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Exploring the Linkage between Corruption and Economic Development in Case of Selected Developing and Developed Nations

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Abstract

Corruption is like an epidemic that has the power to destroy a country's socio-economic, financial, human and political environment. It has severe consequences in developing countries. This study has examined the impact of existing human, political, financial and economic factors on corruption for a set of panel countries. The data from 1995 to 2004 is used to serve this purpose. For examining the stationarity of the variables, Levin- Lin-Chu (2002), Fisher-ADF and Fisher-PP tests are applied. Pedroni Residual based Co-integration and FMOLS by Phillips and Hansen (1990) test has been used for examining the co-integration among the variables of the model. The speed of adjustment and short-run relationship has been tested through VECM. The estimated results show that exports, GDP per capita and political stability have a negative impact on corruption whereas imports, financial development, human development index, bureaucracy, democracy and rule of law have a positive relationship with corruption. The simplified procedures of import and export will help reducing the practice of bribes and corruption. The governments should take steps not only to increase the income, but also to improve the people's standard of living. There should be improvements in the political system. Democracy is also helpful to get rid of corruption.

Keywords: Corruption, Economic Development Financial Development, Human Development,

JEL Codes: D73, E44, F63, O15

I. Introduction

Corruption has developed into a global issue triggered by many structural and institutional factors such as the nature of the political system, the sociocultural background, the low salaries, the low risk of detection and the punishment (Lu, 2000; Quah 2002). In the simplest form, corruption can be defined as the use of power for personal benefits such as stealing public funds, bribes for procurement of public services and sale of public assets by government officers without proper procedures. An act of corruption can be characterized by the value of the transaction concerned. Although this is a continuous variable, the analytical distinction usually made is between a low value (“petty”) and a large value (“grand”) corruption. Typically, the larger the value of the corrupt transaction, the higher the position in the public hierarchy of the public official(s) involved [Goel and Nelson (1998), Fisman and Gatti (1999), Svensson (2005)]. Shleifer and Vishny (1993) highlight the different forms and capacities of corruption. Corruption exists in all types of societies irrespective of different socio-economic and cultural history. It occurs everywhere even though amount/size varies from a person or a nation to another. Mostly, the developing countries that are subject to a low level of transparency and accountability, defective judicial and legislative system, faulty organizational structure and rent seeking movements are trapped in the clutches of corruption. Moreover, it exacts many economic and social costs, and distorts the composition of government spending at the expense of health and education sectors. It also steers resource allocation towards unproductive direction. Further, it discourages the entry of FDI, and thus harms the economic growth (Tanzi 2002, De Vaal and Ebben, 2011). Corruption can be considered as the oil that greases the economic growth engine (Anoruo and Braha, 2005), however it is broadly perceived that the disadvantages of corruption are far outweighed compared to its advantages.

Economic growth is a process that influences the economic well-being of a community. Corruption implements a major threat to economic growth: the public and private sector efficiency is reduced when it enables people to assume positions of power through patronage rather than ability. The current literature lacks of theoretical underpinning that incorporates the potential effects of corruption on aggregate output through its impact on the arguments of the production function (Kaufman 1998; Shleifer 1998; Ackerman 1999; Vittal 1999; Chafuen 2000; Mo 2001; Alesina and Angeletos 2002). Foreign flows are frequently connected with hefty and lucrative projects or often with denationalization of companies that are good prospects of rent extraction due to a large

amount of rent involved and the investor can transfer the cost burden towards customers. Hines (1995) proves that US investors differ from others in preferring to locate their FDI in less corrupt countries after 1977. Undemocratic countries are more prone to corruption (LaPalombara, 1994) as public resources are weakly supervised and officers are interested in using them to appeal foreign investment. Countries enjoying a longer period of democracy along with free media, unrestricted electoral process, voice freedom, and more importantly political opposition are the key elements to deter corruption. Open societies do not only import goods but they also import their customs, standards and knowledge (Treisman, 2000 and Sandholtz and Gray 2003).

Corruption is a prevalent irrespective of development, every country has to face a specific level of corruption. This study is going to answer a few questions. What are the main factors that determine corruption in the case of developed and developing countries? How does the development process more or less plays a role in spreading malfunctioned activities whether on systemic or individual basis? Despite the increasing economic growth, why is a large segment of the population deprived of the basic facilities of life like education and health, in developing countries, and how are the resources in these countries bound in the hands of a tiny portion of the population? Is this a corruption phenomenon?

II. Literature Review

In existing literature of economics, corruption is globally considered to be growth inhibitive. The existing studies consider it a complex phenomenon because its consequences are more deep-seated problems of distortion, institutional incentives and governance. There is a number of studies that highlight the causes and consequences of corruption and the most relevant are taken here as literature review. Huntington (1968) mentions that corruption aids the economy, particularly in the case of cumbersome regulation, excessive bureaucracy, market restriction or inefficient policies. The resulting waiting costs would be effectively reduced if the payment of speed money could induce bureaucrats to increase their efforts. Ironically, however, corrupt officials might, instead of speeding up, actually cause administrative delays in order to attract more bribes. Lui (1985) demonstrates the efficiency enhancing the role of corruption via a queuing model and concludes that the size of the economic agents' bribe reflects their opportunity cost, thereby allowing "better" firms to purchase less red tape.

Ades and Tella (1999) elaborate that strategies for making more competitive markets affect corruption. The low level of rivalry is translated into more rents extracted by a large number of bureaucrats from companies they regulated. There is more corruption in countries enjoying more economic rent, where local companies are protected from external competition or with restrictive trade and where the number of companies is minor. Opportunities for corruption can be squeezed if the external rivalry exists. Indeed, it creates a negative relation between the size of the trade and the corruption. When the tax and the tariff barriers reduce imports, inward oriented strategies increase corruption. This is the foreign rivalry consequences. Limit the trade and financial streams generate ample chances for the private managers and officers to indulge in corrupt attempts where bribes and payoffs can be offered to get beneficial treatments. This is called “direct policy impact”. Bonaglia et al., (2001) argue that openness to trade restrain corruption. The mechanism includes trade policy, foreign rivalry, foreign investors and variations in cost-benefit relationship that is confronted by a country when constructing high-quality organizations to combat corruption. Trade relaxation and financial streams can alter the cost-benefit relationship in corruption. Goel and Korhonen (2011) have discussed the relationship between exports and corruption by using disaggregated statistics of exports covering a large number of countries. It is statistically analyzed that trade of fuel constantly impacts the corruption level whereas trade in manufacturing material and iron doesn't. Growing countries along economic freedom and political liberalization and larger state scope have a reduced corruption level.

Haque and Kneller (2004) demonstrate that corruption is widespread particularly in developing countries, especially in the venture relating to the public sector as government officers are given the responsibility of securing public assets being used in the production of creative inputs. Because the information is lopsided, between the bureaucracy and government, the bureaucracy may give a misleading report that procure best quality products at high cost, while delivering products with low quality, consuming low cost. This result is the shape of severe impacts on the efficiency of the economy and thus lessening the growth. Corruption reduces the worth of public amenities, necessary for production and increases the government expenditures above the efficient level.

You and Khagram, (2005) analyze that people with higher incomes are more inclined toward corrupt activities whereas individuals bearing low income levels are incapable to fight with corruption as they don't have enough resources even they are persuaded to do so. But with the rise in income inequality, people with lower incomes become vulnerable to payoffs in order to have an approach for several state amenities. Uslander (2006) explains that unequal income distribution is a reason of increasing corruption and resultantly increased corruption enhances income disparity. Apergis et al., (2010) prove that rising GDP per capita has an adverse impact on corruption and income disparity. Economic development is the best solution to decrease corruption and income inequality.

Eicher et al., (2006) have exhibited the bilateral relationship between corruption and education. Corruption cut revenues that impedes the process of educational accomplishment. Subsequently, chances of corruption increase as with less education people or voters are unable to recognize corrupt candidates and vote to such as a politician. Blackburn and Sarmah (2007) evaluate the connection of economic growth, corruption and life expectancy. Improved life expectancy is connected with development as life expectancy, economic sovereignty and higher national incomes can possibly discourage corruption.

Mocan (2008) argues that corruption is a consequence of impersonal association between bureaucracy and general public in cities. It permits them to use their positions and take more bribes, as more bureaucrats are appointed in cities. Due to a larger population and heavy public funds, they can grab resources easily. Though, it is feasible that corruption can be higher in areas with lesser population because of lower civil competition and more chances of retaining office in spite of any suspicious matter. Gillette (2008) has demonstrated that minor bureaucracy is strongly connected with corruption as compared to major bureaucracy. Because where there are more bureaucrats, it can be found how they exercise their obligations without taking payoffs. So undermanned and incompetent staff can be more suspicion as less is the number of bureaucrats who can demand heavy kickbacks to perform their responsibilities. Reduced number of bureaucratic staff can be a cause of increasing corruption due to its relaxed involvement, rarer substitutes for amenities, or lessened productivity of state authorities. Therefore, though

bureaucrats are penalized for their rent-seeking behavior, the right way is to raise the number of these reviled officers.

III. Economic Methodology

Alam (1989) refutes the pro-efficiency argument for corruption by contending that because bribery is illegal, bureaucrats will regulate entry into the bidding process to only those who can trust. Since trust is not a proxy for efficiency, there is no reason to believe that the highest bidder will necessarily be most efficient, although the body of theoretical and empirical research that addresses the problem of corruption is still growing (Klitgaard 1987; Kaufman 1998; Shleifer 1998; Ades and Tella 1999; Vittal 1999; Chafuen 2000; Treisman 2000; Wei 2000; Alesina and Angeletos 2002; Johnston 2005; Altunbas and Thornton 2011; Ali 2015). Following the previous methodologies, the functional form of this study become as:

$$C = f(ED, FD, HD, PD)$$

Where,

C = Corruption

ED = Economic Development

FD = Financial Development

HD = Human Development

PD = Political Development

Equation can be written as:

$$(CPI_{it} = f(EXP_{it}, GDP_{it}, IMP_{it}, DCP_{it}, HDI_{it}, BUR_{it}, DEMO_{it}, POLSTB_{it}, RLW_{it}))$$

Here

CPI = Corruption Perception Index

EXP = Exports of Goods and Services as % of GDP

GDPpc = Gross Domestic Product per Capita in LUC

IMP = Imports of Goods and Services as % of GDP

DCP = Domestic Credit to Private Sector as % of GDP

HDI = Human Development Index

BUR = Bureaucracy

DEMO = Democracy

POLSTB = Political Stability

RLW = Rule of Law

The econometric model of this study become as:

$$CPI_{it} = \beta_0 + \beta_1 EXP_{it}, \beta_2 GDP_{it}, \beta_3 IMP_{it}, \beta_4 DCP_{it}, \beta_5 HDI_{it}, \beta_6 BUR_{it}, \beta_7 DEMO_{it}, \beta_8 POLSTB_{it}, \beta_9 RLW_{it} + \varepsilon_{it}$$

In the above mentioned equation $i = 1, \dots, 31$ in case of developed panel and $i = 1, \dots, 49$ in case of developing panel whereas $T = 1, \dots, 20$ in both cases.

Abuse of power implicates affecting a legal standard. The sale of public assets by government officers, bribes for procurement of public services and stealing public funds is called corruption and in this study, it is measured by: Corruption Perception Index (CPI) of Transparency International (TI) is used in this study, TI is a Berlin based non-governmental association that publishes annual CPI of countries, CPI is a "poll of polls" representing ideas of business people, risk forecasters and indigenous population that has been surveyed CPI is intentionally choosier about the choice of indices used in the aggregation. 80 countries have been selected for analysis, dividing all into 31 developed and 49 developing nations. Developed and developing panels have been selected based on income level as per World Development Indicators Database classification. For Economic and Financial Development, data on Exports, Gaps, Imports and Domestic Credit to Private Sector has been taken from WDI database. For Human Development, data on HDI has been extracted from United Nations Development Programmer's database. For Political Development, data on bureaucracy, democracy, political stability and rule of law has been obtained from WGI database as exercised. WGI is produced by Daniel Kaufmann and Aart Kraay.

IV. Econometric Methodology

This study is going to check the effects of Development on Corruption. To check stationarity of variables, this study has applied panel unit root test as it is more powerful than time series unit root tests. Three main tests are being employed for this purpose.

- Levin- Lin- Chu (2002)

- Maddala & Wu (1999) Fisher-ADF
- Choi (2001) Fisher-PP

The null and alternative hypothesis as:

Test name	Year	Null Hypothesis	Alternative Hypothesis
Levin-Lin-Chu	2002	Unit Root	Stationary Series
Fisher-ADF	1999	Unit Root	Stationary Series
Fisher-PP	2001	Unit Root	Stationary Series

If variables are stationary at first difference mean $I(1)$, it is believed to have a long-term relationship between variables, which means that there's a linear combination in stochastic progression. This particular relationship is also named as long-term equilibrium. In this study, the test for long-term relationship is: First residual based Panel Co-integration test is familiarized by Pedroni (1999). Pedroni (1999) uses Engle-Granger (1987) approach to check co-integration. Engle-Granger approach is grounded on analysis of residuals that whether they are stationary or not. If variables are $I(1)$ then residuals should $I(0)$ and if variables are $I(0)$ then residual must be $I(1)$. Pedroni (1999, 2004) expands the framework of Engle-Granger to multiple regressions.

V. Results and Discussion

To investigate the impacts of Development (Economic, Financial, Human and Political) on corruption, this study has applied most relevant econometric techniques. The variables include corruption Perception Index for Corruption, Human Development Index for Human Development, Domestic credit to private sector as share of GDP for Financial Development, Gross Domestic Product per Capita in LCU, Exports of Goods and Services as share of GDP, imports of goods and services as share of GDP for Economic Development. Moreover, Bureaucracy, Democracy, Political Stability and Rule of Law are taken as proxy for Political Development. The 20 years' time period covered in this study extends from 1995-2014 including 31 developed and 49 developing countries. The developed set of countries includes Australia, Austria, Canada, Chile, Croatia, Czech, Republic, Denmark, Estonia, Finland, France, Germany, Iceland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Netherland, Poland, Portugal, Russian, Federation, Singapore, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States, and Uruguay.

The developing countries comprises of Albania, Argentina, Armenia, Azerbaijan, Bangladesh, Belarus, Bolivia, Botswana, Brazil, Bulgaria, Cameroon, China, Colombia, Cost Rice, Cote d'Ivoire, Dominican Republic, Ecuador, Egypt, EI-Salvador, Ghana, Guatemala, Honduras, Hungary, India, Indonesia, Jordan, Kazakhstan, Kenya, Mauritius, Mexico, Moldova, Morocco, Nicaragua, Nigeria, Pakistan, Paraguay, Peru, Philippines, Senegal, South Africa, Tanzania, Thailand Tunisia, Turkey, Uganda, Ukraine, Venezuela, Vietnam and Zambia. To find out unit root in the current study, Levin- Lin- Chu (2000) approach has been replicated. Co-integration among variables is tested through Pedroni Residual Based Co-integration test (1999, 2004). For short run association between Development and Corruption VECM is applied. To review the significance of coefficients FMOLS is applied.

Table 1: Panel Unit Root:

Variables	Methods	At Level		At 1 st Difference	
		Statistic	p-value	Statistic	p-value
CPI	Levin-Lin-Chu (t*)	-1.338*	(0.090)	-20.582***	(0.0000)
	Fisher-ADF (χ^2)*	44.229	(0.957)	446.70***	(0.0000)
	Fisher-PP (χ)*	39.592	(0.988)	493.53***	(0.0000)
EXP	Levin-Lin-Chu (t*)	4.686	(1.000)	-20.548***	(0.0000)
	Fisher-ADF (χ^2)*	13.996	(1.000)	453.36***	(0.0000)
	Fisher-PP (χ^2)*	11.717	(1.000)	448.76***	(0.0000)
GDPpc	Levin-Lin-Chu (t*)	14.402	(1.000)	-8.4583***	(0.0000)
	Fisher-ADF (χ^2)*	13.571	(1.000)	163.155***	(0.0000)
	Fisher-PP (χ^2)*	1.920	(1.000)	353.268**	(0.0000)
IMP	Levin-Lin-Chu (t*)	4.0913	(1.000)	-24.063***	(0.0000)
	Fisher-ADF (χ^2)*	13.650	(1.000)	542.063***	(0.0000)
	Fisher-PP (χ^2)*	12.030	(1.000)	550.725***	(0.0000)

t* shows the t-statistic given by Levin-Lin-Chu (2002) and (χ^2)* shows the Chi-square statistic given by Fisher-ADF and Fisher-PP. *, ** and *** are to show significance at 10%, 5% and 1% respectively.

Table 1 shows the t-statistics and p-values given by Levin-Lin- Chu (2002) and Fisher type tests by Maddala and Choi (2001). All the variables are non-stationary at level, as all p-values are insignificant at 1%, 5% and 10%, except in the case of CPI, LLC given significant result at 10% level of significance. So, we cannot reject the null hypothesis of unit root, but when all variables are converted into 1st difference, they become stationary, as all the p-values are statistically significant at 1% significance level. The order of Integration of all variables is same, means all variables are I(1), so we can check the co-integration among them.

Table 2: Panel Co-integration

Alternative Hypothesis	Technique	t-statistic
Common AR Coefficients “within-dimension”	Panel v-statistic	0.609 (0.271)
	Panel p-statistic	0.140 (0.556)
	Panel PP-statistic	-3.674*** (0.0001)
	Panel ADF-statistic	-3.246*** (0.000)
Individual AR Coefficients “between-dimension”	Group p-statistic	2.534 (0.994)
	Group PP-statistic	-3.588***
	Group ADF-statistic	-3.390*** (0.000)

*, ** and *** are to show significance at 10%, 5% and 1% respectively.

The table 2 shows the results of Residual based Panel Co-integration test given by Pedroni (1999, 2004). Results of four out of seven methods (Panel PP-Statistic, Panel ADF-Statistics, Group PP-Statistics, and Group ADF-Statistics) are statistically significant, as p-values of these tests are less than 5% significance level. Although some of the results are more than 10%, yet majority of the result are significant. So, it shows the rejection of null hypothesis of no co-integration and acceptance of alternative hypothesis of co-integration in both cases. Thus, the study found long-run relationship between variables.

Table 3: The Results of FMOLS

Variables	Coefficient	t-statistic	p-value
EXP	-0.075	[-4.192]***	(0.000)
GDP pc	9.2E-05	[7.518]***	(0.000)
IMP	0.169	[8.412]***	(0.000)

*, ** and *** are to show significance at 10%, 5% and 1% respectively.

Table 3 shows results of Panel FMOLS (Fully Modified Ordinary Least Square). Coefficient values indicate long-run coefficients. P-values are significant at 1% significance level. As EXP has negative sign so, one-unit increase in EXP drop the Corruption by 0.0753 units. The other two coefficients have positive values indicating upsurge in dependent variable. One-unit increase in GDPpc and IMF push the Corruption by 0.0001 and 0.1691 unit respectively. GDPpc pores a very slight impact on corruption level. As developed countries mostly trade in oil and industrial products are available in abundance there, so a rise in exports drop the corruption and they import agricultural products the most which they cannot grow easily so imports grow up the corruption with slight difference in these countries.

Table 4: The results of VECM

Variables	Coefficient	t-statistic	p-value
EXP	-0.075	[-4.359]***	(0.000)
GDPpc	9.26-05	[7.518]***	(0.290)
IMP	0.169	[8.412]***	(0.000)

*, ** and *** are to show significance at 10%, 5% and 1% respectively.

The table 4 shows the t-statistics, Coefficient and p-values of ECT (Error Correction Term). As the coefficient is negative and p-value is significant at 1% significance level in case of EXP and IMP, so the study pledges the presence of a short-run association between CPI-EXP and CPI-IMP. Negative sign of coefficient also shows convergence towards equilibrium. EXP and IMP converges towards CPI at the speed of 2.65% and 2.67% annually. Coefficient of GDPpc has negative sign indicating convergence towards equilibrium at the speed of 0.02% annually. But its p-value is statistically insignificant showing no short-run connection between CPI and GDPpc.

V.I The Results of Financial Development and Corruption

Table 5: Panel Unit Root

Variables	Methods	t-statistic	p-value	t-statistic	p-value
CPI	Levin-Lin-Chu (t*)	-1.338*	(0.090)	-20.582***	(0.0000)
	Fisher-ADF (χ^2)*	44.229	(0.957)	446.70***	(0.0000)
	Fisher-PP (χ)*	39.592	(0.988)	493.53***	(0.0000)
DCP	Levin-Lin-Chu (t*)	6.687	(1.000)	-13.812***	(0.0000)
	Fisher-ADF (χ^2)*	13.526	(1.000)	310.48***	(0.0000)
	Fisher-PP (χ^2)*	12.519	(1.000)	331.39***	(0.0000)

Table 5 shows the t-statistics and p-values are given by Levin-Lin-Chu (2002) and Fisher type tests by Maddala and Wu (1999) and Choi (2001). All the variables are non-stationary at level. LLC given significant result at 10% level of significance for CPI but the other two have given an insignificant result due to which the study considers insignificant at level but when both variables are converted into 1st difference, they become stationary. The order of Integration of both variables is same, means both are I(1), so we can check the co-integration between them.

Table 6: Panel co-integration

Alternative Hypothesis	Techniques	t-statistic
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Common AR Coefficients “within-dimension”	Panel v-statistic	1.147 (0.125)	-
	Panel p-statistic	-1.527*	-
	Panel PP-statistic	(0.063)	-
	Panel ADF-statistic	-3.450*** (0.000)	
		-3.959*** (0.000)	
Individual AR Coefficients “between-dimension”	Group p-statistic	-	-0.312 (0.377)
	Group PP-statistic	-	-2.861***
	Group ADF-statistic	-	(0.002)
			-4.640*** (0.000)

*, ** and *** are to show significance at 10%, 5% and 1% respectively.

The table 6 shows the results of Residual based Panel Co-integration test given by Pedroni (1999, 2004). Results of five out of seven methods (Panel p-statistic, Panel PP-statistics, Panel ADF-statistics, Group PP-statistics, Group ADF- statistics) are statistically significant. Although two results are more than 10%, yet majority of the results are significance of alternative hypothesis of co-integration in both cases, thus the study detected long-run relationship between variables.

Table 7: The results of FMOLS

Variable	Coefficient	t-statistic	p-value
DCP	0.071	[43.786]***	(0.000)

Table 7 shows results of Panel FMOLS (Full Modified Ordinary Least Square). Coefficient value indicates long-run coefficient. P-value is statistically significant. As DCP has positive sign so, 1 unit increase in DCP reveals a gain in Corruption index by 0.0714 units. Borrowers of private sector practically use the credit for their own best interest and try to get more credit in any way so that they can earn more and more on it, so more credit often induce more corruption.

Table 8: The results of VECM

	Variable	Coefficient	t-statistic	p-value
ECT	DCP	-0.007	[-1.150]	(0.250)

The table 8 shows the t-statistics, Coefficient and the p-values of ECT (Error Correction Term). Negative sign of coefficient shows the convergence of DCP towards equilibrium. DCP converge (get back) towards CPI at the speed of 0.725 annually as the data included is on annual basis. But the p-value is statistically insignificant showing no short-run relationship between both variables.

V.II Results of Human Development and Corruption

Table 9: Panel Unit Root

Variables	Methods	t-statistic	p-value	t-statistic	p-value
CPI	Levin-Lin-Chu (t*)	-1.338*	(0.090)	-20.582***	(0.0000)
	Fisher-ADF (χ^2)*	44.229	(0.957)	446.70***	(0.0000)
	Fisher-PP (χ)*	39.592	(0.988)	493.53***	(0.0000)
HDI	Levin-Lin-Chu (t*)	-0.886	(0.187)	-47446***	(0.0000)
	Fisher-ADF (χ^2)*	33.984	(0.998)	668.91***	(0.0000)
	Fisher-PP (χ^2)*	34.663	(0.998)	623.19***	(0.0000)

Table 9 shows the t-statistics and p-values given by Levin-Lin-Chu (2002) and Fisher type by Maddala and Wu (1999) and Choi (2001). All the variables are non-stationary at level. LLC given significant result at 10% level of significance for CPI but the other two given insignificant result

due to which study considers insignificant at level. So, we cannot reject the null hypothesis of Unit Root, but when both the variables are converted into 1st difference, they become stationary. The order of integration of both variables is same, means both are I(1), so we can check the co-integration between them.

Table 10: Panel Co-integration

Alternative Hypothesis	Techniques	t-statistic	
Common AR Coefficients “within-dimension”	Panel v-statistic	3.312*** (0.000)	-
	Panel p-statistic		-
	Panel PP-statistic	-4.242* (0.000)	-
	Panel ADF-statistic	-5.163*** (0.000)	-
		-6.073*** (0.000)	
Individual AR Coefficients “between-dimension”	Group p-statistic	-	-3.319** (0.000)
	Group PP-statistic	-	-7.681*** (0.000)
	Group ADF-statistic	-	-8.264*** (0.000)

*, ** and *** are to show significance at 10%, 5% and 1% respectively.

The table 10 shows the results of residual based Panel Co-integration test given by Pedroni (1999, 2004). Results of the seven methods are statistically significant. So, it shows the rejection of null hypothesis of no Co-integration and acceptance of alternative hypothesis of co-integration in both cases thus, the study found long-run relationship between variables.

Table 11: The results of FMOLS

Variable	Coefficient	t-statistic	p-value
HDI	7.816	[226.586]***	(0.000)

Table 11 shows results of Panel FMOLS (Full Modified Ordinary Least Square). Coefficient value indicates long-run coefficient. P-values is statistically significant. As HDI has positive sign, so, one-unit increase in HDI shows an increase in Corruption index by 7.8162 units. When people are more rich and educated, they will be more aware of their fundamental rights, so to get their rights they will indulge in corrupt activities if they are unable to get their works done easily.

Table 12: The results of VECM

	Variable	Coefficient	t-statistic	p-value
ECT	HDI	0.004	[1.566]	(0.117)

The table 12 shows the t-statistics, Coefficient and the p-values of ECT (Error Correction Term). Positive sign of coefficient indicates divergence of HDI towards equilibrium. HDI diverge (depart) from CPI at the speed of 0.4% annually and the p-value is also statistically insignificant presenting no short-run dynamics between both variables.

V.III Result of Political Development and Corruption

Table 13: Panel Unit test

Variables	Methods	At Level		At 1 st Difference	
		Statistic	p-value	Statistic	p-value
CPI	Levin-Lin-Chu (t*)	-1.338*	(0.090)	-20.582***	(0.0000)
	Fisher-ADF (χ^2)*	44.229	(0.957)	446.70***	(0.0000)

	Fisher-PP (χ^2)*	39.592	(0.988)	493.53**	(0.0000)
BUR	Levin-Lin-Chu (t*)	-2.265	(0.011)	-27.868***	(0.0000)
	Fisher-ADF (χ^2)*	48.715	(0.890)	566.017**	(0.0000)
	Fisher-PP (χ^2)*	52.367	(0.803)	652.906***	(0.0000)
DEMO	Levin-Lin-Chu (t*)	-0.2399	(0.405)	-30.350***	(0.0000)
	Fisher-ADF (χ^2)*	40.054	(0.986)	613.52***	(0.0000)
	Fisher-PP (χ^2)*	54.664	(0.734)	668.75***	(0.0000)
POLSTB	Levin-Lin-Chu (t*)	-2.430	(0.007)	-33.018***	(0.0000)
	Fisher-ADF (χ^2)*	64.044	(0.404)	639.70***	(0.0000)
	Fisher-PP (χ^2)*	73.313	(0.154)	714.30***	(0.0000)
RLW	Levin-Lin-Chu (t*)	3.1973	(0.999)	-28.339***	(0.0000)
	Fisher-ADF (χ^2)*	27.354	(1.000)	572.28***	(0.0000)
	Fisher-PP (χ^2)*	38.395	90.992)	629.14***	(0.0000)

Table 13 shows the t-statistics and p-value given by Levin-Lin-Chu (2002) and Fisher type by Maddala and Wu (1999) and Choi (2001). All the variables are non-stationary at level. LLC given significant at 10% level of significance for the three variables, but the other two given insignificant results due to which study considers them insignificant at level, so we cannot reject the null hypothesis of Unit Root, but when all variables are converted into 1st difference, they become stationary, as all the p-values are statistically significant at 1% significance level. The order of Integration of all variables is same, means all variables are I(1), so we can check the co-integration among them.

Table 14: Panel co-integration

Alternative Hypothesis	Techniques	t-statistic
	Panel v-statistic	-2.031*** (0.978)

	Panel p-statistic		-
Common AR Coefficients		0.712*	
“within-dimension”	Panel PP-statistic	(0.762)	-
	Panel ADF-statistic	-4.158*** (0.000)	
			-3.408*** (0.000)
	Group p-statistic	-	2.491** (0.993)
Individual AR Coefficients	Group PP-statistic	-	
“between-dimension”			-5.805*** (0.000)
	Group ADF-statistic	-	
			-4.857*** (0.000)

The table 14 shows the results of Residual based Panel Co-integration test given by Pedroni (1999, 2004). Results of five out of seven methods (Panel p-statistic, Panel PP-statistics, Panel ADF-statistics, Group PP-statistics, Group ADF- statistics) are statistically significant, as p-values of Panel p-statistic is less than 1% significance level in case of other four tests. Although three methods have given values more than 10%, yet majority of the results are significant. So, it shows the rejection of null hypothesis of no co-integration and acceptance of alternative hypothesis of co-integration in both cases. Thus, the study found long-run relationship among variables.

Table 15: The results of FMOLS

Variable	Coefficient	t-statistic	p-value
BUR	1.613	[7.911]***	(0.000)
DEMO	2.653	[11.006]***	(0.000)
POLSTB	-0.124	[-0.743]	(0.457)

RLW	0.687	[2.543]**	(0.011)
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Table 15 shows results of Panel FMOLS (Full Modified Ordinary Least Square). Coefficient value indicates long-run coefficient. P-values of BUR, DEMO and RLW are significant at 1% and 5% significance level respectively. These variables affect corruption significantly. One-unit increase in BUR, DEMO, and RLW push the corruption up by 1.6136, 2.6533 and 0.6874 units respectively. But the p-values of POLSTB is insignificant as it is more than 10%. It affects corruption negatively but insignificantly, means it has no significant relationship with corruption in developed countries. Longer tenure of bureaucracy often results in corrupt activities. In more democratic nations where media opens all secrets and rules are strict to be implemented, some hidden corruption rise to get personal benefits.

Table 16: The results of VECM

	Variable	Coefficient	t-statistic	p-value
ECT	BUR	-0.098	[-5.502]***	(0.000)
	DEMO	-0.033	[-4.651]***	(0.000)
	POLSTB	-0.039	[-5.407]***	(0.000)
	RLW	-0.074	[-5.445]***	(0.000)

The table 16 shows the t-statistics, coefficient and the p-values of ECT (Error Correction Term). As the coefficients in all cases are negative and p-values are significant at 1% significance, the study concludes the presence of a short-run relationship between CPI-BUR, CPI-DEMO, CPI-POLSTB and CPI-RLW. Negative sign of coefficients shows convergence towards equilibrium. BUR converges towards CPI at the speed of 9.88% annually.

- DEMO converges towards CPI at the speed of 3.33% annually.
- POLSTAB converges towards CPI at the speed of 3.98%.
- RLW converges towards CPI at the speed of 7.46% annually.

P-value are statistically insignificant presenting short-run dynamics among different combinations of variables.

V.IV Results of Economic Development and Corruption

Table 17: Panel Unit Root

Variables	Methods	At Level		At 1 st Difference	
		Statistic	p-value	Statistic	p-value
CPI	Levin-Lin-Chu (t*)	1.700	(0.955)	-33.00***	(0.000)
	Fisher-ADF (χ^2)*	43.043	(1.000)	907.57***	(0.000)
	Fisher-PP (χ)*	41.917	(1.000)	967.29***	(0.000)
EXP	Levin-Lin-Chu (t*)	0.578	(0.718)	-29.86***	(0.000)
	Fisher-ADF (χ^2)*	55.893	(0.999)	838.39**	(0.000)
	Fisher-PP (χ^2)*	52.000	(1.000)	876.56***	(0.000)
GDPpc	Levin-Lin-Chu (t*)	13.920	(1.000)	-6.88***	(0.000)
	Fisher-ADF (χ^2)*	35.115	(1.000)	326.10***	(0.000)
	Fisher-PP (χ^2)*	13.456	(1.000)	523.07***	(0.000)
IMP	Levin-Lin-Chu (t*)	0.250	(0.598)	-29.88***	(0.000)
	Fisher-ADF (χ^2)*	53.027	(0.999)	841.87***	(0.000)
	Fisher-PP (χ^2)*	48.167	(1.000)	898.08***	(0.000)

Table 17 shows the t-statistics and p-values given by Levin-Lin-Chu (2002) and Fisher type tests by Maddala and Wu (1999) and Choi (2001). All the variables are non-stationary at level, as all p-values are insignificant at 1%, 5% and 10%, so we cannot reject the null hypothesis of Unit Root, but when all variables are converted into 1st difference, they become stationary as all the p-values are statistically significant at 1% significance level. The order of Integration of all variables is same, means all variables are I(1), so we can check the co-integration among them.

Table 18: Panel Co-integration

Alternative Hypothesis	Techniques	t-statistic
	Panel v-statistic	-2.881

		(0.9980)	
	Panel p-statistic		-
Common AR Coefficients		0.690	
“within-dimension”	Panel PP-statistic	(0.755)	-
	Panel ADF-statistic	-3.324*** (0.000)	
		-3.973*** (0.000)	
	Group p-statistic	-	2.835 (0.997)
Individual AR Coefficients	Group PP-statistic	-	
“between-dimension”			-4.283***
	Group ADF-statistic	-	(0.000)
			-4.869*** (0.000)

The table 18 shows the results of Residual based Panel Co-integration test given by Pedroni (1999, 2004). Results of four out of seven methods (Panel PP-statistic, Panel ADF-Statistic, Group PP-Statistic, and Group ADF- statistic) are statistically significant, as p-values of these tests are less than 1% significance level. Although some of the results are more than 10%, yet majority of the results are significant. So, it shows the rejection of null hypothesis of no co-integration and acceptance of alternative hypothesis of co-integration in both cases, thus, the study found long-run relationship between variables.

Table 19: The results of FMOLS

Variable	Coefficient	t-statistic	p-value
EXP	0.027	[3.226]***	(0.000)
GDPpc	0.000	[5.863]***	(0.000)

IMP	0.054	[6.696]***	(0.000)
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Table 19 shows results of Panel FMOLS (Full Modified Ordinary Least Square), Coefficient values indicate long-run coefficients. P-values are significant at 1% significance level. All coefficients have positive values indicating escalation in dependent variable. One-unit increase in EXP effect corruption by 0.0278 units positively and one-unit upward trend in GDPpc and IMP push the corruption up by 0.0001 and 0.0549 units respectively. GDPpc leaves a very slight impact on Corruption level. The nations in this panel are mostly import industrial products and export agriculture commodities so imports are more prone to corruption as compared to exports. Income inequality results in more corruption as compared to GDPpc itself.

Table 20: The results of VECM

	Variable	Coefficient	t-statistic	p-value
	EXP	-0.044	[-4.541]***	(0.000)
ECT	GDPpc	-0.000	[0.033]	(0.738)
	IMP	-0.046	[-4.653]***	(0.000)

The table 20 shows the t- statistics, Coefficient and the p-values of ECT (Error Correction Term). As the coefficients are negative and p-values are significant at 1% significance level in case of EXP and IMP, so the study assures the presence of a short-run association between CPI-EXP and CPI-IMP. Negative sign of coefficient also shows convergence towards equilibrium.

- 4.41% annual convergence of EXP towards CPI
- 4.6% annual convergence of IMP towards CPI

Coefficient of GDPpc has negative sign highlighting convergence towards equilibrium at the speed of 0.02% annually but its p-value is statistically insignificant showing no short-run connection among them.

V.V Results of Financial Development and Corruption

Table 21: Panel Unit Root

	Variable	Coefficient	t-statistic	p-value
ECT	HDI	0.004	[1.566]	(0.117)

Table 21 shows the t-statistics and p-values given by Levin-Lin-Chu (2002) and Fisher type test by Maddala and Wu (1999) and Choi (2001). All the variables are non-stationary at level, as all p-values are insignificant at 1%, 5% and 10%, so we cannot reject the null hypothesis of Unit Root, but all variables are converted into 1st difference, they become stationary, as all the p-values are statistically significant at 1% significance level. The order of Integration of all variables is same, all variables are I(1), so we can check the co-integration among them.

Table 22: Panel Co-integration

Alternative Hypothesis	Techniques	t-statistic
Common AR Coefficients “within-dimension”	Panel v-statistic	-3.726 (0.999)
	Panel p-statistic	-
	Panel PP-statistic	-0.513 (0.001)
	Panel ADF-statistic	-3.040*** (0.001)
Individual AR Coefficients “between-dimension”	Group p-statistic	-2.893*** (0.001)
	Group PP-statistic	2.424 (0.992)
	Group ADF-statistic	-
	Group ADF-statistic	-3.943*** (0.000)
		-4.865***

(0.000)

The table 22 shows the results of Residual based Panel Co-integration test given by Pedroni (1999, 2004), the results of four out of seven methods, (Panel PP-statistics, Panel ADF-statistic, Group PP-statistic and Group ADF-Statistic) are statistically significant, as p-values of first two tests are less than 5% and the other two are less than 1% significance level. Although some results are more than 10%, yet majority of the results are significant. So, it shows the rejection of null hypothesis of no co-integration and acceptance of alternative hypothesis of co-integration in both cases thus, the study found long-run relationship between variables.

Table 23: The results of FMOLS

Variable	Coefficient	t-statistic	p-value
DCP	0.110	[54.135]***	(0.000)

Table 23 shows the results of Panel FMOLS (Full Modified Ordinary Least Square), Coefficient values indicate long-run coefficients. P-values are significant at 1% significance level. As DCP has positive sign so, one-unit increase in DCP reveals a gain in Corruption index by 0.01101 units. People of private sector try to pull maximum credit towards them in order to get extra benefits, so more credit usually result in more doubtful activities.

Table 24: The results of VECM

	Variable	Coefficient	t-statistic	p-value
ECT	DCP	-0.048	[-4.675]***	(0.000)

The table 24 shows the t-statistics, Coefficient and p-values of ECT (Error Correction Term). Negative sign of coefficient shows the convergence of DCP towards equilibrium. DCP converge (get back) towards CPI at the speed of 4.82% annually as the data include is on annual basis. The p-values is also statistically significant presenting a short- run relationship between both variables.

V.VI Result of Human Development and Corruption

Table 25: Panel Unit Root

Variables	Methods	t-statistic	p-value	t-statistic	p-value
CPI	Levin-Lin-Chu (t*)	1.700	(0.955)	-33.086***	(0.000)
	Fisher-ADF (χ^2)*	43.041	(1.000)	907.57***	(0.000)
	Fisher-PP (χ)*	41.917	(1.000)	967.29***	(0.000)
HDI	Levin-Lin-Chu (t*)	0.913	(0.819)	-28.765***	(0.000)
	Fisher-ADF (χ^2)*	38.356	(1.000)	763.37***	(0.000)
	Fisher-PP (χ^2)*	38.745	(1.000)	1000.67***	(0.000)

Table 25 shows the t-statistics and p-values given by Levin-Lin-Chu (2002) and Fisher type tests by Maddala and Wu (1999) and Choi (2001). All the variables are non-stationary at level, as all p-values are significant at 1%, 5% and 10%, so we cannot reject the null hypothesis of Unit Root, but when all variables are taken at 1st difference, they become stationary, as all the p-values are statistically significant at 1% significance level. The order of integration of all variables is same, means all variables are I(1), so we can check the co-integration between them.

Table 26: Panel Co-Integration

Alternative Hypothesis	Techniques	t-statistic
Common AR Coefficients “within-dimension”	Panel v-statistic	4.414*** (0.000)
	Panel p-statistic	-
	Panel PP-statistic	-7.186*** (0.000)
	Panel ADF-statistic	-7.205*** (0.000)
		-6.709*** (0.000)

	Group p-statistic		-3.162***
			(0.000)
Individual AR Coefficients	Group PP-statistic	-	
“between-dimension”			-8.293***
	Group ADF-statistic	-	(0.000)
			-7.862***
			(0.000)

The table 26 shows the results of Residual based Panel Co-integration test given by Pedroni (1999, 2004). All the results are statistically significant as the p-values are less than 1% of significance level. So, it shows the rejection of null hypothesis of no co-integration and acceptance of alternative hypothesis of co-integration in both cases thus, the study found long-run relationship between variables.

Table 27: The results of FMOLS

Variable	Coefficient	t-statistic	p-value
HDI	4.902	[155.467]***	(0.000)

Table 27 shows results of Panel FMOLS (Fully Modified Ordinary Least Square). Coefficient value indicates long-run coefficient. P-values is statistically significant at 1% significance level. As HDI has positive sign, so, one-unit increase in HDI shows an increase in corruption index by 4.9028 units. When people are richer and aware, they spend more to get benefits, if not available easily on legal basis.

Table 28: The results of VECM

	Variable	Coefficient	t-statistic	p-value
ECT	HDI	-0.026	[-3.026]***	(0.002)

The table 28 shows the t-statistics, coefficient and p-values of ECT (Error Correction Term). Negative sign of coefficient indicates convergence of HDI towards equilibrium. HDI converge

(get back) towards CPI at the speed of 2.66% annually. Its p-value is also statistically significant at 5% significance level presenting a short-run connection between both variables.

V.VII Results of political Development and Corruption

Table 29: Panel Unit Root

Variables	Methods	At Level		At 1 st Difference	
		Statistic	p-value	Statistic	p-value
CPI	Levin-Lin-Chu (t*)	1.700	(0.955)	-33.08***	(0.000)
	Fisher-ADF (χ^2)*	43.043	(1.000)	907.57***	(0.000)
	Fisher-PP (χ)*	41.917	(1.000)	967.29***	(0.000)
BUR	Levin-Lin-Chu (t*)	-1.858	(0.315)	-35.49***	(0.000)
	Fisher-ADF (χ^2)*	131.90	(1.000)	893.47***	(0.000)
	Fisher-PP (χ^2)*	128.59	(0.802)	1048.57***	(0.000)
DEMO	Levin-Lin-Chu (t*)	-1.761	(0.457)	-36.34***	(0.000)
	Fisher-ADF (χ^2)*	158.86	(0.994)	863.90***	(0.000)
	Fisher-PP (χ^2)*	141.04	(0.298)	1121.26***	(0.000)
POLSTB	Levin-Lin-Chu (t*)	-2.276	(0.998)	-40.97***	(0.000)
	Fisher-ADF (χ^2)*	144.54	(1.000)	985.81**	(0.000)
	Fisher-PP (χ^2)*	157.14	(0.788)	1071.06***	(0.000)
RLW	Levin-Lin-Chu (t*)	-3.529	(0.459)	-37.82***	(0.000)
	Fisher-ADF (χ^2)*	135.21	(0.983)	965.59***	(0.000)
	Fisher-PP (χ^2)*	134.40	(0.879)	1045.11***	(0.000)

Table 29 shows the t-statistics and p-values given by Levin –Lin- Chu (2001) and Fisher type by Maddala and Wu (1999) and Choi (2001). All the variables are non-stationary at level, as all p-values are insignificant at 1%, 5% and 10%, null hypothesis of Unit Root cannot be rejected, but

when all variables are taken at 1st difference, they become stationary, as all the p-values are statistically significant at 1% significance level. The order of integration of all variables is same, means all variables are I(1), so we can check the co-integration among them.

Table 30: Panel Co-integration

Alternative Hypothesis	Techniques	t-statistic
Common AR Coefficients “within-dimension”	Panel v-statistic	-1.242 (0.893)
	Panel p-statistic	-
	Panel PP-statistic	1.783 (0.962)
	Panel ADF-statistic	-4.860*** (0.000)
		-6.006*** (0.000)
	Group p-statistic	4.160 (1.000)
Individual AR Coefficients “between-dimension”	Group PP-statistic	-
	Group ADF-statistic	-5.374*** (0.000)
		-6.673*** (0.000)

The table 30 shows the results of Residual based Panel Co-integration test given by Pedroni (1999, 2004). Results of four out of seven methods (Panel PP-statistic, Panel ADF-Statistic, Group PP-statistic, and Group ADF-Statistic) are statistically significant, as p-values are less than 1% significance level in these four tests. Although three methods have given values more than 10%, yet majority of the results are significant. So, it shows the rejection of null hypothesis of no co-

integration and acceptance of alternative hypothesis of co-integration in both cases thus, the study found long-run relationship among variables.

Table 31: The results of FMOLS

Variable	Coefficient	t-statistic	p-value
BUR	-0.28	[-1.349]	(0.177)
DEMO	1.87	[12.569]***	(0.000)
POLSTB	-1.42	[-3.843]***	(0.000)
RLW	-1.43	[-7.877]***	(0.000)

Table 31 shows results of Panel FMOLS (Fully Modified Ordinary Least Square). Coefficient values indicate long-run relationship. P-values of BUR, DEMO and POLSTB are significant at 1% significance level. These variables have significant impact on corruption. One-unit increase in BUR and POLSTB drop the corruption level by 0.2875 units and 1.4290 units respectively due to their negative signs. DEMO affects corruption positively by 1.8782 units as it has positive sign with coefficient. But the p-value of RLW is insignificant as it is more than 10%. It affects corruption negatively by 1.4318 units but insignificantly. Increased number of bureaucracy, more stable politicians and a perfect law and order condition often put pressure to overcome malfunctioned activities but more democracy where everything becomes open, some hidden doubtful activities always run.

Table 32: The results of VECM

	Variable	Coefficient	t-statistic	p-value
	BUR	-0.110	[-6.808]***	(0.000)
ECT	DEMO	-0.058	[-5.103]***	(0.000)
	POLSTB	-0.056	[-4.783]***	(0.000)
	RLW	-0.100	[-6.423]***	(0.000)

The table 32 shows the statistics, Coefficient and the p-values of ECT Error Correction Term). As the coefficients in all cases are negative and p-values are significant at 1% level of significance,

the study settles the presence of a short-run relationship between CPI-BUR, CPI-DEMO, CPI-POLSTB and CPI-RLW. Negative sign of coefficients shows convergence towards equilibrium.

- BUR convergence toward CPI at the speed of 11.07% annually.
- DEMO converge toward CPI at the speed of 5.8% annually.
- POLSTB converge toward CPI at the speed of 5.65% annually.
- RLW converge towards CPI at the speed of 10.07% annually.

P-values are statistically significant presenting short-run dynamic among different combination of variables.

Conclusions and Policy Suggestions

This study focused on the impacts of Development (Economic, Financial, Human, and Political) on corruption. It examined this relationship by using 20 years' data from sample of two panels of 49 Developing and 31 Developed countries. The main objective was to discover long-term connection and short-run dynamics between variables. At first, a thorough literature has been reviewed on the relationship of Economic Development and Corruption, Financial Development and Corruption, Human Development and Corruption respectively. As a result of the discussion, a detailed econometric methodology has been established to be used in this particular study. Corruption Perception Index was used as regressand to measure Corruption. Regressors were classified into four categories. For Economic Development GDP per capita, Ratio of Exports of Goods and Services to GDP, Ratio of Imports of Goods and Services to GDP has been used. For Financial Development, ratio of Domestic Credit to Private Sectors to GDP was employed. Human Development is measured by Human Development Index and for Political Development Government Effectiveness as proxy of Bureaucracy, Voice and Accountability as proxy of Democracy, Political Stability and Rule of Law was used. Stationarity has been tested to emit spurious results, with the help of three main tests named Levin-Lin-Chu (2002), Fisher- ADF BY Maddals and Wu (1999) and Fisher-PP by Choi (2001). All variables were stationary at the first difference, therefore, long-term relationship was examined by using Pedroni (1999) Residual Based Panel Co-integration Test. After accomplishing long-run connection among variables, co-integration coefficient has been estimated through Panel FMOLS technique, and the results implied that all Development variables have significant impact on Corruption except Political Stability in case of Developed Panel and Bureaucracy in case of Developing Panel. Lastly, the

speed of adjustment and short-term association has been tested by applying Panel VECM and results established that Short-run dynamics exist between EXP, IMP, BUR DEMO, POLSTB, RLW and CPI in developed countries. Whereas in developing countries, all variables have short-run relationship with corruption expect GDP per capita.

Some policy suggestions with the point of view of Corruption and Development relationship have been inferred from this study which include: Policy makers must simplify the imports and exports procedures. It will help reduce the practice of bribes to get their matters resolves quickly. Government should take steps to not only increase the income of people, but also to improve their standard of living in other aspects of life especially in Developing countries. Credit availability to public sector should also be made available on easy terms similar to that of private sector. But the policies and check & balance system in both cases should be strict. Along with improved standards of living, people should be served without discrimination. It can also help reduce the bribes. There should be improvement in the political system. Democracy is helpful to get rid of Corruption but more openness and strictness in democracy can be harmful sometimes, so careful steps should be taken by the Governments.

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