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Research Paper

The Causal Interplay between Corruption and Foreign Direct Investment: Evidence from China and India

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Abstract

This paper uses cointegrated error-correction modeling to investigate the nature of Granger causality between corruption and foreign direct investment (FDI) in two rapidly emerging economic superpowers; namely, China and India. The results for China and India indicate that short-run Granger causality unidirectionally runs from FDI to corruption without feedback. These empirical findings (along with supporting theoretical arguments) dispute prior correlational-based studies which claim that corruption instigates changes in FDI. However, our results further support significant long-run causality running from corruption to FDI inflows, but only in India (not in China). This finding reinforces theoretical propositions of lower corruption arbitrariness in China as compared to India. Furthermore, short- and long-run causality between corruption and FDI in India appear dynamic in nature and time-sensitive implying some difficulties for policymakers in their fight against corruption. The paper discusses possible underlying reasons for the empirical results and draws several policy and Asian business implications.

Keywords: Corruption, FDI, Cointegration, Causality, China, India

Introduction

Given their rapid development and growth, emerging economies are commonly targeted by stakeholders for foreign direct investment (FDI). That said, few developing countries rival China and India in terms of their sheer economic capacity and impact on the global supply chain. The relative significance of these economic superpowers, particularly in the manufacturing and service sectors, has endowed both countries with strong global reputations for outsourcing capabilities, manufacturing efficiencies, and as hubs for foreign investment (Aidt et al., 2020). Typically, investors consider a country's economic performance as a major determinant in selecting the destination of foreign direct investments (Papadopoulos and Hestop, 2002). However, with the hyper growth rates witnessed in China and India in recent years, exploitation of the hierarchical system has become a progressively worsening problem. Reports from Transparency International (2022) indicate that India ranks 85th out of 180 on the global corruption barometer with the highest bribery rate in Asia and the highest proportion of citizens compelled to pay bribes to access basic services like healthcare and education.

China too struggles with high corruption, though consistently outperforming India since President Xi Jinping declared his commitment to crack down on corruption at all levels of government. Nonetheless, bribery and corruption remain rampant in China, impacting noncompetitive pricing and zoning privileges (Chen, 2004), procurement of government contracts (Aidt et al., 2020), building codes and land rights (Li and Vendryes, 2018), and even college admissions (Liu and Peng, 2015). Notably, bribery in China appears to increase with political rank, economic decision-making authority, and education (Aidt et al., 2020). Despite a few high-profile convictions and an improved domestic perception of the government's handling of the problem, the country still ranks 78th out of 180 on the global corruption barometer (Transparency International, 2022). Some research suggests that corruption cases in China are well-publicized events, whereby the officials themselves are the ones put on trial, never the system (Biswas and Hartley, 2015). As such, corruption remains a glaring problem and a source of major concern for policymakers as well as the general public in both countries.

FDI inflows contribute to the overall economic performance in both countries by injecting foreign capital into domestic markets, increasing competitiveness, enhancing liquidity, and improving adherence to international standards of corporate conduct (Wei and Shleifer, 2000). As a result, policymakers in both countries have been actively involved in endowing their countries with a positive public image to attract FDI inflows. For instance, recent research suggests that China is actively branding itself to become an international football superpower by 2050 through an aggressive recruitment strategy of elite players from around the world in hopes of signaling investment legitimacy and global sports influence (Li and Feng, 2022). Similarly, the "Make in India" campaign is projected to raise the share of manufacturing in the Indian economy to around 25% and creating 100 million new jobs by 2030 (Steenkamp, 2021). Recent research reveals that China and India have transitioned into regional economic drivers over the past two decades, in large part, as a result of their growing emphasis on nation branding as low-cost manufacturing and investment hubs (Hao et al., 2021). These branding campaigns emphasize the growing sentiment among Chinese and Indian policymakers that rising FDI inflows are critical to

stimulating market efficiencies and future growth.

The causal nexus between corruption and FDI is highly relevant to all emerging economies and particularly in China and India. Coupled with unprecedented growth in a globalized marketplace, both countries have been successful in positioning themselves as lucrative investment and manufacturing destinations (Hau et al., 2021). However, corruption in both countries remains rampant and may be viewed as an impediment to growth by investors. Evidence suggests that high levels of corruption are a strong deterrent against foreign direct investments, particularly in emerging economies where potential risks of failure are high (Paul and Jadhav, 2019). Corruption is also cited as a discouraging factor for natural resource and sustainability investments (Cruz et al., 2023). Interestingly, the study argues that corrupt officials are more likely to disregard laws to attract FDI during economic downturns and crises than at times of prosperity. Similarly, the extent of systematic reforms and government crackdowns on corruption may be a strong determinant of FDI in emerging countries (Paul and Jadhav, 2019). Researchers attribute the conventional wisdom of an inverse relationship between corruption and FDI to investor perceptions that corruption distorts the allocation of resources and would lead to eventual price increases (Krifa-Schneider et al., 2022). On the other hand, some research suggests that corruption may actually facilitate, or 'grease the wheels' of FDI in emerging markets (Onody et al., 2022). Therefore, a deeper examination of the causal relationships between FDI and corruption in China and India is warranted and long overdue.

Over the past thirty years or so, there has been a plethora of research on the possible connections between corruption and FDI inflows in different countries. Most empirical studies to date conclude that corruption significantly determines FDI inflows (see, for example, Wei, 2000a, 2000b; Habib and Zurawicki, 2002; Voyer and Beamish, 2004; Méon and Sekkat, 2005; Cuervo-Cazurra, 2006; Egger and Winner, 2006; Al-Sadig, 2009; Bellos and Subasat, 2011; Barassi and Zhou, 2012; Subasat and Bellos, 2013; Quazi et al., 2014; Blundell-Wignall and Roulet, 2017; Hasan et al., 2018; and Alshehry, 2020, to name just a few). These studies implicitly presume that corruption induces changes in FDI inflows, and not vice versa. Yet, as discussed in the next section, it is also theoretically plausible that FDI inflows can also prompt changes in corruption, with fundamentally different policy implications. Moreover, the possibility of FDI inflows triggering changes in corruption implies that corruption too should be treated as an endogenous (not exogenous) variable. Such endogeneity possibility in prior studies would easily result in biased and inconsistent parameter estimates with misleading results. We argue that mere correlations between corruption and FDI inflows have no bearing on the nature of causality between the two variables.

This paper explores the causal relationship between corruption and FDI inflows in China and India. Our empirical results are derived from cointegrated error-correction models. The remainder of the paper proceeds as follows. The next section outlines the study's theoretical background and proposes its main hypotheses. Subsequent sections present the methodology used and examine the empirical results. Finally, the paper concludes with discussion and practical implications for Asian business.

Theoretical Background and Hypotheses Development

This paper builds upon the OLI paradigm which postulates that decisions on FDI are predicated on three perceived advantages; namely Ownership (O), Location (L), and Internationalization (I) (see Dunning, 1988; and Habib and Zurawicki, 2002). Under this framework, ownership reflects asset power, or the perceived ability to control relational and transactional risks in inter-firm relationships. Internationalization refers to the perceived costs of inter-firm coordination and integration of core competencies between stakeholders. Most relevant to this study is location which is concerned with market attractiveness in terms of the level of resource commitment required as well as the availability and cost volatility of resources over time. Location selection depends on the volatility of markets, resources, efficiency, and on the strategic assets of potential host countries. Although the OLI framework does not explicitly incorporate corruption as a variable of influence in the location component, we concur with prior research (e.g., Habib and Zurawicki, 2002) that corruption plays an integral role in the volatility of these criteria, in particular with regard to the riskiness of a firm's resource commitments. Research suggests that firms evaluate market entry options based on the highest risk-adjusted return on investment (Agarwal and Ramaswami, 1992) and as such, FDI assessments should be predicated on a robust assessment that incorporates all potential risk factors. We contend that given the pervasiveness and impact of corruption on resource commitments, it is a worthy inclusion in assessing the locational appeal of potential FDI host countries.

Corruption, i.e., the exploitation of public office for private gain, is prevalent in countries where the authoritative apparatus holds excessive discretionary control and dictates legislative processes without transparency (Tanzi and Davoodi, 1998). Notwithstanding the economic successes in most emerging economies, many of them still struggle with rampant corruption and its vicious effects. In 2020 alone, the Foreign Corrupt Practices Act (FCPA), i.e., the anti-corruption arm of the US Department of Justice, collected a record breaking $2.78 billion in corporate fines and penalties. Aside from the enduring cost of these penalties on corporations, corruption drains between 2 to 5 percent of global gross domestic product annually (International Monetary Fund, 2020). Complicating matters, misappropriations and governmental misconduct tend to be systemic and occur within a deliberately negligent regulatory apparatus. Research suggests that corruption is often normalized in the public psyche as 'the way to get things done', particularly in countries like China and India where the phenomenon is fervently engrained within the culture (Guo et al., 2018).

This paper focuses on corruption of government officials who abuse their rank and/or authoritative positions to achieve private gains. The predominant stance with regard to corruption asserts that it is unjustified on moral grounds and is an impediment to free markets and competition (Cuervo-Cazurra, 2006). Some research demonstrates that corruption creates uncertainty in operational costs and distorts investment projections and incentives (Wei, 2000a; and Habib and Zurawicki, 2002). Moreover, the exploitative nature of corruption may misallocate resources to industries that are more conducive to bribery and extortion (Mauro, 1998).

Yet, an alternative viewpoint holds that corruption may also play a productive role in the facilitation of commerce, speeding up bureaucratic procedures, and "greasing the wheel" of FDI inflows in countries with excessive regulations (Huntington, 1968).

For instance, firms that place a high value on time may view corruption (i.e., bribes) as a way to enhance resource allocation and stimulate the emergence of free markets in countries with limited freedom and non-privatized industries (Lui, 1985; and Cuervo-Cazurra, 2006). Without the consent of public officials, foreign firms would be at a competitive disadvantage and at the mercy of local companies operating in monopolistic settings. In fact, some research even suggests a positive effect of corruption on FDI inflows in the case of multinationals operating in developing countries (Henisz, 2000).

A historical assessment of corruption and FDI inflows in China and India reinforces the contention that these variables are highly correlated over time. Specifically, in China over the period of 1995-2021, the correlation coefficient is significant at 0.71 (t= 5.18) between corruption and FDI inflows. The correlation coefficient between corruption and FDI inflows in the case of India is even larger and highly significant, scoring 0.91 (t=11.24). Similar assessments can also be found in Ravi (2015) and Hasan et al. (2018). Strong correlations simply mean that corruption and FDI inflows are highly linked, but do not imply any information on the nature of causality between them. Therefore, we propose testing the following four alternative causal hypotheses:

H1 Corruption unidirectionally causes changes in FDI inflows.

Such a presumption implicitly underlies most prior studies. One main reason backing this hypothesis is that bribe payments made to corrupt officials represent a major cost item for foreign investors.

However, the chain of causation could also run in the opposite direction from FDI inflows to corruption. For example, FDI inflows could encourage public officials in host countries to exploit their authoritative positions since even small bribe payments from large foreign investors would translate into lucrative payoffs (Shleifer and Vishny, 1993; and Tanzi and Davoodi, 1998). With high international capital mobility, foreign investors could also oblige host countries to keep corruption under control, especially since many countries, including those of the Organisation for Economic Co-operation and Development (OECD), have criminalized bribe payments to foreign officials (Larraín and Tavares, 2004). In addition, since foreign investments are usually considered vital to host countries, foreign values of integrity may positively impact the moral values of local officials (Elliott, 1997).

Christensen et al., (2019) contend that dismal economic climates in host countries, as evidenced by feeble FDI inflows, may result in fewer economic opportunities. With a lack of prospects, public officials may leverage their positions to further capitalize on business opportunities (e.g., bribery, extortion, subornation). As such, lower FDI inflows may induce a higher likelihood of corruption and vice versa. Pinto and Zhu (2016) propose that FDI inflows impact the intensity of corruption in the domestic market. In other words, rising FDI inflows could increase market concentration, resulting in more competitive rates that public officials are likely to charge businesses to capitalize on market opportunities.

Based on the above theoretical arguments, we test the following hypothesis:

H2 FDI inflows unidirectionally cause changes in corruption.

The above two possibilities lead to testing two equally plausible hypotheses:

H3 Causality is bidirectional, i.e., corruption causes changes in FDI inflows, and FDI inflows feedback and causes changes in corruption.

H4 Both H1 and H2 are rejected, i.e., corruption and FDI inflows are causally independent.

Methodology

This paper explores the direction(s) of Granger causality between corruption and FDI inflows in China and India using cointegrated error-correction modeling. The Granger definition of causality states that a stationary time series (x) is said to Granger-cause another time series (y) if the prediction error from regressing (y) on (x) significantly declines by using past values of (x) in addition to past values of (y). Granger causality tests require variables free from unit roots whose mean, variance, and autocovariance are time-invariant. Stock and Watson (1989) and Harris (1995), among others, argue that if one or more variables in the testing model possess unit roots, then estimated regressions would become spurious, having inflated R-squares and biased test statistics including t and F ratios. Thus, it is critical to begin by testing for unit roots in the variables to avoid spurious regressions.

Granger (1986) argues that unit root(s) in a given variable can be removed if differenced appropriately. To find the proper degree of differencing (order of integration), we employ two popular unit root tests; namely the Augmented Dickey-Fuller (ADF) test, and the non-parametric Phillip-Perron (PP) test. In their extensive simulation study, Arltová and Fedorová (2016) concluded that, among several unit root tests, the ADF and the PP tests represent the most powerful unit root tests. The null hypothesis under both of these tests is that the variable under testing contains a unit root. The objective of both tests is to determine the proper order of differencing for each variable needed to delete unit roots. The results from unit root tests have direct implications for the presence (or lack thereof) of cointegration among the variable in the model as will be discussed below.

While absence of unit roots in the variables are desirable, this may filter out low-frequency (long-run) information if the variables in the model are cointegrated. A variable with a unit root tends to wander extensively over time, but a pair of unit roots variables may move together through a particular linear combination. In that case, the two variables are said to be cointegrated, implying they have long run (equilibrium) relationship. As Granger (2004) argues, models estimated with variables that are free from unit roots, but ignore the underlying cointegration, are misspecified due to an omitted variable bias that may distort the model inferences. Furthermore, Granger (1986) demonstrates that cointegration and causality are closely related concepts. In particular, when two or more variables are cointegrated, then there should be Granger causality flowing between them in at least one direction. In this paper, possible cointegration is tested among the variables using Johansen's (1988, 1991) efficient test that is based on trace and maximum eigenvalue statistics. Gonzalo (1994) and Enders (2015) report evidence in support of the Johansen approach.

The null hypothesis in the Johansen testing approach is no cointegration, against the alternative of cointegration. If the variables are found to be cointegrated, Granger (1986) argues that testing for causality requires the estimation of an error-correction model (ECM). In our case, the three variables free from unit roots should enter the model, but with the addition of an error-correction (EC) term as another regressor that is derived from the cointegrating relationship. The EC term represents low-frequency information from the long-run (equilibrating) process. In the context of ECMs, the statistical significance of the lagged coefficients of an independent variable indicates the presence of short-run (standard) Granger causality, while the statistical significance of the lagged coefficient on the EC term reflects long-run Granger causality.

It should be noted that bivariate models (containing only corruption and FDI inflows) may suffer from an omitted-variable bias, since any causal relationship found between these two variables may be the result of another variable driving movements in corruption and/or FDI inflows. To alleviate this concern, our bivariate models were broadened by adding the unemployment rate as a control variable on the premise that the unemployment rate (reflecting the state of the economy) would significantly impact both macro variables. The use of unemployment rate as a control variable in our analysis has also been used by several authors in different contexts including Ecker et al. (2016), Vianna (2016), Sapkota and Bastola (2017), and Shen et al. (2020).

Our paper uses trivariate models to explore Granger causality between corruption and FDI inflows in China and India. Although the resultant trivariate model is superior to a bivariate one, it remains possible that variables other than unemployment may also impact the relationship between corruption and FDI inflows. To address this legitimate concern, we subjected our results from the trivariate Granger causality models to Ramsey's RESET (Regression Equation Specification Error) test which investigates if unknown variables have been incorrectly omitted from our estimated trivariate models (Ramsey, 1969; Kennedy, 2008).

To reiterate, this paper attempts to overcome several challenges faced by prior research. Specifically, the empirical analysis focuses on the nature of causality (not correlations) between corruption and FDI inflows in China and India. There have been recent calls to question conventional wisdom and related assumptions made on the basis of correlational research as these findings are not a tenable reflection of reality (Luca, 2021). As such, the present study employs a trivariate model (corruption, FDI inflows and the unemployment rate) to mitigate the omitted-variable bias and test short- and long-run Granger causality relations between corruption and FDI inflows in China and India. The absence of unit roots in time series assessments is also ensured to avoid spurious regressions where causality inferences are drawn from multivariate models that include the underlying cointegration (long-run) relationships among the variables.

Empirical Results

The preceding methodology of unit roots-cointegrating-causality utilizes annual time series data over 1995-2021 for China and India. Corruption is captured by the Corruption Perceptions Index (CPI) which is published annually by Berlin-based

Transparency International and ranks countries "by their perceived levels of public sector corruption, as determined by expert assessments and opinion surveys." Created in 1995, the CPI index is the most widely used indicator of corruption worldwide. It is a composite index formed by the allocation of 13 surveys that measure different dimensions of corruption. The CPI index ranges from 0 (highly corrupt) to 100 (very clean). The CPI index gauges the degree of misuse of public office for personal gain and includes acts such as bribery, illegal kickbacks, and embezzlement. Data on foreign direct investment (FDI) inflows and unemployment rate (U) are sourced from the World Bank's Statistics Database. We begin the empirical analysis by investigating non-stationarity in the data.

Unit Root Tests Results

Results from the ADF and PP tests for each variable are displayed in Table 1 for China and India. Due to the sensitivity of the unit root tests to the lag lengths, we select the proper lags in the ADF, and PP tests based on the Akaike Information Criterion (AIC). Ahking and Miller (1985), among others, argue that the use of a common lag for all variables in any given test is overly restrictive and theoretically baseless.

As noted earlier, the presence of unit roots in the variables is a crucial problem in error-correction modeling. There are two possible outcomes that may emerge from the unit root tests. The first possibility is that all variables in the model are free from unit roots and thus they are of the same order which opens the possibility that these variables may be cointegrated. In that case, a Johansen cointegration test is required to assess whether cointegration does in fact exist among these variables. The second possibility is that the variables are of different orders implying that these variables cannot be cointegrated [for a lucid discussion, see Harris (1995)].

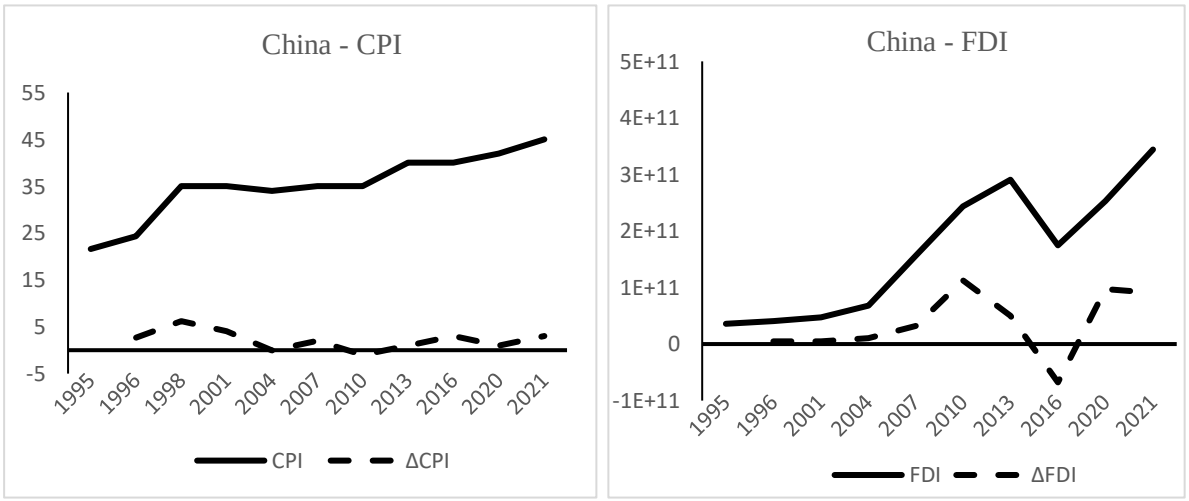
Table 1 displays the unit roots test results. In the case of China, results indicate that corruption is free from unit roots in levels, I(0), but the other two variables (FDI inflows and unemployment) have no unit roots in first differences, I(1). Plots of the two main variables (corruption and FDI inflows) in levels and in first-differences over the estimation period of 1995-2021 are shown in Figure 1. As is clear from these plots, the variances of corruption in levels are free from unit roots since they are not inflating with time (having finite variances). Thus, the levels of corruption in China can be considered free from unit roots without the need to revert to first-differences. In contrast, the variance of the levels of FDI inflows is increasing with time, without any tendency for the series to revert to any mean value. However, the first-differences of FDI inflows (and unemployment) are free from unit roots since they fluctuate around a constant range and appear to have a fixed variance. As to India, the plots indicate that both corruption and FDI inflows have unit roots in levels, but they are free of unit roots in first-differences.

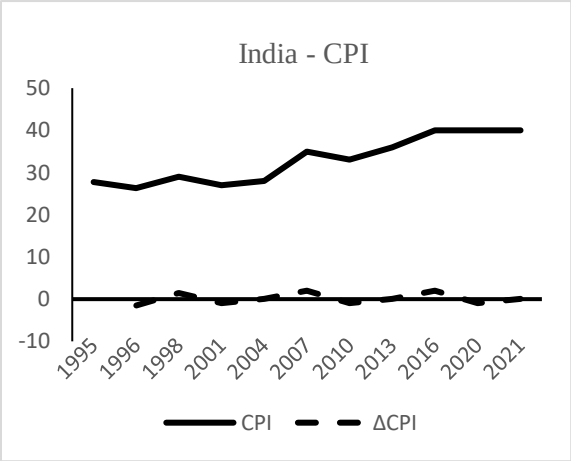
Table 1: Unit Root Tests Results

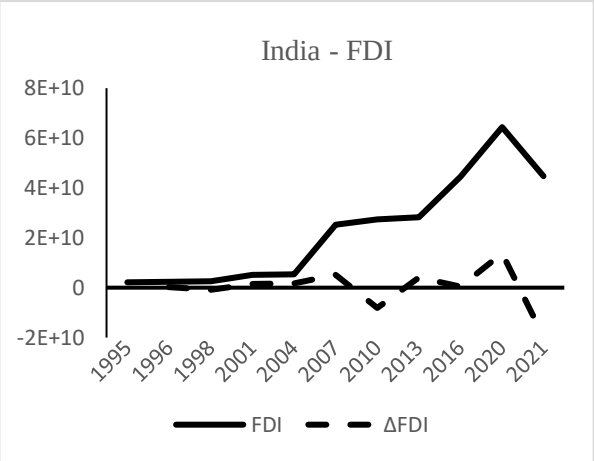
Country	ADF	PP
China		
Variables in levels		
Corruption Perceptions Index (CPI)	-5.114**	-5.510**
Foreign Direct Investment (FDI)	-0.897	-0.531
Unemployment Rate (U)	-1.881	-1.875
Variables in first differences (Δ)		
Δ CPI	---------	---------
Δ FDI	-5.166**	-5.184**
Δ U	-3.809*	-5.252*
India		
Variables in levels		
Corruption Perceptions Index (CPI)	-0.571	-0.571
Foreign Direct Investment (FDI)	-1.109	-1.009
Unemployment Rate (U)	-3.858	-3.868
Variables in first differences (Δ)		
Δ CPI	-5.232**	-5.232**
Δ FDI	-5.178**	-5.149**
Δ U	-7.245**	-7.129**

Notes: ADF is the Augmented Dickey-Fuller test, and PP is the Phillips-Perron test. The optimal lags in the tests are determined by the Akaike Information Criterion (AIC). * and ** indicate rejection of the null hypothesis of unit roots at the 10% and 5% levels of significance, respectively.

Figure 1: Plots of Stationarity and Non-stationarity Time Series







Since corruption is integrated in a different order than both FDI inflows and unemployment in China, then theoretically corruption cannot be cointegrated with the other two variables in the model. Hence, corruption in China lacks a long-run relationship with FDI inflows and unemployment. To avoid spurious regressions, corruption should enter the Granger causality models in levels, while FDI and unemployment should enter these models in first differences.

In contrast, the unit root test results for India (also presented in Table 1) suggest that all three variables have unit roots in levels, but become free from unit roots in first differences, i.e., all variables are integrated of order one, I (1). Therefore, all variables in India models should enter the causality tests in first differences, and the Johansen test should then be used to check if corruption is cointegrated with the other two variables in the models.

Cointegration Tests Results for India

We begin by performing the Johansen cointegration test on the bivariate system containing only corruption and FDI inflows (i.e., excluding the unemployment rate). The purpose is to investigate whether cointegration test results are sensitive to using bivariate (as opposed to trivariate) models. The literature has well documented both theoretically and empirically that non-cointegration found in a low dimensional sub-process could be misleading because of omitting one or more relevant variables [see Miller (1991)].

Table 2 displays the cointegration results for India. As seen in Part (A), the bivariate model results of both the trace and the max-eigenvalue statistics of the Johansen test suggest the absence of cointegration between corruption and FDI inflows at the conventional levels of significance. However, this conclusion is overturned (see Table 2, Part B) when the models are properly expanded to include the unemployment rate as a control variable. Thus, corruption and FDI inflows would be moving together over the long-run (i.e., cointegrated) but only if accompanied by a variable representing the state of the economy (the unemployment rate). This is yet another reason for the importance of adding unemployment as a control variable in our trivariate model.

Consequently, in the context of trivariate models, the Johansen test strongly supports

the presence of significant equilibrium (long-run) relationships binding together corruption, FDI inflows, and unemployment. FDI inflows and corruption are therefore moving together over the long-run, but only if accompanied by a variable representing the state of the economy (the unemployment rate). This finding highlights the sensitivity of the cointegration tests to the omitted-variable bias and underscores the importance of introducing relevant control variables to avoid incorrect cointegration inferences.

Table 2: The Johansen Cointegration Test Results for India

Hypothesized Number of Significant Cointegrating Vectors (r)	Trace Statistics	Max-Eigenvalue Statistics
Part A: Bivariate Vector		
CPI, FDI		
r=0, and r=1	7.77	7.26
r≤1, and r=2	0.50	0.50
Part B: Trivariate Vector		
CPI, FDI, UNE		
r=0, and r=1	41.19**	35.35**
r≤1, and r=2	5.83	5.43
r≤2, and r=3	0.40	0.39

Notes: See Table 1 notes for variable definitions. The bivariate models have no significant cointegration vectors. In the case of the trivariate models, both statistics of the cointegration test indicate the presence of one significant cointegrating vector(s) at the 5% (**) level of significance.

According to Granger's (1986) representation theorem, such potent cointegrating relations in the trivariate models for India imply the presence of Granger causality in at least one direction between corruption and FDI inflows. We turn next to testing Granger causality in both countries.

Short- and Long-run Granger Causality Tests Results

The following section investigates the main issue of this study; namely, the directions of Granger causality between corruption and FDI inflows in China and India. In the case of China, where corruption is not cointegrated with FDI inflows, this can be accomplished through estimating the following two short-run Granger causality models:

$$DFI_t = \Omega_0 + \sum_{i=1}^{h1} \Omega_{1i} DFI_{t-i} + \sum_{i=1}^{h2} \Omega_{2i}\, CPI_{t-i} + \sum_{i=1}^{h3} \Omega_{3i} DU_{t-i} + \upsilon_t \qquad (1)$$

$$CPI_t = \delta_0 + \sum_{i=1}^{g1} \delta_{1i}\, CPI_{t-i} + \sum_{i=1}^{g2} \delta_{2i} DFI_{t-i} + \sum_{i=1}^{g3} \delta_{3i} DU_{t-i} + \kappa_t \qquad (2)$$

where the variables are defined as before; "D" denotes the first differences of the variables (except for CPI which enters the model in levels) as dictated by the unit roots tests.

As for India, the directions of Granger causality were tested both in the short- and the long-run by estimating the following two error-correction models (ECMs):

$$DFI_t = \lambda_0 + \sum_{i=1}^{p1} \lambda_{1i} DFI_{t-i} + \sum_{i=1}^{p2} \lambda_{2i} DCPI_{t-i} + \sum_{i=1}^{p3} \lambda_{3i} DU_{t-i} + \lambda_4 EC_{t-1} + \eta_t \quad (3)$$

$$DCPI_t = \varphi_0 + \sum_{i=1}^{r1} \varphi_{1i} DCPI_{t-i} + \sum_{i=1}^{r2} \varphi_{2i} DFI_{t-i} + \sum_{i=1}^{r3} \varphi_{3i} DU_{t-i} + \varphi_4 EC_{t-1} + \phi_t \quad (4)$$

where the EC variables are the two error-correction terms based on the cointegration test results. The estimated coefficients of the EC terms (λ_4 and φ_4) reflect the speed at which the dependent variable(s) adjust in the short-run to their long-run equilibrium values after deviations have occurred. The terms υ_t , κ_t, η_t, and ϕ_t are the associated white-noise disturbance terms in the various models of the two countries; and *h*, *g*, *p*, and *r* denote the final lag lengths in these models. Long lags in multivariate models can quickly deplete scarce degrees of freedom, especially in small samples. Thus, the lag profiles in the estimated models were initiated for both countries with a maximum of four annual lags for each variable, but the final lag structures are determined using Hendry and Doornik's (2014) General-to-Specific modeling criterion that economize on the degrees of freedom by allowing only significant lags to enter the final causality models.

We conduct several diagnostic tests on the final estimated causality models in both countries to ensure reliable statistical results. In particular, the estimated error terms should not be serially correlated in time series models, and we used the Geary test to investigate this problem. Being nonparametric, the Geary test is particularly suitable for small samples and when the data may not be normally distributed. The results from Geary test suggest that all estimated models for China and India are free from significant autocorrelation. Such absence of significant autocorrelation may also imply the absence of omission of variables biases in the final causality models [see Maddala (1992) and Babatunde et al. (2014)]. Moreover, results from the Chow test (using the mid-date as breaking points) generally support the structural stability of the estimated models. In addition, results from Ramsey's RESET test support our trivariate models that include the unemployment rate along corruption and FDI inflows as RESET test results from our trivariate models do not suffer from significant omission of variables biases. The results from all these tests are available from the authors upon request.

In the case of China, equation (1) investigates H1 that short-run Granger causality runs unidirectionally from corruption to FDI inflows (significant Ω_{2i} as a group), whereas equation (2) explores H2 that short-run Granger causality rather runs in the opposite direction from FDI to corruption (significant δ_{2i} as a group). As noted earlier, failure to reject both H1 and H2 supports H3 (bidirectional short-run Granger causality); while rejecting both H1 and H2 validates H4 instead (short-run causality independence). While short-run causality hypotheses can be tested for India by the two ECMs (3) and (4), these models also examine long-run causality hypotheses in India based on the significance of the EC terms (λ_4 and φ_4) in these models.

The empirical results from the estimated models are assembled in Table 3. For China,

the short-run Granger causality results consistently support H2 that short-run causality flows unidirectionally from FDI to corruption, without feedbacks. Clearly, these results are contrary to most previous correlation-based studies which conclude for many countries that corruption prompts changes in FDI inflows. As noted earlier, such causality pattern in China (FDI unidirectionally cause corruption) sheds doubts on many prior studies due to possible endogeneity problem. There is no long-run causal relationship between corruption and FDI in China based on the results from both the ADF and PP unit root tests.

Table 3: F-Statistics of Short- and Long-run Granger Causality Tests

Null Hypotheses	Short-run	Long-run
China		
Corruption does not cause FDI inflows	0.48	----
FDI inflows do not cause corruption	4.70**	----
India		
Corruption does not cause FDI inflows	1.56	8.65**
FDI inflows do not cause corruption	7.75**	0.37

Notes: The optimal lags in the testing models are determined by Hendry and Doornik's (2014) General-to-Specific Modeling Criterion. ** indicate rejection of the null hypotheses at the 5% level of significance.

Like China, the short-run Granger causality results for India also supports H2 in that short-run Granger causality runs unidirectionally from FDI to corruption. However, the results for long-run Granger causality in India are consistent with H1 that corruption unidirectionally causes changes in FDI. Thus, the unidirectional causality from FDI to corruption in the short-run appears to gradually weaken over time, whereby causality in the long-run becomes primarily unidirectional from corruption to FDI. These results for India suggest that causality between corruption and FDI appear dynamic and time-sensitive process.

Conclusion

The results of this paper dispute the conventional wisdom that simple correlations between corruption and FDI inflows imply corruption *causes* changes in FDI inflows. Our short-run empirical results for both China and India are at odds with this postulation in that the results clearly indicate that short-run Granger causality in both countries unidirectionally runs from FDI to corruption without feedback. This finding corroborates prior research which suggests that larger FDI inflows cause a marked reduction in national corruption (Larraín and Tavares, 2004). Similarly, our empirical results suggest that FDI is a robust determinant of corruption in the short-run. We speculate this may be a result of investors' growing capital mobility and their ability to leverage their exit if corrupt practices are not controlled. In retrospect, a plausible explanation may be that FDI inflows can inundate government institutions in the short-run. Such surges in revenue streams may lead to lax enforcement of investment laws and regulations and, in turn, create an environment ripe for unchecked

corruption. For instance, China has a complex bureaucratic system that can create institutional delays and hurdles for foreign investors (Haveman et al., 2017). As such, in the short-run, foreign companies may feel compelled to engage in corrupt practices to expedite processes and obtain necessary permits or approvals. On the other hand, India's regulatory environment may be even more challenging in that it is subject to bribe-demanding officials at various levels (Gupta, 2017). Therefore, in the face of uncertainty, foreign investors may have no choice but to resort to corrupt practices to help traverse such a system and secure favorable treatment.

In the case of China, our results indicate that corruption and FDI inflows are not causally related in the long-run. However, the long-run results for India concur with the common view that corruption unidirectionally causes changes in FDI without feedback. Such long time lags before corruption in India can significantly cause changes in FDI may unfortunately deceive policymakers (due to their notoriously short-term policy horizons) into deescalating their fight against corruption.

It is worth noting that correlation-based research neglects the potential for an underlying cointegrated (long-run) relationship between corruption and FDI inflows. Such omissions lead to misspecification biases and erroneous inferences. Our findings suggest that corruption and FDI inflows in China are not significantly cointegrated and thus are only linked over the short-run. However, for India, the results consistently show that corruption and FDI inflows are significantly cointegrated and thus share long-run (equilibrium) relationships. Therefore, blind applications of standard (short-run) Granger causality tests that ignore the possible underlying cointegratedness of the variables could yield inaccurate causality conclusions. Another noteworthy result is that long-run relationship between corruption and FDI inflows in India appears to strengthen after controlling for unemployment. This implies that corrupt officials in India seem more likely to push for higher bribes from foreign investors especially during sluggish economic conditions.

Discussion and Some Implications

One possible explanation for our finding that long-run causality between corruption and FDI only exists in India (but not in China) may rest in the discrepancies of the nature of corruption between the two countries, as well as in the discordant manner by which bribe-demanding bureaucrats are structured (Shleifer and Vishny, 1993; Wei, 1997; and Ravi, 2015). While corruption is widespread in both countries, the arbitrariness (the degree of uncertainty) of corruption is generally lower in China compared to that in India. In accordance with previous research, it appears that guanxi, or the systemic need for social networks and influential relationships to facilitate business, is more embedded in the dynamics of Chinese politics and business dealings (Fan, 2002). Unlike tax payments, bribes lack transparency and/or regulations and thus entail weaker, informal agreements between the transacting parties.

Given our results, Chinese bureaucrats may have a relatively transparent and reliable bribery system compared to India, with more assurance of rapid eventual results. Despite the pervasiveness of corruption and bribery in China, research suggests the low arbitrariness of bribe payments (i.e., the increased likelihood of the bribe

accomplishing its goal) is associated with higher levels of inbound FDI (Wei, 2000a). Expectedly, bribe payments in China are a necessary part of relationship building and gift exchanging; and they are also characteristic of the Chinese business culture (e.g., Huang, 2015; Guo et al., 2018). Some research argues that the approval of foreign investments in China is often determined by a strong local government influence which makes it advantageous for local government officials to adhere to a systematic process of extracting and carrying out bribe agreements (Gong, 2002).

In contrast, the outcomes from bribe payments in India appear less guaranteed to materialize after payments. This may partly result from the lack of coordination among government officials in extracting bribes because organized corruption with predictable outcomes may be more conducive to investments. Since India's transition to a market system in 1991, FDI inflows have risen considerably. Yet, the country continues to struggle in attracting inward FDI at the level of China due to the arbitrariness of bribery and corruption in the marketplace (Lee and Oh, 2007). As such, bureaucrats at various levels may demand independent bribe payments from foreign investors without guaranteeing service delivery. Hence, frequent bribes (usually through different bureaucrats) are often required prior to reaching the end result. Peng (2006) validates this notion and argues that the Ministry of Road Transport in India commonly exploits the driving test to arbitrarily fail drivers that refuse, or are financially unable, to pay the bribes required to obtain a license. The author argues that the involvement of numerous intermediaries demanding bribe payments from applicants complicates the likelihood of actually achieving the goal.

On the other hand, the absence of long-run causal relationship between corruption and FDI in the case of China may imply that the country's anti-corruption campaign is gaining ground. Clearly, long-lasting corruption reform is a gradual, perhaps glacial, process that must receive unequivocal support from the highest-ranking public officials. Chinese leaders and policymakers must enforce equitable governance and regulatory controls on foreign contracts and business ventures. Prior research suggests that political instability and governmental interference in job selections and appointment of institutional stewards is a major contributor to corruption (Krammer et al., 2018). Echoing this sentiment, governmental ministries and institutions should be delegated the authority to independently investigate and prosecute nepotism within their ranks and inner circles to ensure that officials are appointed based on integrity, merit, and commitment to transparency. It is expected that influential lobbyists and high-ranking officials who stand to lose from disruption of the status quo will resist by leveraging their political clout to impede this process and prevent the succession of public officials with a reputation for cracking down on corruption. Thus, a climate of accountability should be created through impartial monitoring by independent anti-corruption agencies that can detect and report integrity violations to prosecutors. However, such agencies should be balanced in their approach and not so overzealous as they deter foreign investors and undermine the country's performance. Evidence from India suggests that excessively vigilant anti-corruption agencies instill a sense of hesitation in public sector decision-making that subsequently delays development projects (Mahalingam, 2006; Banerjee et al., 2008). Eradicating corruption makes no sense if that would deter economic growth, and thus officials should supplement the work of anti-corruption agencies by enhancing efficiency and trust in the private sector.

Notwithstanding the practical implications, another contribution of this paper is theoretical in nature. Given the higher uncertainties in emerging economies, our empirical finding for India that long-run causality unidirectionally flows from corruption to FDI is particularly intriguing. If future research also concurs that corruption is a long-run determinant of FDI inflows, frameworks like the OLI paradigm may need to reconsider corruption as a potential catalyst in the assessment of locational appeal, particularly in emerging economies. Researchers should also examine the causes of corruption in emerging countries within a contemporary framework to better understand the role of policymakers and businesses in curbing it. For instance, social media continues to be a transformative force of change around the world in its ability to raise public awareness, harness dissent, and mobilize actions. Given the ubiquity of global subscription rates, it may be interesting to explore the nature of causality between corruption and the prevalence of social media subscribers in a sample of countries.

Furthermore, it should be noted that corruption is not merely a problem in emerging and developing countries. Massive scandals and governmental breaches of trust have sent shockwaves throughout the developed world as well. A recent survey of 40,000 citizens in 27 European Union countries reveals that more than half of them believe their countries are run by private interests and another 45% believe the problem is in a downward spiral (Transparency International, 2022). In Germany, for instance, members of federal and state parliaments were recently indicted on corruption allegations related to 'highly lucrative deals' struck in the dissemination of COVID-19 masks to the public, triggering a series of political resignations (Morris, 2021).

We do hope that this research will propel further examination of corruption in different countries to gain a more generalizable sense of the problem and further identify causal determinants and consequences of this rampant phenomenon.

Practical Implications for Asian Business

With data spanning over two decades, this research provides valuable implications for Asian businesses and policymakers alike. Although significant relationships between corruption and FDI inflows in Asian countries have been reported in several studies, the bulk of these empirical studies are correlation-based. Asian businesses have much to learn from the explosive advance of China and India in attracting foreign direct investments, and how these investments in turn, relate to corruption.

Unlike India where corruption over the long-run does cause changes in FDI inflows without feedback, our empirical findings for China reveal that corruption and FDI inflows are not causally related over the long-run. This could reflect a Chinese government breakthrough in curbing the expected rise of corruption in response to heightened business opportunities. Asian businesses may also glean insights from the legislative approaches and market controls instituted by regional powerhouses, particularly Singapore and Hong Kong, with regard to corruption controls and reforms. Singapore, for example, suffered from pervasively high corruption until 1960 when the ruling party passed the controversial and comprehensive 'Prevention of Corruption Act' (PCA) which has continued to be a strong deterrent to administrative misconduct. According to PCA, business executives and/or government officials

accused of misappropriations or exploitive misconduct are considered "guilty until proven innocent" and face severe penalties if convicted (Lee and Oh, 2007). Despite encouraging progress in Chinese corruption reform, officials and executives at the highest levels often operate with impunity and without the scrutiny aimed at their counterparts in lower-level positions (Ravi, 2015). Passing unequivocally uniform anti-corruption legislation with adequate scope and reach may help in facilitating accountability and transparency in foreign investments and promote even-handed business practices. Recent reform initiatives in China do appear promising, and coupled with impressive economic growth, may create an increasingly attractive investment climate for Asian businesses. The same cannot be extrapolated for other Asian businesses considering investment opportunities in India where results suggest that corruption is a deeply engrained problem that is not only pervasive, but highly unpredictable. It is likely this reality will translate into business endeavors with higher transactional costs and economic uncertainty.

Asian businesses and public officials need to fully comply with international anti-corruption standards such as the United Nations (UN) Global Compact and the UN Convention Against Corruption. Adherence to these standards would enhance the credibility of Chinese and Indian businesses in the global market. The UN Global Compact is a voluntary initiative launched by the UN in 2000 to encourage businesses and organizations worldwide to adopt sustainable and socially responsible policies and practices (UN Global Compact, 2015). As the largest corporate sustainability initiative in the world, the UN Global Compact operates with the belief that businesses are key actors in the global economy and play a significant role in addressing important global challenges, including corruption, human rights abuses, labor exploitation, and environmental degradation. Importantly, Principle 10 of the UN Global Compact states that "businesses should work against corruption in all its forms, including extortion and bribery." Moreover, provisions stipulated by the UN Convention Against Corruption allow individuals to report corrupt practices without fear of retaliation (UN Office on Drugs and Crime, 2004). Better enforcement of these whistleblower protections ought to help combat governmental corruption, and, in turn, facilitate more vigorous investments into Chinese and Indian businesses moving forward.

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