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# Do Higher Government Wages Reduce Corruption? Evidence Based on a Novel Dataset

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## Abstract

This paper employs a novel dataset on government wages to investigate the relationship between government remuneration policy and corruption. Our dataset, as derived from national household or labor surveys, is more reliable than the data on government wages as used in previous research. When the relationship between government wages and corruption is modeled to vary with the level of income, we find that the impact of government wages on corruption is strong at relatively low-income levels.


JEL-Code: J380, J410, J450, O570.

Keywords: corruption, government wages, government pay policy, efficiency wages.

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# 1. Introduction

Corruption is often identified with low government wages (Feinberg, 2009; Klitgaard, 1989; Lindauer, 1987; Stasavage, 1999), but there is no conclusive evidence that raising government wages will reduce corruption (Ni and Van, 2006). On the one hand, it has been argued that higher government wages may deter corruption because corrupt bureaucrats and politicians face higher costs when detected (Becker and Stigler, 1974) or because public servants will forgo corrupt activities when they are paid wages that they perceive as fair (Van Rijckeghem and Weder, 2001). Higher government wages will also attract better employees thereby improving the bureaucratic quality and reducing corruption (UlHaque and Sahay, 1996). On the other hand, it also has been argued that corrupt bureaucrats in highly corrupted environments often use their power and income to influence the probability of corruption detection (Marjit and Shi, 1998) and/or avoid legal punishment if they are detected (Chang and Lai, 2002; Qijun and Kahana, 2010). Under those circumstances, the threat of job loss is low, thereby mitigating the effectiveness of higher wages as a means to deter corruption. In view of the conflicting theoretical arguments, the effect of government wages on corruption has to be settled through empirical research (Van Rijckeghem and Weder, 2001).

However, empirical studies on the relationship between government wages and corruption yield conflicting evidence. Van Rijckeghem and Weder (2001) find that an increase in government wages reduces corruption. Also Herzfeld and Weiss (2003), Pellegrini and Gerlagh (2008) and Dutt (2009) report a negative relationship between government wages and corruption, although the results are often not robust to different econometric specifications.[1] In contrast, the results of Panizza (2001), Ades and DiTella (1997), and Treisman (2000, 2007) suggest that there is no significant relationship between both variables while La Porta et al. (1999) even find that higher government wages are correlated with more corruption.

All of the above mentioned studies use one of the three available datasets on (relative) government wages, created by Schiavo-Campo et al. (1997), Van Rijckeghem and Weder (1997) and Panizza (2001), respectively. The first one is a cross sectional dataset referring to the early 1990s, while the other two consist of short panels for a small number of developing countries in

[1] Several studies using local data for the United States, such as Goel and Rich (1989) and Goel and Nelson (1998), report that higher government wages reduce corruption, measured by the number of corruption convicts. Di Tella and Schargrodsky (2003) find that higher government wages reduce corruption by hospital officials in Buenos Aires, Argentina.

the late 1980s and 1990s. Schiavo-Campo et al. (1997) and Van Rijckeghem and Weder (1997) follow Heller and Tait (1984), i.e. they use macro data to impute government wages (which are obtained from dividing the total government wage bill by total government employment). In contrast, Panizza (2001) relies on micro data, using some 60 household survey datasets from 13 Latin American countries in the 1990s to estimate government wages.

We contribute to the literature by analyzing the relationship between government wages and corruption, using a new large panel dataset on government wages of about 1,200 observations, covering 113 countries over the 1989–2010 period. It is derived from micro-based data sources, such as household budget surveys or labor force surveys. Although micro data arguably yield more reliable figures on government wages than macro data (Le, 2012a), they hardly have been used at a large scale due to the lack of data. Furthermore, our dataset covers a large number of developing—next to developed—countries and the data for each country cover a period of 11.8 years on average. The data allow us to control for country specific effects to avoid the potential endogeneity problem that occurs if corrupt countries deliberately choose to pay low government wages to maintain a corrupt bureaucracy for reasons of cost effectiveness (Besley and McLaren, 1993).

In most of our econometric models we include an interaction term between government wages and the level of income per capita. When the interaction term is not included, we find that the impact of government wages on corruption is rather modest. When the interaction with income is included, the results are quite different. First, the impact of government wages on corruption (which is measured on a scale running from 0 to 6) varies with the level of income per capita. The estimated impact is significantly negative if GDP per capita in international US dollars (in 2012 prices) is lower than 8,842. Second, the impact of government wages on corruption is quite substantial in relatively low-income countries. Increasing government wages by the average wages in manufacturing reduces corruption by more than 1 point (on a scale of 0 to 6) in countries with an income per capita of about 1,000 dollars. This impact is about two times larger than reported by Van Rijckeghem and Weder (2001). Our results are robust to alternative measures of government wages as well as different econometric specifications.

The paper will proceed as follows. Section 2 reviews recent studies and discusses limitations of previous research that our study aims at improving. Section 3 specifies the econometric model and describes the data, while Section 4 presents the empirical results as well as some robustness checks and extensions. Section 5 discusses some policy implications and concludes.

## 2. Literature review

The most common definition of corruption is "the abuse of public office for private gain" (Rose-Ackerman, 2004). Generally, corruption is regarded as problematic, but some studies suggest that corruption might be the second best solution to the problem of over-regulation (Leff, 1964; Lui, 1985).[2] According to the grease-to-the-wheel view, too much government regulation may end up choking off economic activities. In such an environment, bureaucrats accepting bribes and turning a blind eye to black markets and smuggling may actually improve social welfare. Likewise, bureaucratic corruption reduces the delay caused by red tape and gets the most efficient applicants ahead of a slow queue. However, these arguments are only valid under very specific situations (Bardhan, 2006). The redeeming effects of corruption cannot offset the burden of even more regulations and delays as deliberately imposed by bureaucrats to extract further bribes.

Over the past decades, a large number of studies have examined the nexus between corruption and development. Corruption is found to lower economic growth either directly (Mauro, 1995; Swaleheen, 2011) or indirectly via lowering the incentives for productive investment (Johnson et al., 2011). Corruption engenders unsustainable economic developments (Aidt, 2009) and erodes public confidence in government institutions (Clausen et al., 2011). Corruption can also cause budget consolidation efforts to fail (Arin et al., 2011). Most importantly, corruption sustains further corrupt activities because the public becomes indifferent to the problem (Mauro, 2004) while every new generation of bureaucrats becomes corrupt because their past and current colleagues and seniors are also corrupt (Dong et al., 2012; Sah, 2007). Many developing countries seem to be entrapped in a bad equilibrium of rampant corruption, poverty and stagnation. Consequently, fighting corruption has been on top of the policy agenda of several international development organizations.

[2] Meon and Weill (2010) claim that corruption improves efficiency in countries with a weak institutional system. However, these authors do not control for country specific effects.

*2.1 Theory*

Raising government wages to combat corruption seems an intuitive solution because it lessens the bureaucrats' incentive to extract illegal income. Several studies therefore suggest paying higher government wages to break the vicious circle of corruption and poverty (Bond, 2008; Bose, 2004; UlHaque and Sahay, 1996; Van Rijckeghem and Weder, 2001).

First, higher government wages deter corruption via two mechanisms: raising the cost of corruption and increasing the probability of detection (Becker and Stigler, 1974; Van Rijckeghem and Weder, 2001). When the probability that corruption is detected is high and the threat to lose a well-paid job is real, bureaucrats will avoid corruption because it is no longer an optimal choice when maximizing income.

Second, high government wages boost the dignity of civil servants and encourage them to forgo corrupt activities, even when corruption is the optimal choice to maximize income (Van Rijckeghem and Weder, 2001). Arguably, people choose to work for the government because they want to serve society (Macchiavello, 2008). These civil servants might be forced to engage in corruption to ensure sufficient income but each act of corruption is associated with some moral cost (Bond, 2008; UlHaque and Sahay, 1996). As a result, a proportion of the bureaucracy may forgo corruption opportunities as long as they are paid at a level perceived to be fair, even if the probability of corruption detection and punishment is low (Van Rijckeghem and Weder, 2001).

Third, a government pay rise may serve as an exogenous shock to a high-corruption equilibrium. High government wages attract better people to the bureaucracy and prevent the movement of qualified employees to the private sector (UlHaque and Sahay, 1996). The public also becomes more vigilant to the operation of the bureaucracy when government wages are high (Van Rijckeghem and Weder, 2001), putting more pressure on bureaucrats (to forgo corruption themselves and to report corruption by others). Hence, even a modest raise in government wages can lead to a new equilibrium with less corruption.

In contrast, other studies argue that high government wages do not reduce corruption or may even lead to more corruption (Besley and McLaren, 1993; Chang and Lai, 2002; Macchiavello, 2008). In a highly corrupted environment where the probability of detection as well as the probability of getting punishment upon detection is very low, the threat of job loss is close to zero. In such a situation, higher government wages will not change the incentive structure faced by bureaucrats (Van Rijckeghem and Weder, 2001). Selfish agents will also queue up for government jobs because of the high income from corruption (Bond, 2008; Macchiavello, 2008). Highly paid but selfish bureaucrats may also use part of their wage package to bribe their seniors when they are detected (Chang and Lai, 2002). More severely, highly paid government jobs become a scarce good that can be rationed only to those who can mobilize sufficient finances to buy such jobs via bribing the recruiting officials. In return, new bureaucrats will try to corrupt even more to recover their initial investment (Qijun and Kahana, 2010).

### *2.2 Empirical evidence*

In view of the conflicting theoretical arguments, empirical research may shed some light on the effect of government wages on corruption. The most commonly used empirical model to estimate the impact of government wages on corruption across countries is the following linear regression model:

$$CORR_{it} = X_{it}*\beta + WAGE_{it}*\gamma + \alpha_i + \varepsilon_{it} \qquad (1)$$

where CORR is a measure of corruption, X is a set of control variables, WAGE is some measure for government wages, [$\beta$, $\gamma$] is the corresponding vector of coefficients and $\alpha$ is the country-specific effect. The subscript i denotes countries, t indicates time and $\varepsilon$ is the error term. To make cross countries figures comparable, WAGE usually is an indicator (Ades and DiTella, 1997; Heller and Tait, 1984; Schiavo-Campo et al., 1997; Van Rijckeghem and Weder, 2001). Often it is constructed as the ratio of government wages and wages in another reference sector (such as manufacturing) or as the ratio of government wages and GDP per capita.

Several problems emerge from reviewing these studies. First and foremost, they are based on unreliable data. Generally, average government wages are imputed by dividing the total government wage bill by total government employment. However, there is no internationally accepted statistical method to make government employment statistics consistent across countries. Similar difficulties arise with respect to consistency over time, due to the presence of different types of government workers (such as permanent vs. temporary, full time vs. part time). Le (2012a) shows that this leads to a substantial bias that may render empirical conclusions unreliable. Only Panizza (2001) uses micro data to construct an indicator of government wages. However, this study is limited to a small number of countries and covers a short time period with about 60 observations in total.

Second, most studies treat the term $\alpha_i$ in equation (1) as independent of WAGE and other explanatory variables in $X_i$. However, models estimated in cross-country studies are often shaped by data availability. Therefore, $\alpha_i$ is possibly not independent of $X_i$. Panel studies, such as Panizza (2001) and Van Rijckeghem and Weder (2001), use pooled OLS or random effects estimators, which again rely on the same assumption that $\alpha_i$ is independent from all the explanatory variables. The results in Seldadyo and de Haan (2011), however, suggest that country specific factors may play an important role in a country's ability to control corruption.[3]

## 3. The econometric model specification and data description

### *3.1 The econometric model*

We specify our empirical model as:

$$CORR_{it} = X_{it}*\beta + WAGE_{it}*\gamma + INCOME_{it}*\lambda + WAGE_{it}*INCOME_{it}*\delta + \alpha_i + T*\eta + \varepsilon_{it} \qquad (2)$$

where $INCOME_{it}$ is the income level of country i at time t, and T is a vector of year dummies to control for the time specific effects. The other variables are defined as before.

The sign of $\gamma$ is expected to be negative. In our view, the impact of government wages on corruption is conditional upon the level of income in each country, but the sign of $\delta$ is not clear a priori. In low-income countries, corruption is rampant and the amount of money involved in each bribe can be very small (petty corruption). Higher government wages will stimulate bureaucrats to forgo this petty corruption. Furthermore, relatively high-paid government jobs in lower income countries are highly valued. This means that the threat of job loss is arguably more effective in low-income countries. Under this reasoning, government wages may have a strong negative impact on corruption in low-income countries. This impact is weaker or even close to zero in rich countries. If true, the sign of $\delta$ will be positive.

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[3] These authors find convergence of corruption: many corrupt countries became 'cleaner' between 1984 and 2008, while many 'clean' countries became more corrupted. However, the speed of change is relatively slow, suggesting that country specific factors play an important role in the ability of a country to control corruption.

However, richer countries often have a better legal system with higher probability of corruption detection. Furthermore, the fair wage argument might not apply to low-income countries because bureaucrats know that their governments may not be able to meet the demand of fair wages due to budget constraints (Van Rijckeghem and Weder, 2001). This line of argument, instead, suggests that government wages only reduce corruption in relatively rich countries. In low-income countries, raising government wages may have no impact. The sign of $\delta$, in this case, will be negative.

On the basis of previous studies, we select a large number of control variables ($X_{it}$ in equation 2) that have been suggested to affect corruption. The selected variables can be grouped into political factors, economic factors, incentive structure factors, and other factors.

*Political factors* are important to ensure a healthy institutional environment of sufficient checks and balances as well as effective mechanisms for the public to monitor the operation of the bureaucracy. The most important political variables are democracy (DEM), the age of the democracy (DEMAGE) and political polarization (POLAR) (Brown et al., 2011; Rock, 2009). DEM (the Polity2 indicator) runs from -10 to 10, where a higher value means more democracy. DEMAGE is measured as the number of consecutive years since the year the country is classified as a democracy.[4] We also include DEMAGESQ, the squared term of DEMAGE, as democracy may need time to take effect on corruption (Rock, 2009). POLAR is a dummy variable that is equal to 1 if the difference in terms of political orientation of the parties in government is classified as high by Beck et al. (2001, updated 2010). Brown et al. (2011) find that high polarization intensifies the monitoring process, thus reducing corruption. Finally, we include a dummy variable (MIL), which equals 1 if the head of the country is a military officer (Beck et al., 2001, updated 2010). When a country is governed by the military, the military become exposed to politics and may be captured by interest groups, which could increase the amount of corruption in the system (Brown et al., 2011).

The most often used *economic determinants* of corruption are government consumption (GOVSIZE) and openness to trade (TRADE), both taken from the World Bank. A larger government implies more possibilities for corruption by the bureaucracy. Trade exposes

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[4] Following Treisman (2007), we classify a country as democratic if its executive electoral competitiveness index provided by Beck et al. (2001) is 6.5 or higher.

corrupted countries to international competition and interaction, which reduce the monopoly power of domestic producers, shrinking the potential profits available for corrupt officials.

We include two *incentive structure factors*: bureaucratic quality (BURQUAL) and government stability (GOVSTAB), both taken from the International Country Risk Guide (ICRG). Klitgaard (1997) observes that high government wages to attract talented people to the government is not enough; there must be other incentives to persuade bureaucrats to forgo corruption. BURQUAL measures the quality of the bureaucracy and reflects the informal incentive structure offered to the bureaucracy, such as fair recruitment, career concerns, and meritocracy. BURQUAL runs from 1 to 4, where a higher score indicates better bureaucratic quality. GOVSTAB, running from 1 to 12, is a composite measure of government unity, legislative strength and popular support. A higher score of GOVSTAB means a more stable government. This is an important factor to ensure job security and encourage civil servants to forgo corruption (Hunt and Laszlo, 2012).

Finally, we include a large number of *other* time invariant *variables* that are often mentioned in the literature as potential determinants of corruption. Treisman (2000) finds that countries that have a Common Law legal origin and a UK colonial history are less corrupted. He also finds that ethno linguistic division is related to more corruption. We include three dummies accounting for English Common Law, French, and Socialist legal origins (source: Quality of Government Institute, Gothenburg University). There are also dummies for countries with a British, French and Spanish colonial origin (source: Quality of Government Institute, Gothenburg University) and a measure for linguistic fractionalization provided by Alesina et al. (2003). Finally, we add 8 dummies for geographical regions (Eastern Europe and post Soviet Union; Latin America; North Africa and the Middle East; Sub-Saharan Africa; Western Europe and North Africa; East Asia; Southeast Asia; and the Caribbean). Countries in the same region may follow similar wage and anti-corruption policies.

### *3.2 Sources of data*

We use the International Country Risk Guide (ICRG) corruption index as the dependent variable. Previous studies frequently used the corruption perception index (CPI) provided by Transparency International and the control of corruption index provided by the World Bank

World Governance Indicator (WGI) as measures of corruption.[5] The CPI and the WGI aggregate several surveys to form a corruption perception index using the simple average and principal component analysis, respectively. However, the included underlying surveys may differ from one year to the other. As a result, changes in the CPI and WGI scores may be due to the changes in surveys included instead of the changes in perceived corruption (Teorell et al., 2011). The ICRG index has been constructed in a consistent way from year to year. The experts who provide input for constructing the index receive instructions on how to carry out the ratings, making the data comparable across countries. Furthermore, using country experts' ratings may better reflect the actual situation in the rated countries. That is because the experts' ratings are less likely to be affected by the economic situation than ratings based on public opinion sources (Kaplan and Pathania, 2010) and because the experts' ratings are less likely to be affected by the fear of retaliation by corrupted government officials (Jensen et al., 2010). We rescale the original ICRG index to a scale ranging from 0 to 6 where a higher score means more corruption.

Data on government wages are taken from the worldwide database on industrial wages collected by Le (2012b). This database provides data on average wages for the whole economy as well as for industries according to the International Standard Industrial Classification of Economic Activities, Revision 3 (ISIC 3). One part of the data is obtained via international household survey databases, such as the World Bank Living Standard Measurement Study, the Luxembourg Income Study or data from the International Labor Organization. The other part of the data is obtained by studying countries' data archives. Next to the fact that survey data are more accurate than macro data obtained from statistical yearbooks (Le, 2012a), they also open a new path to overcome the problem of missing data for developing countries, where reliable macro data on government wages and on employment are often lacking.

Individuals with positive employment income are first classified into ISIC 3 one digit industries. Next, the average wages in each industry are estimated as the mean wages of all individuals within that industry, using relevant weights to account for missing values and non-response. The resulting wages computed in this manner have been found to be the unbiased estimates of actual wages (see also Akee, 2011; Kapteyn and Ypma, 2007; and Le, 2012a). We

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[5] The correlation of these three indices between countries is very high, see Seldadyo (2008). However, when it comes to the within country variation of corruption over time, the correlation between the indices is low. Over the 1996-2010 period, the correlation coefficients between these three indices (after mean-centering) are between 0.10 and 0.37, which indicates that they are anything but close.

define government wages as the wages of employees in the public administration, defense and compulsory social security industry (public administration from now on). Public administration is the core sector of the government which is responsible for carrying out most government programs as well as implementing laws and regulations. Furthermore, to compute our government wage indicator (WAGE) we follow previous studies and divide average government wages by average wages in manufacturing. In the sensitivity analysis, we use average wages in the finance and average wages in construction as the alternative denominators of the WAGE indicator.

| **Variable** | **N** | **Mean** | **Min** | **Max** | **Definition and sources** |
|---|---|---|---|---|---|
| CORR | 930 | 2.69 | 0 | 6 | ICRG corruption, available for purchase at http://www.prsgroup.com/icrg.aspx |
| WAGE | 1076 | 1.30 | 0.38 | 3.07 | The ratio of government to manufacturing wages, available at http://www.levanhab28.com/ |
| INCOME | 1076 | 9.40 | 6.67 | 11.37 | The natural logarithm of GDP per capita (in 2012 international dollars), available from the World Bank's World Development Indicators (WDI) database |
| WINCOME | 1076 | 12.21 | 2.89 | 26.83 | The product of WAGE and INCOME |
| DEM | 1014 | 7.11 | -10 | 10 | The revised Polity2 score available at http://www.systemicpeace.org |
| POLAR | 1038 | 2.56 | 0 | 8 | A dummy which equals 1 if a country is classified as highly polarized by Beck et al. (2001), as updated in 2010 and available at www.worldbank.org |
| DEMAGE | 1038 | 13.09 | 0 | 64 | Age of the democracy, the number of consecutive years since the year the country is classified a democracy from 1930 until now. Following Treisman (2007), we classify a country as democratic if the executive electoral competitiveness index produced by Beck et al. (2001) is larger than or equal to 6.5. The variable is rescaled to 10 years to prevent the magnitude of the corresponding estimated coefficients from becoming too small. |
| DEMAGESQ | 1040 | 0.32 | 0 | 1 | The square of DEMAGE |
| MIL | 1028 | 0.02 | 0 | 1 | A dummy which equals 1 if the chief executive is at the same time an army officer; source: Beck et al. (2001) |
| GOVSIZE | 1076 | 0.17 | 0.03 | 0.54 | Total final general government consumption as a percentage of GDP, provided by the WDI. This variable is further divided by 100 to prevent the magnitude of the corresponding estimated coefficient from becoming too small. |
| TRADE | 1076 | 0.87 | 0.14 | 3.20 | Total import and export as a percentage of GDP, provided by the WDI. This variable is further divided by 100 to prevent the magnitude of the corresponding estimated coefficient from becoming too small. |
| GOVSTAB | 930 | 8.32 | 3.33 | 12 | ICRG government stability score |
| BURQUAL | 930 | 2.69 | 0 | 4 | ICRG bureaucratic quality score |

**Table 1. Summary of the main variables**

Our WAGE indicator features several improvements in comparison with the data used in previous studies. Most importantly, it is computed from micro surveys and is therefore more reliable than government wages computed from macro data sources (Le, 2012a). Moreover, the data on both the numerator and the denominator of the WAGE indicator are from the same survey in which the wage concept is consistently used. As a result, our WAGE indicator is likely to better capture the relative wage position of government employees.

Most of our control variables are taken from standard sources such as the World Bank's World Development Indicators (WDI); the World Bank's Political Institutions Database (Beck et al., 2001); and the Polity IV Project. In case the WDI does not provide data, the data for these countries are taken from the Penn World Table. Some other variables are taken from the Quality of Government dataset, collected from various sources by the Quality of Government Institute at the University of Gothenburg. Table 1 presents summary information of the main variables, while Appendix A provides more detailed information for all variables. We only retain country/years if we have data for both corruption and government wages.

Table 2 presents the correlation of variables included in Table 1. WAGE is positively correlated with CORR, and the coefficient is 0.35, suggesting that the gap between government wages and manufacturing wages is larger in more corrupted countries. The correlation between WINCOME and corruption is 0.17 while the correlation between INCOME and corruption is -0.63, reflecting that high-income countries are less corrupted. The correlation between WAGE and the other explanatory variables is quite low and the same holds for WINCOME. Note that the correlation between WAGE and WINCOME is very high (0.94) and, not surprisingly, this applies also to DEMAGE and DEMAGESQ.

| | CORR | WAGE | INCOME | WINCOME | DEM | DEMAGE | DEMAGESQ | POLAR | MIL | GOVSIZE | TRADE | GOVSTAB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CORR | 1 | | | | | | | | | | | |
| WAGE | 0.35 | 1 | | | | | | | | | | |
| INCOME | -0.63 | -0.19 | 1 | | | | | | | | | |
| WINCOME | 0.17 | 0.94 | 0.15 | 1 | | | | | | | | |
| DEM | -0.38 | 0.13 | 0.54 | 0.30 | 1 | | | | | | | |
| DEMAGE | -0.64 | -0.24 | 0.71 | -0.03 | 0.44 | 1 | | | | | | |
| DEMAGESQ | -0.65 | -0.31 | 0.68 | -0.11 | 0.36 | 0.97 | 1 | | | | | |
| POLAR | -0.36 | -0.03 | 0.32 | 0.06 | 0.31 | 0.34 | 0.31 | 1 | | | | |
| MIL | 0.17 | 0.03 | -0.12 | -0.02 | -0.23 | -0.06 | -0.08 | -0.11 | 1 | | | |
| GOVSIZE | -0.46 | -0.20 | 0.36 | -0.08 | 0.18 | 0.31 | 0.34 | 0.18 | -0.11 | 1 | | |
| TRADE | 0.07 | -0.04 | 0.07 | -0.01 | 0.04 | -0.05 | -0.01 | -0.11 | -0.12 | 0.19 | 1 | |
| GOVSTAB | -0.02 | -0.08 | 0.06 | -0.05 | -0.21 | 0.01 | 0.04 | -0.02 | -0.01 | 0.00 | 0.12 | 1 |
| BURQUAL | -0.74 | -0.32 | 0.77 | -0.09 | 0.47 | 0.71 | 0.71 | 0.33 | -0.21 | 0.52 | 0.08 | 0.05 |

**Table 2. Correlation Matrix of the main variables**

## 4. Results

Although the original dataset contains about 1,200 observations for government wages, missing data for other variables reduces the sample to a minimum of 898 observations over 76 countries. Appendix B presents the list of countries included in the analysis. We first run the full model using the random effects estimator and test for the validity of the random effects model using the Sargan overidentifying restriction test. The random effects model is rejected at conventional levels of statistical significance. We therefore resort to the fixed effects estimator for inferences, although this choice will lead to a loss of information because the impact of time invariant factors cannot be estimated.

### *4.1 Base line results*

Table 3 presents our estimation results. Besides 20 time dummies which are always included, the number of explanatory variables varies from the most parsimonious model in column (2) to the most general model in column (6). In column (2), only WAGE and INCOME are included. We stepwise add WINCOME in column (3), political factors in column (4), economic factors in column (5), and the incentive structure variables in column (6). This step-by-step inclusion of different sets of control variables shows the effects of our most important explanatory variables, WAGE and INCOME, on corruption as well as the changes in these effects when other determinants of corruption are included. The results confirm that the impact of government wages on corruption is significant and varies with the level of income.

Without the interaction term and any explanatory variables other than the time dummies and INCOME, we see that WAGE has a negative and significant coefficient of -0.30 (column (2) of Table 3). When all additional explanatory variables are included, the coefficient of WAGE is still significant and the magnitude of the impact of government wages on corruption becomes slightly larger, equal to -0.35, and is significant at 1% level when all explanatory variables except WINCOME (the interaction term of WAGE and INCOME) are added (not shown). This result is similar to the finding by Van Rijckeghem and Weder (2001) who show that in developing countries—where corruption detection and prosecution rates are low—government wages must be as high as 19 times the average wages in the manufacturing sector to eliminate corruption. However, the inference based on the model without an interaction term is potentially misleading because the impact of government wages is conditioned by the level of income.

| **Explanatory Variables** (1) | **Wages and GDP Only** (2) | **Interaction** (3) | **Political factors** (4) | **Political and economic factors** (5) | **Full model** (6) |
|---|---|---|---|---|---|
| WAGE | -0.30** | -4.14*** | -3.83*** | -3.90*** | -3.36** |
| | (0.14) | (1.51) | (1.41) | (1.38) | (1.27) |
| INCOME | 1.06*** | 0.63* | 0.63** | 0.64** | 0.87*** |
| | (0.31) | (0.32) | (0.31) | (0.31) | (0.31) |
| WINCOME | | 0.43** | 0.39** | 0.40** | 0.34** |
| | | (0.17) | (0.16) | (0.16) | (0.15) |
| DEM | | | -0.05** | -0.06** | -0.05** |
| | | | (0.02) | (0.02) | (0.02) |
| DEMAGE | | | 0.03 | 0.04 | 0.12 |
| | | | (0.15) | (0.16) | (0.15) |
| DEMAGESQ | | | -0.02* | -0.02 | -0.03** |
| | | | (0.01) | (0.01) | (0.01) |
| POLAR | | | 0.08 | 0.08 | 0.08 |
| | | | (0.07) | (0.07) | (0.07) |
| MIL | | | 0.70*** | 0.74*** | 0.55** |
| | | | (0.22) | (0.23) | (0.22) |
| GOVSIZE | | | | 0.63 | -0.07 |
| | | | | (2.16) | (1.89) |
| TRADE | | | | 0.36 | 0.32 |
| | | | | (0.36) | (0.27) |
| GOVSTAB | | | | | -0.10*** |
| | | | | | (0.02) |
| BURQAL | | | | | -0.42*** |
| | | | | | (0.10) |
| CONSTANT | -6.84** | -3.05 | -2.42 | -2.91 | -3.29 |
| | (3.03) | (3.03) | (3.13) | (3.33) | (3.25) |
| Observations | 898 | 898 | 898 | 898 | 898 |
| R-squared | 0.38 | 0.39 | 0.42 | 0.42 | 0.48 |
| No. of countries | 76 | 76 | 76 | 76 | 76 |

Notes: This table shows estimation results for equation (2). In column (2) only WAGE and INCOME are included as explanatory variables. In column (3) the interaction of WAGE and INCOME is added. In columns (4)-(6) political, economic and incentive structure variables are subsequently added. Robust standard errors corrected for heteroskedasticity and autocorrelation are in parentheses. *, ** and *** indicate significance level of 10, 5 and 1%, respectively. All models control for time and country specific effects.

**Table 3. Main results**

When the interaction term is included in the full model (column (6) of Table 3), the coefficient of WAGE becomes more significant and much larger, about 10 times larger in magnitude. The coefficient of the interaction term is 0.34 and significant at the 5% level. Its positive sign implies that the negative impact of government wages on corruption reduces as income per capita increases.

It should be stressed that inferences cannot be based on the significance of the interaction or the constitutive terms only (Brambor et al., 2006). Using Equation (2), the marginal impact of government wages on corruption is:

$$\frac{\partial CORR}{\partial WAGE} = \gamma + \delta * INCOME$$

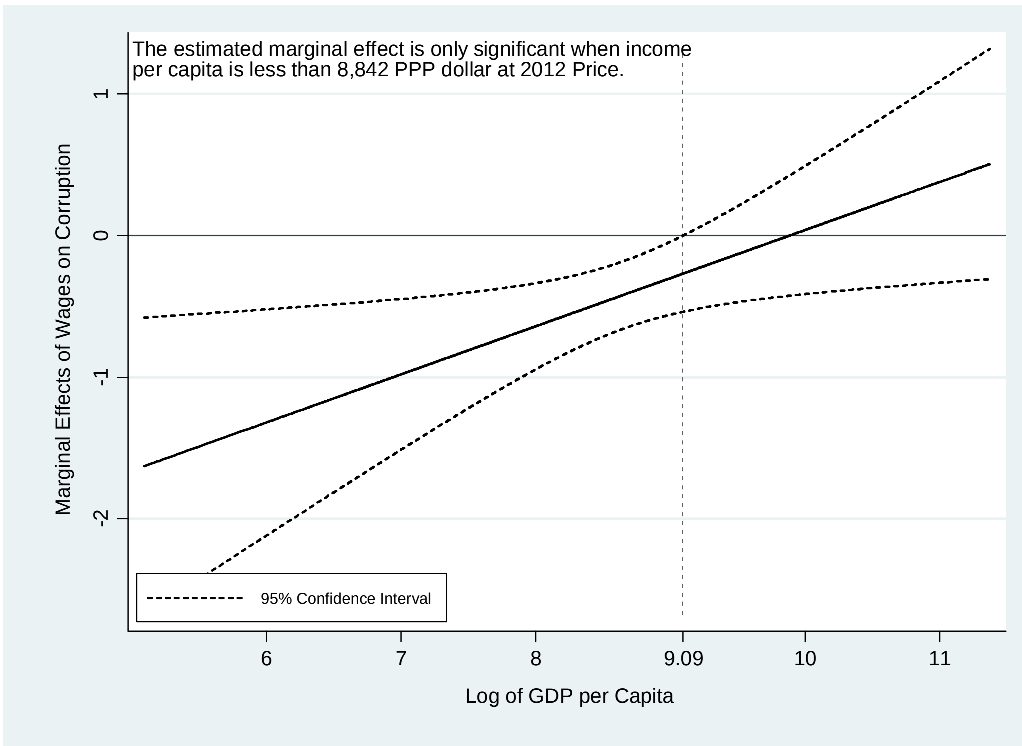


**Figure 1. Marginal impact of government wages on corruption**

For ease of exposition, we graph this marginal effect in Figure 1 with the estimated marginal impact of government wages on corruption on the vertical axis and the natural logarithm of GDP per capita on the horizontal axis. The upward sloping solid line shows the marginal impact of government wages on corruption according to column (6) in Table 3. The dashed curves show the 95% confidence interval of this estimated marginal impact. The dashed vertical line at 9.09 is the level of income (in logs) below which the estimated impact of government wages on corruption is negative and significant at the 5% level. This corresponds to an income per capita level of $ 8,842, equivalent to income in countries such as Albania or

Ecuador.[6] 299 observations from 40 countries fall into this region. Above this income level of \$ 8,842, no significant results can be established. When the income level is higher than \$ 19,468, the estimated impact becomes positive although insignificantly different from zero.

Most studies on the determinants of corruption based on cross sectional or pooled OLS and random effects models find that higher income is correlated with less corruption (Brown et al., 2011; Rock, 2009; Treisman, 2000). However, fixed effect models often indicate that income growth leads to more corruption (Baksi et al., 2009; Braun and Di Tella, 2004). There is no contradiction in these findings. Cross sectional regression models explore the correlation of income and corruption between countries, i.e. are rich countries less corrupt than poor countries? Most studies suggest that this is the case. However, fixed effects models address the question of how corruption changes as the level of income within each country increases, the income differences between countries are captured by the country dummies. As to the effect of income on corruption, two possibilities have been put forward in the literature. On the one hand, it can be argued that economic growth induces corruption because of more opportunities to corrupt. On the other hand, a higher income may improve the country's ability to control corruption, which reduces corruption.[7]

We find that within country economic growth leads to more corruption.[8] Based on the econometric specification in Equation 2, the marginal impact is the derivative of CORR with respect to INCOME, which is $\lambda + \delta$ *WAGE. Because WAGE ranges between 0.38 and 3.1, and $\lambda$ and $\delta$ are both positive, the marginal impact of INCOME on corruption is always positive. We compute the 95% confidence interval of this total impact and find that, regardless of the value of WAGE, the 95% confidence interval of $\lambda + \delta$ *WAGE always is above zero (results are available on request).

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[6] If we accept the 10% significance level, the impact of government wages on corruption is negative and significant at the income level of \$ 9,721 or lower, equivalent to the income level of countries, such as Tunisia or Thailand.

[7] There might also be a cyclical effect. Braun and Di Tella (2004) argue that corruption is pro-cyclical, i.e. "moral standards" are lowered during booms, as greed becomes the dominant force for economic decisions. Kaplan and Pathania (2010) use firm level data and find that firms' perceived corruption increases during an economic boom due to the hikes in the demand for public services.

[8] Referring to the "seeming contradiction" mentioned in the previous paragraph, we also find a negative correlation between INCOME and CORR if the pooled ordinary least squares or the between estimators are used instead of the fixed effects estimator. However, the results based on these alternative estimators are not valid when the country specific effects are correlated with the explanatory variables, as indicated by the Sargan test. Results are available on request.

Most control variables have the expected sign. The coefficient of DEM is negative and significant in all specifications. A one-point improvement in the Polity2 score leads to a decrease of about 0.05 point in corruption. The age of democracy has an inverted U shape impact on corruption. This inference is based on the fact that the coefficients of DEMAGE and DEMAGESQ are positive and negative, respectively. This finding is consistent with a recent study by Rock (2009) who argues that in the early years of a democracy, corruption may even thrive due to institutional weakness. As the democratization process takes effect, democratic countries will be able to better control corruption. However, Rock (2009) reports that democracies need about 12 years to grow effective institutions to control corruption. Our results indicate that democracies need even longer, up to 22.4 years, to control corruption.[9]

We find that countries whose chief executive leader is a military officer are more corrupted. However, high polarization and both economic factors do not appear to be important determinants of corruption in these models. As expected, GOVSTAB and BURQAL have a significant and negative impact on corruption.

The coefficients of our proxies for size of government and openness are not significant.

*4.2 Robustness checks and extensions*

Our regression models with corruption on the left hand side and the natural logarithm of GDP per capita on the right hand side may suffer from an endogeneity problem. While GDP per capita has been found to be the most significant determinant of corruption (Treisman, 2007), corruption may simultaneously affect GDP per capita, as argued by the literature on the nexus between corruption and economic development. Any shock to corruption might also be a shock to GDP per capita. As a result, $INCOME_{it}$ and $\varepsilon_{it}$ in Equation (2) might be correlated. This potential endogeneity problem may lead to the biased estimates of the coefficients of other variables of interest, especially WAGE and WINCOME. The ideal solution is to obtain a good instrument for GDP per capita which is not correlated with the error term in Equation (2) and apply the instrumental variable methods. However, such an instrument is difficult, if not impossible, to obtain.

[9] This result comes from solving the equation $\frac{\partial CORR}{\partial DEMAGE}$=0.1175729-2*0.0262733*DEMAGE = 0. This implies DEMAGE = 2.2374978, equivalent to a period of 22.4 years (this is because DEMAGE is measured in 10 years).

| Explanatory Variables<br>(1) | Three-year lagged INCOME<br>(2) | Latitude as a proxy for Income<br>(3) | One-year lagged WAGE<br>(4) | Comparing industry: Finance<br>(5) | Comparing industry: Construction<br>(6) | OECD<br>(8) | Non-OECD<br>(9) |
|---|---|---|---|---|---|---|---|
| WAGE | -3.36*** | -0.94*** | -0.79*** | -7.48*** | -2.14* | -21.63 | -2.64** |
| | (1.22) | (0.20) | (0.22) | (2.53) | (1.17) | (15.52) | (1.17) |
| INCOME | 0.36 | | | 0.61* | 1.02*** | 0.47 | 0.71* |
| | (0.33) | | | (0.31) | (0.32) | (1.98) | (0.41) |
| WINCOME | 0.35** | | | 0.80*** | 0.23* | 2.17 | 0.27* |
| | (0.14) | | | (0.28) | (0.13) | (1.52) | (0.14) |
| WAGELAT | | 0.03*** | | | | | |
| | | (0.01) | | | | | |
| WAGELAT_1 | | | 0.02** | | | | |
| | | | (0.01) | | | | |
| DEM | -0.05** | -0.05*** | -0.07*** | -0.04* | -0.05** | -0.13 | -0.05** |
| | (0.03) | (0.02) | (0.02) | (0.02) | (0.02) | (0.09) | (0.02) |
| DEMAGE | 0.10 | 0 | 0.04 | 0.24 | 0.11 | -0.59 | -0.05 |
| | (0.14) | (0.17) | (0.14) | (0.18) | (0.17) | (0.58) | (0.30) |
| DEMAGESQ | -0.04*** | -0.04*** | -0.04*** | -0.02** | -0.02* | -0.03 | 0.01 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.02) | (0.12) |
| MIL | 0.25 | 0.45** | 0.36** | 0.56** | 0.57** | 2.58*** | 0.36 |
| | (0.22) | (0.21) | (0.16) | (0.22) | (0.22) | (0.57) | (0.26) |
| GOVSTAB | -0.09*** | -0.07*** | -0.09*** | -0.10*** | -0.10*** | -0.13*** | -0.06* |
| | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.03) | (0.03) |
| BURQAL | -0.43*** | -0.41*** | -0.32*** | -0.41*** | -0.40*** | -0.37* | -0.39*** |
| | (0.11) | (0.10) | (0.10) | (0.10) | (0.10) | (0.21) | (0.12) |
| CONSTANT | 2.16 | 5.70*** | 6.29*** | -1.49 | -4.88 | 3.31 | -0.83 |
| | (3.34) | (0.82) | (0.73) | (3.30) | (3.45) | (22.25) | (3.71) |
| Observations | 884 | 898 | 882 | 895 | 907 | 410 | 488 |
| Within R-sq | 0.46 | 0.46 | 0.44 | 0.48 | 0.47 | 0.57 | 0.45 |
| Number of countries | 76 | 76 | 74 | 78 | 78 | 29 | 47 |

Notes: This table shows the estimation results for equation (2), corresponding with column (6) of Table 3. In column (2) the three year lagged level of income is used as a proxy for INCOME while in column (3) latitude is used as a proxy. In column (4) the one-year lag of WAGE is used as a proxy for itself. In columns (5) and (6) government wages are calculated vis-à-vis wages in finance and construction, respectively. In the final columns the sample is split into OECD and non-OECD countries. Robust standard errors corrected for heteroskedasticity and autocorrelation are in parentheses. *, ** and *** indicate significance level of 10, 5 and 1% respectively. All models control for country and time fixed effects. TRADE, POLAR and GOVSIZE are included as control variables but not reported because they are not significant.

**Table 4. Robustness checks**

We resort to a somewhat ad hoc solution by taking INCOME with a lag of three years as a proxy for itself.[10] The interaction term WINCOME is now the product of current WAGE with the three-year lagged INCOME. We run the model again and present the results in column (2) of

[10] The rationale for taking a lag of three years is twofold. It is necessary to take a sufficiently short lag of INCOME to make a good proxy. At the same time, the lag should be long enough to avoid the “feedback problem”.

Table 4. The coefficients of WAGE and WINCOME are almost the same and remain significant at the 1% and 5% levels, respectively. The coefficient of INCOME is smaller, equal to 0.36 as compared to 0.87 in column (6) of Table 3, but the marginal impact of INCOME on corruption is still positive and significant at the 5% level. These results suggest that our findings on the impact of government wages on corruption are not affected by the potential endogeneity of INCOME.

Another important issue that can render our findings unstable is that WAGE and WINCOME are highly correlated. As we can see in Table 2, the correlation coefficient is as high as 0.94. Multicollinearity, as noted by Treisman (2007), can lead to imprecise estimates of the coefficients of interest. To check whether our conclusion is affected by this high correlation, we follow Treisman (2000) and use the absolute value of the geographical latitude of the capital city of the countries in our sample (LAT) as a proxy for their income level and replace WINCOME by WAGELAT, i.e. the product of WAGE and LAT.[11] The correlation between LAT and INCOME is 0.55 while the correlation between WAGELAT and WAGE is only -0.04.

The results are shown in column (3) of Table 4. While the coefficient of LAT cannot be estimated because it is time invariant, the coefficients of WAGE and WAGELAT still have the same expected sign and are even more significant although their magnitude is smaller, equal to -0.94 and 0.03, respectively. This reduction in the magnitude of the coefficients is because the scale of LAT, which runs from 0 to 65, is different from the scale of INCOME, which is between 6.67 and 11.37. It is important to note that while LAT can partly account for the income differences between countries whose capital cities are located at different latitudes, it fails to distinguish between income levels of countries with roughly equal distance from the equator. Even so, the estimates support our finding that the impact of government wages on corruption is moderated by the level of income.

The third issue is the possible reverse causality between corruption and government wages. Perhaps governments can afford to raise wages because corruption is reduced and tax revenues increase as a consequence. We check this possibility by taking the first lag of WAGE

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[11] Using the log of the mortality rate faced by European settlers at the time of colonization by Acemoglu et al. (2001) in place of LAT as a proxy for income, we reach the same conclusion and the results are also significant at the 5% level for former colonies with a high rate of settler mortality. However, the number of observations is significantly reduced to 364 because countries that have never been colonized are omitted. The results are available on request.

while WAGELAT is replaced by the product of this first lag with LAT[12], WAGELAT_1. The results in column (4) of Table 4 show that the coefficients of the variables of interest are somewhat smaller but they still have the expected sign and are significant at the 1% level. Also when we lag WAGE by two and three years, our conclusions remain the same (results are available on request). These findings suggest that the causality runs from government wages to corruption and not the other way around.

Our findings are also robust to alternative ways of constructing the WAGE indicator. Instead of the wages in manufacturing, we use the wages in the financial sector and the wages in construction as alternative denominators of the WAGE indicator. The results are reported in columns (5) and (6) of Table 4, respectively. For the first alternative, the coefficients of WAGE and WINCOME are much larger than the corresponding estimates in column (6) of Table 3. For the second alternative, however, these coefficients become smaller. Examining the data, we find that wages in construction are generally lower than wages in manufacturing so that the values for WAGE are larger when construction is taken as the comparing industry. In the same fashion, the values for WAGE are smaller when the financial sector is taken as the comparing benchmark because wages in finance are generally higher than wages in manufacturing. The changes in the coefficients of WAGE and WINCOME in columns (5) and (6) when compared to those in Table 3 reflect these relative wage differentials. Similar results are also obtained when we use the wages in other sectors, such as wholesale and retail, transportation or the whole economy as the benchmark to compare.

Finally, we split the sample into OECD and non-OECD countries. The results are presented in columns (7) and (8) of Table 4, respectively. The coefficients of WAGE and WINCOME for the OECD subsample are now very large and become insignificant. The marginal effect of WAGE on CORR (computed in the same way as in Figure 1) is also insignificant. For the non-OECD subsample, however, the marginal impact of WAGE on CORR remains very much the same as in Figure 1, although the corresponding coefficients are less significant and smaller. This supports our finding that government wages only have a negative impact on corruption in relatively poor countries. Another noticeable change when the sample is

[12] Using LAT in place of INCOME, we get rid of the potential endogeneity problem of INCOME and focus on the causality between WAGE and CORR.

split is that the age of democracy now no longer has the inverted U-shape impact on corruption. This may reflect the limited variation in DEMAGE and its squared term within each subsample.

## 5. Conclusions

The impact of government wages on corruption is moderated by the level of per capita income. When income per capita is relatively low, higher government wages reduce corruption. This negative impact reduces as the level of income increases, and eventually becomes positive, though insignificant. Intuitively, petty corruption is more prevalent in poor countries, and well paid bureaucrats forgo such type of corruption. However, when income is higher, petty corruption becomes less important. Grand corruption, involving more secret transactions that violate the laws and regulations, becomes prevalent. This type of corruption brings about larger revenues that outweigh any realistic compensation package to the corrupted bureaucrats. It is also more difficult to detect. To combat the latter form of corruption, increasing government wages might not be efficient.

Our results are robust. The impact of government wages on corruption is significant even if we lag our government wage indicator in order to deal with possible reverse causality. Likewise, using latitude instead of income to deal with multicollinearity problems does not change our main results. Of course, taking the lags of potentially endogenous variables and using latitude as a proxy for income are not perfect solutions to the econometric problems. Still, the robustness tests indicate that our results are not spurious.

Several policy implications can be drawn from this study. Higher government wages only reduce corruption in low-income countries. Government wages may not be an efficient policy tool to reduce corruption in upper middle- or high-income countries with a relatively high level of corruption, such as Greece and Italy. In low-income countries, increasing wages may substantially reduce corruption.

Just as an indication, an increase in average government wages from 100% to 200% of the average wages in the manufacturing industry leads to a decrease of about one point in corruption for countries with an income level between $ 1000 and $ 2000 (in 2012 prices). This drastic pay rise which, in many cases, is equivalent to doubling the government wages seems to be unrealistic. However, this is what happened in successful anti-corruption examples such as

Singapore, Hong Kong and more recently, Da Nang, a city in central Vietnam.[13] A reduction of corruption in combination with other policy reforms can improve the investment climate substantially, moving a country to a new equilibrium with less corruption and more productive economic activities. Our finding is in contrast with theoretical studies arguing that governments in highly corrupted countries should pay low wages and maintain a corrupt bureaucracy (Besley and McLaren, 1993; Chang and Lai, 2002). The results of our study suggest that higher government wages should be used to combat corruption in the poorest and most corrupted countries.

[13] In Vietnamese: http://vnexpress.net/gl/xa-hoi/2012/03/da-nang-ho-tro-csgt-5-trieu-dong-moi-thang/. The city authority decided to pay an extra 5 million VND per month to each policeman to stop traffic bribery. This pay rise is equivalent to some 2 times the then average manufacturing wages in Vietnam. However, it aimed at a small fraction of government employees, i.e. traffic police.

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## Appendix A. Sources and summary of all variables

| Variable | Obs | Mean | Min | Max | Definition and sources |
|---|---|---|---|---|---|
| CORR | 930 | 2.69 | 0 | 6 | ICRG corruption, available for purchase at http://www.prsgroup.com/icrg.aspx |
| WAGE | 1076 | 1.30 | 0.38 | 3.07 | The ratio of government to manufacturing wages, available at http://www.levanhab28.com/ |
| INCOME | 1076 | 9.40 | 6.67 | 11.37 | The natural logarithm of GDP per capita (in 2012 international dollars), available from the World Bank's World Development Indicators (WDI) database |
| WINCOME | 1076 | 12.21 | 2.89 | 26.83 | The product of WAGE and INCOME |
| DEM | 1014 | 7.11 | -10 | 10 | The revised Polity2 score available at http://www.systemicpeace.org |
| POLAR | 1038 | 2.56 | 0 | 8 | A dummy which equals 1 if a country is classified as highly polarized by Beck et al. (2001), as updated in 2010 and available at www.worldbank.org |
| DEMAGE | 1038 | 13.09 | 0 | 64 | Age of the democracy, the number of consecutive years since the year the country is classified a democracy from 1930 until now. Following Treisman (2007), we classify a country as democratic if the executive electoral competitiveness index produced by Beck et al. (2001) is larger than or equal to 6.5. The variable is rescaled to 10 years to prevent the magnitude of the corresponding estimated coefficients from becoming too small. |
| DEMAGESQ | 1040 | 0.32 | 0 | 1 | The square of DEMAGE |
| MIL | 1028 | 0.02 | 0 | 1 | A dummy which equals 1 if the chief executive is at the same time an army officer; source: Beck et al. (2001) |
| GOVSIZE | 1076 | 0.17 | 0.03 | 0.54 | Total final general government consumption as a percentage of GDP, provided by the WDI. This variable is further divided by 100 to prevent the magnitude of the corresponding estimated coefficient from becoming too small. |
| TRADE | 1076 | 0.87 | 0.14 | 3.20 | Total import and export as a percentage of GDP, provided by the WDI. This variable is further divided by 100 to prevent the magnitude of the corresponding estimated coefficient from becoming too small. |
| GOVSTAB | 930 | 8.32 | 3.33 | 12 | ICRG government stability score |
| BURQUAL | 930 | 2.69 | 0 | 4 | ICRG bureaucratic quality score |
| GEO1* | 1076 | 0.32 | 0 | 1 | A dummy equal to 1 if a country is in the Eastern Europe and Post Soviet Union (Including Central Asia) |
| GEO2* | 1076 | 0.23 | 0 | 1 | A dummy equal to 1 if a country is in the Latin America region, including Cuba, Haiti and The Dominican Republic |
| GEO3* | 1076 | 0.04 | 0 | 1 | A dummy equal to 1 if a country is in the North Africa and Middle East, including Israel, Turkey and Cyprus |
| GEO4* | 1076 | 0.04 | 0 | 1 | A dummy equal to 1 if a country is in the Sub-Saharan Africa |
| GEO5* | 1076 | 0.29 | 0 | 1 | A dummy equal to 1 if a country is in the Western Europe and North America, including Australia and New Zealand |
| GEO6* | 1076 | 0.03 | 0 | 1 | A dummy equal to 1 if a country is in the in East Asia, including Japan and Mongolia. |
| GEO7* | 1076 | 0.02 | 0 | 1 | A dummy equal to 1 if a country is in the Southeast Asia Region |
| GEO8* | 1076 | 0.00 | 0 | 1 | A dummy equal to 1 if a country is in the South Asia Region |
| LEGOR1* | 1062 | 0.16 | 0 | 1 | A dummy equal to 1 if a country has the English Common Law origin |
| LEGOR2* | 1062 | 0.41 | 0 | 1 | A dummy equal to 1 if a country has the French Commercial Law origin |
| LEGOR3* | 1062 | 0.35 | 0 | 1 | A dummy equal to 1 if a country has the Socialist/Communist Law origin |

| | | | | | |
|---|---|---|---|---|---|
| COLUK* | 1076 | 0.10 | 0 | 1 | A dummy equal to 1 if a country was formerly a United Kingdom's colony |
| COLFR* | 1076 | 0.01 | 0 | 1 | A dummy equal to 1 if a country was formerly a French colony |
| COLSP* | 1076 | 0.21 | 0 | 1 | A dummy equal to 1 if a country was formerly a Spanish colony |
| LAT* | 1062 | 36.60 | 1 | 65 | The absolute value of the latitude of the capital city. |

* Collected from various sources and available at the Quality of Government Institute, Gothenburg University

## Appendix B. List of countries

| No. | Country | Observations | No. | Country | Observations |
|---|---|---|---|---|---|
| 1 | Albania | 5 | 39 | Italy | 14 |
| 2 | Algeria | 4 | 40 | Jamaica | 11 |
| 3 | Argentina | 19 | 41 | Jordan | 16 |
| 4 | Armenia | 12 | 42 | Kazakhstan | 11 |
| 5 | Australia | 9 | 43 | Latvia | 12 |
| 6 | Austria | 15 | 44 | Lithuania | 12 |
| 7 | Azerbaijan | 11 | 45 | Mexico | 16 |
| 8 | Belarus | 2 | 46 | Moldova | 13 |
| 9 | Belgium | 12 | 47 | Mongolia | 7 |
| 10 | Bolivia | 12 | 48 | Netherlands | 15 |
| 11 | Brazil | 19 | 49 | New Zealand | 19 |
| 12 | Bulgaria | 15 | 50 | Nicaragua | 3 |
| 13 | Canada | 19 | 51 | Norway | 11 |
| 14 | Chile | 9 | 52 | Panama | 17 |
| 15 | China | 19 | 53 | Paraguay | 13 |
| 16 | Colombia | 14 | 54 | Peru | 14 |
| 17 | Costa Rica | 8 | 55 | Philippines | 10 |
| 18 | Croatia | 12 | 56 | Poland | 17 |
| 19 | Cyprus | 13 | 57 | Portugal | 14 |
| 20 | Czech Republic | 16 | 58 | Qatar | 4 |
| 21 | Denmark | 13 | 59 | Romania | 17 |
| 22 | Dominican Republic | 13 | 60 | Russian Federation | 8 |
| 23 | Ecuador | 13 | 61 | Slovakia | 18 |
| 24 | Egypt | 4 | 62 | Slovenia | 13 |
| 25 | El Salvador | 16 | 63 | South Africa | 10 |
| 26 | Estonia | 13 | 64 | Spain | 14 |
| 27 | Finland | 14 | 65 | Sweden | 7 |
| 28 | France | 15 | 66 | Switzerland | 8 |
| 29 | Germany | 15 | 67 | Taiwan | 4 |
| 30 | Greece | 14 | 68 | Tanzania | 3 |
| 31 | Guatemala | 5 | 69 | Thailand | 3 |
| 32 | Guyana | 5 | 70 | Uganda | 3 |
| 33 | Honduras | 19 | 71 | Ukraine | 12 |
| 34 | Hungary | 18 | 72 | United Kingdom | 21 |
| 35 | India | 3 | 73 | United States | 21 |
| 36 | Indonesia | 2 | 74 | Uruguay | 17 |
| 37 | Ireland | 15 | 75 | Venezuela | 17 |
| 38 | Israel | 5 | 76 | Vietnam | 6 |