Does Corruption Matter for Stock Markets?

The Role of Heterogeneous Institutions

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Abstract

In examining the role of institutions in resisting corruption and its impact on growth, most studies concentrate on the aggregate level and conclude that sound institutions enhance growth. We focus instead on varying dimensions of heterogeneous institutions in the presence of corruption and their interactive effect on stock returns in four emerging economies: Brazil, Russia, India, and China (BRIC). We pay particular attention to democratic accountability, bureaucratic quality, and law and order. Using monthly data for the first time in this literature, we find that corruption and other weaker institutions lower stock returns during the period 1995-2014. However, interaction effects show interesting mixed results: Bureaucratic quality can mitigate the ill effects of corruption and increase returns by reducing red tape, whereas corruption distorts law and order and lowers stock returns. Our findings suggest that policies to enhance bureaucratic efficiency can abate the adverse effects of corruption, but a restrictive law and order environment tends to lower stock returns.

Key words: institutions, stock returns, BRIC countries, growth, corruption

JEL Classification: A13, O16, O17, P16, G15, G18

Highlights:

- We examine whether a higher level of corruption in a country lowers stock returns.

- Institutional heterogeneity matters in affecting returns when corruption is present.

- Bureaucracy can improve business practices and increase returns by reducing red tape.

- Law and order is distorted by corruption, and consequently lowers stock returns.

- Policies that combat corruption are flawed if they ignore individual attributes.

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1. **Introduction**

Institutions play important roles in bringing efficiency to markets (Granovetter, 1992; Black, 2013). In the last few decades, many emerging countries have embraced market deregulation, openness, and privatization to improve market outcomes. However, distortions in the market mechanism, in the form of illegal payments for rulings or actions by public servants, can erect barriers to market efficiency (Bardhan, 1997). As with other markets, the smooth functioning of stock markets can be accomplished by good governance—i.e., by promoting the ability to conduct business without frictions, which in turn creates a good climate for investment. However, stock markets can face market failure and sacrifice efficiency if various restrictions are imposed on private investment activities, such as requiring permits and licenses that can encourage corruption by increasing the transaction cost of doing business and, as a result, lower profits (Acemoglu and Verdier, 2000). Moreover, if markets are embedded in weak institutional practices, their signals are perceived as imperfect due to lack of trust.

The degree of corruption and its impact on stock returns may depend on the quality of institutions that secure property rights (Yartey, 2008). Even so, the concept of institutions is complex and has several dimensions (Granovetter, 1992; Rose-Ackerman, 2000), which can produce different outcomes related to efficiency in the market mechanism. Hence, this study investigates the role of corruption in influencing stock markets, measured by stock returns (SR), and how the degree of impact varies at different levels of institutions and their dimensions. We accomplish this by using monthly data from 1995 to 2014 on four emerging economies: Brazil, Russia, India, and China (BRIC).

The motivation for this study derives from growing concern about corruption, particularly in the context of developing countries. Previous studies have mostly concentrated on the nexus between corruption and economic growth (e.g., Mauro, 1995; Tanzi and Davoodi, 1997; Swaleheen, 2011; D'Agostino et al. 2016) and obtain results that reflect a complex and inconclusive relationship between the two. Interestingly the impact of corruption on stock markets, which are essential for investment and hence growth, is mostly neglected. Some studies have looked at the impact of corruption at firm level and its relation to financial performance and sales growth (e.g., Fisman and Svensson, 2007; Nguyen and Dijk, 2012; Vu et al. 2018), but have not examined the market's reaction, which is captured by stock returns (SR). These returns act as transparent signals for economic agents, allowing quicker decision-making and optimal resource allocation, and thus provide a rationale for our study. The role of corruption in country-level stock markets has been relatively sparsely explored (e.g., Hooper et al., 2009; Low et al. 2011; and Karadas et al. 2019 in US states). Also, to the best of our knowledge, no study investigates the impact of corruption on stock markets in BRIC countries.

A substantial body of literature supports a straightforward negative association between the growth of corruption and the rise in weak institutions. However, some studies find a nonlinear corruption-growth nexus in the presence of institutions (e.g., Mendez and Sepulveda, 2006; Méon and Weill (2005). These studies demonstrate a nonmonotonic relationship between corruption and growth after controlling for several economic and institutional factors. The relationship tends to worsen (improve) when indicators of the quality of governance deteriorate (improve). Hence, individual or independent effects alone can overlook the influence of the interactions of institutions on the impact of corruption. Also, most studies consider an institution at the aggregate level in examining its impact on growth. However, the concept of institutions is

multidimensional; each dimension can function differently when interacting with corruption and its impact on growth, and previous work ignores this aspect. This study examines the heterogeneous effect (at the disaggregate level) of institutions on the stock market. Our focus is democratic accountability (the responsiveness of government to its people and market institutions in order to minimize political risk), bureaucratic quality (the stability of policy) and law and order (the establishment of a transparent legal system and adherence to it).

We examine four emerging economies—Brazil, Russia, India, and China —because they are the emerging superstars most likely to dominate the 21st century's globalized economy. These countries account for 40% of the world's population, more than 25% of the world's land, around 23% of global GDP, and a growing share of foreign direct investment flows. Estimates by the International Monetary Fund (IMF) predict that BRIC nations will account for over 50% of global GDP by 2030. Despite being the leading emerging markets and perceived as beacons of global growth, they are marred by imperfect institutions and governance (Borodina and Shvyrkov, 2010), which renders them an intriguing puzzle. Notwithstanding their growth, BRIC countries perform badly on corruption, according Transparency International's Corruption Perceptions Index report for 2015. Out of 175 countries, India and Brazil ranked 76th, China 83rd, and Russia 119th. Given that BRIC nations contribute notably to world trade, manufacturing, and services (Nayyar, 2013), but have a dualistic economy and imperfect infrastructure, the smooth functioning of their stock markets is essential for capital accumulation. BRICs provide an excellent case study, because they are major contributors to global business and investment but, at the same time, are riddled with imperfect and variable institutions. Also, BRIC economies are highly reliant on foreign direct investment for growth, which mostly depends on the perception of the pervasiveness of corruption.

This study's contributions are threefold. First, we examine the independent impact of corruption and other country-level institutional variables on BRICs' stock returns, while controlling for global and emerging markets' returns. Second, we analyze heterogeneous institutions to identify which dimension of institutions supports the smooth functioning of stock markets: Does having a strong bureaucracy or democracy help or hinder these markets? How does the quality of law and order affect stock returns? Which is more crucial? We then examine how each of these institutional elements—law and order (LO), bureaucratic quality (BQ), and democratic accountability (DA) interact with corruption i.e. do any of the variables improve SR in the presence of corruption? For example, does corruption grease the wheels of bureaucratic practices and improve stock returns? Do institutional components such as BQ, DA, and LO moderate the effect of corruption by improving the investment environment and, in turn, increasing stock returns? Finally, we contribute to the financial market literature on BRIC nations by using monthly data for the first time in this literature and applying Extreme Bound Analysis along with panel fixed effects and a dynamic panel, which explicitly incorporates prior information and takes a systematic approach to testing the fragility of coefficients (Leamer (1983); Leamer and Leonard (1983); Granger and Uhlig (1990)).

The rest of the paper is organized as follows. Section 2 reviews the general literature on institutional factors and their impact on growth and stock markets. Section 3 briefly describes BRIC nations, and Section 4 presents our empirical specifications and analytic approach. Results are presented in Section 5, and Section 6 concludes.

2. Literature Review

Stock markets and their returns are not divorced from the effects of institutions; good national and corporate governance practices surround both investment activity as well as influence investors' perception. (La Porta et al., 2000; Bakaert et al. 2016; Boadi and Amegbe, 2017). Earlier literature focused on various institutional risks such as political risk (Bakaert et al. 2016), country risk (Kaminsky and Schmukler, 2002), economic freedom (Blau, 2017) etc. Here, we explore the debate regarding the role of corruption and other related institutions on the economic performance of a country, including stock markets.

2.1 Impact of corruption: an overview

Corruption, while being a pervasive (Bardhan, 1997) issue, remains difficult to solve as it is not openly declared (Shleifer and Vishny, 1993). A variety of reasons support its existence in less developed regions (Rose-Ackerman, 2000; Bai et al., 2019). Not only it is sometimes unrecognized but is also an accepted part of some cultures (Seleim and Bontis, 2009), seen to be mere "gift-giving". Its impact, too, can vary (Bardhan, 1997).

One school of thought argues that this opacity creates distorted perceived signals which can be transmitted into stock markets through foreign and domestic portfolio investment due to imperfect and hidden information and heterogeneity of interests. Thus, corruption can influence returns and investment (Mauro, 1995). Studies show there is a negative relationship between the quality of governance and SR (Low et al. 2011) due to added risk. Similarly, Hooper et al. (2009) find a link between institutional governance and SR. Since corruption distorts perception, the private investment sector faces greater risk and uncertainty as corruption and bribery (Rose-Ackerman, 2000), may negatively impact output. Due to its illegal nature, the success rate in

getting permits and licenses is unclear (Shleifer and Vishny, 1993). Therefore, corruption acts as a secret tax on production inputs, increasing costs and uncertainty, reducing investment activity, profits and the impetus to reinvest (Fisman and Svensson 2007; Farooq et al., 2013; Vu et al. 2018). It also reduces foreign direct investment inflows (Jadhav and Katti, 2012) by dissuading potential foreign participation in joint ventures. Financial markets that have frequent corruption scandals erode trust and confidence in their functioning and governance (Borodina and Suvorov, 2010) — which would further raise risk. In contrast, lowering corruption allows financial sector development (Cooray and Schneider, 2018). Imperfections in emerging markets such as high liquidity spreads, would, *ceteris paribus*, result in lower net returns for the investors and sellers and might negatively, impact future expected gross returns (Eleswarapu and Venkataraman, 2006). Corruption could also be a hurdle for meritorious participants in the investment sector (Acemoglu and Verdier, 1998), eroding reputation, culture, innovation and critical resources (Paunov, 2016; Vu et al., 2018). Hence, corruption can act as sand in the wheels of economic activity by dampening effects on SR (Karadas et al., 2019).

An opposing argument views corruption as greasing or oiling the wheels of investment in the presence of high growth possibilities and imperfect institutions (Huntington, 1968). Promoting investment activity is paramount for economic development and in thin markets; the cost of corruption may be modelled to gauge the level of output lost in forgoing investment (Beck and Maher, 1989). A lack of smoothly functioning institutions might encourage corruption growth (Méon and Weill, 2005; Méon and Sekkat, 2005; Rose-Ackerman and Truex, 2012) but can hasten mandatory business practices such as licensing processes (Leff, 1964; Lui, 1985) and thus aid the mobilization of much needed private investment. Some empirical evidence has lent support to this argument. Legal compliance can act as costly and time-consuming barriers in starting investment ventures for legitimate but small entrepreneurs, as demonstrated in a practical experiment in setting up a textile firm (De Soto, 1989). Bribes could thus facilitate entrepreneurial investment to thrive

and aid the development of innovative products, by-passing the need for slow and inefficient bureaucratic machinery to grant licenses (Krammer, 2019). Similar effects have been reported empirically in South East Asian countries where corruption has smoothed the pathway to high investment and high returns bypassing other impediments. It is argued that in the presence of weak institutions, predictable corruption has had an ameliorating effect (Campos et al., 1999). Political influence at selective times in boardrooms and crony capitalism may encourage market control for private investors (Bernardi et al. 2005) guaranteeing higher returns. In fact, access to political power boosts private sector investment growth even in less corrupt countries like Denmark (Amore and Bennedsen, 2013) but more so where corruption is high (Faccio, 2006). Corruption has served as an incentive, i.e. a helping hand and long-run stimulus for foreign direct investment (Egger and Winner, 2005) by circumventing administrative barriers. In a nutshell, the slower the space of financial development in a country, the less the marginal effect from an improvement in governance and so the greater is the marginal benefit from corruption to the investment sector through bribing tax inspectors, pleasing powerful officials and spending on entertainment to build networks (Wang and You, 2012).

Since the practice and impact of corruption is secretive, nonsystematic and illegal, expectations about investment flows and investor perceptions can either positively or negatively impact SR. Heterogenous investors will perceive distorted signals because the effects of corruption are unpredictable. It is hence unclear what effect would high corruption have on BRIC returns. Individual institutional aspects and the literature on their impact in the presence of corruption might provide some clues.

2.2 Corruption and bureaucratic quality (BQ)

A well-trained bureaucratic system is immune to the politics of government power i.e. BQ, aids market development (Yartey, 2008) and boosts investment (Méon and Sekkat, 2005 and Mendez and Sepulveda, 2006). Stability of policy is a well-known factor in encouraging a vibrant investment sector (Nee and Opper, 2009). Abrupt changes in policy have been known to send markets in tail spins-as recently evidenced in India by demonetization and the sudden implementation of new tax rules. Huskey and Obolonsky (2003) report that institutional rivalries and lack of public debate deter professionalism among Russian bureaucrats. Lambsdorff (2003) finds that by itself, BQ is an important variable which imitates the impact of low corruption on productivity (GDP to capital stock)—a one-point increase in good bureaucracy boosts productivity by 5%. Empirical evidence, however, also points the other direction—bureaucratic procedures in the presence of corruption can impede performance (Seim et al., 2009). In a rapidly volatile environment and changing needs, bureaucracy can constrict the private sector because agency problems can arise due to information asymmetry precipitating market failure. The role of public sector bureaucrats in already corrupt societies can increase the impact of corruption (Bardhan and Mookherjee, 2006; Boycko et al. 1995) due to insufficient monitoring (Shleifer and Vishny, 1993) leading to a suggestion that privatization or local agents may boost productivity bypassing the need for corrupt bribes. However, it is pointed out that public sector bureaucrats can still increase corruption by colluding with private sector agents (theft) or acting as a monopolist and demanding a markup for services rendered. Government failure may be a bigger issue than market failure in impeding investment when bureaucrats are prone to bribe-taking and are heterogeneous and underpaid (Acemoglu and Verdier, 2000; Gupta and Abed, 2002). In such cases, high corruption

can act with weak bureaucracy to have a greasing effect. Goedhuys et al. (2016) report that corruption interacts with bureaucracy and reduces the negative effect bureaucratic red tape has on innovation. Dzhumashev (2014) finds that corruption interacting with bureaucracy can be growth-enhancing. High satisfaction with public sector services allows tolerance to corruption. The interaction effect shows if the quality of bureaucrats is low, corruption can attract a higher quality of bureaucrats by the promise of perks (Beck and Maher, 1989).

2.3 Corruption and democratic accountability (DA)

The picture regarding the impact of DA on stock markets is mixed and inconclusive (Tavares and Wacziarg, 2001). Positive effects are reported in some cases: Yartey (2008) finds a significantly positive relationship between stock market development and democracy. In a study related to African countries, the beneficial effects of democracy on financial sector development are highlighted during 1990-2010 by Asongu and Nwachukwu (2018). Similarly, Boadi and Amegbe (2017) note that higher democracy boosts equity performance in international markets. Biswas and Ofori (2015), too, report using 22 countries for 1985-2011, that mature democracies pave the way for liquidity in markets affecting returns as low bid-ask spreads decrease the cost of trading. An opposing view is formulated by Lehkonen and Heimonen, (2015) however, who note in their study of 49 emerging market returns, during 2000-2012, that while democracy is positively related to SR, the relationship is complex as when democracy reaches a certain threshold, it has a negative impact on SR. This is because democracy has a U shape relationship with political risk. High political risk hovers at low levels of democracy, it decreases as democracy increases. However, at very high levels of democracy, protests and conflicts surface as political risk increases. Moreover, the interaction of democratic accountability and political risk also has a significant effect on SR.

Literature investigates how DA interacts with corruption. At the early stages of economic liberalization, high levels of democracy increase corruption opportunities; democracy starts to mitigate corruption when economic liberalization is high (Saha et al., 2009). An inverted U-shaped relationship hence exists between democracy and corruption (Rock; 2007) with the turning point being at a relatively young age for new democracies. Corruption in autocratic regimes initiates political linkages which have a positive impact on the value of Chinese firms (Wang et al. 2018) and bank loans (Feng and Yu, 2017). Democracy increases corruption when economic liberalization is low and economic freedom reduces corruption (Saha et al., 2009; Tiwari, 2012); an opposing view by Transparency International states that autocracies score poorly on corruption.

2.4 Corruption and law and order (LO)

Early studies highlighted the role of the legal system in fostering a vibrant corporate sector to secure external funding and innovation (La Porta et al., 1997; Demirguc-Kunt and Maksimovic, 1998). Both the strength and impartiality of the system as well as its observance is paramount in financial sector development. Improvements in legal and political institutions lead to greater liquidity in financial markets (Eleswarapu and Venkataraman, 2006). The LO ranking affects the costs of financing and lowers financial risk by reducing transaction and agency costs (Hooper et al., 2000; Öztekin, 2015; Gungoraydinoglu et al., 2017). Literature, thus, indicates that lowering risk (and uncertainty) through strong political, legal, open and regulatory institutions can positively affect SR and development (Yartey, 2008). Returns are larger in countries in the presence of security-conscious institutions i.e. disclosure rules, legal institutions, and strong legal enforcement (Hail and Leuz, 2006) due to lower cost of capital. More recent studies, however, report that regulation, e.g. rigorous environmental laws, can hinder private investment growth through

stronger policy enforcement (Tiwari, 2012; Boadi and Amegbe, 2017; Guo et al., 2020). The World Bank has expressed concern about the possible counterproductive effects of regulation on the small, informal sector. Deregulation has been found to encourage swift entry into capacity building industries. Regulation can create contradictory effects, forcing businesses to work in harmony with social needs but also constraining their activity and performance. For BRIC private investment sector which relies on low-cost production of goods and services using relatively cheap labour, regulatory aspects relating to employment law and other related issues can become cumbersome. Méon and Sekkat (2005) report upon the interaction of the rule of law with corruption─good governance (rule of law) decreases the cost of corruption and curtailing corruption in countries with weak rule of law would have beneficial effects.

The above discussion on LO, BQ and DA highlighted the continuing conflicting views about individual roles of corruption and other institutions. These are frequent in developing economies where some institutions may be stronger than others. More importantly, these institutions can have complex interaction effects in the presence of corruption. By themselves, usually strong institutions bolster performance, development and growth-however empirical and theoretical discussion show that the interaction effects are more paradoxical. This observation invites further scrutiny, which is the main focus of the paper.

While the aim of this paper is to examine the role of institutional variables, we expect that economic and financial variables, as controls, would be relevant in explaining returns. Our economic variables are captured by the exchange rate (Cho et al., 2016) and economic growth (Ritter, 2012). Financial asset pricing theory posits that stock returns are closely correlated to other stock markets as well as institutions (Hooper et al., 2009). Emerging markets like BRICs are attractive destinations for global investors allowing diversification opportunities and possibilities

of higher returns (Mullin, 1993; Meziani, 2018). BRIC countries lead emerging markets and trade with many emerging economies; thus, we aim to investigate whether stock indices of BRICs significantly correlate to emerging and global indices.

3. BRICs: An Overview

The importance of the BRIC countries can be illustrated (Figure 1) by their growing contribution to the global GDP (based on PPP in trillions of dollars) through the years 2008-2018, making them a fascinating subject for study.

[FIGURE 1 ABOUT HERE]

As Figure 1 shows, BRICs contributed a mere 16% to the global GDP in 2004, but in 2018 they nearly doubled their share, accounting for 30% of the total. Moreover, the growth rate of the BRICs also consistently exceeded the growth rate of the global economy during this period. The average growth rate of BRICs was 8.3% while the global economy grew at 3.5%. During the financial crisis in 2009 when the global economy experienced negative growth, in contrast, BRICs' GDP grew more than 11%. The economic pace of these countries has led to predictions that BRICs will, in coming decades, become the nexus of soft power and replace G7 countries. Their ability to influence the global economy makes them attractive regional and international players.

Despite being clubbed together, the BRICs deregulated their markets in different periods. Figure 2 shows the emerging role of stock market capitalization as a ratio of GDP[1] in them.

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[1] Russia was the last country to establish a stock market in 1995 but the World Bank data is not reported until 2004.

China's market capitalization was less than a third of its GDP in 2003 but grew to three quarters by 2015. The financial crisis 2007-2009 also had a varied impact; the ratio of capitalization dropped significantly for Russia and Brazil, while China and India were left relatively unscathed.

[FIGURE 2 ABOUT HERE]

Apart from dissimilarities between BRICs path to privatization, differences also persist in the investment climate due to disparities in economic infrastructure, levels of democracy (China and Russia are run under autocratic regimes, whereas India and Brazil are more democratic), LO, the prevalence of corruption and bureaucracy. Figure 3 shows the average levels of corruption, DA, LO and BQ during our period of study. Brazil has the highest average corruption but also second highest levels of DA after India; the latter has a DA more than one point ahead of Brazil and nearly 4.5 points ahead of China. Russia enjoys a moderate average LO but the lowest BQ.

[FIGURE 3 ABOUT HERE]

Micro-level studies on corruption in India, China, Russia and Brazil emphasize its pervasive prevalence, causes and effects (Schulze et al. 2016; Ernst and Young, 2018) and the political dimensions of BRIC corporate sector. There is no single cause of corruption in BRIC nations, but it often prevails due to power in political office (Wang et al., 2018) over tenders and procurements on infrastructure projects. A powerful state lobby is always watching over the market participants of BRICs, despite recent strides in liberalization. Often the watch-dog

authorities themselves have been implicated thus paradoxically encouraging a mistrustful mindset towards the legitimacy of sanctions-leading to a vicious and spiralling cycle of corruption. For example, in Brazil, the state-owned company Petrobras was implicated in a major corruption scandal which included top officials including the President (Hillier and Loncan, 2019); this affected the equity markets adversely. There is a recognition that not just the legal framework, but the cultural mindset should change; worryingly, corruption has persisted despite historical and legislative attempts to curb it. A detailed analysis of corruption reform at country level is discussed in Kurakin and Sukharenko (2018). Leaders in BRIC countries have initiated a set of reforms to stem the tide of corruption. Finally, corruption scandals have shown links with overseas companies/authorities who want a foothold in BRIC markets (Milne, 2019).

BRIC countries having grown tremendously by export-led growth, now boast of large internal markets and a sophisticated corporate sector. This growth has been beneficial to not only developed countries who wish to diversify their investments and take advantage of higher returns (Mullin, 1993), but also to developing countries who trade with the BRICs (Mminele, 2016). Previously BRICs' industrial backbone was based in the public sector and informal sector; their corporate sector has now contributed to the largest companies in the world. There were 27 BRIC companies in 2005 when the Global Fortune 500 ranking was introduced; by 2011, the number more than trebled to 83 (Goldstein, 2013). Of the top 10 highest valued companies in the world, two are Chinese companies. Chinese companies now surpass US companies in the Fortune 500 Global rankings. Seven Indian companies also feature in the Fortune Global 500 list in 2019. While it is heartening to see the burgeoning corporate sector, some studies (e.g. Nguyen, 2019) suggest that increasing power (firm size) increases corruption practices through greater bribes and time spent with influential public officials. Kurakin and Sukharenko (2018) illustrate the role of BRICs

in corruption. A survey in 2017, based on Europe, Middle East, Africa, and Asia ranked India as the ninth most corrupt country out of 41 despite India's impressive corporate sector. Seventy-eight percent of those surveyed stated that bribery and corrupt practices were common in business. In 2016, in Russia, over 329,00 cases were registered under bribery and corrupt practices; the following year there was a fall by 10%. This, however, was not the true scale of affairs; the reluctance to record accurately was responsible for the low figures.

BRIC countries, like many emerging markets, work with different business cultures than the West. Often, business is carried out through family groups but there is a high state involvement in business circles (Goldstein, 2013). BRICs have exhibited envious growth in the private sector but have an imperfect distribution of wealth and a record of poor institutions. Moreover, there is a great diversity in the level and various dimensions of institutions. The next section explains our model and methodology in greater detail.

4. Model, methodology and data

This section discusses the model, data and methodology employed to examine the relationship between stock return and corruption with other institutional factors for the BRIC countries, estimating the parameters of the model using monthly data, during 1995-2014.

4.1 Model

Following Granger and Uhlig (1990), a generic model of stock returns (SR_{it}) for country i at time t is constructed as:

$$SR_{it} = \alpha_i + \beta^F X_{i,t}^F + \beta^D X_{i,t}^D + \lambda_t + e_{it} \qquad (1)$$

where two types of variables influence return on stocks (SR_{it}). Firstly, free or focus variables ($X_{i,t}^{F}$) which determine the impact on stocks returns, which can go either positively or negatively. For instance, returns may be expected to be adversely affected by corruption but positively influenced by institutional variables including bureaucratic quality (BQ), law and order (LO) and democratic accountability (DA) (our main institutional variables considered in this study), and risk factors. There are plenty of other economic, political, and social indicators whose role in affecting SR are doubtful and uncertain ($X_{i,t}^{D}$), such as exchange rate, investment profile, income, and GDP growth. This model also includes individual country-specific factors (α_i) and time-specific factors (λ_t). As usual, unobserved errors are included in the error term e_{it} that is identically and independently distributed with a zero mean and constant variance for the regression analysis. In more extended form, a panel data model is specified as:

$$SR_{it}=\beta_0+\beta_1 CORR_{it}+\beta_2 DA_{it}+\beta_3 LO_{it}+\beta_4 BQ_{it}+\beta_5(CORR_{it}\times DA_{it}/\ BQ_{it}/\ LO_{it})+\beta_6 EX_{it} +$$

$$\beta_{7,j} risk +e_{it} \qquad (2)$$

where for each country i and time t, CORR is corruption, DA is democratic accountability, LO is law and order, BQ is bureaucratic quality, EX is exchange rate, and risk is co-movements with global or emerging market index j for stock market of country i. The focus of this study is the impact of corruption on SR in the presence of institutional factors such as democratic accountability, law and order and bureaucratic quality. In other words, the impact of individual effect of CORR, DA, LO and BQ, on SR as well as the moderation effect of corruption and institutional factors on influencing SR are examined.

As stated earlier, the literature on corruption and economic performance of a country is plentiful and thus a good starting point for our analysis. It mostly evidences that corruption is deleterious to growth (Mauro 1995; Bardhan 1997; Gupta et al. 2001), however, in examining the positive effect of corruption, Méon and Sekkat (2005) and Mendez and Sepulveda (2006), incorporate the interaction term between corruption/quality of government and economic freedom and find that corruption is beneficial to growth only with good governance and in a free country. Hence, the individual effects of corruption and institutional variables on SR are expected to be negative ($\beta_1 < 0$) and positive ($\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 > 0$), respectively.

In addition, the sign and significance of β_5 are of interest, which captures the interaction effect of corruption and institutional variables on the changes in the stock market returns. Interaction effects measure the impacts of corruption on SR at various levels of democratic accountability (bureaucratic quality and law and order), in other words, do the impacts of corruption vary when the level of DA, BQ and LO changes? For instance, the marginal effect of corruption and democratic accountability (law and order / bureaucratic quality) on SR is computed as follows:

$$\frac{\partial SR_{it}}{\partial CORR_{it}} = \beta_1 + \beta_5 DA_{it}(LO_{it} , BQ_{it}) \qquad (2a)$$

Equation (2a) is the marginal effect of corruption on changes in the stock market returns in the presence of democratic accountability (bureaucratic quality and law and order). If $\beta_5 > 0$ and the absolute value exceeds β_1, then equation (2a) implies that a one percentage point increase in CORR (increase in corruption) yields a less negative impact on the returns as the degree of democratic

accountability expands.[2] In other words, a higher level of corruption reduces stock market returns in the absence of democratic accountability, however, as the democratisation intensifies, the negative marginal impact becomes smaller and may become positive if democracy reaches its matured levels. Alternatively, an increase in corruption may see greasing the wheel effect in stock market growth when countries are strongly democratic. Contrarily, if $\beta_5 < 0$, a higher level of corruption reduces returns on stocks with greater democracy.

Following Méon and Sekkat (2005), Mendez and Sepulveda (2006), Yartey (2008), it is expected that a higher level of bureaucratic quality boosts stock market returns Hence, the individual effect of BQ is expected to be positive and the interaction effect of BQ with CORR can enhance SR if a strong bureaucratic quality greases the wheel of government machinery by lowering red tape. Likewise, sound law and order of a country is expected to increase stock market activity by lowering the risk[3]. Hence, the individual and the interaction effects (CORR*LO) are expected to be positive. Finally, depreciation of the exchange rate can support stock returns. It also changes the value of the firms depending upon whether they are net exporters or importers, causing a change in demand and pricing. Cho et al. (2016) find that capital flows in and out of emerging or developed markets are not only sensitive to global equity market conditions but an inverse relationship exists between stock and currency markets. Hence, the expected sign of β_6 is negative. β_7 captures the relationship between BRIC SR and those of emerging markets or developed markets. We expect this to be low or negative, as co-movements with global indices signify BRICs allow diversification opportunities for investors (Mullin, 1993; Raj and Dhal, 2008;

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[2] Our corruption index ranges from 0 to 6 and a higher value indicates a higher level of corruption.
[3] La Porta et al. (1997) first suggested the positive impact of law and rule on the development of capital markets. Several other such studies explore that various aspects of law have an impact on corporate governance, thus impacting on the size and breadth of the stock market (La Porta et al, 2000).

Meziani, 2018). In addition, BRICs being integral emerging economies, their co-movements should be positively correlated to emerging economies indices.

4.2 Methodology

To test these proposed hypotheses that corruption has negative impacts on SR, we first start with a fixed-effect model with country and time specific variations in this relationship. Next, we test its validity comparing the variances of parameters obtained from the random-effect model using the Hausman test. According to Baltagi (2008) and Basu et al. (2019), all estimators in the fixed effect model even with a small number of cross-sections N, are consistent as time (t) increases and approaches to infinity. In the random effect model, with the regression error term $v_{i,t} = u_{i} + \varepsilon_{i,t}$, where u_i is the time-invariant random individual effect in addition to $\varepsilon_{i,t}$ iid error term denoting all other missing elements. Furthermore, in both models, it is assumed that all explanatory variables are independent of error terms v_{it}, $u_{i,}$ and ε_{it}. The results are presented after correcting for both heteroskedasticity and serial correlation with robust standard errors.

According to Roodman (2009) in OLS, identification flows from the assumption that the regressors are orthogonal to the errors; the inner products, or moments, of the regressors with the errors, are set to 0. Likewise, in the more general 2SLS framework, which distinguishes between regressors and instruments while allowing the two categories to overlap (variables in both categories are included as exogenous regressors) and the estimation problem is to choose coefficients on the regressors so that the moments of the errors with the instruments are 0. If instruments outnumber regressors, then equations outnumber unknowns and the system usually cannot be solved. Thus, the moment conditions cannot be expected to hold perfectly in finite samples even when they are true asymptotically. Arellano–Bond estimation starts by transforming

all regressors, usually by differencing and uses the generalized method of moments (GMM) (Hansen 1982) and is called difference GMM. The Arellano–Bover/Blundell–Bond estimator augments Arellano–Bond by making an additional assumption that first differences of instrument variables are uncorrelated with the fixed effects. This allows the introduction of more instruments and can dramatically improve efficiency. It builds a system of two equations—the original equation and the transformed one—and is known as system GMM. Efficient GMM, then, is GLS on Z-moments.

All these estimations are done in the context of panel data. We start with fixed effect regression, then we conduct instrumental variable 2SLS and then the system GMM. Further, we also do dynamic system GMM with lag 1 and AR(2). Corruption reduces stock return in each model but the system GMM is the most efficient estimation.

In a dynamic panel data model, the current realizations of the dependent variable are influenced by past ones. Fixed individual effects are arbitrarily distributed. This argues against cross-section regressions, which must essentially assume fixed effects away and in favour of a panel setup, where variation over time can be used to identify parameters. Some regressors may be endogenous. Roodman (2009) also states that the idiosyncratic disturbances (those apart from the fixed effects) may have individual-specific patterns of heteroskedasticity and serial correlation. The idiosyncratic disturbances are uncorrelated across individuals. Some regressors can be predetermined but not strictly exogenous; that is, independent of current disturbances, some regressors can be influenced by past ones.

The estimators are designed for general use, it is difficult to get good instruments outside the immediate dataset. In effect, it is assumed that the only available instruments are "internal"—based on lags of the instrumented variables. It is important to note that instruments can be invalid,

weak, or both. In this respect, Bazzi and Clemens (2013) argue that attempts to remedy this general problem remain inadequate using instruments. Their suggestions include grounding growth regressions in more generalized theoretical models, deployment of new methods for estimating sensitivity to violations of exclusion restrictions, opening the "black box" of GMM with supportive evidence of instrument strength, and utilization of weak-instrument robust tests and estimators.

Panel estimations like ordinary least squares (OLS) and fixed-effect models can render biased estimates due to the problem of endogeneity of democracy and corruption.[4] Most advanced dynamic panel System GMM estimators are employed to address the problem of endogeneity. Dynamic panel estimators address the endogeneity issues by not having to find strictly exogenous instruments and have gained increased popularity in recent years. As Roodman (2009) stresses, the Arellano-Bond (1991) and Arellano-Bover (1995)/Blundell-Bond (1998) dynamic panel estimators are particularly suited for small "T" (fewer time-periods) and large "N" (many individual or country) panels. These panel data models are suitable in cases of linear functional relationship including country fixed-effects with a single dynamic dependent variable and independent variables that are not strictly exogenous.

The instrument validity is tested by using Hansen's J statistic of over-identifying restrictions. We check that deeper lags of the instrumented variables are not correlated to the deeper lags of the disturbances.

4.2.1 Extreme Bound Analysis (EBA)

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[4] Democracy and corruption are endogenously determined in the sense that they are both correlated with exogenous shocks that affect the rate of economic growth which in turn can affect the stock market.

Under the traditional econometric approach, an investigator relies on correct sign of coefficients, the significance of t-values and high R-square to determine the accuracy of the model specification with no role for prior beliefs as an initial point for such specification. Only selective results that fulfil the above criteria are reported in practice. EBA explicitly incorporates prior information and has a systematic approach to test fragility of coefficients being reported (Leamer (1983) and Leamer and Leonard (1983) and Granger and Uhlig (1990) as noted in the EBA algorithm in the foot-note below.[5]

While the regression analysis provides points or interval estimations of coefficients for each of these explanatory variables, the EBA provides the minimum and maximum effects of a variable on SR by lower and upper-bounds of alternations coefficients of the free variables (in this case corruption) due to inclusion or exclusion of each of the doubtful variables in the model. Thus, the EBA helps to reach to a correct specification of a regression model. This sensitivity analysis indicates us to which one of the doubtful variables (GS, IC, EC, MP, RT, ET, IP, LO, DQ) should be included (or excluded) in the regression.

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[5] In brief, the algorithm for the extreme bound is as proposed by Granger and Uhlig (1990) is as follows:

Let $y = X\beta + \varepsilon$ and focus coefficient $\beta_0 = \psi'\beta$ with linear constraints $C\beta = c$ and $M(C\beta-c) = 0$. Start with a GLS estimator of the full model of β as $b = (X'\Omega^{-1}X)^{-1}(X'\Omega^{-1}X)$ then estimate of β_0, $b_0 = \psi'b$ with the covariance matrix of b as $D = \sigma^2(X'\Omega^{-1}X)^{-1}$ and its decomposition $A = CDC'$ with $A^{-\frac{1}{2}}=A^{-1}$ for given M define $W=A^{\frac{1}{2}}M'$. Define two important vectors $u = A^{-\frac{1}{2}}CD\psi$ and $v = A^{-\frac{1}{2}}$ $(Cb-c)$ and with Euclidian norm $\|u\| = (u'u)^{\frac{1}{2}}$ for $\theta \in [0,(2/\pi)]$ and $cos2\theta = cos(u,v) \equiv \frac{(u'u)}{\|u\|\|v\|}$. $cos2\theta = cos(u,v) = 0$ if $u = 0$ or $v = 0$. The GLSE of $\hat{\beta}$ of β_0 under restriction $M(C\beta - c) = 0$ is $\beta_0 = b_0 - u'W(W'W)^{-1}W'v$. The extreme values of $\hat{\beta}_0$ over all choices of M (full row rank) are $b_0 - cos^2\theta\|u\|\|v\| < \beta < b_0 + sin^2\theta\|u\|\|v\|$ or $b_0 - \emptyset_L\|u\|\|v\| < \beta < b_0 + \emptyset_U\|u\|\|v\|$

4.3 Data

The dependent variable used in this study is returns on stock indices (SR). It is a continuous variable taken from the DATASTREAM. The main free (focus) variable corruption may be defined here as a threat to foreign and domestic investment for several reasons, following the literature: it can distort the economic and financial environment; it can reduce the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability; and, last but not least, introduces an inherent instability into the political process. The most common form of corruption met directly by business is financial corruption in the form of demands for special payments and bribes connected with import and export licenses, exchange controls, tax assessments, police protection, or loans. Such corruption can make it difficult to conduct business effectively, and in some cases may force the withdrawal or withholding of an investment that can have a significant negative effect in the stock market. For our study, it has been rescaled and now ranges from 1 to 6 indicating the least to the most corrupt country. Democratic accountability is a measure of how responsive government is to its people, on the basis that the less responsive it is, the more likely it is that the government will fall, peacefully in a democratic society, but possibly violently in a non-democratic one. Bureaucratic quality shows the institutional strength and quality of the bureaucracy that tends to minimize revisions of a policies when governments change. A stronger bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services. Countries that lack the cushioning effect of a strong bureaucracy tends to be traumatic in terms of policy formulation and day-to-day administrative functions during a change in government. The Law and order variable assesses the strength and impartiality of the legal system and assessment

of popular observance of the law. All these institutional variables have 1 to m categories with m being the best and 1 being the worst measure. The institutional variables including corruption are obtained from Political Risk Services, International Country Risk Guide. The data on all model variables are in monthly frequency for the period 1995 to 2014. The study also considers the systemic risk factors (return on Global indices (GM) and return on emerging market indices (EM) that affect the stock markets along with the non-systematic risks (including free and doubtful variables). In other words, GM or EM can be interpreted as co-movements of returns of indices. The economic control denoted by the exchange rate (LEX) is obtained from DATASTREAM. YP and gYP are levels and growth rates of per capita income obtained from World Bank Development Indicators in the UK Data services. The variables, their descriptive statistics and the correlation matrix are presented precisely in Table A2, A3 and A4, respectively.

5. Empirical results

We start our analysis looking at the scatter plot of the relationships between corruption and three institutional variables which are displayed in Figure 4. The relationships show an interesting story that corruption is not related to all three institutional variables uniformly. The corruption relationship between democratic accountability and bureaucratic quality is positive but the opposite relationship is evident with law and order which supports our argument to carry out an analysis at a heterogeneous institution.

[FIGURE 4 ABOUT HERE]

To analyze the relationships and their impact on stock returns more rigorously our empirical analysis based on fixed effect and dynamic panel data estimations presented in Table 1, 2, 3 and 4 reveals several interesting results. Consider the coefficients of models 1-5 in Table 1. In summary, corruption has a negative and significant effect on return on stocks of BRIC countries as it not only raises the cost of production but also creates uncertainty and risk on the demand side. These factors squeeze profits of firms and therefore lower return on stocks. Moreover, they create erosion of trust for investors, which is detrimental as BRICs are key destinations for FDI among other investment activity. On the other hand, strong institutions such as good standards of law and order and bureaucratic quality contribute positively to SR. In other words, good bureaucratic practice and enforcement of law and order enhance stock market returns by increasing transparency and lowering uncertainty. We also observe the complementary and competitive nature of risks from emerging and global markets on SR of BRIC economies. When returns fall in global markets due to economic downturns or other sentiments, investors turn to the BRICs. BRICs' SR are positively linked to stock indices of emerging economies showing complementary relation between emerging and BRIC economies. Interaction of corruption with institutions seems very complex providing mixed empirical evidence for "greasing the wheel" or the "sand in the wheel" hypotheses. Interaction of law and order with corruption shows negative effect on stock returns; it can be due to distortions in the rule of law at the ground implementation level including police, judiciary or government officials in the presence of corruption. Such malpractice raises the cost of production and brings inefficiency, causing lower returns. In contrast, the interaction of corruption with bureaucratic quality, however, generates positive returns as this may reduce the red tape and increases bureaucratic efficiency.

The first model in Table 1 analyses the impact of corruption and other institutional variables on the stock return for the BRIC countries using panel two-way fixed-effect model for the period 1995-2014 with monthly frequency. Our first estimates of the coefficients take corruption, democratic accountability, bureaucratic quality and law and order as the free (focused) variables shown in model 1, Table 1. The individual coefficient of corruption is negative and significant at the 5% level in Table 1 (column 1). In other words, the results suggest that corruption is bad news for the stock markets in BRIC countries. The result is consistent with the sand-in the-wheel literature of corruption (such as Mauro,1995; Fisman and Svensson 2007; Nguyen and Van Djik, 2012). It reveals that BRIC countries show on an average 3% reduction in SR due to a one-point increase in corruption, however, the effect is moderate.

On the other hand, the coefficients of the institutional variables (DA, LO and BQ) are positive, indicating that greater democracy, stronger bureaucracy and law and order enhance the returns from stocks in BRIC countries (column 1). This agrees, broadly, with the findings of Yartey, (2008) who investigates these variables in a study on stock market development. Among three institutional variables, BQ shows the most effective impact both in terms of magnitude and significance level, indicating that strong bureaucratic quality provides confidence to the investors that leads to lower risk and increase returns, the results are consistent with Dima et al., (2018). All the doubtful (control) variables, with some exceptions, show the expected signs with varying degrees of significance. Importantly, global and emerging market returns show negative and positive effects on SR of the BRIC countries, respectively. The estimation result shows some significant co-movements between BRIC returns and global and emerging market indices. Emerging market stock indices positively impact BRIC returns: however, global indices have a

negative relationship suggesting BRIC markets offer diversification opportunities for global investors in line with the literature (Mullin, 1993; Raj and Dhal, 2008; Meziani, 2018).

The next step examines the impact of corruption on changes in the SR in the presence of democracy using interaction effects to investigate if greater democratic accountability lowers the negative effect of corruption on SR. The positive and significant interaction coefficient suggests that corruption has a positive and inducing effect on the stock market as the country becomes more democratic (model 2) by transferring bad corruption to a good one (i.e., greasing the wheel effect of corruption). Following equation (2a), the impact of corruption on SR should be measured as 0.0113+0.00221*DA. In effect, the interaction effect at mean value of DA is 0.0113+0.00221*3.64 = 0.0.0193. The negative impact of corruption becomes smaller as democracy in a country is matured within a sample. Because democratic accountability ranges from 1 to 6, the effect of corruption is negative mostly (i.e. over 60%) within a sample. However, the positive and significant interaction effect above the mean value of DA (i.e. 3.64) does suggest that corruption has a growth-inducing effect on the stock market as the country becomes more democratic (model 2) by transferring bad corruption to a good one (i.e., greasing the wheel effect of corruption).

Likewise, the interaction effect of CORR and BA is positive and significant (model 4) suggesting that sound bureaucracy can be beneficial for investment and in turn increases SR by lowering the risk and uncertainty. In contrast, the interaction effect of CORR and LO is negative as shown by its coefficient of -0.0023 (model 3, Table 1) and significant at the 10% level revealing that a high level of corruption can distort a burdensome law and order of a country and in essence increases the cost of business by weakening the property rights and lowers SR. We offer some plausible explanations: one reason is that corrupt officials use law and order to extract bribes or slow down corporate processes-for example do not promptly issue clearance or tax certificates or

permission to start factories or enter new markets. Another channel for this interaction could be the use of discretion on a selective basis to exercise the law where bribes are high. Crony capitalism could be of assistance in by-passing the law in queues which exist, ironically, because of the prevalence of a law. Given the relatively low income received by police officials, corrupt police might demand handouts on the movement of goods and services between borders and states. Another reason could be that zealous and narrow adherence might encourage a corrupt judiciary to prolong lengthy litigation in the hope of out of court settlements. In other words, both the rule book as well as adherence to it may become a trap for the private investment sector in the presence of corruption. This corrupt officialdom which is well known to exist quite openly and discussed in the literature review would explain the negative effects of the interaction variable. Overall, the results suggest that not all institutional factors work in the same way in the presence of high perceived corruption in a country. Mostly, democracy and bureaucracy can manage to overturn the mal-effects of corruption and make it positive by greasing the wheel and easing of doing businesses, however, law and order in BRIC countries does show some weak effect on stock markets. The results are consistent throughout in model 5, after using 2SLS that the individual effect of corruption on SR is negative but when interacting with institutional variables shows some mixed results. Corruption greases the wheel of democratic accountability and bureaucratic quality but the nature of law and order in BRIC countries supports the sand in wheel hypothesis of corruption.

Here we only report fixed effect estimates based as Hausman tests as differences in the variance of estimates between fixed and random effects were not significant indicating the validity of fixed-effect model.

5.1 Impacts of corruption and quality of institutions on SR in dynamic panel data models

Do the above relations stand on a dynamic analysis? We estimate Arellano-Bond dynamic panel data models for this purpose in Tables 2 and 3. Institutional factors are even more prominent in these dynamic panel scenarios. Law and order and bureaucratic quality are very significant as in the fixed-effect model. The competitiveness and complementary nature of relations between indices of advanced and emerging stock indices are true also in the dynamic models. Bureaucratic quality retains the same sign and remains significant. While there seems persistency in the SR as shown by the significant coefficient on lagged of SR term; there is no evidence of significant effect of per capita income or its growth rates in SR in BRIC countries implying stock markets full of brokers and speculators, who focus more on future expectations, to be somewhat separated from rest of the economy. Surprisingly, the interaction of corruption with democratic accountability has become insignificant in the dynamic model. One explanation may be due to time taken for the correction of corruptive malpractices affecting economic outcomes, including returns on stocks in the dynamic panel estimation.

We explore the dynamic panel data estimation in line of Arralano-Bover and Blundell-Bond estimation using STATA to test the robustness of the impact of corruption and quality of institutions on SR resolving the endogeneity between errors and explanatory variables using lagged term of the dependent variable as instruments. Results of Arralano-Bover linear dynamic panel data estimations are in Table 2, Arralano-Bover-Bond in Table 3 and Arralano-Blundell-

Bond GMM estimates are in Table 4. The results are very similar to the panel fixed effect results showing that an increase in corruption reduces SR significantly, but the magnitude of the coefficient is low. Also, the individual impacts of DA, BQ and LO are positive and significant, and mostly BQ and LO enhance stock markets in line with a previous study on BRIC foreign direct investment (Jadhav and Katti, 2013).

Like panel fixed effects' results, changes in emerging market and global stock indices, i.e. co-movements impact SR positively and negatively, respectively. It is noteworthy that the coefficient of lag SR is negative and significant suggesting that the mean reversion of persistence of stock return is consistent with the literature (Lehkonen and Heimonen, 2015).

Note that we did not find GDP per capita (YP) either in level or growth rate (LYP, YP, GYP) to have any significant impact on SR in BRIC countries (column 1 and 3, Table 2). A likely explanation for this is that GDP captures historical data while stock returns are capturing future investor expectations.

[TABLE 2 ABOUT HERE]

[TABLE 3 ABOUT HERE]

The negative, but moderate effects of corruption on SR, could be explained by strong growth records of BRIC economies - increasing foreign direct investment, their relatively large and unsaturated markets with cheap labour and young population as important destinations for global investment and a variety of other factors. Intrinsically, BRIC economies are key suppliers of commodities, manufacturing and services. Moreover, as developed economies have witnessed

financial crises, slow growth, monetary easing and a weak banking sector, global funds have been attracted to BRIC and other emerging economies to find alternative investment opportunities. This is evidenced by the co-movement of BRIC stock prices with global indices (Meziani, 2018).

[TABLE 4 ABOUT HERE]

5.2 Sensitivity analysis: Extreme Bounds Analysis (EBA)

As mentioned earlier, there are k-regressors determining returns to stock in an EBA analysis; some of them are free (F) variables that are always present in the regression model and others are doubtful (d) variables. Thus (k-d) free variables interact with doubtful variables.

[TABLE 5 ABOUT HERE]

EBA analyses the coefficients in free variables vary when one doubtful variable is present (absent) rather than another doubtful variable. The basic model only contains free variables. Augmentation of this occurs with the presence of other doubtful (that may or may not affect the free or focus) variables. As there are many ways of augmenting a stock return model there are so many specifications of the main model. Thus, the lower and upper bounds of β^F coefficients are constructed by the maximum and minimum values of the coefficients with the central values given by the linear combinations of these two bounds.

The results of EBA analysis in Table 5, based on 1000 samples constructed around the observed data on model variables, confirm our earlier findings from the panel data. Corruption has a negative impact on return on equities. More specifically, these returns are sensitive in the presence or absence of doubtful variables in the regression by several variables as listed in the first

column. Interestingly, co-movement factors have significant effects as in the panel data estimations. Thus, the model used seems very robust in determining the returns on stocks in BRIC countries under our investigation.

[TABLE 6 ABOUT HERE]

The impact of exclusion on the coefficient of corruption is shown in Table 6. Each row shows how the coefficient of corruption in the 3rd column is sensitive when the one doubtful variable in the first column is included along with free variable corruption in estimation excluding all other doubtful variables from the EBA estimation. This helps us to find out the marginal impact that one doubtful variable can make in the relation. The results show a negative corruption coefficient throughout. Addition of channels of each doubtful variable in the model, one by one by the EBA analysis, confirm those negative impacts of corruption on SR in BRIC countries. Further results to see the effect of each variable, each year and each country on the returns from the stocks are provided in Table A4 in the appendix. The relation we reported is robust over time as there is almost no effect of time variables as shown by coefficients on year variables in the last column.

6. Conclusions

Corruption can be compared to an unseen virus (like Coronavirus) impacting the spread in all sections of the economy. It is a deleterious culture which is pervasive, insidious and hard to change. However, it may interact with strong institutions to become a grease in desired outcomes such as smooth functioning of markets, or it may interact with prevalent institutions to act as sand

or impediments in the market mechanism. In this study, we investigate the impact of corruption and quality i.e. heterogeneity of institutions on stock returns (SR) in BRIC economies by employing panel data model and EBA analysis, using relevant free and doubtful variables constructed from various sources. Our analysis adds to the literature by using monthly data for the period 1994-2014. The results, in general, suggest that the impact of corruption on SR is negative and significant, although the effect is a moderate one. We find empirically that return on stock returns reduces by up to 3 percent in the presence of corruption in BRIC countries. Corruption weakens the economy on both supply and demand sides of the markets for goods and services. It can raise the cost of inputs and lower the price received by producers. Both effects may further reduce the profit margins of the private investment sector. In addition, it sends distorted signals to potential investors and promotes mistrust. Summing up these leads us to conclude that corruption lowers returns on investment. Results of the panel data model and EBA analysis on the same monthly data confirm this empirically in this study. Strong institutions enhance returns and weak institutions lower returns. Corruption's interaction with the quality of bureaucracy can grease the wheels through good practices but its interaction with the quality of law and order adds sand in the wheels exacerbating negative effects. Democratic accountability is not statistically significant. BRIC indices are negatively related to global indices (due to diversification opportunities) and positively related to emerging market indices as expected. Our results indicate that economic growth is not closely related to stock market returns. A likely explanation for this is that GDP growth focuses on historical data, but stock returns embody future expectations and perceptions of investors. We offer several channels to explain the results.

Corruption interacting with institutions generates both positive and negative returns, either greasing or adding sand in the wheels of stock markets. Hence policy makers should be mindful

of simply putting in place, institutions like excessive law and order regulations, without consideration of how they may be misused in corrupt cultures. Similarly, the quality of bureaucracy has the power not only to moderate but also to transform the negative effects of corruption in lubricating economic activity. Moreover, our results show that stock markets are impacted by external market indices rather than being related to economic growth. This suggests that stock markets and economic growth should not automatically be perceived to be closely related.

Returns on stocks depend on corruption channels spread in fourteen other doubtful variables such as government stability, internal conflict, external conflict, military in politics, religious tensions, ethnic tensions, political instability, socioeconomic conditions, investment profile, law and order, democratic accountability, quality of bureaucracy, levels of risks in emerging and global economies and the exchange rates. Among doubtful variables, bureaucratic quality and law and order show strong and significant impacts on returns.

This may require more elaborate dynamic intertemporal optimization-based national and global general equilibrium models for analysis, which are beyond the scope of the current study but remains a topic for further research. BRIC country leaders have been conscious of corruption and its impact on their economies. They have tried to control the channels of corruption with policy measures and taking stern action (demonetization measures and GST implementation in India in 2017, Anti-Graft Bill in China, the Clean Company Act/ Operation Car Wash in Brazil in 2014 and the National Anti-Corruption Strategy in Russia in 2010). Various senior officials associated with corrupt behavioral practices have been sentenced. While action has been taken with a host of legal measures, strong public and private sector institutions are required to stop corruption at micro-level. Findings of this study are relevant in assessing the impacts of these measures on SR.

Acknowledgement

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