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Corruption and Remittances: Evidence from Around the World

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Abstract

This study revisits the sources of corruption using panel data for 146 countries and contributes to the literature by analyzing the relationship between remittances and corruption with a particular focus on the analysis of the distribution of the dependent variable (corruption). In cross sectional and panel settings the author finds that a one standard deviation increase in the remittances variable is associated with an increase in corruption of 0.33 points, or 25 percent of a standard deviation in the corruption index. The author also investigates whether greater remittances consistently increase corruption among the most and least corrupt countries. Our results show that among the least corrupt countries, remittances do not appear to increase corruption but significantly promote corruption among most corrupt countries. Our findings are robust for different sample specifications, for regional effects and for alternative econometrics techniques.

Keywords: Corruption; remittances; panel data; quantile regression.

1. Introduction

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 such as the World Bank have identified corruption as 'the single greatest obstacle to economic and social development'[1]. Although corruption has become a norm in many countries it is disliked for its detrimental effects on development. The elimination of widespread corruption and the promotion of fairness in markets are at the core of development concerns and are principal policy objectives 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 such as economic, cultural, political and institutional aspects. Following this research, a consensus on some determinants of corruption is slowly emerging, though several aspects remain unclear. For example, the role of government and openness to trade in determining corruption remains unresolved.

In recent years, there has been growing research interest in the relationship between remittances and different macroeconomic variables. Whereas remittances exert favorable macroeconomic effects through ameliorating poverty, increasing savings and investment, it is also observed that remittances exert adverse macroeconomic effects through the channels of appreciation of exchange rate, increasing inflation and adverse effect on labor market participation (Chami et al., 2003; Barajas et al., 2008).

How do remittances influence corruption? Surprisingly, little attention has been paid to this issue. The literature has largely neglected the corruption-impact of remittances. Recently, Abdih et al. (2012) show empirically that remittances adversely affect the quality of institutions. However, their study ignores the importance of existing levels of corruption in determining the corruption impact of remittances. The present study attempts to fill the lacuna by investigating the corruption-impact of remittances for a large set of countries over a long period with a special focus on the role of the distributional profile of corruption.

This study adds to this emerging literature on corruption by addressing the following questions: (i) Do remittances promote corruption? (ii) Does the effect of remittances on corruption depend on the distribution of the dependent variable? (iii) What is the role of government?

The study differs from existing studies on corruption in several important ways. First, this is a systematic panel data study that rigorously examines the impact of remittances on corruption. Second, the study contributes to the existing literature on sources of corruption by analyzing the distribution of the dependent variable (corruption) in relation to remittances. Third, the study provides better explanation of inconclusive causes of corruption (for example government spending) using recent data sets. Fourth, the study uses both cross sectional and panel data sets over a long period as compared to the past literature, which is based on just one or a few years. Fifth, the study uses alternative

econometrics techniques to assess the robustness of the results and to address the problem of endogeneity.

The rest of the discussion is structured as follows: Section 2 provides a review of the related literature. Section 3 briefly describes data issues and section 4 provides an analytical framework for the study. Section 5 reports results and includes discussion. Finally, section 6 concludes the paper.

2. Review of literature

Whether remittances contribute positively or negatively to the macroeconomic performance of a recipient economy is a controversial issue in theoretical and empirical studies. Many empirical studies assessed the effect of remittances on the recipient economy's performance and reached different conclusions despite using the same data sources (see, for example, Barajas et al., 2008).

The negative macroeconomic consequences of remittances are channeled through the labor market. It is expected that remittance receipts exert a negative influence on labor force participation for the following reasons. First, households are likely to substitute unearned remittance income for labor income because remittance inflows are simple income transfer. Second, Chami et al. (2003) argue that irrespective of the intended use of remittances, there are various moral hazard problems linked with remittance receipts. Third, monitoring and management of remittances is extremely difficult because remittance senders and receivers are separated by distance and remittances are sent under asymmetric information. Thus, moral hazard problems may induce an individual to spend resources on leisure and reduce labor work.

Barajas et al. (2008) argue that the availability of remittance inflows decreases the motivation for individuals to monitor and evaluate the domestic governments' policy performance. Remittance inflows create a moral hazard problem for the domestic government as the cost of poor performance of the domestic government is at least partially shifted to the remittance sender because whenever things go wrong at home, remittance transfers are likely to increase. The main point of this argument is that a high remittance inflow may undermine good domestic governance. We focus this argument on a specific aspect of the quality of the domestic institution, and that is corruption.

In a recent study, Abdih et al. (2012) examine the relationship between remittances and the quality of institutions. Their analysis shows that remittances exert a negative influence on the quality of institutions. Individuals with high remittances do not take account of the quality of domestic institutions and prefer to solve their economic issues through remittance senders and may use this unearned money to 'grease the wheels' for speedy work in public sectors.

Remittances enable households to afford the buying of private goods and services rather than depending exclusively on the government to supply these goods and services (Abdih et al., 2012). For example, individuals with remittances can afford private provision of education and medical services. Thus they have little incentive to monitor the public provision of these facilities. Therefore, Abdih et al. (2012, p.644) argue that the ''government can then free ride and appropriate more resources for its own purposes, rather than channel these resources

to the provision of public services''. Following Abdih et al. (2012), Berdiev and Chang (2013) argue that access to remittances causes households to tolerate rent-seeking behavior.

Ahmed (2013) uses a natural experiment of oil-price-driven remittance flows to poor, non-oil-producing Muslim countries to analyze the relationship between remittances and quality of institutions. He demonstrates that remittances deteriorate the quality of governance, especially in countries with weak democratic institutions.

Using the Gallup Balkan Monitor survey, implemented in the six successor states of the former Yugoslavia in 2010 and 2011, Ivlevs and King (2014) hypothesize that the effects of emigration on corruption can be both positive (via migrant value transfer) and negative (via misuse of monetary remittances). Their empirical findings show that migrant households are more likely to face bribe situations and be asked for bribes by public officials.

Recent research has focused only on cross sectional analysis (Abdih et al., 2012) and data from Mexico (Tyburski, 2012) to investigate the relationship between remittances and institutional quality. Furthermore, the existing literature does not take into account the importance of the distributional profile of corruption in shaping its relationship with the quality of an institution. In this study the author uses a large panel data set over a long period to determine the relationship of remittances to corruption. In particular, we empirically examine the role of the distributional profile of corruption in determining the relationship between remittances and corruption.

3. Data description

The data set for this study is taken from different sources. A detailed description of the variables and their sources is given in Table 9 (Appendix). For corruption, author uses the International Country Risk Guide's corruption index (ICRG, 2008); this measure has been used commonly in corruption studies. This index captures the likelihood that government officials will demand special payments. Other than adding consistency to the previous studies and spanning a long period, this index allows us to maximize our sample size of 146 counties.

Furthermore, the index is highly correlated to other corruption indices that have been used in the literature, such as corruption indices by Transparency International and Business International (see Treisman, 2000; Majeed and MacDonald, 2010 for more details). The high correlation between different indices suggests that they are consistent despite being a subjective rating. The year-to-year change of the corruption index is not very informative because of measurement errors. In order to avoid this problem author arranged the data into a panel of five-year averages.

4. Framework of analysis and estimation technique

In order to evaluate the effect of remittances on corruption we follow Abdih et al. (2012), with some modifications. The relationship between remittances and corruption has been developed in the following theoretical model.

The representative agent problem

Households care about their consumption of the private good as well as the public service. They take the government provision of the latter to be exogenous, and choose their own consumption of the two types of goods, x and y, to

maximize:

$$U(x, y, w)= \alpha \log(x) + (1- \alpha)\log (y + w) \quad (1)$$

Where x is the agent's consumption of the private good, and y is the agent's consumption of a good that is a perfect substitute for the public good, while w is the level of government provision of the public good. The agent's budget constraint can be written as follows:

$$(1-t)m + R = Px*x + Py*y \quad (2)$$

Maximizing (1) subject to (2) gives:

$$U(x, y, w)= \alpha\log(x) + (1- \alpha) \log(y + w) + \lambda [(1-t)m + R-x-y]$$

First Order Conditions

$$\alpha/x - \lambda=0$$

$$1-\alpha / (y + w) - \lambda=0$$

$$(1-t)m + R-x-y=0$$

After some manipulation with λ equations, expression for c can be written as

$$x= (\alpha/1- \alpha) (y + w)$$

Now substituting the expression for x into budget constraint

$$(1-t)m + R-x-y=0$$

$$y= [(1-t)m + R]-x$$

$$y= [(1-t)m + R]-[(\alpha/1- \alpha) (y + w)]$$

$$(1- \alpha)y + \alpha y = (1- \alpha) [(1-t) m + R]- \alpha w$$

Finally we get the following optimal value for y

$$y^*= (1- \alpha)[(1 -t)m + R]- \alpha w \quad (3)$$

Therefore, taking the level of government provision of the public good as given, private purchases of the public good are increasing in household disposable income (domestic and foreign) and decreasing in the government's provision of the good. This result is intuitive: when households prefer to keep relatively constant the share of a good in their consumption basket, a higher endowment in a certain good (w) will decrease the demand for this good (y), everything else equal, and increase consumption of the other goods (x).

The Government's problem

One central assumption in this model is that the government does not behave like a central planner. In particular, suppose that the government cares about maximizing a combination of the representative agent's utility and its own utility, derived from resources that the government reserves for itself. In that case the government problem consists of maximizing:

$$\Psi (w, U) = \beta \log(s) + (1- \beta) U(x, y, w) \quad (4)$$

Where s stands for whatever the government keeps for its own consumption. The government chooses w to maximize (4) subject to the budget constraint:

$$tm = w + s \quad (5)$$

Thus, the government is essentially choosing how much of the resources that it collects to divert for its own purposes.

Stackelberg game

Since the government knows the problem of the representative agent and therefore the reaction of private agents to its own spending decisions, the government will take this reaction into account in its optimization problem. However, since it is highly unlikely that private agents could cooperate so as to be able to play a Nash Bargaining game with the government, it is most natural to assume that individual private agents take the government's provision of the public good as fixed and unaffected by their actions. For example, if all agents decrease their private consumption of the public good

they might be able to force the government to increase its own spending; however such an assumption would not be realistic. Therefore we assume that our model economy works as a Stackelberg game where the government moves first. Under this assumption, replacing (3) and (2) in the objective function of the government yields the following:

$\Psi(w) = \beta \log (tm-w) + (1- \beta) \{\alpha \log [\alpha ((1-t) m+ R+ w)] + (1- \alpha) \log [(1- \alpha) (1-t) m+ R+ w)]\}$, which simplifies to:

$\Psi(w) = \beta \log (tm-w) + (1- \beta) [\alpha \log (\alpha) + (1- \alpha) \log (1- \alpha) + \log ((1-t) m+ R+ w)]$, (6)

When Ψ (w) is maximized with respect to w it yields:

$w^* = (t- \beta)m - \beta R$ (7)

Equation (7) simply says that the public provision of the public good is increasing in the tax base, m, but decreasing in the amount of (non-taxed) remittances. The substitutability between private and public provision of the good y, however, implies that an increase in the tax base m does not fully translate into an increase in the provision of the public good w. Instead, part of that increase in the revenue base, which includes remittances, β(m + R), is diverted to the government's own consumption. Given this optimal level of spending on the public good, we can easily derive the optimal level of resources diverted to the government's own consumption:

$s^* = \beta(m + R)$ (8)

Note that the amount diverted does not depend on the tax rate, but is increasing in the revenue base, that is, income and remittances. The "fiscal space" provided by the revenue base, and in particular, the remittances, increases the household's private consumption of both goods (x, y), which allows the government to free ride and reduce its contribution to the public good, thereby increasing its own consumption. It is also clear that the government's proclivity to divert resources to its own consumption, measured by β leaves the household worse off in equilibrium: replacing (3) and (7) into (1) we have:

$\delta U (x^*, y^*, w^*)/ \delta \beta = \beta(1- \alpha)/ (1-\beta) < 0$ (9)

But what we are interested in is the ratio of resources diversion either to total government spending:

$s^{-*}/w^* = \beta m+ \beta R/(t- \beta)m- \beta R = \beta(1+R/m)/(t -\beta)-R/m$ (10)

or to total income

$s^{-*}/y = \beta(1+R/m)$ (11)

As one can easily see:

$\delta (s^{-*}/m)/ \delta R = \beta/m > 0$ *and*

$\delta (s^{-*}/w^*)/ \delta R = \beta tm /[(t- \beta)m- \beta R]^2 > 0.$

The last two expressions show that both measures of corruption are increasing in the level of remittances. Note also that equations (10) and (11) indicate that corruption is potentially higher in countries where the ratio of remittances to GDP is high.

In sum, the above framework helps us to explain the argument that availability of foreign remittances increases spending choices for a household as they can afford private goods and services rather than depending upon the provision of goods and services by government. For instance, an individual with foreign income can afford private arrangement of medical, education and transportation services. This individual, therefore, has less incentive to monitor the quality of these services from the government.

To identify the variables that cause corruption, we draw extensively on the theoretical and empirical literature on this topic. We 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 add the most recent findings of empirically backed literature in order to test and build upon their findings. Following theoretical arguments and other empirical studies, the corruption model is specified as follows:

$$C_{it} = \alpha + \beta_1 Rem_{it} + \beta_2 Y_{it} + \beta_3 X_{it} + \mu_i + \nu_t + \varepsilon_{it} \quad (12)$$

Where $(i = 1 \ldots\ldots\ldots N;\ t = 1 \ldots\ldots\ldots\ldots\ldots T)$

Where C_{it} is a perceived corruption index, Rem_{it} represents remittances as a percentage of GDP, X_{it} represents a set of control variables based on existing corruption literature, μ_i is a country specific unobservable effect, ν_t shows time specific factor and ε_{it} is an i.i.d. disturbance term. The expected sign for our key variable of interest is given as follows: $\beta_1 > 0;\ \beta_2 < 0$.

Estimation techniques

Ordinary Least Squares (OLS) has a problem of omitted variable bias. If regional, country or some group specific factors affect corruption levels, explanatory variables would capture the effects of these factors and estimates would not represent the true effect of explanatory variables. This analysis is based on the 2SLS technique of estimation. This technique addresses the issue of endogeneity that is the covariance between independent variables where the error term is not equal to zero and also addresses the problem of omitted variables bias. We also use alternative econometrics techniques such as Random Effects and system GMM.

This study mainly focuses on the Generalized Method of Moments (GMM) estimation technique that has been developed for dynamic panel data analysis. This technique has been introduced by Holtz-Eakin et al. (1988), Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). GMM control for endogeneity of all the explanatory variables, allows for the inclusion of lagged dependent variables as regressors and accounts for unobserved country-specific effects. For GMM estimation sufficient instruments are required. Following the standard convention in literature, the equations are estimated by using lagged first difference as the instrument.

5. Results and discussion

The estimation strategy for this study is as follows: First, we estimated our key variable of interest - that is, remittances. Second, initially, we conducted cross-sectional estimations to capture the cross-sectional variation and later we replicated estimations for the panel data. Third, we used dummy variables to control for the regional effects for seven regions: East Asia &the Pacific, Europe & Central Asia, Latin America &the Caribbean, the Middle East & North Africa, South Asia, Sub-Saharan Africa, Europe and Others. Fourth, we used an alternative econometrics technique to assess the robustness of results and to address the possible problem of endogeneity. Fifth, we introduced an extensive list of corruption determinants while performing sensitivity analysis. However, for space reasons, we interpreted some selected control variables. Sixth, we used quantile regression analysis to explore the distributional profile of the dependent variable (corruption).

Table 1 reports the results for corruption and

Table 1: Corruption and remittances: CS estimation with regional controls

Ind. Variables	Dependent variable: Corruption					
Remittances	0.025	0.025	0.023	0.023	0.02	0.024
	(1.78)***	(1.78)***	(1.75)***	(1.68)***	(1.67)***	(1.60)***
PCY	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-5.23)*	(-5.23)*	(-4.72)*	(-4.62)*	(-4.85)*	(-4.34)*
Democracy	-0.19	-0.19	-0.23	-0.18	-0.23	-0.24
	(-2.84)	(-2.84)	(-3.36)	(-3.49)*	(-3.13)*	(-3.17)*
Bureaucracy Quality	-0.27	-0.27	-0.21	-0.25	-0.28	-0.24
	(-2.37)*	(-2.37)*	(-1.97)**	(-2.28)*	(-2.61)*	(-2.16)**
Government spending		-0.017	-0.02			
		(-1.6)***	(-1.41)*			
E Asia & Pacific			0.20	0.24		0.68
			(0.90)	(1.09)		(2.08)**
Europe & Central Asia			0.43	0.41		0.82
			(2.46)*	(2.36)*		(2.61)*
Lat America & Caribbean			0.18	0.21		0.65
			(1.18)	(1.35)		(2.07)**
Middle East & North Africa					-0.33	0.35
					(-1.38)	(1.04)
South Asia					0.21	0.88
					(0.78)	(2.28)**
Sub-Saharan Africa					-0.25	0.41
					(-1.80)***	(1.33)
Europe					-0.17	0.34
					(-0.95)	(1.22)
R-Squared	0.74	0.74	0.76	0.75	0.76	0.77
Adj. R-Squared	0.73	0.73	0.74	0.74	0.74	0.75
F-Test	67.71	67.71	44.42	50.34	43.64	33.49
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	121	121	121	122	122	122

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

remittances for 122 countries over the period 1984-2008. We find that remittances exert a positive influence on corruption and the parameter estimate for remittances is significant at a 10% level of significance. The coefficient on remittances is 0.025 in all regressions implying that a one standard deviation increase in the remittances is associated with an increase in corruption of 0.33 points, or 25 percent of a standard deviation in the corruption index.

The regression results regarding corruption and economic development relationship confirm a negative and significant relationship. In countries where incomes are relatively low, the economy generates minimal wealth for the average citizens. Low average incomes create structural incentives for corrupt behaviors. The inverse relationship between economic development and corruption is an empirical regularity (see, for example, Treisman, 2000; Serra, 2006; MacDonald and Majeed, 2011; Majeed, 2014). The impact of rule of law and government spending is negative and significant.

In Table 2, we conduct a sensitivity analysis

Table 2: Corruption and remittances: CS estimation with sensitivity analysis

Ind. Variables	**Dependent Variable: Corruption**						
Remittances	0.022 (1.6)***	0.025 (1.78)***	0.026 (1.88)***	0.024 (1.70)***	0.025 (1.81)***	0.025 (1.85)***	0.03 (2.31)*
PCY	-0.000 (-4.07)*	-0.000 (-5.23)*	-0.000 (-5.08)*	-0.000 (-4.84)*	-0.000 (-2.89)*	-0.000 (-4.42)*	-0.000 (-7.36)*
Democracy	-0.18 (-2.68)*	-0.19 (-2.84)*	-0.19 (-2.79)*	-0.32 (-3.16)*	-0.32 (-3.16)*	-0.19 (-2.83)*	-0.25 (-3.75)*
Bureaucracy Quality	-0.22 (-2.05)*	-0.27 (-2.37)*	-0.33 (-3.21)*	-0.29 (-2.89)*	-0.16 (-2.30)**	-0.31 (-3.03)**	
Rule of Law	-0.19 (-2.71)*						
Government Spending		-0.017 (-1.6)***					
Urbanization			2.01e-09 (1.79)***				
Economic freedom				0.096 (1.36)			
Internet					-0.02 (-1.82)***		
Ethno ling						-0.11 (-2.19)**	
Military							0.86 (1.64)***
R-Squared	0.75	0.74	0.75	0.75	0.75	0.75	0.73
Adj. R-Squared	0.74	0.73	0.74	0.74	0.74	0.74	0.72
F-Test	72.28 (0.000)	67.71 (0.000)	69.08 (0.000)	67.19 (0.000)	69.17 (0.000)	70.31 (0.000)	78.62 (0.000)
Observations	122	121	122	120	122	122	122

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

Table 3: Corruption and remittances: panel estimation with regional effects

Ind. Variables	Dependent Variable: Corruption					
Remittances	0.019	0.020	0.020	0.018	0.018	0.015
	(2.39)*	(2.58)*	(2.59)*	(2.36)*	(2.36)*	(1.79)***
PCY	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-4.41)*	(-4.39)*	(-4.35)*	(-3.87)*	(-3.86)*	(-3.76)*
Democracy	-0.07	-0.06	-0.05	-0.07	-0.07	-0.06
	(-1.98)**	(-1.71)***	(-1.55)	(-1.99)**	(-2.03)**	(-1.74)***
Bureaucracy Quality	-0.37	-0.34	-0.39	-0.36	-0.36	-0.37
	(-6.79)*	(-6.18)*	(-7.28)*	(-6.66)*	(-6.58)*	(-6.66)*
Rule of Law	-0.23	-0.21	-0.23	-0.26	-0.25	-0.26
	(-6.17)*	(-5.62)*	(-6.21)*	(-6.86)*	(-6.52)*	(-6.15)*
Government Spending		-0.023				
		(-3.07)*				
E Asia & Pacific			0.48	0.51	0.52	0.55
			(3.74)*	(3.99)*	(3.99)*	(4.15)*
Europe & Central Asia				0.475	0.485	0.52
				(3.45)*	(3.46)*	(3.64)*
Lat America & Caribbean					0.038	0.064
					(0.39)	(0.65)
Middle East & N Africa						0.166
						(1.26)
South Asia						0.80
						(2.10)*
Sub-Saharan Africa						0.40
						(1.30)
Europe						0.34
						(1.22)
R-Squared	0.61	0.61	0.62	0.63	0.63	0.63
Adj. R-Squared	0.60	0.605	0.61	0.62	0.62	0.62
F-Test	155.15	128.87	134.97	119.91	104.76	93.40
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	509	509	509	509	509	509

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

by controlling further corruption determinants. The coefficient on remittances consistently remains the same, 0.025, and significant. We find a positive role of military spending and ethno linguistics in affecting corruption while our base-line findings remain unaffected.

In the panel setting (Table 3) we find that the effect of remittances is positive and significant in explaining corruption. Results reported in Table 4 and subsequent Tables show that the inclusion of many controls modifies the slope of the relationship only marginally and does not affect its significance. The democracy index is negatively associated with corruption, suggesting that open and free elections might contribute to keeping corruption in check.

In Table 4, we control for the endogeneity problem using instrumental variables techniques and now coefficient on democracy turns out to be significant with the expected sign.

Table 4: Corruption and remittances: panel estimation (IVE)

Variable	IV	LIML	IV	LIML	GMM	Sys-GMM	Sys-GMM
Remittances	0.018	0.018	0.019	0.019	0.017	0.023	0.026
	(1.90)**	(1.91)**	(2.00)**	(2.00)**	(1.70)**	(2.20)*	(2.50)*
PCY	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-5.75)*	(-5.75)*	(-4.81)*	(-4.82)*	(-2.32)*	(-2.91)**	(-3.59)**
Democracy	-0.13	-0.13	-0.11	-0.11	-0.11	-0.007	-0.058
	(-2.34)*	(-2.34)*	(-2.03)*	(-2.04)*	(-2.32)*	(-0.13)	(-0.97)
Bureaucracy Quality	-0.38	-0.38	-0.23	-0.29	-0.27	-0.50	-0.47
	(-4.77)*	(-4.77)*	(-3.43)*	(-3.42)*	(-3.61)*	(-5.96)*	(-5.97)*
Rule of Law			-0.07	-0.07	-0.08	-0.22	
			(-1.02)	(-0.98)	(-1.18)	(4.20)*	
Government Spending			-0.03	-0.03	-0.03		-0.027
			(-2.28)	(-2.29)	(-2.55)		(-2.35)**
R-Squared	0.58	0.58	0.60	0.60	0.60		
Sargan- Test	2.54	2.56	2.05	2.06			
	(0.11)	(0.11)	(0.15)	(0.15)			
Basmann-Test	2.52	2.53	2.02	2.03			
	(0.11)	(0.11)	(0.15)	(0.16)			
Hansen-Test						2.02	2.05
						(0.22)	(0.23)
AR-2						0.46	0.42
Observations	383	383	376	376	376	519	519

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

The coefficient on remittances turns out to be positive and significant at a 5% level of significance. The coefficient on government spending improves its size and level of significance. To check the validity of instrument variables the Sargan and Hannsen tests have been applied. The p-values of these tests do not reject the null hypothesis that instruments are exogenous and, therefore, instrument variables are valid and our results are not plagued by the endogeneity problem. Furthermore, it is clear from p-values of AR (2) test that the residuals of the first-differenced estimating equation are not second-order correlated.

Since cross-country estimates are often said to suffer from spurious correlations due to unobservable factors that may be relevant, it is important to subject the results to further robustness checks. To do so we conduct a very exhaustive sensitivity analysis in a panel setting. We employ ten additional alternative determinants of corruption to assess the robustness of our benchmark findings. It is evident from Table 5 that the coefficient on remittances is remarkably robust and fluctuates between 0.019 and 0.025 at a 1% level of significance.

The role of government in relation to corruption is critical. However, both theoretical and empirical studies predict a conflicting relationship between government spending and corruption. On the one hand, Rose-Ackerman (1999) argues that a larger government contributes to bureaucracy and therefore can foster corruption. On the other hand, La Porta et al. (1999) argue that a larger government may spend more with stronger checks and balances

Table 5: Corruption and remittances: panel estimation: sensitivity analysis

Ind. Variables	**Dependent Variable: Corruption**								
Remittances	0.020	0.025	0.023	0.020	0.025	0.021	0.019	0.024	0.023
	(2.58)*	(3.10)*	(2.86)*	(2.15)**	(3.15)*	(2.64)*	(2.37)*	(2.96)*	(2.75)*
PCY	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-4.39)*	(-6.30)*	(-6.27)*	(-8.54)*	(-5.45)*	(-6.17)*	(-6.58)*	(-6.26)*	(-6.21)*
Democracy	-0.06	-0.08	-0.061	-0.12	-0.08	-0.06	-0.09	-0.01	-0.12
	(-1.71)***	(-2.41)*	(-1.33)	(-3.49)*	(-2.33)*	(-1.69)***	(-2.64)*	(-2.86)*	(-2.79)*
Bureaucracy Quality	-0.34	-0.50	-0.50	-0.42	-0.46	-0.07	-0.48	-0.47	-0.47
	(-6.18)*	(-9.36)*	(-9.31)*	(-7.32)*	(-8.70)**	(2.20)**	(-8.92)*	(-8.90)*	(-8.52)*
Rule of Law	-0.21								
	(-5.62)*								
Government Spending	-0.023								
	(-3.07)*								
Urbanization		2.59e-09							
		(3.72)*							
Economic freedom			0.02						
			(0.56)						
Net				0.02					
				(6.19)*					
Ethno ling					-0.13				
					(-4.45)*				
Military in Politics						0.07			
						(2.20)**			
Trade Openness							0.002		
							(2.28)**		
Credit								-0.00	
								(-2.66)*	
Military Spending									0.049
									(3.15)*
R-Squared	0.61	0.59	0.59	0.59	0.60	0.58	0.58	0.59	0.60
Adj. R-Sq	0.605	0.58	0.58	0.58	0.598	0.576	0.575	0.58	0.59
F-Test	128.87	143.68	118.38	122.93	146.50	139.43	138.06	141.90	137.40
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	509	509	505	436	509	509	506	506	468

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

Table 6: Corruption and remittances: CS estimation: OLS vs. Quintile Regression: specification 1

Variable	OLS	Q0.1	Q0.25	Q0.50	Q0.75	Q0.9
Remittances	0.02	0.013	0.013	0.044	0.03	0.03
	(1.70)***	(0.61)	(0.64)	(1.43)	(2.20)*	(2.00)**
PCY	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-5.15)*	(-2.24)**	(-3.29)*	(-4.23)*	(-4.82)*	(-2.84)*
Democracy	-0.20	-0.29	-0.19	-0.11	-0.29	-0.15
	(-2.97)*	(-2.08)**	(-1.68)	(-0.97)	(-0.36)	(-1.43)
Bureaucracy Quality	-0.30	-0.28	-0.39	-0.35	-0.36	-0.35
	(-2.94)*	(-0.95)	(-2.25)*	(-2.44)	(-3.43)*	(-2.08)**
R-Squared	0.74	0.60	0.60	0.46	0.44	0.41
Adj. R-Square	0.73					
F-Test	83.96	37.94	37.40	78.66	43.87	22.62
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	122	122	122	122	122	122

Notes: Dependent Variable is corruption perception index from ICRG.
Regressions include 120-122 observations of country level data.
Quantile regression results are based upon 100 bootstrapping repetitions.
Lower quantiles (e.g., Q 0.1) signify less corrupt nations.
All regressions include an intercept term but the results are not reported.
F-statistics and associated p-values are reported for the test of all slope parameters jointly equal to zero.
The t-statistics are given in parentheses (*), (**), and (***) indicate statistical significance at 1%, 5% and 10% levels respectively.

to control corruption, thereby decreasing corruption. Our results confirm a negative impact of government spending on corruption.

Mauro (1995) suggests that more ethnically fractionalized countries tend to be more corrupted. One root of the link between ethno linguistic fractionalization and corruption can be the existence of alternative affiliations and obedience with respect to the state. Thus, in ethnically divided societies civil servants and politicians would exploit their positions to favor members of their own ethnic group. Furthermore, divided societies tend to under-provide public goods and this, in turn, would augment the dependency on special bounds to obtain essential services from the state. Our study also confirms this finding as a coefficient of ethno linguistic fractionalization turns out to be positive and significant at a 1% level of significance.

The results reported in Tables (6-8) show both OLS and quantile regression estimates. The parameter estimates obtained using OLS provide a base line of mean effects and we conduct a comparative analysis of these with separate quantiles in the conditional distribution of the dependent variable (corruption). We use 100 bootstrapping and heteroskedasticity-robust methods to obtain heteroskedasticity-robust estimates.

Estimated models for OLS and five separate quantiles in Tables (6-8) have consistently good fit. It is evident from the reported F-statistics that the hypothesis that slope parameters

Table 7: Corruption and remittances: CS estimation: OLS vs. Quintile Regression: specification 2

Variable	OLS	Q0.1	Q0.25	Q0.50	Q0.75	Q0.9
Remittances	0.034	0.01	0.023	0.05	0.038	0.032
	(2.47)*	(0.72)	(1.01)	(1.55)	(2.09)**	(1.92)**
PCY	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-7.78)*	(-3.23)*	(-4.28)*	(-5.07)*	(-5.82)*	(-4.36)*
Democracy	-0.28	-0.40	-0.31	-0.23	-0.19	-0.20
	(-4.95)*	(-4.28)*	(-3.18)*	(-2.49)*	(-2.88)*	(-1.96)**
Government Spending	-0.022	-0.002	-0.03	-0.0	-0.21	-0.41
	(-2.07)**	(-0.10)	(-1.54)	(-0.85)	(-1.86)***	(-3.21)*
R-Squared	0.73	0.60	0.56	0.56	0.42	0.38
Adj. R- Square	0.72					
F-Test	79.15	32.56	59.96	37.07	38.12	26.47
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	121	121	121	121	121	121

Notes: Dependent Variable is corruption perception index from ICRG.
Regressions include 120-122 observations of country level data.
Quantile regression results are based upon 100 bootstrapping repetitions.
Lower quantiles (e.g., Q 0.1) signify less corrupt nations.
All regressions include an intercept term but the results are not reported.
F-statistics and associated p-values are reported for the test of all slope parameters jointly equal to zero.
The t-statistics are given in parentheses (*), (**), and (***) indicate statistical significance at 1%, 5% and 10% levels respectively.

are jointly equal to zero is always rejected at the 1% level.

The results reveal that that the impact of economic development is consistent across specifications and across quantiles; higher economic development leads to lower corruption. This finding is consistent with numerous studies (see Serra, 2006; Majeed and MacDonald, 2010; 2011). In addition, both economic freedom and political freedom reduce corruption. The impact of larger government is corruption reducing.

The effect of remittances is nearly always positive, causing lower indexes; i.e., remittances are correlated with less corruption. However, the effect of remittances is not consistently significant. OLS estimates suggest remittances matter a lot in increasing corruption, but quantile regression results do not uniformly confirm that. Specifically, controlling for government spending, remittances substantially increases corruption, but only in the top top-half of the conditional distribution (among the more/most corrupt). As remittance inflows increase in the most corrupt nations, *cetris paribus*, they experience an increase in corruption.

The effect of democracy is nearly always negative, causing lower indexes; i.e., democracy is correlated with less corruption. However, the effect of democracy is more significant at lower quantiles as compared to higher quintiles and this finding remains consistent, even controlling for government spending and economic freedom. The effect of government spending size is significant in the upper-most quantile, suggesting that within the most corrupt nations,

Table 8: Corruption and remittances: CS estimation: OLS vs. Quintile Regression specification 3

Variable	OLS	Q0.1	Q0.25	Q0.50	Q0.75	Q0.9
Remittances	0.035	0.02	0.033	0.030	0.047	0.047
	(2.44)*	(0.77)	(1.48)	(1.06)	(2.71)*	(2.21)*
PCY	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-7.22)*	(-3.94)*	(-4.40)*	(-4.00)*	(-5.32)*	(-3.99)*
Democracy	-0.44	-0.67	-0.50	-0.48	-0.28	-0.39
	(-4.51)*	(-3.67)*	(-3.49)*	(-4.21)*	(-2.64)*	(-2.25)*
Economic Freedom	0.01	0.16	0.14	0.16	0.03	0.14
	(1.37)	(1.26)	(1.51)	(1.90)**	(0.39)	(0.86)
R-Squared	0.73	0.61	0.56	0.44	0.40	0.40
Adj. R- Square	0.72					
F-Test	76.97	35.57	37.73	31.96	29.07	20.87
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	120	120	120	120	120	120

Notes: Dependent Variable is corruption perception index from ICRG.
Regressions include 120-122 observations of country level data.
Quantile regression results are based upon 100 bootstrapping repetitions.
Lower quantiles (e.g., Q 0.1) signify less corrupt nations.
All regressions include an intercept term but the results are not reported.
F-statistics and associated p-values are reported for the test of all slope parameters jointly equal to zero.
The t-statistics are given in parentheses (*), (**), and (***) indicate statistical significance at 1%, 5% and 10% levels respectively.

increasing the size of the government reduces corruption.

6. Conclusion

The literature on causes of corruption has identified many factors that help to explain the worldwide existence of corruption. However, the role of remittances in determining corruption has been virtually ignored. In particular, the literature has not yet examined the role of distribution of corruption across countries in explaining the link of remittances with corruption. In this study, we conduct a comprehensive analysis to explain the likely relationships between international remittances and corruption with special focus on the distribution of a dependent variable in explaining these relationships. We use both cross sectional and panel data sets over a long period. We use different econometric techniques as robustness checks and to address the problem of endogeneity.

Our results show that remittances exert a positive and significant influence on corruption levels. This effect arises because the presence of remittances expands the revenue base and government finds it less costly in this situation to appropriate resources for its own purposes. This is especially true when the household has access to nontaxable exogenous resources that they can use to finance the purchase of goods that are substitutes for public services. In other words, access to remittance income makes government corruption less costly for domestic households to bear, and consequently such corruption is likely to increase.

Our results support the earlier findings in the literature on sources of corruption, but also provide new insights. The analysis of the

distributional profile of corruption shows that among the least corrupt countries, remittances do not appear to increase corruption but significantly promote corruption among the most corrupt countries.

Following the research questions posted by the study, we find that remittances increase corruption. However, this study does not find sufficient evidence to accept the hypotheses that increase in remittances increases corruption in a uniform way across the distribution. The effect of remittances seems to matter more in more/most corrupt countries, while it is not significant in less/least corrupt countries. In this study, government expenditure appears to have a negative effect on corruption. However, this effect is more significant in more corrupt countries. Our findings are robust to alternative econometrics techniques, to regional effects and to different sample specifications.

APPENDIX

Table 9: Description of variables

Variable	Definitions	Sources
Per capita real GDP	Per capita real GDP at constant prices of the year 2000.	[1]
Credit as % of GDP	Credit as % of GDP represents Claims on the non-financial private sector/GDP	[3]
Trade Openness	It is the sum of exports and imports as a share of real GDP.	[1]
Corruption	ICRG index 0-6 scale; where 6 indicate high degree of corruption and 0 indicate no corruption.	[2]
Democracy	ICRG index 0-6 scale; where 6 indicate high degree of democracy.	[2]
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.	[2]
Religion in Politics	ICRG index 0-6 scale: higher ratings are given to countries where religious tensions are minimal.	[2]
Ethnic Tensions	ICRG index 0-6 scale; higher ratings are given to countries where tensions are minimal.	[2]
Rule of Law	ICRG index 0-6 scale; where 6 indicate high degree of law and order.	[2]
Bureaucracy Quality	ICRG index 0-4 scale; where 4 indicate high degree of law and order.	[2]
Government Stability	ICRG index 0-12 scale; where 0 indicates very high risk and 12 indicates very low risk.	[2]
Socioeconomic Conditions	ICRG index 0-12 scale; where 0 indicates very high risk and 12 indicates very low risk.	[2]
Investment Profiles	ICRG index 0-12 scale; where 0 indicates very high risk and 12 indicates very low risk.	[2]
Internal Conflict	ICRG index 0-12 scale; where 0 indicates very high risk and 12 indicates very low risk.	[2]
External Conflict	ICRG index 0-12 scale; where 0 indicates very high risk and 12 indicates very low risk.	[2]
Economic Freedom	ICRG index 0-7 scale	[4]
Government Spending	General government final consumption expenditure (% of GDP)	[1]
Remittances	Workers' remittances and compensation of employees, received (% of GDP)	[1]
Military Spending	Military expenditure (% of GDP)	[1]
Urbanization	Urban population	[1]
Internet	Internet users	[1]

Sources: [1]: World Bank (2009); [2]: International Country Risk Guide (2008); [3]: IMF (2008); [4]: Fraser Institute

Table 10: Descriptive statistics

Variables	Observations	Mean	Std. Dev.	Min	Max
Per Capita Income	653	6949.03	9566.997	84.89059	53800.33
Trade Openness	644	78.72449	47.99039	2.566213	442.2996
Credit as % of GDP	635	103.5882	775.4475	.7621964	12437.82
Corruption	675	2.932585	1.322528	-.0333328	6
Democracy	675	3.6823	1.607773	0	6
Military in Politics	675	3.715646	1.785895	0	6.033333
Religion in Politics	675	4.591332	1.320474	0	6
Ethno Linguistic	675	3.932934	1.427448	0	6
Rule of Law	675	3.667232	1.45727	.55	6
Bureaucracy Quality	675	2.139725	1.171961	0	4
Government Stability	675	7.566057	2.006066	1.466667	11.5
Socio Economic	675	5.68345	2.131201	.0208333	10.775
Investment Profiles	675	7.057228	2.339163	.8000001	12
Internal Conflict	675	8.765272	2.564226	.0333333	12
External Conflict	675	9.604507	2.118613	0	12
Economic Freedom	673	4.403913	1.942066	1	7
Government Spending	635	16.04497	6.173756	4.05478	46.35652
Remittances	523	2.847373	4.769296	.0018351	42.54366
Military Spending	583	2.785165	3.350683	0	43.7737
Urbanization	693	1.81e+07	4.72e+07	91250.07	5.34e+08
Internet Users	554	9.167496	16.75737	0	82.23592

Table 11: Corruption and remittances: panel estimation with random effects

Ind. Variables	Dependent Variable: Corruption					
Remittances	.028	.024	.029	0.028	0.025	0.025
	(2.50)*	(2.32)*	(2.87)*	(2.97)*	(2.65)*	(2.77)*
PCY		-0.000	-0.000	-0.000	-0.000	-0.000
		(-9.17)*	(-8.18)*	(-3.14)*	(-2.07)*	(-1.74)***
Democracy			-0.146	0.012	0.039	0.047
			(-4.07)*	(0.29)	(1.07)	(1.30)
Bureaucracy Quality				-0.56	-0.47	-0.44
				(-9.89)*	(-8.06)*	(-7.55)*
Rule of Law					-0.21	-0.20
					(-5.12)*	(-5.03)*
Government Spending						-0.03
						(-2.19)*
R-B	0.12	0.63	0.71	0.70	0.71	0.70
R-O	0.07	0.46	0.51	0.56	0.60	0.60
Observations	509	509	509	509	509	509

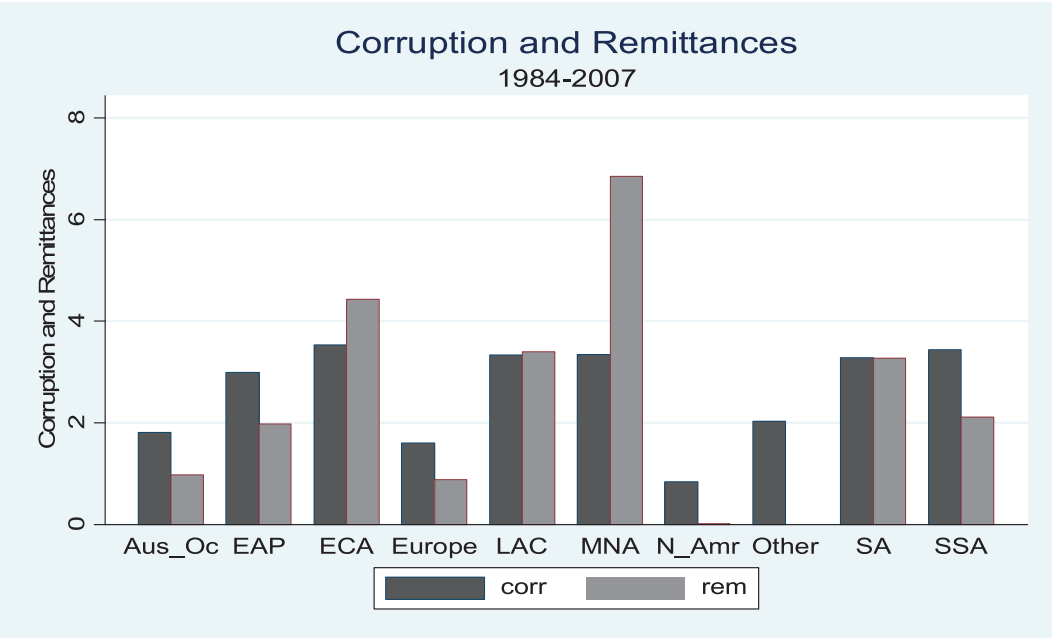
Note: The t-statistics are given in parentheses (*), (**), and (***) indicate statistical significance at 1%, 5% and 10% levels respectively.

Table 12: Corruption and remittances: panel estimation: sensitivity analysis: random effects

Ind. Variables	**Dependent Variable: Corruption**								
Remittances	0.018	0.023	0.022	0.018	0.021	0.019	0.022	0.022	0.024
	(2.00)**	(2.51)*	(2.39)*	(2.04)**	(2.17)**	(2.11)**	(2.35)*	(2.47)*	(2.43)*
PCY	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-3.89)*	(-3.71)*	(-3.78)*	(-6.08)*	(-3.51)*	(-2.69)*	(-3.17)*	(-3.50)*	(-4.13)*
Bureaucracy Quality	-0.59	-0.54	-0.56	-0.63	-0.52	-0.46	-0.54	-0.53	-0.60
	(-11.87)**	(-10.4)*	(-10.8)*	(-13.5)*	(-9.44)*	(-8.70)*	(-10.9)*	(-10.5)*	(-11.2)*
Openness	0.004	0.006	0.006	0.003	0.006	0.006	0.006	0.006	0.006
	(3.83)*	(5.19)*	(5.09)*	(2.37)*	(5.16)*	(5.30)*	(5.23)*	(4.91)*	(3.97)*
Urbanization	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(3.891)*	(4.63)	(4.56)	(4.13)	(4.42)	(4.80)	(4.30)	(4.44)	(4.17)
Government Stability	0.075								
	(4.15)								
Internal Conflict		-0.039							
		(-2.08)*							
External Conflict			-0.038						
			(-1.86)*						
Investment Profile				0.17					
				(10.15)*					
Military in Politics					-0.08				
					(-2.41)*				
Rule of Law						-0.21			
						(-5.54)*			
Religion in Politics							-0.17		
							(-4.66)*		
Ethno Linguistic								-0.14	
								(-3.94)*	
									0.005
									(2.33)*
R-B	0.68	0.69	0.68	0.70	0.69	0.71	0.69	0.69	0.66
R-O	0.58	0.59	0.58	0.62	0.59	0.62	0.59	0.59	0.57
Observations	506	506	506	506	506	506	506	506	506

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

Figure 1: Corruption and remittances in different regions of the world



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Notes:

1. http://www.worldbank.org/publicsector/anticorrupt/index.ctm.

References

Abdih, Y., Chami, R., Dagher, J., and Montiel, P. (2012), 'Remittances and institutions: Are remittances a curse?', *World Development*, Vol. 40, Issue 4, pp.657-666.

Ahmed, F. Z. (2013), 'Remittances deteriorate governance', *Review of Economics and Statistics*, Vol. 95, No.4, pp. 1166-1182.

Arellano, M. and Bond, S. R. (1991), 'Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations', *Review of Economic Studies*, Vol. 58, No.2, pp. 277–297.

Arellano, M. and Bover, O. (1995), 'Another look at the instrumental variable estimation of error components models', *Journal of Econometrics*, Vol.68, No.1, pp. 29–52.

Barajas, A., Cosimano, T., Fullenkamp, C., Gapen, M., and Montiel, P. (2008), *Macroeconomic consequences of remittances,* International Monetary Fund.

Berdiev, A. N., Kim, Y., and Chang, C. P. (2013), 'Remittances and corruption', *Economics Letters*, Vol.118, No.1, pp. 182-185.

Blundell, R. W. and Bond, S. R. (1998), 'Initial conditions and moment restrictions in dynamic panel data models', *Journal of Econometrics*, Vol. 87, No.1, pp.115–143.

Chami, R., Jahjah, S., and Fullenkamp, C. (2003), *Are immigrant remittance flows a source of capital for development*, International Monetary Fund.

Holtz-Eakin, D., W. Newey and H. Rosen (1988), 'Estimating vector autoregressive with panel data, Econometrica', Vol.56, pp.1371-1395.

ICRG [International Country Risk Guide] (2008), *A business guide to political risk for international decisions*, New York: The PRS Group.

IMF [International Monetary Fund] (2008), *International financial statistics yearbook*, International Monetary Fund, Washington DC.

Ivlevs, A., and King, R. M. (2014), 'Emigration, remittances and corruption experience of those staying behind', IZA Discussion Papers, No. 852.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., and Vishny, R. (1999), 'The quality of government', *Journal of Law, Economics, and Organization*, Vol.15, pp. 222–279.

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, pp. 3–51.

MacDonald, Ronald and M. T. Majeed (2011), 'Causes of corruption in European countries: History, law, and political stability', Working Paper, University of Glasgow.

Majeed, M. T. (2014), 'Corruption and Trade', *Journal of Economic Integration*, Vol. 29, No.4, pp.759-782. DOI: http://dx.doi.org/10.11130/jei.2014.29.4.759

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.

Majeed, M. Tariq and Ronald MacDonald (2011), 'Corruption and financial intermediation in a panel of regions: cross-border effects of corruption', Working Paper, University of Glasgow.

Mauro, P. (1995), 'Corruption and growth', *The quarterly journal of economics'*, Vol. 110, No. 3, pp. 681-712.

Rose-Ackerman, S. (1999), *Corruption and government*, Cambridge: Cambridge University Press.

Serra, D. (2006), 'Empirical determinants of corruption: a sensitivity analysis', *Public Choice*, Vol.126, pp. 225–256.

Treisman, Daniel (2000), 'The causes of corruption: a cross-national study', *Journal of Public Economics*, Vol.76, pp. 399-457.

Tyburski, M.D., (2012), 'The resource curse reversed? Remittances and corruption in Mexico', *International Studies Quarterly*, Vol.56, pp.339–350.

World Bank (2009), *World Development Indicators 2009*, Washington DC.