



# International subsidiary performance of Indian multinationals in the extractive sector: The role of institutional quality, corruption and investment regime

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## ABSTRACT

The paper examines the impacts of host country's institutional quality, corruption perception, investment regime, economic growth and resource availability on performance of 150 overseas subsidiaries of Indian multinationals spread across 42 host countries in the extractive sectors of metals and mining during 2005–2017. The dynamic panel data estimation suggests that overseas subsidiary performance is better in countries with superior institutional quality. However, the impact of corruption perception has been sample specific. Further, performance of such subsidiaries was found to be better in countries with underdeveloped investment regime and where the competition from other investors is lower. The economic growth in the host country plays limited role in improving subsidiary performance as these subsidiaries are driven by resource-seeking motive rather than seeking local market. While institutional quality and investment regime are important determinants of subsidiary performance; the role of corruption, economic growth and resource availability in determining the subsidiary performance in the extractive sectors was found to be contrary to conventional expectation, which suggests that the direction of impact of host country-specific variables on subsidiary performance can significantly vary based on the motive of foreign direct investment.

## 1. Introduction

Extractive industries such as metals and mining play crucial role in a growing economy like India. The demand for metals and mining products is driven by its user industries such as construction and real estate, infrastructure, transportation and automobile, among others. The Indian economy started growing at a rapid pace since liberalization that happened in 1991. During the last twenty years (1999–2018), India has maintained an annual average growth rate of 6.7% making it one of the fastest growing emerging economies. Although India has vast mineral potential, but there have been several hiccups in the domestic metals and mining sectors. To meet the growing domestic demand for metals and mining products, the Government of India imposes export duty on metals products such as iron ore and iron ore pellets. Subsequently, India remains a net importer of metals and mineral products.<sup>1</sup> This has led to overseas investment by the Indian firms to meet the growing

domestic demand at a lower cost. An increasing number of metals and mining companies have ventured overseas to secure stable and long-run supply of minerals. However, unless these investments remain profitable meeting the domestic demand predictably will be in a fix. This has motivated us to investigate the host-country factors contributing the performance of overseas subsidiaries. In particular, do institutional quality, investment regime and corruption in the host country matter in promoting international subsidiary performance of Indian multinationals in the extractive sector?

Given the above research question, analyzing international new venture performance of resource-based firms is crucial for several reasons. Firstly, the resource-based firms play an important role in ensuring stable supply and meeting the needs of growing economies. With increasing urbanization and industrialization in India, the demand for metals and extractive industry products is expected to rise further (Shahbaz et al., 2016; Mallick and Mahalik, 2014; Mahalik and Mallick,

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<sup>1</sup> India imported 189 billion dollar and exported 103 billion dollar worth of metal and mineral products in 2016–17 (Export-Import Databank, Ministry of Commerce & Industry, Government of India).

2014). As the domestic supply of these products is not sufficient, to meet the growing demand economically, the external supplies shall continue to fill the domestic supply-demand gap. The external supplies can be secured in a variety of ways that include foreign presence through subsidiary, a high commitment mode of foreign direct investment (FDI).

Secondly, endowment of natural resources as a driver of FDI has been recognized (Teixeira et al., 2017; Das and Banik, 2015). However, FDI inflows into the natural resource based (mineral and metals) industries can be attracted by a separate set of factors (Vivoda, 2011). FDI policy regime, institution and corruption, and regulatory changes can also play an important role in attracting FDI in the sector. However, resource-based FDI is found to be vertical in nature in cross country studies and resource-based FDI can negatively impact non-resource FDI flows (Poelhekke and van der Ploeg, 2013).

Thirdly, in connection with external supplies, excessive reliance on foreign sellers may undermine the stable supply of commodities. With the help of outward FDI strategy, the consistency of external supplies can be ensured. While at the national level, India has embarked on establishing better ties with resource abundant countries across continents and thereby paving the way for the entry of Indian metals and extractive industries; at the firm level multiple obstacles prevent the success of these investments. Therefore, the effectiveness of outward FDI by Indian firms in the resource intensive sectors shall depend on how these challenges are anticipated and mitigated. The challenges encountered by resource intensive firms are several. Unless these challenges are handled well, the success of the energy and resource intensive firms shall remain a question mark. While there are studies that address the concerns with resource dependence, at the country and firm-level, albeit with special attention to African continent (Beri, 2010; Madan, 2010; Alden and Verma, 2015; Chakrabarty, 2017), the challenges faced by the international new ventures across the globe have not received attention. Therefore, this paper employs subsidiary-level data and examines the performance of subsidiaries of Indian multinationals across different host countries in extractive sectors that include metals and mining. The paper assumes significance as it analyzes the performance of overseas subsidiaries of Indian resource intensive firms located in various host countries. From the policy perspective, addressing these micro-challenges will go a long way in ensuring predictable supply of metals and mining products.

An analysis of performance of international ventures would help in identifying the significant factors and suggesting ways of improving performance in the selected sector. The paper considers three sets of factors that could affect subsidiary performance (i.e. host country, firm-level, and subsidiary specific). Hypotheses concerning the impact of host-country variables are developed and tested using dynamic panel data econometric models. The results suggest that better institutional quality plays a significant role in improving subsidiary performance. However, the impact of corruption perception on subsidiary performance is at best sample-specific. Further, the performance of subsidiaries was better in host countries with underdeveloped investment regime for foreign investors. Similarly, the growth of gross domestic product (GDP) did not boost performance of the subsidiaries. Both these results are at odds with conventional understanding that well developed investment regime for the foreign investor and market growth shape firm/subsidiary performance. However, the resource-based sector also differs from other sectors in that countries with abundance of resources experience higher corruption and unstable investment regime. Therefore, the direction of impact of host country variables on subsidiary performance can be reversed in the extractive industries.

The paper also contributes to the internationalization-performance literature in that the direction of impact of many of the host country variables can reverse in the natural resource based extractive industries. For example, due to the resource-seeking motive, the direction of impact of host country's GDP growth on subsidiary performance could reverse as the subsidiary is less reliant on local market sells. The analysis is expected to provide implication for firms to improve performance.

Further, the analysis of performance of resource-based firms' foreign ventures provides implication for policy for both investing firms and host country governments especially in the context of resource-seeking FDI. The rest of the paper is organized as follows. Relevant literature is reviewed and hypotheses developed in Section 2. Methodology is discussed in Section 3. Results and robustness checks are presented in Section 4. Conclusion and policy implications are provided in Section 5.

## 2. Literature and hypothesis development

The performance of international ventures has been examined from international business vantage point (see Singla and George, 2013; Kumar and Singh, 2008). Singla and George (2013) explored the relationship between internationalization and performance of Indian firms and found that firm characteristics played an important role shaping the relationship between the two variables. They anticipated that the relationship between internationalization and performance varies based on the motive of internationalization of the firm. However, there are few studies that explore performance in the resource-based sector. The performance of multinational subsidiaries in the natural resource based sector and extractive industries could be affected by host-country specific economic and institutional environment quite differently than in other sectors. However, the empirical evidence is far from clear. As the resource rich countries are marred by different economic and institutional set up, the direction of impact of host country variables on performance of subsidiaries might be reversed when it comes to extractive sector. Further, studies exploring the link between host country variables and subsidiary performance is quite limited especially with reference to multinationals from emerging countries. Therefore, the paper examines the impact of institutional quality, corruption perception, investment regime, economic growth and resource availability in the host country on subsidiary performance of Indian multinationals. The Indian firms have been investing in mining and extractive industries for quite some time. However, no specific assessment of performance has been attempted at the subsidiary level in these industries. Given below a brief review of the impact of host-country factors on performance and testable hypotheses with reference to the extractive sector.

### 2.1. Host institutional quality and performance

International investment theory suggests that FDI is located in countries with better institutional quality (Yang et al., 2017). Panel data evidence suggests that good institutional quality matters to FDI and it reduces FDI volatility in the recipient country (Buchanan et al., 2012). In the context of developing countries, institutional quality at home is also found to have impacted outward FDI (Das, 2013; Stoian, 2013; Stoian and Mohr, 2016). Therefore institution as a determinant of international subsidiary performance assumes significance. The natural resource rich countries tend to have poor institutional development. However, there is curious pattern of FDI location in countries with poor institutional quality due to non-market behavior of certain multinationals (Kolstad and Wiig, 2012). Further, emerging economy multinationals are adapting to doing business in volatile institutional and political environments due to their home country experience with relatively weaker institutions (Luiz and Ruplal, 2013). Natural resource endowment is found to attract FDI of emerging multinationals when political risk of host country is higher and economic freedom and institutional distance are lower (Luiz and Ruplal, 2013; Kang, 2018).

The impact of institution on FDI inflows has been discussed at a greater detail by type of institution. For instance, the role of institution (say democracy) in promoting FDI is found to be valid in countries that do not rely excessively on export of mineral and oil resources (Asiedu and Lien, 2011). On the other hand, countries that rely heavily on the export of resources may attract FDI without the democratic institutions. Thus the impact of institution (say democracy) on FDI inflows may be influenced by the size of natural resources a country possesses. Further,

different types of institutions are found to affect FDI differently (Choi et al., 2016; Kurul, 2017). While general environmental institutions in the host country attracted FDI, the institutions that protect minority investors discouraged foreign investment activity in the case of US firms during 1981–2008 (Choi et al., 2016). Institutional quality is found to affect FDI positively if the former is above some threshold level suggesting to the asymmetric relationship between institutional factors and FDI flows (Kurul, 2017). However, the reverse effect of FDI flows on institutional development can be present especially in the case of South-South FDI and in natural resource based economies (Demir, 2016).

Recent studies have also found that investment from south flows to locations with better institutions than the home country but the deterring effect of institution is weakened for destination countries with substantial resources (Aleksynska and Havrylychuk, 2013). There is also heterogeneity in the role of institutions in attracting FDI from different source countries. However, countries with higher institutional quality can expect greater spillover of FDI on host country's economic and financial development (Aibai et al., 2019). Studies suggest that, unlike Chinese firms, Indian firms tend to invest in countries with better institutions. Thus, we expect subsidiaries of Indian multinationals to perform better in countries with better institutional quality as Indian firms experienced democratic and pro-market institutions at home.

**Hypothesis 1.** Better institutional quality in the host country positively impacts performance of subsidiaries even in the resource-based sector.

## 2.2. Host corruption and performance

Host countries that control corruption is expected to attract foreign direct investment regardless of endowment of mineral resources. However, most of the natural resource rich countries are grappled with corruption. Further, mineral resource endowment and corruption can have complex interplay. The link between corruption and FDI is inconclusive, so is the case of corruption and entrepreneurship (Liu et al., 2019). There is no evidence that foreign owned firms tend to reduce bribery after investment has occurred in emerging markets (Webster and Piesse, 2018). Some studies have found that FDI varies positively with corruption and the latter did not hinder the former (Helmy, 2013). FDI in extractive industry is found to be positively associated with corruption albeit at a diminishing rate as corruption grows larger (Kolstad and Wiig, 2013). In a separate stream of literature, bribe payment is found to be associated with firm performance either positively or negatively (Sharma and Mitra, 2015). However, in the context of assessing international subsidiary performance of emerging multinationals there is lack of empirical evidence on the issue. The international development community has viewed transparency as a central mechanism to curb corruption of resource rich developing countries (Kolstad and Wiig, 2009).<sup>2</sup> The Extractive Industry Transparency Initiative (EITI) established in 2003 (see Lujala, 2018; see Savacool et al., 2016 for the weaknesses of EITI e.g. a limited mandate, its voluntary nature, stakeholder resistance, and dependence on strong civil society). Since there is limited mandate (see Appendix for a list of countries compliant with EITI initiative that are part of this study) the impact of corruption in host country on subsidiary performance can be in the same direction.

**Hypothesis 2.** Corruption in the host country impacts performance of subsidiary positively in the resource-based sector.

<sup>2</sup> Transparency is pushed through initiatives such as the Extractive Industries Transparency Initiative (EITI), established in 2003. However, the role of EITI in reducing corruption in reducing corruption has been limited (see Kolstad and Wiig, 2009; Savacool et al., 2016).

## 2.3. Host investment regime and performance

A well-developed foreign investment regime is marked by agglomeration and greater competitive pressure in the host country. It also signifies partial capital account openness of the host country (Das and Banik, 2015). While foreign investment regime is instrumental in attracting capital into the host country (Zhou and Lall, 2005), the performance implication is not straightforward. It is expected that there will be positive performance implication arising out of well-developed investment regime. However, there is a possibility that performance in the resource-based sector can be better in the absence of competitive pressure. Further, Indian investment is not large enough to change investment regime in many of the host countries. Therefore, in many resource rich countries where investment regime is not well developed, and where competition from other investors is lower, investment by Indian firms can have significant positive implication on the subsidiary performance.

**Hypothesis 3.** Less developed investment regime in the host country can positively impact performance of subsidiaries in resource-based sector.

## 2.4. Host economic growth and performance

Host market attractiveness is found to have positive impact on performance of subsidiaries in a sample of Asian countries (Nguyen and Rugman, 2015). However, the impact of market attractiveness, or growth in the host country, on subsidiary performance is not as straightforward as it may seem. Firstly, according to the 'natural resource curse hypothesis' countries with plenty of natural resources tend to grow slowly than resource-poor countries (Sachs and Warner, 1995, 1997, 1999). Secondly, these subsidiaries have resource-seeking motive as opposed to the market-seeking one. Market-seeking orientation is found to be profitable for foreign subsidiaries under certain conditions such as the presence of favorable institutional framework towards FDI, longer experience of the subsidiary in the host country and when subsidiary is organized as wholly owned subsidiary (He et al., 2015). While economic growth matters when the subsidiary has market-seeking motive, the same may not hold when the subsidiary has resource-seeking motive. This could be because of less competitive investment regime in many of the resource rich host countries that restrict local market access through various regulations to protect domestic firms.

**Hypothesis 4.** Subsidiary performance in the resource-based sector is not directly driven by economic growth in host country.

## 2.5. Resource abundance in the host country and performance

Resource seeking FDI is found to target economically feeble countries with low export diversification and highly dependent on the export of non-renewable mineral resources (Teixeira et al., 2017). However, it is not clear whether endowment of non-renewable resources matters for subsidiary performance. Available empirical evidence based on cross section data suggests that the impact of resource endowment on firm performance is not straightforward (Zoogah, 2018). Further, in the context of international subsidiary in resource-based sector, there is limited evidence as regards the impact of resource abundance on subsidiary performance.

**Hypothesis 5.** Endowment of ores and mineral resources in the host country positively impacts performance of subsidiary located in that country.

The following section deals with the methodology to test the above stated hypothesis, variables and data sources.

### 3. Methodology

Dynamic panel data model has been used to examine performance of overseas subsidiaries. The use of dynamic panel is motivated by both persistence in performance and endogeneity concerns.

We found the presence of serial correlation in the residual obtained from static panel data regression i.e. without involving lag of the dependent variable in the model. Wooldridge test (Wooldridge, 2002; Drukker, 2003) suggested to the rejection of null hypothesis that there is no first order serial correlation in the residual from static panel data regression. The Wooldridge test p-values were highly significant and ranged from 0.0003 to 0.0045 depending on the set of explanatory variables used in the static panel data estimation for testing serial correlation.<sup>3</sup> As serial correlation in linear panel data models biases the standard errors and cause results to be less efficient, the dynamic panel data model is used that accounts for the presence of serial correlation. Accordingly, the following dynamic panel-data model is used.

$$spat\_asset_{it} = \sum_{j=1}^p \alpha_j spat\_asset_{i,t-j} + x_{it} \beta_k + \nu_i + \varepsilon_{it} \quad (1)$$

where  $i$  represents subsidiary and  $t$  represents time (2005–2017).

The dependent variable ( $spat\_asset$ ) is the profitability of the subsidiary.  $x_{it}$  is a  $(1 \times k)$  vector of covariates,  $\beta_k$  is a  $(k \times 1)$  vector of parameters to be estimated.  $\nu_i$  are the subsidiary-level effects (panel unit), which are correlated with the lagged dependent variable.  $\varepsilon_{it}$  are identically and independently distributed error. The estimation model including all covariates is of the following form.

$$\begin{aligned} spat\_asset_{it} = & \sum_{j=1}^p \alpha_j spat\_asset_{i,t-j} + iq_{it} \beta_1 + ti\_cpi_{it} \beta_2 + fdist\_gdp_{it} \beta_3 \\ & + gdppc_{it} \beta_4 + gdp\_gr_{it} \beta_5 + ores\_me_{it} \beta_6 + sub\_size_{it} \beta_7 + exp\_int_{it} \beta_8 \\ & + firm\_size_{it} \beta_9 + \nu_i + \varepsilon_{it} \end{aligned} \quad (2)$$

In the estimation model, the dependent variable ( $spat\_asset$ ) measures performance (description of variables is presented in Table A2 of Appendix). The explanatory variables are institutional quality ( $iq$ ), corruption perception ( $ti\_cpi$ ), FDI stock ( $fdist\_gdp$ ), GDP per capita ( $gdppc$ ), GDP growth rate ( $gdp\_gr$ ), ores and metals exports ( $ores\_me$ ), subsidiary size ( $sub\_size$ ), export intensity ( $exp\_int$ ), and parent firm's size ( $firm\_size$ ).<sup>4</sup> The lagged dependent variable (e.g.  $spat\_asset_{t-1}$ ) is present by default in the dynamic panel data model.

As the lagged dependent variables are correlated with unobserved fixed effects ( $\nu_i$ ), the model needs to be estimated using instruments for the endogenous covariates. Arellano-Bond approach (Arellano and Bond, 1991) tackle the endogeneity problem by using instruments after removing the panel level effects through first differencing. However, the lagged-level instruments are found to become weaker as the autoregressive process becomes persistent. The Blundell-Bond approach (Blundell and Bond, 1998) uses lagged differences as instruments for the level equation (in addition to the moment conditions of lagged levels as instruments for the differenced equation). The Blundell-Bond approach includes lagged differences of the dependent variable as instruments for the level equation, whereas the Arellano-Bond approach does not. The advantages of the former over the latter are a) the former approach performs better when autoregressive parameters are larger and b) the

former does not have downward bias in the coefficients than the latter c) the former uses more instruments and additional moment conditions.

#### 3.1. Sample, data and variables

The parent Indian firms that have invested abroad were identified from Reserve Bank of India (RBI) database on overseas direct investment. Thereafter, the overseas subsidiaries of the extractive sector firms were identified from their annual reports. A host of information was retrieved from annual reports including location of the subsidiary, profit after tax, asset value, whether the subsidiary is surviving or closed down during the study period. Several issues were encountered while collecting data from annual reports. The unit of reporting varied from company to company. There was loss of observation as in some cases the data on a few subsidiaries were clubbed by the parent company while reporting in the annual report. Note that we do not include joint ventures in the analysis. The sample industries covered in our analysis belong to metals, mineral and mining sector. The 3-digit NIC codes are 239, 241, 242, 243, 251, 259 (see Table A1 of Appendix for details). The oil exploration sector was excluded from our analysis as the sector is characterized by very different modes of operation and marred by geopolitical issues.<sup>5</sup> The sources of data include annual report of parent firms, Prowess IQ from CMIE, corruption perception index (CPI) from Transparency International, World Investment Report from UNCTAD and World Development Indicators from the World Bank (see Table A2 in Appendix for details). The panel data is an unbalanced one as some subsidiaries were closed and some others were opened during the study period 2005–2017. The dependent variable is profitability of the subsidiary proxied by the ratio of profit after tax to total assets ( $spat\_asset$ ). The subsidiary-specific profitability variable is compiled from Annual Report of the parent company. Under section 212(8) and 129(3) of Indian Companies Act (1956 and 2013 respectively), firms are required to report details of subsidiaries in their annual reports.

To test hypotheses 1–5, we use five independent variables. Institutional quality ( $iq$ ) index is a composite measure based on the six dimensions of the World Governance Indicators (see Appendix for details). Corruption in the host country is represented by corruption perception index ( $ti\_cpi$ ). Investment regime is proxied by the stock of FDI in the host country as percentage of GDP ( $fdist\_gdp$ ). Inward FDI stock is taken as evidence that a host country has a good regime for foreign investors and the country has capital account openness (Zhou and Lall, 2005; Das and Banik, 2015). However, Indian investment is not large enough to change investment regime (and institution) in many of the host countries. Therefore, in many resource rich countries where investment regime is not well developed, and where competition from other investors is lower, investment by Indian firms can have significant implication on the subsidiary performance. Economic growth in host country measured by GDP growth ( $gdp\_gr$ ). Endowment of mineral resources in the host country is captured by ores and metals exports of host country as percentage of merchandise exports ( $ores\_me$ ). This is in line with previous literature where export is used as a proxy for resource endowment rather than proven reserve of mineral resources (see Teixeira et al., 2017).

We further control for host of other variables that may impact subsidiary performance in the host country. These factors are host-country specific, parent-firm specific, and subsidiary-specific. The parent-firm specific variables are firm size, and export intensity as a proxy for firm internationalization. The subsidiary-specific variables are size of the subsidiary and the lag of profitability ratio. In addition, we control for unobserved factors that are common for all panel units (subsidiary) but varies over time using time dummy (see Table A2 in Appendix for construction of variables and data sources).

<sup>3</sup> The Wooldridge test p-values are a) 0.0045 when host country specific variables are used in the model, b) 0.0020 when firm and subsidiary-specific variables are used, and c) 0.0003 when full set of variables is used in the static panel estimation.

<sup>4</sup> Panel data contains heterogeneous cross section units and hence multicollinearity is not likely to be a major issue. Nevertheless, we tested for multicollinearity before estimating the panel data model. The finding from multicollinearity test is discussed under results (Section 4).

<sup>5</sup> Energy and resources are critical to national interest and much of the nationalism and security concern is linked to the nature of the sector (Tan, 2013).

#### 4. Results

During the study period 2005–2017 we have 823 observations, 150 subsidiaries belonging to 23 parent firms, and spread across 42 host countries. Thirty-eight percent of observations are during 2005–2012, remaining 62 percent are from 2013–2017. The descriptive statistics are provided in [Table 1](#). The average value of institutional quality is 0.543 and that of the corruption perception index is 5.7 (out of 10). In 2017, corruption perception index ranked 180 countries, of which two-thirds of countries scored below 5 with an average score of 4.3 (in a 10 point scale). Note that corruption perception index indicates corruption in public sector perceived by business people and experts. FDI stock as percent of GDP is 71.9% on average. The GDP growth in the sample host countries during study period is 3.7%. Ores and metals exports constituted 7.56% of merchandise exports on average.

Before estimating the dynamic panel data model, we performed multicollinearity test using a formal test (VIF test) as our model includes potentially correlated variables (such as *gdppc* and *gdpgr*). The VIF of *gdppc* and *gdpgr* were 6.23 and 1.36 respectively, which are well below the rule of thumb value of ten. However, the VIF of *iq* and *ti\_cpi* was found to exceed ten. This is not surprising as there is an element of corruption in institutional quality. Therefore, in addition to running the unrestricted model, we performed restricted models excluding the potentially multicollinear variable (*iq* or *ti\_cpi*).<sup>6</sup> The results from restricted models are consistent with the unrestricted model in terms of both sign and significance of the variables.<sup>7</sup>

Results of econometric analysis are reported in [Table 2](#). We treat these results as baseline. We first present the result of host country-specific variables (column 1) and then add firm-specific and subsidiary-specific variables (Column 2 and Column 3). Column 4 excludes GDP per capita (to eliminate the chances of multicollinearity with *gdpgr*). Column 5 includes the unrestricted model. In column 6, we exclude *iq* and in column 7 we exclude *ti\_cpi*. The models presented in the table meet standard diagnostic tests applied to dynamic panel data. The autoregressive process of the first differenced error term is significant at lag one (significant AR(1)) but not at lag two (insignificant AR

(2)). The insignificant Sargan test validates the over identifying restrictions.

The impact of institutional quality is expectedly positive and significant. This is quite an interesting result in that even emerging country multinationals can benefit from institutional quality in the host country. In addition, even in the resource-based sector, subsidiaries of Indian multinationals performed well under superior institutional quality. Therefore, international expansion of emerging multinationals from India must consider institutional quality of the host country while establishing local presence through subsidiary as it has implication on performance. The impact of corruption perception on subsidiary performance is noteworthy. Higher corruption (measured by lower CPI score) is found to enhance performance of subsidiaries in the metals and mining sector. Given that corruption is one of the serious issues in resource rich countries the result is not surprising. Further, most of the sample countries are not EITI compliant (see [Appendix](#) for EITI compliant countries) and hence the contribution of corruption to performance can be expected. However, when *iq* is excluded the impact of corruption (*ti\_cpi*) ceased to be significant (column 6, [Table 2](#)). In the robustness check (reported subsequently in [Table 3](#)), the significant impact of corruption ceased to hold good in the unrestricted model (column 5) indicating that corruption has limited impact on subsidiary performance.

Subsidiaries of Indian firms are also found to perform better in countries where the foreign investment regime is underdeveloped (FDI stock is lower). Whereas in countries with better FDI regime (higher FDI stock), the performance is found to be relatively lower suggesting to the lack of agglomeration benefits in the extractive industries. This is an important finding as Indian firms in the resource based sector tend to do well in host countries where competition from other investors is lower. This also indicates towards challenges Indian firms can face from major foreign investors who have significant presence in the resource rich countries. Another important finding is that GDP growth in the host country did not boost performance of the subsidiaries. This may sound puzzling. However, it must be kept in mind that FDI in the extractive sector (such as the metals and mining sector) is driven by resource-seeking motive to ensure stable supply of commodities in the relevant market. The host market demand could be less important a factor. Further, absence of strong enabling environment in the host country may prevent local sales by these subsidiaries ([Zoogah, 2018](#)). It is possible that a sunk of FDI does not follow growth opportunity in the host country ([Shen and Li, 2017](#)).

Resource abundance (*oresme*) carries expected sign in the baseline regression ([Table 2](#)) indicating positive impact on performance. This is expected as hypothesized. Among other country level variables, the GDP per capita carries expected negative sign in the baseline specification.

We also controlled for subsidiary-specific and parent firm attributes. The sign and significance are satisfactory. There is persistence in performance i.e. subsidiaries that performed well (poorly) in a given year also performed well (poorly) in the subsequent year ([Table 2](#)). There is scale effect as larger subsidiaries performed better. Further, subsidiaries of parent firms that are internationalized through exports also performed well. However, the parent's size has negative impact on subsidiary performance.

##### 4.1. Robustness checks

We exclude subsidiaries located in offshore financial centers (Mauritius, Singapore, UAE, and Netherlands). The number of subsidiaries excluded was 35, which led to reduction of number of observations by 174. The results are reported in [Table 3](#). The impact of institutional quality on subsidiary performance is found to be robust as it carries positive sign and significance in both restricted and unrestricted models ([Table 3](#)). Thus, the positive impact of institutional quality on performance of subsidiary was irrespective of the sample of host countries.

**Table 1**

Descriptive statistics (time: 2005–2017).

Variable	Mean	Standard deviation	Observations	No. of subsidiaries
<i>iq</i>	0.543	0.847	823	150
<i>ti_cpi</i>	5.744	2.100	823	150
<i>fdist_gdp</i>	0.719	0.995	823	150
<i>gdppc</i>	25097.91	22316.87	823	150
<i>gdpgr</i>	3.703	2.797	823	150
<i>oresme</i>	7.564	11.581	823	150
<i>spat_asset</i>	-0.278	7.231	823	150
<i>sub_size</i>	6.474	3.208	823	150
<i>exp_int</i>	10.337	11.452	823	150
<i>firm_size</i>	11.725	1.269	823	150

Source: Authors' calculation.

<sup>6</sup> We thank one of the reviewers for pointing out the possibility of multicollinearity in the unrestricted model.

<sup>7</sup> Further, we reconstructed *iq* excluding "control of corruption" indicator. However, we did not observe any significant drop in VIF when the reconstructed *iq* variable was used. Therefore we have used the extant results. It may be noted that the scope of "control of corruption" from World Governance Indicators is broader than corruption perception index from Transparency International. The former draws on four different types of source data including commercial business information providers and non-governmental organizations, whereas the latter considers only the assessments of business people and country experts. Accordingly, we have retained the information contained in "control of corruption" indicator in the overall *iq*.

**Table 2**  
Dynamic panel estimation (Dependent variable: *spat\_asset*).

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>iq</i>	3.997*** (0.467)	4.428*** (0.404)	5.001*** (0.408)	0.146 (0.345)	3.964*** (0.521)	–	1.397*** (0.332)
<i>ti_cpi</i>	-1.692*** (0.100)	-1.446*** (0.123)	-0.1350*** (0.155)	-0.712*** (0.126)	-1.167*** (0.151)	0.118 (0.107)	–
<i>fdist_gdp</i>	-0.338** (0.133)	-0.085 (0.186)	-0.376** (0.148)	-0.635*** (0.181)	-0.359** (0.183)	-0.461*** (0.175)	-0.532*** (0.177)
<i>gdppc</i>	-0.00001 (6.90e-06)	-0.0001*** (7.66e-06)	-7.74e-06 (9.77e-06)	–	-0.0001*** (9.95e-06)	-0.0001*** (0.00001)	-0.0001*** (0.00001)
<i>gdp_gr</i>	-0.025* (0.015)	-0.025** (0.010)	-0.091*** (0.016)	-0.048*** (0.013)	-0.060*** (0.016)	-0.119*** (0.011)	-0.106*** (0.013)
<i>ores_me</i>	0.083*** (0.009)	0.106*** (0.010)	0.060*** (0.012)	0.081*** (0.011)	0.073*** (0.011)	0.066*** (0.011)	0.059*** (0.011)
<i>spat_asset_1</i>	0.375*** (0.004)	0.342*** (0.004)	0.331*** (0.005)	0.338*** (0.003)	0.269*** (0.007)	0.315*** (0.006)	0.295*** (0.005)
<i>sub_size</i>	–	–	0.708*** (0.029)	0.670*** (0.018)	0.783*** (0.024)	0.730*** (0.031)	0.765*** (0.032)
<i>exp_int</i>	–	0.027*** (0.005)	–	0.026*** (0.004)	0.023*** (0.005)	0.027*** (0.004)	0.026*** (0.004)
<i>firm_size</i>	–	-2.722*** (0.288)	–	-2.820*** (0.222)	-2.931*** (0.305)	-2.628*** (0.274)	-2.493*** (0.311)
Constant	12.337*** (0.616)	37.526*** (2.971)	9.742*** (1.042)	35.349*** (3.306)	48.403*** (5.059)	38.696*** (4.806)	43.653*** (4.997)
Time dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	665	663	659	657	657	657	659
Subsidiaries	135	134	135	134	134	134	134
Wald	302273.61***	164812.0***	264473.42***	1.43e+06***	82976.01***	145384.24***	108379.66***
AR(1)	-2.543**	-2.683***	-3.462***	-3.371***	-4.021***	-3.601***	-3.924***
AR(2)	0.56	0.191	-1.078	-1.225	-1.250	-1.183	-1.289
Sargan test	82.68	95.98	80.60	81.89	86.233	80.296	94.070

Note: \*\*\*<0.01, \*\*<0.05, \*<0.10. AR(1) and AR(2) are test for serial correlation in the first-differenced errors. The moment conditions are valid when there is no serial correlation in the idiosyncratic component at higher orders (two and above). First lag of the variables are used since the moment conditions using higher lags are redundant.

**Table 3**  
Dynamic panel estimation (excluding subsidiaries in Mauritius, Singapore, UAE, Netherlands) Dependent variable: *spat\_asset*.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>iq</i>	-0.215 (0.136)	-0.127 (0.142)	0.289*** (0.090)	0.711*** (0.119)	0.310** (0.156)	–	0.291* (0.168)
<i>ti_cpi</i>	0.229*** (0.029)	0.152*** (0.036)	0.028 (0.034)	0.029 (0.041)	-0.026 (0.034)	-0.082** (0.036)	–
<i>fdist_gdp</i>	-0.615*** (0.142)	-0.679*** (0.132)	-0.905*** (0.107)	-0.893*** (0.106)	-0.857*** (0.130)	-1.036*** (0.119)	-0.874*** (0.123)
<i>gdppc</i>	0.00004*** (2.55e-06)	0.0001*** (4.47e-06)	0.00003*** (3.37e-06)	–	0.00003*** (3.58e-06)	0.00003*** (2.95e-06)	0.00004*** (3.16e-06)
<i>gdp_gr</i>	-0.013** (0.005)	-0.021*** (0.003)	-0.052*** (0.006)	-0.059*** (0.007)	-0.055*** (0.007)	-0.057*** (0.006)	-0.055*** (0.007)
<i>ores_me</i>	-0.037*** (0.003)	-0.038*** (0.003)	-0.0321*** (0.003)	-0.030*** (0.004)	-0.029*** (0.004)	-0.025*** (0.003)	-0.028*** (0.003)
<i>spat_asset_1</i>	0.029*** (0.002)	0.026*** (0.002)	-0.012*** (0.003)	0.008** (0.003)	-0.010*** (0.003)	0.014*** (0.003)	-0.008** (0.003)
<i>sub_size</i>	–	–	0.156*** (0.006)	0.148*** (0.008)	0.151*** (0.009)	0.138*** (0.010)	0.154*** (0.008)
<i>exp_int</i>	–	0.009*** (0.001)	–	0.010*** (0.001)	0.010*** (0.001)	0.009*** (0.001)	0.009*** (0.001)
<i>firm_size</i>	–	-0.403*** (0.093)	–	-0.319*** (0.105)	-0.259** (0.123)	-0.340*** (0.090)	-0.319*** (0.119)
Constant	-0.868*** (0.162)	-8.403*** (0.538)	-0.306 (0.212)	-3.592*** (0.551)	-4.942*** (0.731)	-2.770*** (0.441)	-5.138*** (0.668)
Time dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	491	489	485	483	483	483	485
Subsidiaries	100	99	100	99	99	99	99
Wald	892626.11***	2.75e+07***	8.95e+07***	6.50e+07***	2.37e+06***	1.28e+08***	2.20e+06***
AR(1)	-1.97**	-1.92*	-1.63	-1.81*	-1.66*	-1.77*	-1.680*
AR(2)	0.95	0.80	1.27	0.96	1.20	0.717	1.14
Sargan test	61.69	69.04	58.08	64.29	62.19	60.572	61.081

Note: \*\*\*<0.01, \*\*<0.05, \*<0.10.

The econometric results presented in Table 3 do not suggest to any consistent impact of corruption on subsidiary performance. Thus there is not much that corruption can help in improving performance of overseas

subsidiaries. At best the impact of corruption on performance could be transient and sample specific. Thus there is no robust impact of corruption on performance. Further, corruption ceased to have significant

coefficient when all three sets of factors are included in the model (column 3, 4 and 5, Table 3). Positive sign of  $ti\_cpi$  in column one can also be due to omitted variables. Nevertheless, the institutional quality variable retained positive and significant sign in the unrestricted models (column 5) as well as models that omit multicollinear variable (column 4, column 7).

Similarly, FDI regime continues to have negative sign and statistical significance. This suggests that performance of subsidiaries has been better where competition from other foreign investor is lower. In addition, GDP growth in the host country remains statistically significant with same (negative) sign as in the baseline. Thus the results pertaining to the impact of institutional quality, investment regime, and GDP growth have been quite consistent with the baseline estimation. However, the exclusion of offshore financial countries from analysis reverses the sign of  $ores\_me$  (and  $gdppc$ ). The results suggest that host countries' resource abundance (captured through export of ores and metals) will not guarantee subsidiary performance and it could depend on multiple factors including scale of operation of the subsidiary and the type of extraction permit the subsidiary gets from host country regulators. The sign and significance of parent firm and subsidiary-specific control variables are qualitatively similar to the baseline.

In sum, the results provide panel data evidence as regards the impact of three sets of variables on subsidiary performance. It thus extends the results of earlier empirical studies based on cross section data on firm performance (Zoogah, 2018). Our results provide evidence that subsidiary performance depends on competition with other investors in the host country, institutional quality at ground, and parent firm and subsidiary-specific operational characteristics.

## 5. Conclusion and policy implications

The importance of ensuring stable supply of metals and mining product in an emerging economy like India motivated us to examine the performance of overseas subsidiaries of Indian multinationals in the extractive sectors. The dynamic panel data model has been estimated to test the impacts of host country's institutional quality, corruption perception, investment regime, economic growth and resource availability on performance of 150 overseas subsidiaries of 23 Indian multinationals spread across 42 host countries in the extractive sectors during 2005–2017. The empirical analysis significantly enhances our understanding about the economic and non-economic drivers of subsidiary performance in the extractive sector.

The results reveal that institutional quality plays significant positive role in impacting subsidiary performance. This implies that overseas

subsidiary performance is better in countries with superior institutional quality. However, the host country factors could affect subsidiary performance quite differently in the extractive industries. Since the impact of corruption perception has been sample specific, then it may be argued that subsidiary performance need not deteriorate even in host countries where corruption was perceived to be higher. Similarly, subsidiaries of Indian multinationals in the resource based sector performed better in countries with lesser competition from other foreign investors and in countries with less developed foreign investment regime. Similarly, performance was not driven by economic growth in the host country. This is not surprising in the extractive industries where local market demand plays a limited role in spurring sales. We believe that this result is due to resource-seeking motive and could be termed sector specific (metals and mining sectors). Given that the Indian firms tend to invest in countries with better institutions, the positive impact of institutional quality on subsidiaries performance is quite encouraging. However, there are differential impact of other host country factors on subsidiary performance. Accordingly, performance implication of these host country factors with respect to the resource based sector needs to be noted in FDI policy and practice.

The paper provides implications for both FDI host countries and emerging multinationals operating in the extractive sector. Improving institutional quality in the host country is important to attract FDI inflows in the extractive sector and to ensure performance of the investing firms. Similarly, there are important implications for emerging firms to enhance subsidiary performance by enhancing local market penetration so as to benefit from economic growth in the host country. This will also require presence of enabling business environment in the host market by the respective host-governments. However, the multinationals in the resource-based sector will need to improve performance in competitive markets where FDI regime is well developed and where corruption is lower. Enhancing the scale of operation can also be helpful. This may require more liberal outward FDI regime in India for the resource-based sector as the sector plays vital role in ensuring stable supply of commodities that are essential to meet both domestic and overseas needs of growing economies. On a final note, these findings bearing crucial policy implications might suggest both home and host governments to liberalize outward and inward FDI respectively along with added focus on the part of the latter to improve institutional quality and investment regime to benefit from resource availability.

## Declaration of competing interest

The authors have declared that no competing interest exists.

## Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.resourpol.2020.101664>.

## Appendix

**Host countries:** Algeria, Australia, Bahrain, Bangladesh, Belgium, Bolivia, Botswana, Brazil, Cameroon, Canada, China, Congo, Cote D'Ivoire, France, Germany, Indonesia, Madagascar, Malawi, Malaysia, Mauritius, Mozambique, Namibia, Nepal, Netherlands, Norway, Oman, Qatar, Senegal, Singapore, South Africa, Spain, Sri Lanka, Sweden, Tanzania, Thailand, UAE, UK, USA, Uganda, Vietnam, Zambia, Zimbabwe.

**Sample countries with satisfactory or meaningful progress as per EITI standards:** Cameroon, Cote D'Ivoire, Germany, Madagascar, Mozambique, Norway, Senegal, Tanzania, Zambia. The compliance is as per 2016 EITI standard (<https://eiti.org/countries>). As of November 2017, the initiative had 51 member countries as they were implementing the EITI standards. Upto 2015, compliance was assessed against the 2011 rules. EITI was formed in 2003 to improve financial transparency and governance in the extractive industry.

## Construction of institutional quality (iq) index

The raw data pertaining to various dimensions of institutional quality ( $I_{ij}$ ) were collected from World Governance Indicators. These indicators are control of corruption, government effectiveness, political stability and absence of violence/terrorism, regulatory quality, rule of law, voice and accountability. As individual governance indicators can be highly correlated (Daude and Stein, 2007), these dimensions of institutional quality were

aggregated and a single index of institutional quality was developed following Xu et al. (2019). A higher *iq* index denotes a better institutional environment.

The process of aggregation is stated below: Step 1: standardization

$$I_{ij}^* = \frac{I_{ij} - \min(I_{ij})}{\max(I_{ij}) - \min(I_{ij})} \text{ where } i = 1, 2, \dots, m; j = 1, 2, \dots, n \tag{3}$$

$I_{ij}$  denotes the institutional quality score of *i*th country in the *j*th dimension.

Step 2: translation of standardized data

$$I_{ij}^* = 1 + I_{ij}^* \tag{4}$$

Step 3: calculate the entropy ( $e_j$ ) of the *j*th dimension as well as the coefficient of variation ( $g_j$ )

$$e_j = -\frac{1}{\ln m} \sum_{i=1}^m I_{ij} \ln I_{ij} \tag{5}$$

$$g_j = 1 - e_j \tag{6}$$

where,  $I_{ij} = \frac{I_{ij}}{m \sum_{i=1}^m I_{ij}}$

Step 4: calculate the final weight of each institutional dimension

$$W_j = \frac{g_j}{\sum_{j=1}^n g_j} \tag{7}$$

Step 5: calculate the (overall) index of institutional quality

$$iq_i = \sum_{j=1}^n W_j I_{ij} \tag{8}$$

**Table A1**  
Sample industries.

Nic (3-digit) code	Industry
239	manufacture of non-metallic mineral products nec
241	manufacture of basic iron and steel
242	manufacture of basic precious and other non-ferrous metals
243	Casting of metals
251	manufacture of structural metal products, tank, reservoirs and steam generators
259	manufacture of other fabricated metal products; metalworking service activities

**Table A2**  
Description of variables and data sources.

Variable	Description of independent variables	Data source	Hypothesis
<i>iq</i>	Institutional quality index	Constructed using the World Governance Indicators	>0
<i>ti_cpi</i>	Corruption Perception Index	Transparency International	>0
<i>fdist_gdp</i>	FDI stock as % of GDP of host country	World Investment Report 2018 & World Development Indicators	<0
<i>gdppc</i>	GDP Per Capita (US \$) of host country	World Development Indicators	
<i>gdp_gr</i>	GDP growth (annual %) of host country	World Development Indicators	>0
<i>ores_me</i>	Ores and metals exports (% of merchandise exports) of host country	World Development Indicators	>0
<i>spat_asset_1</i>	Subsidiary's profit after tax as a share of asset (first lag)	Compiled from Annual Reports	
<i>sub_size</i>	Subsidiary size measured by log of asset	Compiled from Annual Reports	
<i>exp_int</i>	Export intensity: parent firm's export as a % of sales	CMIE	
<i>firm_size</i>	Parent firm's size measured by log of sales	CMIE	



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