



# The impact of democracy and press freedom on corruption: Conditionality matters<sup>☆</sup>

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## Abstract

This paper empirically analyzes the joint impact of democracy and press freedom on corruption. Based in the theoretical literature, we argue that both institutional features are complements rather than substitutes in controlling corruption. Our regressions are based on a cross section of 170 countries covering the period from 2005 to 2010 as well as on panel evidence for 175 countries from 1996 to 2010. The results show that democratic elections only work in controlling corruption, if there is a certain degree of press freedom in a country, vice versa. Our policy implication is that democratic reforms are more effective, if they are accompanied by institutional reforms strengthening the monitoring of politicians.

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## 1. Introduction

Corruption is a widespread phenomenon in particular among developing countries. According to the former World Bank president J.D. Wolfensohn “we need to deal with the cancer of corruption” (Wolfensohn, 2005, p. 50) in order to achieve growth and to reduce poverty. This view

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is strongly supported by the empirical and theoretical literature [see e.g. [Acemoglu & Verdier, 1998](#); [Mauro, 1995](#)].

The natural question that arises from this diagnosis is the question of the most effective therapy. Potentially effective instruments are democratic elections and press freedom. Several empirical studies find a significant and robust relationship between both means and the level of corruption [see e.g. [Brunetti & Weder, 2003](#); [Chowdhury, 2004](#); [Treisman, 2000](#)]. However, recent studies on the causes of corruption have demonstrated that the estimation of unconditional effects may lead to misleading policy conclusions, since the corruption alleviating effect of single corruption determinants may depend on others [see [Lessmann & Markwardt, 2010](#); [Saha, Gounder, & Su, 2009](#)]. We argue based on the theoretical literature that both instruments – democratic elections and press freedom – are complements rather than substitutes in reducing corruption. On the one hand, without a free press, the voters do not have unbiased information on corrupt activities by politicians and bureaucrats, therefore the accountability enhancing effect of democratic elections is questionable. On the other hand, just having a free press is also not a sufficient instrument in controlling corruption as people need free elections in order to punish revealed corrupt behavior. Therefore, the major contribution of our paper is to analyze the *joint impact* of democracy and press freedom on corruption.

Since the effects of press freedom and democracy on corruption should depend on each other, we use an interaction model which is able to estimate those conditional effects. We thereby extend the existing literature in several dimensions: (1) we use a broader dataset covering 170 countries for the period 2005–2010, (2) we use three alternative measures of corruption as well as alternative measures for the degree of press freedom and democracy, (3) we take a possible endogeneity bias into account by using an instrumental variable approach, (4) we consider a continuous interaction variable of press freedom and democracy, which puts less strong assumptions on the classification of countries as democratic or not, and (5) we also consider panel data for 175 countries from 1996 to 2010. We find that democracy and press freedom are indeed complements in reducing corruption in support of our main hypothesis. In particular, democracy – measured by the Vanhanen index – can increase corruption without a sufficiently high degree of press freedom. Our policy conclusion is straightforward: democratic reforms should be accompanied by a liberalization of the press. Otherwise, the effectiveness of reforms will be reduced significantly.

The remainder of the paper is organized as follows: Section 2 initiates in the related theoretical literature and derives our main hypothesis. Section 3 reviews the empirical literature. Section 4 presents our empirical analysis. Section 5 sums up and concludes.

## 2. The theoretical link between corruption, democracy and freedom of the press

Concerning the relationship between corruption, democracy, and freedom of the press, we discuss three basic models thereby highlighting the interaction between democracy and press freedom in the respective frameworks. These are the principal–agent model used by [Rose-Ackerman \(1978\)](#), the rent-seeking model by [Persson and Tabellini \(2002\)](#), and the industrial organization approach of [Shleifer and Vishny \(1993\)](#). Finally, we discuss the results of [Stroemberg \(2001\)](#) who models the role of the mass media explicitly.

In one of the first formal approaches that explains political corruption, [Rose-Ackerman \(1978\)](#) models asymmetric information between the voters (principal) and legislators (agent). The majority voting rule determines the election of legislators and policies. The principals cannot influence the policy outcome directly, since passing the laws depends on majority vote. Therefore, voters elect the legislator to whom they have the maximum accordance with. We are particularly

interested in the role of a free press in this model, which is implicitly considered by the degree of asymmetry in information. We interpret a situation with symmetric information – where the legislators (or the media) publish their positions on the policy issues in their campaign – as a situation of a high degree of press freedom. In the case of asymmetric information the positions are not predetermined, and consequently, the detection of corruption is not as easy as in the symmetric case. With symmetric information, the potential representative will announce his position on every relevant policy issue in his campaign. In order to be re-elected, a legislator has to decide according to his or her promises. Corruption appears in Rose-Ackerman's principal-agent model in form of bribes paid by interest groups. If the value of the bribe is bigger than the expected utility of a further legislation term, the incumbent will act in favor of the interest group and take the bribe. Therefore, a trade-off emerges between re-election and the bribe. A free press ensures that voters know the legislator's position on every issue. That means that they can punish corrupt legislators by not re-electing them, if they change their positions. Consequently, only the combination of press freedom and democracy allows for *detection and punishment* of corruption.

But what happens in a situation with asymmetric information? The problem of asymmetric information arises, since legislators have to decide on new topics that have not been part of the campaign. Therefore, the voting behavior of legislators is not (completely) known to the voters before they elect their representatives. We argue that this case is comparable to a situation with a low degree of press freedom, where unbiased information on the intentions of politicians is not publicly available. As a consequence, the detection of corrupt incumbents is more difficult. Besides this, the politicians can buy votes to increase the possibility of their re-election worsening the scope for accepting bribes. What becomes clear is that press freedom is essential to detect corrupt incumbents, and democracy is essential to vote corrupt incumbents out of office. Neither press freedom, nor democracy will be able to solve the problem of corruption on their own in this framework.

The rent-seeking model of [Persson and Tabellini \(2002\)](#) leads to quite similar results. In this approach corruption occurs as the acquisition of additional rents from the transformation of private into public goods by the government. The size of corrupt activities can be measured by comparing the expenditures for public goods and their real production costs. The amount of public goods provided is influenced by (1) the costs of transforming private goods into public goods, (2) the reservation utility, that is set by the voters, and (3) the transaction costs, that arise when politicians adopt extra rents. If the transformation costs are known to both actors, we can assume symmetric information, which we interpret as a situation that is established by a high degree of press freedom. Voters will re-elect the incumbent, if they received their reservation utility, which depends on the amount of public goods. The government's trade-off occurs between extracting resources (rents) from the transformation process from private into public goods on the one hand, and the value of holding the office on the other. When the rent outstrips the present value of holding office, the government will act corrupt. Importantly, the voters can influence rent extraction by setting their reservation utility. If transformation costs are transparent, the reservation utility is set in an optimal way decreasing the rents extracted by the incumbent. The incumbent decides about satisfying the voter's reservation utility or not. This depends on the trade-off between holding office and extracting the maximum rent. The voters therefore set their optimal reservation utility by taking the trade-off into account. This minimizes the level of rents, which is equivalent to a situation with a lower level of corruption. To sum up, symmetric information (press freedom) lowers the level of rents (corruption).

[Persson and Tabellini \(2002\)](#) describe in their extended model the problems that appear when the transaction costs are not known to the voters (asymmetric information). We interpret this

scenario as a situation with a low degree of press freedom. In this case, voters have less influence on the policy outcome and incumbents are able to extract higher rents. In the case of asymmetric information the incumbent only satisfies the reservation utility if the real transformation costs are low. Then incumbents provide the amount of public goods requested by the voters and deduct the remaining money. But if transformation costs are high, the satisfaction of the reservation utility is too expensive, therefore the incumbent chooses to take the rent at the costs of losing office. Similarly to the framework of Rose-Ackerman, the possibility of voting corrupt politicians out of office (democracy) is alone not sufficient to lower the level of corruption. In addition, freedom of the press is necessary to create transparency on the size of possible rent extraction and to detect corrupt behavior.

Shleifer and Vishny (1993) study the economics of corruption in an industrial organization approach. In their basic model a monopolistic bureaucrat offers a publicly provided private good and maximizes his monopoly rent. We interpret this case as a situation of autocracy, where only one decision maker is in charge. In contrast, a democracy has often a more complex government structure, therefore more than just one decision maker optimize independently from each other. In the Shleifer–Vishny framework, the decentralized decision making leads to higher corruption, since the single bureaucrats do not take the negative externality of their monopoly prices on other bureaucrats into account (double marginalization). However, if transparency comes into play – say by a free press – then competition between the bureaucrats emerges decreasing the sum of bribes paid. In this interpretation of the model, democracy can make things even worse, since the sum of bribes is higher compared to an autocracy. Importantly, press freedom stimulates competition between bureaucrats decreasing corruption below the initial autocracy level. Of course, this simple interpretation of the model abstracts from the fact that democracy is also an instrument to throw corrupt officials out of office, which counteracts the negative effects coming from double marginalization, therefore the net effect from democratization on corruption is ambiguous.

Stroemberg (2001) connects the influence of mass media and electoral competition. Parties define their platforms, which is the amount of money the parties will spend on each government program. These programs are published by the newspapers. As voters use this information to decide about private action, they assign a personal value to the newspaper's information coverage. Parties need mass media to convince voters of their policy agenda. Voters elect the party which assigns more money to the program which is most important to them. The potential of deciding between the two parties in Stroemberg (2001) model can be interpreted as democracy. In this model corruption is equivalent to politicians rent extraction. Rents emerge from embezzlement of government resources or from inefficiencies in the public sector. Stroemberg (2001) shows that in countries with a high share of informed voters on the total electorate, which is interpreted as a high degree of press freedom, government rents are lower. In countries with a low degree of press freedom the avoidance of corruption is too costly for politicians. In this respect, the approach differs from the classical models: in the classical models politicians act corrupt to acquire additional rents, and in the media model corruption is equivalent to inefficiencies in the public sector.

To sum up the theoretical models states three hypotheses: (1) democracy can control corruption, since it facilitates the punishment of corrupt activities, (2) press freedom can control corruption through decreasing information asymmetries, and (3) press freedom makes democracy a more effective instrument, vice versa. The mass media model yields similar conclusions, but democracy alone does not lower corruption in that type of model. Only the combination of democracy and the flow of information decreases corruption. Importantly, the theoretical literature emphasizes the need for democracy as well as press freedom to lower corruption. The majority of empirical

studies in the field do not consider these interaction effects. Therefore, the aim of this paper is to fill this gap.

### 3. Related empirical literature

Based on the theoretical literature discussed above, there are a number of empirical studies testing the impact of freedom of the press and democracy on corruption separately. We first discuss existing studies on the relationship between democracy and corruption, and second we present studies on corruption and press freedom. [Serra \(2006\)](#) is the single exception among the empirical papers, which also interacts measures of democracy and press freedom, therefore this paper is discussed in detail at the end of this section.

[Treisman \(2000\)](#) examines different determinants of corruption. The author mainly uses the measure of perceived corruption by Transparency International, and the index by the organization Business International for robustness analysis. By evaluating the existing literature on the causes of corruption, [Treisman \(2000\)](#) hypothesizes that corruption will be lower in democratic countries and in countries with a higher level of freedom of the press. In a cross-section of up to 85 countries in the period of 1996–1998 [Treisman \(2000\)](#) finds that not the pure fact that a country is democratic or not is relevant for the corruption level, but the durability is crucial: only if a country is a democracy for at least 40 years the level of corruption is significantly lower.<sup>1</sup> Press freedom has not been considered in the empirical model, although [Treisman \(2000\)](#) puts forward the hypothesis that corruption will be lower in countries with a freer press. The results of [Treisman \(2000\)](#) concerning the relationship between democracy and corruption are confirmed in an updated study [see [Treisman, 2007](#)].

[Montinola and Jackman \(2002\)](#) analyze data on 66 countries over the period from 1980 to 1983 from the Business International dataset and data on 51 countries over the period from 1988 to 1992 from the Transparency International dataset. They find that the implementation of democracy per se does not lead to lower corruption levels, but democracy counteracts corruption if political competition exceeds a certain threshold. [Montinola and Jackman \(2002\)](#) stress that without the reduction of the power of politics, corruption in countries with an intermediate level of democracy is higher than in less democratic countries. Democracy is measured by the index of [Bollen \(1993\)](#).<sup>2</sup>

[Paldam \(2002\)](#) regresses the Corruption Perception Index (1999) on the Gastil index<sup>3</sup> for democracy as explanatory variable. Thereby, he focuses on different effects in different cultures using an interaction model. He finds that democracy leads to lower perceived corruption. Note that the effect is not robust for every cultural area if the GDP per capita is considered as control variable.

[Rock \(2009\)](#) tests the theoretical hypothesis of the inverted U relationship between democracy and corruption in a panel of 84 countries covering the period 1982–1997. [Rock \(2009\)](#) argues that the impact of democracy on corruption depends on the speed of the government in ensuring trust in institutions, transparency and accountability. The dependent variable, control of corruption, is

<sup>1</sup> [Treisman \(2000\)](#) estimates the impact of the different determinants of corruption in the years 1996 (with 54 countries in his sample), 1997 (52 countries), and 1998 (85 countries). In his robustness regression the sample includes 68 countries.

<sup>2</sup> The index incorporates (1) the freedom of group opposition (see [Banks, 1979](#)), (2) political rights (see [Gastil, 1988](#)), and (3) effectiveness/elective legislative body (see [Banks, 1979](#)).

<sup>3</sup> Also known as Freedom in the World Index published by Freedom House. The index ranges between 1 (full democracy) and 7 (no democracy).

taken from the IRIS project at the University of Maryland and the major independent variable, the log of the durability of democracy, is taken from the POLITY IV dataset.<sup>4</sup> The results show that persistence of democracy has an inverted U-shaped influence on the level of corruption. [Rock \(2009\)](#) draws the conclusion that time allows young democratic countries to build transparent and accountable institutions. Implicitly, this analysis suggests an interaction of democracy with other institutional features.

[Ahrend \(2002\)](#) is the first cross-country study on press freedom and corruption. Based on a panel regression using data of 130 countries covering the period from 1984 to 1995, [Ahrend \(2002\)](#) identifies two channels through which press freedom influences corruption: (1) low levels of monitoring capacities directly lead to higher levels of corruption, and (2) higher education leads to lower corruption levels when press freedom is low. The corruption index is taken from the International Country Risk Guide, and the degree of press freedom is measured by the index provided by Freedom House.

[Brunetti and Weder \(2003\)](#) study a cross section of 125 countries using the similar data sources as [Ahrend \(2002\)](#).<sup>5</sup> Two features are different to other studies in the field, which we will also apply in our analysis: (1) the authors compose the average of the corruption measure from 1994 to 1998 to avoid the influence of shocks, and (2) they run instrumental variable regressions in order to reduce a potential endogeneity bias. [Brunetti and Weder \(2003\)](#) find a robust and significant negative effect of press freedom on corruption.

[Freille, Haque, and Kneller \(2007\)](#) test the impact of press freedom on corruption controlling for the level of democracy. They use an extreme bounds analysis for an unbalanced panel of 51 countries from 1995 to 2004. The indices used in this study are the Corruption Perception Index by Transparency International and the Press Freedom Index by Freedom House. [Freille et al. \(2007\)](#) also integrate a dummy variable for 50 years persistent democracy in their base specification. The disaggregation of the press freedom index into laws and regulations, political, and economic influences allows them to filter out the crucial restrictions to the media that lead to higher corruption levels. Especially economic and political influence on the media, significantly lead to higher levels of corruption.

[Adserà, Boix, and Payne \(2003\)](#) test the political accountability theory by estimating the impact of the level of democracy as well as press freedom on corruption. Their dataset includes observations of more than 110 countries in the period of the early 1980s until the late 1990s. They use five year averages of the level of democracy by the Polity II database<sup>6</sup> and the quality of informational controls to measure freedom of the press. The dependent variable is the corruption index of the International Country Risk Guide. [Adserà et al. \(2003\)](#) conclude that corruption is only low in countries where voters have the opportunity to hold officials responsible for acting corrupt. This includes both the potential of voting corrupt politicians out of office as well as the information about politicians that do not act according to the voter's preferences.

[Goel and Nelson \(2010\)](#) look at historical, geographical as well as government determinants of corruption. In their cross-country analysis of about 100 nations at three time periods: 1995–1997, 1998–2000, and 2001–2003. They use Transparency International's corruption index and measure democracy by rescaling the Freedom in the World Index of Freedom House from –14 (least democracy) to –2 (most democracy). They find that in more democratic countries corruption is

<sup>4</sup> See [The Political Risk Service Group \(2002\)](#) and [Marshall and Jagers \(2009\)](#) for more information.

<sup>5</sup> For robustness tests the authors use different alternative corruption indicators as well as alternative measures of the degree of press freedom. See [Brunetti and Weder \(2003\)](#) for details.

<sup>6</sup> See [Jagers and Gurr \(1995\)](#) for more details.

lower. This effect is significant and robust to the inclusion of several determinants of corruption. [Goel and Nelson \(2010\)](#) do not directly control for the impact of press freedom on corruption but for the impact of the number of internet users which is not significant.

Closely related to our study is [Chowdhury \(2004\)](#) who aims to bring together democracy and press freedom. Similar to our line of reasoning he argues that the effect of democracy on corruption might depend on the degree of press freedom. In the empirical implementation, the study estimates the effect of one institutional variable on corruption controlling for the other. Interaction variables are not considered. [Chowdhury \(2004\)](#) uses Transparency International's Corruption Perception Index, Vanhanen's Democratization Index and the Freedom of the Press Index of Freedom House. Note that we use the updated data sets of the similar sources. The study includes observations of 97 countries covering the period from 1995 to 2002. The results of [Chowdhury \(2004\)](#) show that press freedom as well as democracy significantly lower the level of corruption. A conclusion concerning the joint effect of both institutional features is not possible based on this approach.

The first study which considers an interaction of democracy and press freedom is [Serra \(2006\)](#). [Serra \(2006\)](#) conducts a Global Sensitivity Analysis of standard determinants of corruption. Thereby, interaction variables of the different explanatory variables are taken into account, in particular an interaction of press freedom and democracy. Democracy is measured by a dummy variable for countries which are classified as democratic during the period considered. By the author's definition democratic countries are those with a political rights score<sup>7</sup> equal to or less than 3. The press freedom variable comes from Freedom House, and corruption from Transparency International and the World Governance Indicators. [Serra \(2006\)](#) uses data for 62 countries covering the period 1990–1999. The Extreme Bounds Analysis leads to ambiguous results concerning the impact of the interaction effect on corruption. Considering TI's corruption index, the interaction effect of democracy and press freedom is statistically significant and positive in support of the theoretical considerations above. The higher the degree of press freedom, the more effective is democracy in controlling corruption. However, the effect vanishes if the WGI index is used as dependent variable, although both corruption measures are highly correlated. We depart from this initial study in several dimensions: (1) we use a broader data set covering 175 countries for the period 1996–2010, (2) we use three alternative measures of corruption as well as alternative measures for the degree of press freedom and democracy, (3) we take a possible endogeneity bias into account by using an instrumental variable approach, (4) we consider a continuous interaction variable of press freedom and democracy, which puts less strong assumptions on the classification of countries as democratic or not, and (5) we also consider panel data.

Concerning the econometric methodology our analysis is related to [Saha et al. \(2009\)](#) and [Lessmann and Markwardt \(2010\)](#) who made significant progress in the empirical literature on the causes of corruption by using interaction models. [Saha et al. \(2009\)](#) focuses on an interaction effect of press freedom and economic freedom, finding that press freedom is only a suitable instrument to control corruption, if it is accompanied by a high degree of economic freedom. [Lessmann and Markwardt \(2010\)](#) study the effect of decentralization on corruption, which depends on the monitoring possibilities of bureaucrats (as reflected by the degree of press freedom). Both studies do not consider the level of democracy.

Interestingly, the theoretical as well as the empirical literature is aware of a possible joint effect of democracy and freedom of the press on corruption. But none of the existing empirical studies has analyzed this relationship satisfactorily. As the theoretical literature clearly emphasizes

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<sup>7</sup> Political rights is a partial index of the Freedom in the World Index of Freedom House.

the interdependency of press freedom and democracy, both variables have to be interacted in a regression analysis. The following section presents estimation results for the joint or conditional effect of democracy and press freedom on the level of corruption.

#### 4. Empirical analysis

In the forthcoming empirical analysis we focus on the joint effect of press freedom and democracy on corruption. In Section 4.1 we first discuss the data and measurement issues, which is particularly important as we are concerned with institutional features that are difficult to measure. In Section 4.2 we set up our econometric model, and we present baseline estimates in Section 4.3. In Section 4.4 we consider a potential endogeneity bias. Section 4.5 provides panel estimates, and finally, Section 4.6 provides robustness tests.

##### 4.1. Data

In the body of the paper we refer to the commonly used Corruption Perception Index (CPI) by Transparency International as a measure of corruption.<sup>8</sup> Note that we also provide robustness tests using the corruption measure provided by the PRS Group's International Country Risk Guide (ICRG index) as well as the measure "control of corruption" provided by the World Governance Indicators (WGI index). Transparency International defines corruption as "the abuse of entrusted power for private gain" [see [Transparency International, 2009](#)]. The meta-index is based on different sources and it covers only those countries, where at least three different sources are available. Data sources are business people opinion surveys and expert assessments. The index ranges from 0 to 10, where 10 indicates the total absence of corruption. Following [Brunetti and Weder \(2003\)](#) we use the average of the index for the period from 2005 to 2010 to ensure that our regression results are not biased by single outliers. The most corrupt countries in our sample are the Iraq (CPI: 1.650), Afghanistan (CPI: 1.700), and Sudan (CPI: 1.767). In New Zealand (CPI: 9.433) and Denmark (CPI: 9.383) we have the highest absence of corruption.

In order to clearly separate the impact of press freedom from the effect of democracy, we chose the mean of Vanhanen's democratization index of the period 2005 to 2010 (*DEMO*).<sup>9</sup> This indicator does not consider press freedom as a dimension of democracy in contrast to other indicators such as the index of democracy by the Economist Intelligence Unit.<sup>10</sup> The Vanhanen democratization index has two dimensions: the degree of competition in elections and voter participation. [Vanhanen \(2000\)](#) defines competition as 100 minus the share of the votes won by the largest party. Both subcomponents range from 0 to 100. The aggregate democratization index is built by multiplying the subcomponents and dividing by 100. The index is zero in countries with no voter participation and/or 100 percent votes won by the largest party. The aggregate index ranges from 0 (e.g. Oman, Qatar, China) to 100, with 100 meaning perfect democracy. In our sample Denmark is the most democratic country with a value of 44.433 followed by Belgium, the Netherlands and Iceland.

The conditioning variable in our analysis is the degree of press freedom (*PRESS*) which is provided by Freedom House.<sup>11</sup> The index classifies countries into three groups: free (0–30 index

<sup>8</sup> See <http://www.transparency.org> and [Lambsdorff \(2005\)](#) for details.

<sup>9</sup> See [Vanhanen \(2000\)](#) for details.

<sup>10</sup> For more information on the construction of the index see [Economist Intelligence Unit. \(2008\)](#).

<sup>11</sup> See <http://www.freedomhouse.org> for details.



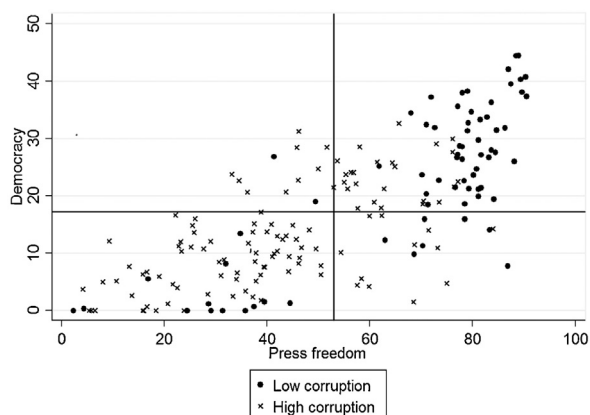


Fig. 1. The relationship between press freedom, democracy and corruption levels.

points), partly free (31–60 index points), and not free media (61–100 index points). We recode this variable by subtracting the country's press freedom value by 100 to make the interpretation of regression coefficients easier. Similarly to the CPI the score of the press freedom index is based on expert assessments. The researchers from Freedom House examine the degree of press freedom by collecting expert opinions to 23 methodology questions and 109 indicators on the equally weighted categories legal, political, and economic environment. According to Freedom Houses' index, Turkmenistan (4.2), Uzbekistan (8.0), and Belarus (9.3) have the lowest degree of press freedom, while Finland (90.5), Iceland (90.3), and Norway (89.667) are at the highest.

In Fig. 1 we take a first look at the relationship between the variables of interest. The vertical axis denotes the level of democracy, the horizontal axis the degree of press freedom. The mean of both variables is illustrated by horizontal and vertical lines. Each mark represents the period average of one of the 170 countries. A first important observation is that democracy and press freedom are positively associated, but not perfectly correlated. This would make an econometric analysis of both corruption determinants impossible due to multicollinearity. The level of corruption is considered by choosing different marks for the countries: countries with a level of corruption below average are illustrated by dots, countries with a level of corruption above average are illustrated by crosses. Interestingly, the majority of low corruption countries are concentrated on the upper-right corner, while the majority of highly corrupt countries lie in the bottom-left corner. This implies that press freedom and democracy are important in reducing corruption. The upper-left and bottom-right corner are dominated by highly corrupt countries implying that having a high degree of press freedom or a high level of democracy, respectively, is not sufficient to reduce corruption to below average levels. This supports our hypothesis, which states the democracy and press freedom are complements rather than substitutes in reducing corruption. Both institutional characteristics seem to interact. Of course, this graphical analysis does not substitute for a detailed econometric analysis, since omitted variables might be relevant here. An important determinant of corruption is, for example, the level of economic development. The low corrupt countries in the bottom-left corner are very rich, but autocratic countries such as Bhutan, Saudi Arabia or the United Arab Emirates. Controlling for economic development and other corruption determinants, might improve the findings concerning the relationship between corruption, democracy, and press freedom.

Table 1  
Summary statistics.

	Obs.	Mean	Std. Dev.	Maximum	Minimum
Corruption Perception Index, mean 2005–2010	170	4.041	2.081	9.433	1.650
Democracy, mean 2005–2010	170	17.256	11.414	44.433	0.000
Freedom of the press, mean 2005–2010	170	52.939	22.831	90.500	4.167
Log(GDP p.c.), 2010	170	8.399	1.534	11.562	5.293
Political instability and violence, mean 2005–2010	170	-0.118	0.940	1.469	-2.550

The econometric analysis presented below considers different control variables the literature has shown to impact corruption. A summary statistic of our main variables for our cross-section analysis is given in Table 1. The most important control variable is the logarithm of the GDP per capita (*GDPPC*) which serves as a proxy for a country's development level [see e.g. Aidt, 2011; Chowdhury, 2004; Mauro, 1995]. Adserà et al. (2003) point out the importance of controlling for political instability (*STABILITY*). Therefore we use the composite indicator Political Stability and Absence of Violence/Terrorism of the Worldwide Governance Indicators<sup>12</sup>. The indicator measures the perceived likelihood of the destabilization of the overthrow of a government by unconstitutional or violent means where politically-motivated violence and terrorism are included [see Kaufmann et al., 2010]. The estimate of the unobserved political instability ranges from -2.5 (lowest stability) to 2.5 (highest stability). We expect a positive sign as political instability leads to higher levels of corruption.

A historical control variable is the colonial heritage. Treisman (2000) finds that countries with a British colonial heritage are less corrupt than others, therefore we also consider a respective colonial dummy (*BRITCOL*) as control. This might be due to less abuse of authority or superior administration of justice in countries with a common law legal system (*COMLAW*) for which we control separately in our robustness analysis.<sup>13</sup>

#### 4.2. Econometric model

Our empirical approach starts with a baseline model where we consider the most common determinants of corruption [see e.g. Treisman, 2000] as control variables: the log of the GDP per capita (*GDPPC*), the political stability index (*STABILITY*), and a dummy for former British colonies (*BRITCOL*). We subsequently consider a potential endogeneity bias, check for robustness against additional control variables, and regard an alternative measurement of key variables. Finally, we provide panel estimates. Note that there is very few variation of corruption over the short period of time where corruption measures are available, therefore these results have to be interpreted with caution. Recalibrations, differing data sources and their weights in the corruption indices, as well as methodological changes reinforce these difficulties [see Treisman, 2007]. Therefore, we believe that the cross-country approach is better suited for our purpose, but we want our results to be comparable to other studies in the field which focus on panel data.

<sup>12</sup> See Kaufmann, Kraay, and Mastruzzi (2010) for more information.

<sup>13</sup> See also Treisman (2000) and Goel and Nelson (2010) who use a dummy variable for the English Common Law System as a control.

The main estimations are based on a cross-section of 170 countries considering period averages from 2005 to 2010. The estimation equation has the following form:

$$CPI_i = \alpha + \sum_{j=1}^k \beta_j CONTROLS_{j,i} + \gamma_1 DEMO_i + \gamma_2 PRESS_i + \gamma_3 DEMO_i \times PRESS_i + \epsilon_i. \quad (1)$$

Hence, we model country  $i$ 's level of corruption ( $CPI_i$ ) as a function of  $k$  exogenous control variables ( $CONTROLS_i$ ), the index of democracy ( $DEMO_i$ ), the degree of press freedom ( $PRESS_i$ ), their interaction ( $DEMO_i \times PRESS_i$ ), and an error term ( $\epsilon_i$ ).  $\gamma_1$ ,  $\gamma_2$  and  $\gamma_3$  are the coefficients of the main variables of interest.

Eq. (1) is estimated using ordinary least squares (OLS). Note that we can interpret the coefficients and their significance of the control variables easily, since the coefficients are similar to marginal effects. But the interpretation of the results of our interaction term as well as its components is more difficult. We are not particularly interested in the individual statistical significance of either of these terms. Instead, we want to know their joint significance or, more precisely, the marginal effect of democracy on corruption. The marginal effect can be calculated as follows:

$$\frac{\partial CPI_i}{\partial DEMO_i} = \gamma_1 + \gamma_3 \times Press_i. \quad (2)$$

Thus, our interaction model asserts that the effect of democracy on corruption depends on the value of the conditioning variable press freedom. We want to stress that this is the exact empirical representation of the theoretical reasoning in Section 2, which has implies that the impact of democracy on corruption should depend on the degree of press freedom.

#### 4.3. Baseline results

Table 2 reports OLS results. We control for the GDP per capita ( $GDPPC$ ), political instability ( $STABILITY$ ), and a country's colonial heritage ( $BRITCOL$ ).

We begin with two regressions reported in column (1) and (2) of Table 2, where only democracy or press freedom is considered. Please remind that the corruption indicator as dependent variable reflects the absence of corruption. Both coefficients are positive and statistically significant at conventional confidence levels. In the results reported in column (3) we add both determinants into one regression without interacting them. This specification is similar to Chowdhury (2004). The signs of the coefficients stay the same, but the coefficient of democracy becomes insignificant. While press freedom leads to lower corruption levels, democracy has no significant influence. This result is in line with Treisman (2000), who shows that the current level of democracy has no significant effect on the level of corruption. Instead, he provides evidence for a significant positive impact of the durability of democracy on corruption. Importantly, the specification reported in column (3) does not reflect the theoretical relationship we want to study. Our aim is to look at the combined influence of democracy and press freedom on corruption. Therefore we interact democracy and press freedom in column (4) of Table 2. The interaction effect is highly significant and positive implying that conditionality matters.

As mentioned above, we cannot interpret these coefficients independently from each other, since this would mean that, for example, in the case of democracy the effect is only negative if

Table 2  
Baseline regressions.

	Dependent variable: CPI, mean 2005–2010			
	OLS (1)	OLS (2)	OLS (3)	OLS (4)
DEMO	0.037*** (3.72)		0.013 (1.08)	−0.135*** (−6.93)
PRESS		0.022*** (4.22)	0.018*** (2.72)	−0.011 (−1.55)
DEMO×PRESS				0.002*** (7.63)
GDPPC	0.650*** (8.38)	0.714*** (10.12)	0.674*** (8.96)	0.512*** (6.45)
STABILITY	0.712*** (6.70)	0.512*** (4.55)	0.548*** (4.62)	0.423*** (3.63)
BRITCOL	0.495** (2.53)	0.421** (2.09)	0.416** (2.09)	0.454** (2.22)
Constant	−2.082*** (−3.49)	−3.165*** (−5.35)	−2.833*** (−4.47)	−0.131 (−0.18)
Obs.	170	172	170	170
F-Value	91.934	93.725	76.133	116.523
Prob > F	0.000	0.000	0.000	0.000
Adj. R <sup>2</sup>	0.726	0.740	0.738	0.796

Note: *T*-Test statistics are reported in parenthesis; standard errors are calculated using White correction; \*\*\*, \*\*, and \* indicate significance at 1%, 5% and 10%, respectively.

press freedom was zero. If we insert the estimated coefficients of our basic regression [column (4) of Table 2] in Eq. (2), the marginal effect is calculated as follows:

$$\frac{\partial CPI_i}{\partial DEMO_i} = -0.135 + 0.002 \times Press_i. \quad (3)$$

To illustrate that the marginal effect of democracy on corruption varies by the degree of press freedom, we plot the marginal effect in Fig. 2 including confidence bands for the 10% significance level.

The positive slope of the marginal effect is an outcome of the positive sign of the coefficient of the interaction variable ( $\gamma_3$ ). For low levels of the freedom of the press index, the marginal effect of democracy on corruption is negative (corruption is higher), while it is positive for high index values. The sign of the marginal effect of democracy on corruption changes at a degree of press freedom of about 55 index points. Confidence bands for the 10 percent significance level around the line indicate the statistical significance of our effect for a wide range of countries.<sup>14</sup> If a country has a degree of press freedom of more than 63 index points, the marginal effect of democracy on corruption is positive and significant implying that democracy is a suitable instrument to reduce corruption. In our sample there are 65 countries exceeding this value. However, in an almost similar number of countries, democracy is linked to higher levels of corruption, since press freedom is not sufficiently high enough. This finding is in line with our theoretical interpretation of the Shleifer and Vishny (1993) model, where democracy can be linked to even higher levels of corruption.

<sup>14</sup> See Brambor, Clark, and Golder (2006) for more details on interaction models.

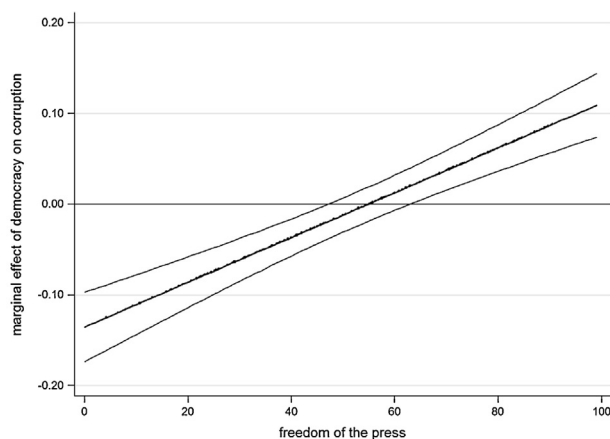


Fig. 2. Marginal effect of democracy on corruption.

To sum up, our estimations imply that democracy decreases corruption in countries with a high degree of press freedom, while democracy may increase corruption otherwise. Importantly, the effects of both institutional features – democratic elections and press freedom – on corruption are conditional on each other. This effect is robust towards the integration of various controls (see Section 4.6).

The graph of the marginal effect of press freedom on corruption depending on the different democracy levels confirms our findings [see Fig. A.1 in the appendix]. In countries with a democracy level of over 10, press freedom leads to lower corruption levels. In the other cases the effect is not significant. This implies that in 117 out of 170 countries of our sample: press freedom has a significant positive effect on corruption, if the democracy level is above 10. This is an important result, since here is a difference between democracy and press freedom. Both instruments are complements concerning their effect on the absence of corruption. The effectiveness of press freedom in reducing corruption increases with the degree of democracy, vice versa. However, press freedom never increases corruption, while democracy does harm, if the degree of press freedom is not sufficiently high. Therefore, policy advisors might put the focus on the liberalization of the media in countries that suffer heavily from corruption. Democratic reforms should come later.

Let us briefly discuss the coefficients of our control variables. A country's development level, measured by the logarithm of the GDP per capita (*GDPPC*), has a significant and positive impact on the absence of corruption. Higher developed countries are less corrupt than lower developed countries. Countries with a more stable political system (*STABILITY*) are also associated with lower corruption. This effect is highly significant and goes along with the literature [see e.g. Adserà et al., 2003]. The last major control variable we use in the baseline regression is the dummy for former British colonies, *BRITCOL*. Countries with British colonial heritage have a lower level of corruption than countries that were not a British colony.

#### 4.4. Endogeneity

Our baseline results have to be interpreted with caution since endogeneity might bias our estimates. Corrupt politicians have an incentive to avoid or manipulate elections, and they also might pressurize journalists [see e.g. Di Tella & Franceschelli, 2011; McMillan & Zoido, 2004].

Table 3  
Regression results with lagged dependent variables.

	Dependent variable: CPI index		
	Lag: DEMO (1)	Lag: PRESS (2)	Lag: both (3)
$DEMO_{t-1}$	-0.123*** (-6.38)		-0.113*** (-5.62)
DEMO		-0.119*** (-6.04)	
$PRESS_{t-1}$		-0.020*** (-2.82)	-0.011 (-1.59)
PRESS	-0.004 (-0.48)		
$DEMO_{t-1} \times PRESS$	0.002*** (6.80)		
$DEMO \times PRESS_{t-1}$		0.002*** (7.18)	
$DEMO_{t-1} \times PRESS_{t-1}$			0.002*** (7.00)
GDPPC	0.555*** (6.87)	0.472*** (5.68)	0.520*** (6.30)
STABILITY	0.408*** (3.51)	0.551*** (4.71)	0.540*** (4.47)
BRITCOL	0.457** (2.34)	0.426** (2.16)	0.440** (2.34)
Constant	-0.860 (-1.23)	0.499 (0.64)	-0.296 (-0.41)
Obs.	167	168	167
F-Value	115.011	115.716	116.943
Adj. $R^2$	0.794	0.790	0.787

Note: T-Test statistics are reported in parenthesis; standard errors are calculated using White correction; \*\*\*, \*\*, and \* indicate significance at 1%, 5% and 10%, respectively. The lagged independent variables are calculated by mean democracy or rather press freedom in the period 1995–2000.

Therefore, democracy as well as press freedom might be endogenous. We consider this issue in two ways: (1) we use lagged dependent variables instead of contemporaneous values, (2) we use an instrumental variable (IV) approach.

#### 4.4.1. Lagged endogenous variables

First we will check for endogeneity by regressing corruption on lagged levels of the explanatory variables. For this purpose, we construct the mean value of democracy as well as press freedom from 1995 to 2000 – a period without an overlap to the period were corruption measures are observed. The results are reported in Table 3.

We gradually develop the final regression with both lagged variables in column (3) of Table 3 by first using the lag for democracy in column (1) and afterwards the lag for press freedom [column (2)].<sup>15</sup> We can observe that the sign and significance of all explanatory variables remain

<sup>15</sup> The interaction terms are constructed using the lag of democracy but our standard press freedom in column (1) and the lag of press freedom but the standard democracy variable in column (2). In column (3) we use the lags of democracy as well as press freedom in the interaction term.

unchanged. In particular, the interaction variable is always statistically significant and positive. However, the institutional characteristics of a country are not varying a lot over time, therefore past realizations strong predictors of the current values. Consequently, just lagging potentially endogenous variables might not be sufficient in order to reduce an endogeneity bias. We therefore apply an instrumental variable approach in the following section.

#### 4.4.2. Instrumental variable regressions

This section presents an instrumental variable approach. The problem in our case is that we need instruments for both variables – democracy and press freedom. Our instruments have to be exogenous determinants of one variable without determining the other. The instruments are motivated by Hall and Jones (1999), who use various correlates of Western European influence in countries as instruments for good institutions (property rights, checks and balances, etc.). As instruments for democracy we use the distance from the equator (*LATITUDE*), dummies for Europe and Central Asia (*ECA*), and Scandinavian legal origin (*LEGOR\_SC*). Our instruments for the degree of press freedom are the share of the population that speaks any major European language (*EURLANG*), the mean of the press freedom index of neighboring countries (*PRESS\_NEIGHBORS*), and a dummy for French legal origin (*LEGOR\_FR*) [see also Brunetti & Weder, 2003]. The average press freedom index of neighboring countries is used as an additional instrument, since reports of foreign media may be received by the domestic population pressuring the government to increase press freedom to a similar level (yardstick competition).

Table 4 summarizes the second stage results of IV regressions.<sup>16</sup> We report results of three different specifications: in column (1) we instrument democracy (and the interaction variable), in column (2) we instrument press freedom (and the interaction variable), and in column (3) we instrument both potentially endogenous variables (as well as the interaction variable) simultaneously. Most importantly, our major finding of a positive impact of press freedom on the effectiveness of democracy in controlling corruption holds for the IV estimates as can be seen from the second stage regressions. Fig. 3 plots the marginal effect of democracy on corruption as we estimate it from column (3) of Table 4, which looks quite similar to the OLS results.

Some discussion is needed on the validity of the instruments. The first stage results reported in Table A.3 in the appendix show that the instrumental variables, which are excluded from the second stage regression, have quite strong explanatory power if democracy is treated as endogenous variable. The *F*-statistic is larger than 18 in both first stage regressions [see column (1) and (2) in Table A.3]. Our instruments for the degree of press freedom are less powerful [see column (3) and (4) in Table A.3], since the *F*-statistic is below 10 in both first stage regressions. This might cause a weak instrument bias. However, if we instrument democracy and press freedom simultaneously, the *F*-statistics exceed the critical value of 10 in all three first stage regressions as indicated by the results reported in column (3) and (4) in Table A.3 [see Stock and Yogo (2005) for details]. Note that also the Hansen test on overidentifying restrictions is passed as indicated by the results reported in Table 4 column (3). We therefore conclude that our main finding concerning the interaction effect of press freedom and democracy can be interpreted as causal and not as a result of endogeneity.

<sup>16</sup> First stage regression results are reported in Table A.3.

Table 4  
IV results.

	Dependent variable: CPI index		
	IV: democracy (1)	IV: press (2)	IV: both (3)
<i>Second-stage regression results</i>			
DEMO	−0.344*** (−5.33)	−0.183* (−1.90)	−0.308*** (−3.15)
PRESS	−0.022** (−2.08)	0.018 (0.55)	0.014 (0.44)
DEMO×PRESS	0.005*** (7.22)	0.002 (1.63)	0.004*** (3.85)
GDPPC	0.474*** (4.66)	0.574*** (4.04)	0.521*** (4.48)
STABILITY	0.201 (1.12)	0.207 (0.81)	0.032 (0.09)
BRITCOL	0.339 (1.30)	0.270 (1.19)	0.249 (0.88)
Constant	1.615* (1.71)	−1.308 (−0.59)	−0.287 (−0.18)
Obs.	162	135	135
Second stage <i>F</i> -value	178.151	78.308	86.678
<i>Prob</i> > <i>F</i>	0.000	0.000	0.000
Adj. <i>R</i> <sup>2</sup>	0.702	0.752	0.680
Hansen <i>J</i> statistic	0.305	0.139	1.080
$\chi^2$ ( <i>p</i> )	0.581	0.709	0.782
<i>Excluded instruments</i>			
ECA	✓		✓
EURLANG		✓	✓
LATITUDE	✓		✓
LEGOR_FR		✓	✓
LEGOR_SC	✓		✓
PRESS_NEIGHBORS		✓	✓

Note: Z-Test statistics are reported in parenthesis; standard errors are calculated using White correction; \*\*\*, \*\*, and \* indicate significance at 1%, 5% and 10%, respectively. Interaction variables are instrumented.

#### 4.5. Panel evidence

In the following we perform panel estimations to make our results comparable to related studies such as Chowdhury (2004). Note, that these regressions might be biased for two reasons: First, the commonly used corruption measures are not comparable over time since the underlying data sources of the meta indices varies year by year [see Lambsdorff, 2005], and the methodology has changed to some extent [see Treisman, 2007]. Second, the variables of interest in our analysis are persistent in the sense that there is very little variation over time (if any), and the existing variation comes from a handful of countries. In the case of the WGI index not only sources changed but also the weights assigned to them [Treisman, 2007]. Additionally Knack (2006) puts emphasize on the problem of re-calibration of the ICRG index. Table 5 provides the results of our baseline specification using fixed and random effects in panel data.

Column (1)–(2) consider the CPI index as corruption measure, column (3)–(4) the ICRG index, and column (5)–(6) uses the WGI index. The within *R*<sup>2</sup> shows the limited explanatory power of



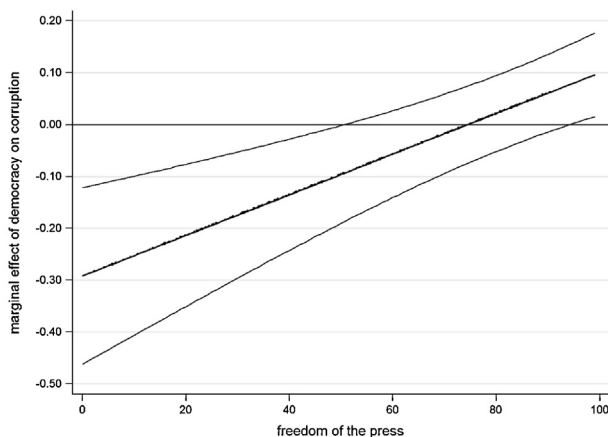


Fig. 3. Marginal effect of democracy on corruption, IV regressions.

these estimations, which is due to the low variation of variables over time. Our interaction variable is only significant in the random effects models. Here, the coefficient of the interaction variable ( $DEMO \times PRESS$ ) is positive and statistically significant in support of our earlier findings. The estimation results go along with our considerations on the limited usability of our data for panel

Table 5  
Panel results.

	Dependent variable: alternative corruption indicators					
	CPI index		ICRG index		WGI index	
	FE-OLS (1)	RE-GLS (2)	FE-OLS (3)	RE-GLS (4)	FE-OLS (5)	RE-GLS (6)
DEMO	-0.009 (0.01)	-0.041*** (0.01)	-0.016 (0.02)	-0.052*** (0.02)	-0.002 (0.01)	-0.015*** (0.00)
PRESS	0.007 (0.01)	0.008* (0.00)	0.005 (0.01)	-0.001 (0.01)	0.004* (0.00)	0.004* (0.00)
DEMO $\times$ PRESS	0.000 (0.00)	0.001*** (0.00)	0.000 (0.00)	0.001*** (0.00)	0.000 (0.00)	0.000*** (0.00)
GDPPC	0.116* (0.06)	0.328*** (0.05)	-0.772*** (0.13)	-0.003 (0.05)	-0.006 (0.03)	0.079*** (0.02)
STABILITY	0.075 (0.07)	0.202*** (0.07)	0.048 (0.10)	0.217*** (0.08)	0.182*** (0.04)	0.222*** (0.03)
BRITCOL		0.374 (0.24)		0.206 (0.15)		0.224** (0.10)
Constant	2.975*** (0.58)	0.694 (0.45)	8.589*** (1.11)	2.376*** (0.48)	-0.206 (0.23)	-1.048*** (0.18)
Obs.	1559	1559	895	895	2099	2099
N	175	175	132	132	181	181
Adj. $R^2$ within	0.021	0.017	0.091	0.005	0.086	0.070
Adj. $R^2$ between	0.721	0.776	0.348	0.684	0.636	0.775
Adj. $R^2$ overall	0.722	0.777	0.241	0.529	0.608	0.741

Note: Adjusted standard errors are reported in parenthesis; standard errors are calculated using White correction; \*\*\*, \*\*, and \* indicate significance at 1%, 5% and 10%, respectively.

regressions. Most of the variation of our variables comes from differences between countries rather than within countries. Therefore, a cross-country setting as presented in the previous section is the more appropriate approach.

#### 4.6. Robustness tests

The first set of robustness tests is inspired by Chowdhury (2004) and Saha et al. (2009), which are the studies closest to ours although the interaction of democracy and press freedom is not considered. Table A.4 summarizes the results.

In columns (1) and (2) we control for trade openness using the indices by Sachs and Warner (1995) and Frankel and Romer (1999). In column (3) we control for continental dummies. In column (4) we consider alternative measures of ethnic fractionalization (see Alesina, Devleeschauwer, Easterly, Kurlat, and Wacziarg (2003)). In column (5) we control for natural resource abundance. In columns (6) and (7) we use an alternative measure of democracy and press freedom respectively. In the results reported in column (6), we use the years of democracy since 1950 based on the Polity2 dataset as an indicator of democracy following Treisman (2000). In column (7) we use the number of internet users per 100 people instead of the freedom of press index as alternative conditioning variable. In columns (10) and (11) we consider the ICRG corruption measure, and the sub-index *control of corruption* of Kaufmann et al. (2010) as alternative measures of corruption. All these robustness tests do not change our main finding concerning the interaction effect of democracy and press freedom.

In the previous regressions we did not consider the effect of economic freedom on corruption. Saha et al. (2009) interact the index of economic freedom with the democracy level to explain why countries with an above average level of democracy are highly corrupt. To avoid that our results are biased because of an omitted variable, we examine the robustness concerning the integration of economic freedom and its interaction effect with democracy on the perceived corruption. For this purpose, we estimate Eq. (1) including economic freedom and its interaction with democracy in addition to press freedom and its interaction term. Column (8) of Table A.4 shows the results. This “horse race” between the two interaction variables implies, that press freedom is more important (i.e. more significant) concerning the impact of democracy on corruption than economic freedom. Note that the democracy index we use does not contain a press freedom component in contrast to the democracy index used by Saha et al. (2009). Therefore it is easier to uncover which variable is crucial.

Additionally we control for the robustness of our estimation results when including the most robust determinants of corruption of the Sensitivity Analysis in Gunardi (2008) [see column (9) of Table A.4]. Government Effectiveness, *GOVEFF* and Rule of Law, *RULELAW*, have both a positive and highly significant impact on the absence of corruption. This means that higher quality of officials as well as the enforcement of the rule of law lead to lower corruption levels. Political polarization, *POLARIZ*, and regulatory quality, *REGQUALI* have no significant impact in our sample of countries. Importantly, the joint effect of democracy and press freedom remains stable in these robustness tests.

Finally, to ensure that our regression results are not biased by other omitted variables, we control sequentially for the share of protestants (*PROTESTANT*), the gross enrollment ratio in secondary education (*EDU*), the ethnic fractionalization (*ETHNO*), the government size (*GOVCONS*), the common law system (*COMLAW*), decision decentralization (*FEDERAL*), the percentage of urban population (*URBAN*), and the land area (*LAND*).

La Porta, de Silane, Shleifer, and Vishny (1999) argue that Muslim and Catholic countries are more intervening than Protestant countries, therefore we control for the share of protestant people (*PROTESTANT*). Protestant countries are supposed to be less corrupt because they are less hierarchical.

Ali and Isse (2003) use the secondary school enrollment rate as a proxy for the level of education. The authors argue that higher levels of education are associated with more awareness of the public for their rights as well as more nationalism, pride, and civic duty, leading to lower levels of corruption. We therefore consider the gross enrollment ratio in secondary education in 2010 (*EDU*) as additional control.

Ethnic fractionalization is a measure of a country's ethnic diversity and commonly used as control variable in corruption studies. For example, Ali and Isse (2003) hypothesize that more fractionalized countries are more corrupt, since bureaucrats act in favor of people of the same ethnic group. We therefore control for ethnic fractionalization using the degree of ethnolinguistic fractionalization (*ETHNO*) provided by Alesina et al. (2003).

Furthermore, we include the government size (*GOVCONS*) measured by the general government final consumption expenditures (in % of GDP) from the World Development Indicators in 2010. La Porta et al. (1999) find that countries with a bigger government are less corrupt, since government size reflects a greater law enforcement machinery and greater checks and balances (see also Goel & Nelson, 2010).

As mentioned in Section 4.1 we control for the common law legal system (*COMLAW*) and countries with British colonial heritage separately. Goel and Nelson (2010) stress that a strict legal system as well as a strong system of checks and balances lead to lower levels of corruption. Therefore in countries with a common law legal system corruption is more costly because of the efficient legal framework.

Following Treisman (2000) we control for the structure of the government by including a dummy variable for federal countries (*FEDERAL*).<sup>17</sup> The effect of decentralization is ambiguous, since it might involve double marginalization problems as discussed by Shleifer and Vishny (1993), but it potentially increases inter-jurisdictional competition as discussed by Fisman and Gatti (2002).

Finally we control for geographical influences using the share of urban population (*URBAN*) and the land area (*LAND*) as suggested by Goel and Nelson (2010). We expect that a higher degree of urban population as well as countries with more disperse population lead to lower levels of corruption. In countries with a high geographic concentration of the population and low geographical expanse the detection of corrupt behavior is easier as monitoring corrupt bureaucrats is less costly [see Goel & Nelson, 2010]. The results are reported in Table A.5 in the appendix. Again, the regressions show that the main finding concerning the interaction effect of press freedom and democracy is robust to the inclusion of these additional controls.

## 5. Summary and policy conclusions

This paper studies the interaction effect of democracy and press freedom on corruption. Existing theoretical and empirical studies reveal that (1) democracy helps to reduce corruption, since corrupt officials can be punished through voting out of office; and (2) press freedom increases the probability of detection of corrupt behavior thereby reducing the expected gain from corruption.

<sup>17</sup> See Treisman (2008) dataset.

Hence, the literature implies that both instruments help reducing corruption independently from each other, but the literature also suggests – at least implicitly – that both institutional features work together in decreasing corruption. For example, a free press can help to reduce information asymmetries in the principal–agent framework by [Rose-Ackerman \(1978\)](#) making democratic elections a more efficient instrument. Similar effects can be found in [Persson and Tabellini \(2002\)](#) model, [Shleifer and Vishny \(1993\)](#) model and the mass media model by [Stroemberg \(2001\)](#). Consequently, democracy and press freedom should be complements in their effect on corruption rather than substitutes. The empirical test of this hypothesis is at the heart of our analysis.

Based on cross-country and panel data we show that conditionality matters in the sense that press freedom is an important conditioning variable concerning the impact of democratic elections on corruption. Democracy – measured by the Vanhanen Index – has a negative impact on the absence of corruption in countries with a low degree of press freedom, while democracy helps to reduce corruption in countries with a high degree of press freedom. Our result is robust to the consideration of a potential endogeneity bias using an instrumental variable approach, and robust to the inclusion of several different control variables.

The policy conclusion from our study is straightforward: our results suggest that democratic reforms should be accompanied by a liberalization of the media to provide unbiased information to the voters. Merely in countries with high press freedom voters are able to evaluate the performance (corrupt behavior) of politicians. One example is Denmark, where the combination of a highly democratic government ( $DEMO = 44.9$  in 2010) and a free press ( $FP = 87$ ) leads to a high absence of corruption ( $CPI = 9.3$ ). If there is no free press, the introduction of democratic elections in former autocratic countries might lead to even higher levels of corruption. People in democratic countries are able to vote corrupt politicians out of office. In countries with a free press, the information asymmetries between politicians and the voters decompose. Only knowing who is corrupt but not being able to vote this corrupt politician out of office does not necessarily lower the corruption level. Similarly, having the right to vote but not knowing which politician is corrupt also does not lead to lower corruption. One example is Mexico. Despite an above-average level of democracy of 23.1 in 2010, Mexico is highly corrupt with a CPI of 3.1. This is – at least to some extent – related to the fact that the press freedom level is below the critical value of 55.<sup>18</sup> Only the joint implementation of democratic reforms as well as the liberalization of the press can lead to lower corruption levels. Another interesting case is Hungary, where different new press laws passed under Prime Minister Viktor Orbán in 2010, which threaten media independence. Although this is not yet observable in the data, one might expect that this will weaken democracy and increase the level of corruption in the. It is important to stress that democracy might have undesired effects on the level of corruption. Our results imply that the level of corruption is even higher in those countries, which are democratic, but have not a sufficient high degree of press freedom. From a technical point of view, this is a result of the crossing of the zero line of the marginal effect of democracy on the absence of corruption as illustrated by [Fig. 2](#) in [Section 4.3](#): for a low degree of press freedom, this marginal effect is negative, while it changes the sign to positive for a high degree of press freedom. The results are different, if the marginal effect of press freedom is calculated. Here, the zero line is not crossed. [Fig. A.1](#) in the appendix shows that the marginal effect of press freedom on the absence of corruption is not significant for countries with low levels of democracy, but positive and significant for countries with a high value of the democracy index. We can thus conclude that press freedom is never harmful concerning the effect

<sup>18</sup> The critical value derives from the regression results shown in [Table 2](#).

on the absence of corruption. This is a major difference to democracy. For policy makers this can be interpreted as press freedom being a superior instrument in controlling corruption compared to democracy. Thus, our policy advice is to concentrate first on a liberalization of the media, and then introduce democratic reforms in countries that suffer heavily from corruption.

## Appendix

Fig. A.1.

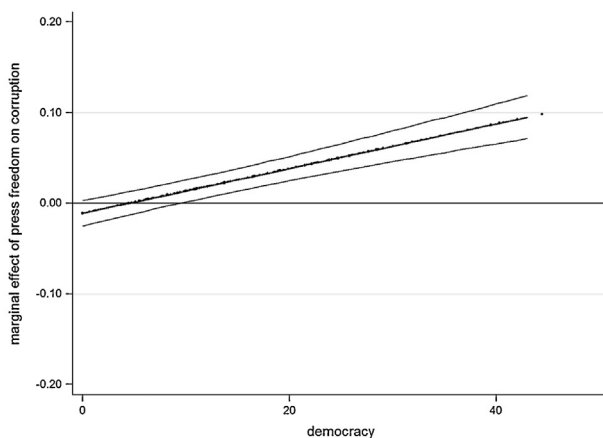


Fig. A.1. Marginal effect of press freedom on corruption.

Tables A.1–A.5.

Table A.1

Data sources and definitions.

Variable	Definition	Source
BRITCOL	Dummy for British colonial heritage.	<a href="#">La Porta et al. (1999)</a>
COMLAW	Dummy for countries with a common law legal system.	<a href="#">La Porta et al. (1999)</a>
CPI	Corruption Perception Index (0 = highest corruption; 10 = absence of corruption), mean of the years 2005–2010.	Transparency International
DEMO	Vanhanen's Index of democratization (0 = absence of democracy, 100 = highest degree of democracy), mean of the years 2005–2010.	<a href="#">Vanhanen (2011)</a>
DEMO_1950	Years of democracy since 1950.	<a href="#">Marshall and Jaggers (2009)</a>
EAP	East Asia and Pacific, Regional dummy	<a href="#">The World Bank. (2012)</a>
ECA	Europe and Central Asia, Regional dummy	<a href="#">The World Bank. (2012)</a>
EDU	Gross enrollment ratio in secondary education in 2010.	<a href="#">The World Bank. (2012)</a>
EF	Aggregate index measuring the degree of freedom of a country (0 = repressed, 100 = free), mean of the years 2005–2010.	The Heritage Foundation

Table A.1 (Continued)

Variable	Definition	Source
ETHNO	Ethnic fractionalization, partial index of the ethnolinguistic fractionalization, which is computed as one minus Herfindahl index of ethnolinguistic group shares, and reflects the probability that two randomly selected individuals form a population belonged to different groups.	Alesina et al. (2003)
EURLANG	Population share speaking a primary language of Western Europe – English, French, German, Portuguese, and/or Spanish.	Hall and Jones (1999)
FEDERAL FR	Dummy for Decision Decentralization Log of Frankel and Romer's Predicted Trade Share.	Treisman (2008) Frankel and Romer (1999)
GDPPC	Logarithm of the GDP per capita in 2010.	The World Bank. (2012)
GOVCONS	Government final consumption expenditures (in % of GDP) in 2010.	The World Bank. (2012)
GOVEFF	Government effectiveness, partial index of world government indicators, mean 2005–2010.	The World Bank. (2011)
ICRG	International Country Risk Guide corruption measure (0 = highest corruption; 6 = absence of corruption), mean of the years 2000–2005.	The Political Risk Service Group (2002)
INTERNET	Number of internet users per 100 people in 2010.	The World Bank. (2012)
LAND	Land area (Sq. km), 2010.	The World Bank. (2012)
LANG	Linguistic fractionalization, partial index of the ethnolinguistic fractionalization, which is computed as one minus Herfindahl index of ethnolinguistic group shares, and reflects the probability that two randomly selected individuals from a population belonged to different groups.	Alesina et al. (2003)
LATITUDE	Measure of a country's distance from the equator in 2001.	The World Bank. (2012)
LEGOR_FR	Dummy for French Legal Origin	Treisman (2008)
LEGOR_SC	Dummy for Scandinavian Legal Origin	Treisman (2008)
MENA	Middle East and North Africa, Regional Dummy.	The World Bank. (2012)
NA	North America, Regional Dummy.	The World Bank. (2012)
OIL	Share of natural resources exports as a percentage of total merchandise exports in 2010.	The World Bank. (2012)
POLARIZ	Political polarization, mean 2005–2010.	Beck, Clarke, Groff, Keefer, and Walsh (2001).
PRESS	Inverted Freedom of the Press Index, mean of the years 2005–2010.	Freedom House
PRESS NEIGHBORS	Inverted Freedom of the Press Index of neighboring countries, mean of the years 2005–2009.	Freedom House
PROTESTANT REGQUALI	Population share belonging to the protestant church. Regulatory quality, partial index of world government indicators, mean 2005–2010.	La Porta et al. (1999) The World Bank. (2011)

Table A.1 (Continued)

Variable	Definition	Source
RELIGION	Religious fractionalization, partial index of the ethnolinguistic fractionalization, which is computed as one minus Herfindahl index of ethnolinguistic group shares, and reflects the probability that two randomly selected individuals form a population belonged to different groups.	Alesina et al. (2003)
RULELAW	Rule of law, partial index of world government indicators, mean 2005–2010.	The World Bank. (2011)
SA	South Asia, Regional dummy.	The World Bank. (2012)
SSA	Sub-Saharan Africa, Regional dummy	The World Bank. (2012)
STABILITY	Composite indicator Political Stability and Absence of Violence/Terrorism, mean 2005–2010.	The World Bank. (2011)
SW	Sachs and Warner's openness index in 1992, see Sachs and Warner (1995) for details.	Center of International Development
URBAN	Urban population share in 2010.	The World Bank. (2012)
WGI	Control of Corruption, partial index of world government indicators, mean 2005–2010.	The World Bank. (2011)

Table A.2  
Summary statistics.

	Observations	Mean	Std. Dev.	Maximum	Minimum
BRITCOL	170	0.224	0.418	1.000	0.000
COMLAW	170	0.265	0.442	1.000	0.000
CPI, mean 2005–2010	170	4.041	2.081	9.433	1.650
DEMO, mean 2005–2010	170	17.256	11.414	44.433	0.000
DEMO_1950	153	23.281	20.730	60.000	0.000
EAP	170	0.129	0.337	1.000	0.000
ECA	170	0.288	0.454	1.000	0.000
EDU, 2010	101	77.175	29.129	131.000	12.600
EF, mean 2005–2010	165	60.004	10.509	86.100	21.400
ETHNO, 2001	166	0.438	0.255	0.930	0.000
EURLANG, 1999	139	0.236	0.385	1.000	0.000
FEDERAL	150	0.140	0.348	1.000	0.000
FR, 1999	133	2.969	0.803	5.639	0.833
GDPPC, 2010	170	8.399	1.534	11.562	5.293
GOVCONS, 2010	137	16.503	5.857	37.200	5.370
GOVEFF, mean 2005–2010	170	−0.025	0.978	2.248	−1.736
ICRG, mean 2000–2005	129	2.639	1.123	6.000	0.208
INTERNET, 2010	167	34.134	27.563	95.600	0.207
LAND, 2010	170	729'	1953'	16,400'	300
LANG, 2001	161	0.399	0.280	0.923	0.002
LATITUDE, 2001	163	0.282	0.189	0.710	0.003
LEGOR_FR	167	0.030	0.171	1.000	0.000

Table A.2 (Continued)

	Observations	Mean	Std. Dev.	Maximum	Minimum
LEGOR_SC	167	0.545	0.499	1.000	0.000
MENA	170	0.088	0.284	1.000	0.000
NA	170	0.012	0.108	1.000	0.000
OIL_2010	117	48.778	29.484	100.000	2.000
POLARIZ, mean 2005–2010	133	0.489	0.813	2.000	0.000
PRESS, mean 2005–2010	170	52.939	22.831	90.500	4.167
PRESS NEIGHBOR, mean 2005–2009	164	50.106	19.523	90.300	2.600
PROTESTANT, 1999	162	12.755	21.083	97.800	0.000
REGQUALI, mean 2005–2010	170	−0.010	0.945	1.901	−2.218
RELIGION, 2001	167	0.443	0.229	0.860	0.004
RULELAW, mean 2005–2010	170	−0.088	0.983	1.971	−1.898
SA	170	0.047	0.212	1.000	0.000
SSA	170	0.271	0.446	1.000	0.000
STABILITY, mean 2005–2010	170	−0.118	0.940	1.469	−2.550
SW, 1992	101	0.653	0.478	1.000	0.000
URBAN, 2010	170	55.477	22.474	100.000	11.000
WGI, mean 2005–2010	170	−0.063	0.990	2.453	−1.543

Table A.3

First-stage IV results.

	Dependent variable: CPI index						
	IV: democracy		IV: press		IV: both		
	(1)		(2)		(3)		
	DEMO	DEMO × PRESS	PRESS	DEMO × PRESS	DEMO	PRESS	DEMO × PRESS
ECA	9.182*** (5.05)	545.259*** (4.75)			14.090*** (4.90)	11.818** (2.46)	998.131*** (4.39)
EURLANG			7.639** (2.25)	−44.102 (−0.62)	6.280*** (2.74)	14.254*** (2.88)	504.637*** (2.88)
LATITUDE	−4.412 (−1.01)	−123.277 (−0.52)			−5.112 (−0.79)	1.927 (0.16)	−17.437 (−0.04)
LEGOR_FR			−5.109** (−2.10)	−157.632*** (−2.88)	−1.794 (−0.96)	−6.520** (−2.19)	−241.804* (−1.78)
LEGOR_SC	5.272*** (3.08)	800.810*** (5.65)			8.976*** (3.68)	9.986** (2.43)	1008.417*** (4.84)
PRESS NEIGHBORS			0.091 (0.92)	3.861** (2.46)	0.153*** (2.88)	0.242** (2.05)	13.354*** (3.21)
First-stage F-value	18.21	32.38	5.72	4.29	16.09	10.82	28.44

Note: Z-Test statistics are reported in parenthesis; standard errors are calculated using White correction; \*\*\*, \*\*, and \* indicate significance at 1%, 5% and 10%, respectively. Interaction variables are instrumented.



Table A.4  
Robustness test.

	(Dependent variables)										
	CPI									ICRG	WGI
	(1)	(2)	(3)	(4)	(5)	(6) <sup>(a)</sup>	(7) <sup>(b)</sup>	(8)	(9)	(10)	(11)
DEMO	-0.161*** (-4.63)	-0.135*** (-4.70)	-0.114*** (-5.95)	-0.125*** (-6.25)	-0.144*** (-5.95)	-0.049*** (-4.15)	-0.040*** (-4.08)	-0.183*** (-3.83)	-0.068*** (-3.40)	-0.066*** (-3.11)	-0.050*** (-5.12)
PRESS	-0.031*** (-2.84)	-0.021** (-2.53)	-0.010 (-1.55)	-0.008 (-1.07)	-0.017* (-1.91)	-0.003 (-0.43)	0.013* (1.72)	-0.012 (-1.59)	-0.003 (-0.48)	-0.009 (-1.35)	-0.002 (-0.61)
DEMO×PRESS	0.003*** (5.31)	0.002*** (5.91)	0.002*** (7.42)	0.002*** (6.79)	0.003*** (5.93)	0.001*** (5.63)	0.001*** (8.19)	0.002*** (3.72)	0.001*** (3.00)	0.001*** (4.34)	0.001*** (5.93)
GDPPC	0.508*** (3.86)	0.546*** (6.07)	0.552*** (4.52)	0.560*** (6.46)	0.506*** (4.90)	0.499*** (6.23)	0.215** (2.18)	0.277*** (3.61)	0.058 (1.09)	0.066 (1.03)	0.210*** (5.44)
STABILITY	0.662*** (4.30)	0.666*** (4.31)	0.478*** (4.22)	0.433*** (3.69)	0.539*** (4.01)	0.561*** (5.03)	0.542*** (5.88)	0.409*** (3.71)	-0.061 (-0.67)	0.272*** (3.14)	0.270*** (4.93)
BRITCOL	0.501** (2.36)	0.308 (1.57)	0.208 (0.93)	0.500** (2.45)	0.658*** (2.62)	0.373 (1.62)	0.582*** (3.42)	0.278 (1.60)	-0.122 (-0.82)	0.254 (1.55)	0.249*** (2.94)
<i>Trade openness</i>											
SW	0.437 (1.64)										
FR		-0.111 (-0.89)									
<i>Regional dummies</i>											
EAP			0.316 (0.96)								
ECA			-0.104 (-0.41)								
MENA			0.652* (1.94)								
NA			0.974 (1.48)								
SA			0.978** (2.49)								
SSA			0.571** (2.05)								

Table A.4 (Continued)

	(Dependent variables)										
	CPI									ICRG	WGI
	(1)	(2)	(3)	(4)	(5)	(6) <sup>(a)</sup>	(7) <sup>(b)</sup>	(8)	(9)		
<i>Fractionalisation</i>											
ETHNO				−0.008 (−0.02)							
LANG				0.501 (1.14)							
RELIGION				−0.204 (−0.59)							
OIL					−0.006* (−1.71)						
EF								0.055** (2.36)			
EF×DEMO								0.002 (1.62)			
POLARIZ									−0.002 (−0.02)		
GOVEFF									0.929*** (4.15)		
RULELAW									1.179*** (4.64)		
REGQUALI									−0.244 (−1.47)		
Constant	0.960 (0.88)	0.631 (0.61)	−0.934 (−40.98)	−0.805 (−1.00)	0.625 (0.61)	−0.516 (−0.78)	1.502** (2.31)	−1.291 (−1.23)	4.000*** (7.18)	1.990*** (2.88)	−1.943*** (−5.19)
Obs.	101	133	170	159	117	154	167	165	133	130	176
F-Value	99.954	109.554	69.885	74.782	85.676	107.145	233.503	123.069	152.192	34.594	130.536
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Adj. R <sup>2</sup>	0.854	0.819	0.805	0.801	0.834	0.798	0.832	0.855	0.921	0.645	0.786

Note: T-Test statistics are reported in parenthesis; standard errors are calculated using White correction; \*\*\*, \*\*, and \* indicate significance at 1%, 5% and 10%, respectively.

(a) Democracy is measured by the years of democracy since 1950; (b) Freedom of the Press is measured by the number of internet users per 100 people in 2010.

Table A.5

Regression results with additional controls.

	Dependent variable: Corruption Perception Index, mean 2005–2010							
	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	OLS (6)	OLS (7)	OLS (8)
DEMO	-0.135*** (-6.93)	-0.129*** (-5.82)	-0.163*** (-6.88)	-0.130*** (-6.65)	-0.119*** (-5.19)	-0.135*** (-6.90)	-0.129*** (-5.23)	-0.141*** (-6.78)
PRESS	-0.011 (-1.55)	-0.009 (-1.16)	-0.014* (-1.84)	-0.011 (-1.45)	-0.009 (-1.05)	-0.011 (-1.59)	-0.007 (-0.93)	-0.011 (-1.59)
DEMO×PRESS	0.002*** (7.63)	0.002*** (6.16)	0.003*** (8.96)	0.002*** (7.34)	0.002*** (6.17)	0.002*** (7.59)	0.002*** (5.87)	0.003*** (7.69)
GDPPC	0.512*** (6.45)	0.537*** (6.42)	0.434*** (3.43)	0.520*** (6.29)	0.545*** (5.41)	0.514*** (6.45)	0.446*** (4.77)	0.359*** (3.22)
STABILITY	0.423*** (3.63)	0.429*** (3.62)	0.305** (2.06)	0.457*** (3.93)	0.410*** (3.01)	0.420*** (3.62)	0.529*** (3.98)	0.452*** (3.83)
BRITCOL	0.454** (2.22)	0.428** (2.05)	0.202 (0.89)	0.414** (2.03)	0.598** (2.53)	0.401* (1.69)	0.419* (1.82)	0.511** (2.44)
PROTESTANT		0.002 (0.45)						
EDU			-0.000 (-0.08)					
ETHNO				0.274 (0.87)				
GOVCONS					0.017 (1.17)			
COMLAW						0.089 (0.40)		
FEDERAL							0.274 (1.18)	
URBAN								0.012* (1.67)

Table A.5 (Continued)

	Dependent variable: Corruption Perception Index, mean 2005–2010							
	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	OLS (6)	OLS (7)	OLS (8)
LAND								0.000 (0.16)
Constant	−0.131 (−0.18)	−0.406 (−0.52)	0.650 (0.76)	−0.332 (−0.43)	−0.876 (−1.06)	−0.144 (−0.20)	0.286 (0.35)	0.513 (0.66)
Obs.	170	162	101	166	137	170	150	170
<i>F</i> -Value	116.523	109.769	97.352	99.055	105.409	98.976	97.897	81.670
<i>Prob</i> > <i>F</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Adj. <i>R</i> <sup>2</sup>	0.796	0.796	0.842	0.796	0.826	0.795	0.809	0.800

Note: *T*-Test statistics are reported in parenthesis; standard errors are calculated using White correction; \*\*\*, \*\*, and \* indicate significance at 1%, 5% and 10%, respectively.

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