

Beyond government size: Types of government intervention and corruption

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(Forthcoming in *Regulation and Governance*)

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Keywords: corruption, government intervention, regulation, fiscal burden.

JEL Codes: D73; H29; L51; N44; O52

Statement on conflict of interest: The author does not have any conflict of interest related to this research.

Acknowledgments: This research received financial support from Government of Catalonia (2017-SGR-1556) and the Spanish Ministry of Science and Innovation (PID2019-104319RB-I00). E. Kjørsvirk and S. Miravent provided helpful research assistance. Comments from D. Albalade, J.R. Borrell, X. Fageda, and M. Holst and three anonymous reviewers have been very useful.

Beyond government size: Types of government intervention and corruption

Abstract: Evidence on the relationship between government size and corruption is mixed, and might be misleading, as government size is usually measured by fiscal size. The core hypothesis in this research is that the type of government intervention in the economy –rather than the size of government– is a key explanatory factor for corruption. The empirical analysis disentangles the effects of the two main government tools for intervention: fiscal and regulatory. The main result is that fiscal burden does not present any significant relationship with corruption. In contrast, a consistent and significant positive association is found between regulatory quality and corruption. Furthermore, legal origins and democratic experience contribute to explaining differences in corruption.

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Introduction

Corruption negatively affects investment and growth (Mauro, 1995; Beekman, Bulte and Nillesen, 2014). In its political variety, corruption has been defined as “the abuse of entrusted power by political leaders for private gain” (Transparency International, 2004: 1). Based on this definition, a relationship between corruption and government size has been drawn, because an increase in the latter provides more opportunities for bureaucrats and politicians to engage in activities with a potential for corruption (Rose-Ackerman, 1999). In a similar vein, both Tanzi (1997) and Alesina and Angeletos (2005) confirm that the larger the government the greater the likelihood of corruption, while Goel and Nelson (1998) report that the size of the state and local government has a direct association with corruption in the United States. Similarly, Dreher, Kotsogiannis, and McCorriston (2007) and Buehn and Schneider (2012) find that government size is positively related to corruption; however, the results in Treisman (2000) point to contradictory outcomes in this regard.

It is frequent in the literature to use a fiscal indicator -e.g. public expenditure or government revenues- to measure government size. However, government size is a relative term, and measuring it often lacks precision (Ott, 2018). Fiscal intervention is just one of the tools available to governments to intervene in the economy and it does not, in itself, define the overall size of government. For this reason, the relationship between corruption and government size as reported in earlier studies -when measuring government size with fiscal intervention- might be misleading, given that fiscal size does not necessarily influence the level of corruption – as Alesina and Angeletos (2005) also point out. A similar conclusion is drawn by Rothstein and Teorell (2008), who claim that the Nordic countries, with their low levels of corruption and high levels of public spending and fiscal government intervention obviously contradict this belief, and that it is good governance what matters (Persson and Rothstein, 2015).

The core hypothesis of this study is that –rather than the size of government– the type of government intervention in the economy is the main explanatory for cross-country differences in corruption. To test this hypothesis, the analysis distinguishes between the effect of the two main tools for government intervention in the economy: fiscal and regulatory. Regarding these dual types of government intervention, my key hypothesis is that the regulatory burden caused by low regulatory quality is a major trigger of corruption. In other words, the lower the regulatory quality, the more and bigger are the opportunities for corruption or related activities, thus increasing the presence of corruption.

Obtaining precise data on corruption is difficult, the reason for this being obvious: those involved in corruption naturally seek to hide its presence. For this reason, developing a reliable corruption index has attracted much scholarly attention. Indeed, in the literature, corruption is most usually measured by applying a corruption index developed by a reputable organization. The most widely used index is the Corruption Perception Index (CPI), published by Transparency International. I have opted to use CPI as primary corruption index. Additionally,

I have used the index developed each year by the World Economic Forum in the Global Competitiveness Report (GCR-WEF, henceforth) to check stability of the results. It is worth stressing that for the period under analysis, 2007–2017, corruption perception as measured by the CPI and the GCI presented a correlation of 0.954 ($p < 0.000$).

The research reported here was conducted on both the European Union (EU) and the European Free Trade Association (EFTA) countries for the period 2007–2017. The empirical analysis allows the effects of fiscal intervention and regulation to be disentangled. In doing so, the article contributes to the literature by disentangling the respective effects of regulatory and fiscal government intervention. In that regard, the main finding is that regulatory quality is negatively related to corruption (the more regulatory quality, the less corruption). However, fiscal burden does not appear to have any systematic association with corruption.

This article provides an additional contribution to the literature by disentangling the effect of the different legal origins and administrative traditions, beyond the 'civil law versus common law' usual duality. In that regard, both French Civil Law and English Common Law appear to have a positive association with corruption, whereas corruption is lower for both the German and the Scandinavian legal origin. Furthermore, differences in consolidation of democracy and in the level of educational attainment contribute to explaining differences in corruption.

Types of Government intervention and corruption: Background and hypotheses

In his seminal study on the theory of economic regulation, Stigler (1971) distinguishes between different forms of government intervention on the economy, and argues that intervention via legal regulations can be preferred to fiscal intervention for rent seeking purposes, because the number of beneficiaries can be more easily restricted, so that relative profit from government intervention can be higher for politically connected private interests. In the same vein, Hart,

Shleifer, and Vishny's (1997) propose that contractual government intervention (or "private management under contractual regulation" as they described it) has a stronger effect on corruption than direct government activity (or, again to use their terms, "public management").

Cross-country differences in the propensity to use either fiscal or regulatory tools for government intervention on the economy have been emphasized in studies such as Piketty (1997). However, this topic has received limited attention so far. In a recent and suggestive study, Charron, Harring and Lapuente (2021) distinguish between two main tools of government intervention: redistribution (via fiscal policy) and regulation, and show that level of trust of individuals on institutions are positively associated to the demand of redistribution, while low levels of trust are associate with high demand of regulation. Hence, low levels of trust lead to over-regulation, which "leads to more corruption opportunities". (p. 5). The distinction in the present research between two different types of government intervention - fiscal and regulatory- fits well within Charron, Harring and Lapuente (2021) setting, and provides empirical evidence on the effect of each type of intervention on corruption.

When analyzing the potential effect of regulation on corruption, we need to be aware of the potential endogeneity in the relationship. Knack and Keefer (1995) suggest that countries that allow public officials to demand large and arbitrary bribes also inhibit those officials from credibly following through their future commitments, which in turn shapes the characteristics of inefficient regulation. Further, Krueger (1993) argues that corrupt bureaucrats will intentionally introduce new regulations and red tape, to be able to extract more bribes by threatening to deny permits. Hence, it may happen that it is in fact corruption that promotes regulation, consistent with Shleifer and Vishny's (1993) view that many regulations exist because they provide the opportunity for officials to obtain benefits from their discretionary power. This issue is specifically addressed below, when implementing the empirical strategy.

Although scarcer than the research on fiscal burden and corruption, research on the effect of the regulation on corruption has tended to reach more of a consensus, frequently finding a positive relationship between the regulatory burden and corruption. Djankov et al. (2002) investigated the number of procedures an entrepreneur must face before they can operate a business legally and the effect this has on corruption. The authors found that countries in which the number of procedures was greater experienced more corruption.

A study that specifically relates regulation and corruption is Holcombe and Boudreaux (2015), who seek to explain why Scandinavian countries present lower levels of corruption despite their having relatively large governments, when measured in fiscal terms. They run a cross-sectional analysis on a worldwide sample of countries and find that while government expenditure has a weak negative association with corruption, regulation has a strong positive effect. In another interesting study, Fazekas (2017) analyses the effect of different types of regulations on bribery and government favoritism. He finds that the effect of different types of regulations is context-dependent and suggests stronger potential to reduce corruption by decreasing regulations related to day-to-day business-state interaction, contract enforcement, and registering property. Furthermore, Fazekas (2017) contribution is useful as it provides a reminder that not all regulations have the same association with corruption.

Indeed, for instance, regulation that forces to publish quality standards of products has a very different nature from regulation and procedures that impose excess delays in the time needed to open a business. The precise meaning of Regulatory Quality in this article is as described in the World Bank Worldwide Governance Indicators: "Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development". Within this framework, regulatory burden is defined as "The risk that normal business operations become more costly due to the regulatory

environment. This includes regulatory compliance and bureaucratic inefficiency and/or opacity." Regarding regulatory intervention, I formulate the following first hypothesis:

H₁: The overall regulatory quality has a negative association with corruption

Turning to fiscal intervention, the hypothesis that big government -understood as high fiscal intervention on the economy-, causes more corruption is based on the Public Choice literature. This view has been challenged by recent theoretical contributions. Persson and Rothstein (2015: 232) argue that "while the opportunities to engage in corrupt activities presumably increase with the size of government, the incentives to do so are rather likely to decrease". The rationale for this claim is that citizens have more incentives to hold corrupt politicians and bureaucrats accountable as the size of the government increases, which in turn increases the potential costs of corruption.

Whereas Persson and Rothstein (2015) focus on the level of visible taxation (p. 233) as a key feature of big government, Dahlström, Lindvall and Rothstein (2013) further contribute to the analysis by looking at government expenditure. They differentiate public expenditure according to the degree of discretionary power that bureaucrats enjoy when allocating payments. Thus, public spending composition matters regarding corruption. Universal entitlements, for which bureaucratic discretionary power is low, would have no significant relationship with corruption. Instead, more discretionary programs - such as targeted subsidies - would provide wider room for corruption, and in these cases bureaucratic reliability or "absence of corruption" (Dahlström, Lindvall and Rothstein, 2013: 525) matters more.

Available evidence in the literature provides contradictory findings on the effect of fiscal burden on corruption: Goel and Nelson (1998) and Buehn and Schneider (2012) found fiscal burden to increase corruption, while Montinola and Jackman, (2002), Adserà, Boix and Payne (2003), and Dreher and Schneider (2010) found the opposite result: fiscal burden negatively

impacts corruption. Given the contrasting theoretical views, and the divergent potential effect on corruption of different fiscal tools (direct taxation versus non direct taxation; universal programs versus targeted subsidies), I formulate the second hypothesis as follows:

H₂: The overall fiscal burden does not have a significant relationship with corruption.

Beyond contemporary public policies, historically rooted institutional factors are important determinants to consider when seeking to explain what triggers (or prevents) corruption (Lambsdorff, 1999). In recent decades, a notable body of research has been built up suggesting that a country's administrative tradition or legal origin is strongly correlated with its economic outcomes as well as its legal rules and regulations. Painter and Peters (2010) distinguish between four Western administrative traditions: Anglo-Saxon Law (Common Law), Napoleonic or French Law (Civil Law), German Law and Scandinavian Law. Dominant state traditions are defined mainly by the relationship between the state and civil society (Painter and Peters, 2010). In this regard, the pluralist Anglo-Saxon tradition contrasts markedly with the heavily hierarchical, interventionist Napoleonic tradition. Both German and Scandinavian traditions are characterized as being organicist, with an emphasis on open government in the case of Scandinavian Law (Painter and Peters, 2010).

These differences in interventionism and discretionary power could well have an impact on corruption, strengthening effects of the factor 'regulatory burden'. La Porta, Lopez-de-Silanes, and Shleifer (2008) adopt a broad view of legal origin as a means of socially controlling economic life, in what they refer to as their Legal Origin Theory. In their empirical analysis they find Anglo-Saxon common Law to be associated with lower levels of corruption than those associated with French civil law. This article looks beyond the Civil versus Common Law dilemma and extends as well to the two other existing legal origins well (German and Scandinavian). I formulate the following hypothesis:

H₃: French legal origin (Civil law) is associated with greater corruption

By testing those hypotheses, this research contributes to the literature in several ways. The two closest published papers are Holcombe and Boudreaux (2015) and Fazekas (2017), both mentioned above. Holcombe and Boudreaux use both fiscal and regulatory indicators in their study, which is an empirical cross-section analysis. The research here conducted takes care of endogeneity issues by analyzing a 11 years period time (2007-2017) by means of panel analysis and GMM techniques, thus providing more robust results. Differences on the effect of fiscal burden are found, and the analysis of the effects of legal origins/administrative traditions strengthens the impact of regulatory quality on corruption. Fazekas (2016) uses panel data techniques for a 2009-2015 dataset and finds that effect of regulation on corruption is highly dependent on the type of procedures being analyzed, while overall regulation score does not have an impact on corruption. Different from Fazekas (2016), this paper addresses the issue of endogeneity between regulation and corruption -as stated above- and also considers the effect of fiscal burden, so that the two types of intervention are explicitly considered. Here, overall regulatory quality (regulatory burden) is found to have a strong and negative (positive) association with corruption.

Other factors affecting corruption: Related literature

The literature has considered many factors as potential drivers of corruption. Treisman (2007) is particularly comprehensive, as it considers factors related to colonial history, religion, ethnic divisions, socioeconomic characteristics, institutions, and government. The empirical analysis described below includes the countries of the EU and the EFTA; hence, it deals with a relatively homogeneous area in terms of history, religion, and ethnicity. For this reason, the focus is placed first on political factors. Later, attention switches to social and economic factors.

Political factors

The hypothesis that democracy contributes to reducing corruption has been frequently tested in empirical analyses. The typical conclusion is that it has a negative effect (that is, it reduces) corruption perception (Treisman, 2000, 2007; Montinola & Jackman, 2002; Mohtadi and Roe, 2003; Kalenborn and Lessmann, 2013). However, the relationship would seem to be far from linear (Montinola and Jackman, 2002). In cases where there is a weakening in extreme autocracies or where political freedoms are gained, perceived corruption seems to decrease. However, in cases of imperfect democracies, small increases in freedom do not seem to have a direct impact on corruption perception. Overall, most of the available evidence indicates that long-established democracies present lower levels of corruption than those presented by young democracies or authoritarian regimes (Treisman, 2007; Mohtadi and Roe, 2003; Kalenborn and Lessmann, 2013).

Recent literature has emphasized a relationship between women and corruption. Dollar, Fisman and Gatti (2001) suggest that women are more honest than men. Empirical studies by Esarey and Schwindt-Bayer (2019) and by Bauhr, Charron, and Wängnerud (2019) find that women's representation decreases corruption. However, Barnes and Beaulieu (2018) conduct a survey experiment survey and find that rather than being more honest, women are more risk adverse than men, and this would lead to the perception of women being less likely to engage in corruption.

Economic and social factors

Several studies have examined the effect of the shadow economy on corruption (Dreher, Kotsogiannis, and McCorriston, 2009; Buehn and Schneider, 2012), using unemployment as one of the main indicators of this informal economy. Other papers have focused on the direct effect of unemployment on corruption. Most studies find that unemployment reinforces

corruption (Saha, Gounder, and Su; 2009; Peña-Miguel and Cuadrado-Ballesteros 2019), although Saha and Su (2012) do not find a direct relationship between the two.

The relationship between trade openness and corruption was first tested by Krueger (1974), who reports that trade restrictions divert resources from productive activities to corruption and other forms of rent seeking. Ades and Di Tella, (1999), however, suggest a more ambiguous theoretical relationship between trade and corruption. Trade restrictions reduce market competition and generate extra rents, thus triggering corruption. Yet, lower levels of competition increase the value of corruption avoidance and, as a result, trade restrictions may reduce corruption. Indeed, the authors' empirical analysis supports the insight that trade openness reduces corruption. The same outcome is reported by Sachs et al (1995), Ades and Di Tella (1997), Treisman (2000), Leite and Weidmann (1999) and Gatti (2004), whereas Torrez (2002) and Majeed (2014) find more mixed results.

Individuals with a lower level of education tend to have more difficulties in understanding public policies and the workings of government (Rose-Ackerman, 1999). In contrast, citizens in countries with higher levels of educational attainment are better able to identify practices that undermine the correct functioning of institutions, such as corruption, and are less tolerant of them (Hakhverdian and Mayne, 2012). An influential study examining the effect of education on corruption is that undertaken by Glaeser and Saks (2006), who analyze the drivers of corruption in the United States and find education to be negatively associated with corruption. Most subsequent studies also find a negative effect of education on corruption (e.g. Truex, 2011; Asongu and Nwachukwu, 2015, Peña-Miguel and Cuadrado-Ballesteros 2019). However, Buehn and Schneider (2012) fail to find a significant relationship between the two.

Finally, we turn to the relationship between economic development and corruption. The negative effect of economic development on corruption perceptions has long been reported (La Porta et al.; 1999, Treisman, 2000; Holcombe and Boudreaux, 2015).

Corruption in European countries

A sizeable majority of Europeans believe corruption to be a major problem within their country, as indicated by various Eurobarometer Surveys published since 2005, although there is considerable divergence across the countries of the EU. Data from the 2017 Eurobarometer Survey (European Commission, 2017) seems to adhere to a two-out-of-three rule: thus, two out of three of the population in EU countries believe corruption to be a widespread problem, while in two out of three of all EU countries, two out of every three citizens or more believe corruption to be a major problem.

Data on perception of corruption from the GCR-WEF are particularly useful for illustrative purposes, showing a high degree of variation of perception of corruption among the EU and EFTA countries. In a scale ranging between 1 (corruption is very common) and 7 (corruption never occurs), the values obtained vary between a 2.8 and 6.3.¹ Figure 1 shows the classification of countries in quartiles, from 1st quartile (very high corruption) to 4th quartile (very moderate corruption). Corruption appears to be higher in former communist countries (junior democracies) and southern countries of French legal origin.

Figure 2 shows the diversity in changing perceptions across the EU and EFTA, based on the difference of values obtained in 2017 and in 2017 in the GCR-WEF. No clear pattern emerges from these data about these shifting perceptions of corruption.

(Insert Figures 1 and 2 around here)

Parallel to concerns with corruption in the institutional arena, scholarly research has paid increasing attention to other manifestations of corruption, identified as constituting a problem in most EU countries (Charron, 2016). For example, Kartal (2014) finds that while in the pre-accession period (pre-candidacy) incentives from the EU institutions contributed to controlling corruption among East European candidates, following accession this control over corruption was weakened. Yet, recent research by Elbasani and Šelo Šabić (2018) challenges the fact that pre-accession efforts were successful in controlling corruption in the cases of Croatia and Albania. Elsewhere, Pellegata and Memoli (2016) find a negative effect of corruption on confidence in political institutions across the EU. In a further examination of institutional confidence, Bauhr and Charron (2020) find that support for within EU-redistribution policies is contingent upon perceptions of corruption. Thus, corruption perception in countries in which the quality of government is low tends to increase support for within-EU redistribution policies, but the contrary occurs in contexts where the quality of governmental institutions is high.

While factors related to perceptions of corruption have been empirically analyzed for different countries, regions, and local jurisdictions (see, for instance, Bauhr and Charron, 2020; Bauhr, Charron, and Wängnerud, 2019), only one paper -unpublished-, MacDonald and Majeed (2011), has attempted to explain differences in the causes of corruption across Europe using cross-country data and multivariate techniques. They draw on data from the corruption perception index published by the International Country Risk Guide (ICRG) for five-year average periods between 1984 and 2007 for the EU-25 Member States. They analyze the potential effect of several factors, using aggregate indicators obtained mainly from the ICRG, and find that rule of law, economic development, and government size (measured in terms of government expenditure) reduce corruption. A not dissimilar study was conducted by Peña-Miguel and Cuadrado-Ballesteros (2019) in their examination of the relationship between privatization and corruption. The authors use as their controls a set of economic variables

similar to the ones used herein and find corruption to be positively associated with unemployment and foreign trade, and negatively related to education and economic development.

The empirical strategy deployed in the following sections is closely connected to that adopted by MacDonald and Majeed (2011). Here, however, I further contribute to the literature by using full annual data sets for the period 2007–2017 for all EU-28 Member States plus three EFTA members (Iceland, Norway, and Switzerland). This results in a database with 431 observations, four times the size of that employed by MacDonald and Majeed (2011). Additionally, I use a variety of specifications for institutional, social and economic variables, and disentangle the effect of government intervention by distinguishing between fiscal and regulatory intervention.

Data and methods

Data

To undertake this research a database was first built for the EU-28 Member States plus Iceland, Norway and Switzerland. The database begins in 2007 for two reasons: First, the accession of Romania and Bulgaria to the EU in that year virtually completed the expansion of the Union to the countries of Eastern European (the accession of Croatia in 2013 poses no problem as data are available for this country as far back as 2006). Second, availability of data back to 2006 is a relevant issue, because I use generalized method of moments (GMM), given the nature of the data and also to control for endogeneity. GMM includes a lag variable for the corruption index. Had 2006 been used as our cut-off point it would not have been possible to include this lag.

All data were obtained from publicly available sources. Data for the Corruption Perception Indexes were obtained from Transparency International (and additionally from the GCR-WEF). Data for Regulatory Quality was obtained from the World Bank. Data for most of the economic

and social variables were obtained from Eurostat. Data about the openness of the economy were obtained from the OECD and World Bank national accounts. Data on institutional, political, and democracy-related variables were obtained from the dataset in La Porta et al. (2008), World Bank, and the countries' institutional web pages.

Variables

Dependent variable

The primary dependent variable is the corruption index elaborated by Transparency International, *TI_Corruption*, the most widely used indicator of corruption worldwide. The CPI scores and countries based on how corrupt a country's public sector is perceived to be by experts and business executives.² Given the way in which the scale is constructed in the Report and in order to facilitate direct interpretation, the index is reversed here multiplying by (-1). To check the stability of results, a secondary dependent variable is used: The *Corruption_Index* (CI) in the GCR-WEF, capturing perceptions with regard to irregular payments and bribes. It is constructed as explained above. Given the way in which the scale is constructed in the Report and to facilitate direct interpretation, the index is reversed here multiplying by (-1), as well.

Indexes based on opinion surveys are open to criticism on the grounds that they may be affected by the media, anticorruption campaigns or politically motivated accusations (Blais, Gidengil and Kilibarda, 2017; Escresa and Picci, 2020; Olken, 2009; Picci, 2018; Razafindrakoto and Roubaud, 2010). Lambsdorff (2004) discusses the relative strengths and shortcomings of such perception indexes but stresses the lack of alternatives. Certainly, progress has been made recently with proposals on more objective indexes, such as the Corruption Risk Index (Fazekas, Tóth and King, 2016) and the Public Administration Corruption Index (Escresa and Picci, 2017). While these advances are promising, they do not yet provide large time series of indexes for a wide number of countries, as compared to those available based on perception indexes.

Furthermore, their results have a high correlation with corruption perception indexes, a point to which I later return.

Perceived corruption has its flaws and potential biases; nonetheless, perception indexes present a high degree of inter-correlation, suggesting that despite differences in their respective methodologies, they have a common output, that is, corruption. Indeed, the high correlation between different indexes is indicative of their consistency. In this case, and as mentioned earlier, a correlation of 0.95 is found between the GCR indexes and the CPI-TI and the CI-GCR-WEF for the period 2007–2017. Furthermore, a correlation of 0.87 was found between GCR data for 2017 and corruption perception in the Eurobarometer (2017).

It is important to recall the high correlation with the Eurobarometer, because this last one is based on citizens perceptions. Therefore, it is potentially more sensible to petty bribery ('petty corruption') than both the indexes from Transparency International and WEF, which are based on opinions of experts and business executives and could be more focused on 'grand corruption'. Hence, the very high degree of correlation among all three indexes provides relief regarding the potential difference between perceptions from citizens, and experts plus business executives, and suggest little difference with respect to the duality between petty and grand corruption for this research.³

Additional support is obtained here from the fact we include EU and EFTA countries in our observation group, since, to a certain degree, this controls for major cultural differences, providing us with relatively homogenous data compared to that used in worldwide studies. Finally, it is worth pointing out that Charron's (2016) study, conducted in EU countries, finds that the corruption perceptions of citizens that have personally experienced public sector corruption and those who have not are similar. Likewise, Charron found considerable consistency between citizen and expert assessments of corruption. Hence, Charron (2016, p.

167) claims that “little evidence is found in support of critics’ claims that corruption perceptions are driven by outside noise, at least in the sample European countries and regions”.

A final remark on the choice of dependent variable is worth making. In Fazekas, Tóth and King (2016) an objective Corruption Risk Index is used, based on different features of procurement in each country. This proposal has later been followed in Charron, et al. (2017), Bauhr, Charron, and Wängnerud (2019), and Bauhr et al. (2020). Indeed, Escresa and Picci (2016: 544) argue that good reasons exist “to believe that levels of corruption vary greatly across countries, but are very persistent within countries.” This would damage the ability to analyze changes of corruption over time by means of corruption indexes. However, as stated in Fazekas and Kocsis (2020: 163), while corruption perceptions can be inadequate to capture changes in corruption, “they are more reliable for comparing levels of corruption across countries for a longer time period”, which is the type of research here conducted, for the period 2007-2017.

In fact, Fazekas and Kocsis (2020) find that their 2009–13 country average single-bidder and CRI indicators have a high degree of correlation perception-based corruption indicators such as Transparency International’s CPI, with coefficients around 0.6 (Fazekas and Kocsis, 2020: 163). Furthermore, I have computed the correlation between PACI (Escresa and Picci, 2017) and the CPI Perception indexes used in this research, and have obtained a coefficient of 0.71 with CPI (and of 0.64 with the WEF index, later used for checking the stability of results).

Independent variables

The first set of explanatory variables is that related to types of government intervention. I have chosen to measure this key dependent variable the index of *Regulatory_Quality* provided by the World Bank, which “reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.” (World Bank, Worldwide Governance Indicators database). Recall that because this index is

taken from the World Bank, we avoid taking both the dependent and the key independent variable from the same survey.

Additionally, the variable *Fiscal_Burden* measures total government expenditure as a percentage of GDP. Still directly connected to the type of government intervention, I include variables capturing *Legal_origin* (four Western administrative traditions): *Civil_Law*, *Common_Law*, *German_Law* and *Scandinavian_Law* (Painter and Peters, 2010). Relationship with the literature of these variables has been provided above.

Turning now to political-related variables, I first include the variable *Senior_Democracies*, a variable that measures the number of years of uninterrupted democratic regime after World War II [which resembles Treisman's (2007) decision to consider democratic regimes since 1950]. The relationship between democracy and corruption is not linear (Montinola and Jackman, 2002). Given the distribution of *Senior_Democracy*, data are transformed to its logarithmic form, to bring it closer to a normal distribution. Second, following recent literature on the relationship between women and corruption, I include the variable *Women_in_Government*, which measures the percentage of seats in national parliaments held by women.

Finally, I include several economic and social variables following the literature above. *Unemployment* is the rate of unemployment; *Openness* measures the weight of foreign trade in GDP; *Education* captures the percentage of population (active, 16-64 years) with tertiary education (levels 5 to 8 Eurostat); and *GDPpc_ppp* captures the gross domestic product per capita (purchasing power parity adjusted).

A point worth making is that openness and unemployment could be expected to have some relationship with regulation. Regulatory barriers could dampen openness of the economy, and a rigid regulation of the labor market could increase unemployment. The data show a very low and non-significant correlation between regulatory quality and openness (a correlation matrix

is provided in table A1 in the appendix). This may be explained by the fact that the area under study (EU plus EFTA) forms an internal market, and foreign trade is subject to harmonized regulation. Instead, a significant and negative correlation between regulatory quality and unemployment is found. However, average as well as individual VIF analysis suggests that no relevant problems of collinearity exist. Furthermore, the results for regulatory quality do not change depending on whether unemployment is included in the estimations (details in tables below). Table 1 summarizes the information on these variables, sources, and expectations.

(Insert table 1 around here)

Methodology

I use a panel dataset for the period 2007–2017 to analyze the relationship between corruption perception and a set of explanatory variables. The panel data model is specified as follows, where sub-indices i and t represent country and year, respectively:

$$\begin{aligned}
 Corruption_Index_{it} = & \beta_0 + \beta_1 Regulatory_Quality_{it} + \beta_2 Fiscal_Burden_{it} + \beta_3 Legal_origin_{it} + \\
 & \beta_4 Senior_Democracy_{it} + \beta_5 Women_in_Government + \beta_6 Unemployment_{it} + \\
 & \beta_7 Openness_{it} + \beta_8 Education_{it} + \beta_9 GDPpc_ppp_{it} + e_{it}
 \end{aligned} \tag{1}$$

All variables are described in Table 1 and e_{it} is the error term. For *Legal_origin*, I include *Common_Law*, *German_Law* and *Scandinavian_Law* (with *Civil_Law* as the reference category). Table 2 reports the descriptive statistics. Table A-1 in the appendix shows the correlation matrix.

(Insert table 2 around here)

The Breusch-Pagan test for heteroscedasticity yields $p < 0.002$, thus homoscedasticity is rejected. The average variance inflation factor (VIF) is 2.70 and all variables have an individual

VIF below five (most of them, below 3). The Hausman test yields $p < 0.000$, which indicates that a fixed-effect estimation might be appropriate. I retain the results of the GLS estimations, which enables me to check the effects of the legal variables with time-invariant form. Given the dynamic nature of the data, I conducted the Wooldridge-Drukker test for serial correlation in panel data (Drukker, 2003), which rejected the hypothesis of no first order correlation ($p < 0.0000$). Therefore, fixed effects regressions are biased, which would lead to inconsistency (Nickell, 1981).

Consequently, I use the Difference-GMM panel data specification based on developments of Arellano and Bond (1991). Difference-GMM considers the dynamic nature of the dependent variable, by differentiating with lagged values correcting for the bias. To ensure that Difference-GMM is an appropriate technique I tested stationarity with the Harris-Tzavalis unit-root test (Harris and Tzavalis, 1999), which shows that all key variables are stationary: *CPI* (ρ $p < 0.0184$); *RegulatoryQuality* (ρ $p < 0.0567$); *FiscalBurden* (ρ , $p < 0.0000$).⁴ Hence, it is appropriate to use difference-GMM. Furthermore, using this technique helps to deal with concerns regarding potential endogeneity between corruption and regulation. Time was handled in the models by means of dummy variables.

Results

Table 3 shows the results obtained from the random-effects GLS estimations, robust and country clustered, with time effects. This set of estimations show that *Regulatory Quality* is significantly and negatively associated with corruption (the higher the regulatory quality, the lower the perception of corruption). In contrast, *Fiscal_Burden* does not present any relationship with corruption. Both results are in accordance with expectations: regulatory quality (burden) negatively (positively) associated with corruption (H_1), and non-significant association between fiscal burden and corruption (H_2).

(Insert table 3 around here)

For the political variables, a negative and highly significant effect ($p < 0.01$) is found for *Senior_Democracy* on (the greater a country's experience with democracy, the lower the level of corruption), whereas the percentage of *Women_in_Government* does not appear to have any significant association. The results for social and economic variables lack significance, except for education, which shows a significant ($p < 0.05$) and negative association with corruption. At this point, highly interesting results that emerge from Table 3 are those for the time-invariant variables that cannot enter GMM estimations. Hence, greater attention needs to be given here to the variable(s) related to legal origins and administrative traditions.

Table 4 presents the results for each legal origin vs. all others and also a one-to-one comparison. As hypothesized, Civil Law is positively associated with corruption, whereas German and Scandinavian Law are negatively related to corruption in all comparisons, presenting highly significant coefficients. A somehow surprising result is obtained for Common Law Origin. While it does not have a significant difference with Civil Law Origin, it appears to be significantly associated ($p < 0.000$) to more corruption when compared with German and with Scandinavian legal origins, respectively. Results remain unchanged if I shift Netherlands from Civil (as in La Porta et al., 2008) to German Law (as in Painter and Peters, 2010: 22).

(Insert table 4 around here)

We turn now to the results from the GMM estimations. Performance statistics provided at the bottom of table 5 show that GMM estimations fit the model well (Chi-square-statistic $p < 0.000$), thus the covariates are jointly significant. Second order serial correlation is generally rejected, as the customary threshold for significance is $p < 0.05$ and all AR(2) show values over this threshold. Though of minor relevance, third order serial correlation -AR(3)- might be an issue in the estimations conducted without the variable Regulatory Quality. Later, in table 6, the

results with the corruption indicator (Dependent Variable) taken from GCR-WEF are presented, to check the stability of the results. It can be seen at the bottom of table 6 that even the minor concerns about third order serial correlation disappear in estimations without Regulatory Quality. Furthermore, for the Hansen's overidentification test indicates that validity of the instruments chosen cannot be rejected in any of the estimations (Rodman, 2009).

(Insert table 5 around here)

Regarding the key variables, *Regulatory_Quality* has a negative and significant effect on corruption across almost all estimations, and its significance is particularly high in the two preferred estimations (models 6 and 9). On the contrary, *Fiscal_Burden* does never appear to have a significant effect. Hence, for both variables the results are in line with those obtained in previous estimations. If we scale up the variable Regulatory Burden to make its coefficients more comparable with those for Fiscal Burden (though keeping in mind that these last do not significantly differ from zero), we obtain coefficients of -0.018** for model 12, and of -0.017** for models 15 and 18, while the respective coefficients for Fiscal Burden are -0.003 (model 12), -0.005 (model 15), and -0.008 (model 18) (results are available upon request).

As in the previous estimations, the results for *Senior_Democracy* are negative and significant. Note, however, that the significance of the coefficient in the two preferred estimations (models 15 and 18) is weaker ($p < 0.10$). *Women_in_Government* does not show any significant effect, as found in the previous set of estimations. None of the social and economic variables appear to be significant; not even education, which did show a negative association with corruption before.

Table 6 shows the results when the secondary dependent variable, the *Corruption_Index* (CI) from GCR-WEF, is considered (Harris-Tzavalis unit-root test, $p < 0.078$). Regulatory Quality show across all estimations a highly significant ($p < 0.05$) and negative association with

corruption, while Fiscal Burden is not significant in any estimation. Results are very similar as those obtained when using as dependent variable the Corruption Index from Transparency International, which reveals that the results are stable across dependent variables.

(Insert table 6 around here)

The effect of Senior Democracy is negative and with stronger significance than before ($p < 0.05$). The most relevant variation occurs for two socio-economic variables, openness and education: both show now a negative and significant ($p < 0.05$) effect on corruption. Different from the key variables, results for the socioeconomic variables are not so stable to the choice of dependent variable.

Robustness tests

In this section I check the robustness of the previous results, first by using a third dependent variable: the indicator of corruption in the EU report *Eurobarometer Businesses' Attitudes towards Corruption*, which is -again- a different survey from that used to measure Regulatory Quality. Within the period here considered, the survey was run for three years (2013, 2015 and 2017), and only for the EU countries. Therefore, the number of observations falls from 341 to 84. The Breusch-Pagan test for heteroscedasticity yields $p < 0.33$, thus homoscedasticity is not rejected. Average VIF for this sample is 3.34, and all individual VIFs are below six. The Hausman test yields $p < 0.55$, which indicates that a fixed-effect estimation is not appropriate. Note that difference GMM is not suitable for this sample.

Table 7 presents the results obtained by using data from that source. Estimations with Random-effects GLS and Pooled OLS (both clustered by country) are included, to check the stability of results across different techniques. As can be seen, the results for the key variables are highly consistent with those from previous estimations. Again, Regulatory Quality is negative, and always highly significant ($p < 0.01$)***, whereas Fiscal Burden is only significant in one out of

six estimations (31), which is not the most complete one. Variables related to Legal origins behave as they did in the previous GLS estimation. Different from before, Senior Democracy becomes now not significant, while education shows again a negative and significant ($p < 0.05^{**}$ and $p < 0.01^{***}$) effect on corruption.

(Insert table 7 around here)

Second, I have taken advantage of an objective measure on corruption risk, measured by the Share of contracts (in the country) with only one bid in total. Data have been obtained from Fazekas and Kocsis (2020) and Teorell et al. (2021). This last source (*The Quality of Government Standard Dataset, January 2021*) includes information on the share of contracts with only one bid in total for all EU countries plus Iceland, Norway, and Switzerland, from 2011 to 2019. I have constructed the alternative dependent variable *Corruption_Risk* with data for 2011 to 2017, because this is the period for which the core analyses are conducted. Also, because data for 2018 and 2019 are unavailable for Cyprus, Estonia, Ireland, and Malta. Furthermore, data from Croatia begins in 2013. Therefore, the sample for this robustness test includes 215 observations for 31 countries. The correlation between *Corruption_Risk* and our key dependent variable, Corruption Perception by Transparency International is 0.654.

The Breusch-Pagan test for heteroscedasticity yields $p < 0.0001$, thus homoscedasticity is rejected. Average VIF for this sample is 2.95, and all individual VIFs are below five. The Wooldridge test for autocorrelation in panel data does not reject no first order autocorrelation ($p = 0.111$), and tests conducted advice to use random effects. Table 8 presents the results using *Corruption_Risk* as dependent variable. As before, estimations with Random-effects GLS and Pooled OLS (in this case, both robust and clustered by country) are included. The results for Regulatory Quality are highly consistent with those from previous estimations: its coefficient is negative and always significant: in OLS estimations is always $p < 0.01^{***}$, and significance slightly decreases in the random-effects estimations ($p < 0.05^{**}$ and $p < 0.10^*$). In the case of

Fiscal Burden, while we obtain positive but weakly significant coefficients with OLS estimations ($p < 0.15$), the random-effects estimations yield negative coefficients with stronger significance ($p < 0.05^{**}$ and $p < 0.10^*$). The remaining variables tend to have little, if any, significance.

(Insert table 8 around here)

With respect to the variables related to types of intervention, the results obtained with the objective corruption measure used as proxy are highly consistent with our basic results, particularly for Regulatory Quality, which is always negative and significant. The fact that these estimations yield much less significant results for other variables than those previously obtained must be interpreted with caution: as Coviello, Guglielmo and Spagnolo (2018) have shown, that lack of competitors can be reflecting others' firms beliefs about the performance and chances of winning the contract by an incumbent firm, rather than corruption.

Limitations

This study has several limitations. Among them, two are especially worth discussing. First, the dependent variable is a corruption perception index based on experts and business executives' opinions. This might overlook the incidence of petty corruption, which might have a greater impact in citizen-based surveys, such as Eurobarometer. Unfortunately, using the series of Eurobarometer to measure the dependent variable would lead to an extremely short sample, reducing number of observations from 341 to 135 (see detailed explanation in endnote 2), thus greatly damaging the robustness of the analysis. Furthermore, Eurobarometer values have a high degree of correlation with the two indices used for the dependent variable, as explained above, which provides some relief in that regard. Nonetheless, future research would benefit from having available long enough series of corruption indicators from citizen-based surveys

that are homogeneous across countries, so that an empirical exercise as the one conducted here can be robustly implemented.

Second, in the empirical exercise the two different types of government intervention, regulation and fiscal intervention, are measured in a different way. Regulatory Quality is a subjective measure obtained from opinion surveys. Instead, Fiscal Burden is an objective measure obtained from Eurostat, expenditure as percentage of GDP. One possible alternative could be to use the Doing Business Score, which is formed with objective measures from 10 different regulatory areas, which is used in Fazekas (2017) to analyze the effects of different types of regulations on petty corruption. However, using the Total Doing Business Score can be problematic to measure overall regulatory quality, because of "the heterogeneous effect of different regulatory areas in composing the overall effect" (Fazekas, 2017, p.415). Here is another road for future research to improve the empirical analysis.

Discussion

The empirical analysis conducted shows that poor regulatory intervention, which imposes high regulatory burden on the economic actors, has the effect of increasing the perception of corruption. This is a result systematic and consistent across all estimations and techniques, as well as in the robustness checks conducted. The results for Regulatory Quality in our preferred estimation (model 18), indicate that -in the short run- an increase of one unit in the independent variable RQ (five-points scale) has the effect of reducing by 0.345 the value of the $CPI(x-1)^*$; that is, to increase around 0,345 points the index taken from TI. When using the CI from GCR-WEF as dep variable, the impact is a bit higher: an increase of one unit in the independent variable RQ (five-points scale) has the effect of reducing by 0.349 the value of the $CI(x-1)$ from WEF (seven-points scale) (table 6, preferred estimation model 27). Instead, fiscal burden does not show any significant association with corruption. Consistently with Stigler (1971),

government intervention by means of regulations offers more room for corruption than fiscal intervention.

The results further confirm this stance on corruption and type of intervention, as in countries of French Legal Origin (Civil Law), which is characterized by a heavier regulatory burden on economic activity, the perception of corruption is significantly higher. Further to that, we unexpectedly found the perception of corruption is higher in countries of Anglo-Saxon Legal Origin (Common Law), with respect to German and Scandinavian Legal Origin. The fact that only three countries in our sample, Cyprus, Ireland and the United Kingdom belong to the Common Law subgroup calls for caution when interpreting that result.

Greater experience of democracy is negatively related to corruption, result which is consistent with most available evidence. Instead, contrary to recent evidence Esarey and Schwindt-Bayer (2019) and Bauhr, Charron, and Wängnerud (2019), our results suggest that no significant relationship exist between the relevance women representation and corruption. Several reasons could explain why results here are different. First, different types of databases and estimation techniques are used; second, the different operationalization of the dependent variable in the case of Bauhr, Charron, and Wängnerud (2019), which follows the measure of corruption risk as suggested in Fazekas, Tóth and King (2016). Instead, in this research experts and business executives' opinions are used, which is a subjective measure. Notice however, that women representation and corruption do not show significant association even when the robustness check with an objective corruption risk measure is conducted. Therefore, attention should be paid to the possibility that actual gender differences on risk preferences do not exist, consistent with the experimental analysis in Pondorfer, Barsbai and Schmidt (2017), and the perception the women are more risk adverse (that provides the rationale for a negative association between women and corruption) is rather based on stereotypes.

The results obtained regarding social and economic variables are diverse. The only variable in this group that more frequently shows a significant result is education, with a negative effect on corruption. This is consistent with views that in more educated societies citizens are better able to identify practices such as corruption and are less tolerant of them (Hakhverdian and Mayne, 2012). The other socio-economic variables do not appear to have a significant effect on corruption. One possible reason for these result is that the sample is composed of relatively homogeneous countries, UE plus EFTA, where variations of unemployment and openness are more limited than in worldwide samples, and unemployment could be not such a good proxy for shadow economy, which is assumed to be connected with corruption. Finally, we do not find any effect of economic development on corruption. Again, a possible reason is that the sample is more homogeneous on economic development than worldwide samples.

Northern European countries tend to give priority to fiscal intervention and adopt a more flexible approach to regulatory intervention and bureaucratic procedures. In contrast, Eastern and particularly Southern European countries tend to give greater priority to intervention by means of regulation and bureaucratic procedures. Charron, Harring and Lapuente (2021) have shown that level of trust of individuals on institutions are positively associated to the demand of redistribution, while low levels of trust are associate with high demand of regulation. Therefore, in countries with low level of trust over-regulation and under-redistribution will coexist.

According to the results from the empirical analysis above, regulatory burden has a much stronger influence on corruption than fiscal burden. Thus, corruption will be a bigger problem in countries that combine over-regulation and under-redistribution. This is consistent with the fact that the Scandinavian and German, administrative and legal traditions present a negative association with corruption, while the opposite is the case of the Civil Law tradition. Because corruption negatively impacts trust (Richey, 2010; Rothstein, 2011; Kubbe, 2020), the vicious

circle described in Charron, Haring and Lapuente (2021) that goes from regulation to corruption, to mistrust, and, again, to more regulation, might be at work. This would have a relevant policy implication, of which policy makers must be aware: improving quality of government (Rothstein and Teorell, 2011; Persson and Rothstein, 2015) to increase trust in institutions might be a prerequisite so that changes in the type of government intervention, reducing over-regulation, can be promoted, and therefore corruption can be reduced.

Conclusion and policy implications

Differences in the perception of corruption across the countries of Europe are marked and persistent over time. This study has contributed to the literature by providing an explanation of the main factors accounting for these divergences in a sample made up of the 28 EU and three EFTA countries between 2007 and 2017.

Two main hypotheses have been formulated. First, that the overall regulatory quality has a negative association with corruption. The results obtained consistently and systematically show a negative effect of Regulatory quality on corruption. Second, that the overall fiscal burden does not have a significant relationship with corruption. The results have failed to show a significant association in that regard, consistently with that hypothesis. Other variables that have shown relevance in explaining corruption are, on the one hand, the legal origin and administrative tradition of each country, with the German and Scandinavian legacies associated to less corruption; on the second hand, the differences in consolidation of democracy and education, both of them negatively associated with corruption, as well.

These findings provide support to the core hypothesis in this study: that corruption is most dependent on the type of government intervention in the economy. Indeed, while fiscal intervention does not appear to have a systematic and significant influence on corruption, regulatory intervention and the burden associated show a strong and consistent direct

association across all models and estimations. This is a relevant finding and suggests a fruitful path for interpreting differences between European countries and their subsequent policy implications.

Policy implications directly emerge from this research. If regulatory intervention and bureaucratic proceduralism and discretion favor corruption, improving the quality of regulation and reducing unjustified and excessive compliance burden could help to improve transparency and cut down on the amount of corruption. How to politically manage reforms to reduce overregulation -in countries where low levels of trust favor precisely regulatory intervention- is a public policy puzzle that deserves future research.

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Table 1. Variables, data, sources and expectations

Variables	Measure	Source	Expected effect on corruption perception
Dependent			
<i>Corruption_Index (x-1)</i>	Corruption Perception	Transparency International	
<i>Corruption_Index (x-1)</i>	Corruption Perception	GCR-WEF (Code 1.05)	
Independent			
<i>Regulatory_Quality</i>	Sound governmental regulations that permit and promote the private sector	World Bank Worldwide Governance Indicators	H ₁ : Negative
<i>Fiscal_Burden</i>	Total government expenditure as a % of GDP	Eurostat	H ₂ : Uncertain
<i>Civil_Law</i>	Civil Law Origin		Civil Law (French legal origin) positive
<i>Common_Law</i>	Common Law Origin	Data Set La Porta et al (2008)	
<i>German_Law</i>	German Law Origin		
<i>Scandinavian_Law</i>	Scandinavian Law Origin		
<i>Senior_Democracy</i>	Years of uninterrupted democratic regime after world war II (log)	Countries' institutional data sources	Negative
<i>Women_Government</i>	Percentage of seats held by women in national parliaments	World Bank	Negative
<i>Unemployment</i>	Rate of unemployment	Eurostat	Positive
<i>Openness</i>	Imports + exports combined as a % of GDP	World Bank and OECD National Accounts	Negative
<i>Education</i>	% population with tertiary education (levels 5-8)	Eurostat	Negative
<i>GDPpc_ppp</i>	Gross Domestic Product per capita (ppp adjusted)	Eurostat	Negative

Source: Author

Table 2. Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
<i>Corruption_Index (x-1) TI</i>	341	-6.58	1.69	-9.40	-3.33
<i>Corruption_Index (x-1) WEF</i>	341	-4.31	1,21	-6.38	-2.21
<i>Regulatory Quality</i>	341	1.23	0.44	0.15	2.05
<i>Fiscal Burden</i>	341	45.09	6.68	26.30	65.10
<i>legor_fr</i>	341	0.35	0.48	0	1
<i>legor_uk</i>	341	0.10	0.30	0	1
<i>legor_ge</i>	341	0.38	0.49	0	1
<i>legor_sc</i>	341	0.16	0.37	0	1
<i>Senior_Democracy</i>	341	1.63	0.23	1.20	1.86
<i>Women_in_Government</i>	341	26.37	10.25	8.70	47.60
<i>Unemployment</i>	341	8.61	4.54	2.25	27.47
<i>Openness</i>	341	120.89	66.83	45.61	412.87
<i>Education</i>	341	25.39	7.41	9.90	40.40
<i>GDPpc_ppp</i>	341	28037.24	11840.65	10400	77300

Table 3. Results from random-effects GLS, robust and country clustered. Dependent Variable CPI (TI)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Random	Random	Random						
<i>Regulatory_Quality</i>	-0.693*** (0.203)		-0.685*** (0.202)	-0.584*** (0.178)		-0.585*** (0.179)	-0.580*** (0.182)		-0.577*** (0.186)
<i>Fiscal_Burden</i>		6.10e-05 (0.011)	-3.38e-05 (0.011)		-0.005 (0.011)	-0.004 (0.012)		-0.007 (0.013)	-0.004 (0.013)
<i>Common_Law</i>	-0.045 (0.469)	-0.138 (0.586)	-0.042 (0.479)	0.359 (0.441)	0.200 (0.540)	0.345 (0.441)	0.353 (0.438)	0.162 (0.533)	0.329 (0.439)
<i>German_Law</i>	-0.928*** (0.340)	-1.140*** (0.430)	-0.934*** (0.341)	-0.932*** (0.302)	-1.042*** (0.345)	-0.929*** (0.302)	-0.932*** (0.302)	-1.059*** (0.347)	-0.929*** (0.302)
<i>Scandinavian_Law</i>	-1.468*** (0.450)	-1.752*** (0.578)	-1.471*** (0.455)	-1.299*** (0.413)	-1.484*** (0.504)	-1.281*** (0.416)	-1.298*** (0.415)	-1.472*** (0.505)	-1.277*** (0.417)
<i>Senior_Democracy</i>	-5.440*** (0.864)	-6.638*** (1.020)	-5.472*** (0.872)	-5.093*** (0.745)	-5.730*** (0.806)	-5.018*** (0.758)	-5.048*** (0.847)	-5.557*** (0.942)	-4.916*** (0.898)
<i>Women_Government</i>	0.001 (0.014)	0.008 (0.015)	0.001 (0.014)	0.002 (0.013)	0.005 (0.014)	0.002 (0.013)	0.002 (0.014)	0.006 (0.015)	0.002 (0.014)
<i>Unemployment</i>				0.005 (0.012)	0.018 † (0.012)	0.006 (0.013)	0.004 (0.013)	0.015 (0.013)	0.005 (0.013)
<i>Openness</i>				-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)
<i>Education</i>				-0.046** (0.020)	-0.046** (0.022)	-0.047** (0.020)	-0.045** (0.019)	-0.043** (0.021)	-0.046** (0.020)
<i>GDPpc_ppp</i>							-1.75e-06 (1.36e-05)	-9.07e-06 (1.40e-05)	-3.50e-06 (1.48e-05)
Constant	3.269*** (1.204)	4.213** (1.697)	3.306*** (1.263)	3.528*** (1.038)	3.981*** (1.252)	3.592*** (1.078)	3.484*** (1.167)	3.926*** (1.304)	3.522*** (1.154)
Time	√	√	√	√	√	√	√	√	√
# Observations	341	341	341	341	341	341	341	341	341
# Countries	31	31	31	31	31	31	31	31	31
Chi2 of Wald Test	666.70***	437.97***	677.64***	711.68***	671.28***	741.23***	758.18***	705.72***	801.27***
R-squared within	0.254	0.266	0.256	0.234	0.247	0.232	0.233	0.248	0.230
R-squared between	0.784	0.687	0.783	0.846	0.792	0.849	0.847	0.795	0.851
R-squared overall	0.761	0.669	0.760	0.820	0.769	0.822	0.820	0.771	0.824

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.10, † p<0.15

Table 4. Results comparing legal origins (from model 9 in random-effects GLS estimation)

	All three other	Civil Law	Common Law	German Law	Scandinavian Law
Civil Law	0.816*** (0.298)	-	-	-	-
Common Law	0.931** (0.401)	0.329 (0.439)	-	-	-
German Law	-0.768** (0.263)	-0.929*** (0.302)	-1.258*** (0.439)	-	-
Scandinavian Law	-1.115*** (0.348)	-1.277*** (0.417)	-1.606*** (0.457)	-0.348 (0.332)	-

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.10

Note: Countries according to Legal Origin (La Porta, Lopez-de-Silanes and Shleifer, 2008).

Civil Law: Belgium, France, Greece, Italy, Lithuania, Luxembourg, Netherlands, Malta, Portugal, Romania, Spain.

Common Law: Cyprus, Ireland, United Kingdom.

German Law: Austria, Bulgaria, Croatia, Czech Republic, Estonia, Germany, Hungary, Latvia, Poland, Slovak Republic, Slovenia, Switzerland.

Scandinavian Law: Denmark, Finland, Iceland, Norway, Sweden.

Table 5. Results from GMM robust estimations. Dependent Variable CPI (TI)

Variables	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	Difference	Difference	Difference	Difference	Difference	Difference	Difference	Difference	Difference
	GMM	GMM	GMM	GMM	GMM	GMM	GMM	GMM	GMM
<i>Corruption_index_t-1</i>	-0.345 (0.358)	-0.306 (0.382)	-0.348 (0.389)	-0.514 (0.418)	-0.382 (0.378)	-0.456 (0.408)	-0.609 (0.453)	-0.511 (0.452)	-0.590 (0.474)
<i>Regulatory_Quality</i>	-0.332* (0.171)		-0.365** (0.177)	-0.278 † (0.178)		-0.332** (0.163)	-0.272 (0.198)		-0.345** (0.169)
<i>Fiscal_Burden</i>		-0.001 (0.011)	-0.003 (0.012)		-0.002 (0.012)	-0.005 (0.012)		-0.004 (0.013)	-0.008 (0.013)
<i>Senior_Democracy</i>	-15.009** (6.841)	-11.837** (6.286)	-14.224** (6.858)	-18.745* (11.009)	-12.919* (7.652)	-16.031* (8.428)	-20.059* (12.176)	-14.899 † (9.512)	-18.330* (10.061)
<i>Women_Government</i>	0.002 (0.011)	0.002 (0.011)	0.001 (0.011)	0.006 (0.014)	0.003 (0.011)	0.002 (0.011)	0.008 (0.013)	0.005 (0.011)	0.004 (0.011)
<i>Unemployment</i>				0.016 (0.014)	0.014 (0.012)	0.014 (0.013)	0.006 (0.013)	0.015 (0.012)	0.014 (0.013)
<i>Openness</i>				0.001 (0.002)	0.002 (0.003)	0.001 (0.003)	0.002 (0.004)	0.002 (0.003)	0.001 (0.003)
<i>Education</i>				-0.045 (0.051)	-0.019 (0.036)	-0.031 (0.038)	-0.044 (0.050)	-0.020 (0.034)	-0.033 (0.036)
<i>GDPpc_ppp</i>							-1.21e-05 (3.48e-05)	-1.78e-05 (3.48e-05)	-2.04e-05 (3.41e-05)
Time	√	√	√	√	√	√	√	√	√
# Instruments	20	20	21	23	23	24	24	24	25
# Observations	310	310	310	310	310	310	310	310	310
# Countries	31	31	31	31	31	31	31	31	31
Chi2 of Wald Test	87.30***	90.09***	108.06***	201.16***	241.66***	401.73***	266.84***	299.47***	441.15***
AR (1)	0.81	0.67	0.74	0.91	0.81	0.89	1.09	0.94	1.03
AR (2)	-1.52 †	-1.37	-1.46 †	-1.62 †	-1.52 †	-1.56 †	-1.71*	-1.72*	-1.66*
AR (3)	-2.16*	2.12**	-2.05**	-1.92*	-1.97**	-1.87*	-1.95*	-2.09**	-1.95*
Hansen Test p-value	0.304	0.343	0.321	0.298	0.386	0.364	0.300	0.407	0.384

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.10, † p<0.15

Table 6. Results from GMM robust estimations. Dependent Variable CI (GCR-WEF)

Variables	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
	Difference	Difference	Difference	Difference	Difference	Difference	Difference	Difference	Difference
	GMM	GMM	GMM	GMM	GMM	GMM	GMM	GMM	GMM
<i>Corruption_index_t-1</i>	-0.432 (0.358)	-0.225 (0.359)	-0.420 (0.354)	-0.441 (0.355)	-0.298 (0.336)	-0.418 (0.345)	-0.488 (0.361)	-0.384 (0.322)	-0.485 (0.345)
<i>Regulatory_Quality</i>	-0.395*** (0.148)		-0.375** (0.150)	-0.377** (0.162)		-0.356** (0.154)	-0.373** (0.163)		-0.349** (0.157)
<i>Fiscal_Burden</i>		0.007 (0.010)	0.005 (0.011)		-0.009 (0.012)	-0.007 (0.012)		-0.011 (0.013)	-0.009 (0.012)
<i>Senior_Democracy</i>	-14.427** (5.678)	-14.028** (7.130)	-13.674** (6.598)	-15.234** (6.338)	-15.124* (8.448)	-15.726** (7.524)	-15.412** (6.351)	-16.226* (8.727)	-16.487** (7.609)
<i>Women_Government</i>	0.009 (0.007)	0.007 (0.006)	0.008 (0.007)	0.010 † (0.006)	0.009 † (0.006)	0.010 † (0.006)	0.010 † (0.006)	0.009 † (0.006)	0.010 † (0.006)
<i>Unemployment</i>				0.012 (0.011)	0.018* (0.010)	0.016 (0.011)	0.012 (0.011)	0.017 * (0.010)	0.016 (0.011)
<i>Openness</i>				-0.005*** (0.002)	-0.004** (0.002)	-0.005*** (0.002)	-0.005*** (0.002)	-0.004** (0.002)	-0.005*** (0.002)
<i>Education</i>				-0.061*** (0.022)	-0.052** (0.022)	-0.060*** (0.022)	-0.063*** (0.023)	-0.057** (0.024)	-0.064*** (0.024)
<i>GDPpc_ppp</i>							-6.77e-06 (1.98e-05)	-1.06e-05 (1.49e-05)	-1.12e-05 (1.48e-05)
Time	√	√	√	√	√	√	√	√	√
# Instruments	20	20	21	23	23	24	24	24	25
# Observations	310	310	310	310	310	310	310	310	310
# Countries	31	31	31	31	31	31	31	31	31
Chi2 of Wald Test	204.37***	210.39***	175.10***	622.90***	260.98***	954.76***	692.56***	235.25***	901.16***
AR (1)	1.81*	1.52 †	1.82 *	2.01**	1.93*	2.10**	2.05**	2.14**	2.20**
AR (2)	1.06	1.15	0.94	1.37	1.34	1.39	1.34	1.42	1.44
AR (3)	0.54	0.90	0.33	0.76	0.98	0.74	0.71	0.97	0.75
Hansen Test p-value	0.409	0.357	0.352	0.576	0.467	0.548	0.613	0.532	0.606

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.10, † p<0.15

Table 7. OLS & Random-effects GLS, country clustered. Dependent Variable CI-EUBusSurvey

Variables	(28) OLS	(29) OLS	(30) OLS	(31) Random	(32) Random	(33) Random
<i>Regulatory_Quality</i>	-32.372*** (5.094)	-26.579*** (6.174)	-26.739*** (6.100)	-23.573*** (5.044)	-19.982*** (4.924)	-19.787*** (4.900)
<i>Fiscal_Burden</i>	0.278 (0.223)	0.321 (0.262)	0.325 (0.266)	0.451** (0.198)	0.081 (0.250)	0.126 (0.258)
<i>Common_Law</i>	-10.746 (7.451)	1.378 (9.552)	1.303 (9.734)	-9.922 (9.119)	-1.472 (11.694)	-0.523 (11.967)
<i>German_Law</i>	-6.744 † (4.136)	-8.201* (4.286)	-8.319* (4.322)	-10.040** (4.771)	-8.412** (3.831)	-8.830** (3.695)
<i>Scandinavian_Law</i>	-14.157** (6.362)	-12.595* (7.347)	-12.484 † (7.424)	-20.466*** (5.863)	-15.632** (7.008)	-15.391** (7.226)
<i>Senior_Democracy</i>	17.651* (11.643)	7.704 (12.905)	5.625 (15.452)	-4.662 (11.495)	6.632 (12.091)	-1.052 (13.206)
<i>Women_Government</i>	-0.478*** (0.140)	-0.178- (0.194)	0.202 (0.194)	-0.323** (0.151)	-0.171 (0.169)	-0.203 (0.177)
<i>Unemployment</i>		0.234 (0.402)	0.228 (0.403)		0.377 (0.385)	0.365 (0.379)
<i>Openness</i>		0.030 (0.024)	0.023 (0.031)		0.007 (0.030)	-0.009 (0.027)
<i>Education</i>		-0.876** (0.411)	-0.887** (0.426)		-1.023*** (0.302)	-1.089*** (0.318)
<i>GDPpc_ppp</i>			7.29 e-05 (2.06e-04)			2.25e-04 † (1.67e-04)
Constant	54.436** (20.348)	70.941*** (21.775)	74.242*** (26.091)	70.545*** (21.562)	88.077*** (18.551)	90.817*** (18.025)
# Observations	84	84	84	84	84	84
# Countries	28	28	28	28	28	28
R-squared	0.746	0.775	0.7775			
F	25.07***	20.59***	18.08***			
Chi2 of Wald Test				176.95***	216.79***	223.18***
R-squared within				0.020	0.108	0.115
R-squared between				0.780	0.808	0.807
R-squared overall				0.727	0.762	0.762

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.10, † p<0.15

Table 8. OLS & Random-effects GLS, robust and country clustered. Dependent Variable Corruption Risk (Fazekas & Kocsis, 2020; Teorell et al, 2021)

Variables	(34) OLS	(35) OLS	(36) OLS	(37) Random	(38) Random	(39) Random
<i>Regulatory_Quality</i>	-11.202*** (3.320)	-12.096*** (4.035)	-12.146*** (3.969)	-9.792** (4.365)	-9.454* (4.841)	-8.566* (5.085)
<i>Fiscal_Burden</i>	0.191 (0.135)	0.215 † (0.131)	0.221 † (0.136)	-0.316** (0.134)	-0.356* (0.185)	-0.415** (0.189)
<i>Common_Law</i>	5.704 (4.691)	7.548 † (4.511)	7.775* (4.471)	3.659 (5.850)	-0.992 (5.791)	-0.166 (5.319)
<i>German_Law</i>	3.796* (2.091)	4.041* (2.070)	3.951* (2.187)	3.652 (3.095)	4.474 (3.371)	4.547 (3.492)
<i>Scandinavian_Law</i>	-2.782 (3.079)	-2.114 (3.522)	-2.077 (3.456)	-5.324 (4.272)	-5.067 (5.063)	-5.244 (5.228)
<i>Senior_Democracy</i>	-13.595* (6.836)	-14.314* (7.066)	-15.899* (8.705)	-10.290 (9.421)	-9.333 (10.425)	-4.157 (11.506)
<i>Women_Government</i>	-0.010 (0.092)	0.060 (0.095)	0.050 (0.096)	0.219* (0.131)	0.182 (0.125)	0.208 † (0.130)
<i>Unemployment</i>		-0.002 (0.201)	0.003 (0.200)		0.201 (0.305)	0.193 (0.304)
<i>Openness</i>		0.0153 (0.012)	0.012 (0.016)		0.005 (0.022)	0.014 (0.029)
<i>Education</i>		-0.045 (0.157)	-0.064 (0.176)		0.192 (0.192)	0.242 (0.184)
<i>GDPpc_ppp</i>			4.82e-05 (1.05e-04)			-1.72e-04 (1.93e-04)
Constant	45.932*** (9.722)	44.159*** (11.255)	46.304*** (12.993)	56.040*** (14.509)	49.059*** (15.380)	44.036*** (17.020)
# Observations	215	215	215	215	215	215
# Countries	31	31	31	31	31	31
R-squared	0.542	0.547	0.547***			
F	19.31***	17.63***	16,21***			
Chi2 of Wald Test				49.19***	61.45***	61.20***
R-squared within				0.055	0.085	0.104
R-squared between				0.548	0.494	0.461
R-squared overall				0.438	0.406	0.383

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.10, † p<0.15

Table A1. Correlation matrix.

	CPI(x-1)	Regqualy	fiscalburden	legorUK	legorGE	legorSC	SeniorDemo	WomenGov	Unemploy	Openness	Education	GDPPC
CPI(x-1) TI	1.0000											
Regqualy	-0.8549	1.0000										
fiscalburden	-0.1945	0.0236	1.0000									
legorUK	-0.1122	0.2407	-0.1651	1.0000								
legorGE	0.3056	-0.2491	-0.2346	-0.2601	1.0000							
legorSC	-0.5766	0.4023	0.3080	-0.1435	-0.3485	1.0000						
SeniorDemo	-0.7305	0.6476	0.2913	0.2409	-0.5723	0.3888	1.0000					
WomenGov	-0.6700	0.4425	0.3412	-0.2767	-0.2555	0.6228	0.5019	1.0000				
Unemploy	0.4531	-0.4886	0.2059	0.0224	-0.0414	-0.2539	-0.2926	-0.1456	1.0000			
Openness	-0.0494	0.1958	-0.3004	0.0066	0.0249	-0.2309	0.0483	-0.2901	-0.1837	1.0000		
Education	-0.6419	0.5991	-0.0116	0.4080	-0.3471	0.3314	0.5009	0.4314	-0.0508	0.0880	1.0000	
GDPPC	-0.7166	0.6681	0.0166	0.0908	-0.3344	0.2880	0.7155	0.4185	-0.4011	0.4016	0.5440	1.0000

Figure 1: Perception of corruption as a major problem in own country, 2017

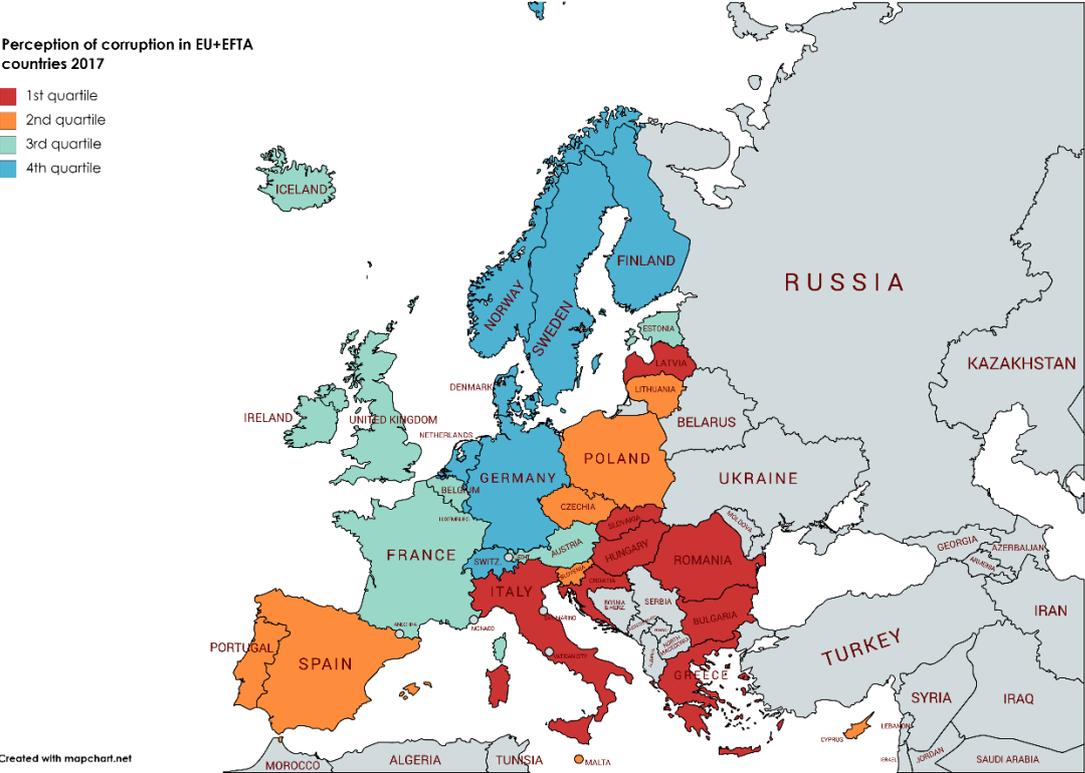


Figure 2: Change in perception of corruption as a major problem in own country, 2007-2017



Endnotes

¹ The GCR is compiled from a survey conducted among business executives and experts. The indicator is an average score across the five components of these questions: “In your country, how common is it for firms to make undocumented extra payments or bribes connected with (a) imports and exports; (b) public utilities; (c) annual tax payments; (d) awarding of public contracts and licenses; (e) obtaining favorable judicial decisions? In each case, the answer ranges from 1 [very common] to 7 [never occurs]”.

² The score was given in a scale 0 to 10 until 2011, and 0 to 100 thereafter. Data after 2011 have been rescaled, so that the scale is the same across all years in the analysis.

³ A potential alternative of using corruption perception from the Eurobarometer on corruption has been considered. However, this would restrict the number of years to five (2007, 2009, 2011, 2013 and 2017; recall that including 2005 would not make possible the analysis with lags). Furthermore, that would exclude EFTA countries and Croatia (first included in the 2017 Eurobarometer). In this way, the number of available observations would decrease from 341 to 135, thus greatly damaging the robustness of the analysis.

⁴ Graphs SM1 and SM2 in Supplementary Materials show the country means across all years for these key variables, paired as corruption against regulatory quality and corruption against fiscal burden.

