Trade, Economic Freedom and Corruption: Cross-Country Evidence

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Abstract

Using a panel data set for 146 countries over the period 1984-2007, this study contributes in the area of trade-corruption linkages by discovering a presence of threshold and significance of complementary policy reforms in shaping the link. Our analysis suggests that in a linear specification openness to trade is corruption increasing while its effect is negative in a non linear specification. We exhibit that this non-linear nature of the relationship is worth noting and lend support to answer the question why previous empirical results of the relationship between the degree of openness to trade and corruption index are so different from one another. Further more we argue and find empirical support to our proposition that this is not just openness to trade that can reduce corruption but there are complimentary policy reforms that cause a decline in corruption. This analysis shows that the combined effect of trade openness and high bureaucracy quality or financial reforms are corruption reducing. Finding of the study are robust to alternative specifications, econometric techniques, control of nonlinearity, control of interactive effects and exclusion of outliers.

JEL Classification: C23, D72, K42, H1, O50

Keywords: corruption; law; openness to trade; economic freedom; panel data

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1. Introduction

> Corruption is worse than prostitution. The latter might endanger the morals of an individual, the former invariably endangers the morale of the entire country- Karl Krauss

Corruption around the world is believed to be endemic and pervasive, a significant contributor to low economic growth, to stifle investment, to inhibit the provision of public services and to increase inequality to such an extent that international organizations like the World Bank have identified corruption as 'the single greatest obstacle to economic and social development' (World Bank, 2001). Though corruption has become a norm in many countries, but still it is disliked for its detrimental effects to development. The elimination of widespread corruption and the promotion of fairness in markets are at the core of development concerns and a principal objective of all countries.

Research on the determinants and effect of corruption has proliferated in recent years (see for example Lambsdorff, 2006 for an excellent review of the relevant literature). Cross-country empirical studies of the causes of corruption have investigated a wide range of factors like economic, cultural, political and institutional aspects. Following this research, a consensus on some determinants of corruption is slowly emerging, though several aspects are still unclear. For example, the role government and openness to trade in determining corruption remain unresolved.

While institutional and cultural factors have received a considerable amount of attention as key explanatory variables, a subset in the corruption literature has focused on the effects of various aspects of international openness on government corruption (Krueger, 1974; Ades and Di Tella, 1997, 1999; Wei, 1999; Sandholz and Koetzle, 2000; Wei and Sheifler, 2000; Bonaglia et al., 2001; Torrez, 2002; Lambsdorff, 2003; Sandholtz and Gray, 2003; Gatti, 2004). Among the analyses in the openness–corruption nexus, the empirical findings have mainly been supportive of the positive relationship between openness and good governance. Thus among many economists and political scientists there is an optimistic consensus in the empirical literature that openness has a negative relationship with corruption.

However, some theoretical and empirical studies disagree with negative relation ship between openness and corruption. For example, Ades and Di Tella 1999 in their theoretical model proves that effect of openness on corruption is ambiguous. In an empirical study, Treisman (2000) argues that trade liberalization may also create opportunities for corruption. As he finds, trade liberalization must be extensive in order for corruption to fall. If trade reform is not credible corruption may actually rise. Empirical studies by Gurgur-Shah (2005) and You and Khagram (2005) also note a positive relationship between openness to trade and corruption. Contrary to significant role of openness some studies find insignificant effect of openness on corruption (see for example Pellegrini-Gerlagh, 2008). Here, contribution of this study is two fold. First, we find a threshold level for openness-corruption relationship. A second important contribution of this study to the literature is the attention to the interplay between openness – an international variable – and domestic institutions of transparency. Specifically, we argue that complimentary policy reforms in a country play a conditional role in the spread of anti-corruption norms as economic openness increase. Previous empirical studies have overlooked the potentially significant interaction between openness and domestic institutions.

The existing literature on causes of corruption mainly focuses individual effects of corruption determinants and provides conflicting results. This paper adds to the existing literature by using cross-country data for 146 nations to examine the role of trade, legal influences and the economic freedom on corruption. Important innovations include considering an interactive and nonlinear nature of determinants of corruption, taking account of cross-border effects of corruption and examining some of the previously considered determinants at a finer level of detail. Four key questions addressed are: (1) what are the effects of the trade openness on the incidence of corruption? (2) Does the relationship between trade and corruption is perhaps non-monotonic? (3) How important are economic freedom and legal influences in affecting corruption? (4) What are the interactive effects of trade and domestic policy reforms?

1.3: Structure of the Study

Rest of the discussion is structured as follow. Section 2 provides a review of literature. Section 3 briefly describes data issues and section 4 provides an analytical frame work for the study. Section 5 put forwards results derived from the hypotheses and a comprehensive discussion on theses results. Finally, section 6 is our concluding section.

2. Review of Literature

2.1 Review of Studies Related to Trade Openness and Corruption

Analyzing how trade openness impacts governance and how it spurs or curbs corruption implies to clearly diagnose causes and effects of corruption and to take into consideration various factors. To carry out that we need to depart to from basic stylized facts to more complex theories and empirical tests. Particularly, the key question we try to investigate here is: why and how trade openness influences the level of perceived corruption in a given country? Apparently, an assessment of direct relationship between openness to trade and corruption seems difficult, however rent seeking literature provides the base to develop sound theoretical linkages between two.

Krueger (1974) provides the first mechanism between rent seeking activities and imports restrictions. The quantitative restrictions on imports, in contrast to tariff, quota and other official permissions to imports, generate considerable opportunities for economic rent seeking activities because of monopolistic powers entitled to legal importers. In order to exploit these opportunities, agents may legally compete or illegally seek rent seeking activities like smuggling, black market, bribery and corruption. Krueger confirms that these rent seeking activities force an economy to operate at a level below its optimal and lead to deviation between social and private costs and hence cause a welfare cost in addition to trade restrictions.

In successive academic papers, Bhagwati and Srinivasan (1980) and Bhagwati (1982), have extended Krueger's concept of rent seeking activities to a whole array of Directly Unproductive, Profit-seeking (DUP) providing further arguments in favor of free trade.

Recently Gatti (1999) provides empirical evidence of the explicit relationship between restricted trade and corruption. Indeed, the author detangles two effects of inward looking policies on corruption: the “direct policy distortion” and the “foreign competition effect”. Where direct policy distortion implies that high restrictions to free trade encourage private agents to seek favoritism from public officials offering bribes. And foreign competition effect implies that high barrier to international transactions hamper competition between domestic and foreign firms, such a decline in competition leads to high margins for corruption and rent seeking.

In another study, Ades and Di Tella (1997), provide further insights on corruption-rent seeking mechanism. They present evidence that the level of rents in general and market structure in particular determine the intensity of corruption in an economy. They argue that variation in rents size as a result of changes in competition cause ambiguous effects on corruption. On the one hand, lower levels of competition provide opportunities to bureaucrats to extract more rents from the firms they control. On the other hand this situation also implies that it is more valuable for the society to avoid corruption and increase the accountability and monitoring of its bureaucracy. Theoretically, net impact of competition on corruption is ambiguous. Investigating the net impact of these two possible tendencies requires empirical test.

However, real world exhibits some examples of possible association between both. For instance, Nigeria provides a striking example of positive association between rents and corruption. In 1980s, oil exports of Nigeria generated 80% of government revenue and created extraordinary opportunities for corruption. They develop a model based on three types of variables that determine corruption: wages of the bureaucracy, the level of monitoring by civil society and the level of profits of domestic firms that, in turn, degree of competition. In order to capture bureaucratic wages and monitoring, this study use general level of economic development (GDP per capita, schooling) and political development (Gastil index of political rights). They proxy degree of competition with the share of imports in GDP, the concentration of fuels and mineral exports in the composition of total export and the distance from the world’s major exporters. Evidence

of theirs study suggest that corruption is higher in countries where domestic firms are less exposed to foreign competition or countries with concentrated exports.

Wei (2000) advances a final third mechanism on the relationship between globalization and quality of institution by explicitly evaluating differences in the costs and benefits of monitoring government officials. The central idea is that quality of institutions and their capacity to curb corruption crucially depend on the resources a country allocates to this end. A country chooses to invest more in building good public governance when benefits are larger or costs are smaller.

Since international investors and traders can easily divert their businesses from one country to another than domestic ones, corruption and bad governance discourage more strongly to business decisions of foreign stake holders than domestic one. Such a diverse effect of corruption between domestic and foreign stake holders justifies strong corruption reducing policies in relatively more open economies. Given resulting larger benefits, an economy that is more exposed to international markets would find it optimal to allocate more resources to building good institutions and end up with a lower level of corruption than a less open inward-looking one.

These implications of the model depend on two key assumptions. First, the impact of corruption on international transactions is stronger than domestic ones. Wei justifies this assumption arguing that international investors enjoy stronger bargaining power relative to domestic procedures. Furthermore, enforcement costs for international contracts increase more steeply with bad governance. Second, assumption about direction of causality implies that openness is exogenous and it comes before corruption. Indeed it is important to examine the issue of causality in more detail for all three mechanisms of openness-corruption links we have illustrated.

According to Krueger model, trade policy come first independent of corruption (or other rent seeking activities). High barriers to trade reduce foreign competition and give a rise to rent seeking activities. In the Ades and Di Tella model, direction of causality goes

from degree of competition to corruption however this causality preserve certain intolerable thresholds which can provide incentives to change the rules of competition. They over come this circularity using import openness that is determined only by population and land size of a country. The assumption is that these variables are independent of corruption and effect corruption, indirectly, through their effects on import openness.

Finally, Wei (2000) addresses the problems of causality using two types of openness that are natural and residual openness. Where former is the potential cause of corruption and latter is the possible consequence of corruption. Wei, in his model, uses geographical measures, such as a country's distance from major trading nations weighted by bilateral trade flows, to determine natural openness. In this way, natural openness can not be altered by corrupt bureaucrats creating artificial trade barriers; however they can affect residual openness.

A positive relation between openness and corruption is born out by the initial experience of the transitional economies of Eastern Europe and erstwhile USSR, "where essential steps to privatize the economy and rewrite the rules of commerce after the demise of socialism were often accompanied by widespread corruption" (Transparency international, 2005, p.271). Liberalization typically increases imports, and imports introduce new goods and services to consumers of liberalized economies (this is in the spirit of international trade models with product differentiation (such as Krugman, 1980; Lawrence and Spiller, 1983) and Romer, 1994. Klenow and Rodriguez-Clare (1997) and Mitra (2005).

Trade liberalization may also create opportunities for corruption. As Treisman (2000) finds, trade liberalization must be extensive in order for corruption to fall. If trade reform is not credible corruption may actually rise. Furthermore, Tanzi (1998) argues that trade liberalization removes barriers to economic growth, these barriers were mostly imposed by national governments, and hence did nothing to eliminate regulations imposed, for instance, by local governments and unions. the authors further reports that international

trade has created new opportunities for corruption , as bribes age paid to obtain privileged access to markets, or specific benefits such as tax incentives.. (Tavares (2007) p.1057)

Smaller nations trade more because fewer goods are domestically produced in small countries. The market discipline imposed by being an open economy in turn imposes good governance. This argument is somewhat paradoxical, in claiming that the quality of the government is improved, relative to larger nations, by a more restricted choice set. It also neglects the possibility that small size could increase the per-capita rents that can be extracted by customs officials for precisely the same reasons that small economies are more open: a larger share of goods cross national boundaries, so corrupt customs officials have more opportunities to solicit bribes. Higher "natural openness" could then be associated with a higher incidence of corruption.

In nutshell, several arguments link trade openness to lower corruption. It is often claimed that by introducing greater foreign competition, trade liberalization reduces monopolistic rents enjoyed by firms and decreases their ability to pay a bribe, there by reducing bureaucratic corruption (e.g. Ades and Di Tella, 1999). Wei (2000) argues that countries that have a "natural" propensity to trade, because of their small size and favorable locations, will "find it optimal to devote more resources to building strong institutions" that constrain corrupt behavior. Ades and Di Tella (1999) argue that if corruptible officials are paid an efficiency wage to induce hones behavior, the effect of increasing competition on corruption is ambiguous. By reducing profits of oligopolistic firms, competition reduces the efficiency wage as it becomes less attractive to induce honesty, but, at these contradictory effects, equilibrium corruption can either rise or fall with completion.

Table 2.1 Trade openness reduces corruption

Authors	Subject	Data	Estimation Technique	Non linearity	Policy complimentary	Sample
Knack-Azfar (2003),	Trade Intensity and Corruption	Cross sectional 1995-99	OLS	No	No	40-98
Persson et al. (2003),	Electoral Rules and	Cross sectional &	OLS	No	No	80

	Corruption	Panel1990s				
Fisman-Gatti (2002),	Decentralization and Corruption	Cross sectional 1980-1995	OLS, 2SLS	No	No	59
Bonaglia et al. (2001),	Globalization and Governance	Cross sectional 1984-1998	OLS, OLS (IV)	No	No	-
Frechette (2001),	Determinant of Corruption	Panel data 1982-1998	Fixed Effects	No	No	135
Wei (2000),	Corruption and Global Capital Flows	Panel data 1994-96	Fixed Effects	No	No	99
Ades-Di Tella (1999),	Rents, Competition and Corruption	1980-83 1989-90	OLS, 2SLS	No	No	52, 31
Laffont and N'Guessan (1999),	Competition and Corruption in a agency relationship	Theory	-	No	No	-
Leite-Weidmann (1999)	Natural Resources and corruption	Cross sectional 1970-90	OLS, 2SLS	No	No	72
Gatti (2004)	Corruption and Openness	Simple Pooling 1982-2000	OLS	No	No	-

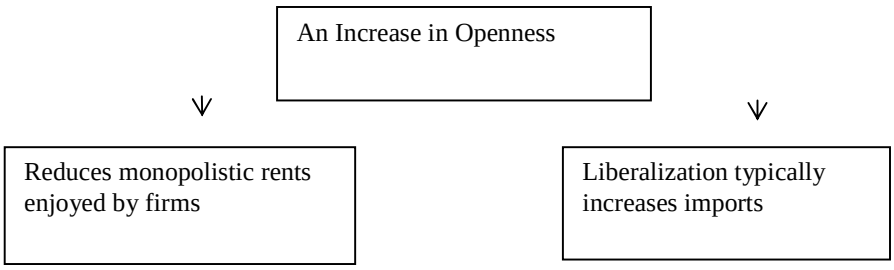
Trade 2.2 Trade openness increases corruption

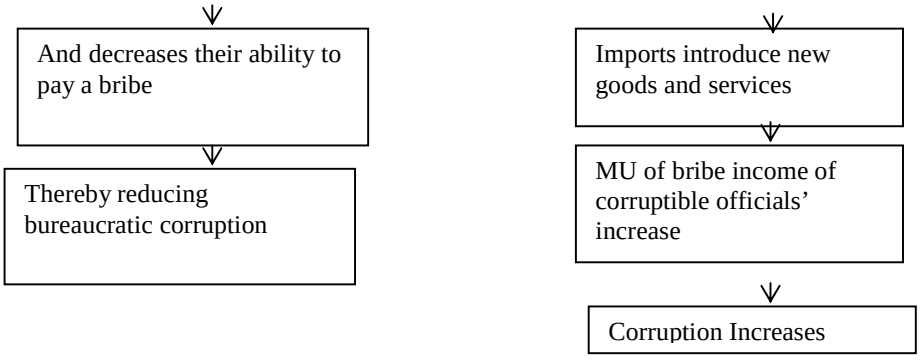
Authors	Subject	Data	Econometrics Technique	Sample
Gurgur-Shah (2005),	Localization and corruption	Cross sectional 1997	OLS	30
You and Khagram (2005)	Inequality and Corruption	Cross sectional 1996-2002	OLS, 2SLS	129

Trade 2.3 Openness is insignificant for corruption

Authors	Subject	Data	Econometrics Technique	Sample
Pellegrini-Gerlagh (2008)	Causes of Corruption	Cross sectional 1994-2003	WLS	106
You and Khagram (2005)	Inequality & Corruption	Cross sectional 1996-2002	OLS, 2SLS	129

Theory of Openness and Corruption





2.2 Review of Studies Related to Government Spending and Corruption

A larger government contributes to bureaucracy and thus can increase corruption (Rose-Ackerman, 1999). On the other hand, a larger government might be associated with stronger checks and balances (i.e., better over sight) and in this case corruption might actually decrease with government size (La Porta et al., 1999). But it can also refer to higher expenditures (by Govt) in education and health, or in public goods in general. These in turn could be channels through which corruption is diminished."(Pellegrini-Gerlagh (2008).

Table 2.4 Government Spending Deter Corruption

Authors	Subject	Data	Econometrics Technique	Sample Size
Fisman-Gatti (2002),	Decentralization and Corruption	Cross sectiona1980-1995	OLS, 2SLS	59
Montinola and Jackman (2002)	Sources of Corruption	cross sectional 1980-83 1989-92	OLS	66
Bonaglia et al. (2001)	Globalization and Governance	Cross sectiona1984-1998	OLS, OLS (IV)	-
La Porta et al., (1999).	Quality of Government	Cross sectional different year, mostly 1990s	OLS	47-152

Table 2.5 Government Spending Encourage Corruption

Authors	Subject	Data	Econometrics Technique	Sample Size
Ali-Isse (2003)	Determinants of Economic corruption	Cross sectional 1982-90,1995-99	OLS	-

(Rose-Ackerman, 1999)

Table 2.6 Government Spending insignificant for Corruption

Authors	Subject	Data	Econometrics Technique	Sample Size
Montinola and Jackman (2002) -	Sources of Corruption	cross sectional 1980-83 1989-92	OLS	66
Pellegrini-Gerlagh (2008) +	Causes of Corruption	Cross sectional 1994-2003	WLS	106

Theory of Government Spending and Corruption

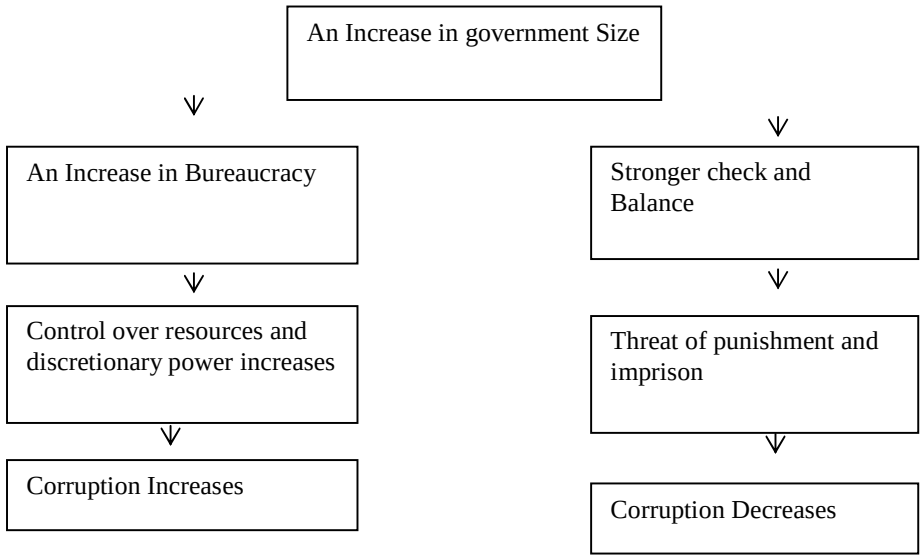


Table 2.7 Main Empirical Studies on Determinants of Corruption

Authors (Year of Pub.)	**ED**	**G**	**Ed**	**NE**	**Op**	**Re**	**EL**	**BL**	**RL**
Pellegrini-Gerlagh (2008)	-*	+		+*	-	-*	-	-	
Dreher et al. (2007)	-*		-*		+			-*	-*
Serra (2005)	-*					-*			
Kunicova-R.Ackerman (2005)	-*								
Lederman et al. (2005),	-*						+*		
Gurgur-Shah (2005),	-*	-			+*		+		
Braun-Di Tella (2004),	-*				+				
Damania et al. (2004),	-*								-*
Alt-Lassen (2003),	-*		-*						
Brunetti-Weder (2003),	-*		-*				+		-*
Graeff-Mehlkop (2003),	-*								

Herzfeld-Weiss (2003),	-*									-*
Knack-Azfar (2003),	-*					-*				
Tavares (2003),	-*									
Ali-Isse (2003),		+*	-*							-*
Bruentti and weder (2003)	-*		-*			+*				
Persson et al. (2003)	-*		-**			-*	-*	-		
Fisman-Gatti (2002),	-*	-*				-		+		
Paldam (2002-01),	-*						-*?			
Swamy et al. (2001),	-*									-*
Frechette (2001)	+*		+*	-*						
Bonanglia et al. (2001),	-*	-*		+*		-*	-*	-*		
Wei (2000)	-*					-*				
Treisman (2000)	-*			+		-	-*	+*	-*	
Rauch-Evan (2000),	-*		-*							
Sandholtz and Koetzle (2000)	-*					-*	-*			
Ades and Di Tella (1999)	-*		-*	+		-*				
La Porta et al. (1999)	-*	-*				-	-	+	-*	
Goldsmith (1999-97),	-*									
Van Rijckeghem-Weder (1997)	-*		-*							

ED= Economic Development; G=Government Spending; Ed=Education; PR=Political Rights; NE= Natural Endowment; OP=Openness; Re= religion; EL=Ethno-linguistic; BL=British Legal System; RL=rule of law

Table 2.7 Main Empirical Studies on Determinants of Corruption (Continued)

Authors (Year of Pub.)	**De**	**BC**	**De**	**F**	**Dc**	**PR**	**PI**	**EF**	**Pop**	**Inf**
Pellegrini-Gerlagh (2008)	-*	-	-*	-*	-*		+*			
Dreher et al. (2007)	-*		-*							
Serra (2005)	-*	-*	-*				-*			
Kunicova-R.Ackerman (2005)	-*		-*		+*			-*		
Lederman et al. (2005),	-*		-*	-*	-*					
Gurgur-Shah (2005),	-*	+*	-*		-*			-*		
Braun-Di Tella (2004),	-*		-*			+				+*
Damania et al. (2004),	-*		-*		+*				+*	
Alt-Lassen (2003),									+*	
Brunetti-Weder (2003),				-*						
Graeff-Mehlkop (2003),								-*		
Herzfeld-Weiss (2003),	-*		-*							
Knack-Azfar (2003),	-*		-*						+*	
Tavares (2003),		+*							-*	
Ali-Isse (2003),					-*			-*		
Bruentti and weder (2003)				-*		+				
Persson et al. (2003)						-				
Fisman-Gatti (2002),					-*				+*	
Paldam (2002-01),	-*		-*					+*		+*
Swamy et al. (2001),	-*	-*	-*							
Frechette (2001)	-*		-*							

Bonanglia et al. (2001),	-*		-*					
Wei (2000)	-*		-*		-*			
Treisman (2000)	-*	-*	-*		+*	-	-*	-*
Rauch-Evan (2000), Sandholtz and Koetzle (2000)	-*	-*	-*					-*
Ades and Di Tella (1999)	-*		-*			+		
La Porta et al. (1999) Goldsmith (1999-97),	-*		-*		+*			-*
Van Rijckeghem-Weder (1997)	-*		-*					

De= Democracy; BC= British Colony; F=freedom of Information; Dc= Decentralization; PR= Political Rights; PI=Political Instability; EF= Economic Freedom; Pop= Population; Inf. = Inflation

3. Data Description

The data for our test are drawn from a wide range of sources. Table1 provides a detailed description of the variables and their sources. As our principal measure of corruption, we use the International Country Risk Guide's corruption index; this is the measure that has been most commonly used in previous work in the economics literature. This variable is meant to capture the likelihood that government officials will demand special payments, and the extent to which illegal payments are expected throughout lower levels of government as subjectively ranked by panels of international experts (see Knack and Keefer, 1995).

Empirical studies on corruption mainly use two indexes of corruption provided by ICRG (International Country Risk Guide) and Transparency International. In this study corruption perception index by ICRG has been used for two reasons. First, this index spans over a long period of time and covers a large number of countries. Such a comprehensive nature of the index gives it an edge over other available indices for corruption. Second, this index is highly correlated with other available corruption indices (see Treisman, 2000).

Recently, Majeed and Macdonald (2010) show a correlation between these alternative corruption indices over the period 1984-2007. They show that correlation between ICRG and TI corruption indices is 0.87 while the correlation between ICRG and World Bank (WB)'s corruption indices is 0.88. Finally their study shows a very high correlation, 0.98,

between TI and WB. These high correlations indicate that these alternative corruption indices are consistent even though they are based on subjective rating. The other variables used in this study are reported in Table 1 (appendix). The data for this study has been averaged over 5-years non over lapping period, 1984-2007. Thus data series contain 5 observations for each country in the sample. The year average periods are: 1984-88, 1989-93, 1994-98, 1999-03, 2004-07.

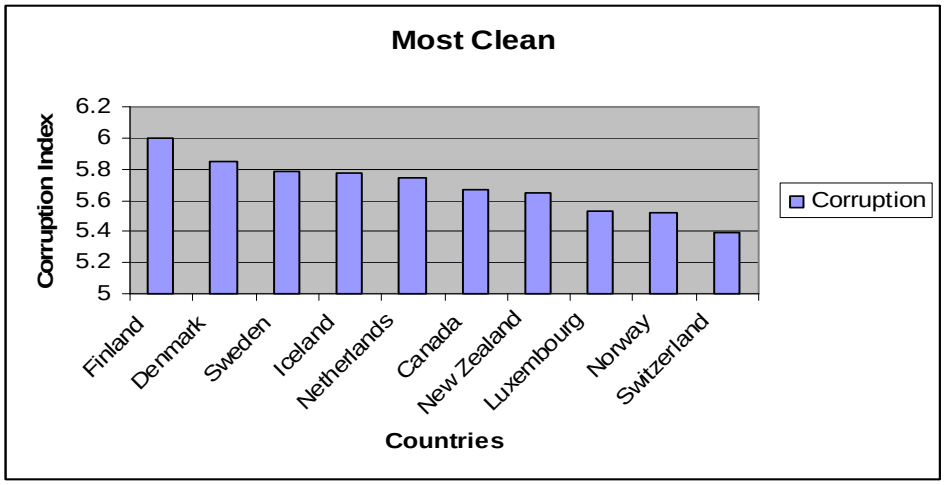
Table 3.3: Simple correlation among variables

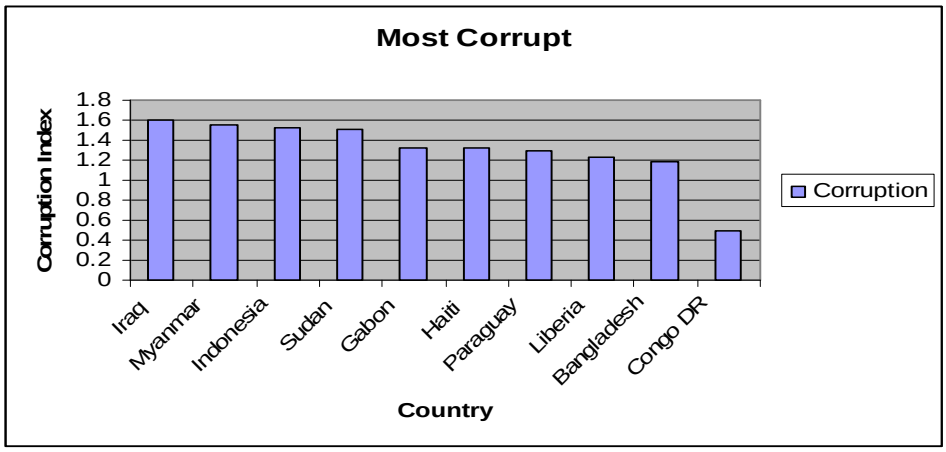
	Rem	MP	OP	Cred	UP	CL	Pro	Ethn	Fed	BC	Span	French	Ger	Scan	RL	Inf	IC	E
Rem	1																	
MP	-0.35	1																
OP	0.09	0.20	1															
Cred	-0.04	0.06	-0.04	1														
UP	-0.18	0.07	-0.35	-0.04	1													
CL	-0.06	-0.01	0.09	-0.08	0.13	1												
Pro	-0.21	0.48	0.01	-0.06	-0.08	0.07	1											
Eth	-0.11	-0.36	-0.13	-0.13	0.11	0.46	-0.18	1										
Fed	-0.21	0.17	-0.09	-0.05	0.49	0.12	-0.04	0.08	1									
BC	0.07	0.05	0.08	-0.08	0.14	0.87	0.05	0.33	0.11	1								
Spa	-0.04	-0.10	-0.05	-0.02	-0.05	-0.08	-0.06	0.11	-0.06	-0.08	1							
Fre	0.23	-0.30	-0.02	0.09	-0.12	-0.72	-0.49	-0.23	-0.24	-0.60	-0.12	1						
Ger	-0.15	0.30	-0.07	-0.00	0.08	-0.17	0.08	-0.17	0.34	-0.17	-0.03	-0.26	1					
Scan	-0.17	0.34	0.01	-0.02	-0.12	-0.19	0.82	-0.27	-0.13	-0.19	-0.03	-0.29	-0.06	1				
RL	-0.38	0.80	0.19	0.05	0.06	-0.07	0.46	-0.39	0.19	-0.04	-0.13	-0.26	0.32	0.44	1			
Inf	-0.14	-0.22	-0.13	-0.04	0.06	-0.17	-0.11	0.11	-0.01	-0.17	0.47	0.13	-0.08	-0.09	-0.26	1		
IC	-0.37	0.80	0.27	0.07	0.01	-0.11	0.46	-0.43	0.23	-0.08	-0.13	-0.22	0.34	0.38	0.86	-.28	1	
Ec	-0.29	0.60	0.12	0.02	-0.06	-0.25	0.35	-0.39	0.17	-0.20	0.03	-0.06	0.26	0.30	0.53	-.07	0.67	1

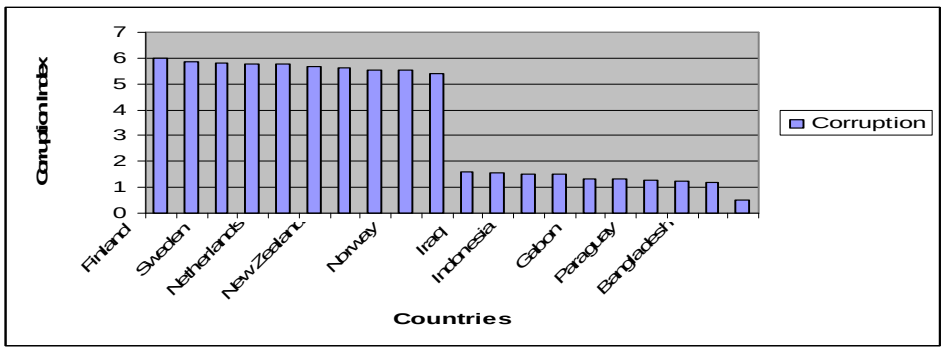
Table 3.4 Top and Bottom Ten Countries, 1984-2007

No	Top Clean Countries		Top Corrupt Countries	
	Country	Corruption Index	Country	Corruption Index
1	Finland	6	Iraq	1.595486
2	Denmark	5.850694	Myanmar	1.550347
3	Sweden	5.788194	Indonesia	1.515625
4	Iceland	5.774306	Sudan	1.510417
5	Netherlands	5.743056	Gabon	1.322917
6	Canada	5.668403	Haiti	1.315972
7	New Zealand	5.649306	Paraguay	1.284722
8	Luxembourg	5.528986	Liberia	1.236111
9	Norway	5.520833	Bangladesh	1.180556
10	Switzerland	5.390625	Congo DR	0.489583

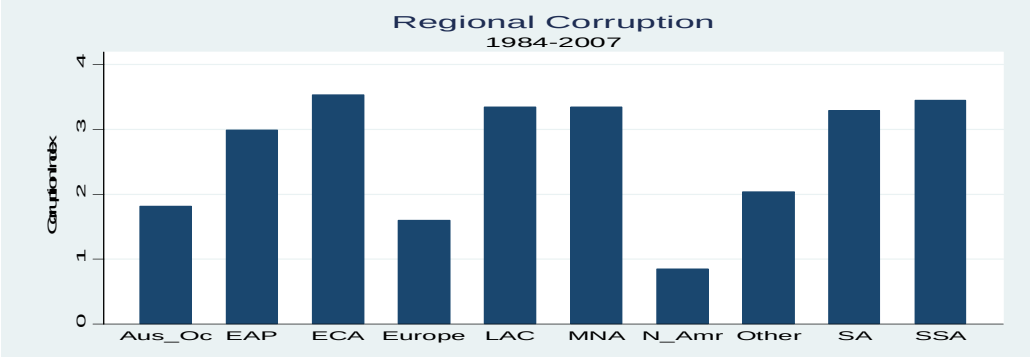
Note: corruption Index ranges from 0-6 where 0 indicates most corrupt and 6 indicates corruption free.







The most corrupt countries



4. Model and Estimation Technique

Theoretical formation of a model for this study relies on Becker (1968)'s seminal work where individuals make rational choices by giving weights to relative costs and benefits of an illegal (corrupt) activity. These costs and benefits depend on exogenous factors that, in turn, depend on the role of law and the socio-cultural environment. The socio-cultural environment is developed by historical, legal, political and country-specific factors. This study takes into account all these factors for an empirical analysis.

Openness to trade and increasing supply of foreign products on the domestic market enhances domestic competition, thereby reducing rents and corruption. Conversely, trade-barriers increase the opportunities for earning extra rents by gaining access to trade allowances, stimulating corruption. Furthermore, the imposition of trade barriers increases the incentive of importers and customs officials to collude (Krueger, 1974), thereby increasing corruption. But once trade barriers are lowered and domestic firms

have to compete with foreign firms, the rents enjoyed by the domestic firms are reduced, thereby diminishing the incentive for corruption (see Ades and di Tella, 1999). Greater openness, then, may reduce corruption, but the more corruption there is, the more rent-generating trade barriers there will be (Treisman, 2000).

Trade liberalization may also create opportunities for corruption. As Treisman (2000) finds, trade liberalization must be extensive in order for corruption to fall. If trade reform is not credible, corruption may actually rise. Furthermore, the Tanzi (1998) argues that though trade liberalization removes barriers to economic growth, these barriers were mostly imposed by national governments, and hence did nothing to eliminate regulations imposed, for instance, by local government and unions. The author further reports that international trade has created new opportunities for corruption, as bribes are paid to obtain foreign contracts or privileged access to markets, or even specific benefits such as tax incentives. Politicians wishing to maximize their chances of being re-elected will have an incentive then to award contracts or other benefits to firms that pay them bribes, which can be used to finance their campaigns. The lower the threat of punishment, in turn, will not only depend on how much information the voters have, but also on how easy it is to change the rules o of the game and/or buy votes to remain in office. Having discussed theoretical arguments, we propose following corruption models.

$$C_{it} = \alpha_{it} + \Psi_1 Open_{it} + \Psi_2 Y_{it} + \Psi_3 X_{it} + u_{it} + v_t + \varepsilon_{it} \quad \ldots\ldots (1)$$

Where (i= 1… N; t=1… T)

Where C_{it} is a perceived corruption index, $Open_{it}$ represents openness to trade, Xit represents a set of control variables based on existing corruption literature, u_i is a country specific unobservable effect, v_t shows time specific factor and ε_{it} is an i.i.d. disturbance term. Expected sign for our key variable of interest are given as follow: $\Psi_1 > 0$ or $\Psi_1 < 0$ $\Psi_2<0$

Equation 2 includes a non-liner term for openness to trade to test for possible existence of threshold in shaping the relationship between trade and corruption. Expected sign for Ψ_4 is negative. Expected sign for our key variable of interest are given as follow: $\Psi_1 > 0$ $\Psi 2<0$ $\Psi_3<0$

$$C_{it} = \alpha_{it} + \Psi_1 Open_{it} + \Psi_2 (Open)^2_{it} + \Psi_3 Y_{it} + \Psi_3 X_{it} + u_{it} + v_t + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Equation 3 includes an interactive terms Open*PR to assess the combined effect of trade openness and policy reforms in reducing corruption levels. Expected sign for Ψ_4 is negative.

$$C_{it} = \alpha_{it} + \Psi_1 Open_{it} + \Psi_2 Open*PR_{it} + \Psi_3 Y_{it} + \Psi_4 Open*PR_{it} + \Psi_3 X_{it} + u_{it} + v_t + \varepsilon_{it} \ldots. (3)$$

To identify the other variables that cause corruption, we draw extensively on the theoretical and empirical literature on this topic. We will take as a starting point the theories on the sources of corruption that are mentioned in Treisman (2000) and La Porta et al. (1999) as those studies are considered a benchmark in the literature and they provided a powerful battery of empirical tests. To these we will add the most recent findings of empirically backed literature in order to test and build upon their findings.

The rent-seeking literature emphasizes the link between corruption and possibilities for economic agents to gain access to sources of higher-than-average rents, when state intervention prevents free entry (see Rose-Ackerman 1999). In this perspective, the fight against corruption is helped with a reduction of non-generic state regulation. Thus, corruption would be associated to the size of government activities (Chafuen and Guzmàn 1999; Acemoglu and Verdier 2000).

A second argument relates to the extent of individual economic freedom. When the state and its administrative apparatus exercise relatively greater control over the economy, public officials make decisions that determine who will enjoy access to economic resources and opportunities. Under theses conditions, economic success depends less on market activities and more on the ability to influence the relevant officials. Thus bribery, extortion, payoffs, and kickbacks become viable means of influencing the distribution of wealth. Or, as Scott puts it, "the larger is the relative size and scope of the public sector, the greater will be the proportion of certain acts that will meet our criteria of corruption". Conversely, where economic outcomes are largely the product of private decisions (outside of state control), the state will not be seen as the crucial dispenser of economic recourses. Private economic activity is more likely than political/bureaucratic influence to lead to wealth. A high level of personal economic freedom thus implies reduced political control over economic opportunities, and fewer incentives to engage in corruption. It implies that the degree of state control of the economy should correlate positively with corruption.

Equation 4 is a modification of equation 1 which includes two other main variables of interest namely government spending and economic freedom. Where the expected effect of government spending could be either way while expected effect of economic freedom is negative

$$C_{it} = \alpha_{it} + \Psi_1 Open_{it} + \Psi_2 Y_{it} + \Psi_3 G_{it} + \Psi_4 EF_{it} + \Psi_5 X_{it} + u_{it} + v_t + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(4)}$$

Where (i= 1… N; t=1… T)

4.2 Estimation Technique

Ordinary Least Squares (OLS) has a problem of omitted variable bias. If region, country or some group specific factors affected growth rates, explanatory variables would capture the effects of these factors and estimates would not represent the true effect of explanatory variables. Baltagi (2001) proposes fixed effect econometric techniques to estimate panel data, which could avoid the problem of omitted variable bias. However, in case of lag independent variable this technique gives biased parameter estimates. This

analysis is based on 2SLS technique of estimation. This technique addresses the issue of endogeniety that is covariance between independent variables and error term is not equal to zero and also addresses the problem of omitted variables bias. We also use alternative econometrics techniques like random effects and system GMM.

5. Results and Discussions

Estimation procedure in this study has been proceeded in the following ways. First, using a panel data for 146 countries over a long period of the time has been estimated for economic prosperity. Second, initially, main variables of interest such as trade and law have been estimated. Third, for a sensitivity analysis some further control variables have been introduced. During sensitivity analysis we focus two things. First, to replicate existing determinants of corruption those have been already analyzed in literature and second we pick those controls that are yet controversial in empirical literature for better explanation like government spending and trade openness. Fourth, we estimate a non-monotonic relationship between trade and corruption to discover possible presence of a threshold level. Fifth, we estimate interactions between trade and some other important variables to find out the importance of complimentary policy reforms. Sixth, in order to control time factor, we also introduce five time dummies that are based on five year averages 1989 (1984-89), 1994 (1990-94), 1999 (1995-99), 2004 (2000-04) and 2007. Seventh and finally, alternative econometric techniques have been used to address the possible problem of endogeneity.

Table 1: Corruption and Openness: Panel Estimation

Variable							
Openness	0.002	0.002	0.003	0.004	0.003	0.002	-0.004
	(2.15)**	(2.43)*	(3.68)*	(4.39)*	(3.36)*	(2.82)*	(-4.08)*
PCY	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-18.96)*	(-12.89)*	(-6.12)*	(-5.38)*	(-6.16)*	(-6.60)*	(-5.44)*
EF		-0.21	-0.16	-0.17	-0.07	-	-0.071
		(-18.31)*	(-6.88)*	(-7.12)*	(-1.98)**		(2.07)**
RL			-0.36	-0.33	-0.34	-0.29	-0.29
			(-10.11)*	(-9.17)*	(-8.99)*	(-8.00)*	(-8.05)*
Government				-0.034	-	-0.028	-0.034
expenditure				(-5.17)*		(-4.38)*	(-5.20)*
Democracy					0.158	-0.21	-0.16

					(3.68)*	(-7.28)*	(-3.76)*
R	0.38	0.45	0.53	0.54	0.54	0.54	0.55
R2	0.37	0.44	0.52	0.53	0.53	0.53	0.54
F	183.31	158.40	164.48	137.46	137.06	138.42	119.47
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	608	600	600	591	600	598	591

Note: The t-statistics are given in parentheses (*), (**), and (***) indicate statistical significance at 1%, 5% and 10% levels respectively

Table 1 reports the results on openness to trade and corruption. Empirical literature is not yet conclusive on the role of openness in effecting corruption. Though majority of the studies report negative effect of openness on corruption but some studies differ with it. Our study reports a robust positive effect of openness on corruption. In most of the regression coefficient on openness is highly significant at 1% level. Our results reveal that a one unit increase in standard deviation will lead to 0.025 increases in corruption.

It is interesting to note that when we keep openness to trade as a key variable of interest then significance level of other corruption determinants improve drastically. In most of the regressions coefficients on other corruption determinants become significant at 1% level. For instance role of economic freedom is much significant in openness regressions. Rule of law, government expenditure and democracy all of them appear with expected signs and significant at 1% level.

Table 2: Corruption and Openness: Panel Estimation: Random Effects

Variable							
Openness	0.006	0.006	0.006	0.006	-0.006	0.005	0.006
	(4.47)**	(4.60)*	(5.15)*	(5.46)*	(-4.70)*	(4.63)*	(5.32)*
PCY	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-7.78)*	(-7.40)*	(-4.71)*	(-3.65)*	(-6.53)*	(-4.63)*	(-3.82)*
EF		-0.12	-0.09	-0.095	-0.064		-0.07
		(-3.80)*	(-2.95)*	(-3.18)*	(-1.63)**		(-1.89)**
RL			-0.29	-0.28		-0.27	-0.27
			(-7.62)*	(-7.57)*		(-7.08)	(-7.06)*
Government expenditure				-0.045	-0.05	-0.04	-0.04
				(-5.43)*	(-5.39)*	(-4.95)*	(-5.45)
Democracy					-0.13	-0.09	-0.053
					(-2.97)*	(-2.76)*	(-1.26)*
RB	0.40	0.53	0.62	0.61	0.60	0.62	0.63
RO	0.33	0.41	0.50	0.51	0.48	0.51	0.52

Observations	608	600	600	591	591	598	591	

Note: The t-statistics are given in parentheses (*), (**), and (***) indicate statistical significance at 1%, 5% and 10% levels respectively

In Table 2 we control for random effects and results for openness improves in this case like coefficient on openness is 0.006 that is higher as compared to benchmark analysis 0.004. In this case a one unit increase in standard deviation will lead to 0.037 increases in corruption. All other results remain same however coefficient on economic freedom slightly fall though it remain significant through out. The other factors like rule of law and government expenditures remain robustly significant.

Table 3: Corruption and Openness: Panel Estimation: Sensitivity Analysis (I)

Variable								
Openness	0.003	0.004	0.002	0.003	0.003	0.002	0.004	0.012
	(3.68)*	(4.28)*	(2.44)*	(3.14)*	(3.52)*	(1.77)***	(4.36)*	(7.39)*
PCY	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-6.12)*	(-6.26)*	(-6.18)*	(-5.82)*	(-5.92)*	(-7.70)*	(-5.78)*	(-3.36)*
EF	-0.16	-0.16	-0.15	-0.18	-0.17	-0.20	-0.12	-0.14
	(-6.88)*	(-6.73)*	(-6.42)*	(-7.1)*	(-6.80)*	(-8.75)*	(-4.89)*	(-6.01)*
RL	-0.36	-0.36	-0.43	-0.41	-0.37	-0.41	-0.30	-0.31
	(-10.11)*	(-10.36)*	(-11.7)*	(-8.98)*	(-9.83)*	(-11.85)*	(-7.69)*	(-8.87)*
Urbanization		0.000						
		(2.65)*						
Government Stability			0.121					
			(5.66)*					
Internal Conflict				0.05				
				(1.87)***				
External Conflict					0.021			
					(0.93)			
Investment Profile						0.15		
						(7.49)*		
Military Politics							-0.12	
							(-3.57)*	
Openness* Bureaucracy Quality								-0.003
								(-6.35)*
R	0.53	0.53	0.55	0.53	0.53	0.57	0.54	0.56
R2	0.52	0.53	0.54	0.52	0.52	0.56	0.53	0.55
F	164.48	134.33	144.84	132.84	131.73	154.96	136.73	148.33
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	600	600	600	600	600	600	600	600

Note: The t-statistics are given in parentheses (*), (**), and (***) indicate statistical significance at 1%, 5% and 10% levels respectively. mp sign did not change

Table 4: Corruption and Openness: Panel Estimation: Sensitivity Analysis (II)

Variable							
Openness	0.003	0.003	0.003	0.003	0.003	0.003	0.003
	(3.68)*	(3.74)*	(4.11)*	(1.81)***	(3.29)*	(3.50)*	(3.26)*
PCY	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-6.12)*	(-6.23)*	(-2.91)*	(-3.55)*	(-6.50)*	(-5.11)*	(-6.73)*
EF	-0.16	-0.14	-0.10	-0.19	-0.16	-0.17	-0.13
	(-6.88)*	(-5.63)*	(-4.34)*	(-4.91)*	(-6.64)*	(-7.00)*	(-4.90)*
RL	-0.36	-0.34	-0.25	-0.43	-0.36	-0.32	-0.35
	(-10.11)*	(-9.62)*	(-6.86)*	(-6.59)*	(-10.09)*	(-8.87)*	(-9.68)*
Religion in Politics		0.08					
		(2.34)*					
Bureaucracy Quality			0.399				
			(7.77)*				
Arm Trade				0.000			
				(1.55)			
Inflation					0.000		
					(2.11)*		
HFI						0.000	
						(1.90)*	
Remittances							0.013
							(1.6)***
R	0.53	0.53	0.57	0.58	0.56	0.47	0.58
R2	0.52	0.53	0.56	0.57	0.55	0.46	0.57
F	164.48	134.08	156.80	63.32	141.96	90.10	133.33
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	600	600	600	600	600	600	600

Note: The t-statistics are given in parentheses (*), (**), and (***) indicate statistical significance at 1%, 5% and 10% levels respectively

In above two tables we conduct a very comprehensive sensitivity analysis using 13 additional corruption determinants. The coefficient on openness remains robustly significant with positive sign and coefficient fluctuate between 0.003 and 0.004. Here we will highlight the most and least significant factors observed in this sensitivity analysis. Bureaucracy quality, government stability and investment profile turn out the most significant factors that effect corruption, while arm trade and external conflict turn out least significant determinants.

We purpose another line of reason in the literature on openness-corruption nexus that earlier studies did not include the role of complementary reforms that bring the fruits of openness. This is not just openness but other complementary factors like rule of law,

financial reforms, bureaucracy quality among others do matter in transmitting the true effects of openness on corruption. In order to assess this proposition, we include an interaction term of openness and bureaucracy quality and find highly significant negative effect on corruption. So this is not just openness but also complementary reforms matter in reducing corruption.

Table 5: Corruption and Openness: Panel Estimation: Nonlinearity

Variable							
Openness	0.007	0.012	0.011	0.009	0.009	0.007	0.01
	(3.72)**	(5.35)*	(5.41)*	(4.23)*	(4.95)*	(3.74)*	(5.93)*
Openness	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
Square	(-2.33)*	(-3.83)*	(-4.04)*	(-3.18)*	(-4.15)*	(-2.50)*	(-3.18)*
PCY	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-5.54)*	(-4.34)*	(-4.36)*	(-9.35)*	(-5.35)*	(-5.55)*	(-3.22)*
EF	-0.17	-0.18	-0.08	-0.06	-	-0.07	-0.19
	(-7.14)*	(-7.67)*	(-2.35)*	(-1.71)***		(-2.12)*	(-7.78)*
RL	-0.37	-0.34	-0.30	-	-0.30	-0.34	-0.31
	(-10.36)*	(-9.60)*	(-8.45)*		(-8.42)	(-9.26)	(-8.40)*
Government	-	-0.04	-0.04	-0.05	-0.04	-	-0.04
expenditure		-(6.05)*	-(6.14)*	-(6.83)*	-(5.46)*		(-5.26)*
Democracy	-	-	-0.17	-0.25	-0.23	-0.16	-
			(-3.97)*	(-5.88)*	(-7.93)*	(-3.79)*	
OP*HFI							-0.000
							(-2.56)*
R	0.53	0.55	0.57	0.51	0.55	0.55	0.50
R2	0.52	0.54	0.56	0.50	0.54	0.54	0.49
F	133.65	119.66	107.41	101.11	121.38	116.27	71.84
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	600	600	591	591	591	591	591

Note: The t-statistics are given in parentheses (*), (**), and (***) indicate statistical significance at 1%, 5% and 10% levels respectively

Table 6: Corruption and Openness: Panel Estimation: Nonlinearity: Random Effects

Variable							
Openness	0.014	0.017	0.012	0.014	0.018	0.011	0.017
	(5.55)*	(6.81)*	(6.85)*	(5.43)*	(7.22)*	(4.39)*	(6.70)*
Openness	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
Square	(-3.54)*	(-4.84)*	(-4.96)*	(-4.03)*	(-5.03)*	(-3.37)*	(-4.57)*
PCY	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-3.92)*	(-2.52)*	(-2.65)*	(-2.58)*	(-2.03)**	(-4.73)*	(-2.27)**
EF	0.11	0.12	0.04	0.12	0.076	0.16	0.13
	(3.46)*	(4.01)*	(2.29)*	(4.07)*	(2.46)*	(5.66)*	(4.21)*
RL	-0.30	-0.30	-0.29	-0.37	-0.24	-0.33	-0.27

	(-8.03)*	(-8.19)*	(-7.57)*	(-9.58)*	(-6.22)*	(-9.45)	(-7.12)*
Government expenditure	-	-0.05 -(6.39)*	-0.05 -(6.46)*	-0.05 -(5.34)*	-0.049 -(5.94)*	-0.04 (-4.99)	-0.05 (-5.46)*
Democracy	-	-	-0.07 (-1.75)*				-
Government Stability				0.094 (5.08)*			-0.000 (-2.56)*
Military in Politics					-0.15 (-4.04)*		
Investment Profiles						0.15 (8.38)*	
OP*HFI							0.000 (1.00)
RO	0.63	0.65	0.67	0.67	0.64	0.68	0.60
RB	0.50	0.52	0.53	0.54	0.53	0.57	0.47
Observations	600	591	591	591	591	591	591

Note: The t-statistics are given in parentheses (*), (**), and (***) indicate statistical significance at 1%, 5% and 10% levels respectively

Table 7: Corruption and Openness: Panel Estimation: Nonlinearity: Sensitivity Analysis

Variable								
Openness	0.012	0.009	0.007	0.011	0.009	0.013	0.012	0.006
	(5.35)*	(4.48)*	(3.90)*	(5.67)*	(5.08)*	(5.08)*	(5.57)*	(3.15)*
Openness	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
Square	(-3.83)*	(-3.42)*	(-3.14)*	(-3.96)*	(-3.42)*	(-4.24)*	(-4.07)*	(-2.65)*
PCY	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-4.34)*	(-4.57)*	(-5.97)*	(-4.11)*	(-1.91)**	(-2.18)**	(-3.49)*	(-5.18)*
EF	-0.18	-0.17	-0.21	-0.15	-0.13	-0.20	-0.19	-0.19
	(-7.67)*	(-7.16)*	(-9.27)*	(-5.92)*	(-5.24)*	(-5.53)*	(-7.79)*	(-9.12)*
RL	-0.34	-0.40	-0.38	-0.29	-0.25	-0.44	-0.31	-0.37
	(-9.60)*	(-10.77)*	(-11.15)*	(-7.70)*	(-6.84)*	(-6.98)*	(-8.54)*	(-11.36)*
Government	-0.04	-0.04	-0.04	-0.04	-0.04	-0.06	-0.04	-0.03
expenditure	(-6.05)*	(-5.24)*	(-5.42)*	(-5.54)*	(-4.97)*	(-5.19)*	(-5.18)*	(-4.14)*
Government Stability	-	0.099 (4.29)*						
Investment Profile			0.14 (6.95)*					
Military in Politics				-0.09 (-2.84)*				
Bureaucracy Quality					-0.34 (6.71)*			
Arm Trade						0.00 (2.01)*		
HFI							0.00 (1.84)*	

Yr1989								-0.23 (-2.08)**
Yr1994								-0.34 (-3.18)*
Yr1999								0.53 (5.27)*
Yr2004								0.82 (7.93)*
R	0.55	0.57	0.59	0.56	0.59	0.63	0.50	0.66
R2	0.54	0.56	0.58	0.55	0.58	0.62	0.49	0.65
F	119.66 (0.000)	109.09 (0.000)	117.77 (0.000)	104.95 (0.000)	116.85 (0.000)	53.93 (0.000)	70.97 (0.000)	110.74 (0.000)
Observation	600	591	591	591	591	230	512	512

Note: The t-statistics are given in parentheses (*), (**), and (***) indicate statistical significance at 1%, 5% and 10% levels respectively

Table 8: Corruption and Openness: Panel Estimation (IVE)

Variable	IV	LIML	GMM	IV	LIML	GMM
Openness	0.002 (2.53)*	0.003 (2.53)*	0.003 (2.94)*	0.002 (2.32)**	0.002 (2.32)**	0.003 (2.92)*
PCY	-0.000 (-6.31)*	-0.000 (-6.31)*	-0.000 (-6.19)*	-0.000 (-5.91)*	-0.000 (-5.90)*	-0.000 (-5.95)*
DE	-0.08 (-1.53)	-0.08 (-1.53)	-0.08 (-1.63)***	-0.11 (-1.98)**	-0.11 (-1.98)**	-0.11 (-2.11)**
BQ	-0.32 (-3.94)*	-0.32 (-3.99)*	-0.33 (-4.72)*	-0.31 (-3.69)*	-0.31 (-3.67)*	-0.30 (-4.10)*
Government spending	-0.04 (-3.45)*	-0.04 (-3.45)*	-0.04 (-3.46)*	-0.04 (-3.28)*	-0.03 (-3.29)*	-0.04 (-3.63)*
Remittances	-	-	-	0.02 (1.76)***	0.02 (1.76)***	0.01 (1.5)
R2	0.58	0.58	0.58	0.58	0.58	0.59
Sargan	2.03 P=0.36	2.03 P=0.36	2.39 hen P=0.29	2.94 P=0.23	2.97 P=0.23	
Basmann	2.0 P=0.37	1.00 P=0.37		2.90 P=0.24	1.45 P=0.24	
Observations	380	380	380	376	376	376

Note: The t-statistics are given in parentheses (*), (**), and (***) indicate statistical significance at 1%, 5% and 10% levels respectively

6. Conclusion

Numerous factors have been considered to assess the causes of corruption. The economics literature on corruption is slowly coming to agreement on some issues, although many issues remain unsolved. For instance, in her review of the existing literature, Serra (2006) identifies economic prosperity, democracy, and political stability

among the important determinants of corrupt activity (also see Jain, 2001; Lambsdorff, 2006). However, the literature has not yet examined the presence of threshold in shaping the relationship between trade and corruption. Similarly, the importance of complimentary policy reforms in corruption-openness nexus has not yet been examined. The results presented in this study confirm some of the previous conclusions regarding the causes of corruption, but it also sheds light on some new results and raises entirely new questions and also provides better explanation of earlier inconclusive findings.

The literature on corruption theories is not yet conclusive on the relationship between trade openness and corruption. We try to build a consensus by controlling non linear nature of the relationship and complimentary reforms. Our analysis suggest that in a linear specification openness to trade is corruption enhancing while in a non linear specification the effect is negative after reaching a certain level of openness using a panel data set for 146 countries over the period 1984-2007. Further more we argue and find empirical support to our proposition that this is not just openness to trade that can reduce corruption but there are complimentary policy reforms that cause a decline in corruption. The combined effect of trade openness and high bureaucracy quality are corruption reducing. Similarly combined effect of trade openness and financial reforms reduce corruption. Previous literate provide mix results on this variable because of over looking non linear nature of the relationship and complimentary reforms.

Our study finds out negative and significant impact of government spending on corruption. Though this not empirical regularity but in lines with Montinola and Jackman (2002) who challenge the common claim of the rent-seeking literature that large public sectors engender corruption on empirical grounds. This study shows s that economic freedom reduce4 corruption in all regression. The sign of the coefficient on economic freedom on economic freedom is always stable and significant.

Following research questions posted by the study, we find out that openness increases corruption. This study does not find systematic evidence of negative association between openness to trade and corruption. However, our analysis finds strong support for a

threshold level of openness and complimentary reforms. It is evident form empirical results that openness to trade reduces corruption when it is combined with complementary policy reforms-such as financial and governance reforms-or after reaching a threshold point. In this study, government expenditures appear to have negative effect on corruption.

Appendix:

Table 1: Description of Variables

Variable	Definitions	Sources
Per capita real GDP	Per capita real GDP growth rates are annual averages between two survey years	IMF, WDI and International Financial Statistics (IFS) databases.
Secondary school enrollment	The secondary school enrollment as % of age group is at the beginning of the period. It is used as a proxy of investment in human capital	World Bank database World Bank (2008)
Investment	Investments as shares of GDP are annual average for the period between two survey years	International Financial statistics; IFS.
Credit as % of GDP	Credit as % of GDP represents Claims on the non-financial private sector/GDP	Derived from 32d line of the IFS.
M2 as % of GDP	It represents Broad money/GDP,	Derived from lines 34 plus 35 of the IFS.
Trade Liberalization	It is the sum of exports and imports as a share of real GDP. Data on exports, imports and real GDP are in the form of annual averages between survey years.	World Bank database World Bank (2008)
Corruption	ICRG index 0-6 scale; where 6 indicate high degree of corruption and 0 indicate no corruption.	International Country Risk Guide, PRS group.
Democracy	ICRG index 0-6 scale; where 6 indicate high degree of democracy.	International Country Risk Guide, PRS group.
Military in Politics	ICRG index 0-6 scale; higher risk ratings (6) indicate a greater degree of military participation in politics and a higher level of political risk.	International Country Risk Guide, PRS group.
Religion in Politics	ICRG index 0-6 scale: higher ratings are given to countries where religious tensions are minimal.	International Country Risk Guide, PRS group.
Ethnic Tensions	ICRG index 0-6 scale; higher ratings are given to countries where tensions are minimal.	International Country Risk Guide, PRS group.
Rule of Law	ICRG index 0-6 scale; where 6 indicate high degree of law and order.	International Country Risk Guide, PRS group.
Bureaucracy Quality	ICRG index 0-4 scale; where 4 indicate high degree of law and order.	International Country Risk Guide, PRS group.
Government Stability	ICRG index 0-12 scale; where 0 indicates very high risk and 12 indicates very low risk.	International Country Risk Guide, PRS group.
Socioeconomic Conditions	ICRG index 0-12 scale; where 0 indicates very high risk and 12 indicates very low risk.	International Country Risk Guide, PRS group.
Investment Profiles	ICRG index 0-12 scale; where 0 indicates very high risk and 12 indicates very low risk.	International Country Risk Guide, PRS group.
Internal Conflict	ICRG index 0-12 scale; where 0 indicates very high risk and 12 indicates very low risk.	International Country Risk Guide, PRS group.

External Conflict	ICRG index 0-12 scale; where 0 indicates very high risk and 12 indicates very low risk.	International Country Risk Guide, PRS group.
Economic Freedom	ICRG index 0-7 scale	Fraser Institute.
HFI	The level of Financial Intermediation is determined by adding M2 as a % of GDP and credit to private sector as % of GDP.	World Bank database World Bank (2008);IFS
British Colony	A dummy variable that is 1 for British Colony	http://flagspot.net/flags/gb-colon.html
British	British legal origin	La Porta et al. (1997)
French	French legal origin	La Porta et al. (1997)
Scandinavian	Scandinavian legal origin	La Porta et al. (1997)
Socialist	Socialist legal origin	La Porta et al. (1997)
Germany	Germany legal origin	La Porta et al. (1997)
Equator	Distance from equator	La Porta et al. (1997)
Ethno	Ethno fractionalization	Alesina et al. (2003)
Ling	Linguistic fractionalization	Alesina et al. (2003)
Religious fract	Religious fractionalization.	Alesina et al. (2003)
RP	Religious polarization	Reynal-Querol (2006)
esp_col	Spanish colony	CEPII (2006)
fra_col	French colony	CEPII (2006)
prt_col	Portuguese colony	CEPII (2006)
Abslat	Absolute latitude in degrees	CEPII (2006)
Distcr	Mean distance to coast or river	CID (2001)

Table 2: Summary Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Corruption	675	2.932585	1.322528	-.0333328	6
Per Capita Income	653	6949.03	9566.997	84.89059	53800.33
Remittances	523	2.847373	4.769296	.0018351	42.54366
High Financial Lib.	562	95.77334	197.5284	5.237262	4410.351
Openness	644	78.72449	47.99039	2.566213	442.2996
Government	635	16.04497	6.173756	4.05478	46.35652
Democracy	675	3.6823	1.607773	0	6
Economic Freedom	673	4.403913	1.942066	1	7
Urbanization	693	1.81e+07	4.72e+07	91250.07	5.34e+08
Military in Politics	675	3.715646	1.785895	0	6.033333
Bureaucracy Quality	675	2.139725	1.171961	0	4
Socio Economic	675	5.68345	2.131201	.0208333	10.775
Government Stability	675	7.566057	2.006066	1.466667	11.5
Internal conflict	675	8.765272	2.564226	.0333333	12
External conflict	675	9.604507	2.118613	0	12
Investment Profiles	675	7.057228	2.339163	.8000001	12
Religion in Politics	675	4.591332	1.320474	0	6
Rule of Law	675	3.667232	1.45727	.55	6
Ethno linguistic	675	3.932934	1.427448	0	6
Consumer P Index	621	41152.82	1023276	7.20e-10	2.55e+07
Inflation	615	74.31995	434.1466	-4.207125	6523.051
Credit Private	635	103.5882	775.4475	.7621964	12437.82
Capital Formulation	643	22.13034	6.456459	6.354923	56.41584

Net Users	554	9.167496	16.75737	0	82.23592
Military/Government	296	10.34746	9.270922	0	53.5601
Military/GDP	583	2.785165	3.350683	0	43.7737
Education	633	66.66573	32.51444	3.31139	156.3496
Arm exports	276	4.20e+08	1.52e+09	0	1.27e+10
Aram imports	573	2.06e+08	4.05e+08	0	3.70e+09
Arm Trade	259	7.99e+08	1.63e+09	8666667	1.33e+10
News papers	230	127.1414	137.2347	.1951921	588.01
External Debt	412	86.79141	97.3172	.8948886	992.9259

Reference:

Ades, A. and Di Tella, R. (1997). The new economics of corruption: a survey and some new results. *Political Studies*, XLV: 496-515.

Ades, A. and Di Tella, R. (1999). Rents, Competition, and Corruption. *American Economic Review*, 89(4): 982-92.

Ali, M. Abdiweli and Hodan Said Isse. 2003. "Determinants of Economic Corruption: A Cross-Country Comparison". Cato Journal 22(3): 449-466.

Alt, James E. and David Dreyer Lassen. 2003. "The Political Economy of Corruption in American States". Journal of Theoretical Politics 15(3): 341-365.

Becker, G. S. (1968). Crime and punishment: An economic approach, *Journal of Political Economy*, 76: 169–217.

Becker, Gary S. and Edward L. Glaeser and Kevin M. Murphy. (1999). Population and economic Analysis". Empirical Economics.

Bhagwati, J. (1982), "Directly Unproductive, Profit-Seeking (DUP) Activities", Journal of Political Economy, 90, 988-1002.

Bhagwati, J. and T.N. Srinivasan (1980), "Revenue Seeking: A Generalization of the Theory of Tariffs", Journal of Political Economy, 88, 1069-87.

Bonaglia, Federico, Jorge Braga de Macedo, and Maurizio Bussolo. 2001. "How Globalization Improves Governance". Discussion Paper No. 2992. Paris, France: Centre for Economic Policy Research, Organization for Economic Co-operation and Development.

Braun, Miguel and Rafael Di Tella. 2004. "Inflation, Inflation Variability, and Corruption". Economics and Politics 16: 77-100. 53

Brunetti, Aymo and Beatrice Weder. 2003. "A Free Press is Bad News for Corruption". Journal of Public Economics 87:1801-1824.

Damania, Richard, Per Fredriksson, and Muthukumara Mani, 2004. "The Persistence of Corruption and Regulatory Compliance Failures: Theory and Evidence". Public Choice 121: 363-390.

Fisman, Raymond J. and Roberta Gatti. 2002. "Decentralization and Corruption: Evidence across Countries". Journal of Public Economics 83: 325-345.

Frechette, Guillaume R. 2001. "A Panel Data Analysis of the Time-Varying Determinants of Corruption". Paper presented at the EPCS 2001. 54

Gatti, R. (1999). "Corruption and Trade Tariffs, or a Case for Uniform Tariffs", World Bank Policy Research Working Paper No. 2216.

Gatti, R. (2004). "Explaining Corruption: Are Open Countries Less Corrupt? Journal of International Development. 16: 851–861. (New Inserted)

Goldsmith, Arthur A. 1999. “Slapping the Grasping Hand: Correlates of Political Corruption in Emerging Market”. American Journal of Economics and Sociology 58(4): 865-883.

Graeff, P. and Mehlkop, G. 2003. “The Impacts of Economic Freedom on Corruption: Different Patterns for Rich and Poor Countries”, European Journal of Political Economy 19: 605-620.

Gurgur, Tugrul and Anwar Shah. 2005. “Localization and Corruption: Panacea or Pandora’s Box”. World Bank Policy Research Working Paper 3486.

Herzfeld, Thomas and Christoph Weiss. 2003. “Corruption and Legal (In)- Effectiveness: An Empirical Investigation”. European Journal of Political Economy 19: 621-632.

Jain, Arvind K. 2001. “Corruption: A Review”. Journal of Economic Surveys 15(1): 71-121.

Klenow, P., Rodriguez-Clare, A., 1997. Quantifying Variety Gains from Trade Liberalization. University of Chicago, mimeo.

Knack, Stephen and Omar Azfar. 2003. “Trade Intensity, Country Size and Corruption”. Economics of Governance 4: 1-18.

Krueger, 1974 A. Krueger, The political economy of the rent-seeking society, American Economic Review **64** (1974), pp. 291–303.

Kunicova, Jana and Susan Rose-Ackerman. 2005. “Electoral Rules and Constitutional Structures as Constraints on Corruption”, British Journal of Political Science 35 (4): 573-606.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R.W. 1998. “The Quality of Government”, Journal of Law, Economics, and Organization 15: 222-79.

Laffont, Jean J. and Tchetche N’Guessan. 1999. “Competition and Corruption in an Agency Relationship”. Journal of Development Economics 60: 271-95.

Lambsdorff and Teksoz, 2004 J.G. Lambsdorff and S.U. Teksoz, Corrupt relational contracting. In: J.G. Lambsdorff, M. Schramm and M. Taube, Editors, The new institutional economics of corruption, Rutledge, New York (2004), pp. 138–151.

Lambsdorff, J.G. (2006). Causes and consequences of corruption: what do we know from a cross-section of countries? In: S. Rose-Ackerman, Editor, International Handbook on the Economics of Corruption, Edward Elgar, Cheltenham, UK (2006), pp. 3–51.

Lawrence, C., Spiller, P., 1983. Product diversity, economies of scale, and international trade. Quarterly Journal of Economics 98, 63–83.

Lederman, Daniel, Norman V. Loayza, and Rodrigo R. Soares. 2005. “Accountability and Corruption: Political Institutions Matter”. Economics and Politics 17: 1-35.

Leite, Carlos A. and Jens Weidmann. 1999. “Does Mother Nature Corrupt?: Natural Resources, Corruption, and Economic Growth”. Working paper WP/99/85, International Monetary Fund, Washington, DC. 57

Li, H., Xu, L. C. and H. F. Zu (2000). Corruption, income distribution and growth. *Economics and Politics*, 122,155-182.

Macdonald, Ronald and M. T. Majeed (2010). Distributional and poverty consequences of globalization: a dynamic comparative analysis for developing countries. Working Paper, University of Glasgow, 2010–22.

Majeed, M. Tariq and Ronald Macdonald (2010). Corruption and the military in politics: theory and evidence from around the World. Working Paper, University of Glasgow, 2010–34.

Mauro, Paulo. 1995. “Corruption and growth.” Quarterly Journal of Economics 110(3): 681-712.
Mitra, S., 2005. Corruption Reexamined. SSRN Working Paper.
Nye, Joseph S. 1967. “Corruption and Political Development: A Cost-Benefit Analysis”. The American Political Science Review 61(2): 417-427.
Paldam, Martin. 2001. “Corruption and Religion: Adding to the Economic Model”. Kyklos 54: 383-414
Paldam, Martin. 2002. “The Cross-Country Pattern of Corruption: Economics, Culture and the Seesaw Dynamics”. European Journal of Political Economy 18: 215-240.
Pellegrini, L. & Gerlagh, R. (2008). Causes of Corruption: a survey of cross-country analyses and extended results. Economics of Governance, 9, 245-263.
Persson, Torsten and Guido Tabellini. 2003. The Economic Effects of Constitutions. Cambridge, Mass.: MIT Press.
Persson, Torsten, Guido Tabellini, and Francesco Trebbi. 2003. “Electoral Rules and Corruption”. Journal of the European Economic Association 1(4): 958-989.
Rauch, James and Peter Evans. 2000. “Bureaucratic Structure and Bureaucratic Performance in Less Developed Countries”. Journal of Public Economics 75: 49- 71.
Romer, P., 1994. New goods, old theory, and the welfare costs of trade restrictions. Journal of Development Economics 43, 5–38.
Scott, James C. 1972. Comparative Political Corruption. Englewood Cliffs, NJ: Prentice-Hall.
Serra, D. (2006). Empirical determinants of corruption: a sensitivity analysis, Public Choice, 126, pp. 225–256.
Shleifer, Andrei and Robert W. Vishny. 1993. “Corruption”. Quarterly Journal of Economics 108(3): 599-617.
Swamy, Anand, Stephen Knack, Young Lee, and Omar Azfar. 2001. “Gender and Corruption”. Journal of Development Economics 64: 25-55.
Tanzi, V., 1998. Corruption around the world: Causes, consequences, scope, and cures. IMF Staff Papers 45, 559–594. Reprinted in: Abed, G.T., Gupta, S. (Eds.), Governance, Corruption, and Economic Performance. International Monetary Fund, Washington DC, pp.19–58.
Tanzi, Vito and Hamid R. Davoodi. 1997. “Corruption, Public Investment, and Growth”. IMF Working Paper 97/139.
Tavares, Jose. 2003. “Does Foreign Aid Corrupt?” Economic Letters 79: 99-106. The Guardian, March 26, 2004.
Treisman, Daniel (2000). The causes of corruption: a cross-national study. *Journal of Public Economics*, 76: 399-457.
Van Rijckeghem, Caroline and Beatrice S. Weder. 1997. “Corruption and the Rate of Temptation: Do Low Wages in the Civil Service Cause Corruption?”. IMF Working Paper WP/97/73.
Wei, Shang-Jin. 2000. “Local Corruption and Global Capital Flows”. Brookings Papers on Economic Activity 2: 303-352.
You, J. & Khagram, S. (2005). A Comparative Study of Inequality and Corruption. American Sociological Review, 70: 136-157.