Susanna Thede · Daniel Gravino

Foreign Direct Investment and Corruption

Multinational Enterprises' Behaviour in Corrupt Environments

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CHAPTER 1

Introduction

Abstract Multinational enterprises generate roughly one-third of global economic activity and their cross-border investments in subsidiary production platforms have multiplied many times over recent decades. Corruption is an obstacle to enterprises' production activities in many countries where they operate. Despite this, little is known about the multinational enterprise's investment behaviour in corrupt environments. We provide theory and evidence on market corruption mechanisms that impact the enterprise's foreign direct investment engagement. Our integrated approach goes beyond prior contributions in the field to lay bare core corruption mechanisms and unveil base components that explain investment adaptation. Theory is put to rich data on Swedish enterprises' foreign direct investment engagements over an 18-year period (1997–2015), which enables an identification of systematic investment/disinvestment effects of corruption.

Keywords Multinational enterprise · Foreign direct investment · Corruption

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1.1 Background and Scope

Multinational enterprises (MNEs) generate roughly one-third of global economic activity, and around 30% of their production takes place in foreign subsidiaries (Becker et al., 2019). MNEs' organisational structures include foreign production platforms to raise profits through access to localised advantages. They invest in sales and/or source markets, regularly outperforming (purely) domestic enterprises (e.g., Mayer & Ottaviano, 2008; Tomiura, 2007). Cross-border investments in subsidiary production platforms have multiplied many times over recent decades as rapid technological progress has reduced transport and transmit costs and trade partners have engaged in (bilateral and/or multilateral) liberalisation to limit trade costs. Global foreign direct investment (FDI) more than tripled from 1997 to 2010 and subsequently doubled by 2023.[1] The production process has become more fragmented for many MNEs, and corruption is an obstacle to production activities in many countries where they operate. Despite this, little is known about the multinational enterprise's investment behaviour in corrupt environments. The multinational enterprise's organisation and location decision has been analytically informed (e.g., Antràs & Helpman, 2004; Helpman et al., 2004), particularly focusing on its technology and (external) locational cost structures. Related empirical studies that examine their predictions (e.g., Corcos et al., 2013; Thede, 2017; Yeaple, 2009) find that they are evidenced from granular micro data. In particular, enterprises with superior technology engage in (horizontal or vertical) FDI. To the extent that institutional deficiencies are considered in this research, they pertain to contracting limitations that affect relationship-specific investments of the headquarter and subsidiary (e.g., Antràs & Yeaple, 2014). Specifically, legislative weaknesses can reinforce the hold-up problem in the investment relationship, weakening the headquarter's incentive to engage in FDI. Another, empirically oriented, strand of the research field investigates the host country corruption effect on foreign direct investment. This research largely relies on aggregate data, providing mixed evidence on the direction of the corruption effect (e.g., Egger & Winner, 2005; Hines, 1995; Wei, 2000). The discrepant corruption results have been attributed to different cost mechanisms (to be detailed below). Studies

[1] In real terms based on reported UNCTAD FDI data and World Bank consumer price index data.

that account for corruption in the investment origin country show that FDI is stimulated by a similar corruption level in the destination country (Brada et al., 2019; Habib & Zurawicki, 2002; Ledyaeva et al., 2013), which points to the importance of common investment conditions for market performance. Micro-level evidence unveils distinct investment responses to corruption among comparable enterprises of the same origin, showing that corruption constraints are tied into production and market conditions (e.g., Hakkala Nilsson et al., 2008; Thede & Karpaty, 2023). While investigating facets of investment behaviour in corrupt environments, research contributions in this area remain fragmented and lack a unified theoretical basis. We provide theory and evidence on market corruption mechanisms that impact the enterprise's foreign direct investment engagement. Our integrated approach goes beyond prior contributions in the field to lay bare corruption mechanisms and unveil base components that explain investment adaptation. Theory is put to rich data on Swedish enterprises' foreign direct investment engagements over an 18-year period (1997–2015), which enables an identification of systematic investment/disinvestment effects of corruption.

Corruption is a main impediment to enterprise activities in most markets (World Bank Enterprise Surveys (WBES), 2025). Fisman and Svensson (2007) estimate that corruption is roughly three times as growth impeding as taxation for Ugandan firms. In a study of Brazilian local governments, Colonnelli and Prem (2021) show that more firms are active in government-dependent sectors (relating to, e.g., public procurement) after audits that detect and deter corruption. Similar findings on the cost imposition and competitive constraint of corruption are found in other contexts. Corruption is commonly defined as the use of public office for private gain, which comprises a wide range of (illicit) activities at various levels of government. Common corrupt practices include slowing down administrative processes to extract payments for expediting requests (speed money), circumventing regulatory enforcement in return for bribes, and making public procurement deals to generate private returns (kickbacks). These can be categorised into petty corruption, which are smaller transactions used in administrative processing, and grand corruption, which are high-level deals (involving, e.g., ministers) including substantial private rewards. Corruption is closely interlinked with administrative inefficiencies in public office (e.g., Rose-Ackerman, 1999). Gauthier et al. (2021) show that businesses acceding to bribery requests from tax officials increase their unreported sales by 16% using

WBES data from 77 developing countries. Some research contributions have pointed to a second-best efficiency argument for corruption that alleviates cumbersome regulation (e.g., Leff, 1964; Lui, 1985) while others have argued that such regulatory constraints are in place to entice corrupt practices (e.g., Aidt, 2003; Bardhan, 2006). The debate hinges on discrepant views on corruption cost fundaments, which require empirical micro-economic evidence to be informed (Aidt, 2009). Previous studies show that firm/enterprise characteristics are important for performance in corrupt systems (e.g., Demir et al., 2022; Hellman et al., 2003; Nguyen et al., 2012) with results indicative of resource reallocation that counteracts market efficiency. Our theoretical framework gives a detailed exposition of corruption cost effects, which are defined by the cost imposition of corruption (i.e., not necessitating corrupt activities), that impact individual and market investment outcomes. The enterprise data has the twofold advantage of complete reporting of foreign market engagements (i.e., without downward size limitations) and originating in a country where the rules of the game follow legal standards, which ensures that the results are not subject to sample selection or home corruption infiltration bias. We provide direct evidence on corruption cost effects on market entry, operations and exit, which contributes to evaluate the basis of the efficiency argument for corruption.

Corrupt practices are deeply ingrained into national institutions (e.g., Andvig & Moene, 1990; Mauro, 2002; Mishra, 2006) as public officials' preferences are conditioned by institutional constraints such as monitoring, transparency and penalties (e.g., Banerjee et al., 2012; Bardhan, 1997). There is no reason to expect these preferences to be affected by the ownership or organisational form of the enterprise interacted with. Anecdotal evidence abounds of corruption hindrances to production activities of multinational enterprises. E.g., IKEA halted its planned expansion in Russia in 2009 to reduce its corruption exposure. A case in point was the use of diesel generators to get electricity without resorting to corrupt activities, which was compromised by a local executive inflating the price in return for kickbacks from the supplier (New York Times, 2009). Foreign MNEs can however face different corruption constraints than purely domestic enterprises on several grounds. First, the multinational enterprise's organisational form allows it to uproot production at lower cost as it can redeploy some invested capital (e.g., machinery) to production platforms in other countries (e.g., Bernard & Jensen, 2007; Bernard & Sjöholm, 2003; Görg & Strobl, 2003). Second, enterprises

outside the jurisdiction are less informed about corruption (Cuervo-Cazurra, 2016) as it forms part of informal rules and norms that cannot be transcribed or codified due to their illicit nature. This lack of market know-how can be a stark investment deterrent for foreign MNEs from uncorrupt countries (Couttenier & Toubal, 2017; Thede & Karpaty, 2023). Third, multinational enterprises can face outside penalties through international anti-corruption legislation (Cuervo-Cazurra, 2006; Hines, 1995). Though the behavioural impact of such legislation depends on its bite (i.e., enforcement) and the probability of detection, the incurred costs of malfeasance can be substantial. E.g., Walmart agreed to pay 137 million USD in 2019 to resolve charges violating the U.S. Foreign Corrupt Practices Act relating to lacking due diligence enforcement in its foreign market operations (U.S. Justice Department, 2019). Swedish MNEs are subject to the OECD anti-bribery convention (in force since 1999), though it has not been effectively enforced in the jurisdiction (OECD, 2024). We incorporate corruption constraints to foreign direct investment into the theoretical framework featuring, e.g., a corruption uncertainty barrier to market entry and stop-loss through market exit. It should be noted that foreign investors can use their bargaining position to affect, e.g., regulatory constraints (Campos & Giovannoni, 2007) and limit corruption costs (Hakkala Nilsson et al., 2008; Thede & Gustafsson, 2017). Though it is outside the scope of this book to investigate particular lobbying possibilities, we caution the link to corrupt behaviour interpreting the results and narrowly pin down indicative evidence of undue undertakings.

In this book, we provide a simple, stylised, small-scale model representation of the enterprise's investment decision and position in a foreign market infiltrated by corruption. In a setting with many heterogeneous enterprises in Cournot competition, we examine corruption cost effects on market outcomes (in Nash-Cournot equilibrium). Enterprises are heterogeneous in terms of production technologies and possibly their capabilities to reduce the cost imposition of corruption (at a given corruption level), which gives an exposition of individual investment engagement and performance outcomes under different market conditions. The capability to invest in a corrupt environment is consistent with the use of bribery (or bargaining power) to buy down costs. The enterprise's investment behaviour depends on its corruption-related expenses and market adjustment to corruption (taking account of competitor behaviour) in this setting. The enterprise's foreign market engagement

is also investigated under a priori corruption uncertainty in a two-stage game where the entry choice is based on market assessment (at stage 1) and the continued investment (or exit) choice is informed (at stage 2). The enterprise's investment engagement and return depend on its market evaluation (i.e., perceived corruption risk) and, if entering the market, the cost imposition of corruption in this game. Our theory contributes to explain investor behaviour that is difficult to reconcile with symmetric corruption costs and perfect information fundaments. In addition to prior theoretical frameworks investigating foreign direct investment and corruption cost asymmetries (Hakkala Nilsson et al., 2008; Javorcik & Wei, 2009) or corruption uncertainty (Campos et al., 2010; Wei, 1997), we formalise the market-adjustment effect channelling competitor cost conditions and the information barriers that face market entrants. These components are at the core of the foreign market conditions that determine the enterprises investment decision, position and performance.

The empirical investigation is performed using a gravity approach to examine bilateral FDI engagements (Anderson, 2011) in suitable format to estimate foreign market conditions (à la Head & Mayer, 2014). Market entry, investment and exit regressions with interaction terms are estimated to identify enterprise-specific corruption effects and marginal effects are computed to evaluate corruption impacts. While the identification of corruption effects is facilitated by the utilisation of data on enterprises of uncorrupt origin, and their estimates are applicable in this context, there is no reason to expect the mechanisms they represent to differ for enterprises of corrupt origin. Enterprise results are provided on industry basis to analyse investment behaviour under comparable production and market conditions. The manufacturing, mining & quarrying, communication & information services, finance & insurance services and professional, scientific & technical services industries are included in the investigation. This enables a detailed analysis of enterprises that invest under widely varying production and market conditions, which is used to place the results in theoretical context and relate them to other findings. In addition, alternative corruption measurement (with respect to petty/grand corruption) further informs the results' interpretation. We provide representative evidence on systematic behavioural investment patterns, which is unusual in the research field and (to our knowledge) does not previously exist for mining and quarrying enterprises or divestments.

1.2 Structure

The rest of this book is organised as follows. In Chap. 2, we present the theoretical framework to frame core corruption mechanisms that impact the enterprise's foreign direct investment engagement. The next chapter contains a detailed description of our enterprise and corruption data, providing statistics descriptives on data variables and relationships (by industry). The empirical investigation, which reports and discusses the estimation results at length, is provided in Chap. 4. The last chapter gives a summary of the main findings (placed in literature context) and concluding remarks.

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CHAPTER 2

Theoretical Framework

Abstract We study the enterprise's FDI engagement in a foreign market using a small-scale structure to formalise core corruption mechanisms relating to production and market conditions. The enterprise's investment and performance are examined under Cournot market competition (between heterogeneous enterprises) or in a two-stage game of the investment decision process under corruption uncertainty. We introduce the enterprise capability to limit the cost imposition of corruption and derive Nash-Cournot market equilibria to pinpoint corruption effects. Our game structure incorporates learning through investing. The enterprise's market participation and performance depend on its market assessment and/or encountered market corruption level. The theoretical framework provides predictions for a range of scenarios, which can be applied in general context.

Keywords Multinational enterprise · Foreign direct investment · Cournot competition · Game structure

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2.1 Introduction

Our theoretical framework is built on the standard behavioural assumptions that the enterprise acts on profit-maximising objectives, exerts market power and internalises the market price impact of its engagement. It can invest in a foreign (sales) market and compete with other (heterogeneous) multinational enterprises in Cournot manner. The enterprise's investment behaviour depends on its individual cost structure, which is based on its production technology (i.e., cost efficiency) and capability investing in corrupt environments (corruption capability). In addition, it faces investment risk if market engagement is required to get informed about corruption. The basic set up is akin to prior theoretical frameworks in the field (e.g., Nilsson Hakkala et al., 2008; Wei, 1997). A key discrepancy is the study of differential corruption effects stemming from enterprise-specific corruption capability or market corruption assessments. Prior research indicates that enterprise-specific corruption capabilities exist (e.g., Bennedsen et al., 2011; Thede & Gustafson, 2017; Thede & Karpaty, 2023) and that the obscure nature of corruption involves investment risk that can turn out to be particularly costly to investors (e.g., Rose-Ackerman, 1999; Wei, 1997). Our primary analytical contribution is to disentangle how the enterprise's investment performance is affected by its corruption capability and uncertainty under given market conditions.

The rest of this chapter is structured as follows. In Sect. 2.2, a baseline framework of the enterprise's investment engagement in a foreign (sales) market with corruption is presented. The framework is extended to include many heterogeneous enterprises with intrinsic production technologies in Cournot competition in Sect. 2.3. The framework is extended further to incorporate enterprise-specific corruption capabilities in the next section. In Sect. 2.5, a modified baseline framework of the enterprise's investment engagement under corruption uncertainty is provided. The last section concludes.

2.2 Baseline Framework

A single enterprise considers setting up production in a foreign market with inverse demand function $P(Q)$, where P is the per-unit price and Q is the quantity demanded. The inverse demand function declines in the quantity, $dP/dQ < 0$. The enterprise's investment cost takes the form of a fixed market-entry cost F and a constant per-unit variable cost c, implying

that the average cost $(F/Q + c)$ decreases in its output level generating economies of scale in production. The variable cost component decreases in the quality of its production technology φ $(dc/d\varphi < 0)$. The enterprise encounters corruption barriers in the foreign market, which add to investment costs. Its fixed and per-unit variable costs increase in the corruption level θ, $dc/d\theta > 0, dF/d\theta > 0$. The fixed corruption-related cost increases the barrier to entry capturing a characteristic commonly observed in corrupt environments (e.g., Campos et al., 2010; Thede & Karpaty, 2023). The variable corruption-related cost includes additional expenses incurred to run operations and establish sales channels (Nilsson Hakkala et al., 2008).

The enterprise's profit π from investing in the foreign country is

$$\pi = TR(Q) - TC(Q), \tag{2.1}$$

where TR and TC are the enterprise's total investment revenues and costs at output level Q. Its profit function, which is assumed to be strictly concave in Q and twice differentiable, equals

$$\pi = (P(Q) - c) \cdot Q - F. \tag{2.2}$$

The enterprise invests if it can make a profit, $\pi > 0$. If so, it produces at the level equating its marginal revenue and marginal cost $(d\pi/dQ = 0, d^2\pi/dQ^2 < 0)$ to attain maximum profit π^*. This level of output Q^* increases with a more cost-efficient production and decreases in the corruption cost imposition (via c). The profit-maximising price P^* is inversely affected. Consumers benefit from the MNE's use of a better production technology and lose out as it encounters more corruption problems.

2.2.1 *Illustrative Case*

For ease of exposition, the inverse market demand function is set to $P(Q) = 1 - Q$. The enterprise's profit function is then given by

$$\pi = (1 - Q - c) \cdot Q - F. \tag{2.3}$$

Taking its derivative and using $d\pi/dQ = 0$ to solve for the profit-maximising output level yields

$$Q^* = \frac{1}{2}(1 - c), \tag{2.4}$$

which decreases in the enterprise's marginal cost. The output effect of a marginal increase in the corruption level equals

$$\frac{dQ^*}{d\theta} = -\frac{1}{2}c'(\theta). \tag{2.5}$$

The enterprise produces less in a more corrupt environment in line with evidenced private sector impediments of corruption (e.g., Mauro, 1995; Rose-Ackerman, 1999; Wei, 1999).

Inserting (2.4) into the inverse demand function to solve for the profit-maximising price yields

$$P^* = \frac{1}{2}(1 + c). \tag{2.6}$$

P^* is independent of F implying that the fixed (sunk) cost does not alter the price that the multinational enterprise charges consumers. The marginal cost affects the price via pass through. Specifically, half of the marginal cost increase that results from corruption is passed onto consumers. This is in line with the view that the producer can shed some, but not all, of the cost burden of corruption (Dixit, 2018).

Inserting (2.4) into (2.3) to derive the maximised profit level yields

$$\pi^* = \frac{1}{4}(1 - c)^2 - F. \tag{2.7}$$

This profit level decreases in the enterprise's per-unit variable and fixed cost. It can be noted that $c < 1$ is a necessary condition for operating profits to be made. That the operating profit exceeds the fixed cost, $\frac{1}{4}(1 - c)^2 > F$, is a sufficient condition for FDI engagement. Due to the trade-off between the cost efficiency in production and the cost imposition of corruption, a better technology is required to profit in a corrupt environment.

The profit effect of a marginal increase in the corruption level equals

$$\frac{d\pi^*}{d\theta} = -\frac{1}{2}(1 - c(\theta))\frac{dc}{d\theta} - \frac{dF}{d\theta}, \tag{2.8}$$

where the first term captures the reduced operational profit and the second term captures the fixed cost increment. The enterprise's profit decreases in the market corruption level, implying that the corruption cost imposition limits market attractiveness.

2.3 Extended Framework

The framework is extended to include many enterprises that (simultaneously) consider setting up production in the foreign market. The enterprises are heterogeneous based on intrinsic production technologies and indexed by $i = 1, \ldots I$ in descending productivity order. Their products are regarded as perfect substitutes in the foreign market, where they engage in Cournot (1838/1927) competition. The corruption cost imposition is symmetric across enterprises. Enterprise i's cost structure depends on its technology φ_i and fixed and per-unit variable costs at a given corruption level θ, $F_i(\theta)$, $c_i(\varphi_i, \theta)$. Its profit function is

$$\pi_i = (P(q_i + Q_{-i}) - c_i) \cdot q_i - F_i, \tag{2.9}$$

where q_i is its output level and Q_{-i} is the aggregate output of its competitors, $Q_{-i} = \sum_j q_j \; \forall j \neq i$. Enterprise i sets up production if expecting to make a profit taking its competitors' expected behaviour into account, $\pi_i(q_i|Q_{-i}) > 0$. It then produces at the level that equates its marginal revenue and marginal cost to get the highest profit (i.e., $d\pi_i/dq_i = 0$, $d^2\pi_i/dq_i^2 < 0$) given other market output. Enterprise i's reaction function traces its profit-maximising output level in relation to the aggregate output of its competitors, $q_i^R(Q_{-i})$. The reaction function provides a higher q_i for any given Q_{-i} if its production technique is more cost-efficient and/or it encounters lower market corruption barriers.

In Nash-Cournot equilibrium, enterprises that invest produce at profit-maximising levels and do not gain from altering behaviour. Denoting the number of enterprises that invest by N, their equilibrium investment performances $((q_1^*, \ldots q_N^*), \; (\pi_1^*, \ldots \pi_N^*))$ are ranked in descending order of the quality of their production technologies. If $N < I$, enterprise 1 to N invest and other enterprises that are not productive enough to profit stay out of the market. The equilibrium market quantity $Q^* = \sum_{i=1}^{N} q_i^*$ increases in the (general) state of technology and decreases in the corruption level. The market-clearing price P^* is inversely affected. Consumers

gain from a better state of technology and are worse off when producers face more corruption impediments.

To sum up the main implications, the ranking of enterprises' investment performances is determined by the quality of their technologies in equilibrium. There is sorting of the most productive enterprises that can cover investment barriers and make a profit into FDI engagement. The sorting pattern is akin to the Helpman et al. (2004) model outcome. As corruption increases investment barriers, it restricts competition (as in Campos et al., 2010). The market output level is reduced by corruption, and the market-clearing price increases, at consumers' expense.

2.3.1 *Illustrative Case*

If the inverse demand function is $P(Q) = 1 - Q$, enterprise i's profit function equals

$$\pi_i = (1 - q_i - Q_{-i} - c_i) \cdot q_i - F_i. \tag{2.10}$$

Its reaction function is derived using $d\pi_i/dq_i = 0$ to solve for the profit-maximising output level,

$$q_i^R = \frac{1}{2}(1 - Q_{-i} - c_i). \tag{2.11}$$

Aggregating the profit-maximising output levels of enterprises that invest in equilibrium, and produce on their reaction functions, yields

$$\sum_{i=1}^{N} q_i^* = \frac{1}{2}\left(N - \sum_{i=1}^{N} Q_{-i}^* - \sum_{i=1}^{N} c_i\right), \tag{2.12}$$

where Q_{-i}^* is the output aggregate of enterprise i's profit-maximising competitors. Inserting $Q_{-i}^* = Q^* - q_i^*$ into (2.12) and solving for the equilibrium level of market output yields

$$Q^* = \frac{N - \sum_{i=1}^{N} c_i}{N + 1}. \tag{2.13}$$

This market output level decreases in each enterprise's marginal cost and increases in the number of investing enterprises. Inserting (2.13) into the

inverse demand function gives the equilibrium market price

$$P^* = \frac{1 + \sum_{i=1}^{N} c_i}{N + 1}. \tag{2.14}$$

This market price increases in each enterprise's marginal cost and decreases in the number of investing enterprises. Corruption increases the price, passing through $N/(N + 1)$ of its marginal cost imposition to consumers. The market price is more responsive to corruption-related investment costs at a higher N as the market power of each enterprise is limited by the larger number of competitors and their markups are lower.

Enterprise i's equilibrium production level is derived by inserting $Q^*_{-i} = Q^* - q^*_i$ and (2.13) into (2.11) and solving for q^*_i :

$$q^*_i = \frac{1 - Nc_i + \sum_{j=1}^{N-1} c_j}{N + 1}, \tag{2.15}$$

which decreases in the enterprise's marginal cost, increases in the marginal cost of each competitor j and decreases in the number of investing enterprises. It can be noted that $c_i < (1 + \sum_{j=1}^{N-1} c_{j\neq i})/N$ is a necessary condition to produce in equilibrium.

Deriving the enterprise's production effect of a marginal increase in the corruption level, taking the symmetric cost increment into account, yields

$$\frac{dq^*}{d\theta} = -\frac{1}{N + 1}\frac{dc}{d\theta}, \tag{2.16}$$

where subscripts are suppressed for the symmetric effects. The enterprise's output reduction increases with the corruption-related cost addition by a magnitude that is limited by N.

Enterprise i's equilibrium profit level is derived by inserting $Q^* = q^*_i + Q^*_{-i}$, (2.13) and (2.15) into (2.10) and rearranging the terms:

$$\pi^*_i = \frac{\left(1 - Nc_i + \sum_{j=1}^{N-1} c_j\right)^2}{(N + 1)^2} - F_i. \tag{2.17}$$

The enterprise's profit decreases in its fixed and marginal cost, increases in the marginal cost of each competitor and decreases in the number of

investing enterprises. Enterprise i needs to be cost-efficient enough to make an operating profit and cover its fixed cost to profit in equilibrium, making $c_i < (1 + \sum_{j=1}^{N-1} c_j - \sqrt{F_i}(N+1))/N$ a sufficient condition for investing.

Enterprise i's profit effect of a marginal increase in the corruption level equals

$$\frac{d\pi_i^*}{d\theta} = -\frac{2\left(1 - Nc_i(\theta) + \sum_{j=1}^{N-1} c_j(\theta)\right)}{(N+1)^2}\frac{dc}{d\theta} - \frac{dF}{d\theta}. \tag{2.18}$$

The enterprise's profit is reduced by a magnitude that declines in its competitiveness (relatively low c_i and low N). A more productive enterprise reduces its market share less, generating a beneficial market-adjustment effect that partly offsets the output-restrictive effect of higher corruption-related costs. Corruption is less limiting for more productive enterprises, which contributes to explain the empirical observation that larger enterprises are less deterred by corruption than other enterprises (e.g., Bennedsen et al., 2011; Campos & Giovannoni, 2007; Thede & Gustafson, 2017).

2.4 Extended Framework with Corruption Capability

The extended framework is modified to allow for enterprises' capability to lower the cost imposition of corruption. Such may take the form of less corrupt activity or the use of legal means (e.g., lobbying) to counteract corruption pressure. If regulatory constraints are in place to entice bribery (Aidt, 2009; Banerjee et al., 2012; Kaufmann & Wei, 1999), it can also include illicit payments to limit the intertwined regulatory burden (e.g., speed money). Enterprise i's corruption capability is inversely measured by a proportional parameter $\lambda_i \in (0, 1]$ that limits corruption impediments faced at level θ to $\lambda_i\theta$. The enterprise's cost structure depends on its technology φ_i and experienced corruption level $\lambda_i\theta$, $c_i(\varphi_i, \lambda_i\theta)$ and $F_i(\lambda_i\theta)$.

Before turning to the full-fledged setting, we note that the introduction of corruption capability into the baseline framework affects the single enterprise via a cost-reducing effect that increases its output and profit. Scaling up the structure to include many enterprises adds a pro-competition effect working through competitors' (capability-induced)

output expansion in the market. Enterprise i's profit $\pi_i(q_i|Q_{-i})$ increases in its capability to reduce corruption-related costs (lower λ_i) and decreases in the fiercer competition of corruption capable competitors (lower $\bar{\lambda}_j, \bar{\lambda}_j = \sum_{j=1}^{N-1} \lambda_j/(N-1)$). The enterprise's reaction function $q_i^R(Q_{-i})$ provides an output level that is larger in relation to its competitors' aggregate output level, the larger is its relative corruption capability $\bar{\lambda}_j/\lambda_i$.

The Nash-Cournot equilibrium is altered by each enterprise's output adjustment (taking its competitors' expected output changes into account). In the special case of symmetry ($\lambda_i = \lambda_j \, \forall i, j$), every enterprise's output and profit increases with the lower cost imposition of corruption. The effect is equivalent to that of a proportional θ reduction in the underlying many-enterprise setting ($\lambda_i = 1 \, \forall i$), resulting in a larger market output Q^* and lower market price P^*. Investment sorting on the basis of production technology is preserved, possibly including more MNEs in the market (that make a marginal profit at the lower corruption level). The outcome is consistent with the efficiency argument for corruption, which states that corrupt activities can reduce inefficiencies (i.e., linked to policymaking or administration) and improve market outcomes (e.g., Leff, 1964; Lui, 1985). It can be noted that this is a second-best argument as abolishing corruption would improve efficiency more. In the general case allowing for asymmetry ($\lambda_i \neq \lambda_j \, \forall i, j$), the market position of each enterprise is adjusted based on its relative corruption capability. Due to corruption-related cost advantages, production technology becomes less important for investment performance. The market restructuring towards enterprises more capable of investing in the corrupt environment can thereby uproot technology-based investment sorting. A reshuffling towards enterprises with technology of lower quality distorts regular market mechanisms. The outcome is consistent with the corruption efficiency counterargument that corruption channels resources into wasteful uses (e.g., Aidt, 2009; Banerjee et al., 2012; Tanzi, 2002).

2.4.1 *Illustrative Case*

The illustrative case set out in (2.10)–(2.15) and (2.17) is applied noting that investment costs channel enterprises' experienced corruption levels $\lambda_i\theta \, \forall i$. The limiting cost imposition of corruption is brought out in the marginal corruption effects.

Enterprise i's production effect of a marginal increase in the corruption level equals

$$\frac{dq_i^*}{d\theta} = -\frac{\left(N\lambda_i - (N-1)\bar{\lambda}_j\right)}{N+1}\frac{dc}{d\theta}. \tag{2.19}$$

which increases in the relative corruption capability $\bar{\lambda}_j/\lambda_i$, ranging from an output loss to an output gain at superior capability. The enterprise's output adjustment in response to the higher corruption level depends on the cost-reducing effect of its capability and the pro-competition effect of other enterprises' capabilities. It contracts its output by a magnitude that declines in $\bar{\lambda}_j/\lambda_i$ up to a threshold where the effects cancel out ($\bar{\lambda}_j/\lambda_i = N/(N-1)$). Above this point, it expands its production by a magnitude that increases in $\bar{\lambda}_j/\lambda_i$. Corruption reinforces the corruption-related cost advantage of an enterprise with superior capability, increasing its market share and output level. The outcome clearly illustrates a market-distortive effect commonly observed in corrupt environments, where more capable enterprises are favoured at others' expense (Hellman et al., 2002, 2003).

Enterprise i's profit effect of a marginal increase in the corruption level equals

$$\frac{d\pi_i^*}{d\theta} = -\frac{2\left(1 - Nc_i + \sum_{j=1}^{N-1} c_j\right)\left(N\lambda_i - (N-1)\bar{\lambda}_j\right)}{(N+1)^2}\frac{dc}{d\theta} - \lambda_i\frac{dF}{d\theta}, \tag{2.20}$$

where the first term captures the operating profit effect, which increases in its relative corruption capability (ranging from a reduction to an expansion), and the second term captures the fixed cost addition, which declines in its capability. The enterprise's operating profit is reduced below a relative corruption capability cut-off point (where the cost-reducing and pro-competition effects are equalised), and increases at higher $\bar{\lambda}_j/\lambda_i$. The profit level increases in θ if its corruption capability is very strong and superior to that of its competitors. A higher corruption level and more left-skewed λ-distribution in the enterprise population contributes to strengthen the corruption-related cost advantage of more capable enterprises. The array of possible outcomes shows that corruption capable enterprises are less deterred, and may even be stimulated, by corruption. This aligns with empirical evidence of a differential corruption effect on FDI originating in uncorrupt and corrupt systems (Brada et al.,

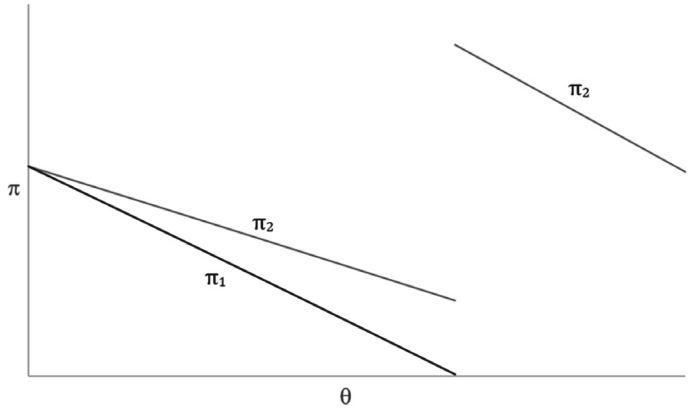

Fig. 2.1 Enterprise profit functions and corruption ($N = 2, \lambda_1 = 1, \lambda_2 = 0.75, 0 \leq \theta \leq 1$)

2019; Cuervo-Cazurro, 2006; Habib & Zurawicki, 2002; Ledyaeva et al., 2013).

A simplified case of two enterprises with symmetric technology is used to illustrate equilibrium output and profit effects of corruption under normal conditions. The discrepant corruption constraints disproportionately reduces the output of the more burdened enterprise via an effect that increases in the corruption level. In Fig. 2.1, enterprise profit effects of corruption are displayed for a scenario where only enterprise 2 has corruption capability. The different corruption cost imposition limits enterprise 2's (output and) profits less and puts enterprise 1 out of business at a sufficiently high corruption level. In effect, corruption makes enterprise 2 better off at this point ($\theta \approx 0.66$) because it inhibits competitor investment. This example demonstrates how corruption capability can overturn regular market performance (related to production technology) and reduce competition in a corrupt market.

2.5 Corruption Uncertainty

Corruption uncertainty is intrinsic to the obscure nature of corruption, which implies that information is hidden to outside parties. Enterprises learn about market corruption through market engagement. Adding on investment risk makes the theoretical framework more complex. To

unveil underlying mechanisms while avoiding unnecessary complexity, corruption uncertainty is analysed for a single enterprise.

The baseline setting is modified to investigate a scenario where the enterprise is uncertain about the corruption level in making its investment decision. The enterprise learns about the corruption level through market entry and can adjust its investment position. Its investment behaviour is formalised in a two-stage game where the market-entry choice is based on profit expectations at stage 1, and the subsequent (informed) production choice is based on operating profit considerations (as set up costs are sunk) at stage 2. The game is solved by backward induction.

At stage 1, the risk-neutral enterprise decides to invest if expecting to profit ($E(\pi) > 0$). It otherwise stays out of the market and forgoes any investment return that could have been made. The enterprise becomes informed through market entry as tackling corruption-related impediments are integral to set up production in corrupt systems. The corruption level is obtained as a random draw from a uniform distribution in the $[\theta_L, \theta_H]$ interval, where θ_L and θ_H denote the lowest and highest plausible levels in the market. Let θ_T denote the corruption threshold level at which operating profits are null. If $\theta > \theta_T$, the enterprise limits its capital destruction to $F(\theta_T)$ in anticipation of market exit. The setup is consistent with findings of the multinational enterprise's ability to limit its loss leaving a market (e.g., Blanchard et al., 2016; Görg & Strobl, 2003).

At stage 2, the enterprise uses θ to reassess its investment position and chooses to continue investing if it can make an operating profit producing for the market. If $\theta \leq \theta_T$, the enterprise stays in the market and produces at the level maximising its operating profits (i.e., where the marginal revenue equals the marginal cost). This replicates the profit-maximising outcome in the baseline framework at a sufficiently low corruption level and generates the loss-minimising outcome (recouping part of the fixed cost payment) otherwise. If $\theta > \theta_T$, the enterprise leaves the market cutting its loss to $F(\theta_T)$.

The enterprise's investment decision is based on a (subjective) market assessment, which consists of assigning probabilities to corruption levels in the $[\theta_L, \theta_H]$ interval. The setup is consistent with analytical market risk fundaments of international business (Buckley & Casson, 2019). The enterprise's expected profit can be expressed as

$$E(\pi) = \int_{\theta_L}^{\theta_T} Pr(\theta)\pi(\theta)d\theta - Pr(\theta > \theta_T)F(\theta_T), \tag{2.21}$$

where the first term captures the weighted profit estimate if production takes place in the market ($\theta \leq \theta_T$) and the second term captures the weighted fixed (sunk) cost estimate otherwise. The expected profit declines in the perceived investment risk (i.e., of making a loss) $Pr(\theta > \theta_T)$ and related capital destruction via sunk cost $F(\theta_T)$, which limits the investment incentive in line with prior findings (Wei, 1997).

Corruption uncertainty brings out discrepant investment behaviour introducing the possibility (i) that the (risk-neutral) enterprise turns down a profitable investment opportunity (ii) that the enterprise engages in FDI despite making a loss and (iii) of immediate market exit.

2.5.1 *Illustrative Case*

Given the inverse demand function $P(Q) = 1 - Q$, the enterprise's expected profit function equals

$$E(\pi) = \int_{\theta_L}^{\theta_T} Pr(\theta)\left(\frac{1}{4}(1 - c(\theta))^2 - F(\theta)\right)d\theta - Pr(\theta > \theta_T)F(\theta_T). \tag{2.22}$$

The expected profit increases in the enterprise's regular production efficiency, increasing its markup and expanding the θ range compatible with making operating profits, and decreases in the cost imposition of corruption. The enterprise's decision-making process is illustrated in Fig. 2.2. If $E(\pi) > 0$, the enterprise enters the market, incurs its fixed cost F and observes θ in the process. Its continued investment choice depends on the payoffs of staying in and leaving the market:

$$\pi = \max\begin{cases} \frac{1}{4}(1 - c(\theta))^2 - F(\theta) \; if & \theta \leq \theta_T, \\ -F(\theta_T) \qquad\qquad\quad if & \theta > \theta_T, \end{cases} \tag{2.23}$$

where it remains in the market if operating profits can be made ($c < 1$) and exits the market otherwise.

At low corruption levels, the maximum payoff is the highest profit π^* (2.7) attained producing Q^* (2.4). At intermediate corruption levels, the maximum payoff is the minimised loss obtained producing at the level maximising its operating profit. At high corruption levels, the maximum payoff is the minimised loss of sunk cost $F(\theta_T)$ leaving the market.

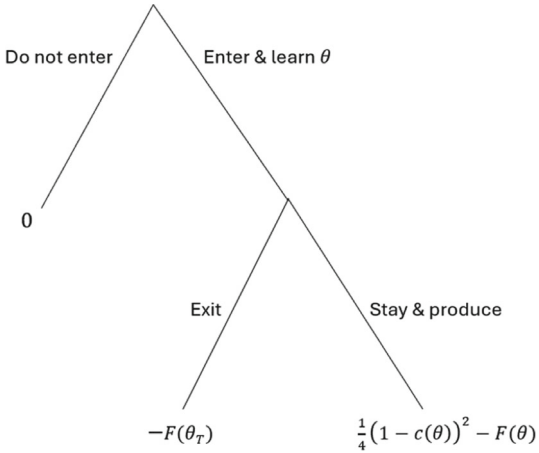

Fig. 2.2 The enterprise's investment decision process under corruption uncertainty

2.6 Conclusions

Our theoretical framework cuts to the core of the multinational enterprise's investment behaviour in corrupt environments. It features key corruption mechanisms through which the enterprise's FDI engagement is affected, placing particular focus on its strategic considerations. The modelling is centred around corruption-related investment costs channelled via host market production conditions. The investment-restrictive effect of corruption comes out in the baseline framework featuring the investment behaviour of a single enterprise. The enterprise reduces its output and profit due to (fixed and variable) corruption-related costs that are only partly passed through to consumers. Corruption can deter investment if its cost enhancement is large in relation to the enterprise's regular cost efficiency in production. The outcome echoes findings that corruption serves as a major impediment to investment and growth (Mauro, 1995; Rose-Ackerman, 1999; Wei, 1999).

Heterogeneous enterprises invest jointly and engage in Cournot competition in our extended framework. The enterprises use their own (exogenous) technologies in production, which vary in quality (i.e., cost efficiency), and face identical market conditions (in the industry) encountering the same cost imposition of corruption. In Nash-Cournot equilibrium, the enterprises invest, produce and profit less in a market

with a higher corruption level. Competition is restrained by corruption-related costs as only more productive enterprises can make an investment return. Enterprises' investment performances are based on regular cost efficiency (i.e., technology) due to corruption-related cost symmetry. In addition, a market-adjustment effect channelling the reduced competitive pressure faced in the market (as competitors are burdened by corruption) is brought out in an illustrative case. The cost-enhancing effect dominates the market-adjustment effect, implying that the investment-restrictive effect of corruption is preserved for all enterprises. These outcomes align with findings that corruption is less deterring for large (more productive) enterprises (e.g., Bennedsen et al., 2011; Campos & Giovannoni, 2007; Thede & Gustafson, 2017). In the extended framework, consumers face a lower quantity and a higher price in a more corrupt environment.

Introducing the enterprise-specific capability to limit the cost imposition of corruption alters equilibrium outcomes. The lower corruption-related costs incurred by more capable enterprises enhance their investment, production and profit at competitors' expense. The asymmetric cost-enhancing and market-adjustment effects of corruption work in tandem to strengthen the relative performance of these enterprises. In other words, the existence of corruption capabilities generates a direct cost-saving effect and an indirect pro-competition effect working via market adjustments to competitors' cost-savings that favour enterprises with stronger capabilities. For less capable enterprises, the lower cost-savings and starker pro-competition effect reinforce the investment-restrictive effect of corruption. For more capable enterprises, which face a relatively low corruption cost imposition and a weaker pro-competition effect, corruption is less restrictive. Under particular conditions (uneven capability distribution, relatively high corruption level), the most capable enterprises can be incentivised by corruption and increase their investment, production and profit in a more corrupt environment. The discrepant corruption effects relating to investment capability in corrupt systems can contribute to explain evidence that MNEs of corrupt country origin are less deterred by corruption, and at times attracted to other corrupt markets (e.g., Brada et al., 2019; Cuervo-Cazurra, 2006; Habib & Zurawicki, 2002; Ledyaeva et al., 2013). As competitive structures are tilted to the benefit of enterprises with starker corruption capability, regular cost efficiency is less important for investment performance in corrupt systems. The blurred sorting pattern into FDI engagement is only partly linked to technological proficiency, and

distort regular market mechanisms. The corruption-related cost advantage that arises is key to competitiveness in highly corrupt systems. This outcome highlights the redistribute element intrinsic to markets infiltrated by corruption, and underpins the view that corruption induce market distortions (e.g., Aidt, 2009; Banerjee et al., 2012; Tanzi, 2002).

Another intrinsic feature of corruption is the lack of transparency, which gives rise to uncertainty that is taxing on outside investors (i.e., foreign enterprises) without know-how of the market. To study the enterprise's investment decision when the corruption level is not known a priori, the baseline framework is modified into a two-stage game where the enterprise makes its market-entry decision based on a subjective market assessment (at stage 1), becomes informed through market entry, and reassesses its investment position making an informed production choice (at stage 2). Due to investment risk, the enterprise can avoid investing or invest making a loss/profit depending on encountered corruption impediments. This leads to seemingly irrational behaviour when a profitable investment opportunity is turned down, the enterprise operates in the market despite making a loss (to generate operating profits) or immediately exits the market (to cut its losses). While anecdotal evidence abounds on MNEs that incur investment losses because of corruption, we do not know of any prior systematic empirical evidence informing the issue.

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CHAPTER 3

Data

Abstract We put theory to data on Swedish enterprises' FDI engagements in the manufacturing, mining & quarrying, communication & information services, finance & insurance services and professional, scientific & technical services industries. MNEs outperform other domestic enterprises having much stronger market positions with many times larger revenues and value added. Corruption is measured based on alternative (standard) indices from the PRS group and World Bank, which capture a wide range of corrupt activities in public office. Systemic corruption is common in most countries and institutional corruption infiltration is persistent (over time). Enterprises have a low investment probability in markets that are heavily infiltrated by corruption, and those that enter such markets have almost always invested under similar market conditions. MNEs seldom uproot their investments and are less inclined to do so from corrupt markets.

Keywords Enterprise data · Corruption data · Data descriptives · MNE market selection

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3.1 Introduction

This chapter provides a detailed description of enterprise and corruption data used in the empirical investigation. We report enterprise production characteristics and market outreach patterns, describe corruption measurement details and give a breakdown of market investment, entry and exit probabilities (computed from raw data frequencies) by market category.

Our data set includes Swedish enterprises active over the 1997–2015 period in the manufacturing, mining & quarrying, communication & information services, finance & insurance services and professional, scientific & technical services industries. Previous empirical research predominantly investigates the manufacturing industry (or uncategorised data). The different production and market conditions in these industries enable a fuller empirical analysis of behavioural investment patterns and a less restrictive investigation of corruption effects. The data has the unusual advantage of containing complete information on enterprises' foreign market engagement (without downward reporting limitations for small investments), allowing the enterprises' entry, investment and exit patterns to be identified. In the research field, systematic behavioural data patterns on MNEs' activities in corrupt environments mostly pertain to the manufacturing industry. To our knowledge, such evidence has hitherto been lacking for the mining and quarrying industry and only been reported for highly specialised services market segments (e.g., investigating banking lending processes).

Standard corruption measurement in form of indices comprising data on a wide array of corrupt activities are used to measure the market corruption level. Two alternative indices from the World Bank (WB) and the PRS group, which have global country coverage and are reported on annual basis, forms the basis of the investigation. These are supplementary measures that differ in their coverage of corrupt activities linked to regulatory barriers (so-called petty corruption) and high-level corruption involving public officials (so-called grand corruption), which is useful to disentangle behavioural discrepancies relating to the form of corruption. Sweden is one of the best performing countries in the world in the (inverse) corruption rankings, implying that Swedish enterprises are not used to invest under corrupt market conditions. This implies that the observed data patterns relate to host market corruption (without indirectly capturing behavioural effects of home country corruption).

3.2 Enterprise Data

Our enterprise data includes complete information on the foreign investment engagements of Swedish enterprises over the 1997–2015 period. Foreign direct investment is inferred from the enterprise's employment in a country (down to one employee), which provides information on each market engagement of every MNE. The enterprise's market entry, operations and exit are captured by indicator variables in the empirical investigation. Ownership is defined by majority shareholding in Sweden. The data also includes firm production characteristics in form of employment, the education composition of employees, revenues and value added in the home market, which are aggregated (i.e., for the group of firms) to enterprise level. Firms are categorised by the standard Swedish industry classification, which is in direct concordance with the EU NACE industry classification at 2-digit level. Enterprises are identified by the industry code of the largest firm (based on revenues) in the group. The data is provided by Statistics Sweden under a strict confidentiality agreement.

Enterprise basics in form of the number of enterprises and share of multinationals are reported by industry in Table 3.1. Among all enterprises that were active in the investigated period, 3–8% invest abroad (at some time). This amounts to a large number of MNEs in industries where competition is high, i.e., manufacturing producers, communication & information services providers and professional, scientific & technical services providers. The fewest multinationals are found in the mining & quarrying industry.

MNEs are highly productive enterprises that operate at large scale with superior performance (e.g., Mayer & Ottaviano, 2007; Tomiura, 2007)

Table 3.1 Enterprise basics by industry

Industry	*No. enterprises*	*MNE share*
Manufacturing	17,591	0.08
Mining & quarrying	248	0.04
Communication & information services	10,363	0.06
Finance & insurance services	508	0.06
Professional, scientific & technical services	37,531	0.03

Note 1997–2015 period

Table 3.2 Enterprise characteristics by category and industry (enterprise-year means)

	Man		*Min, qua*		*Com, inf*		*Fin, ins*		*Pro, sci, tec*	
Characteristic	*Dom*	*MNE*	*Dom*	*MNE*	*Dom*	*MNE*	*Dom*	*MNE*	*Dom*	*MNE*
Employment	31	372	15	232	33	167	15	4.294	14	129
- skilled	5	95	2	53	12	79	54	783	7	78
Revenues	53	949	37	1.264	61	424	120	6.857	23	186
Value added	16	269	10	589	19	134	32	3.539	11	89
Skill intensity	0.78	0.83	0.76	0.97	0.84	0.95	0.91	0.96	0.92	0.97

Notes 1997–2015 period. Pecuniary values in million SEK

and internalise gains from trade exploiting the home country's comparative advantage (e.g., Antràs & Yeaple, 2014; Yeaple, 2003). Swedish MNEs are skill-intensive due to their home country's skilled labour abundance (i.e., highly educated labour force) and comparative advantage in skill-intensive production (e.g., Thede & Karpaty, 2023). Industry enterprise characteristics in form of employment (number of employees), sales (million SEK), value added (million SEK) and skill intensity (share of skilled employees) are reported for (purely) domestic and multinational enterprises in Table 3.2. Skill is measured in standard way by secondary education attainment. MNEs employ more personnel, make more revenues and generate more value added than domestic enterprises. The (mean) differences are substantial, and particularly large in manufacturing, mining & quarrying and finance & insurance services industries where multinationals are 18, 34 and 57 times larger and generate 17, 59 and 111 times more value added compared to their domestic counterparts. The discrepancy in skill intensity is starker for mining & quarrying and communication & information services MNEs that have a 0.22 and 0.12 higher proportion of skilled employees compared to domestic counterparts.

In theory, there is a direct link between the enterprise's productivity, size and foreign market engagement (see also, e.g., Antràs & Helpman, 2004 and Helpman et al., 2004). As the investigated industries vary widely in production technologies, and total factor productivity estimates (using standard techniques) are only comparable for enterprises in the same industry, we rely on the enterprise's size (i.e., revenues) as a proxy for its production cost efficiency in the empirical investigation.

Table 3.3 MNE market outreach (no. foreign investment markets, year means)

Industry	*Mean*	*Median*	*Min*	*Max*
Manufacturing	5	2	1	100
Mining & quarrying	2	1	1	13
Communication & information services	3	1	1	30
Finance & insurance services	5	3	1	24
Professional, scientific & technical services	3	1	1	32

Note 1997–2015 period

The MNE market outreach (i.e., number of foreign investment markets) is presented by industry in Table 3.3. Multinational enterprises invest in on average 5 markets in manufacturing and finance & insurance services industries, 3 markets in communication & information services and professional, scientific & technical services industries and 2 markets in the mining & quarrying industry. A majority of MNEs display more limited outreach and only invest in one location in mining & quarrying, communication & information services and finance & insurance services industries.

3.3 Corruption Data

Our corruption measurement is based on standard PRS group and World Bank (WB) indices, which include expert evidence on a wide range of corrupt activities from bribery to overcome administrative barriers (e.g., speed money) to close ties between politics and business that can incorporate undue rewards such as kickbacks in return for public contracts. The former type of corruption constitutes regular transaction costs (i.e., petty corruption) and the latter type of corruption induces market distortions to benefit corrupt enterprises (i.e., grand corruption). Petty corruption is more prevalent in the compilation of the WB index while grand corruption dominates PRS group measurement. In particular, the WB index includes data on irregular payments in administrative handling and corruption in various public sectors and the PRS index includes data indicative of a corruption stronghold on power including *quid-pro-quo* arrangements and undue private–public sector ties.

The corruption index from the PRS group is based on annual expert survey evidence for 140 countries in the 1997–2015 period. It decreases

in corruption and ranges between 0 and 6. The index is provided in the International Country Risk Guide database, which is available for purchase (with a measurement description accompanying the data). The World Bank index is computed across standardised data of expert assessments from a large number of sources capturing a wide range of corrupt practices (Kaufmann & Kraay, 2024). It decreases in corruption and lies in the −2.5 to 2.5 interval. The index is reported in the Worldwide Governance Indicators database on annual basis for up to 212 countries from the year 2002. Our corruption measures are modified indices that increase in corruption and lie in the 0–1 interval.

Corruption indices are reported by country for the last year of observation in Table 3.4. Nordic countries (including Sweden) are top performers with corruption indices below 0.10. The fact that Sweden is one of the countries where enterprises are least likely to encounter corruption is important from an identification perspective (tracing investment effects of host market corruption). Fragile states like Libya, Somalia and Syria are most infiltrated by corruption with indices above 0.80.

Descriptive corruption statistics are presented by period in Table 3.5. The corruption distribution is left-skewed with a median value above 0.50, which implies that corruption is widespread enough to be expected (i.e., more probable than not) in a majority of reported countries. Marginal discrepancies in the (comparable) $CORR_{PRS}$ and $CORR_{WB}$ distributions suggest that grand corruption is more infiltrating than petty corruption.

Corruption infiltration of economic systems is quite persistent and change slowly if at all (e.g., Andvig & Moene, 1990; Mauro, 2002; Mishra, 2006). Descriptive statistics of corruption alterations are presented by period in Table 3.6. The mean annual change in corruption is close to zero though (rare) considerable corruption alterations are observed in the data. The strongest improvement is linked to a Chilean constitutional reform in 2005 and the worst deterioration is connected to corruption in the Japanese banking sector regulatory bodies and financial turmoil in 1998.

Table 3.4 Country corruption indices (modified, 2015)

Country	$CORR_{PRS}$	$CORR_{WB}$	Country	$CORR_{PRS}$	$CORR_{WB}$
Aruba		0.241	Cayman Islands		0.297
Andorra		0.257	Cent. Afr. Rep.		0.760
Afghanistan		0.770	Chad		0.771
Angola	0.833	0.782	Chile	0.250	0.257
Anguilla		0.257	China	0.667	0.555
Albania	0.583	0.604	Colombia	0.583	0.565
Algeria	0.667	0.623	Comoros		0.649
Argentina	0.667	0.611	Congo (DR)	0.750	0.758
Armenia	0.667	0.617	Congo	0.750	0.750
American Samoa		0.257	Costa Rica	0.500	0.356
Ant. & Barb.		0.363	Côte d'Ivoire	0.667	0.588
Australia	0.250	0.124	Croatia	0.500	0.454
Austria	0.250	0.198	Cuba	0.583	0.487
Azerbaijan	0.750	0.686	Cyprus	0.333	0.299
Bahamas	0.250	0.273	Czechia	0.500	0.400
Bahrain	0.569	0.473	Denmark	0.083	0.055
Bangladesh	0.500	0.663	Djibouti		0.635
Barbados		0.202	Dominica		0.375
Belarus	0.667	0.558	Dom. Rep.	0.667	0.670
Belgium	0.250	0.198	Ecuador	0.667	0.630
Belize		0.536	Egypt	0.667	0.616
Benin		0.607	El Salvador	0.583	0.585
Bermuda		0.257	Equatorial Guinea		0.810
Bhutan		0.295	Eritrea		0.763
Bolivia	0.667	0.639	Estonia	0.333	0.242
Botswana	0.333	0.337	Eswatini		0.538
Brazil	0.667	0.587	Ethiopia	0.667	0.591
Brunei	0.583	0.386	Fiji		0.415
Bulgaria	0.583	0.564	Finland	0.083	0.049
Burkina Faso	0.583	0.555	France	0.250	0.243
Burundi		0.753	French Guiana		0.297
Cambodia		0.726	Gabon	0.667	0.640
Cameroon	0.667	0.715	Gambia	0.667	0.659
Canada	0.167	0.123	Georgia		0.354
Cape Verde		0.310	Germany	0.167	0.137

(continued)

Table 3.4 (continued)

Country	$CORR_{PRS}$	$CORR_{WB}$	Country	$CORR_{PRS}$	$CORR_{WB}$
Ghana	0.500	0.537	Lebanon	0.688	0.676
Greece	0.583	0.518	Lesotho		0.492
Greenland		0.263	Liberia	0.583	0.629
Grenada		0.388	Libya	0.833	0.812
Guam		0.257	Liechtenstein		0.088
Guatemala	0.667	0.652	Lithuania	0.417	0.377
Guinea	0.750	0.698	Luxembourg	0.167	0.081
Guinea-Bissau	0.833	0.797	Macao		0.378
Guyana	0.750	0.627	Madagascar	0.667	0.672
Haiti	0.833	0.747	Malawi	0.667	0.655
Honduras	0.583	0.613	Malaysia	0.583	0.458
Hong Kong	0.333	0.170	Maldives		0.594
Hungary	0.500	0.471	Mali	0.667	0.636
Iceland	0.167	0.113	Malta	0.417	0.321
India	0.583	0.576	Marshall Islands		0.513
Indonesia	0.500	0.599	Martinique		0.257
Iran	0.750	0.622	Mauritania		0.682
Iraq	0.833	0.783	Mauritius		0.449
Ireland	0.250	0.158	Mexico	0.750	0.674
Israel	0.417	0.312	Micronesia		0.374
Italy	0.583	0.489	Moldova	0.667	0.683
Jamaica	0.590	0.552	Mongolia	0.667	0.597
Japan	0.250	0.187	Montenegro		0.519
Jersey		0.263	Morocco	0.583	0.552
Jordan	0.500	0.445	Mozambique	0.667	0.652
Kazakhstan	0.750	0.670	Myanmar	0.750	0.666
Kenya	0.750	0.701	Namibia	0.500	0.440
Kiribati		0.457	Nauru		0.606
North Korea	0.833	0.751	Nepal		0.615
South Korea	0.500	0.426	Netherlands	0.167	0.126
Kosovo		0.607	New Zealand	0.083	0.045
Kuwait	0.500	0.546	Nicaragua	0.750	0.676
Kyrgyzstan		0.727	Niger	0.750	0.630
Laos		0.683	Nigeria	0.750	0.714
Latvia	0.500	0.407	North Macedonia		0.548

(continued)

Table 3.4 (continued)

Country	$CORR_{PRS}$	$CORR_{WB}$	Country	$CORR_{PRS}$	$CORR_{WB}$
Norway	0.083	0.052	St. Lucia		0.370
Oman	0.500	0.447	St. Vin. & Gre.		0.365
Pakistan	0.667	0.661	Sudan	0.917	0.797
Palau		0.606	Suriname	0.667	0.549
Panama	0.667	0.582	Sweden	0.083	0.063
Pap. New Guin.	0.667	0.686	Switzerland	0.167	0.073
Paraguay	0.667	0.700	Syria	0.833	0.811
Peru	0.667	0.616	Taiwan	0.500	0.346
Philippines	0.583	0.591	Tajikistan		0.725
Poland	0.417	0.355	Tanzania	0.667	0.637
Portugal	0.333	0.315	Thailand	0.667	0.606
Puerto Rico		0.484	Timor-Leste		0.608
Qatar	0.333	0.322	Togo	0.667	0.647
Réunion		0.374	Tonga		0.583
Romania	0.583	0.529	Trin. & Tob.	0.667	0.568
Russia	0.750	0.690	Tunisia	0.583	0.510
Rwanda		0.377	Turkey	0.583	0.527
Samoa		0.434	Turkmenistan		0.741
S. Tomé & Prin.		0.508	Tuvalu		0.503
Saudi Arabia	0.500	0.491	Uganda	0.750	0.713
Senegal	0.653	0.489	Ukraine	0.750	0.704
Serbia	0.667	0.559	UAE	0.333	0.286
Seychelles		0.264	UK	0.167	0.126
Sierra Leone	0.667	0.659	USA	0.250	0.221
Singapore	0.250	0.082	Uruguay	0.250	0.233
Slovakia	0.500	0.472	Uzbekistan		0.754
Slovenia	0.417	0.346	Vanuatu		0.527
Solomon Islands		0.569	Venezuela	0.833	0.778
Somalia	0.833	0.825	Vietnam	0.583	0.586
South Africa	0.583	0.509	Virgin Islands		0.374
South Sudan		0.840	Yemen	0.833	0.798
Spain	0.417	0.367	Zambia	0.583	0.569
Sri Lanka	0.583	0.570	Zimbabwe	0.833	0.764
St. Kitts & Nevis		0.402			

Table 3.5 Descriptive corruption statistics

Measure	*Mean*	*Median*	*Min*	*Max*	*STD*	*Period*
$CORR_{PRS}$	0.551	0.583	0	1	0.201	1997–2015
$CORR_{PRS}$	0.573	0.618	0	1	0.194	2002–2015
$CORR_{WB}$	0.500	0.548	0.008	0.870	0.200	2002–2015

Note Reporting based on maximum number of observations

Table 3.6 Corruption alteration descriptive statistics

Measure	*Mean*	*Min*	*Max*	*STD*	*Period*
$\Delta CORR_{PRS}$	0.005	−0.333	0.375	0.053	1997–2015
$\Delta CORR_{PRS}$	−0.003	−0.333	0.278	0.041	2002–2015
$\Delta CORR_{WB}$	0.000	−0.199	0.289	0.027	2002–2015

Note Reporting based on maximum number of observations

3.4 Foreign Direct Investment and Corruption Patterns

Market investment and corruption patterns are provided to display basic data relationships using industry scatter plots in Fig. 3.1. These show that Swedish MNEs are less prone to invest in more corrupt markets (albeit founded on few, and partly repeated, observations in the mining & quarrying industry and the finance & insurance services industry). The relationship is not accentuated for lesser investment markets (as the investment incentive depends on a set of unaccounted factors) though it is clear that market attractiveness is constrained by widespread corruption.

Investment probabilities are computed to give a direct account of investment incentives. The (overall) investment probability equals the share of enterprises (including purely domestic) that invest in any foreign market a given year. Conditional investment probabilities are calculated for market categories to observe investment incentives under particular market conditions. Our market categories are corrupt, large or developed markets. A corrupt market is specified as a location where corruption is expected (CORR > 0.50), a large market is defined by a substantial share of global GDP (>5%) and a developed market is categorised by OECD membership.

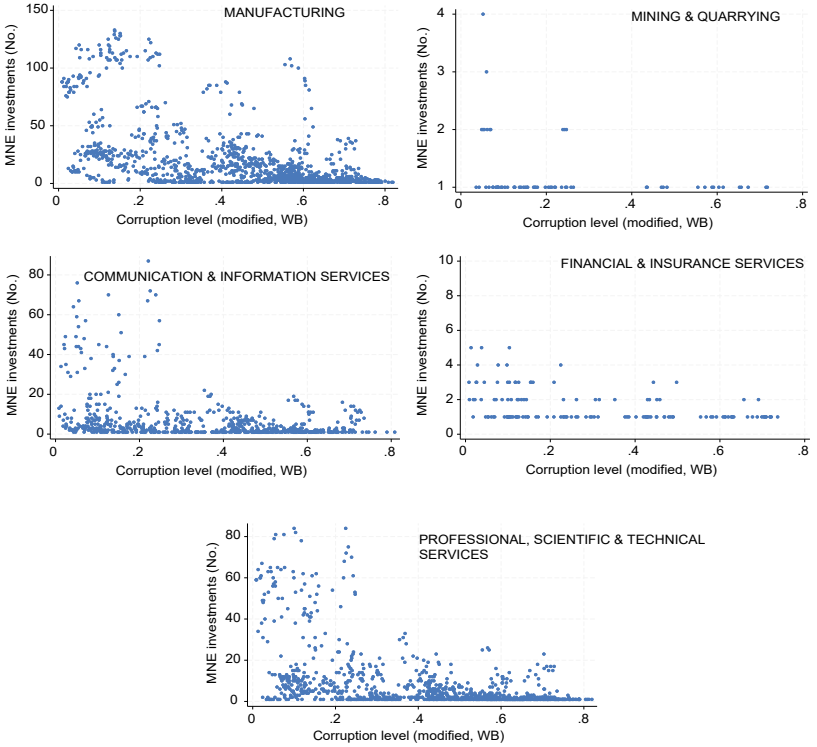

Fig. 3.1 Market investments versus corruption by industry (market-year data)

Investment probabilities are presented by market category and industry in Table 3.7. These are low due to the account of all enterprises and markets. Investments are attracted to large and developed markets and impeded to corrupt markets. The discrepancies are large displaying at least 1.3 and 2.5 times starker investment incentives on average compared to corrupt markets based on PRS and World Bank data. Enterprises are more prone to engage in FDI in the manufacturing and finance & insurance services industries as evidenced by outreach patterns. Enterprises in the mining & quarrying and the professional, scientific & technical services industries are least likely to invest in foreign markets. The pattern is reinforced by market attractiveness as cautious investors favour large and developed markets.

Table 3.7 Investment probability by market category and industry (%)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
All	0.140	0.022	0.049	0.166	0.029
Corrupt (PRS)	0.110	0.012	0.029	0.098	0.016
Corrupt (WB)	0.056	0.008	0.014	0.041	0.009
Large	1.701	0.333	0.606	1.413	0.384
Developed	0.842	0.127	0.309	0.983	0.190

Entry probabilities provide an overview of market-entry incentives that can be particularly important to discern enterprise behaviour in corrupt markets. The entry probability, which equals the number of enterprises that enter a market a given year divided by the number of enterprises that were not investing in the location the previous year, is computed for corrupt markets. Enterprise categories can be differently affected by corruption based on manufacturing evidence (Thede & Gustafson, 2017; Thede & Karpaty, 2023). Specifically, MNEs of large size (exceeding the industry mean) and/or with investment experience from at least one corrupt market could be less restricted by corruption. The relative corrupt market-entry probability is presented by enterprise category and industry in Table 3.8. In general, large enterprises are more prone to enter corrupt markets. This tendency is the strongest in manufacturing and finance & insurance services, which indicates that production efficiency is especially important to overcome corruption barriers in these industries. The mining & quarrying industry, where only small enterprises enter corrupt markets, is an exception. Corruption experience, as defined by previous corrupt market investment, is central for corrupt market entry. MNEs without this experience are very reluctant to enter corrupt markets and never do so to engage in mining & quarrying activities or provide finance & insurance services in the investigated time period.

Exit probabilities are calculated to trace enterprise incentives to uproot FDI. The exit probability equals the number of enterprises that exit a market a given year divided by the number of enterprises that invested in the location the previous year. Conditional exit probabilities are computed for different market categories to examine if MNE exits are more prevalent under particular market conditions. Exit probabilities are reported by market category and industry in Table 3.9. The on average probability of

Table 3.8 Relative corrupt market-entry probability by enterprise category and industry

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
Corrupt market (PRS)					
Large	48.1	0	13.7	34.0	16.9
Corr. exp.	28,214	–	21,297	–	47,777
Corrupt market (WB)					
Large	50.2	0	13.4	464.8	27.2
Corr. exp.	54,583	–	–	–	71,710

Notes Entry probability relative to small/inexperienced enterprise category. None reported for zero base probability

Table 3.9 Exit probability by market category and industry (%)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
All	3.282	1.786	5.973	5.204	6.416
Corrupt (PRS)	3.112	0	4.675	3.125	6.484
Corrupt (WB)	3.088	0	5.709	0	6.177
Large	0.224	0.065	0.127	0.378	0.085
Developed	2.203	0	6.508	5.687	4.299

market exit ranges from 1.8% in mining & quarrying to 6.4% in professional, scientific & technical services. Corrupt market exits are regularly less common and never observed among mining & quarrying enterprises in the investigated time period. Large market investments are seldom uprooted by MNEs. The tendency to leave developed markets vary widely across industries. It is non-existent for mining & quarrying MNEs and above 5% for enterprises providing communication & information services and finance & insurance services.

We operationalise theory using an indicator of corruption experience to measure the enterprise's corruption capability at entry (for identification purposes) and by tracing enterprise-specific uncertainty about corruption from behavioural differences in market entry, operation and exit decisions.

3.5 Other Data

The investment behaviour of MNEs is well evidenced using the empirical gravity equation, which predicts the bilateral investment exchange from the attractive (economic) force between the home and foreign country (Anderson, 2011). Our unidimensional home country version of the gravity model includes regular determinants in form of the foreign country's market size, distance and economic development as well as a common border indicator. In addition, regional indicators are used to take account of institutional factors that may otherwise be channelled via the corruption effect. The market size and economic development level are measured by GDP and GDP per capita (in natural logarithms of USDs) using World Bank data. The market distance is measured in (natural logarithms of) agglomerated-weighted kilometres as described in Head and Mayer (2010) using *CEPII* data. Regional indicators are constructed using the World Bank 2-digit regional classification.

3.6 Conclusions

The chapter provides an account of the data to be used in our empirical investigation. The Swedish enterprise data set contains information on the FDI engagements of each enterprise over the 1997–2015 period. MNEs outperform other enterprises in the home market, producing at larger scale and making much larger sales. Their market positions are particularly strong in the manufacturing, mining & quarrying and finance & insurance services industries, where the mean market revenues of multinational enterprises are 18, 34 and 57 times larger compared to their domestic counterparts. MNEs are also more skill-intensive than domestic enterprises. The largest discrepancies are observed in the mining & quarrying and communication & information services industries that have a 0.22 and 0.12 larger proportion of skilled employees. A few per cent of the enterprise population engage in FDI (3–8% in investigated industries), and among these enterprises few invest in many markets. The mean market outreach of MNEs is the largest in the manufacturing and finance & insurance services industries (5), more limited in the communication & information services and professional, scientific & technical services industries (3) and the lowest in the mining & quarrying industry (2).

The corruption level is measured by indices from the PRS group and World Bank that are modified to increase in corruption and lie in the 0–1 interval. Sweden is a top performer in institutional proficiency, ranking among the least corrupt countries in the world (together with other Nordic countries). The median market corruption level exceeds 0.5 in the corruption data set, showing that systemic corruption in public office is widely prevalent. Country corruption levels are persistent over time and non-negligible deviations are exceptional occurrences in the data. Industry scatterplots show that less corrupt markets generally attract more MNEs. Based on PRS and World Bank data, the computed investment probability is at least 1.2 and 2.5 times larger to a market in this category compared to a corrupt market (with a corruption level above 0.5). Narrowing down the focus to corrupt market entry, large enterprises are regularly much less deterred than their small counterparts. The behavioural discrepancy is the largest among manufacturing and finance & insurance services MNEs, indicating that production efficiency is particularly important for corrupt market engagement in these industries. In the mining & quarrying industry, only small MNEs invest in corrupt markets. Enterprises that have corruption experience, as defined by previous investment in a corrupt market, are predominant among corrupt market entrants. Market exits are infrequent among MNEs, and less prevalent from corrupt markets. Mining & quarrying enterprises never uproot FDI engagements from corrupt markets in the investigation period.

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CHAPTER 4

Empirical Investigation

Abstract We use a gravity approach to investigate corruption effects on the enterprise's market entry, investment and exit decisions. Logit estimates are presented to identify corruption effects and marginal effects are computed to examine corruption impacts. The results are interpreted in relation to theory and set in empirical context. Industry-by-industry regressions enable an examination of enterprises' investment behaviour under different production and market conditions. Our main empirical contributions to the research field lie in the provision of representative evidence, expanding the analysis to mining & quarrying, communication & information services, finance & insurance services and professional, scientific & technical services industries (as well as manufacturing) and examining corruption effects on divestments.

Keywords Multinational enterprise · Corruption effects · Investment adjustment

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4.1 Introduction

This empirical investigation's primary aim is to identify market corruption mechanisms relating to the enterprise's market entry, investment and exit decisions. We rely on a gravity approach to examine bilateral FDI (e.g., Anderson, 2011), which is an economic application of Newton's law of gravity determining the (economic) attractive force between a home and foreign country due to market factors (e.g., market size, economic development, corruption) and bilateral frictions or lack thereof (e.g., distance, a shared border indicator). Our gravity specification of the enterprise's FDI engagement also includes key enterprise factors and controls required to correctly estimate the effects of foreign market conditions such as the corruption level (à la Head & Mayer, 2014). Multinational enterprises are long-run investors, and as corruption levels are persistent, corruption effects are largely channelled by level effects. For this reason, the market entry and exit regressions include the same set of determinants as the benchmark investment regression (i.e., capturing production and market conditions conducive to profitable investment). The estimations are performed using a logit technique and marginal effects are computed to quantify corruption impacts. Alternative corruption measures capturing different extents of petty/grand corruption are used to further inform the results.

Our rich empirical analysis contributes to the research field in several main ways. First, we provide representative results of market entry and exit behaviour due to complete reporting of enterprises' FDI engagements. Second, systematic evidence is presented for the mining & quarrying, communication & information services, finance & insurance services and professional, scientific & technical services industries (as well as manufacturing). Third, we investigate the corruption effects on divestments. As the enterprises in our empirical investigation originate in an uncorrupt country (Sweden), and have no domestic experience of corrupt activities, host country corruption effects can be directly identified. We have no reason to believe that MNEs originating from other countries would face different corruption mechanisms in the host market. The relative impacts of these mechanisms are likely depending on the home market corruption level, however, as bilateral FDI from corrupt home countries is less constrained by host country corruption (Brada et al., 2019; Habib & Zurawicki, 2002; Ledyaeva et al., 2013). Our results are therefore expected to be more applicable to enterprises that do not encounter corruption in their home country.

The rest of this chapter is organised as follows. The enterprise's investment decision is examined in the next section using a benchmark equation including the direct corruption effect and extended equations adding indirect effects working via the enterprise's size and/or market experience (to identify corruption uncertainty implications). In Sect. 4.3, the enterprise's entry decision is investigated with particular focus placed on its corruption capability (captured by a corruption experience indicator). Section 4.4 provides exit regression results to investigate the extent to which enterprises uproot their investment because of corruption, partly featuring entrants' behaviour (i.e., immediate market exits). The last section concludes.

4.2 Estimation Results

4.2.1 The Enterprise's Investment Decision

Our benchmark equation of the enterprise's investment decision includes corruption and a set of standard enterprise and gravity determinants. An empirical logit model determines the probability that the enterprise invests in a particular country at a given time:

$$\begin{aligned}\Pr(FDI_{ijt}) = \Lambda(&\alpha + \alpha_{j\in k} + \alpha_t + \beta_1 Corruption_{jt} + \beta_2 Enterprise\,size_{it} \\ &+ \beta_3 Skill\,intensity_{it} + \beta_4 Market\,size_{jt} \\ &+ \beta_5 Economic\,development_{jt} + \beta_6 Market\,distance_{jt} \\ &+ \beta_7 Border\,country_j + z_{jt}{}'\varepsilon),\end{aligned} \tag{4.1}$$

where subscripts i, j, k and t denote enterprise, country, region and time (year), FDI_{ijt} is an indicator capturing if the enterprise invests in the country at the time, Λ is the cumulative logistic distribution function, α is a constant, $\alpha_{j\in k}$ is a region effect, α_t is a time effect, $Corruption_{jt}$ is the country's corruption level at the time, $Enterprise\,size_{it}$ is the enterprise's domestic size (revenues) at the time, $Skill\,intensity_{it}$ is the enterprise's domestic production skill intensity at the time, $Market\,size_{jt}$ is the country's market size at the time, $Economic\,development_{jt}$ is the country's level of economic development at the time, $Market\,distance_{jt}$ is the bilateral market distance at the time, $Border\,country_j$ is an indicator capturing if the country shares a border with the home country, and z_{kt} is a foreign vector composite of (border country indicator and distance) investment drivers vis-à-vis the rest of the world at the time.

The constant captures any factor outside the empirical model that is common to all enterprises (i.e., home country characteristics). Region effects are included to capture institutional factors that may otherwise be captured by, and bias, corruption estimates. Time effects capture events that alter business conditions (e.g., economic shocks like financial crises) and occurrences that impact annual variable measurement (e.g., inflation). Controlling for each country's investment drivers vis-à-vis the rest of the world (multilateral resistance) is required to avoid estimation bias. This is standard in empirical gravity applications to ensure consistency with the model's theoretical foundation (Anderson & van Wincoop, 2003). The multilateral resistance of the home country is captured by the constant and time effect in our unidimensional home country version of the gravity model. The multilateral resistance of the foreign country is accounted for via the z vector composite (à la Head & Mayer, 2014).

Regression results of Eq. (4.1) using alternative corruption indices are presented by industry in Tables 4.1 and 4.2. Empirical model performances are fine and determinants are generally confirmed. Corruption is a regular investment deterrent in the manufacturing, mining & quarrying and professional, scientific & technical services industries. Its impact on

Table 4.1 Benchmark investment results (modified PRS corruption index)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
Corruption	−0.487***	−5.338*	−0.226	−0.265	−0.733***
	(0.156)	(2.754)	(0.319)	(0.641)	(0.218)
Enterprise size	1.143***	0.712***	0.812***	0.738***	0.883***
	(0.010)	(0.118)	(0.015)	(0.044)	(0.012)
Skill intensity	4.925***	18.62***	4.067***	8.072***	8.724***
	(0.204)	(4.055)	(0.512)	(1.624)	(0.462)
Market size	0.622***	0.573*	0.495***	0.340***	0.535***
	(0.020)	(0.316)	(0.034)	(0.095)	(0.026)
Economic development	0.093***	−0.380	0.112	−0.186	0.130**
	(0.035)	(0.869)	(0.074)	(0.218)	(0.054)
Market distance	−0.386***	0.534	−0.367***	−0.572**	−0.264***
	(0.060)	(1.020)	(0.085)	(0.275)	(0.067)
Border country	0.901***	3.426***	0.967***	1.072***	1.024***
	(0.085)	(0.875)	(0.121)	(0.372)	(0.092)
Log lik	−103,369	−186	−24,070	−1,071	−52,760
Nobs	9,621,054	32,839	3,505,833	47,734	12,862,367

Notes Including time and region effects and multilateral resistance controls. Enterprise-market clustered standard errors in parenthesis. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table 4.2 Benchmark investment results (modified WB corruption index)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
Corruption	−2.776***	−9.219**	−2.577***	−0.713	−2.993***
	(0.278)	(4.301)	(0.529)	(1.782)	(0.405)
Enterprise size	1.153***	0.730***	0.808***	0.904***	0.868***
	(0.010)	(0.123)	(0.016)	(0.059)	(0.013)
Skill intensity	4.814***	18.73***	5.309***	4.264**	9.068***
	(0.236)	(4.048)	(0.685)	(1.969)	(0.594)
Market size	0.644***	0.399	0.511***	0.383***	0.541***
	(0.020)	(0.281)	(0.033)	(0.098)	(0.026)
Economic development	−0.204***	−1.189*	−0.167**	−0.244	−0.189***
	(0.041)	(0.667)	(0.081)	(0.321)	(0.063)
Market distance	−0.361***	0.482	−0.258***	−0.603*	−0.234***
	(0.061)	(1.081)	(0.082)	(0.325)	(0.067)
Border country	0.842***	3.854***	0.902***	0.836*	1.024***
	(0.090)	(0.889)	(0.120)	(0.498)	(0.097)
Log lik	−80,890	−191	−21,628	−638	−42,225
Nobs	10,019,568	39,145	3,715,122	43,263	13,045,094

Notes Including time and region effects and multilateral resistance controls. Enterprise-market clustered standard errors in parenthesis. $*p < 0.10$, $**p < 0.05$, $***p < 0.01$

investment behaviour is less clear-cut in the communication & information services industry and cannot be verified in the finance & insurance services industry. Large, productive, enterprises are more prone to invest under given market conditions (including corruption constraints) as they generate enough revenues to cover incurred cost structures. These enterprises engage in FDI to expand sales (e.g., Helpman et al., 2004; Yeaple, 2009), source inputs (e.g., Antràs & Helpman, 2004) or exploit other localised advantages. Enterprises with skill-intensive production have a competitive advantage stemming from the home country's skill abundance, which incentivises FDI engagement internalising gains from trade (e.g., Antràs & Yeaple, 2014; Yeaple, 2003). Enterprises invest in large markets to expand production opportunities. Enterprises from rich countries (like Sweden) can be attracted to invest in similar markets to enhance their sales (horizontal FDI) and to different markets to engage in low-cost production (vertical FDI). The latter investment rationale has become more important due to significant trade cost reductions over the investigated time period (Krugman et al., 2015), which can explain discrepant results using corruption measurement with restricted availability to the later part of the period (i.e., based on World Bank data). Enterprises generally invest in more proximate markets, which is a common empirical

result that may be attributed to FDI setup costs that increase with distance (Kleinert & Toubal, 2010) and/or predominant FDI sourcing induced by trade cost liberalisation (Hayakawa & Matsuura, 2015). Enterprises similarly invest more in border countries to capitalise on low transaction costs.

Larger enterprises may be less susceptible to corruption pressure because of their stronger bargaining power (Svensson, 2003) or use of legal means of influence (Campos & Giovannoni, 2007; Thede & Gustafson, 2017). To examine if larger enterprises are less restricted by corruption, Eq. (4.1) is extended with a corruption-enterprise size interaction term:

$$\begin{aligned}\Pr(FDI_{ijt}) = \Lambda(&\alpha + \alpha_{j\in k} + \alpha_t + \beta_1 Corruption_{jt} + \beta_2 Corruption_{jt} \cdot \\ &Enterprise\,size_{it} + \beta_3 Enterprise\,size_{it} + \beta_4 Skill\,intensity_{it} \\ &+ \beta_5 Market\,size_{jt} + \beta_6 Economic\,development_{jt} \\ &+ \beta_7 Market\,distance_{jt} + \beta_8 Border\,country_j + z_{jt}'\varepsilon). \end{aligned} \tag{4.2}$$

Table 4.3 Investment results: Corruption-enterprise size interaction (modified PRS index)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
Corruption	−1.522***	−3.546	−0.542	−5.184**	−1.134*
	(0.531)	(9.816)	(0.805)	(2.490)	(0.583)
Corruption·	0.076**	−0.137	0.025	0.329**	0.034
Ent. size	(0.038)	(0.645)	(0.062)	(0.168)	(0.048)
Enterprise	1.113***	0.751***	0.804***	0.637***	0.872***
size	(0.018)	(0.247)	(0.026)	(0.067)	(0.020)
Skill	4.895***	18.73***	4.068***	8.128***	8.712***
intensity	(0.203)	(4.060)	(0.511)	(1.627)	(0.462)
Market	0.620***	0.578*	0.495***	0.332***	0.535***
size	(0.020)	(0.323)	(0.034)	(0.094)	(0.026)
Economic	0.100***	−0.397	0.113	−0.165	0.131**
development	(0.035)	(0.864)	(0.074)	(0.218)	(0.054)
Market	−0.377***	0.566	−0.365***	−0.546**	−0.263***
distance	(0.061)	(1.009)	(0.085)	(0.262)	(0.067)
Border	0.882***	3.558***	0.963***	0.988***	1.021***
country	(0.084)	(0.937)	(0.121)	(0.348)	(0.092)
Log lik	−103,356	−186	−24,070	−1,068	−52,759
Nobs	9,621,054	32,839	3,505,833	47,734	12,862,367

Notes Including time and region effects and multilateral resistance controls. Enterprise-market clustered standard errors in parenthesis. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table 4.4 Investment results: Corruption-enterprise size interaction (modified WB index)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
Corruption	−3.605***	−4.341	−2.973***	−3.982	−2.625***
	(0.638)	(9.298)	(0.947)	(4.453)	(0.786)
Corruption· Ent. size	0.060	−0.358	0.032	0.212	−0.031
	(0.042)	(0.560)	(0.067)	(0.290)	(0.059)
Enterprise size	1.134***	0.815***	0.799***	0.853***	0.875***
	(0.017)	(0.212)	(0.024)	(0.095)	(0.020)
Skill intensity	4.789***	18.94***	5.310***	4.329**	9.080***
	(0.235)	(4.107)	(0.685)	(1.987)	(0.596)
Market size	0.642***	0.405	0.511***	0.379***	0.542***
	(0.020)	(0.281)	(0.033)	(0.098)	(0.026)
Economic development	−0.198***	−1.233*	−0.165**	−0.228	−0.190***
	(0.041)	(0.657)	(0.081)	(0.317)	(0.063)
Market distance	−0.353***	0.511	−0.257***	−0.590*	−0.235***
	(0.061)	(1.091)	(0.082)	(0.317)	(0.067)
Border country	0.827***	4.169***	0.898***	0.801*	1.027***
	(0.089)	(0.946)	(0.120)	(0.485)	(0.097)
Log lik	−80,884	−190	−21,627	−637	−42,225
Nobs	10,019,568	39,145	3,715,122	43,263	13,045,094

Notes Including time and region effects and multilateral resistance controls. Enterprise-market clustered standard errors in parenthesis. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Regression results of Eq. (4.2) using alternative corruption indices are presented by industry in Tables 4.3 and 4.4. These show that a negative direct corruption effect ($\beta_1 < 0$) and positive indirect corruption effect ($\beta_2 > 0$) are confirmed in manufacturing and finance & insurance services industries using measurement that primarily captures grand corruption (based on PRS data). The results provide weak support of a differential corruption effect based on enterprise size, which hinges on particular production and market conditions and appears to be conditioned by high-level dealings.

Uncertainty about corruption can deter entry and induce investment losses. To examine if such investment implications can be observed in the data, Eq. (4.1) is extended with a corruption-market incumbent interaction term (and a market incumbent control):

$$\begin{aligned}\Pr(FDI_{ijt}) = \Lambda(\alpha + \alpha_{j\in k} + \alpha_t + \beta_1 Corruption_{jt} + \beta_2 Corruption_{jt} \cdot \\ Market\ incumbent_{ijt} + \beta_3 Enterprise\ size_{it} \\ + \beta_4 Skill\ intensity_{it} + \beta_5 Market\ incumbent_{ijt} \\ + \beta_6 Market\ size_{jt} + \beta_7 Economic\ development_{jt} \\ + \beta_8 Market\ distance_{jt} + \beta_9 Border\ country_j + z_{jt}{}'\varepsilon),\end{aligned} \tag{4.3}$$

where $Market\ incumbent_{ijt}$ is an indicator capturing the enterprise's incumbent status in the market. Regression results of Eq. (4.3) using alternative corruption indices are presented by industry in Tables 4.5 and 4.6. The existence of a negative direct corruption effect ($\beta_1 < 0$) shows that corruption deters investors without market experience, which is consistent with theoretical underpinnings on ex-ante corruption uncertainty. In manufacturing and services industries, a positive indirect corruption effect ($\beta_2 > 0$) reveals that incumbent enterprises are less restricted by corruption in line with their informed investment decision in theory. This echoes prior evidence from German MNEs over the 1996–2006 period (Couttenier & Toubal, 2017). In the mining & quarrying industry, a negative indirect effect ($\beta_2 < 0$) indicates that incumbent enterprises are more deterred by corruption than their counterparts. This is consistent with a theoretical scenario where the MNE encounters a corruption level so high that it makes a loss (though remaining in the market if making operating profits). Overall, the results align with the two-stage decision-making process set out in theory where enterprises learn about corruption through market engagement and adjust their investment behaviour accordingly.

As large enterprises are more often established in foreign markets, we also examine an equation extended with both interaction terms to disentangle corruption channels:

$$\begin{aligned}\Pr(FDI_{ijt}) = \Lambda(\alpha + \alpha_{j\in k} + \alpha_t + \beta_1 Corruption_{jt} \\ + \beta_2 Corruption_{jt} \cdot Enterprise\ size_{it} + \beta_3 Corruption_{jt} \cdot \\ Market\ incumbent_{ijt} + \beta_4 Enterprise\ size_{it} \\ + \beta_5 Market\ incumbent_{ijt} + \beta_6 Skill\ intensity_{it} \\ + \beta_7 Market\ size_{jt} + \beta_8 Economic\ development_{jt} \\ + \beta_9 Market\ distance_{jt} + \beta_{10} Border\ country_j + z_{jt}{}'\varepsilon).\end{aligned} \tag{4.4}$$

Table 4.5 Investment results: Corruption-market incumbent interaction (modified PRS index)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
Corruption	−0.408***	−7.340**	−1.198***	−1.814***	−1.223***
	(0.141)	(3.707)	(0.309)	(0.636)	(0.201)
Corruption·	1.147***	−11.534	3.147***	2.410**	3.906***
Mark. inc.	(0.204)	(7.457)	(0.395)	(0.994)	(0.346)
Enterprise	0.818***	0.465***	0.546***	0.539***	0.652***
size	(0.008)	(0.104)	(0.016)	(0.040)	(0.013)
Skill	3.465***	9.181**	2.856***	7.183***	5.975***
intensity	(0.167)	(4.205)	(0.452)	(1.605)	(0.426)
Market	5.815***	14.491***	5.644***	2.679***	5.860***
incumbent	(0.080)	(3.741)	(0.144)	(0.435)	(0.124)
Market	0.417***	0.545	0.319***	0.323***	0.377***
size	(0.017)	(0.539)	(0.033)	(0.091)	(0.022)
Economic	0.093***	−1.506**	0.152**	−0.211	0.103**
development	(0.031)	(0.670)	(0.063)	(0.204)	(0.044)
Market	−0.506***	−0.866	−0.400***	−0.288	−0.313***
distance	(0.050)	(1.843)	(0.094)	(0.258)	(0.062)
Border	0.548***	6.020	0.754***	0.945***	0.792***
country	(0.069)	(3.703)	(0.113)	(0.353)	(0.083)
Log lik	−53,785	−58	−13,893	−866	−31,360
Nobs	9,621,054	32,839	3,505,833	47,734	12,862,367

Notes Including time and region effects and multilateral resistance controls. Enterprise-market clustered standard errors in parenthesis. $^{**}p < 0.05$, $^{***}p < 0.01$

Estimated corruption effects of Eq. (4.4) using alternative corruption indices are reported by industry in Tables 4.7 and 4.8. These confirm the importance of market incumbent status for investment in corrupt environments. The results of the finance & insurance services industry indicate that this is the differential corruption effect previously captured through the enterprise size channel (using modified PRS index measurement). Manufacturing is the only industry where the corruption effect depends on the enterprise's size, possibly because systemic corruption is ingrained into public office handling procedures facing industrial producers. In other words, manufacturers can be subject to common regulatory and policy constraints used to exert corruption pressure that is more easily overcome by larger MNEs.

To examine the predictive performance of validated investment regressions, the proportion of correctly predicted investment decisions

Table 4.6 Investment results: Corruption-market incumbent interaction (modified WB index)

	Man	*Min, qua*	*Com, Inf*	*Fin, ins*	*Pro, sci, tec*
Corruption	−2.055***	−7.647**	−3.240***	−3.177*	−3.357***
	(0.263)	(3.252)	(0.467)	(1.765)	(0.373)
Corruption·	1.737***	−11.293**	4.131***	4.079***	4.670***
Mark. inc.	(0.256)	(5.279)	(0.460)	(1.241)	(0.385)
Enterprise	0.771***	0.500***	0.511***	0.620***	0.591***
size	(0.010)	(0.112)	(0.017)	(0.066)	(0.015)
Skill	2.980***	9.726**	3.518***	1.855	5.140***
intensity	(0.210)	(4.151)	(0.625)	(1.751)	(0.634)
Market	5.897***	12.880***	5.744***	2.601***	6.295***
incumbent	(0.080)	(1.990)	(0.136)	(0.431)	(0.114)
Market	0.389***	0.268	0.347***	0.350***	0.362***
size	(0.019)	(0.262)	(0.031)	(0.115)	(0.023)
Economic	−0.120***	−1.796***	−0.117	−0.379	−0.203***
development	(0.042)	(0.307)	(0.076)	(0.363)	(0.060)
Market	−0.604***	−0.766	−0.339***	−0.511	−0.357***
distance	(0.057)	(1.605)	(0.097)	(0.422)	(0.069)
Border	0.449***	6.151***	0.734***	0.880	0.772***
country	(0.079)	(2.289)	(0.113)	(0.580)	(0.093)
Log lik	−39,344	−64	−12,118	−487	−22,958
Nobs	10,019,568	39,145	3,715,122	43,263	13,045,094

Notes Including time and region effects and multilateral resistance controls. Enterprise-market clustered standard errors in parenthesis. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table 4.7 Estimated corruption effects (modified PRS index)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
Corruption	−1.396***	−0.371	−1.454*	−4.641**	−1.763***
	(0.424)	(6.438)	(0.797)	(2.186)	(0.597)
Corruption·	0.078**	−0.567	0.022	0.198	0.049
Ent. size	(0.031)	(0.362)	(0.066)	(0.149)	(0.052)
Corruption·	1.115***	−10.452	3.128***	2.078**	3.903***
Mark. inc	(0.206)	(6.599)	(0.406)	(1.042)	(0.350)
Log lik	−53,778	−57	−13,893	−864	−31,358
Nobs	9,621,054	32,839	3,505,833	47,734	12,862,367

Notes Eq. (4.4) estimates. Enterprise-market clustered standard errors in parenthesis. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table 4.8 Estimated corruption effects (modified WB index)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
Corruption	−4.100***	1.308	−3.861***	−6.611	−3.406***
	(0.564)	(7.826)	(0.943)	(5.132)	(0.863)
Corruption·	0.161***	−0.746	0.056	0.233	0.004
Ent. size	(0.040)	(0.528)	(0.074)	(0.331)	(0.071)
Corruption·	1.607***	−9.264**	4.081***	3.739***	4.676***
Mark. inc	(0.261)	(4.354)	(0.475)	(1.435)	(0.390)
Log lik	−39,326	−63	−12,118	−486	−22,958
Nobs	10,019,568	39,145	3,715,122	43,263	13,045,094

Notes Eq. (4.4) estimates. Enterprise-market clustered standard errors in parenthesis. $^{**}p < 0.05$, $^{***}p < 0.01$

is presented by alternative corruption measurement and industry in Table 4.9. The predictive power of investment decisions is particularly high for mining & quarrying enterprises (88–91%), consistently high for manufacturing enterprises (78–81%) and moderate to high for services enterprises (52–78%). This supports the unified empirical model structure and confirms the general applicability of our approach.

Table 4.9 Predictive performance of validated investment regressions (modified PRS and WB index)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
PRS	0.782	0.912	0.685	0.518	0.661
WB	0.806	0.880	0.532	0.699	0.782
Size	X				
Mark. exp	X	X	X	X	X

Note Reporting proportion of successful model predictions

4.2.2 *The Enterprise's Entry Decision*

The enterprise's entry decision is separated out to be examined in detail. The benchmark entry equation equals:

$$\begin{aligned}\Pr(Entry_{ijt}) = \Lambda(&\alpha + \alpha_{j\in k} + \alpha_t + \beta_1 Corruption_{jt} + \beta_2 Enterprise\,size_{it} \\ &+ \beta_3 Skill\,intensity_{it} + \beta_4 Market\,size_{jt} \\ &+ \beta_5 Economic\,development_{jt} + \beta_6 Market\,distance_{jt} \\ &+ \beta_7 Border\,country_j + z'_j\varepsilon).\end{aligned} \tag{4.5}$$

where $Entry_{ijt}$ is an indicator capturing the enterprise's market entry at the time. Regression results of (4.5) using alternative corruption indices are presented by industry in Tables 4.10 and 4.11. Systematic differences brought out compared to the corresponding investment results are: (i) a regularly lower enterprise size effect in roughly 70–80% of parity without repeated market investment observations of large enterprises, (ii) a negative (verified) economic development effect showing that MNEs primarily wanted to expand their production networks to low-wage destinations, (iii) a lower (confirmed) market distance effect as transport and transmit costs are reduced over the investigated period (Table 4.10).

The enterprise's corruption capability (i.e., capability investing in corrupt environments) reduces corruption-related costs in theory. If such capabilities exist, they may be detected at market entry. To investigate if there is a differential corruption effect relating to the enterprise's capability to invest in a corrupt market, we add a corruption and corruption capability interaction term (and a corruption capability control) to Eq. (4.5). The previous market outreach is also added to control for general market experience, which may stimulate further international expansion (e.g., Davidson, 1980). The extended entry equation equals:

$$\begin{aligned}\Pr(Entry_{ijt}) = \Lambda(&\alpha + \alpha_{j\in k} + \alpha_t + \beta_1 Corruption_{jt} + \beta_2 Corruption_{jt} \cdot \\ &Corruption\,capability_{it} + \beta_3 Corruption\,capability_{it} \\ &+ \beta_4 Enterprise\,size_{it} + \beta_5 Skill\,intensity_{it} \\ &+ \beta_6 Market\,size_{jt} + \beta_7 Economic\,development_{jt} \\ &+ \beta_8 Market\,distance_{jt} + \beta_9 Border\,country_j \\ &+ \beta_{10} Market\,outreach_{it-1} + z'_j\varepsilon),\end{aligned} \tag{4.6}$$

where $Corruption\,capability_{it}$ is an indicator capturing the enterprise's corrupt market investment the previous year (as described in the previous

Table 4.10 Benchmark entry results (modified PRS index)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
Corruption	−0.393**	−10.15*	−0.689*	−1.103	−0.745***
	(0.164)	(5.747)	(0.377)	(1.061)	(0.204)
Enterprise size	0.783***	0.509***	0.602***	0.524***	0.711***
	(0.026)	(0.139)	(0.033)	(0.078)	(0.029)
Skill intensity	4.081***	4.139	4.211***	10.529**	7.381***
	(0.396)	(5.301)	(0.885)	(4.611)	(0.857)
Market size	0.478***	2.094***	0.531***	0.372***	0.479***
	(0.023)	(0.770)	(0.039)	(0.094)	(0.025)
Economic development	0.020	−4.573***	0.005	−0.177	0.038
	(0.035)	(1.760)	(0.100)	(0.254)	(0.069)
Market distance	−0.286***	−3.808	−0.202**	−0.179	−0.213***
	(0.045)	(3.105)	(0.088)	(0.287)	(0.053)
Border country	0.638***	17.12***	1.114***	1.430***	1.003***
	(0.066)	(2.936)	(0.113)	(0.339)	(0.073)
Log lik	−22,019	−24	−6,583	−378	−15,400
Nobs	9,247,409	7,720	3,388,096	44,002	12,390,605

Notes Including time and region effects and multilateral resistance controls. Enterprise-clustered standard errors in parenthesis. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

chapter) and $Market\ outreach_{it-1}$ is the enterprise's number of investment markets the previous year. Regression results of (4.6) using alternative corruption indices are presented by industry in Tables 4.12 and 4.13. These show that a negative direct corruption effect ($\beta_1 < 0$) and positive indirect corruption effect ($\beta_2 > 0$) always exist, which implies that the imposition of corruption is lower for enterprises with corruption capability. ($\beta_3 > 0$ carries no direct economic meaning as the corruption index always exceeds zero.) The stark evidence of a corruption capability effect extends on prior enterprise evidence from the Swedish manufacturing industry (Thede & Karpaty, 2023) attributed to a learning effect of investing in corrupt markets. The result highlights that corruption costs are asymmetric between enterprises as some have acquired the capability to invest in corrupt environments outside the market. The interpretation that corruption capability reduces the (perceived and/or incurred) cost of market entry is akin to prior research showing that the enterprise's entry behaviour is affected by know-how attained from similar market experience (e.g., Eriksson et al., 1997). The intrinsic adjustment process can be particularly important to counteract information asymmetries pertaining to corruption due to its obscure (i.e., illicit) nature.

Table 4.11 Benchmark entry results (modified WB index)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
Corruption	−2.290***	−10.88	−3.622***	−2.343	−3.103***
	(0.308)	(6.988)	(0.510)	(2.203)	(0.412)
Enterprise size	0.789***	0.509***	0.596***	0.699***	0.691***
	(0.030)	(0.136)	(0.034)	(0.100)	(0.035)
Skill intensity	4.088***	4.124	5.391***	4.503	7.209***
	(0.454)	(5.305)	(1.138)	(4.089)	(1.121)
Market size	0.508***	2.114**	0.592***	0.385***	0.495***
	(0.024)	(0.850)	(0.040)	(0.141)	(0.029)
Economic development	−0.220***	−4.858**	−0.370***	−0.427	−0.289***
	(0.038)	(2.107)	(0.099)	(0.458)	(0.071)
Market distance	−0.235***	−2.607	−0.053	−0.192	−0.202***
	(0.048)	(3.771)	(0.090)	(0.587)	(0.059)
Border country	0.618***	16.88***	1.136***	1.445***	1.041***
	(0.076)	(1.163)	(0.118)	(0.531)	(0.085)
Log lik	−17,710	−24	−6,020	−194	−11,734
Nobs	10,000,361	9,114	3,709,808	39,770	13,036,341

Notes Including time and region effects and multilateral resistance controls. Enterprise-clustered standard errors in parenthesis. $^{**}p < 0.05$, $^{***}p < 0.01$

4.2.3 *The Enterprise's Exit Decision*

The enterprise's market exit is investigated on the premise that continued market presence requires positive operating profits, which implies that information about the corrupt environment and/or altered investment determinants drive its uprooting decision. The exit benchmark equation equals:

$$\begin{aligned} Prob(Exit_{ijt}) = \Lambda(&\alpha_i + \alpha_j + \alpha_t + \beta_1 Corruption_{jt} + \beta_2 Enterprise\,size_{it} \\ &+ \beta_3 Skill\,intensity_{it} + \beta_4 Market\,size_{jt} \\ &+ \beta_5 Economic\,development_{jt}), \end{aligned} \tag{4.7}$$

where $Exit_{ijt}$ is an indicator capturing that the enterprise no longer invests in the market at the time and α_i and α_j are time-invariant enterprise and market controls. Exit results using alternative corruption indices are reported by industry in Tables 4.14 and 4.15. (The mining & quarrying industry, which includes an insufficient number of observations to ensure statistical validity, is included for completeness.) These reveal that

Table 4.12 Entry results: Corruption-corruption capability interaction (modified PRS index)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
Corruption	−4.326***	−16.61*	−3.611***	−4.943***	−3.651***
	(0.227)	(9.496)	(0.412)	(1.014)	(0.269)
Corruption·	5.344***	8.509***	5.755***	5.261***	5.417***
Corr. cap	(0.189)	(2.423)	(0.373)	(1.503)	(0.229)
Corruption	1.340***	1.371**	0.637**	0.535	1.478***
capability	(0.129)	(0.593)	(0.268)	(0.752)	(0.190)
Enterprise	0.354***	−0.088	0.217***	0.234**	0.290***
size	(0.031)	(0.175)	(0.059)	(0.110)	(0.034)
Skill	2.692***	0.263	3.435***	9.252**	3.668***
intensity	(0.334)	(1.494)	(0.707)	(4.230)	(0.688)
Market	0.498***	1.894*	0.579***	0.380***	0.521***
size	(0.025)	(0.977)	(0.042)	(0.099)	(0.028)
Economic	0.063*	−4.105**	0.066	−0.091	0.118
development	(0.037)	(2.030)	(0.105)	(0.275)	(0.075)
Market	−0.227***	−3.599	−0.116	−0.160	−0.146**
distance	(0.046)	(3.433)	(0.092)	(0.297)	(0.057)
Border	0.532***	17.50***	1.021***	1.267***	0.961***
country	(0.067)	(3.745)	(0.115)	(0.360)	(0.075)
Market	0.007	0.207	0.094**	0.053	0.081***
outreach	(0.006)	(0.148)	(0.037)	(0.041)	(0.018)
Log lik	−19,674	−20	−5,860	−351	−13,242
Nobs	9,247,409	7,720	3,388,096	44,002	12,390,605

Notes Including time and region effects and multilateral resistance controls. Enterprise-clustered standard errors in parenthesis. $*p < 0.10$, $**p < 0.05$, $***p < 0.01$

corruption is a regular driver behind MNE divestments. Growing enterprises are more prone to retain any market investment. There is little evidence that a higher skill intensity of production matters, and in the case that it does, it incentivises exit. As the result pertains to finance & insurance enterprises, it is likely due to organisational restructuring (and reduced outreach) in the wake of financial crises. MNEs in the manufacturing and professional, scientific & technical services industries are reluctant to leave growing markets, which provide enlarged source and sales opportunities, and inclined to leave developing markets, possibly as they are disincentivised by higher wages. Our results highlight the importance of corruption as a determinant of market exits and add to prior findings on MNE responsiveness to altered market conditions (e.g., Alvarez & Görg, 2008; Görg & Strobl, 2003).

Table 4.13 Entry results: Corruption-corruption capability interaction (modified WB index)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
Corruption	−5.405***	−23.47*	−6.454***	−4.542**	−5.839***
	(0.366)	(13.03)	(0.660)	(2.291)	(0.521)
Corruption·	4.649***	13.93**	5.753***	4.559**	6.148***
Corr. cap	(0.252)	(6.027)	(0.461)	(1.948)	(0.428)
Corruption	1.202***	0.453	0.034	−1.153	−0.176
capability	(0.183)	(0.963)	(0.375)	(1.392)	(0.495)
Enterprise	0.494***	−0.069	0.321***	0.508***	0.403***
size	(0.035)	(0.197)	(0.057)	(0.135)	(0.042)
Skill	2.863***	0.252	4.466***	3.002	4.551***
intensity	(0.411)	(1.495)	(1.056)	(3.771)	(1.017)
Market	0.512***	1.921*	0.612***	0.385**	0.516***
size	(0.026)	(1.138)	(0.044)	(0.151)	(0.032)
Economic	−0.207***	−4.461*	−0.350***	−0.290	−0.212***
development	(0.041)	(2.674)	(0.100)	(0.451)	(0.075)
Market	−0.172***	−2.499	0.059	−0.172	−0.109*
distance	(0.048)	(4.908)	(0.091)	(0.576)	(0.059)
Border	0.513***	17.13***	1.027***	1.272**	0.938***
country	(0.075)	(4.716)	(0.117)	(0.555)	(0.084)
Market	−0.004	0.201	0.091**	0.090	0.128***
outreach	(0.007)	(0.164)	(0.038)	(0.077)	(0.032)
Log lik	−16,400	−20	−5,629	−186	−10,664
Nobs	10,000,361	9,114	3,709,808	39,770	13,036,341

Notes Including time and region effects and multilateral resistance controls. Enterprise-clustered standard errors in parenthesis. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

As market entrants can react differently to corruption than market incumbents (i.e., adjusting their investment position as they observe the corruption level), the exit equation is extended to include a corruption and entrant interaction term (and a market entrant control):

$$\begin{aligned} Prob(Exit_{ijt}) = \Lambda(&\alpha_i + \alpha_j + \alpha_t + \beta_1 Corruption_{jt} \\ &+ \beta_2 Corruption_{jt} \cdot Entrant_{ijt} + \beta_3 Entrant_{ijt} \\ &+ \beta_4 Enterprise\,size_{it} + \beta_5 Skill\,intensity_{it} \\ &+ \beta_6 Market\,size_{jt} + \beta_7 Economic\,development_{jt}), \end{aligned} \tag{4.8}$$

Table 4.14 Exit results (modified PRS corruption index)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
Corruption	1.251***	16.28**	0.924***	2.058*	2.105***
	(0.171)	(7.624)	(0.342)	(1.190)	(0.303)
Enterprise size	−0.608***	–	−0.358***	0.768	−0.295***
	(0.106)		(0.118)	(0.720)	(0.052)
Skill intensity	−1.839	–	2.275	17.73**	−0.828
	(1.221)		(1.403)	(8.453)	(0.969)
Market size	−0.326***	−4.818**	0.051	−0.093	−0.103***
	(0.018)	(2.048)	(0.033)	(0.090)	(0.028)
Economic development	0.080**	−3.849*	0.093	0.277	0.246***
	(0.037)	(2.054)	(0.082)	(0.221)	(0.062)
Log lik	−8,211	−5	−1,972	−226	−3,184
Nobs	26,663	42	3,857	471	8,337

Notes Enterprise, market and time effects included. Enterprise-time clustered standard errors in parenthesis. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. (Variable estimates dropped in case of collinearity)

Table 4.15 Exit results (modified WB corruption index)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
Corruption	1.972***	8.185***	1.026**	2.783	2.584***
	(0.243)	(1.385)	(0.481)	(2.228)	(0.462)
Enterprise size	−0.626***	–	−0.310**	−2.121***	−0.170***
	(0.119)		(0.128)	(0.704)	(0.050)
Skill intensity	−2.280	–	−0.102	17.12***	−0.788
	(1.451)		(1.992)	(5.978)	(0.984)
Market size	−0.354***	−1.037	0.055	−0.063	−0.108***
	(0.020)	(1.099)	(0.036)	(0.127)	(0.031)
Economic development	0.224***	−0.539	0.160	0.252	0.357***
	(0.051)	(0.760)	(0.099)	(0.348)	(0.082)
Log lik	−7,106	−15	−1,826	−167	−2,669
Nobs	21,032	45	3,426	321	6,175

Notes Enterprise, market and time effects included. Enterprise-time clustered standard errors in parenthesis. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. (Variable estimates dropped in case of collinearity)

where $Entrant_{ijt}$ is an indicator capturing the enterprise's market entry the same year (i.e., immediate market exit). Extended exit regression results using alternative corruption indices are reported by industry in Tables 4.16 and 4.17. (It can be noted that the limited market outreach of mining & quarrying MNEs inhibits the statistical validation of results for the industry.) These show that entrants are more responsive to corruption than incumbents in the manufacturing and finance & insurance services industries. The results are consistent with the theoretical prediction that immediate market exit is triggered if the enterprise (makes its investment decision under corruption uncertainty and) encounters stark corruption impediments upon market entry.

Table 4.16 Exit results: Corruption-entrant interaction (modified PRS corruption index)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
Corruption	1.242***	15.05**	0.916***	1.874	2.089***
	(0.174)	(6.463)	(0.343)	(1.212)	(0.316)
Corruption·	1.223**	5.163***	−0.690	2.797*	0.524
Entrant	(0.581)	(0.369)	(0.944)	(1.669)	(0.584)
Entrant	−2.168***	−2.716***	−1.041***	−1.820*	−1.534***
	(0.272)	(0.954)	(0.372)	(0.963)	(0.270)
Enterprise	−0.636***	–	−0. 331***	0.603	−0.306***
size	(0.103)		(0.116)	(0.688)	(0.054)
Skill	−1.462	–	2.201*	17.27**	−0.749
intensity	(1.171)		(1.325)	(7.408)	(0.996)
Market	−0.338***	−4.892**	0.047	−0.094	−0.109***
size	(0.018)	(2.093)	(0.033)	(0.090)	(0.028)
Economic	0.066*	−4.082*	0.061	0.293	0.232***
development	(0.038)	(2.263)	(0.081)	(0.225)	(0.064)
Log lik	−8,052	−5	−1,943	−223	−3,118
Nobs	26,663	42	3,857	471	8,337

Notes Enterprise, market and time effects included. Enterprise-time clustered standard errors in parenthesis. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. (Variable estimates dropped in case of collinearity)

Table 4.17 Exit results: Corruption-entrant interaction (modified WB corruption index)

	Man	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
Corruption	2.029***	6.641***	1.042**	2.880	2.678***
	(0.247)	(1.593)	(0.483)	(2.231)	(0.476)
Corruption·	1.648**	14.92**	−0.817	−3.850	−0.242
Entrant	(0.724)	(6.867)	(1.185)	(2.636)	(0.639)
Entrant	−2.031***	−5.713	−1.175***	0.755	−1.201***
	(0.272)	(4.330)	(0.359)	(1.173)	(0.252)
Enterprise	−0.643***	–	−0.223*	−2.260**	−0.181***
size	(0.116)		(0.125)	(1.015)	(0.051)
Skill	−2.070	–	0.054	16.05**	−0.694
intensity	(1.403)		(1.843)	(7.885)	(0.994)
Market	−0.366***	−1.123	0.050	−0.077	−0.114***
size	(0.021)	(1.130)	(0.036)	(0.128)	(0.031)
Economic	0.227***	−0.849	0.130	0.230	0.346***
development	(0.051)	(1.032)	(0.098)	(0.353)	(0.084)
Log lik	−6,992	−15	1,795	−166	−2,623
Nobs	21,032	45	3,426	321	6,175

Notes Enterprise, market and time effects included. Enterprise-time clustered standard errors in parenthesis. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. (Variable estimates dropped in case of collinearity)

4.3 Marginal Corruption Effects

4.3.1 The Investment Decision

The corruption impact is quantified by its marginal effect, which is the regression equation derivative with respect to corruption. Based on the benchmark investment regression (of Eq. 4.1), it equals (suppressing subscript denotation):

$$\frac{dPr(FDI)}{dCorruption} = \beta_1 \Lambda(.)(1 - \Lambda(.)), \tag{4.9}$$

which is computed from estimated coefficients and observed determinant values. The estimated effect is reported by corruption index and industry in Table 4.18. In manufacturing, mining & quarrying and professional, scientific & technical services (where a corruption effect is detected), the estimated marginal (0.01) effect is a 0.05–0.68 percentage point reduction of the investment probability using predominant grand corruption

Table 4.18 Marginal corruption effect (investment benchmark regression)

Index	*Man*	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
PRS	−0.117***	−0.679*	−0.030	−0.146	−0.053***
	(0.037)	(0.402)	(0.042)	(0.356)	(0.016)
WB	−0.499***	−1.005*	−0.287***	−0.258	−0.168***
	(0.050)	(0.536)	(0.059)	(0.647)	(0.023)

Note Average marginal effect reported. *$p < 0.10$, ***$p < 0.01$

measurement. The manufacturing estimate is lower than the investment impact equivalent reported for Swedish enterprises in the industry using cross-sectional data mid period (for the year 1998) and the same underlying corruption measure (Hakkala Nilsson et al., 2008), which suggests that prior survey based estimates can mask sample selection bias (excluding smaller investments). The largest investment deterrent effect of a 0.68–1.01 percentage point reduction is observed in mining & quarrying, which is an industry known to be highly susceptible to corruption pressure (Leite & Wiedman, 2002). The marginal corruption effect is regularly larger using measurement mostly capturing petty corruption. This form of corruption (e.g., speed money) may be difficult to circumvent, in which case investment costs can be greatly amplified for incorruptible enterprises. Indeed, cumbersome regulations and red tape can be in place to facilitate bribes extraction in the bureaucracy (see, e.g., Aidt, 2009).

As previously shown, the benchmark estimates mask a differential corruption impact depending on the enterprise's market incumbent status. The marginal corruption effect from the regression results of Eq. (4.3) equals:

$$\frac{dPr(FDI)}{dCorruption} = (\beta_1 + \beta_2 Market\,incumbent)\Lambda(.)(1 - \Lambda(.)), \qquad (4.10)$$

which comprises the direct corruption effect facing each enterprise and the indirect corruption effect if the enterprise is a market incumbent. The estimated average marginal effect is presented by corruption index and industry in Table 4.19. Enterprises without market experience are deterred by corruption. Their strongest deterrent effect in the finance & insurance services industry that face a 0.53−0.61 percentage point investment probability reduction in a slightly (0.01) more corrupt environment.

The restrictiveness echoes prior evidence of information barriers in less mature financial markets (Pagano & Japello, 1993; Tsai et al., 2011). The differential effect comes out clearly in the investigated industries. The results are consistent with our exposition of a two-stage decision-making process where the initial investment decision is made under corruption uncertainty and the continued investment decision is informed. The informed market engagement of manufacturing and services MNEs is regularly unaffected, or incentivised, by corruption. These market incumbents are commonly observed to be less deterred by corruption than their counterparts and are often stimulated to invest using measurement mostly capturing grand corruption. A marginal (0.01) corruption increase strengthens the investment incentive of MNEs in this category by 5.6, 21 and 30 percentage points in the manufacturing, communication & information services and professional, scientific & technical services industry. The very large effects are suggestive of considerable rents from breaking the rules. It is however important to clarify that bribery is not the only explanation of established MNEs' favourable investment position in corrupt environments. Prior research shows that enterprises can use legal means of influence (i.e., bending the rules through lobbying) as a shield against corruption pressure and to improve their market position (Bennedsen et al., 2011; Campos & Giovannoni, 2007; Thede & Gustafson, 2017). In the mining & quarrying industry, market incumbents are much more discouraged by corruption than their counterparts. They are 72–81 percentage points less likely to continue investing at a marginal corruption increase, which indicates a high susceptibility to corruption pressure. The adverse result supports the view that corruption is intrinsically linked to natural resource abundance, and directly counteracts the productive use of resources, in many economic systems (Leite & Widman, 2002).

The corruption effect also depends on the enterprise's size in the manufacturing industry. The marginal corruption effect from the regression results of Eq. (4.4) equals:

$$\frac{dPr(FDI)}{dCorruption} = (\beta_1 + \beta_2 Enterprise\ size + \beta_3 Market\ incumbent) \Lambda(.)(1 - \Lambda(.)), \tag{4.11}$$

which comprises the direct and indirect effects that face each enterprise and the additional indirect effect if the enterprise is a market incumbent.

Table 4.19 Marginal corruption effect based on market incumbent status

Index	*Mark. inc*	*Man*	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
PRS	No	−0.037***	−0.212*	−0.064***	−0.612***	−0.039***
		(0.013)	(0.121)	(0.016)	(0.223)	(0.006)
PRS	Yes	5.598***	−81.29***	21.05***	2.258	30.23***
		(1.852)	(22.95)	(5.915)	(4.075)	(5.288)
WB	No	−0.121***	−0.206**	−0.140***	−0.529*	−0.071***
		(0.016)	(0.096)	(0.021)	(0.304)	(0.008)
WB	Yes	−2.240	−72.41***	9.980	2.875	16.44**
		(2.446)	(18.13)	(7.300)	(6.377)	(6.736)

Notes Average marginal effect reported. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The estimates are reported by corruption index and market incumbent status for (large/small) enterprise evaluation samples in Table 4.20. Manufacturing enterprises without experience of the market are always deterred by corruption. Large enterprises in this category face a 6–7 times larger reduction in investment probability at a slight (0.01) corruption increase compared to their small counterparts. These results indicate that the positive indirect effect of enterprise size (channelled via β_2) is dominated by the negative direct effect (channelled via β_1), generating a net effect that is reinforced by distributional factors for large enterprises (channelled via Λ). Manufacturing market incumbents are generally much more prone to invest in more corrupt environments. Small enterprises in this category increase their investment probability by 1.9–3.5 percentage points when corruption increases at the margin. Large enterprises in the category are 3 times as incentivised by corruption using measurement mostly capturing grand corruption. In contrast, large market incumbents are very reluctant to invest in more corrupt environments using predominant petty corruption measurement. The discrepant latter result indicates that large manufacturing enterprises face considerable administrative corruption costs despite the counteractive influence of continued market presence (i.e., reduced investment uncertainty) and size (i.e., bargaining power).

Table 4.20 Marginal corruption effect based on market incumbent status (accounting for enterprise size)

	No	*Yes*	*Enterprise size*
PRS	−0.010***	1.943*	Small
	(0.003)	(1.160)	
PRS	−0.061**	6.650**	Large
	(0.023)	(2.630)	
WB	−0.029***	3.499**	Small
	(0.003)	(1.368)	
WB	−0.210***	−5.627*	Large
	(0.028)	(3.281)	

Notes Average marginal effect reported. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

4.3.2 *The Entry Decision*

The marginal corruption effect from the regression results of the benchmark entry equation (4.5) equals:

$$\frac{dPr(Entry)}{dCorruption} = \beta_1 \Lambda(.)(1 - \Lambda(.)). \tag{4.12}$$

The estimated effect is reported by corruption index and industry in Table 4.21. It is smaller than the corresponding benchmark investment estimate due to the low market-entry prevalence in the data. A deterrent corruption effect is often detected and regularly observed in the manufacturing and professional, scientific & technical services industries. The entry deterrence is the strongest in the mining & quarrying industry using measurement that predominantly includes petty corruption.

Table 4.21 Marginal corruption effect (benchmark entry equation)

Index	*Man*	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
PRS	−0.014**	−0.516	−0.019*	−0.188	−0.012***
	(0.006)	(0.351)	(0.010)	(0.173)	(0.003)
WB	−0.061***	−0.469*	−0.084***	−0.211	−0.036***
	(0.009)	(0.335)	(0.013)	(0.203)	(0.005)

Notes Average marginal effect reported. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

The entry effect of corruption also depends on corruption capability. The marginal corruption effect from regression results of Eq. (4.6) equals:

$$\frac{dPr(Entry)}{dCorruption} = (\beta_1 + \beta_2 Corruption\,capability)\Lambda(.)(1 - \Lambda(.)), \quad (4.13)$$

which comprises the direct effect facing each enterprise and an added indirect effect for enterprises with corruption capability. Its estimated effect is presented by corruption index, corruption capability status and industry in Table 4.22. A differential corruption effect is detected in each industry. Enterprises that have not previously invested in a corrupt market are regularly deterred by corruption. Enterprises with corruption capability are generally undeterred, or incentivised, by corruption. A stimulating effect is often obtained using predominant grand corruption measurement. In the manufacturing, communication & information services and professional, scientific & technical services industry, the entry probability is 0.23, 0.34 and 0.32 percentage points higher in a slightly (0.01) more corrupt environment. These results are consistent with the existence of superior corruption capabilities. They indicate that MNEs adapt corrupt behavioural norms used in host markets in line with stylised evidence (Kaufmann, 2004; Søreide, 2006). As previously noted, a superior corruption capability does not necessarily involve illicit deals but can stem from enterprises' use of alternative (legal) means of influence to improve their market position in corrupt environments. Manufacturing MNEs with corruption capability behave differently using predominant petty corruption measurement. The discrepant result, which is akin to the one obtained for large market incumbents in the industry, suggests that these enterprises encounter high administrative corruption costs (due to particular production and/or market conditions) that cannot be circumvented.

4.3.3 The Exit Decision

The marginal corruption effect from regression results of the benchmark exit equation (4.7) equals:

$$\frac{dPr(Exit)}{dCorruption} = \beta_1 \Lambda(.)(1 - \Lambda(.)). \quad (4.14)$$

Table 4.22 Marginal corruption effect based on corruption capability (extended entry equation)

Index	*Corr. cap*	*Man*	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
PRS	No	−0.052***	−0.436	−0.058***	−0.400***	−0.033***
		(0.004)	(0.273)	(0.008)	(0.183)	(0.003)
PRS	Yes	0.233***	−5.354	0.344***	0.126	0.324***
		(0.044)	(6.360)	(0.084)	(0.538)	(0.056)
WB	No	−0.074***	−0.522*	−0.114***	−0.383*	−0.053***
		(0.006)	(0.300)	(0.014)	(0.232)	(0.005)
WB	Yes	−0.118**	−5.048	−0.054	0.001	0.012
		(0.060)	(5.979)	(0.055)	(0.267)	(0.022)

Notes Average marginal effect reported. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Its estimate is presented by corruption index and industry (though the ones reported for the mining & quarrying industry are not statistically validated due to the low number of observations) in Table 4.23. Corruption substantively impacts the risk of exit. A 0.01 higher corruption index increases the exit probability by 0.12–0.21 percentage points in manufacturing and 0.16–0.36 percentage points in services.

The exit effect of corruption can depend on if the enterprise is an entrant in the manufacturing, (mining & quarrying) and finance & insurance industry. The marginal corruption effect from regression results of the extended exit equation (4.8) equals:

$$\frac{dPr(Exit)}{dCorruption} = (\beta_1 + \beta_2 Entrant)\Lambda(.)(1 - \Lambda(.)), \tag{4.15}$$

which contains the direct effect facing all enterprises and an additional indirect effect for market entrants. Its estimate is presented by enterprise

Table 4.23 Marginal corruption effect (benchmark exit equation)

Index	*Man*	*Min, qua*	*Com, inf*	*Fin, ins*	*Pro, sci, tec*
PRS	0.119***	0.490***	0.158***	0.324*	0.258***
	(0.016)	(0.179)	(0.058)	(0.186)	(0.037)
WB	0.207***	0.881***	0.184**	0.486	0.363***
	(0.026)	(0.163)	(0.086)	(0.376)	(0.064)

Notes Average marginal effect reported. *$p < 0.10$, **$p< 0.05$, ***$p < 0.01$

Table 4.24 Marginal corruption effect (extended exit regression)

Index	*Category*	*Man*	*Min, qua*	*Fin, ins*
PRS	Entrant	0.124***	0.571***	0.579**
		(0.033)	(0.186)	(0.272)
PRS	Incumbent	0.124***	0.454***	0.309
		(0.017)	(0.159)	(0.196)
WB	Entrant	0.209***	0.627***	−0.157
		(0.050)	(0.059)	(0.479)
WB	Incumbent	0.219***	0.746***	0.503
		(0.027)	(0.225)	(0.377)

Notes Average marginal effect reported. $^{**}p < 0.05$, $^{***}p < 0.01$

category, corruption index and industry in Table 4.24. (The mining & quarrying effects are not statistically validated because of the small sample size.) In general, entrants only behave differently from incumbents in the finance & insurance industry using the corruption index predominantly capturing grand corruption. Entrants in this industry have a 0.58 percentage point higher exit probability from a slightly (0.01) more corrupt environment. In manufacturing, the impact of a stricter corruption effect detected for entrants (channelled via β_2) is offset by distributional effects (channelled via Λ). The discrepant evidence points to complex exit strategies. While ex-ante corruption uncertainty makes entrants more prone to error and can trigger immediate market exits, incumbents may encounter compounding corruption costs ex-post. As corrupt deals lack commitment mechanisms and generate hold-up problems, enterprises may be snagged into extortive relationships with public officials (e.g., Bennett & Rablen, 2021). Alternatively, they can face enhanced obstacles set up by some competitor that use corrupt deals to impede market competition.

4.4 Conclusions

Our empirical results provide systematic evidence on the foreign market entry, investment and exit incentives of Swedish enterprises in corrupt environments. The investigation is performed for enterprises in the manufacturing, mining & quarrying, communication & information services, finance & insurance services and professional, scientific & technical services industries. We use a gravity approach and run logit regressions

to estimate corruption effects, and compute marginal effects to quantify corruption impacts on enterprises' investment behaviour. Our data set covers each enterprise's foreign market engagement over an 18-year period (1997–2015), which allows us to provide representative results.

Our results show that corruption is a general investment deterrent. The investment incentive is affected by the enterprise's size (i.e., productivity) as set out in theory (see also, e.g., Antràs & Helpman, 2004; Helpman et al., 2004). The result is consistent with the prediction that larger, and more productive, enterprises generate large revenues that can cover setup costs in the foreign market. We also find robust evidence of a differential corruption effect with respect to enterprise size in the manufacturing industry. The indirect effect is positive, implying that larger MNEs face a lower cost imposition of corruption. The lack of corresponding effects in other industries is noteworthy. Insofar that corruption costs are asymmetric, our results indicate that they are unrelated to production efficiency in the mining & quarrying and services industries.

The investment incentive is impacted differently by corruption for enterprises that do not have market experience and market incumbents. Negative corruption estimates for enterprises without market experience are consistent with the prediction that corruption uncertainty disincentivises market entry in our two-stage game of the investment decision process. Initial investors are most deterred in the finance & insurance services industry, displaying a 0.53–0.61 percentage point lower investment probability at a marginal (0.01) increase in the corruption level. A discrepant indirect effect of market experience comes out clearly for all industries in support of investment adaptation (i.e., in response to updated information) in theory. Its estimates are positive in manufacturing and services industries and negative in the mining & quarrying industry. That the investment deterrent effect of corruption faces new investors and market incumbents can be undeterred, or incentivised, by corruption is akin to prior findings from German MNEs in the 1996–2006 period (Couttenier & Toubal, 2017).

Manufacturing and services enterprises that are market incumbents are generally unaffected or incentivised by corruption in line with a theoretical scenario where the multinational enterprise encounters a low corruption level in the market. MNEs in the manufacturing, communication & information services and professional, scientific & technical services industry have a 6.7, 21 and 30 percentage point higher investment probability in a slightly more corrupt market using predominant

grand corruption measurement. These estimates indicate rent seeking activities such as high-level corrupt deals. In the manufacturing industry, a narrowed down evaluation by enterprise size reveals that large MNEs are disincentivised by petty corruption (pointing to the relevance of quantifying corruption effects taking distributional factors into account). A plausible explanation for this result is that regulatory frameworks have been instituted for industrial production, leading to more administrative hurdles for these producers in corrupt systems.

In the mining & quarrying industry, the investment probability of market incumbents is reduced by as much as 72–81 percentage points at a marginal corruption increase (depending on measurement). These estimates are consistent with a theoretical scenario where the MNE encounters an intermediate/high corruption level in the market, and only remains active as long as it can make operating profits (to minimise its loss). The finding that mining & quarrying investors face considerable corruption obstacles that eat into their operation profits (and may instigate exit) could reflect an exacerbated predation of policy makers and public administrators on these activities relating to an intrinsic function of natural resource abundance observed in many corrupt systems (Leite & Weidman, 2002).

Corruption capability is a central factor in theory that is identified by the enterprise's corruption experience (i.e., previous investment in a corrupt market) at market entry. We find a positive indirect effect of corruption capability in all industries, providing strong support of the prediction that enterprises with this capability face a lower cost imposition of corruption. In theory, these enterprises gain a cost advantage vis-à-vis competitors in corrupt environments. It is important to note that while the indirect effect functions as an efficiency gain from the enterprise's perspective, which is consistent with the use of bribes to buy down regulatory barriers, it is accrued at competitors' expense. This is confirmed by the quantified corruption effects, which reveal that corruption capable enterprises generally are undeterred or stimulated by corruption while their competitors almost always are deterred by corruption. (The result echoes prior evidence provided by Thede and Karpaty (2023) from Swedish manufacturing MNEs for the same investigated period.) The stimulating effect of corruption is consistent with a scenario where a multinational enterprise with superior corruption capability reaps a competitive advantage in a corrupt environment. The incentivising effect is observed for manufacturing, communication & information services

and professional, scientific & technical services MNEs, which have a 0.23, 0.34 and 0.32 percentage point higher probability of entry into a slightly more corrupt market using predominant grand corruption measurement. This is indicative of corrupt high-level dealings made to ensure better market-entry conditions. As the market environment is distortionary and can discourage competition (as exemplified in Fig. 2.1), our results can contribute to explain the sustenance of low productivity enterprises in corrupt markets open to investment (e.g., Tanzi & Davoodi, 2000).

Corruption is a key driver of market exits. A marginal increase in the corruption level increases the exit probability by 0.12–0.21 percentage points in the manufacturing industry and by 0.16–0.36 percentage points in the services industries. (Mining & quarrying MNE exits are too few for the results to be statistically validated.) An indirect positive corruption effect for market entrants is detected in the manufacturing and finance & insurance services industries in line with modelled asymmetric information constraints. Entrants are more disincentivised by corruption than market incumbents in the finance & insurance services industry using predominant grand corruption measurement. In theory, this is consistent with downweighted corruption risks in the enterprise's market assessment and encountering a high corruption level upon market entry. It can be noted that the result would be difficult to explain from standard theoretical fundaments of informed decision-making. In the manufacturing industry, there is no (statistical) difference between the quantified corruption effects of market entrants and incumbents, indicating that distributional factors (i.e., production and market conditions) outweigh the indirect effect. The result suggests that established MNEs are disincentivised by exacerbated corruption problems in the market, possibly due to being locked into increasingly burdensome corrupt deals (that are subject to hold-up and commitment problems) and/or because some local enterprise utilises corrupt means to stifle competition. While we do not want to overstate these results (as market exits are rare), they point to important corruption hindrances of investment often overlooked in the research field.

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CHAPTER 5

Conclusions

Abstract The book's main contributions are summarised, placed in context and discussed. The theoretical framework incorporates corruption-related cost and/or risk components, and predicts that enterprise-specific corruption-related cost advantages can undermine technology-based investment performance. Our empirical findings strongly support the existence of such distortive effects, showing that expected investment returns increase with corruption capability. The results also indicate considerable corruption-related investment risks, in particular relating to predicted post entry investment adjustments of mining & quarrying MNEs.

Keywords Multinational enterprise · Corruption-related advantage · Corruption risk · Investment adjustment

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5.1 Main Contributions and Further Elaboration

In this book, we provide an analytical foundation of the multinational enterprise's investment behaviour in corrupt environments. The theoretical framework provides a small-scale structure including the main corruption mechanisms that affect the enterprise's FDI engagement. It incorporates corruption-related cost and/or risk components as prior studies in the field (e.g., Nilsson Hakkala et al., 2008; Wei, 1997). The primary aim is to give a clear and tractable exposition of host market corruption effects regularly facing the multinational enterprise. Our data set includes Swedish enterprises' FDI engagements in selected industries over an 18-year period (1997–2015). As Sweden has exemplary institutions, behavioural corruption effects can be identified via FDI engagements for enterprises of this origin. The investigation is performed for the manufacturing industry, which is more targeted in the field, the mining & quarrying industry, for which there is no prior systematic evidence (to our knowledge), and the communication & information, finance & insurance and professional, scientific & technical services industries, which are rarely analysed. The results clearly demonstrate that the corruption impact depends on production and market conditions set out in theory.

The theoretical framework features corruption effects that impact the enterprise's investment in a foreign market. The enterprise incurs fixed and variable corruption-related investment costs, which increase in the market corruption level. MNEs that (simultaneously) invest in a market engage in Cournot competition, producing at their profit-maximising levels taking competitor behaviour into account. The enterprise's investment cost depends on its technology and capability to invest in a corrupt environment (corruption capability). This implies that regular production cost efficiency is of less importance for investment performance in a market more infiltrated by corruption. Investment behaviour under corruption uncertainty is studied in a two-stage game where the enterprise bases its market-entry decision on a subjective market assessment at stage 1 and makes an informed market participation (and production) decision at stage 2. The (risk-neutral) enterprise's market assessment incorporates subjective probabilities (as proposed by Buckley & Casson, 2019) assigned to an interval of plausible corruption levels. The enterprise invests if the perceived corruption risk is low enough for it to expect

a profit and, if so, continues if it can make an operating profit at the encountered market corruption level.

Corruption-related costs are broadly defined as any expense incurred due to corruption. The definition aligns with common private sector implications of institutionalised corruption (e.g., Rose-Ackerman 1999). In particular, all enterprises face cost additions in corrupt environments. Capability-induced cost reductions are consistent with the use of bribes to buy down regulatory market barriers (e.g., Hellman et al., 2003; Leff, 1964; Lui, 1985) as well as that of legal means (i.e., bargaining power) to reduce corruption pressure (Bennedsen et al., 2011; Campos & Giovannoni, 2007; Thede and Gustafson, 2017). Lacking information on the market corruption level reduces the enterprise's investment incentive (Wei, 1997). Due to the obscure nature of corruption, the uncertainty that is prevalent in corrupt systems can be particularly restrictive to enterprises without market experience (Campos et al., 2010).

The theoretical framework includes the main corruption mechanisms that affect the enterprise's FDI engagement. First, the cost imposition of corruption (channelled via setup and operational cost additions) deters investment. Second, the enterprise's corruption-related costs are declining in its corruption capability. The net investment impact depends on the enterprise corruption capability distribution and the corruption level in the market. In equilibrium, a market-distortive effect is generated that tilts market shares towards enterprises more capable of investing in the corrupt environment. Moreover, a superior corruption capability triggers a stark cost advantage that incentivises market investment in more corrupt environments. Third, corruption uncertainty leads to a range of diverse outcomes that depend on the enterprise's market assessment and experienced corruption level. The simple stylised setting generates several adverse outcomes (forgone investment returns, investing at a loss, and immediate market exit) underlining that dissonant investment behaviour is consistent with rational decision-making.

Concretely, we formalise the enterprise's engagement in sales FDI. The small-scale structure can be built upon to incorporate the interrelated trade decision to supply the market through exports (as in Helpman et al., 2004). For the purpose of examining corruption effects on MNE production channels, the exercise would add complexity without altering qualitative outcomes. It is likely that corruption is more taxing on investors than exporters, and that more enterprises serve a corrupt host

market via trade in equilibrium. This would not alter that corruption-related costs and uncertainty deter investment, that the cost imposition of market corruption declines in the enterprise's corruption capability, and that the most capable enterprises benefit from corruption under particular conditions (i.e., an uneven capability distribution and relatively high corruption level). Our theoretical framework could also be developed into a many-market setting where the enterprise may opt for export-platform FDI (as in Ekholm et al., 2007). This would enable a more detailed investigation of interlinked market corruption effects without changing the investment relationship to basic corruption-related components.

Another theoretical approach could study sourcing FDI of intermediate inputs, possibly taking account of alternative sourcing via independent suppliers (as in, e.g., Antràs & Helpman, 2004). This would provide detailed predictions relating to the enterprise-specific technology that underpins sourcing activities. The account of technology-related investment considerations would complicate the analysis while preserving the main corruption effects. As corruption adds to investment costs and risks, the enterprise's incentive to invest in a foreign production platform is reduced. And the sorting of large enterprises into FDI (e.g., Krugman et al., 2012) can be distorted by the corruption-related cost advantage of enterprises with stronger corruption capability. The two-stage game structure that features a priori corruption uncertainty would also generate the same set of diverse investment outcomes in sourcing as sales FDI. In addition, a narrowed down focus on the ownership of foreign suppliers can pinpoint the trade-off between exploiting localised cost advantages and technology protection in corrupt environments (akin to, e.g., Javorcik & Wei, 2009). This perspective would bring nuance but not change the main investment implications of host market corruption.

The enterprise data contains information on FDI market engagements that is matched to foreign country data displaying large variation in corruption levels, economic development levels and geographical locations. The primary advantage of our enterprise-market-year data set is the complete account of investments and divestments, which enables a full analysis of enterprises' market entry, investment and exit behaviour. The enterprise data includes home production characteristics, which display a regular pattern of superior MNE performance. MNEs are larger, more productive and more skill-intensive than (purely) domestic enterprises. Highly productive enterprises become multinational as their cost-efficient production technology generates large revenues that can cover regular

foreign investment costs (e.g., Antràs & Helpman, 2004; Helpman et al., 2004). Multinationals internalise gains from trade by exploiting locational comparative advantages in their production networks, which reinforce their use of the home country's abundant factor (Antràs & Yeaple, 2014; Yeaple, 2003). Swedish MNEs are highly skill-intensive producers as Sweden is a skill-abundant country (with a well-educated labour force). MNEs are many times larger than (purely) domestic enterprises in terms of domestic revenues, value added and employment levels. Multinationals constitute a small proportion of the enterprise population ranging from 3% in the professional, scientific & technical services industry to 8% in the manufacturing industry. MNEs display limited market outreach including on average 2 markets in the mining & quarrying industry, 3 markets in the communication & information services and professional, scientific & technical services industries and 5 markets in the manufacturing and finance & insurance services industries.

The corruption data is based on standard indices from the PRS group and World Bank capturing a wide range of corrupt activities in public office, which include various forms of petty and grand corruption (e.g., speed money in the bureaucracy, kickbacks for public contracts). The corruption level is measured by a modified index in the 0 to 1 interval. The distribution of corruption levels is left-skewed with a median that exceeds 0.50, implying that corruption problems are common, and can be expected to be encountered in most foreign markets. Corruption levels are highly persistent over time though considerable changes are occasionally observed in the data. Swedish multinationals are reluctant to incorporate corrupt markets (where investors are likely to encounter corruption) into their production networks. A narrowed down focus on the relative entry probability shows that corruption experience (i.e., previous FDI engagement in at least one corrupt market) substantially magnifies the corrupt market-entry incentive. In the 18-year investigation period, every mining & quarrying and finance & insurance service enterprise that extends its outreach to a corrupt market have investment experience in the market category. As raw data patterns are suggestive of an acquired capability to invest in corrupt markets through experience (across the board of industries), the MNE's corruption experience is used as a corruption capability indicator in the market-entry investigation. (The empirical setup is akin to prior research by Thede and Karpaty (2023) on the market-entry incentive of Swedish manufacturing enterprises). Market exits are rarely observed in the data. The market exit probability ranges

from 1.8% for mining & quarrying investments to 6.4% for professional, scientific & technical services investments. MNEs seldom uproot investments from corrupt markets and never do so in the mining & quarrying industry.

The empirical investigation is performed using a gravity approach (Anderson, 2011). Our gravity specification includes enterprise and/or foreign market determinants of primary interest and controls for home and outside market effects (as devised by Head & Mayer, 2014). The empirical setup is based on benchmark investment/entry/exit equations with the market corruption level, which are extended with corruption and enterprise-specific interaction terms to trace corruption mechanisms. Corruption effects on the enterprise's market investment/entry/exit incentive are analysed through logit-estimated coefficients and computed marginal effects. The empirical strategy is rooted in the behavioural foundation set out in theory, where investment initiation and uprooting are integral to the objective of maximising the return to market investment, and consistent with MNEs' persistent foreign market engagements. The empirical analysis gives an overview of market corruption mechanisms and estimates the corruption impact on the enterprise's investment/divestment decision. Our results clearly evidence that the relative strength of these mechanisms differ between enterprises, generating corruption impacts that vary widely in terms of direction and magnitude.

The results show that the market corruption level is a key determinant of the enterprise's investment incentive. Corruption is often a strict investment deterrent. Its effect is particularly restrictive for mining & quarrying enterprises, which display a 0.68–1.01 percentage point lower investment probability at a slightly higher (0.01) corruption level. There is a differential corruption effect with respect to market incumbent status. The investment-restrictive effect regularly pertains to new investors, which is consistent with lacking market information in theory. In the category, finance & insurance services enterprises are most deterred by corruption. MNEs that are market incumbents are mostly undeterred or stimulated by corruption. In particular, they display a 5.6, 21 and 30 percentage point higher probability to invest at a marginally (0.01) higher, predominantly grand, corruption level in the manufacturing industry, the communication & information services industry and the professional, scientific & technical services industry. In contrast, mining & quarrying enterprises with market experience are heavily constrained by corruption displaying a 72–81 percentage point lower investment probability in a slightly (0.01)

more corrupt environment. The discrepant industry results are consistent with theoretical outcomes stemming from investment under corruption uncertainty and different encountered corruption levels.

The corruption capability effect (as measured by corruption experience) is identified at market entry. Our results provide stark support of the prediction that corruption capability limits the cost imposition of corruption. A differential corruption effect that deters enterprises lacking the capability and leaves their capable counterparts unaffected or incentivised is regularly observed. Finance & insurance services enterprises in the former category are most reluctant to initiate investment in a corrupt environment, displaying an entry probability reduction of 0.38–0.40 percentage points as corruption is increased at the (0.01) margin. Enterprises with corruption capability can be incentivised to start investing in a market infiltrated by more grand corruption. In the manufacturing industry, the communication & information services industry and the professional, scientific & technical services industry, the entry probability is increased by 0.23, 0.34 and 0.32 percentage points at a marginal, predominantly grand, corruption (0.01) increase. The results are consistent with the existence of a market-distortive effect that favours these MNEs at competitors' expense. Our findings clearly demonstrate that an individual enterprise's gain from corruption comes at the cost of market distortion, indicating that corrupt systems trigger inefficient resource allocation (as advocated by, e.g., Aidt, 2009; Banerjee et al., 2012; Kaufmann & Wei, 1999).

The results reveal that corruption is an important driver of market exits. The exit probability at a marginal (0.01) increase in the corruption level is at least 0.12, 0.16 and 0.26 percentage points larger in the manufacturing industry, the communication & information services industry, and the professional, scientific & technical services industry. (Results for the mining & quarrying industry cannot be statistically validated due to the small number of observations.) The evidence is consistent with investment uprooting as operating losses are made at high corruption costs. The results generally indicate that a high corruption level is difficult to overcome by entrants and established enterprises alike, which suggests that corruption is more taxing for all in highly infiltrated systems. E.g., established enterprises may face corruption hold-up problems in entrenched positions (e.g., Lambsdorff, 2002; Rose-Ackerman, 1999). In the finance & insurance services industry, entrants display a 0.58 percentage point higher exit probability than incumbents at a marginal

(0.01), mostly grand, increase in the corruption level. The result indicates that new investors take an elevated corruption risk, which is in line with observations of stark information asymmetries in developing financial markets (Pagano & Japello, 1993; Tsai et al., 2011).

We provide representative evidence on enterprises' investment behaviour in corrupt environments. The results confirm that production and market conditions are central in determining the enterprise-specific investment impact of corruption. Corruption effects are asymmetric in a way that, at least partly, is unrelated to technology. A systematic investment sorting of larger, more productive, enterprises into more corrupt environments is only observed in the manufacturing industry using measurement mostly capturing grand corruption. The scant evidence of technology determinacy of market performance shows that corruption functions differently from regular market barriers that are more easily overcome by cost-efficient producers. This aligns with market-based results of a disconnect between regular production drivers and performance in systems with institutional deficiencies (Driffield et al., 2013), including those identifying corruption as the direct cause (Chueng et al., 2012; Fisman et al., 2024).

The empirical investigation disentangles underlying corruption mechanisms, revealing that the enterprise's experience is important for the return to investment in a corrupt environment. Our results show that there is a learning effect, which generates a cost advantage that may be large enough to stimulate investment. These echo prior results of German MNEs' market adaptation (Couttenier & Toubal, 2017) and Swedish manufacturers' extended outreach to new corrupt markets (Thede & Karpaty, 2023). The information asymmetry in a system infiltrated by corruption is relevant, indicating that enterprises can improve their assessment of a market where business operations are costlier due to market conditioning. Illicit deals with corrupt officials affect competitive market structures, which can favour corrupt MNEs. This is more apparent in cases when grand corruption is used to ascertain favourable treatment. The enterprise's internalised investment know-how from a corrupt environment implies that the learning effect, at least partly, is transferable between markets. This can contribute to explain why corruption is less impeding for FDI from corrupt countries (Cuervo-Cazurro, 2006; Habib & Zurawicki, 2002; Ledyaeva et al., 2013), where MNEs are accustomed to corruption-related market distortions. A contrasting result is found for mining & quarrying MNEs with market experience

that are strongly disincentivised by corruption. Their stark susceptibility to corruption pressure is in line with observation for less developed resource-rich countries (Leite & Widman, 2002). Our evidence of market investment cut-off points shows that MNEs can be discouraged by encountered corruption impediments. That corruption barriers cannot be circumvented in these cases is indicative of compounding corruption costs, possibly due to hold-up problems in corrupt relationships or because institutional deterioration cuts off alternative (legal) forms of influence.

The scope of this book is to provide theory and evidence on the enterprise's incentive to engage in FDI in a market infiltrated by corruption. At the loss of generality, the system related determination of corruption could be analysed in a full-fledged political-economy setting incorporating enterprise interactions with public officials. While an individual enterprise is unlikely to influence market institutions under normal conditions, a strong market presence of MNEs may impact political-economy outcomes. The theoretical account of political-economy factors can sharpen the analysis and pinpoint system implications, thereby providing a strong foundation for applications to particular contexts (e.g., case studies). For industry-specific analysis, the host country's locational advantage is relevant as the type of production that it attracts can affect local political-economy incentives. In particular, specific governance conditions may pertain to corruption linked to FDI in extractive activities (Dadasov et al., 2017). Dynamic economic implications of FDI may also affect the workings of the system. Feedback loops of this kind can be channelled in various ways, including via labour and product market competition. The study of such knock-on effects could identify under what conditions the market presence of MNEs reinforce institutional progress/regress. Another important avenue for future research is to inform the behavioural implications (rather than the bite) of international anti-corruption legislation. Recent research shows that home country enforcement of such legislation strengthens inexperienced investors' incentive to engage in corrupt environments (Dedho et al., 2025). This evidence suggests that enforcement of OECD anti-corruption legislation in Sweden, which has been ineffective (OECD, 2024), would (at least partly) have counteracted the stark advantage of MNEs with corruption experience/capability vis-à-vis domestic competitors in foreign markets.

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