

## **Is there a relationship between corruption and job creation in resource rich oil and gas developing countries?**

Olumide Ijose  
Governors State University

Jesus Valencia  
Slippery Rock University of Pennsylvania

### **ABSTRACT**

Though the relationship between corruption and development has attracted increased research attention in the last 5 years, past studies have not segmented developing countries in a unique manner in examining this relationship. Using data from the Economic Intelligence Unit, Transparency International and the Heritage Foundation, this paper examines the relationship between corruption and employment growth in oil rich developing countries between the 1999 and 2006-time period. The period was selected as it represents an era of high oil and gas prices and in theory, an enhanced ability to create jobs. The paper will deepen the understanding of the impact of corruption on employment in emerging/developing resource rich countries.

Keywords: Corruption, job creation, oil and gas, developing countries



Copyright statement: Authors retain the copyright to the manuscripts published in AABRI journals. Please see the AABRI Copyright Policy at <http://www.aabri.com/copyright.html>

## INTRODUCTION

Economies are hard pressed to create good jobs at a reasonable clip, if their resources are sub-optimally utilized. Since corruption creates inefficiencies, there should be a direct relationship between job creation and the incidence of corruption. Corruption is however but one force affecting job creation. The openness of an economy also influences its ability to create jobs. If it is true, that the more institutionalized corruption is in an economy, the less open it becomes, it means that *ceteris paribus*, the more corrupt a country is, the less competitive it becomes, and the more constrained its ability to create jobs becomes.

The relationship between natural resources and slow economic growth in emerging economies has been well-demonstrated (Sachs and Warner, 1995, Gylfason, 2001). Likewise, the negative correlation between slow economic growth and job creation has been well documented. This finding is counter to classic economic theory which holds that *ceteris paribus*, the more abundant the supply of natural resources in a country, the better for the country's economy. It is a fact that today, aside from the United States, the rich countries and the major emerging economies do not possess an abundant stock of natural resources.

Most economists agree that a plausible reason for the seeming contradiction is that, other important job creating factors tend to be crowded out in countries with abundant natural resources. Gylfason (2001) for instance, points to a dearth of investment in human capital, Sachs and Warner (2001) argue that natural resources tend to crowd out manufacturing, while Kronenberg (2004) contends that natural resource rich countries are plagued by rent seeking behavior and widespread corruption that negatively affects their economic performance.

There has been no previous empirical work on the relationship between corruption, economic openness and job creation in oil and gas dominated economies. This paper analyses this relationship, using measures of economic openness and corruption estimates from Heritage Foundation and employment data from Economic Intelligence Unit.

The study covers employment growth in the period between 1999 and 2006 as this represents a period of significantly increased earnings for oil and gas endowed countries. The countries studied were selected, because sales from crude oil represent a majority of their earnings and because of the existence of reliable data. This meant that a lack of consistent data led to the exclusion of interesting countries such as Nigeria, Iran, Iraq, Kuwait and Angola from the study. To control for the level of development in the selected countries, Norway, a developed country, endowed with huge oil and gas deposits, was included in the regression equation. The expectation is that everything being equal, given the significant increase during the period under review, the countries should demonstrate significant gains in employment.

Section 2 of this paper provides a brief overview of the literature on corruption and economic openness and how they may affect job creation. The next section describes the data methodology used in the regression analysis. In section 4, the regression results are discussed while concluding remarks are presented in section 5.

## WHAT IS CORRUPTION?

The conceptualization of corruption in this paper includes all of its economic forms, public and private. Public sector corruption, includes activities such as the blatant use of public money for private gain such as trade mispricing where public contracts are over-invoiced for private gain and the payment of bribes to a public official to gain undue advantage such as evading taxes, winning a competitive

contract, winning a tender offer, winning a privatization bid, or winning access to a license to exploit natural resources. Private sector corruption includes, over-invoicing of import transactions as a tool for facilitating transfer payments, evading taxes or to conceal illegal payments, under-invoicing of import prices to reduce import duties, to avoid paying taxes or to foster capital flight (de Boyrie, Pak and Zdanowicz, 2004).

Though corruption is an age-old problem (Bardham, 1997), there are divergent views on how it has impacted national economies. Some researchers (Leff, 1964, Huntington, 1968, Lui, 1985, Lien, 1986) have argued that corruption has an efficiency effect in developing countries where bureaucracies tend to distort efficient economic activities and to hinder entrepreneurial behavior as practiced in western market economies. In essence, these researchers argue that corruption should have a positive effect on economic growth and employment. A second group (Rose-Ackerman, 1978, Shleifer and Vishny, 1993) contends that the impact of corruption depends on the nature of government. That corruption hinders growth in countries where power is decentralized but not in countries where power is centralized. Shleifer and Vishny (1993) use this argument in contending that the increase in corruption in Russia post the communist Soviet Union was due to the ensuing decentralization of corruption. A third group argues that corruption impacts negatively on static efficiency, investment and growth (Romer, 1994, Mauro, 1995, Tanzi, 1998, Leite and Weidman, 1999). Empirical studies that have found a negative relationship between corruption and indices of economic growth include the works of Mauro, 1995 and Wei, 1997 that found a negative relationship between the incidence of corruption and investment and growth and those of Kruger, 1974 and Torrez, 2002 that found a similar effect on international trade. This paper is based on the hypothesis that corruption has a negative effect on job creation and thus, belongs to the school of thought that discredits the argument that corruption has an efficiency effect.

## **METHODOLOGY**

### **Data Sources**

The unit of analysis for the study was an oil and gas producing country, with a country defined as a distinct autonomous entity, able to take independent decisions on the structure of its internal institutional environment and its domestic economic, social and political policies. Longitudinal data was collected for the period between 1999 and 2006 from the websites of Economist Intelligence Unit and Heritage Foundation. Data was collected for the following countries: Algeria, Azerbaijan, Kazakhstan, Mexico, Norway, Russia and Venezuela.

### **Dependent Variable**

The dependent variable for the study was employment growth. Data was collected from the Economist Intelligence Unit for the period between 1999 and 2006 and indicates yearly changes in job creation. Analysis was done by pooling the individual country data. Countries are presumed to constitute relatively homogenous economic/political entities, thus they are the logical units within which to identify variations in the independent variable, and to assess the impact of these variations on job creation.

## Independent Variables

Nine indicators of a country's ability to create jobs were identified from the Heritage Foundation's Index of Openness, Transparency International's Corruption Perceptions Index (CPI) and the Economist Intelligence Unit Country Reports database. These indicators include variables measuring economic freedom, corruption and economic growth. As the extent of a country's economic openness, level of corruption and rate of economic growth is expected to affect job creation, each measure is expected to correlate with employment growth.

Retroactively analyzing the effect of economic openness, corruption and economic growth on employment growth in selected natural resource rich countries, will help in understanding how these countries in general can leverage their natural resource wealth to create jobs. From this understanding comes different theoretical, empirical and policy making attributes, which will inform future theoretical, empirical and policy making activities.

**The measurement of each of the nine variables is briefly described below.**

Business Freedom: "The ability to create, operate and close an enterprise quickly and easily."

Trade Freedom: "A composite measure of the absence of tariff and non-tariff barriers that affect imports and exports of goods and services."

Monetary Freedom: "Combines a measure of price stability with an assessment of price controls."

Freedom from Government: "Includes all government expenditures, including consumption and transfers."

Fiscal Freedom: "A measure of the burden of government from the revenue side. The measure includes both tax burden and the overall amount of tax revenues as a proportion of GDP."

Property Rights: "An assessment of the ability of individuals to accumulate private property secured by clear laws that are enforced by the state."

Investment Freedom: "An assessment of the free flow of capital especially foreign investment."

Financial Freedom: "A measure of banking security as well as independence from government control."

Gross Domestic Product Per Capita: GDP in US\$ per capita at current prices and exchange rates

Source: Heritage Foundation 2007

## STATISTICAL ANALYSIS

The data consisted of 10 variables collected on seven countries during 9 years for a total of 630 observations. The data is referred to in the econometric literature as panel data.

The research question is the impact that corruption has on the ability of countries to generate employment. This meant that employment growth (empgrwt) will be the dependent variable. The independent variables comprising the data set were named as follows:

Gdpch = percentage change in GDP

Corrupt = corruption index

Regul = freedom from regulation index (business freedom)

Trade = trade freedom

Fiscal = a measure of the burden of government from the tax revenue side.

Govinterv = a measure of the degree of freedom from government.

Monetstabil = a measure of price stability and absence of price controls.

Invest = a measure of investment freedom – how freely capital can flow.

Finance = a measure of financial freedom: banking security and freedom from banking regulation

According to economic theory, the creation of jobs is of course positively related to the growth of gross domestic product (GDP) – increases in real GDP should accompany increases in labor employment. The paper thus examines corruption as a force that reduces the effectiveness of GDP growth on the premise that it causes an inefficient allocation of scarce resources in pursuit of economic activity, that would otherwise be allocated more efficiently.

The initial estimates estimated employment growth as a function of GDP growth and the 8 variables measuring the various economic freedoms as defined above.

$$\text{Empgrwt}_{i,t} = \alpha + \beta_1(\text{gdpch})_{i,t} + \beta_2(\text{corrupt})_{i,t} + \beta_3(\text{regul})_{i,t} + \beta_4(\text{trade})_{i,t} + \dots + \beta_9(\text{finance})_{i,t} + v_i + \varepsilon_{i,t} \quad [1]$$

'i' refers to country i and 't' refers to year t.

Equation [1] was estimated using a fixed effects estimator. The term  $v_i$  corresponds to the country specific term that would define a different intercept equation for country 'i'. The term  $\varepsilon_i$  represents an assumed white noise error term with expected zero mean. The results from using a fixed effects estimator for equation [1] were disappointing to say the least. Corruption had the wrong sign and most coefficients were not statistically significant.

### Corruption as an Endogenous Variable

Corruption is perhaps better viewed as a variable, which is endogenously generated alongside forces that also determine job creation. It is indeed possible that corruption affects job creation, which affects subsequent levels of corruption for better, or worse. If that is the case, the inclusion of corruption as an explanatory variable in an equation attempting to explain employment growth leads to simultaneous causality bias. In that case, OLS estimates are known to be inconsistent because the explanatory variable "corruption" is correlated with the error term  $\varepsilon_i$ .

## **Instrumental Variables Regression**

This estimation technique was designed specifically to deal with situations where for some reason an explanatory variable is correlated with the error term in a regression. The simultaneous causality case invoked here is but one of several theoretical cases where correlation between a regressor and the error term is the result.

### **Possible Instruments for the variable “Corruption”**

The difficulty of using the instrumental variable technique usually has to do with finding a suitable instrument for the endogenous regressor in the estimating equation as the instruments have to be correlated with the endogenous variable “corruption” but also have to have zero correlation with the error term  $\varepsilon_i$  in the equation. The instruments selected also have to be exogenous to the system of variables that determine employment growth and corruption.

### **Three Suitable Instruments for “Corruption”**

The variables “trade”, “invest”, and “monetstabil” appear to be suitable instruments in that they are correlated to “corruption” but can be thought of as exogenously determined.

The variable “trade” measures a country’s freedom to trade. It is a composite measure of the absence of tariff and non-tariff barriers that affect a country’s level of imports and exports. Trade freedom is an economic policy variable determined through a country’s political process and thus determined exogenously to the process being modeled in this study. The same can be said about the variable “invest”, which measures the extent to which financial capital can flow freely, especially foreign capital. The third instrumental variable “monetstabil” measures monetary freedom in the sense that it combines a measure of price stability with an assessment of price controls. In essence, this posits that price stability and the degree of price controls in the economy are also economic policy variables that are determined outside the system being examined in this study.

### **An Instrumental Variable Approach: Statistical Results**

In essence, the method of instrumental variables is a two stage least squares estimating technique. Table 1 shows the results of the instrumental variable approach. The variable “country” represented the cross sectional dimension and the variable “year” represented the time-series dimension in the data.

The results shown in table 1 are the result of using a random effects estimator of the coefficients. The selection of the random effects estimator can be defended because the sample of seven countries is but a subset of the oil exporting countries for which inference are being made regarding the relationship between corruption and its impact on job creation.

**TABLE 1**

First-stage G2SLS regression

Number of obs. = 61  
 Wald chi (4) = 28  
 Prob > chi2 = 0.0000

corrupt	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
gdpch	-.506	.359	-1.41	0.159	-1.211	.198
monetstabil	.437	.141	3.10	0.002	.160	.713
trade	.446	.250	1.78	0.075	-.044	.937
invest	.296	.158	1.88	0.061	-.013	.606
_cons	-29.630	16.190	-1.83	0.067	-61.362	2.102

G2SLS random-effects IV regression  
 Group variable: country

Number of obs = 61  
 Number of groups = 7  
 Obs per group: min = 8  
 avg = 8.7  
 max = 9

Corr (u<sub>i</sub>, X) = 0

F (2,59) = 4.77  
 Prob > F = 0.012

empgrwt	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
corrupt	.145	.054	2.67	0.010	.036	.255
gdpch	.194	.087	2.21	0.031	.018	.369
_cons	-4.695	2.376	-1.98	0.053	-9.449	.059

sigma\_u | 1.429  
 sigma\_e | 3.458  
 rho | .1454 (fraction of variance due to u<sub>i</sub>)

**Analysis of the results**

The results of the first stage in this two-stage least-squares estimating technique shows that “corruption” is well explained by the instruments “monetstabil”, “trade” and “invest”. All coefficients for the 3 instrumental variables are statistically significant. According to the estimates:

- A. Growth of real GDP reduces the index value for corruption, which means that corruption increases.
- B. Increased price stability and increased freedom from price controls increases the index value of corruption, which means that corruption falls.

- C. Increased trade freedom increases the index value of corruption, which means that corruption falls.
- D. Increased investment freedom increases the index value of corruption, which means that corruption falls.

It is reassuring that greater investment and trade freedom reduces corruption and that price stability and freedom from price controls do the same.

The second stage in this instrumental variable estimating technique uses the results from the first stage in order to estimate the relationship of primary interest in this study: how corruption affects employment growth.

The results in table 1 show that all coefficients are statistically significant. The coefficient on corruption is significant at the 1% level of confidence, and those on “gdpch” and the constant term are significant at a 5% level of significance or better. According to the results:

- A. An increase in the index value of corruption (a reduction in corruption) increases employment growth. The marginal effect being an increase of 0.14 increase in employment growth for a one-point increase in the index value of corruption (a reduction in the level of corruption).
- B. The elasticity of employment growth with respect to changes in corruption was estimated at 2.876. This elasticity was measured at the mean level of corruption for all countries in the sample (37.67). This estimate shows that there are significant returns to fighting corruption.
- C. The elasticity of employment growth with respect to changes in real GDP growth was estimated as 0.581. This elasticity was measured at the mean level of DPG growth for all countries in the sample (5.72%).

### Country-Specific Inferences

The random effects estimating technique facilitated the estimation of the following equation for each country in the sample:

$$\text{Empgwth}_{i,t} = -4.695 + 0.1942(\text{Gdpch})_{i,t} + 0.1458(\text{Corrupt})_{i,t} + \nu_i + \varepsilon_{i,t} \quad [2]$$

where the subscript ‘i’ denotes country ‘i’ and ‘t’ denotes year ‘t’

For purposes of illustration, let us refer to equation [2] as  $y_{i,t} = x\beta_i + \nu_i + \varepsilon_{i,t}$ .

Under a random effects estimator the coefficient  $\nu_i$  is a country specific random error derived from the characteristics particular to country ‘i’. Table 2 shows the means for each of the elements of equation [2] by country as well as the means for corruption and gdp change. The table also shows the employment growth rates estimated by the model:  $x\beta_i + \nu_i$ .



**TABLE 2**

Country	Corrupt	gdpch	Constant	$x\beta_i$	$v_i$	$x\beta_i + v_i$
Algeria	44.777	4.188	-4.695	2.649	0.861	3.511
Azerbaijan	21.333	13.711	-4.695	1.079	-0.234	0.844
Kazakhstan	21.444	8.122	-4.695	0.010	0.434	0.444
Mexico	42	3.222	-4.695	2.056	2.579	4.636
Norway	88.777	2.588	-4.695	8.756	-7.934	0.822
Russia	27.333	5.433	-4.695	0.346	0.186	0.533
Venezuela	18.555	2.544	-4.695	-1.494	4.216	2.722

The levels of corruption shown on table 2 are averages for each country during the years sampled: 1998 through 2006. In terms of corruption the most corrupted in the sample is Venezuela (18.55) followed by Azerbaijan (21.3), Kazakhstan (21.4), Russia (27.3), Mexico (42), Algeria (44.7) and far away from the rest, Norway (88.7).

Table 3 shows the employment growth rates that would have taken place had the index of corruption for every country been 10 points greater than they actually were during the years sampled, all else being equal. That means if levels of corruption had been less than they actually were.

**TABLE 3**

	Corrupt	gdpch	constant	$x\beta_i$	$v_i$	$x\beta_i + v_i$	%Change emplymt	%Change corrupt	Elasticity
Algeria	54.777	4.188	-4.695	4.108	0.861	4.969	41.541	22.332	1.860
Azerbaijan	31.333	13.711	-4.695	2.537	-0.234	2.303	172.719	46.875	3.684
Kazakhstan	31.444	8.122	-4.695	1.468	0.434	1.903	328.184	46.632	7.037
Mexico	52	3.222	-4.695	3.515	2.579	6.095	31.458	23.809	1.321
Norway	98.777	2.588	-4.695	10.215	-7.934	2.280	177.394	11.264	15.748
Russia	37.333	5.433	-4.695	1.805	0.186	1.991	273.485	36.585	7.475
Venezuela	28.555	2.544	-4.695	-0.035	4.216	4.180	53.580	53.892	0.994

As table 3 shows, there appears to be great returns to fighting corruption. The empirical analysis indicated an elasticity of 2.87 on average for a 1% reduction in corruption by all countries. That elasticity was however estimated at 37.67, the average level of corruption for all countries in the sample.

The results indicate that the returns on fighting corruption are varied given the country-specific estimates obtained in the model. The percentage change in employment is of course greatly affected by the employment performance each country experienced during the period sampled. Thus, those with high employment growth rates between 1998 and 2006 stand to gain smaller returns fighting corruption.

Venezuela, the most corrupt in the sample, gains the least simply because a 10-point increase in the corruption index represents a large reduction in corruption and its employment growth performance during the period sampled was relatively good. The high return on corruption reduction that Norway experiences, the least corrupt country in the sample, is due to the small reduction in corruption

(percentage-wise) that a 10-point increase would bring coupled with a relatively poor employment growth record between 1998 and 2006.

## CONCLUSION

This study examined the relationship between corruption and economic openness on job creation in a subset of countries. The result suggests that there should be little doubt that economic openness and reductions in the incidence of corruption will have a positive impact on job creation, as consistent with predictions from the openness, growth, rent seeking and other literature (Torrez, 2002; Kaufman, 1997; Tanzi and Davoodi, 1997), the empirical results demonstrated the expected negative relationship between corruption and employment creation.

Interestingly, the analysis shows that a reduction in the incidence of corruption leads to an increase in the job creation capability of a country. Granted that corruption cannot be reduced solely by will power or by an understanding of its systemic negative consequences, it can be argued that policy makers need to put a genuine market based system in place, if they are serious about fighting corruption.

Although, the data covered only a subset of all oil and gas dominated economies, there is strong reason to believe that the results would hold true if data had been available on all of them. In fact, the results suggest that it would only have been strengthened with the availability of reliable data on countries such as Nigeria, Angola, Equatorial Guinea, Chad and Sudan.

Research on the underlying political, socio-cultural, institutional and historical factors undergirding corruption in oil and gas rich economies would also be useful. Such research will help us understand the extent to which financial inflows and external pressures can in reality provide a signal to these countries to put in place, real market based economic systems and workable institutional checks and balances.

## REFERENCES

Bardham, P. (1997). Corruption and Development: A Review of the Issues. *Journal of Economic Literature*: XXXV, 1320-1346.

de Boyrie, M., Pak, S.J., and Zdanowicz, J. (2004). Money Laundering and Income Tax Evasion: The Determination of Optimal Audits and Inspections to Detect Abnormal Prices in International Trade. *Journal of Financial Crime*: 12:2, 123-130.

Gylfason, T. (2001). Natural Resources, Education and Economic Development. *European Economic Review*: 45(4-6), 847-859.

Huntington, S. (1968). *Political Order in Changing Societies*. New Haven: Yale University Press.

Kaufmann, D. (1997). Corruption: the Facts. *Foreign Policy*: 107, 114-31.

Krueger, A. 1974. The Political Economy of the Rent-Seeking Society. *American Economic Review*: 64, 291-303.

Leff, N. (1964). Economic Development Through Bureaucratic Corruption. *The American Behavioral Scientist*: 8(2), 8-14.

- Lien, D. (1986). A Note on Comparative Bribery Games. *Economic Letters*: 22, 337-41.
- Leite, C. and Weidman, J. (1999). Does Mother Nature Corrupt? Natural Resources, Corruption and Economic Growth. *IMF Working Paper WP/99/85*.
- Lui, F. (1985). An Equilibrium Queuing Model of Bribery. *Journal of Political Economy*: 93(4), 760-81.
- Mauro, P. (1995). Corruption and Growth. *Quarterly Journal of Economics*: 11093, 681-712.
- Romer, P. (1994). New Goods Old Theory and the Welfare Costs of Trade Restrictions. *Journal of Development Economics*: 43(1), 5-38.
- Rose-Ackerman, S. (1978). *Corruption: A Study in Political Economy*. New York: Academic Press.
- Sachs, J.D. and Warner, A.M. (2001). The Curse of Natural Resources. *European Economic Review*: 45(4-6), 827-838.
- Shleifer, A and Vishny, R. (1993). Corruption. *Quarterly Journal of Economic*, 108(3), 599-617.
- Tanzi, V. (1998). Corruption around the World: Causes, Consequences, Scope and Cures. *IMF Staff Papers*: 45(4), 559-94.
- Tanzi, V. and Davoodi, H. (1997). Corruption, Public Investment, and Growth. *IMF Working Paper*. WP/97/139.
- Torrez, J. (2002). The Effect of Openness on Corruption. *The Journal of International Trade & Economic Development*. 11(4) 387-403.
- Wei, S.J. 1997. How Taxing is Corruption on International Investors? *National Bureau of Economic Research Working Paper*, 5755: May

### Authors' Note

Data for this paper was collected from the 2007 Heritage Foundation Index of Economic Freedom and the Economist Intelligence Unit. As much as the authors would have liked to include every oil and gas dominated economy in the empirical analysis, the countries in the dataset were those with consistent data across the years studied. As such, interesting countries like Nigeria and Saudi Arabia were not included in the empirical analysis.