



## CORRUPTION AND STOCK MARKET DEVELOPMENT: NEW EVIDENCE FROM GCC COUNTRIES

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**Abstract.** The theoretical relationship between corruption and stock market development has been debated quite extensively in the literature, yet the evidence on the impact of corruption on stock market development remains contradictory and ambiguous. This paper investigates the impact of corruption, as measured by Corruption Perception Index (CPI) published by Transparency International, on stock market development focusing exclusively on Gulf Cooperation Council (GCC) countries with its special characteristics of combining richness with relatively high level of corruption.

Results from an estimation of alternative regression models on a panel of six GCC countries over the period 2003–2011, through which CPI is legitimately comparable, confirms a positive impact of corruption on stock market development, where the latter is measured by market capitalization. This is consistent with the view that corruption greases the wheels of economy by expediting transactions and allowing private firms to overcome governmentally imposed inefficiencies.

**Keywords:** corruption, stock market development, oil price, GDP growth, foreign direct investment, GCC countries.

**JEL Classification:** G10, G15, G18, G19.

### Introduction

Factors affecting stock market development in many countries have received a great deal of attention, especially Latin America, Middle East and Central Asia, which have shouldered an increasing share of world growth. Recently, a number of papers have examined the impact of corruption on stock market development (see Ng 2006; Pinheiro 2010; Bolgorian 2012; Jain *et al.* 2012; Lau *et al.* 2013; Shahbaz *et al.* 2013; Tvaronavičienė *et al.* 2013, 2014; Chêne 2014; Giriūnas, Mackevičius 2014; Peker *et al.* 2014; Šabasevičienė, Grybaitė 2014; Caurkubule, Rubanovskis 2014a, 2014b; Raudeliūnienė *et al.* 2014; Kaminskienė *et al.* 2014; Tunčikienė, Korsakienė 2014; Kanapinskas *et al.* 2014; Tunčikienė, Drejeris 2015), but little interest was given to the impact of corruption on stock market development in Gulf Countries Council (GCC), the richest countries in Middle East.

Many definitions are offered for corruption. The Enterprise Survey of World Bank defines corruption “the percentage of informal payments to public officials”. Jain (2002) describes corruption as “an act in which the power of public office is used for personal gain in a manner that contravenes the rules of the game”.

Although corruption is a variable that cannot be measured directly, in recent years, some organizations have provided corruption indices across a wide range of countries based on surveys to qualitatively assess the level of corruption. These surveys are based on different criteria. Some are assessed by country risk analysts based in the home country or abroad while others are surveys of local or expatriate businessmen. Others are surveys based on local residents. Ng (2006) assures that the three most popular surveys are from the Economist Intelligence Unit, International

Country Risk Guide, and Transparency International's Corruption Perception Index (CPI).

One of the most renowned indices is the Corruption Perception Index (CPI) published by Transparency International. This index is defined as "abuse of public power for private benefit" (see Freckleton *et al.* 2011); it is an aggregate indicator that classifies countries based on the degree to which corruption is perceived to exist among politicians and public authorities.

The aim of this paper is to examine the impact of corruption on stock market development in GCC. We explore the correlation between CPI and stock market development; employing market capitalization as a proxy for stock market development. The study covers a sample period from 2003 to 2011 of six members of GCC, using pooled regression, random and fixed.

The main contribution of this paper to the ongoing discussion in the literature lies in two points. First, it investigates the impact of corruption on stock markets development focusing exclusively on GCC countries. It is interesting to investigate this relationship in such group of homogeneous countries considering the unique characteristics of these countries combining richness with relatively high level of corruption. This is important since many studies neither distinguish between developing and developed countries in their tests nor consider the special characteristics of certain groups within each category. This is reflected in many challenging and conflicting results. Second, this paper challenges the view that perceptions-based measure of corruption is not good enough as a measure of corruption. Perception-based measures have been criticized on argumentative and empirical grounds, causing some researchers to resort to other measures or proxies that fit better into their econometric models. However, this does not seem to be the case with GCC as perceived levels of corruption perform rather well in explaining the variation in financial market development.

The paper is structured as follows. Section two provides a brief review of theoretical and empirical Studies on the impact of corruption on stock market development. Section three presents descriptive statistics and explain research methodology. Section four reports regression results and section five concludes.

## 1. Previous research

### 1.1. Theoretical literature

While there is a large consensus in the literature on the negative impact of corruption on economic growth, some researchers continue to argue that corruption has a motive factor on growth; there are two competing approaches on how the corruption may affect the economic growth: corruption greases the wheel of economy and corruption sands the wheel of economy.

In theory; corruption may not necessarily be bad for stock market development, Early studies documents a positive impact of corruption on stock market development (see Leff 1964; Lui 1985). The pioneering theoretical work of Leff (1964) stated that corruption works like the engine of economic growth in the situation when strict/inefficient regulations forced by the government because corruption "Enables the privates agents to buy their way out of politically imposed inefficiencies". Ahlin and Pang (2008) claim that corruption raises the need for liquidity and thus makes financial improvements more potent.

Corruption may hold a positive impact on stock market development through its impact on FDI, acting as "grease" by expediting transactions and allowing private firms to overcome ineffective regulations and governmental institutions (see Leff 1964; Huntington 1968; Bardhan 1997; Egger, Winner 2005; Cuervo-Cazurra 2008; Aidt 2009).

Lau *et al.* (2013) argue that bribery (a proxy of corruption) helps firms to overcome the inefficiencies in the economic system and decreases uncertainty, which may lead to a positive performance. Furthermore, Chène (2014) argues that corruption can overcome red tape and institutional weaknesses and "grease the wheels" of the economy in highly regulated countries that do not have effective government institutions and governance systems.

In contrast, a number of studies suggest there is a negative impact of corruption on stock market development. Mashal (2011) argues that corruption loots economic growth by decreasing competition in domestic market which impairs efficiency of domestic and foreign firms. Moreover, corruption makes it more difficult and costly to conduct foreign operations through obtaining licenses and permits (see Habib, Zurawick 2002; Voyer, Beamish 2004; Cuervo-Cazurra 2008).

Ng (2006) argues that managers might participate in projects that they otherwise would not just so they can accept bribes creating waste and increasing transaction costs in the economy. Moreover, corruption may negatively affect stock market development through its influence on FDI. Wei (2000), Lambsdorff (2003), and Voyer and Beamish (2004) find a negative relationship between a host country's corruption and the FDI it receives. Other academics refer to corruption as "sand in the gear" (see Jain *et al.* 2012; Lau *et al.* 2013) viewing government officials as bribe-takers who will try to set up hurdles for businesses so that they can extract more bribery.

Some studies suggest asymmetric impact of corruption on stock market development on the basis of the country's development, i.e., whether emerging or developed. De Rosa *et al.* (2010) find that corruption has a negative effect on firm productivity in Central and Eastern European countries. Hillman and Krausz (2004) show that corruption brings short term performance advantages. For example, Wang

and You (2012) suggest that corruption is likely to increase firm growth when financial markets are underdeveloped whereas it deters firm growth when there are more developed financial markets. On the same vein, Pinheiro (2010) suggests that, in more developed countries, corruption is inversely related to stock market returns while, in developing economies, higher levels of corruption impact positively on stock markets returns

In contrast, Olken (2007) finds that corruption can seriously hamper the distributive efforts of developing countries. That is, the growth impact of reducing corruption is higher when the financial system is less developed. Conversely, a rise in corruption is more prohibitive in a less developed financial system (see Ahlin, Pang 2008).

A contradictory view argues that in developed economies like the UK, corporate bribery is not that obvious as in the emerging markets (Lau *et al.* 2013), so a financially developed country is hurt less by a given increase in corruption, since funds can be borrowed more readily (see Ahlin, Pang 2008).

Another strand of the empirical literature suggests that corruption plunders economic development/growth by increasing the cost of business and also uncertainty in the decision making process. Since Asset prices are determined based on future discounted cash flows; therefore, they are good measures for evaluating the cost of corruption from the investors' points of view (see Ciocchini *et al.* 2003). Hence, corruption should increase the firm's borrowing cost, decrease stock valuation and stock market development (see Ng 2006).

Corruption does not only affect stock market development but also affects its volatility. Pastor and Veronesi (2012) argue that if investors consider bribery as a resource for firms, it decreases uncertainty about government policies and helps overcome the inefficiencies in the country. In that sense, bribery may lower stock market volatility especially in emerging markets.

## 1.2. Empirical studies

Similar to the theoretical literature on corruption and stock market development, the findings from the empirical studies on the impact of corruption on stock market development are mixed and conflicting.

A good starting point for this empirical literature review is with the paper of Ayaydin and Baltaci (2013) who focus on the role of corruption and banking sector development on stock market development using a panel data of 42 emerging economies for the period 1996 to 2011. They found that corruption level is significantly and negatively associated with stock market development.

Bolgorean (2011) analyzed a data set of corruption and stock market development measures such as market capitalization and total value of share trading for 46 countries

around the world for the period 2007–2009, using a quantitative approach for investigating the dependence of the Corruption Perception Index (CPI) on stock market development. He found that countries with higher relative stock market development are less corrupt, and the power-law relation between level of corruption and stock market development is significant at the 5% level.

Abdul Qadir and Yaroson (2013) highlighted the role of selected macroeconomic variables and corruption in explaining stock market development in Nigeria for the period 1998–2011. Employing the Augmented Dickey Fuller (ADF) unit root test to analyze the stationary properties of the variables adopted in the study, they found that corruption has significant impact on the development of the stock market; the turnover ratio as a share of GDP which is used to test the market liquidity, has a negative impact on the stock market; and the real interest rate, foreign direct investment and value of shares traded to be significant in determining stock market development in Nigeria.

Cherif and Gazadar (2010) examine the relationship between institutional indicators and stock market development using International Country Risk Guide (ICRG) to proxy for corruption. Using data from 14 MENA countries for the period from 1990 to 2007 and applying panel data and instrumental variable methods, they find there is a negative relationship between corruption and stock market development.

Yartey (2010) examines the impact of corruption as a part of institutional determinants of stock market development using a panel data of 42 emerging economies for the period 1990 to 2004. He finds there is a negative relationship between corruption and stock market development. He also proves that macroeconomic factors such as income level, gross domestic investment, banking sector development, private capital flows and stock market liquidity are important determinants of stock market development in emerging market countries.

Shahbaz *et al.* (2013) examine the long run relationship between financial development, corruption and economic growth in Pakistan using ARDL bounds testing approach and applying cointegration tests and VECM granger causality method to examine the direction of causality between the variables for the period of 1987–2009. They find that a rise in corruption has a positive impact on financial development.

## 2. Sample and data

The study made use of data which were sourced from the Transparency international organization, World Development Indicators (WDI), and British Petroleum (BP) Statistical review of world energy 2014.

In order to test the relation between corruption and stock market development, we use the Corruption Perception Index (CPI), Market Capitalization (MC), Oil Price, Foreign

Direct Investment (FDI), Domestic credit to private sector (% of GDP), and GDP growth (G) for Gulf Cooperation Council (GCC) countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates) for the period 2003–2011 with 53 observations. The study period is limited to 2011 because the methodology of calculating CPI has been updated in 2012 by Transparency International. This means that CPI scores before 2012 are not compatible with those of 2012 and beyond.<sup>1</sup>

The following are the variables specified in the study so as to achieve the primary objectives of the study.

#### Corruption (CPI):

This paper employs the Corruption Perceptions Index (CPI), published by Transparency International, as proxy to measure the level of corruption. CPI is compiled by Transparency International and it draws on surveys from different businessmen, country experts, international institutions and the local populace to report the extent of perceived corruption amongst government officials and politicians. The index is scaled from 0 to 10 where 0 means that a country is perceived as highly corrupt and 10 means it is perceived as the least corrupt (very clean).

#### Market capitalization (LNMC):

This paper employs the natural logarithm of capitalization ratio to proxy stock market development. Capitalization ratio is calculated as the value of domestic equities traded on the stock exchange relative to GDP. This index is obtained from the World Development Indicators (WDI) issued by World Bank.

#### Oil price (OILPRC):

The variable that we use to proxy for oil prices is crude oil price compiled by British Petroleum (BP) Statistical review of world energy 2014. Given that GCC economies are oil-dependent, it is plausible that oil price volatility is an important determinant of stock market development. In real terms, the oil price drastically decreased in the period 2003–2011 (with the exception of a price peak in 2009).

#### Foreign direct investment (FDI):

Foreign direct investment is defined as investment made by a company or entity based in one country, into a company or entity based in another country; Open economies with skilled workforces and good growth prospects tend to attract larger amounts of foreign direct investment than closed, highly regulated economies. We use foreign direct

investment as a proxy of business environment. This variable is extracted from WDI of World Bank.

#### Domestic credit to private sector (% of GDP) (DCP)

In the last few decades, private sector has emerged as major participants in emerging stock markets. The domestic credit to private sector (DCP) indicates financial resources provided to the private sector by financial corporations. This variable is a natural candidate to proxy banking system activity and is computed as percentage of domestic credit to private sector as compared to GDP.

#### GDP growth (G)

This variable is obtained from the World Development Indicators (WDI) issued by World Bank to proxy economic growth. Table 1 provides a summary statistics for the above mentioned variables for the sample period.

Table 1. Descriptive statistics of the variables for the sample period 2003–2011

Variable	Mean	Standard deviation	Minimum	Maximum
<i>lnmc</i>	4.2528	0.6459	2.9857	5.3217
<i>cpi</i>	5.3173	1.0187	3.3	7.7
<i>fdi</i>	3.9332	3.5910	-0.2733	18.3833
<i>oilprc</i>	66.826	24.5023	28.83	111.26
<i>dcp</i>	49.1829	15.8601	28.3958	85.1739
<i>g</i>	-0.0252	5.5073	-13.3333	13.5437

Table 1 clearly show a considerable level of variation in almost all variables across all countries included in the sample. Figure 1 depicts the behavior of each variable, by country, over the study period. CPI shows that although GCC countries have almost similar levels of corruption, two countries (United Arab Emirates and Qatar) enjoy lower levels of corruption compared to the remaining four countries.

Economic variables show unstable performance across time in Figure 1. The generally declining economic growth rate shows some improvements beginning from 2009. Each country seems to develop its unique story in terms of its ability to attract foreign direct investment. On the other hand, financial variables seem to follow a more homogenous pattern across countries. As far as market capitalization is concerned, the general trend is downward sloping, and the last few years of the series indicate a continuing decline towards below-average levels.

### 3. Methodology

The literature suggests a wide spectrum of variables to proxy those elements of development that promotes the

<sup>1</sup> For details on CPI methodology update, please refer to [http://www.transparency.org/files/content/pressrelease/2012\\_CPIUpdatedMethodology\\_EMARGO\\_EN.pdf](http://www.transparency.org/files/content/pressrelease/2012_CPIUpdatedMethodology_EMARGO_EN.pdf)

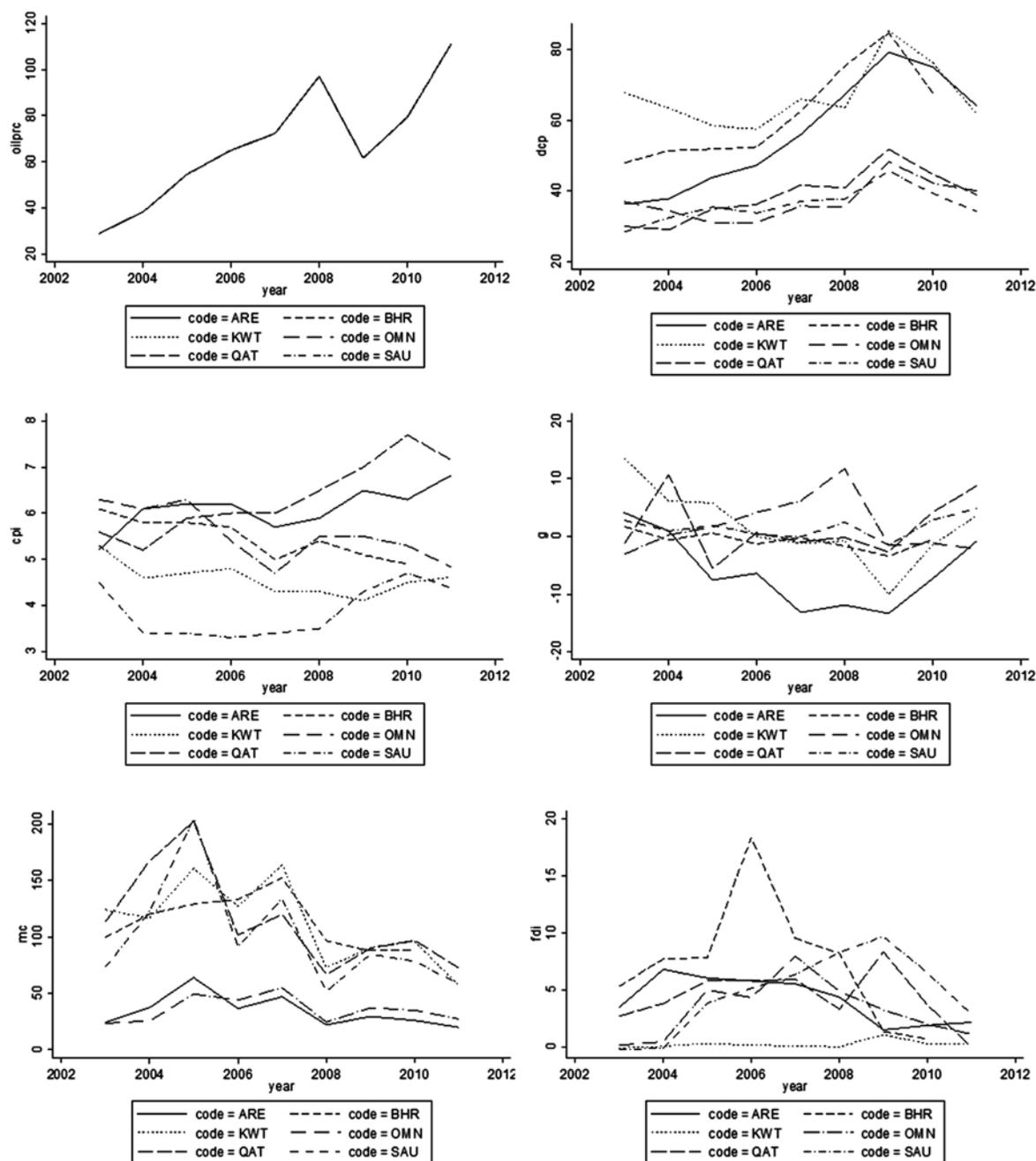


Fig. 1. Variables variation across countries 2003–2011

expansion of financial market activities. In practice, development research suffers numerous data issues, and the availability of data dictates the number of alternatives at the disposal of the researcher to a considerable extent.<sup>2</sup> On the other hand, financial market development is measured in

a number of ways. The common measures are the value of shares traded, market capitalization, and the turnover ratio value of shares traded, all being taken as a percentage of GDP.<sup>3</sup> It is not easy to isolate explanatory variables specific to each of these measures. Macroeconomic performance, for example, is expected to affect them all positively, but no distinction can be made on how this effect may differ for each. Therefore, the practice of regressing a variable that measures financial market development on a number of

<sup>2</sup> For example, a number of candidate variables used in the literature to proxy the level of macroeconomic stability, such as the level of unemployment and remittances could not be adopted in this study, as data were available either for a very limited number of years, or for a limited number of countries. Even for the most parsimonious models, it is almost impossible to compile a time-balanced dataset of a decent size.

<sup>3</sup> These are available from the World Development Indicators dataset.

suggested explanatory variables remains an empirical issue on both sides of the equation. The fact that corruption is also measured in different ways by different institutions adds another complication.

The usual starting point, the simplistic case, is to try the OLS regression, where the model can be written as:

$$\ln mc_{it} = a + \beta_1 cpi_{it} + \beta_2 oilprc_{it} + \beta_3 fdi_{it} + \beta_4 dcp_{it} + \beta_5 g_{it} + \varepsilon_{it} \quad (1)$$

This form assumes neither time effect nor *heterogeneity* or individual effects (i.e. country-specific effects,  $u_i$ ). The above model treats all countries in the dataset as identical individuals. That is, it assumes that there is nothing unique about any country, compared to others, that might have an effect on its financial market development. If individual country or time effects do not exist, then OLS is expected to produce efficient and consistent parameters estimates. Obviously this is not necessarily the case, as it implies that within-individual errors are uncorrelated. For example, if some unobserved factor such as business orientation of a given country, which is not directly captured by the included explanatory variables, is higher than GCC average in a given year, then it should be the case that it is higher than average in other years too. A population-averaged estimation of the same model with cluster-robust standard errors relaxes this restrictive assumption and leads to more efficient estimators.

The most widely used panel regressions are the fixed-effect and the random-effect models. While a fixed-model treat this heterogeneity though allowing each individual to have its own intercept, a random model deals with heterogeneity through allowing each group of countries to have its own specific error variance. The fixed model in our case can be written as follows:

$$\ln mc_{it} = \alpha_i + \beta_1 cpi_{it} + \beta_2 oilprc_{it} + \beta_3 fdi_{it} + \beta_4 dcp_{it} + \beta_5 g_{it} + \varepsilon_{it} \quad (2)$$

Under this model, constant slope and constant variances are assumed across all countries included in the sample. Practically, an individual effect is a part of the constant, and it is allowed to be correlated with other variables included in the model.

The fixed-effects model (Eq. (2)) assumed that all country differences were captured by differences in the intercept parameters to be estimated using least squares estimator. Unlike the fixed effect model, a random effects model does not allow the intercept to vary across individual countries, but rather assumes a common (average) intercept for all countries and recognizes that these countries are a sample of a wider population, so that individual differences are treated as random rather than fixed. In other words, the intercept is considered to be composed of two parts, "fixed"

population average ( $\alpha$ ) and random differences around the average ( $u_i$ ). The model can then be written:

$$\ln mc_{it} = \alpha + \beta_1 cpi_{it} + \beta_2 oilprc_{it} + \beta_3 fdi_{it} + \beta_4 dcp_{it} + \beta_5 g_{it} + u_i + \varepsilon_{it} \quad (3)$$

where these random effects are assumed to have a zero mean, a constant variance and zero correlation across individuals. Hence, each individual country to express its own heterogeneous though having its own error variance, i.e. its own component of the composite error term that combines the usual regression disturbance term and the random individual effect.<sup>4</sup>

Although the dataset is way far from rich, it is still worthy to try a random-coefficient model where randomness in coefficient is applied to *cpi* only.

#### 4. Results, discussion and limitations

Regression outputs for a number of alternative log-linear forms / specifications are summarized in Table 2. Columns (1), (2), and (3) report results for three pooled OLS regressions. While Column (1) drops *g* from the list of explanatory variables, Column (2) drops out *dcp*, with Column (3) dropping both, so that only significant coefficients are included. These two variables are significantly correlated, and, therefore, do not appear together in any of the reported models. Next, each successive block of three columns follows the same specification on a different panel model. That is, Columns (4) through (6) report panel regression results for the same three specifications on a population-averaged model (robust error). Next, Columns (7) through (9) report results from the application of fixed-effect model, Columns (10) through (12) provides a similar report from the estimation of a random-effect model, and, finally, the last three columns do the same job for a random-coefficient model, where coefficient randomness is assumed to apply only to the coefficient of our concern, the level of corruption (*cpi*). To preserve space, results from major statistical tests and other important statistics are reported in the lower part of the same table at the columns corresponding to the model to which the test was applied. The final row indicates that the sample size is equal across all the regressions reported.

Obviously, the results from the pooled OLS regression are not very impressive, with an  $R^2$  ranging between 0.17 and 0.18. However, the F-test strongly rejects the joint hypothesis that all coefficients are not significantly different from zero. The coefficient of oil price is quite modest in magnitude and significant at the 5% level, but its sign needs some attention. Naturally, one would expect that higher oil prices result in more generous public investment spending,

<sup>4</sup> The random model is also called an error component model (see Green 2012).

as public revenues increases. Indeed, GCC public budgets are obviously tied to oil revenues, but extra revenues do not necessarily seem to translate into expansion in public investments subcontracted to firms listed on stock exchange. In fact, higher oil prices do make richer public budgets, but better economic performance in this region in general has been dependent on political stability. Oil shocks are rather harmful to investors' confidence, as it causes entrepreneurs to reconsider their plans, and confuses financial market players. Therefore, a negative relation between oil prices and financial market development is more reasonable than one would expect. However, the magnitude of this coefficient is rather small and almost insensitive to the inclusion of other control variables such as the rate of economic growth.

The coefficient of foreign direct investment, *fdi*, which reflects the development of business environment, has the expected sign. The magnitude of this coefficient decreases slightly with the dropping of control variables (*g* and *dcp*). The coefficient of our focus, corruption index, is significantly different from zero at the 1% level of significance, and its magnitude is reasonable and robust against the inclusion of other control variables.<sup>5</sup>

The above model treats all countries in the dataset as identical individuals. That is, it assumes that there is nothing unique about any country, compared to others, that might have an effect on its financial market development. If individual country or time effects do not exist, then OLS is expected to produce efficient and consistent parameters estimates. Obviously this is not necessarily the case, as it implies that within-individual errors are uncorrelated. For example, if some unobserved factor such as business orientation of a given country, which is not directly captured by the included explanatory variables, is higher than GCC average in a given year, then it should be the case that it is higher than average in other years too.

A population-averaged estimation of the same model with cluster-robust standard errors relaxes this restrictive assumption and leads more efficient estimators, as can be seen from Column (4) through (6). Here, country specific effects are assumed to be random and are averaged out. It is clear that the coefficients differ considerably from those of the pooled OLS. All the coefficients in Model (6) are significantly different from zero at the 1% level of significance. Their magnitudes as well as their efficiency are almost totally insensitive to the introduction of either *g* or *dcp*. As far as our focus variable is concerned, this indicates that, on average, an extra point on the ladder of corruption is associated with almost 0.18 point increase in logged market capitalization.

Considering the value range of these two variables, the effect of corruption on market capitalization cannot, indeed, be described as a negligible effect. However, while a cluster-robust population-averaged estimator outperforms the basic pooled one, it is known that its standard error is not fully efficient. Panel regressions are usually used in accounting for heterogeneity across groups (i.e. countries) while not violating OLS assumptions.

Columns (7) through (9) report regression output for the fixed effect model (Eq. (2)). The Wald-test strongly rejects the OLS model in favor of the fixed effect model. The magnitudes of the coefficients are considerably different from those of OLS in general, and all coefficients, except *g* and *dcp* are significantly different from zero. The magnitude of *cpi* is fairly close to its population-averaged counterpart.

Columns (10) through (12) report the estimation results for Eq. (3). The coefficients are quite close to those of the fixed-effect model. The value of the statistic rho indicates that about 89 percent of the total error variance is attributed to country heterogeneity, also indicating a good level of goodness of fit.<sup>6</sup> The test statistic of Breusch and Pagan LM test for random effects is estimated at  $\chi^2(01) = 121.9$  which is significant at the 0.001 level of significance, indicating a strong rejection of the OLS model estimates in favor of the random-effect model. Therefore, both fixed and random effects are superior to the pooled model. A common test used in model selection between these two models is the Hausman test. The null hypothesis of this test states that the difference in coefficients between the two models is not systematic. Applying the Hausman test gives a test statistic that follows a Chi distribution with four degrees of freedom,  $\chi^2 = 0.10$ , which is too small to reject the null hypothesis of the test. Therefore, the test says that it is better to fit a random-effect rather than a fixed effect model. However, although statistical testing tends to favor the random-effect model, there is a concern that our coefficient of interest might change significantly across groups (of countries), so a Swamy's test can be used to test constancy of the parameters. The test statistic for this test is  $\chi^2 = 200.8$  which is significant at the .001 level of significance, indicating a strong rejection of parameters' constancy.

This result leads us to investigate the application of a random-coefficient model. Columns (13) through (15) from a random-coefficient regression, where randomness in coefficient is applied to *cpi* only.<sup>7</sup> The values of the coefficients are generally quite close to the results obtained from the previous two models. All coefficients are significant at the 0.05 level. An LR test of Random Coefficient Model

<sup>5</sup> Unfortunately, the two control variables used in this simple robustness check, *dcp* and *g*, are the only economic variables for which data is available throughout the whole series. Inclusion of other variables available from WDI dataset, such as unemployment or remittances will result in unaffordable loss in degrees of freedom.

<sup>6</sup>  $\widehat{\rho} = \hat{\rho} = 1 - \left( \hat{\sigma}_e / \sqrt{T\hat{\sigma}_u^2 + \hat{\sigma}_e^2} \right)$ .

<sup>7</sup> The log-likelihood numerical optimization failed to compute standard errors when all variables were included as variables with random coefficients. This is not quite surprising given the humble size of our sample.

Table 2. Summary of regression results (dependent variable: Logged market capitalization)

	Pooled OLS regression			Pooled (Robust errors)			Fixed-effect model			Random-effect model			Random-coefficient model		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
<i>Cons.</i>	5.534*** (0.531)	5.641*** (0.489)	5.765*** (0.488)	5.536*** (0.457)	5.490*** (0.432)	5.495*** (0.431)	5.526*** (0.450)	5.448*** (0.421)	5.459*** (0.415)	5.534*** (0.611)	5.467*** (0.548)	5.479*** (0.506)	5.585*** (0.446)	5.633*** (0.383)	5.566*** (0.416)
<i>Cpi</i>	-0.231*** (0.080)	-0.209** (0.080)	-0.227*** (0.080)	-0.178*** (0.068)	-0.178*** (0.068)	-0.179*** (0.068)	-0.171** (0.075)	-0.171** (0.076)	-0.173** (0.074)	-0.173** (0.072)	-0.173** (0.072)	-0.176* (0.071)	-0.186* (0.073)	-0.197** (0.078)	-0.189** (0.074)
<i>oilprc</i>	-0.008** (0.003)	-0.006* (0.003)	-0.007** (0.003)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.007*** (0.002)	-0.007*** (0.002)
<i>Fdi</i>	0.042* (0.023)	0.040* (0.023)	0.037 (0.023)	0.035*** (0.013)	0.035*** (0.013)	0.035*** (0.013)	0.034** (0.014)	0.035** (0.014)	0.035** (0.014)	0.034** (0.014)	0.035*** (0.013)	0.035*** (0.013)	0.034** (0.013)	0.033** (0.013)	0.034*** (0.013)
<i>Dcp</i>	0.006 (0.005)			-0.001 (0.004)			-0.002 (0.005)			-0.002 (0.004)			-0.001 (0.004)		
<i>G</i>		0.022 (0.015)			-0.001 (0.008)			-0.003 (0.009)			-0.002 (0.008)			-0.003 (0.008)	
<i>Wald Chi-sq</i>				31.3***	31.3***	31.2***	31.08***	30.19***	32.65***	29.31***	28.97***	29.16***	29.78***	29.79***	29.59***
<i>F test</i>															
<i>Hausman test</i>										0.020	0.030	0.010			
<i>Swamy's test</i>										181.5***	284.8***	200.8***			
<i>Adj. R-sq</i>	0.18	0.19	0.17							0.80	0.80	0.80			
<i>Rho</i>															
<i>Breusch-Pagan LM test</i>							0.788	0.786	0.787	0.937	0.913	0.884			
<i>LR test vs. Linear Reg.</i>										116.3***	104.4***	121.9***			
<i>N</i>	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53

Note: standard errors in parentheses (\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ ).

against linear regression clearly rejects the linear regression in favor of the random coefficient model. The random effect parameter for *cpi* is significantly different from zero and both variance components are statistically significant. However, as far as our focus coefficient, *cpi*, is concerned, the coefficient is obviously significant and robust across all competing specification, a matter that enhances the view that corruption does grease the financial wheel in GCC countries.

## Conclusions

This paper investigates the impact of corruption on stock market development focusing exclusively on GCC countries. It provides empirical evidence, from the Middle East, on the effect of corruption on financial market, where the former is measured by CPI of Transparency International and the latter by market capitalization relative to gross domestic product.

Econometric analysis of this relation shows that corruption in GCC countries is positively associated with financial market development, and therefore confirms the view of many previous studies (see Leff 1964; Huntington 1968; Bardhan 1997; Egger, Winner 2005; Cuervo-Cazurra 2008; Aidt 2009) that corruption greases the wheel of financial development.

As far as GCC countries are concerned, the frequently criticized measure of corruption based on public perceptions, CPI, can actually explain considerable variation in financial market capitalization during the study period. This result challenges the argumentative view that recommends avoiding the use of perceptions-based measure of corruption in empirical analysis.

Given the mixed empirical findings obtained from other studies applied to different economies, it does seem that the relationship between corruption and financial markets does not necessarily take a similar form across different economies at a particular time. However, it should be emphasized that despite data limitations, the relation between corruption and GCC financial market development is statistically significant and robust against changes in model forms and specifications.

Finally, it should be noted that the main element that complicates the empirical study of the relation between corruption and financial markets development is the fact that both sides of this relation are being described in the literature by different competing measures. Therefore, future research should pay more attention to the nature of differences between different types of measures, particularly those of corruption. Until a specific measure of corruption proves superior, the choice of corruption measure will remain an empirical question. Future research should also try to expand the sample to other countries in the region covering

a longer time period, a matter that requires better access to economic and financial data for countries of the region.

## Disclosure statement

Authors declare that they don't have any competing financial, professional, or personal interests from other parties.

## References

- Abdul-Qadir, A. B.; Yaroson, E. 2013. Does corruption matter in the development of the stock market in Nigeria?, *Enugu State University of Science Journal of Accountancy* 4(1): 1–20.
- Aidt, T. S. 2009. Corruption, institutions and economic development. *Oxford Review of Economic Policy* 25(2): 271–291. <http://dx.doi.org/10.1093/oxrep/grp012>
- Ahlin, C.; Pang, J. 2008. Are financial development and corruption control substitutes in promoting growth?, *Journal of Development Economics* 86: 414–433. <http://dx.doi.org/10.1016/j.jdeveco.2007.07.002>
- Ayaydin, H.; Baltaci, N. 2013. Corruption, banking sector, and stock market development: a panel data analysis, *European Journal of Research on Education* 1(2): 94–99.
- Bardhan, P. 1997. Corruption and development: a review of issue, *Journal of Economic Literature* 35(3): 1320–1346.
- Bolgorian, M. 2011. Corruption and stock market development: a quantitative approach, *Physica A* 390: 4514–4521. <http://dx.doi.org/10.1016/j.physa.2011.07.024>
- Caurkubule, Ž.; Rubanovskis, A. 2014a. Shadow economy as a obstacle to sustainable economic development, *Journal of Security and Sustainability Issues* 4(2): 175–186. [http://dx.doi.org/10.9770/jssi.2014.4.2\(6\)](http://dx.doi.org/10.9770/jssi.2014.4.2(6))
- Caurkubule, Ž.; Rubanovskis, A. 2014b. Sustainable entrepreneurship through motivation: case of Latvian companies, *Entrepreneurship and Sustainability Issues* 2(1): 43–48. [http://dx.doi.org/10.9770/jesi.2.1\(6\)](http://dx.doi.org/10.9770/jesi.2.1(6))
- Chêne, M. 2014. *The impact of corruption on growth and inequality*. Transparency International.
- Cherif, M.; Gazadar, K. 2010. Macroeconomic and institutional determinants of stock market development in MENA region: new results from a panel data analysis, *International Journal of Banking and Finance* 7(1): 138–159.
- Ciocchini, F.; Durbin, E.; Ng, N. 2003. Does corruption increase emerging market bond spreads?, *Journal of Economics and Business* 55: 502–528. [http://dx.doi.org/10.1016/S0148-6195\(03\)00052-3](http://dx.doi.org/10.1016/S0148-6195(03)00052-3)
- Cuervo-Cazurra, A. 2008. Better the devil you don't know: type of corruption and FDI in transition economies, *Journal of International Management* 14(1): 12–27. <http://dx.doi.org/10.1016/j.intman.2007.02.003>
- De Rosa, D.; Gooroochurn, N.; Gorg, H. 2010. *Corruption and productivity: firm-level evidence from the BEEPS survey*. World Bank Policy Research Working Paper Series, 5348.
- Egger, P.; Winner, H. 2005. Evidence on corruption as an incentive for foreign direct investment, *European Journal of Political Economy* 21: 932–952. <http://dx.doi.org/10.1016/j.ejpoleco.2005.01.002>

- Freckleton, M.; Wright, A.; Craigwell, R. 2011. Economic growth, foreign direct investment and corruption in developed and developing countries, *Journal of Economic Studies* 39(6): 639–652. <http://dx.doi.org/10.1108/01443581211274593>
- Giriūnas, L.; Mackevičius, J. 2014. Evaluation of frauds in public sector, *Entrepreneurship and Sustainability Issues* 1(3): 143–150. [http://dx.doi.org/10.9770/jesi.2014.1.3\(3\)](http://dx.doi.org/10.9770/jesi.2014.1.3(3))
- Green, W. 2012. *Econometric analysis*. 7<sup>th</sup> ed. Prentice Hall.
- Habib, M.; Zurawick, L. 2002. Corruption and foreign direct investment, *Journal of International Business Studies* 33: 291–308. <http://dx.doi.org/10.1057/palgrave.jibs.8491017>
- Hillman, A. L.; Krausz, M. 2004. Development failure, corruption, and the financial system, in *European Public Choice Society Conference*, April 15–18, Berlin, Germany.
- Huntington, S. 1968. *Political order in changing societies*. New Haven: Yale University Press.
- Jain, A. 2002. Corruption: a review, *Journal of Economic Survey* 15(1): 71–121. <http://dx.doi.org/10.1111/1467-6419.00133>
- Jain, P. K.; Kuvvet, E.; Pangano, M. S. 2012. *Corruption's impact on liquidity, investment flows, and cost of capital* [online], [cited 18 November 2015]. Available from Internet: [http://www.lehigh.edu/~jms408/pagano\\_2012.pdf](http://www.lehigh.edu/~jms408/pagano_2012.pdf)
- Kaminskienė, N.; Žalėnienė, I.; Tvaronavičienė, A. 2014. Bringing sustainability into dispute resolution processes, *Journal of Security and Sustainability Issues* 4(1): 69–77. [http://dx.doi.org/10.9770/jssi.2014.4.1\(6\)](http://dx.doi.org/10.9770/jssi.2014.4.1(6))
- Kanapinskas, V.; Plytnikas, Ž.; Tvaronavičienė, A. 2014. In-house procurement exception: threat for sustainable procedure of public procurement?, *Journal of Security and Sustainability Issues* 4(2): 147–158. [http://dx.doi.org/10.9770/jssi.2014.4.2\(4\)](http://dx.doi.org/10.9770/jssi.2014.4.2(4))
- Lambsdorff, J. G. 2003. How corruption affects persistent capital flows, *Economics of Governance* 4(3): 229–244. <http://dx.doi.org/10.1007/s10101-002-0060-0>
- Lau, C. K. M.; Demir, E.; Bilgin, M. H. 2013. Experience-based corporate corruption and stock market volatility: evidence from emerging markets, *Emerging Markets Review* 17: 1–13. <http://dx.doi.org/10.1016/j.ememar.2013.07.002>
- Leff, N. 1964. Economic development through bureaucratic corruption, *American Behavioral Scientist* 8: 8–14. <http://dx.doi.org/10.1177/000276426400800303>
- Lui, F. 1985. An equilibrium queuing model of bribery, *Journal of Political Economy* 93: 760–781. <http://dx.doi.org/10.1086/261329>
- Mashal, A. M. 2011. Corruption and resource allocation distortion for “ESCWA” countries, *International Journal of Economics and Management Sciences* 1(4): 71–83.
- Ng, D. 2006. The impact of corruption on financial markets, *Managerial Finance* 32(10): 828–36. <http://dx.doi.org/10.1108/03074350710688314>
- Olken, B. 2007. Monitoring corruption: evidence from a field experiment in Indonesia, *Journal of Political Economy* 115(2): 200–249. <http://dx.doi.org/10.1086/517935>
- Pastor, L.; Veronesi, P. 2012. Uncertainty about government policy and stock prices, *Journal of Finance* 67: 1219–1264. <http://dx.doi.org/10.1111/j.1540-6261.2012.01746.x>
- Peker, S.; Tvaronavičienė, M.; Aktan, B. 2014. Sustainable risk management: fuzzy approach to volatility and application on FTSE 100 index, *Entrepreneurship and Sustainability Issues* 2(1): 30–36. [http://dx.doi.org/10.9770/jesi.2014.2.1\(4\)](http://dx.doi.org/10.9770/jesi.2014.2.1(4))
- Pinheiro, A. R. D. C. 2010. *Does corruption drive the stock market?* Master's thesis. Universidade Nova de Lisboa.
- Raudeliūnienė, J.; Tvaronavičienė, M.; Dzemyda, I. 2014. Towards economic security and sustainability: key success factors of sustainable entrepreneurship in conditions of global economy, *Journal of Security and Sustainability Issues* 3(4): 71–79. [http://dx.doi.org/10.9770/jssi.2014.3.4\(7\)](http://dx.doi.org/10.9770/jssi.2014.3.4(7))
- Šabasevičienė, V.; Grybaitė, V. 2014. Main foreign direct investment factors as precondition of sustainable entrepreneurship: evidence from Lithuania, Central and Eastern Europe, *Entrepreneurship and Sustainability Issues* 1(4): 230–238. [http://dx.doi.org/10.9770/jesi.2014.1.4\(5\)](http://dx.doi.org/10.9770/jesi.2014.1.4(5))
- Shahbaz, M.; Hye, Q. M. A.; Shabbir, M. S. 2013. Does corruption increase financial development? A time series analysis in Pakistan, *International Journal of Economics and Empirical Research* 1(10): 113–124.
- Tunčikienė, Ž.; Drejeris, R. 2015. Entrepreneurship ecosystem: methodological approaches to functions' review of public sector institutions, *Entrepreneurship and Sustainability Issues* 2(3): 118–132. [http://dx.doi.org/10.9770/jesi.2014.2.3\(1\)](http://dx.doi.org/10.9770/jesi.2014.2.3(1))
- Tunčikienė, Ž.; Korsakienė, R. 2014. Sustainable development of public institutions: the model of functional review, *Journal of Security and Sustainability Issues* 4(2): 187–195. [http://dx.doi.org/10.9770/jssi.2014.4.2\(7\)](http://dx.doi.org/10.9770/jssi.2014.4.2(7))
- Tvaronavičienė, M.; Grybaitė, V.; Tunčikienė, Ž. 2013. Globalization drivers in developed and less developed countries: if consistent patterns can be traced, *Journal of Security and Sustainability Issues* 2(4): 5–11. [http://dx.doi.org/10.9770/jssi.2013.2.4\(1\)](http://dx.doi.org/10.9770/jssi.2013.2.4(1))
- Tvaronavičienė, M.; Šimelytė, A.; Lace, N. 2014. Sustainable development facets: exporting industrial sectors from inside, *Journal of Security and Sustainability Issues* 3(4): 37–44. [http://dx.doi.org/10.9770/jssi.2014.3.4\(4\)](http://dx.doi.org/10.9770/jssi.2014.3.4(4))
- Voyer, P. A.; Beamish, P. W. 2004. The effect of corruption on Japanese foreign direct investment, *Journal of Business Ethics* 50: 211–224. <http://dx.doi.org/10.1023/B:BUSI.0000024737.57926.bf>
- Wang, Y.; You, J. 2012. Corruption and firm growth: evidence from China, *China Economic Review* 23(2): 415–433. <http://dx.doi.org/10.1016/j.chieco.2012.03.003>
- Wei, S. J. 2000. Local corruption and global capital flows, *Brookings Papers on Economic Activity* 31(2): 303–354. <http://dx.doi.org/10.1353/eca.2000.0021>
- Yartey, C. A. 2010. The institutional and macroeconomic determinants of stock market development in emerging economies, *Applied Financial Economics* 20: 1615–1625. <http://dx.doi.org/10.1080/09603107.2010.522519>

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