Journal of Applied Finance & Banking, Vol. 10, No. 2, 2020, 119-125
ISSN: 1792-6580 (print version), 1792-6599(online)
Scientific Press International Limited

The effect of corruption on stock market volatility

Eleftherios Spyromitros[1]

Abstract

This paper addresses the issue of impacts of corruption on stock market volatility. By applying panel data analysis on a set of 16 countries from 2010 to 2016, sufficient evidence for a negative relationship between corruption and stock market volatility is provided, while controlling for several macroeconomic and financial variables.

JEL classification numbers: D73, E44, G1.
Keywords: Corruption, stock market volatility, panel data.

1. Introduction

The role of corruption in affecting economic growth has been extensively investigated by the existing literature providing mixed results. The seminal study by Mauro (1995) shows a negative effect of corruption on growth through its impact on investment. Méon and Sekkat (2005) argue that corruption may have a different impact on growth depending upon the quality of governing institutions. Precisely, they show that, under low quality governing institutions, growth lowers more. In the same context, the embezzlement of tax revenues by public officials leads the government to rely more on seigniorage to cover its expenditures raising thus inflationand lowering investment (Blackburn and Powell, 2011).

On the other hand, Aidt et al. (2008) show that low quality of government institutions is not related to economic growth. Méon and Weill (2010) confirm that corruption is less damaging in countries where the institutional framework is ineffective. Moreover, the role of economic freedom in modifying the impact of corruption on growth is investigated by Swaleheen and Stansel (2007) and Heckelman and Powell (2010). It is shown that higher (lower) economic freedom is

[1] Department of Economics, Democritus University of Thrace.

Article Info: *Received:* October 7, 2019. *Revised:* October 22, 2019.
Published online: March 1, 2020.

associated with a positive (negative) effect of corruption on growth. Thus, it appears that an efficient corruption level that helps overcome the existing institutional insufficiencies may exist.

From the above, it is unclear whether corruption is detrimental or beneficial for economic growth. Furthermore, only few studies have focused on the effects of corruption on the economic performance of firms (Gaviria, 2002). In other words, bribery may affect the firm's performance either by greasing the wheel of commerce or by sanding the wheel of commerce. Once again, the results are mixed. According to Fisman and Svensson (2007) and De Rosa et al. (2010) corruption has a negative effect on firm growth and productivity, respectively. On the other hand, Peng and Luo (2000) suggest that connections with government officials can negatively affect business uncertainty, with a positive impact on firm performance. Stock markets help companies raise necessary capital from investors, promoting thus economic growth. However, in the case of volatile stock markets risk-adverse investors tend to avoid exposure in such markets, negatively affecting investment. In this context several studies document the effect of political uncertainty and news on stock market volatility (Mei and Guo, 2004; Önder and Şimga-Mugan, 2006; Goodell and Vahamaa, 2013; Chau et al., 2014). In this study, we aim to investigate the role of corruption on stock market volatility.

Several empirical studies have investigated the effect of corruption on financial markets finding that corruption is harmful for financial markets. Specifically, Ciocchini et al. (2003) consider bond spread as a proxy for borrowing cost and show that corruption increase borrowing costs for governments and firms in emerging markets. Lee and Ng (2009), by examining stock prices, they show that corruption decreases equity values after controlling for some firm- and country-level control factors. In this context, Gelos and Wei (2002) find that a lower level of country transparency discourages investment from international funds. In other words, corrupted countries is more likely to receive less investment from foreign investors. The role of the quality of governance is also highlighted by more recent studies. Hooper et al. (2009) provide evidence that good governance quality is positively associated with stock returns but, on the other hand, Low et al. (2011) show that countries with weak governance framework characterized by ineffective government and lack of control for corruption exhibit higher equity returns than countries with strong governance settings.

More closely to our study, Pastor and Veronesi (2012) show from their general equilibrium model that bribery may lower the stock market volatility especially in emerging markets. In the same spirit, Zhang (2012) uses the corruption perception index to assess the effect of corruption on stock market volatility in the period 2002-2007 for 29 stock exchange markets. It is shown that there is a negative correlation between corruption and stock market volatility, however this result is obtained prior to the global financial crisis. In our analysis, we consider the period after the financial crisis.

The remainder of the paper is structured as follows: Section 2 presents data and methodology employed in our empirical analysis. Section 3 presents and discusses the main results and finally section 4 concludes.

2. Data and Methodology

We collect data from 2010 to 2016 on the following countries: Australia, Brazil, Canada, Chile, China, Denmark, India, Japan, Korea, Norway, Russia, South Africa, Sweden, Switzerland, United Kingdom, and the United States. The dependent variable is annual stock returns' volatility (VOL). To measure it, we collect monthly data from the OECD database. For the VOL, we use the season adjusted approach, which is commonly used in the literature. This is the standard deviation of the monthly returns, multiplied with the square-root of 12 (as it is monthly) and with 100 to turn it into a percentage.
This can be described as:

$$VOL = St.dev(m_{returns}) * \sqrt{12} * 100$$

The independent variables used in the regressions are: the corruption perception index (CPI) published by Transparency International, GDP growth (GDPg), inflation (CPI), one-year money market interest rates (IR), and finally economic openness of a country defined as the percentage of the total trade over GDP (OPN). For GDPg, we use the data collected from the OECD database. CPI, OPN and IR data[2] are drawn from the World Bank database.
The basic model for estimating the relation between stock returns' volatility and the independent variables is:

$$VOL_{it} = \beta_1 COR_{it} + \beta_2 GDPg_{it} + \beta_3 CPI_{it} + \beta_4 IR_{it} + \beta_5 OPN_{it} + \mu_i + u_{it}.$$

where the last two terms are the individual heterogeneity term (μ_i) and the common error term (u_{it}). To continue with the regressions, we test for the unit roots at the variables. Then, to estimate the results, we apply a panel regression analysis with variations according to the results of the diagnostic tests. The four basic variations used here are as follows: the fixed effects and the random effects regression; the Prais–Winsten panel corrected standard error regression which is a linear regression used for autocorrelated panels with corrected standard errors to avoid the violation of ordinary least square (OLS) estimators and the Driscoll–Kraay standard error regression (Driscoll and Kraay, 1998), which is a pooled OLS regression. To determine the results, we consider the fixed effects and the random effects

[2] In the case of Denmark, Switzerland and Sweden, we use the one-year EURIBOR rate, which is the one commonly used in these countries. For the United Kingdom, we use the one-year LIBOR rate. Both EURIBOR and LIBOR are drafted from their official website, in which each rate is quoted. To annualize the rates, we use the mean value of the rates quoted in each year.

regression through the Hausman test. For both cases, we also apply the cross-sectional dependence tests of Frees and Pesaran (Frees, 1995; Pesaran, 2004). Moreover, the Wooldridge test for autocorrelation is conducted (Wooldridge, 2002). We also consider a Breusch and Pagan LM test to decide between random effects and a simple OLS model (Breusch and Pagan, 1980).

3. Empirical Results

In Table 1, we use Harris-Tzavalis test to examine non-stationarity of our variables of interest. We observe that only OPN and IR have a unit root. To correct this issue, we take first differences.

Table 1. Unit-root tests for dataset including all countries

Variable/ Test Name	Harris-Tzavalis
VOL	-0.0394*** (0.0000)
COR	0.4541** (0.0000)
GDPg	0.2054*** (0.0000)
CPI	0.2531*** (0.0000)
IR	0.5064 (0.1014)
OPN	0.7106 (0.8211)
d. IR	-0.0153*** (0.0000)
d. OPN	-0.0717*** (0.0000)
Note: Ho, unit root is present. P-values are in parentheses. *,** and ***indicate statistical significance at the 10%, 5%, and 1% level, respectively.	

Table 2 presents the results of the regressions for the annual volatility of the stock indexes for the whole country dataset. According to the Hausman test, the random effects regression is recommended. The Wooldridge test for autocorrelation suggests no autocorrelation, while Frees and Pesaran tests show cross sectional dependence in our residuals. Therefore, we continue the regression with a linear regression with the Prais–Winsten panel-corrected standard errors specification, as well as we test the results with a Driscoll-Kraay corrected standard errors regression. Corruption, and openness have a statistically significant effect on volatility, and all the other variables are statistically insignificant.

Table 2. Panel data estimation results for stock market volatility

VOL	Random Effects	Prais-Winsten	Driscoll-Kraay
COR	-.0011** (0.017)	-.0011** (0.016)	-.0.011* (0.057)
GDPG	.00094 (0.451)	.0006 (0.7)	.0006 (0.708)
CPI	.0028 (0.960)	-.0034 (0.244)	-.0034 (0.285)
d. IR	.0007*** (0.000)	.0026* (0.862)	-.0004 (0.781)
d. OPN	.0026*** (0.000)	.0003* (0.06)	.0026*** (0.000)
Constant	0.2111*** (0.000)	0.2156*** (0.000)	17.35847*** (0.000)
R^2	0.1172	0.1188	0.1062
Hausman Test (FEM vs REM)	$x^2(5)$=1.41 (0.9236)		
Test of cross-sectional independence by Frees	0.194 α=0.4127		
Test of cross-sectional independence by Pesaran	3.382 (0.0007)		
Test for autocorrelation by Wooldridge	F(1,15)=0.001 (0.9814)		
Breusch-Pagan LM Test for REM vs OLS	$\bar{x}^2(01)$=7.54 (0.003)		
Note: *,** and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.			

In effect, we confirm the results obtained by Zhang (2012) for the post crisis period under investigation. The negative relationship between corruption and stock market volatility is statistically significant when controlling for a number of macroeconomic and financial variables. It appears that corruption may not be harmful for financial stability. Moreover, the positive link between trade openness and stock market volatility can be explained on the ground that the exposure of listed firms on international trade and adverse shocks is important because of more international risk sharing between markets and thus any related issues are transmitted in the stock markets affecting thus their volatility.

4. Conclusion

This paper addresses the effect of corruption, measured by the corruption perception index, on stock market volatility. By applying panel data analysis on a set of 16 countries from 2010 to 2016 and considering the main macroeconomic variables as control variables, sufficient evidence for a negative relationship is provided. Therefore, corruption may have a different than expected effect on stock market volatility, implying benefits for financial stability. However, this result should be interpreted with caution due to the fact that the index of corruption is based on perception rather than experience.

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