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RESEARCH ARTICLE

Does financial development reduce the level of corruption? Evidence from a global sample of 140 countries

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Abstract

The current research explores the role of financial sector development on the control of corruption in a global sample of 140 countries. Using annual data from 1996 to 2015, this study makes use of *system generalized method of moments* technique to identify the determinants of corruption across the full sample, low and lower middle-income countries and, upper middle and high-income countries. Our empirical findings show that financial development plays an important role in controlling the growth of corruption across the full sample, low and lower middle-income countries and upper middle and high-income countries. Similarly, per capita income has a significant positive impact on control of corruption in upper middle and high-income countries, while education plays a similar role in low and lower middle-income countries. On the contrary, the per capita income, trade openness, government expenditure, political rights and civil liberty are the major factors, which promote the growth of corruption in low and lower middle-income countries, whereas trade and civil liberty play the same role in high-income countries. Given these findings, our study makes number policy recommendations and adds new knowledge to the empirical literature.

KEYWORDS

corruption, education, financial development, government expenditure, political rights, trade openness

JEL CLASSIFICATION

D73; G21; H53; P33; P37

1 | INTRODUCTION

Corruption is a serious issue in both the developed and developing economies around the world as it can significantly affect economic prosperity, development and social stability of any given country. A number of researchers and institutions have defined corruption in many ways. For instance, Rose-Ackerman defines corruption as "*an illegal payment to a public agent to obtain a benefit that may or may not be deserved in the absence of payoffs*," while the World Bank defines it as "*the abuse of public office for private gain*." All of these definitions mainly imply the misuse of power for personal gain.

In any given country, a well-functioning banking system plays an important role in mobilising savings into

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productive capital. This ensures efficient capital allocation among the best productive activities and makes a platform for economic prosperity and development (Levine, 1997, 2005). However, this may not be the case always. For instance, corruption in credit lending not only reduces the efficiency in capital allocation but may also divert capital from most productive to the unproductive activities. Charumilind, Kali, and Wiwattanakantang (2006) and Laeven (2001) document that the firms that have connections with the banks may have easier access to the capital than the firms that do not have such ties. La Porta, Lopez-de-Silanes, and Zamarripa (2003) come up with another view that the banks that offer loans to the related parties may suffer from higher default rates than the loans that were granted to the unrelated ones. Overall, these arguments imply that lending corruption can have serious implications on the banking system; more specifically, it reduces the efficient capital allocation process, decreasing firm growth and economic development.

Some researchers explore the effect of banking credit on the level of corruption. For instance, Altunbaş and Thornton (2012) establish that the banking credit to the private sector plays an important role in fighting the growth of corruption. Authors attribute this finding to the fact that the financial institutions or creditors closely monitor borrowers' activities and hence potentially reduces their level of corruption. Similarly, Barry, Lepetit, and Strobel (2016) investigate the role of bank ownership on bank lending corruption by accounting other determinants in the model such as regulatory environment and the level of economic development. The findings indicate that lending corruption is significantly higher in circumstances where a higher proportion of credit comes from the state-owned or family-owned banks. This finding is consistent across the developed and developing economies.

Similarly, a number of other studies (Dinç, 2005; Khwaja & Mian, 2005; La Porta, Lopez-de-Silanes, & Shleifer, 2002; Sapienza, 2006) argue that the banks that are owned-and-controlled by the state are more prone to the lending corruption. Further, these authors, among others, argue that the state-owned banks finance more to the politically desired projects than the others; hence, these banks contribute more to the politicians' welfare than the social welfare. Another study by Houston, Lin, and Ma (2011) empirically establishes that lending corruption is significantly higher in the banks that are owned by the state. Likewise, Beck, Demirgüç-Kunt, and Levine (2006) explore the effect of different banking supervisory policies on lending corruption. Their findings show that the traditional style of bank supervision has no significant impact on the banks' lending integrity. However, increasing private monitoring of banks can potentially reduce lending corruption, where legal institutions also occupy an important role in the process. In the later period, Barth, Lin, Lin, and Song (2009) report two important factors, which contribute to reducing lending corruption, which are competition in the banking sector and sharing information via credit bureaus.

Much of the related literature on the drivers of corruption has focused on factors such as government expenditure, investment and economic growth (Del Monte & Papagni, 2007), bureaucracy (Sharma & Mitra, 2015), legal system (Treisman, 2000), political factors (Lederman, Loayza, & Soares, 2005), social organisation (Coleman, 1990), regulatory system (Svensson, 2005) and tax system (Mitra & Sharma, 2016). On the other side, impact of financial sector development on economic growth, investment and development are well documented in the theoretical and empirical literature (see, Ang, 2008; Levine, 2005). However, there is no much literature that attempts to explore the role of financial sector development as a controlling factor of corruption. Theoretically, there could be some important channels, which potentially connect these two factors. For instance, the most important channel is financial sector, which enhances the level of competition in the market that, in turn, controls corruption (Guiso, Sapienza, & Zingales, 2009). Specifically, a better and efficient financial sector promotes entrepreneurship and encourages new players in the industry that intensifies competition in the market. Moreover, it is well documented that corruption is lower in countries where firms face greater competition (Ades & Di Tella, 1999; Sharma & Mitra, 2015). In addition, the efficient financial sector through better participation of private and foreign banks in a liberal but well-regulated financial market can control corruption by enhancing the competition among banks and reducing the credit cost. It, therefore, implies that the effect of financial sector development in controlling corruption is somewhat unfairly ignored in the literature.

Given this backdrop, in the current research, we explore the effect of financial development on control of corruption in a global sample of 140 countries. While doing so, we make some significant contributions to the literature. First, we use comprehensive data for analyses. Our sample covers almost all major countries of the world for a long time horizon: 1996–2015. The considered sample countries are in different stages of development and the inter-linkage between corruption and financial sector development may also differ across these economies. Therefore, along with the overall sample, we also test their relationship for low – and lower middle-income countries and, upper middle – and high-income countries. Furthermore, for the financial sector development,

we consider the domestic credit to the private sector by the banks. Second, the related theoretical and empirical literature indicate that several other factors such as economic, political, government, natural resources, and education also play an important role in determining the level of corruption. Therefore, we use a range of control variables to capture these aspects, which not only control our empirical models but also provide information regarding their effect on corruption. Third, the related literature suggests that the relationship between corruption and financial sector development is endogenous in nature. Therefore, we use the *system generalized method of moments* (GMM) technique as it helps to address the issue of endogeneity in the model. Fourth, the literature has examined the role of financial sector development on economic growth, inequality and several other issues; however, its effect on corruption is widely ignored. In fact, barring Altunbaş and Thornton (2012), to the best of our knowledge no other study has attempted to explore the effect of financial sector development on corruption. Finally, we make a considerable contribution to the policy and practise by identifying the role of financial development in control of corruption across the panels.

The findings show that financial development plays an important role in reducing the growth of corruption across the panels (full sample, low- and lower middle-income countries, and to some extent in upper middle- and high-income countries). Further, results reveal that per capita income has a significant positive impact on control of corruption, while trade openness and civil liberty played the opposite role in upper middle- and high-income countries. On the other hand, education is only the other factor, which promoted the control of corruption in low- and lower middle-income countries, whereas per capita income, trade openness, government expenditure, political rights and civil liberty seem to provide more opportunities for rent-seeking, where institutions are comparatively weak.

The organisation of the paper goes as follows: the next section provides a brief literature review on the dynamic association among the corruption, economic development, banking system, and institutional setup. Section 3 reports a description of the data, and empirical methodology. Section 4 presents empirical findings and detailed discussion. Section 5 reports important policy implications. The conclusion and summary of the findings are discussed in the final section.

2 | LITERATURE REVIEW

Much of the previous literature focused on the nexus between corruption and economic growth. There are two strands of literature in regards to corruption and economic development. One stream of researchers believe that a higher level of corruption leads to a lower level of economic development. The second stream of researchers thinks that corruption fastens economic development. However, both of these arguments are true to some extent. Thus, it mainly depends on the purpose of corruption and the channels through which it affects economic growth. Most economists generally view corruption has a significant obstacle for economic development (Mauro, 1995; Murphy, Shleifer, & Vishny, 1993). A number of previous studies (e.g., Gyimah-Brempong, 2002; Keefer & Knack, 1997; Sachs & Warner, 1997) empirically establish that corruption has a considerable negative effect on economic growth.

In contradiction to that, Wedeman (2002) documents that East Asian countries such as China, Indonesia, South Korea, and Thailand have held up with significant levels of corruption but still all of these countries could enjoy with substantial growth in per capita incomes. This evidence indicates that a high level of corruption not necessarily hinders economic growth or per capita income. Leff (1964) and Lui (1985) also come up with an argument that corruption may promote economic development on some occasions. Other economists ask the question of the channels through which corruption affects growth (Mauro, 1995; Mo, 2001; Murphy et al., 1993; Park, 2012; Tanzi & Davoodi, 1998; Wei, 2000). Several channels are identified such as reducing investment rates (Mauro, 1995; Neeman, Paserman, & Simhon, 2008), adversely effecting foreign investment inflows (Wei, 2000), making obstacles for business establishment (World Bank, 2002) and misplacing government resources (Tanzi & Davoodi, 1998).

The findings of Tanzi and Davoodi (1998), Mauro (1998) and Gupta, De Mello, and Sharan (2001) indicate that corruption affects economic growth by altering the composition of government expenditure from higher productive activities to the less productive ones. Some authors explained the association between corruption, banking, and economic development. For example, Park (2012) examines the effect of corruption on banking and economic growth in a panel of 70 developed and developing economies around the world. The author makes use of data from 2002 to 2004 and employs various econometric techniques to achieve the goals of the study. The author finds a significant positive association between corruption and non-performing loans to total loans. Further, the study reports that corruption has a significant positive impact on non-performing loans, implying that corruption weakens the quality of bank loans. The findings of this study also confirm that corruption reduces economic growth. More specifically, the

author argues that corruption leads to divert the bank loans from the good projects to the bad projects, reducing the quality of funding for the economic activities and hence lowering economic growth.

On the other side, Ahlin and Pang (2008) document that a lower level of corruption and higher financial development work in favour of promoting economic growth. Some empirical studies also explained the relationship between corruption and economic growth through various other channels. Mo (2001) finds that the most significant channel through which corruption affects economic growth is political instability. Serra (2006) empirically examines the determinants of corruption using a sensitivity analysis approach. More specifically, the author covers a panel of 62 countries around the world, which includes developed and developing economies. The study uses average values on the selected variables during the study period that is, 1990–1998. The findings of this study show that democratic institutions play an important role in reducing corruption levels in developed economies, while political instability plays the opposite role; specifically, it contributes to a higher level of corruption. Freille, Haque, and Kneller (2007) explore the association between corruption and aggregate press freedom. Their results are consistent with the theoretical expectation, that is lower the press freedom higher the corruption and, vice versa. Further, authors argue that both economic and political influence on media seems to be strongly associated with corruption. By accounting for other potential determinants of corruption, a number of other researchers (e.g., Ahrend, 2002; Brunetti & Weder, 2003) also confirm that a lower level of press freedom is strongly associated with a higher level of corruption. Similarly, Chowdhury (2004) suggests that both democracy and press freedom have considerable influence on corruption.

The empirical analysis of Lederman et al. (2005) and Brunetti and Weder (2003) indicate that higher the press freedom lowers the level of corruption. Neeman et al. (2008) empirically examine the association between corruption and economic output by taking into account of the degree of openness. The results show the evidence of a strong negative correlation between per capita income and corruption in countries that have higher openness. Similar to the above findings, Blackburn and Forgues-Puccio (2010) document that the negative impact of corruption on economic development is determined by the degree to which the economy is opened, higher (lower) the open economy higher (lower) would be the impact. On the contrary, Treisman (2000), and Knack and Azfar (2000) find that openness to the world is related to less corruption because trade restrictions often give more discretionary power to bureaucrats that result into a considerable amount of bribery and rent-seeking activities.

The other economic, political, institutional and social factors could potentially cause corruption. For instance, studies of Treisman (2000), Knack and Azfar (2000), Lederman et al. (2005), and Serra (2006) indicate the level or stage of economic development has an impact on corruption. It is argued that developed countries are able to devote more resources for the detection and prevention of corruption, which in turn, controls the level of corruption. In addition, development increases education, skill, and literacy that enhance the likelihood that an act of corruption is discovered and punished.

Leite and Weidmann (1999) show that the extent of natural resource abundance is an important cause of corruption as the resources generate opportunities for rent-seeking behaviour. Likewise, Fisman and Gatti (2002), and Elbahnasawy and Revier (2012) document that higher government expenditure and the public sector often provide considerable rent-seeking opportunities. It is simply because if a greater ratio of production is procured by the government then higher bribes might be offered to the officials. The analysis of Sharma and Mitra (2015), Gurgur and Shah (2005), Brunetti and Weder (2003) suggest that higher quality of bureaucracy and regulation lead to significantly reduce the probability of corruption to occur. Damania, Fredriksson, and Mani (2004), Brunetti and Weder, (2004), and Park (2003) use the rule of law index that includes several indicators to measure to what extent the economic agents abide by the rules of society in their analysis. The findings of these studies were quite favourable, and indicate that these aspects play a significant role in determining the level of corruption in a country.

Overall, our literature survey implies that most of the previous studies focused on the effect of corruption on economic development and some studies even further investigated to explain the channels through which corruption affects economic development. One of the important channels through which corruption affects economic development is through banking lending. Again, some empirical findings indicate that banks' lending corruption may have a positive or negative impact on economic output. However, the empirical evidence on the role of financial development on corruption is very limited. Hence, our current research paper explores the role that financial development plays on corruption in a global sample of 140 countries and makes use of the most recent available data set. Therefore, the findings obtained from this research may offer significant policy implications and may add new knowledge to the empirical literature.

3 | EMPIRICAL SETUP: SPECIFICATION, DATA AND STYLIZED FACTS

3.1 | Basic model specification

Our baseline empirical model is a mixed model that follows the specification of Becker (1968) and Ades and Di Tella (1999). We include several factors that potentially affect the level of corruption or control of corruption. These factors come from economic, governance, social and political arenas. Formally, we estimate the determinants of control on corruption for a panel of countries:

$$Y_{it} = \beta_1 + \beta_2 X_{it} + \beta_3 Z_{it} + e_{it} \quad (1)$$

where, Y and X represent control on corruption and financial sector development indicators, respectively. The variable Z is a vector of control variables and e is the error term. The control of corruption index is used as the dependent variable in the model. The i and t indicate cross-section (country) and time period (1996–2015), respectively.

3.2 | Data measurement

In this study, we use annual data from 1996 to 2015[1] on a sample of 140 countries across the globe.[2] For a better insight and comparison, we divide the full sample countries into low- and lower-middle income countries and, upper-middle and high-income countries according to the World Bank classification. Using these annual data series, we construct the panel data sets.

Measurement of corruption is a challenging task because of its nature. Direct data on corruption or bribery is not available; nevertheless, a number of perceptions based indices of corruption or of control of corruption are available. We mainly utilize the Control of Corruption (CC) index, which is provided by the International Country Risk Guide's corruption index (ICRG). Transparency International's Corruption Perception Index (CPI) is compartively popular in public discussion; however, it is not very appropriate for a panel data of countries analysis mainly because the CPI computation methodology changed in 2012; therefore, before and after computed data are not directly comparable (Kaufmann, Kraay, & Mastruzzi, 2011; Treisman, 2007). The control of corruption index of ICRG is developed based on the idea of "high government officials likely to demand special payments" and "illegal payments generally expected throughout lower levels of government" in the form of "bribes connected with import and export licences, exchange rate controls, tax assessment, police protection, or loans" (Tanzi & Davoodi, 1997). In this study, the corruption perception index of the ICRG has been used for mainly two reasons. First, the series covers a long time-horizon as well as a large number of countries. Further, the comprehensive nature of the index is could be advantageous for analysis such as one in hand over other available indices for corruption. Second, the index shares a high degree of correlated with other available corruption indices (see Treisman, 2000).

It is important to identify the theoretical and empirical support for the selection of the relevant variables that affect the control of corruption. Therefore, we build our empirical model by making use of those theoretical and empirical studies. By following Levine et al. (2000), Beck et al. (2000), and Altunbaş and Thornton (2012), we proxy financial development with domestic credit to the private sector by the banks as a percentage of GDP (DCPvtB). Likewise, we undertake a range of control variables in our empirical analyses. Our variables cover different aspects such as economic, political, government and education areas, which potentially have some degree of impact on the level of corruption. Specifically, the income is proxied with GDP per capita (LYCAP) (e.g., Damania et al., 2004; Kunicova & Rose-Ackerman, 2005; Lederman et al., 2005), natural resources proxied by total natural resources rent value as a percentage of GDP (RESOURCE) (e.g., Leite & Weidmann, 1999), trade openness is proxied by the total exports and imports as a percentage of GDP (TRADE) (e.g., Gurgur & Shah, 2005), size of the government proxied by general government final consumption expenditure as a percentage of GDP (GOVEXP) (e.g., Fisman and Gatti (2002). Likewise, we also account for civil liberties (CL), press freedom (PF) and political rights (PR) (e.g., Graeff & Mehlkop, 2003; Gurgur & Shah, 2005) and, finally education is proxied with secondary school enrolment rate (percentage) (NETENROL) (e.g., Brunetti & Weder, 2003; Persson & Tabellini, 2003; Rauch & Evans, 2000). We provide a detailed description and sources of data on the considered variables in Table 1.[3]

In Figures 1–3, we present scatter plots to illustrate the bivariate relationships between control of corruption and financial sector development. The figures show, for all of the considered countries, the regression line fits quite well and there is a clear positive relationship between them (see Figure 1). While, in case of low and lower middle-income countries (Figure 2), and upper middle and high income countries (Figure 3), although the regression lines show a positive effect, yet, the lines do not fit very well as suggested by R^2 statistics. This analysis is simple but tells us about the fundamental positive relationship between these variables. Recognizing the complication in the relationship between corruption

TABLE 1 Data description

Name	Definition	Source
CC	Control of corruption	ICRG
DCPvtB	Domestic credit to private sector by banks % of GDP	WDI, 2016
LYCAP	Log of GDP per capita (constant 2010 US$)	WDI, 2016
TRADE	Trade as a share of GDP, in %	WDI, 2016
GOVEXP	General government final consumption expenditure (% of GDP)	WDI, 2016
RESOURCE	Total natural resources rent % of GDP	WDI, 2016
NETENROL	Net secondary school enrolment rate (%)	WDI, 2016
PR	Political rights (1 = most free and 7 = least free)	Freedom house
PF	Press freedom (not free = 0; partly free = 1; free = 2)	Freedom house
CL	Civil liberties (1 = most free and 7 = least free)	Freedom house

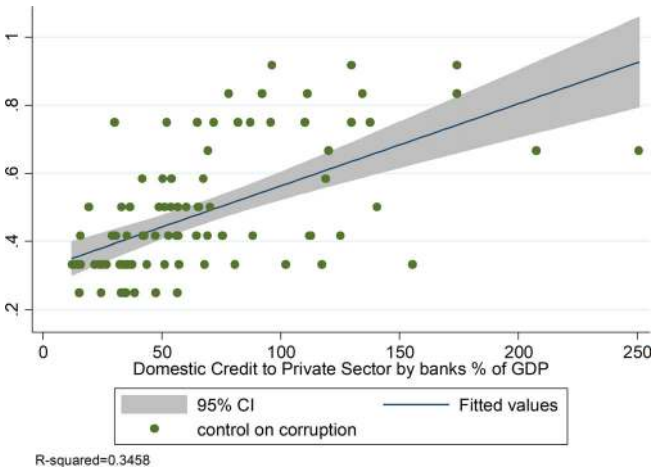

FIGURE 1 Control on corruption and financial sector development for full sample. *Note:* Average value of indicators of the period 1996–2015 used in the scatter diagram. Source of control on corruption (CC) data is from ICRG. *Source:* Authors' calculation based on data described in data section [Colour figure can be viewed at wileyonlinelibrary.com]

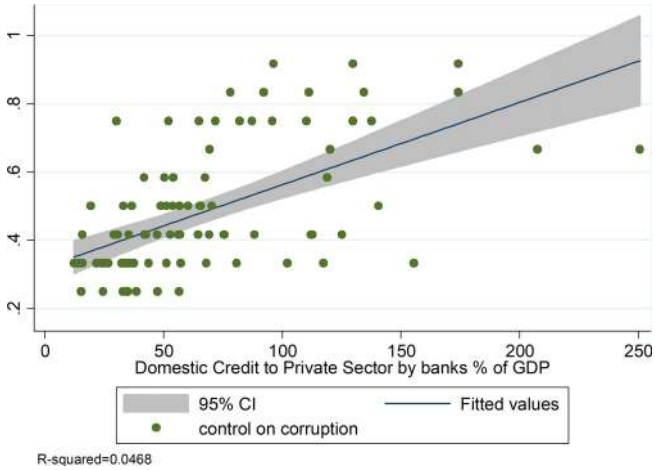

FIGURE 2 Control on corruption and financial sector development for low and lower middle income sample. *Note:* Average value of indicators of the period 1996–2015 used in the scatter diagram. Source of control on corruption (CC) data is from ICRG. *Source:* Authors' calculation based on data described in data section [Colour figure can be viewed at wileyonlinelibrary.com]

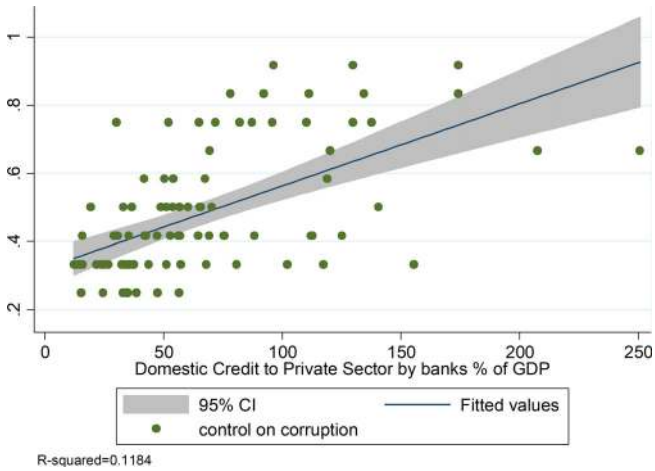

FIGURE 3 Control on corruption and financial sector development for high income and upper middle income sample. *Note:* Average value of indicators of the period 1996–2015 used in the scatter diagram. Source of control on corruption (CC) data is from ICRG. *Source:* Authors' calculation based on data described in data section [Colour figure can be viewed at wileyonlinelibrary.com]

and financial sector development, the next section explores the linkage in a more comprehensive way.

3.3 | Estimation technique

The previous research documented that corruption can cause financial sector development and economic growth. It, therefore, implies the presence of endogeneity and reverse causality in the model that we presented in Equation (1). Given that fact, the conventional methodology such as the fixed effects method does not resolve the potential endogeneity problem of the important explanatory variables of the model, such as financial sector development and economic growth. Hence, we employ the *system GMM* method on the country panel which controls for unobserved heterogeneity and simultaneity bias

in the data. The GMM methodology, which involves taking first differences to eliminate country-specific effects and instrumenting these with lagged levels to control for simultaneity bias has not yielded satisfactory results in reducing bias in parameter estimates (Blundell and Bond, 2000). Blundell and Bond (2000) show that imposing more informative moment conditions that are valid under reasonable restrictions of stationarity on the initial conditions process yield a better result in controlling the simultaneity bias. This augmented GMM-model is popularly called *system GMM*. Essentially, *system GMM* involves the use of lagged first-differences as instruments for equations in first differences, in addition to employing lagged-levels as instruments for equations at level; this dramatically improves the efficiency (Arellano and Bover, 1995). Blundell and Bond (2000) confirm that lagged first-differences are more informative instruments for levels and produce more reasonable results than the GMM (differenced-GMM). While estimating Equation 1 using *system GMM*, we consider indicators of financial sector development and per-capita GDP as endogenous variables.

4 | EMPIRICAL RESULTS AND DISCUSSION

The main objective of this research paper is to examine the determinants of corruption across a global sample of 140 countries. Nevertheless, we have a special interest in knowing the role of financial sector development in controlling corruption. Further, we divide our sample countries into two sub-samples such as low- and lower middle-income countries, and upper middle- and high-income countries. The reason for dividing our sample countries into these two groups is to see whether the determinants of corruption change as the nature of economic development and institutional set up significantly varies among these groups of nations. To achieve these objectives, we employ the *system GMM* technique. The empirical findings of this method are presented and discussed in the following.

The results from the *system GMM* technique are presented in Table 2. The results suggest that financial development has a positive impact on control of corruption across the models presented in columns 1 to 5. The level of economic developed proxied by per capita income is turned out to be positive and statistically significant in all models. While, education has a negative impact on controlling corruption in the comprehensive model presented in column 5 and that is a surprising result, indeed. As expected, government size, proxied with government expenditure, is negatively affecting control of corruption or causing corruption. Surprising results are also found on coefficients of political rights and civil liberties as both indices have negative effect on control of corruption, but later could not pass the statistical significance. The surprising inverse impact of political rights on control on corruption perhaps indicates that prosecution in corruption-related cases becomes cumbersome and time taking process when citizens have high-level political rights. These results might be due to the significant heterogeneity in the selected full sample countries. Therefore, to address this issue, we again carry this empirical exercise for low- and lower middle-income countries, and upper middle- and high-income countries separately and their detailed results will be discussed.

On the other side, press freedom is shown to have a supportive factor in controlling corruption. While, openness is found to be negative and statistically significant throughout, implying that opening of the market perhaps makes it difficult to control corruption. This may be because lesser trade restrictions make it easy to cross the illicit capital to the national boundaries through trade mispricing (see Nitsch, 2012). As expected, the abundance of natural resources endowment often causes a higher level of corruption; this tendency is captured by results regarding natural resources. Given the findings from the *system GMM*, we argue that financial development, through banking credit to the private sector, plays an important role in reducing the level of corruption in our sample countries. While, increasing trade openness, government spending and political rights seem to be in favour of raising corruption levels in the sample countries.

It is a well-known fact that issues of financial development and reforms, and corruption are prime concerns and thus they are core elements of economic policies in developing economies. Therefore, we specifically estimate their linkage for low- and lower middle-income countries and their findings are displayed in Table 3. The *system GMM* results suggest that financial development is a major factor in controlling the level of corruption in low- and lower middle-income countries. We also find that education has a significant positive impact on control of corruption in these countries. However, factors like trade openness and government spending perhaps increase the rent-seeking opportunities for government officials in these economies. Importantly, per capita GDP turns out to be negative and statistically significant in two out of four occasions, indicating that in low and lower middle-income countries an increase in economic growth leads to a relatively higher level of corruption growth and that is not very surprising, given the nature of the market and economic structure. Furthermore, a greater extent of civil liberty and political rights leading to difficulty in

TABLE 2 Determinants of corruption: Sys GMM estimation (full sample)

	(1)	(2)	(3)	(4)	(5)
	CC	CC	CC	CC	CC
L.CC	0.783**	0.747**	0.712**	0.593**	0.559**
	(0.0208)	(0.0195)	(0.0220)	(0.0314)	(0.0319)
DCPvtB	0.000493**	0.000226**	0.000156	0.000345**	0.000362**
	(0.0000810)	(0.0000907)	(0.000102)	(0.000106)	(0.000117)
LYCAP		0.0215**	0.0293**	0.0499**	0.0459**
		(0.00375)	(0.00430)	(0.00757)	(0.00757)
TRADE			−0.0000374	−0.000353**	−0.000312**
			(0.0000839)	(0.000105)	(0.000131)
GOVEXP			−0.00258**	−0.00434**	−0.00440**
			(0.000893)	(0.00123)	(0.00129)
RESOURCE			−0.00130**	−0.00160**	−0.000505
			(0.000274)	(0.000350)	(0.000417)
NETENROL				−0.000208	−0.000923**
				(0.000392)	(0.000415)
PR					−0.00909*
					(0.00525)
PF					0.0196**
					(0.00904)
CL					−0.00997
					(0.00639)
Constant	0.0706**	−0.0862**	−0.0772**	−0.148**	−0.0327
	(0.00794)	(0.0273)	(0.0294)	(0.0421)	(0.0539)
N	1702	1,691	1,503	794	770
Sargan (*p*-value)	.000	.024	.540	.993	.583

Note: Standard errors in parentheses. *$p < .10$, **$p < .05$.

Note: 1. Sargan is Sargan Test of over-identified Restrictions. 2. One step Sys-GMM is used in all models. 3. DCPvtB and LYCAP are considered endogenous, while all other variables are considered exogenous.

controlling corruption.. Given these findings, we argue that financial development is an important factor, which plays a major role in reducing the corruption level. While, raising international trade, through the exports and imports of goods and services, government spending on various public welfare activities and increasing political rights are giving more opportunities for corruption in relatively low-income economies.

Undoubtedly, financial sector is well developed and corruption is low in most of the developed economies. However, the recent financial crisis and a number of scandals over corruption have shown that developed economies also have issues on both accounts. The nations that are supposed to be free from corruption are also suffering from its effects.[4] Therefore, we test the impact separately for these countries and our goal is to know whether the effect works differently. Table 4 presents *system GMM* results on upper middle- and high-income countries. Our results show that the financial sector development seems to have a positive impact on control of corruption even in the developed economies. More specifically, our results suggest that financial development is statistically significant in two models out of five. It is often perceived that financial development and control of corruption might have passed the threshold level in higher-income countries; nevertheless, our results provide some evidence that indicates financial sector development still matters for controlling the corruption in developed countries.

The results across the models (columns 2 to 5) imply that, as expected, per capita income is found to be a dominant factor in determining the control of corruption,

TABLE 3 Determinants of corruption: Sys GMM estimator (low and lower middle income countries)

	(1)	(2)	(3)	(4)	(5)
	CC	CC	CC	CC	CC
L.CC	0.693**	0.700**	0.680**	0.638**	0.589**
	(0.0245)	(0.0215)	(0.0242)	(0.0325)	(0.0332)
DCPvtB	0.000283*	0.000512**	0.000312	0.00112**	0.00117**
	(0.000149)	(0.000161)	(0.000195)	(0.000266)	(0.000262)
LYCAP		−0.00484	0.00793	−0.0199*	−0.0190*
		(0.00546)	(0.00617)	(0.0102)	(0.0100)
TRADE			0.0000760	−0.000532**	−0.000559**
			(0.000113)	(0.000177)	(0.000174)
GOVEXP			−0.00439**	−0.00754**	−0.00723**
			(0.000955)	(0.00121)	(0.00119)
RESOURCE			−0.00103**	−0.000486	0.000447
			(0.000298)	(0.000346)	(0.000371)
NETENROL				0.00112**	0.000787**
				(0.000377)	(0.000376)
PR					−0.0142**
					(0.00447)
PF					0.00929
					(0.00887)
CL					−0.0128**
					(0.00623)
Constant	0.0947**	0.123**	0.106**	0.325**	0.425**
	(0.00900)	(0.0405)	(0.0441)	(0.0668)	(0.0745)
N	1,090	1,079	938	425	425
Sargan test of overid. Restrictions	0.001	0.052	0.040	0.221	0.401

Note: Standard errors in parentheses. *$p < .10$, **$p < .05$.
Note: 1. Sargan is Sargan Test of over-identified Restrictions. 2. One step Sys-GMM is used in all models. 3. DCPvtB and LYCAP are considered endogenous, while all other variables are considered exogenous.

perhaps indicating that when these economies witness an economic slump (surge) then corruption moves up (down). While, natural resource abundance and civil liberty make it difficult to control corruption in upper middle- and high-income countries. The evidence on the remaining variables seem to be statistically insignificant.

Since our results on political rights, civil liberty, and press freedom are a bit surprising. This could be due to multicollinearity between them. To avoid this issue, we separately keep them in control of corruption models and present results of estimations in Table 5. The results of PR, PF and CL do not change much from our previous estimates. Specifically, it is suggested that civil rights have an inverse impact on the control of corruption in all three sets of countries. Political rights has a negative coefficient in the overall sample as well in developing countries' samples. Press freedom is found to have a positive and significant impact on corruption control in all sets except in the developed countries set (not statistically significant, though). The results of other variables do not vary at a noticeable level. Thus, these results further validate that in certain conditions a higher level of political and civil rights can make controlling corruption cumbersome.

5 | POLICY IMPLICATIONS

Our empirical results from low- and lower middle-income countries indicated that financial development has a significant positive impact on control of corruption. For the sake of comparison from existing literature, the

TABLE 4 Determinants of corruption: Sys GMM estimation (upper middle and high income countries)

	(1)	(2)	(3)	(4)	(5)
	CC	CC	CC	CC	CC
L.CC	0.713**	0.744**	0.699**	0.627**	0.639**
	(0.0317)	(0.0283)	(0.0326)	(0.0422)	(0.0433)
DCPvtB	0.000225**	0.000122	0.0000658	0.000112	0.000205*
	(0.0000871)	(0.0000855)	(0.0000939)	(0.000101)	(0.000120)
LYCAP		0.0444**	0.0572**	0.0627**	0.0466**
		(0.0105)	(0.0113)	(0.0142)	(0.0155)
TRADE			0.0000680	−0.000101	−0.000236*
			(0.0000825)	(0.0000991)	(0.000124)
GOVEXP			0.000156	0.000599	0.00105
			(0.00131)	(0.00173)	(0.00194)
RESOURCE			−0.00101**	−0.000682	−0.0000113
			(0.000375)	(0.000502)	(0.000762)
NETENROL				0.000626	0.00145
				(0.000889)	(0.00109)
PR					0.0147
					(0.0127)
PF					−0.00592
					(0.0129)
CL					−0.0258**
					(0.0103)
Constant	0.160**	−0.307**	−0.408**	−0.476**	−0.373**
	(0.0191)	(0.0998)	(0.106)	(0.144)	(0.165)
N	612	612	565	369	345
Sargan test of overid. Restrictions	0.000	0.061	0.022	0.228	0.362

Note: Standard errors in parentheses. *$p < .10$, **$p < .05$.

Note: 1. Sargan is Sargan Test of over-identified Restrictions. 2. One step Sys-GMM is used in all models. 3. DCPvtB and LYCAP are considered endogenous, while all other variables are considered exogenous.

study of Altunbaş and Thornton (2012) comes close to our attempt. However, our coverage of countries and data significantly differs from that of Altunbaş and Thornton (2012). Specifically, we have more sample countries as we make use of the latest available data, and classify sample countries into two groups based on the nature of economic development. Nevertheless, our main results still validate the findings of Altunbaş and Thornton. Based on the finding, we argue that financial development is effectively working in favour of reducing the level of corruption across the low- and lower middle-income countries. More specifically, we attribute this finding to the fact that the financial institutions such as banks might be closely monitoring borrowers' activities and hence effectively reducing the growth of corruption level. Similarly, we also find that the growth in financial development promotes the control of corruption in upper middle- and high-income countries. However, financial development is significant only in two models out of five. These findings, overall, imply that financial development plays an essential role in reducing the corruption growth across the countries. Given these arguments, we suggest that the policymakers should aim to further strengthen the financial institutions, particularly in low- and lower middle-income countries, which will play a significant role in minimising the corruption level.

Similarly, our results from the low- and lower middle-income countries suggested that education plays a pivotal role in fighting the growth of corruption in these economies. In contrast, evidence indicated that the growth in per capita income, trade openness, government expenditure, political rights and civil liberty are the major factors,

TABLE 5 Determinants of corruption: Testing the role of political freedom, rights and civil liberty

	Overall sample			Low and lower middle income			Upper middle and high income countries		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
L.cc	0.569**	0.576**	0.572**	0.605**	0.640**	0.602**	0.625**	0.625**	0.622**
	(0.0322)	(0.0313)	(0.0317)	(0.0331)	(0.0323)	(0.0330)	(0.0427)	(0.0433)	(0.0424)
DCPvtB	0.000301**	0.000436**	0.000261**	0.00125**	0.00119**	0.00133**	0.0000384	0.000211*	0.00000752
	(0.000110)	(0.000113)	(0.000110)	(0.000266)	(0.000267)	(0.000265)	(0.000106)	(0.000114)	(0.000106)
LYCAP	0.0517**	0.0439**	0.0474**	−0.0214**	−0.0200*	−0.0247**	0.0671**	0.0551**	0.0669**
	(0.00765)	(0.00749)	(0.00771)	(0.0102)	(0.0102)	(0.0101)	(0.0150)	(0.0146)	(0.0142)
TRADE	−0.000289**	−0.000290**	−0.000324**	−0.000558**	−0.000542**	−0.000584**	−0.000222*	−0.000131	−0.000242**
	(0.000132)	(0.000105)	(0.000132)	(0.000176)	(0.000176)	(0.000175)	(0.000122)	(0.000108)	(0.000122)
GOVEXP	−0.00449**	−0.00474**	−0.00371**	−0.00801**	−0.00774**	−0.00792**	0.00244	−0.000305	0.00315*
	(0.00128)	(0.00124)	(0.00128)	(0.00122)	(0.00121)	(0.00121)	(0.00189)	(0.00177)	(0.00190)
RESOURCE	−0.000727*	−0.00111**	−0.000946**	0.000316	−0.000108	0.00000287	−0.000353	−0.000666	0.000416
	(0.000412)	(0.000368)	(0.000388)	(0.000375)	(0.000356)	(0.000353)	(0.000728)	(0.000547)	(0.000657)
NETENROL	−0.000809*	−0.000539	−0.000734*	0.000979**	0.00122**	0.00101**	0.000814	0.000875	0.000698
	(0.000420)	(0.000385)	(0.000413)	(0.000381)	(0.000377)	(0.000378)	(0.00105)	(0.000926)	(0.000996)
PR	−0.0188**			−0.0195**			−0.00378		
	(0.00429)			(0.00382)			(0.00980)		
PF		0.0298**			0.0286**			−0.00209	
		(0.00716)			(0.00791)			(0.0104)	
CL			−0.0226**			−0.0252**			−0.0189**
			(0.00501)			(0.00506)			(0.00805)
_cons	−0.0705	−0.106**	−0.0332	0.419**	0.294**	0.464**	−0.551**	−0.404**	−0.526**
	(0.0485)	(0.0422)	(0.0528)	(0.0680)	(0.0680)	(0.0701)	(0.149)	(0.158)	(0.148)
N	782	781	782	425	425	425	357	356	357
Sargan test of overid. Restrictions	0.06	0.06	0.11	0.09	0.09	0.11	0.12	0.12	0.18

Note: Standard errors in parentheses. *$p < .10$, **$p < .05$.

Note: 1. Sargan is Sargan Test of over-identified Restrictions. 2. One step Sys-GMM is used in all models. 3. DCPvtB and LYCAP are considered endogenous, while all other variables are considered exogenous.

which are obstacles in controlling corruption in low- and lower middle-income countries. It implies that the expansion of economic growth, in terms of increasing per capita income, provides more rent-seeking opportunities for government officials in low-income economies. Further, we argue that the firms that are involved in international trade for exports and imports of goods and services might be making illegal payments to the concern officials to get quick approvals for their international trade activities. Therefore, the growth in trade openness might be adversely affecting control of corruption. Similarly, increasing government spending on various public welfare schemes might also becoming a platform for corruption activities for many bureaucrats and other mediators. This might be true in many developing countries as most of these countries are trapped with low-level of education, lack of transparency in decision-making and have less awareness of the public welfare policies. Hence, there is a significant scope for the bureaucrats to misuse their power for their personal gain. Consequently, a higher level of government spending in low- and lower middle-income countries seems to lead to a higher-level of corruption. Thus, this is supporting the argument of Tanzi (1994) that the larger the state and the greater the extent of state intervention in the economy, the greater will be the rent-seeking options available. In addition to those, a higher-level of political rights and civil liberty in the developing countries leading to an obstacle in controlling corruption. This could be because a higher-level of political and civil rights provides the time for reputations to build and relationships to form across the public-private border in which briber givers and takers can have confidence. Thus, while increasing the potential loss if bureaucrats are fired, rights might delay the process and actually increase the expected returns to corruption. This is especially true when the institutions, such as legal systems are inefficient and overburdened (for a detailed discussion, see Treisman, 2000). Our results also show that a high level of trade leading to difficulty in controlling the corruption, this could be because of more international trade provides an easy way to transfer illicit capital aboard (see Neeman et al., 2008).

Further, our findings indicated that the growth in per capita income played an important role in controlling the corruption level in upper middle- and high-income countries. Based on this finding, we argue that rising per capita income, or economic growth, levels of individuals might be discouraging them to involve in corruption activities; hence, it has an adverse effect. Our findings further showed that the growth in trade openness, resource renting and civil liberty work in favour of promoting corruption activities in high-income economies. Given these pieces of evidence, we suggest the policymakers and government officials of the upper middle- and high-income countries should realize the potentiality of the higher per capita income or higher economic growth in fighting the growth of corruption. Similarly, the policymakers also should be aware of the fact that the growth in trade openness, resource renting and civil liberty is working against the spirit of control on corruption. Therefore, the policymakers should initiate appropriate and transparent policies in regards to international trade activities and resources renting. These policies may assist those economies to minimize the growth of corruption.

Our results regarding government expenditure support the findings of Treisman's (2000), who found that greater state intervention in the economy is significantly associated with higher corruption. It was argued that the greater the presence of the state, quantified by government expenditure or other indicators, higher is the probability of corruption. The high intervention through government expenditure and regulatory environment encourages corruption because in such cases profitability is more driven by government policies and discretionary power of the officials rather than by management or entrepreneurial skills (Acemoglu, Ticchi, & Vindigni, 2011). This phenomenon is likely to occur in developing economies that have confirmed by our results. Our results on resources leading corruption are supporting the argument of natural resource riches breed corruption, which, in turn, lower economic performance (e.g., Leite and Weidmann, 2002, Sala-i-Martin & Subramanian, 2013, and Sharma & Mitra, 2019).

The results in regards to political rights and civil liberty are suggesting that these factors promote corruption in some contexts. Similar findings were found by earlier studies, for example, Rock (2009). It was argued that there is an inverted U-shaped relationship between democracy, civil liberty and corruption. Given these discussions, the policymakers and government officials should realize that the political and administrative powers by the politicians and bureaucrats are often misused for personal gains that in turn promote corruption and nepotism. Therefore, the policymakers should make sure that political and civil rights can not be misused for higher rent-seeking. Therefore, it is of utmost importance to have institutional efficiency along with political and civil rights. Our findings imply in such a way, developing and developed economies can minimize the incidents of corruption.

6 | CONCLUSION

There is a growing interest among the policymakers, academic community and government officials on the

factors, which affect the corruption level across the developed and developing economies. It is mainly because corruption affects all walks of life in society. More specifically, corruption can affect economic development, prosperity, political and social stability, and social turmoil in any given country. Therefore, recent research has started to pay considerable attention to identify the factors that drive the level of corruption. Some authors (e.g., Altunbaş & Thornton, 2012) documented that a well-functioning financial system can help to reduce the growth of corruption. However, it is not yet clear whether the growth in financial development has a negative impact on corruption or not across the developed and developing economies.

Given this background, our study has explored the role of financial sector development (proxied by banking credit to the private sector) on the control of corruption in a global sample of 140 countries. Further, to understand its dynamic impact across the developed and developing economies, we divided our sample countries into low - and lower middle-income countries and, upper middle – and high-income countries. For the empirical investigation, we employed the *system GMM* technique and used annual data from 1996 to 2015.

Our empirical findings established that financial development played an important role in reducing the growth of corruption in full sample, low- and lower middle-income countries, and to some extent in upper middle- and high-income countries. Further, our empirical findings have shown that per capita income has a significant positive impact on control of corruption, while trade openness and civil liberty played the opposite role in upper middle- and high-income countries. On the other hand, education is only the other factor, which promoted the control of corruption in low- and lower middle-income countries, whereas per capita income, trade openness, government expenditure, political rights and civil liberty seemed to provide more opportunities for rent-seeking, where institutions are comparatively weak.

Overall, these results suggested that financial development played an essential role in reducing the growth of corruption across low-income and high-income countries. However, the low-income countries are more exposed to corruption through the expansion of economic growth, trade activities and government expenditure, while developed economies, it is the trade openness that provides more the rent-seeking opportunity and corruption. Given these findings, our study offered a number of policy recommendations and adds new knowledge to the body of the empirical literature.

While concluding, it is essential to highlight some limitations of this study. One important limitation of this study is a limited period of the data for the analyses due to the unavailability of corruption series for a longer period. Another limitation of this study is not providing evidence on the effect of sub-sectors of the financial sector, such as banking, stock markets and bond markets on corruption. Future studies may consider these issues in their research.

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ENDNOTES

[1] The sample period is relatively small and it is due to the availability of data. Therefore, this can be considered as a limitation of the study.

[2] The list of selected countries for the analyses is displayed in Appendix A.

[3] The readers can see the descriptive statistics and cross-correlations of these variables in Appendix B and Appendix C, respectively.

[4] For example, even in cleanest countries like Norway and Sweden, state owned companies have shown to be taking bribe. Former Chancellor Helmut Kohl and his Christian Democratic party, the CDU, were established to be engaged in malpractices and they were penalized for receiving illegal campaign funding. In financial sector too, several developed nations have witnessed a mild to deep crisis in the recent years including the American financial crisis of 2008–2009.

DATA AVAILABILITY STATEMENT

Statement of availability of data: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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APPENDIX: LIST OF 140 COUNTRIES MONITORED BY INTERNATIONAL COUNTRY RISK GUIDE (ICRG)

Albania	Croatia	Indonesia	Morocco	Slovenia
Algeria	Cuba	Iran	Mozambique	Somalia
Angola	Cyprus	Iraq	Myanmar	south Africa
Argentina	Czech republic	Ireland	Namibia	Spain
Armenia	Denmark	Israel	Netherlands	Sri Lanka
Australia	Dominican republic	Italy	new Zealand	Sudan
Austria	Ecuador	Jamaica	Nicaragua	Suriname
Azerbaijan	Egypt	japan	Niger	Sweden
Bahamas	El Salvador	Jordan	Nigeria	Switzerland
Bahrain	Estonia	Kazakhstan	Norway	Syria
Bangladesh	Ethiopia	Kenya	Oman	Taiwan
Belarus	Finland	Korea, DPR	Pakistan	Tanzania
Belgium	France	Korea, south	panama	Thailand
Bolivia	Gabon	Kuwait	Papua new guinea	Togo
Botswana	Gambia	Latvia	Paraguay	Trinidad & Tobago
brazil	Germany	Lebanon	Peru	Tunisia
Brunei	Ghana	Liberia	Philippines	turkey
Bulgaria	Greece	Libya	Poland	UAE
Burkina Faso	Guatemala	Lithuania	Portugal	Uganda
Cameroon	guinea	Luxembourg	Qatar	Ukraine
Canada	guinea-Bissau	Madagascar	Romania	united kingdom
Chile	Guyana	Malawi	Russia	united states
china	Haiti	Malaysia	Saudi Arabia	Uruguay
Colombia	Honduras	Mali	Senegal	Venezuela
Congo	Hong Kong	Malta	Serbia	Vietnam
Congo, DR	Hungary	Mexico	sierra Leone	Yemen
costa Rica	Iceland	Moldova	Singapore	Zambia
Côte d'Ivoire	India	Mongolia	Slovakia	Zimbabwe

APPENDIX: DESCRIPTIVE STATISTICS

Variable	Obs	Mean	SD	Min	Max
CC	2,352	0.45	0.20	0.00	1.00
DCPvtB	3,472	44.16	39.70	0.15	312.15
YCAP	3,770	12,501.29	18,285.44	122.49	145,221.20
TRADE	3,617	90.15	53.01	0.03	531.74
GOVEXP	3,455	16.40	8.26	2.05	156.53
RESOURCE	3,342	10.13	14.77	0.00	92.02
NETENROL	1,622	68.84	25.28	2.68	100.00
PR	3,812	3.39	2.18	1.00	7.00
PF	3,774	1.02	0.83	0.00	2.00
CL	3,812	3.35	1.85	1.00	7.00

APPENDIX: CROSS-CORRELATION

	CC	DCPvtB	LYCAP	TRADE	GOVEXP	RESOURCE	NETENROL	PR	PF	CL
CC	1									
DCPvtB	0.52	1								
LYCAP	0.70	0.65	1							
TRADE	0.16	0.28	0.23	1						
GOVEXP	0.41	0.33	0.54	0.11	1					
RESOURCE	−0.24	−0.28	−0.22	−0.05	−0.25	1				
NETENROL	0.49	0.50	0.81	0.11	0.52	−0.16	1			
PR	−0.54	−0.36	−0.53	−0.06	−0.40	0.57	−0.44	1		
PF	0.59	0.40	0.55	0.07	0.48	−0.50	0.42	−0.82	1	
CL	−0.61	−0.46	−0.62	−0.13	−0.46	0.57	−0.51	0.90	−0.83	1