	0.0020868 (0.0020825)
FUEL_METAL_EXPORTS	-0.0081514*** (0.0012944)	*LIFEEXP*	-0.0273425 (0.0197387)

TI_CPI		*GDPPC_GROWTH*	
Explanatory Variables		**Explanatory Variables**	
IMPORTS_SHARE	0.0106878*** (0.0011444)	*YR_SCHOOLING*	0.1545845* (0.0921478)
LogGDPPC	0.8602313*** (0.0322413)	*POP_GROWTH*	-0.8917552*** (0.114939)
FEDERAL	0.0525319 (0.0802165)	*DEMOC_LEVEL*	-0.0842602 (0.0661731)
WIP	0.0200878*** (0.0033617)	*PLURALITY*	0.0314132 (0.2290652)
GOVEXP	0.0185325*** (0.0066429)	*MIXED*	1.688054** (0.7678549)
DEMOC_EXPOSURE	0.9267106*** (0.0976301)	*TI_CPI*	0.2406538* (0.127762)
DEMOC_LEVEL	0.0256716 (0.0172387)		
PLURALITY	0.4837933*** (0.0654393)		
MIXED	-0.0638805 (0.2090855)		
Constant	-4.231709*** (0.2821581)	*Constant*	6.121948*** (1.520125)
Obs.	1260	*Obs.*	1260
R^2	0.8494	R^2	0.1892
χ^2	7108.71***	χ^2	288.57***

Notes:
All equations are estimated simultaneously using 3SLS.
Robust standard errors in parentheses.
The symbols ***, **, * indicate a significance level of 1%, 5% and 10% respectively.

Table 6: 3SLS Estimation Results for Impact of Constitutional Rules, Using Control of Corruption Index

WB_CC		*GDPPC_GROWTH*	
Explanatory Variables		**Explanatory Variables**	
ETHNIC	-0.2326913*** (0.0742716)	*LogGPPC_initial*	-0.5887047*** (0.2210058)
PROTMG	0.0074446*** (0.0007574)	*INV*	0.1941498*** (0.0211531)
ENG_COMMONLAW	0.0683879 (0.0481083)	*GOVEXP*	-0.1208984*** (0.0296169)
BRITISH_COLONY	0.2072477*** (0.0531047)	*TRADE*	0.0026377 (0.0023291)
FUEL_METAL_EXPORTS	-0.0044169*** (0.0006435)	*LIFEEXP*	-0.0142069 (0.0218956)
IMPORTS_SHARE	0.0040162*** (0.0005761)	*YR_SCHOOLING*	0.2075849** (0.104147)
LogGDPPC	0.3976408*** (0.015391)	*POP_GROWTH*	-0.8514194*** (0.1283028)
FEDERAL	0.0026703 (0.04185)	*DEMOC_LEVEL*	-0.0986765 (0.078069)
WIP	0.0086011*** (0.0017292)	*PLURALITY*	-0.1078605 (0.2582509)
GOVEXP	0.0113454*** (0.0033379)	*MIXED*	1.714083* (0.8979753)
DEMOC_EXPOSURE	0.4383789*** (0.0513283)	*WB_CC*	0.4371809 (0.3524117)
DEMOC_LEVEL	0.0425018*** (0.0085028)		
PLURALITY	0.2039018***		

WB_CC		*GDPPC_GROWTH*	
Explanatory Variables		**Explanatory Variables**	
	(0.0330487)		
MIXED	0.1042309 (0.111056)		
Constant	-4.097642*** (0.1365176)	*Constant*	6.447978*** (2.289668)
Obs.	1049	*Obs.*	1049
R^2	0.8419	R^2	0.1999
χ^2	5586.87***	χ^2	260.16***

Notes:
All equations are estimated simultaneously using 3SLS.
Robust standard errors in parentheses.
The symbols ***, **, * indicate a significance level of 1%, 5% and 10% respectively.

Table 7: 3SLS Estimation Results for Impact of Constitutional Rules, Using ICRG Corruption Index

ICRG		*GDPPC_GROWTH*	
Explanatory Variables		**Explanatory Variables**	
ETHNIC	-0.2339629** (0.1166092)	*LogGPPC_initial*	-0.353168** (0.1555952)
PROTMG	0.0141898*** (0.0011854)	*INV*	0.1830251*** (0.017682)
ENG_COMMONLAW	-0.0711095 (0.0745567)	*GOVEXP*	-0.0982112*** (0.0241285)
BRITISH_COLONY	0.2904393*** (0.0826302)	*TRADE*	0.0027986 (0.0018945)
FUEL_METAL_EXPORTS	-0.0063262*** (0.0010066)	*LIFEEXP*	-0.0149656 (0.0188768)
IMPORTS_SHARE	0.0021031** (0.0008997)	*YR_SCHOOLING*	0.1090528 (0.0879139)
LogGDPPC	0.2912566*** (0.0240408)	*POP_GROWTH*	-0.8454226*** (0.1120577)
FEDERAL	0.1279736* (0.0651668)	*DEMOC_LEVEL*	-0.0285706 (0.0634395)
WIP	0.0056378** (0.0026875)	*PLURALITY*	0.0868458 (0.2100375)
GOVEXP	0.0109964** (0.0051751)	*MIXED*	1.588316** (0.7724911)
DEMOC_EXPOSURE	0.5854433*** (0.0794925)	*ICRG*	0.0401417 (0.2102399)
DEMOC_LEVEL	0.0483977*** (0.0132879)		
PLURALITY	0.0498817 (0.0515406)		
MIXED	-0.2035236 (0.1723984)		
Constant	-0.3680437* (0.2128374)	*Constant*	4.161805*** (1.179566)
Obs.	1359	*Obs.*	1359
R^2	0.6357	R^2	0.1854
χ^2	2371.99***	χ^2	307.43***

Notes:
All equations are estimated simultaneously using 3SLS.
Robust standard errors in parentheses.
The symbols ***, **, * indicate a significance level of 1%, 5% and 10% respectively.