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Corruption and Economic Development in Energy-rich Economies

YELENA KALYUZHNOVA[1], ALI M KUTAN[2] & TANER YIGIT[3]

[1]The Centre for Euro-Asian Studies, The University of Reading, Whiteknights, PO Box 218, Reading RG6 6AA, UK. E-mail: y.kaluyzhnova@reading.ac.uk
[2]Department of Economics and Finance, Southern Illinois University, Edwardsville, Il 62026-1102, USA. E-mail: akutan@siue.edu
[3]Department of Economics, Bilkent University, Ankara, Turkey. E-mail: tyigit@bilkent.edu.tr

We empirically model the causes of corruption and test the economic development–corruption link in energy-rich economies, using data from 48 countries with energy resources. The results indicate that energy abundance may not necessarily hurt economic development in energy-rich countries, allowing enterprises to conduct business more effectively to reduce corruption, establishing a better political (democratic) regime improves corruption rankings, and finally while corruption reduces both the level of GDP per capita and its growth rate, economic development decreases corruption.
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INTRODUCTION

Data limitations and the complexity of the oil and gas industry have impeded the efforts of researchers to study and uncover the links between the rents generated by oil revenues and high levels of corruption as well as the corruption–development link in energy-rich economies.[1] The studies that

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have been undertaken in energy-rich countries (Aslaksen and Torvik, 2005; Auty, 2001; Damania and Bulte, 2003; Gylfason, 2004) argue that corruption could be blamed for the failure of a number of energy-rich economies to develop. This literature has not considered the multi-directional causality between resource richness, corruption and economic development. We intend to fill this gap in the literature by providing evidence on both the link between natural resource wealth and corruption and the lack of development, with special reference to energy-rich countries.

Our paper relates to several strands of the academic literature. First, it extends the literature on the corruption–development debate (Aslaksen and Torvik, 2005; Auty, 2001; Damania and Bulte, 2003; Gylfason, 2004) by relating the causes of corruption to some energy-specific variables.

Second, our paper is related to a more recent literature that studies the corruption–growth link using regional level analysis, especially for the region of the Middle East and North Africa (MENA) where the major energy reserves are located (World Energy Outlook, 2007). These studies include in their cross-country regressions a number of region-specific institutional variables such as bureaucratic quality and corruption in order to distinguish the impact of these variables on economic growth at a regional level. For example, Guetat (2006) attempts to distinguish the impact of corruption on growth in MENA countries from of its impact on countries in Latin America, Asia and sub-Sahara Africa. Their results suggest that corruption may hamper economic growth more in MENA countries. Gyimah-Brempong and de Camacho (2006) examine regional differences in the impact of corruption on economic growth in Africa, Asia and Latin America. They find a negative impact of corruption on the growth of income per capita, with the largest negative effect in Africa. Kutan *et al*. (2008) provide further empirical evidence on the impact of corruption on economic development in MENA and Latin American countries. They report significant differences in terms of the impact of corruption on economic development in both regions.

Third, the present paper relates to recent theoretical attempts that model the corruption–economic growth link conditional on the quality of political institutions. Aidt *et al*. (2008) show that corruption may have no significant impact on economic growth in a regime where political institutions are of low quality. However, it may hurt growth significantly when political institutions are of high quality. Our paper is related to theirs, as we estimate the impact of corruption on growth (and *vice versa*) conditional upon energy dependency variables, which play an important role in government policy. In addition, we test how democratic institutions affect growth and corruption in the presence of significant energy dependence.

Fourth, our paper is linked to the literature on the resource curse and rent-seeking behaviour of government bureaucracy in energy-rich countries

(Sachs and Warner, 1995, 1999a; Auty, 1994; Gylfason *et al*., 1999, Leite and Weidmann, 1999; Kalyuzhnova, 2008). A recent study by Kalyuzhnova and Nygaard (2008) brings a different perspective to this literature. They consider corruption as an element of overall state capacity; in case-specific economies corruption may be an integral element of the functioning of the economic and political system. Finally, the paper relates to the literature on the effect of national oil companies on corruption (Olcott, 2007).

In the next section, we discuss the hypotheses to be tested and outline the empirical framework and strategy used. The subsequent section describes the data and presents the empirical evidence. The last section concludes the paper with some policy implications.

TESTABLE HYPOTHESES, EMPIRICAL FRAMEWORK AND ESTIMATION STRATEGY

In this section, we first discuss our testable hypotheses using arguments developed in the literature. Next, we summarise our empirical models and explain our estimation strategy.

Key hypotheses to be tested

One of the key arguments regarding corruption in energy-rich countries relates to the behaviour of the state bureaucracy with regard to a country's resource endowment. The nature of exploration and production in the oil and gas industry creates a high concentration of capital expenditures, generates a high level of resource revenue for the government, and through this provides ample opportunities for corruption and rent-seeking behaviour by the government bureaucracy. In fact, all 34 less-developed oil-rich countries 'share one striking similarity: they have weak, or, in some cases, non-existent political and economic institutions' (Birdsall and Subramanian, 2004, p. 78). Corruption and rent seeking by government officials connected to the oil industry could be 'exacerbated by use of ''off-budget'' accounts (including those established by national oil companies)' (ODI/UNDP, 2006, p. 14). Thus the existence of regulations and a state bureaucracy to enforce them as well as entire political regimes in energy-rich countries are open to corruption. Thus, we argue that political institutions may hurt or improve corruption conditional upon the level of energy dependency, formulating the following hypotheses specific to energy-rich economies:

Hypothesis 1. *Corruption is higher in energy-rich countries where state bureaucracy is high or ease of doing business is low.*

Hypothesis 2. *Democratic regimes foster corruption in countries with significant energy dependency.*

Corruption may also be affected by education level or human capital stock in a given country. Gylfason (2001) shows that public spending on education in resource-rich countries is inversely related to the share of natural capital in national wealth across countries because natural capital tends to crowd out human capital. Hence, we develop our third hypothesis as follows:

Hypothesis 3. *Energy-abundant countries with low level of education are likely to be more corrupt.*

Another key argument discussed in the literature is the link between economic growth, resource richness and corruption. The few studies analysing the poor economic performance of resource-rich economies (Auty, 2001; Gylfason, 2001) overlooked the important possibility of bi-causality, where poor economic performance causes corruption and corruption causes economic decline. Using a dynamic general equilibrium model of economic growth, Blackburn *et al*. (2005) derive a theoretical link between corruption, economic development and a number of other variables. They show that the relationship between corruption and economic growth is both negative and bi-causal in general. From these arguments we derive our fourth hypothesis:

Hypothesis 4. *There is a negative and bi-causal relationship between corruption and growth in energy-rich economies.*

It is possible that corruption may not affect the growth rate of GDP, but just its level. Hence, we derive the following final hypothesis:

Hypothesis 5. *There is negative and bi-causal relationship between corruption and economic development, measured by the level of GDP per capita, in energy-rich economies.*

Empirical models

We estimate two sets of two equations, the first set for the growth rate of real GDP per capita and corruption, and the other one for the level of real GDP per capita and corruption. In the economic growth equation, our focus variable is corruption and energy-specific variables. We also use several control variables to account for the other potential determinants of economic growth. Regarding the latter, standard growth theory (ie Solow, 1956; Barro and Sala-i-Martin, 1991) and new growth theory suggest that capital accumulation and human capital are important factors determining long-term growth (Aghion and Howitt, 1992; Romer, 1990). We therefore expect a positive coefficient for these variables. As proxies for capital accumulation, we use government expenditures, gross fixed capital formation, foreign direct investment (FDI) and infrastructure (percentage of total roads paved). In addition, following some recent studies we have included democracy and openness variables in estimations and these studies have presented evidence that better democratic systems and a higher level of openness increase growth significantly (Bardhan, 1997; Durham, 1999; Rodrik, 2000; Sachs and Warner, 1999b, Tavares and Wacziarg, 2001). Democracy is used to measure institutional quality and openness is utilised as a measure of country's openness to foreign trade. Hence, we expect positive coefficients for these two variables as well.

For the corruption equation, following our testable hypotheses, we include the growth rate of real GDP per capita (level of GDP per capita in the second set), education, democracy, ease of doing business and energy-specific variables. The expected signs of these variables are discussed above when we developed our hypotheses. In addition, we use the following control variables: openness, democracy index, general government final consumption expenditure as percentage of GDP, economic freedom and external debt. In terms of the signs of coefficients, we expect that countries that are more open, having a smaller ratio of government expenditure in GDP, more economic freedom and less external debt should have lower levels of corruption. The intuition for the inclusion of these variables into our regression equations and expected signs come from some related studies mentioned earlier (Aidt, 2003; Aidt *et al.*, 2008; Mehlum *et al.*, 2006; Papyrakis and Gerlagh, 2004; Sachs and Warner, 1995, 1999b).

One of the key contributions of our paper is to test the significance of energy-specific variables on growth and corruption. Both the corruption and growth estimations include variables reflecting energy dependence. We test whether such energy dependency variables have any additional explanatory power beyond those variables typically used to explain growth and corruption. We use three different 'measures' of natural resource endowment/production in explaining the corruption–development–natural resource relationships (primary exports as a percentage of merchandise exports, proven oil reserves in bln, bbl, oil production in thousand barrels/day, natural gas reserves in trillion cubic meters, and natural gas production in billion cubic meters). We mix the flow with the stock only if they help explain the oil richness of a country (by explaining the variation in the data matrix as the first principal component). The impact of energy-specific variables on growth and other variables is a highly debated issue, and we therefore do not assign coefficient signs *a priori*. Some studies argue that natural resources might be a curse, others a blessing.[2] Also, we use interactive terms combining energy-specific variables along with other explanatory variables, such as democracy, to test whether they have any impact on corruption or economic growth.

Estimation strategy

We estimate the corruption and growth models using a system of equations. We first test our hypotheses using a system estimation method, weighted two-stage least squares, for the possible bi-causality between GDP per capita growth and corruption. We switch from a general to specific model specification using the adjusted R^2, so the seemingly insignificant variables also contribute positively to explaining the variation in the dependent variables. However, we use all the exogenous variables as instruments whether they are in the final equation or not. We later switch to weighted (across equations) least squares, as we find, using the above method, economic growth to be insignificant in the corruption equation, indicating no bi-directional causality between GDP per capita growth and corruption.

Next, we test for the possible bi-causality between the level of GDP per capita and corruption. We do find two-way causality and thus the estimation is based on two-stage weighted least squares. Again, we use all the exogenous variables as instruments including the interactive terms and report the best-fitting model going from a general to a specific model. As above, the final model specification is based on the contribution of each variable to the adjusted R^2. In the next section we describe the data and test our hypotheses.

DATA AND FINDINGS

Data

We use data from 48 countries that possess energy resources, either oil or gas.[3] We divide the sample into two groups of countries with significant energy resources (either oil or gas). Our definition of 'significant energy resources' is whether the oil or gas reserves in the country constitute more than 0.2% or 0.4% of total world reserves, respectively. Such a division gives us a non-heterogeneous sample of countries that are listed in Table 1.

[2] Some related studies include Gylfason (2001), Knack and Keefer (1995), Murshed (2004), Rodriguez and Sachs (1999), Sachs and Warner (2001), Torvik (2002), Wick and Bulte (2006).

[3] Iraq was an outlier (only 2 years of GDP growth data) so it was not included.

Table 1: List of countries used in this study

Country	Country
Algeria	Libya
Angola	Malaysia
Argentina	Mexico
Australia	Nigeria
Azerbaijan	Norway
Bahrain	Oman
Brazil	Peru
Brunei	Qatar
Canada	Romania
Chad	Russian Federation
China	Saudi Arabia
Colombia	Sudan
Congo, Rep.	Syrian Arab Republic
Denmark	Thailand
Ecuador	Trinidad and Tobago
Egypt, Arab Rep.	Tunisia
Equatorial Guinea	Turkmenistan
Gabon	United Arab Emirates
India	United Kingdom
Indonesia	USA
Iran, Islamic Rep.	Uzbekistan
Italy	Venezuela, RB
Kazakhstan	Vietnam
Kuwait	Yemen, Rep.

As mentioned earlier, for energy dependence, we use three proxies in the estimations: primary exports as a percentage of merchandise exports, proven oil reserves scaled down using GDP per capita[4] and the principal component of the following energy variables: oil and natural gas production and reserves, which are also scaled down by GDP per capita.[5] In addition, we include a dummy variable for the presence of a national oil company.[6]

Owing to the low variation in corruption data over time, we rely only on cross-sectional data. The data are constructed by averaging the available years between 1989 and 2006 for each variable. Table 2 provides some descriptive statistics of the data used in the final estimations based on the

[4] We scale the reserves down by GDP per capita to control for size. The results are robust even when we use non-scaled data.

[5] The correlation matrix of the variables at hand is not too problematic, so that multicollinearity is not an issue.

[6] A referee also suggested that we also divided the sample countries into developing and developed. However, the correlation between this and the dummy variable for the presence of a national oil company was 0.99. As a result, we only used the latter in the paper.

Table 2: Descriptive statistics of regression variables

	Mean	Std. dev.
GDP per capita level	7107.69	9185.99
GDP per capita growth rate	2.53	4.20
Democracy index	101.04	51.26
Business index	90.67	51.52
Education × Primx	3501.40	2497.45
Democracy × Primx	5525.63	5424.17
Primx	52.82	36.45
PC1	−9.06E−18	1.69
Openness	76.53	38.62
Government	16.52	6.42
FDI	3.82	5.74
Infrastructure	53.58	30.38
Education	*65.44*	*22.00*

Notes: *PC1*: The principal component of the following energy variables: oil and natural gas production and their reserves scaled down by GDP per capita. See the Appendix for the full definitions of the abbreviations.

general-to-specific model specification using the adjusted R^2. The Appendix provides further information on data and sources.

Corruption and growth regressions

Table 3 reports the results for the equations relating corruption and the growth rate of GDP per capita and corruption based on the weighted least squares estimate, because, as mentioned above, the results (not reported) indicated no bi-causality between GDP per capita growth and corruption. Hence, the first equation includes the country's corruption rank as obtained from Transparency International, which shows more variation than the corruption score reported by the same organisation, as the dependent variable. In the ranking data, larger numbers mean a worse corruption ranking, hence more corruption. The second dependent variable is the growth rate of GDP per capita.

We first discuss the results for the corruption rank equation. The estimated coefficient for GDP per capita is significant, indicating that a $1,000 increase in GDP per capita improves the corruption ranking by one step.[7] The democracy index is significant and positive. An increase in the democracy index meaning a less democratic society, worsens the corruption ranking. We

[7] The dummy variable for the presence of a state oil ownership was insignificant in the regressions, suggesting that corruption is not sensitive to a particular ownership (state *versus* private) for energy. Hence, one could extend the same conclusion to the development dummy due to the high correlation between the two dummy variables.

Table 3: GDP per capita growth and corruption regressions

Variable	Corruption	Variable	GDP growth
Constant	42.99	*Constant*	5.756
	(0.00)		(0.00)
GDP per capita	−0.001	*Openness*	−0.012
	(0.05)		(0.16)
Democracy	0.128	*Democracy*	0.010
	(0.07)		(0.19)
Business	0.366	*Government*	−0.070
	(0.00)		(0.09)
Primx × *Education*	−0.004	*FDI*	0.276
	(0.24)		(0.00)
Primx × *Oil reserves*	0.082	*Infrastructure*	0.023
	(0.60)		(0.04)
PC1	−1.756	*Education*	−0.038
	(0.32)		(0.04)
Oil reserves	−14.324	*Corruption*	−0.030
	(0.13)		(0.02)
		Primx × *Oil reserves*	−0.003
			(0.66)
		PC1	−0.118
			(0.58)
Adjusted *R*-squared	0.74		0.41
N	45		46

Notes: *P*-values are displayed in the parentheses for significance levels. *Primx:* Primary exports (percentage of merchandise exports); *Democracy:* Democracy index; *Business*: Ease of doing business index; *PC1*: principal component for oil and gas-related measures; *Government*: General government final consumption expenditure as percentage of GDP; *Education*: Initial schooling enrolment secondary percentage to gross. See the Appendix for further data definition.

also note that an increase in the highly significant business index, meaning more regulation on business activity, moves the country down in the corruption ranking. One can interpret this as reflecting the growing need for ‘greasing the wheels’ as the business environment deteriorates. When the education index (*Education*) interacts with the share of primary exports in total merchandise exports, *Primx*, our proxy for resource abundance, we observe that resource-abundant countries with a higher level of education are likely to be less corrupt. Thus, these results support our three testable hypotheses 1–3.

Regarding our proxies for energy abundance variables, the interaction of *Primx* with proven oil reserves shows that resource-abundant countries with higher levels of oil reserves are likely to become more corrupt. The results for the principal component for oil and gas-related measures, *PC1*, have the opposite effect on corruption ranking, suggesting an increase in energy production and reserves alone causes improved rankings in corruption.

Finally, proven oil reserves have a very significant additional effect beyond that captured by the *PC1* variable alone. By itself, this variable causes a reduction in the corruption level and leads a country to drop down 14 levels in the corruption rankings. Because the *PC1* variable captures both production and reserve effects, the results suggest that they play an important role together in determining the corruption ranks in energy-rich economies.

Note that it is the interaction between *Primx* and energy reserves, which causes a higher level of corruption. That is, an increase in *Primx* × *oil reserves variable* brings about a worsening in corruption rankings, reflecting the 'resource curse' effects. Higher levels of energy production and reserves themselves may, on the other hand, capture improvements in per capita GDP levels because of higher energy production and stocks, hence lowering the corruption level. The estimated model is able to explain about 74% of the cross-country variation in corruption.

We now discuss the results for the growth equation. Traditional variables such as openness, democracy and FDI do affect the growth rate of GDP per capita in energy-rich economies. The FDI variable has the most significant impact on growth: a 1% increase in net FDI flows/GDP brings about a 0.28% increase in the GDP per capita growth rate. Government consumption has a negative impact on growth, perhaps capturing some crowding out effects. Infrastructure has a positive contribution to the growth rate. Education has an unexpected sign, which may be due to low variation in the sample. The corruption variable itself indicates that countries with high corruption tend to have lower growth rates. Both energy abundance variables, *Primx* × *oil reserves* and *PC1*, have the same negative effect on growth, much as in the corruption equation. An increase in energy production and reserves reduces the growth rate based on the coefficient of the *Primx* × *oil reserves* variable. The estimated model is able to explain about 41% of the cross-country variation in the growth rate.

Corruption and GDP per capita level regressions

Table 4 reports the *level* regression results where the level of GDP per capita is the dependent variable in the second equation. Here, the results showed two-way causality and the estimation is based on two-stage weighted least squares. As in Table 3, the instruments used in Table 4 are all the exogenous variables including interactive terms and we report the best-fitting model going from a general to a specific model, looking at the contribution of each variable to the adjusted R^2.

Looking at the corruption equation first, we can see that a higher level of GDP per capita improves corruption rankings. Ease of doing business is both

Table 4: Determinants of corruption and GDP per capita/level

Variable	Corruption	Variable	GDP Per Capita
Constant	57.47 (0.00)	*Constant*	13186.04 (0.000)
GDP per capita	−0.001 (0.03)	*Democracy*	−5.86 (0.83)
Business	0.371 (0.000)	*Government*	382.95 (0.01)
Primx × Education	−0.005 (0.01)	*Corruption*	−154.97 (0.000)
Primx × Democracy	0.00005 (0.96)	*Primx × Democracy*	−0.511 (0.04)
PC1	−0.92 (0.61)	*PC1*	482.98 (0.35)
Primx × Oil reserves	0.420 (0.01)	*Primx × Oil reserves*	42.833 (0.15)
Oil reserves	−21.62 (0.04)		
Adjusted *R*-squared	0.72		0.64
N	44		44

Notes: *P*-values are displayed in the parentheses for significance levels. *Primx:* Primary exports (percentage of merchandise exports); *Democracy:* Democracy index; *Business*: Ease of doing business index; *PC1*: principal component for oil and gas-related measures; *Government*: General government final consumption expenditure as percentage of GDP; *Education*: Initial schooling enrolment secondary percentage to gross. See the Appendix for further data definition.

statistically and economically significant and positive: a 1 rank reduction in the business index, indicating improvement in business conditions, moves the corruption rank down by close to 3 (1/0.371) steps, to a lower level of corruption. This finding indicates that policy makers need to reduce regulations, so as to reduce opportunities for officials to extract bribes from businesses. Some energy-abundance interaction terms also contribute to explaining the variance in per capita GDP. For example, when the *Education* variable interacts with *Primx*, we observe a decline, and hence improvement in, corruption rankings, a finding similar to the growth rate results.

Regarding energy abundance variables, the second interactive term (*Democracy* × *Primx*) has a positive sign, suggesting a worsening in corruption ranks in energy-rich countries with low levels of democracy; recall that an increase in the democracy index shows a less democratic country. The principal component variable, *PC1*, capturing the impact of oil and gas production and reserves, is negative. This shows that an increase in energy production and reserves moves the ranking down, meaning less corruption, due to a higher expected level of economic development in the future due from today's higher energy production and stocks.

Similar to the results in Table 3, the *Primx* × *oil reserves and oil reserves* variables have the opposite effects on corruption. An increase in *Primx* × *oil reserves variable* brings about a worsening in corruption rankings, while higher levels of energy production and reserves lower the corruption level. The estimated model is able to explain about 72% of cross-country variation in corruption ranks.

We next discuss the results for the level of GDP per capita. First, we find that an improvement in democracy (a decline in the index) increases GDP per capita. Second, *Government*, general government final consumption expenditure as percentage of GDP, is significant and positive, suggesting that government spending adds to the standard of living. On the other hand, an increase in corruption, reflecting an increase in the index, reduces the GDP per capita. The only significant interactive term in the model is *Democracy-Primx* and it has a negative sign, suggesting that GDP per capita is lower in energy-rich countries with low levels of democracy. Finally, the principal component term is positive, showing that an increase in energy production and reserves alone would increase GDP per capita.

The *Primx* × *oil reserves* variable is significant and positive, suggesting that energy abundance increases economic development. Note that this finding is opposite to that in Table 3 on growth: while energy abundance appears to lower economic growth, it may improve economic development, measured by the level of GDP per capita. This finding suggests that energy abundance may not be a curse for economic development. The estimated model is able to explain about 64% of cross-country variation in GDP per capita.

CONCLUSION AND POLICY IMPLICATIONS

We have tested several hypotheses regarding the determinants of corruption in energy-rich economies. Concerning our first hypothesis, we found that easing regulations on business activity reduces corruption. With respect to our second hypothesis, we find results that establishing a more democratic regime improves corruption rankings. Testing our third hypothesis, we observe that energy-rich countries with a higher level of education tend to have less corruption. For the last two hypotheses, we found that there is no bi-causality between corruption and the GDP per capita growth rate, but that there is one between corruption and the level of GDP per capita. Corruption reduces both the growth rate of GDP per capita and its level while the level of GDP per capita only affects corruption, suggesting that it is only the higher level of economic development, measured by the level of per capita GDP, that reduces corruption.

These results suggest that corruption is not only a threat for economic growth but also for economic development and improvements over time in the standard of living in energy-rich countries. On the other hand, since corruption reacts only to GDP per capita but not necessarily the growth rate of GDP, policy makers need to design long-term development strategies to fight against corruption. Our results from the GDP per capita regression suggest that improvements in democracy, fiscal policy, and energy production can improve the long-term sustainable development of energy-rich countries and hence aid in their fight against corruption.

In addition, we have discovered some important linkages between our resource-abundance proxies and socio-economic variables such as education and the political regime. We have also observed that resource abundance may not necessarily hurt economic development in energy-rich countries. Without careful modelling of such linkages, it would be difficult to correctly explain the patterns of corruption and growth in energy-rich economies. In this sense, our paper has provided some methodological insights on modelling corruption and growth in countries with rich energy-specific assets, and this modelling strategy may also be applicable to countries that posses other types of natural resources.

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APPENDIX

DATA DESCRIPTION

In this Appendix, we describe the variables which we used in the presented regressions.

COR: Corruption Rank. *Source:* Transparency International, http://www.transparency.org/policy_research/surveys_indices/cpi, accessed 22 May 2007.

Energy-specific variables

BARREL: Oil production scaled by GDP per capita. *Source:* BP Statistical Review (2006).

GAS: Natural Gas production scaled by GDP per capita. *Source:* BP Statistical Review (2006).

ORES: Oil reserves scaled by GDP per capita. *Source:* BP Statistical Review (2006).

GRES: Natural Gas reserves scaled by GDP per capita. *Source:* BP Statistical Review (2006).

STATE: Dummy variable that is equal to one for the countries which have state national oil company and equal to zero otherwise.

PRIMX: Primary exports (percentage of merchandise exports). *Source*: The World Bank, http://publications.worldbank.org/subscriptions/WDI/old-default.htm, accessed 18 May 2007.

OILPR: Dummy variable for proved oil reserves – Generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from known reservoirs under existing economic and operating conditions (equals 1 when oil reserves > 0.2% of world total reserves and 0 otherwise).

Control variables

OPEN: Openness – the sum of merchandise exports and imports divided by the value of GDP, in % (all in current US$) *Source*: The World Bank, http://publications.worldbank.org/subscriptions/WDI/old-default.htm, accessed 18 May 2007.

GDPPC: GDP per capita. *Source:* The World Bank, http://publications.worldbank.org/subscriptions/WDI/old-default.htm, accessed 18 May 2007.

GDPPCG: GDP per capita growth. *Source:* The World Bank, http://publications.worldbank.org/subscriptions/WDI/old-default.htm, accessed 18 May 2007.

DEMOCRACY: Democracy index – The Economist Intelligence Unit's democracy index is based on five categories: electoral process and pluralism; civil liberties; the functioning of government; political participation; and political culture. *Source:* Laza Kekic, The Economist Intelligence Unit's Index of Democracy, Economist Intelligence Unit 2006, http://www.economist.com/media/pdf/DEMOCRACY_INDEX_2007_v3.pdf, accessed 18 May 2007.

GOVERNMENT: General government final consumption expenditure as percentage of GDP. *Source:* The World Bank, http://publications.worldbank.org/subscriptions/WDI/old-default.htm, accessed 18 May 2007.

ECONFR: Economic freedom – ranking based on economic theory and empirical study. It identifies the variables that comprise economic freedom and analyses the interaction of freedom with wealth. *Source:* The Heritage Foundation, Index of Economic Freedom 2007, http://www.heritage.org/research/features/index/countries.cfm?sortby = country.

BUSINESS: Ease of doing business index is calculated as the ranking on the simple average of country percentile rankings on each of the 10 topics covered in WB 'Doing business' database. *Source*: The World Bank, http://publications.worldbank.org/subscriptions/WDI/old-default.htm, accessed 18 May 2007.

EXDEBT: External debt – debt in US$. *Source:* The World Bank, http://publications.worldbank.org/subscriptions/WDI/old-default.htm, accessed 18 May 2007.

FDI: Foreign Direct Investment Net Inflows (percentage of GDP). *Source:* The World Bank, http://publications.worldbank.org/subscriptions/WDI/old-default.htm, accessed 18 May 2007.

ROAD: Roads, paved (percentage of total roads). *Source:* The World Bank, http://publications.worldbank.org/subscriptions/WDI/old-default.htm, accessed 18 May 2007.

EDUCATION: Initial schooling enrolment secondary % to gross. *Source:* World Development Indicators, http://publications.worldbank.org/WDI/.