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Informal labor regulations, firm boundaries, and global sourcing

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**INFORMAL LABOR REGULATIONS, FIRM
BOUNDARIES, AND GLOBAL SOURCING**

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Abstract

This paper extends the global sourcing model with informal labor, which spawns reputation and legal costs for violating the rules and regulations imposed on foreign firms regarding accessing informal labor under integration. Under these circumstances, foreign firms, facing a higher cost than domestic firms, prefer to outsource rather than integrate into the informal labor-abundant country under both transaction-cost and property-rights theory approaches. The attractiveness of foreign investment rises with the fall in the costs for foreign firms that access informal labor. However, such adverse effects of the cost decline with a rise in the capital intensity and bargaining strength of the foreign firm. Three sets of empirical exercises using cross-country panel data for 80 countries from 2000-2019 and pooled cross-sectional firm-level and industry-level data for 31 countries confirm such conjectures and reveal that foreign investment declines with the rise in the fraction of informal labor employed by the affiliate firm across countries, industries, and firms.

Keywords: global value chain, informal labor, firm boundary, labor regulations, FDI

JEL Classification: C67, F14, F16, F21, F23

1 Introduction

When a multi-national firm prefers to take advantage of abundant labor from the developing world, which often possesses a large informal sector, choosing whether to outsource or integrate (foreign direct investment [FDI]) depends on the reputation and legal costs imposed to access this informal labor. The existing literature concerning the ownership decisions of foreign firms discusses factors like the cultural distance, contractual frictions, contracting institutions, long-term oriented managers, intellectual property rights (IPR), etc., which cause a rise in transaction costs¹, interfering with the ownership decision; however, the literature has ignored the issues such as the reputation and legal costs that emerge in dealing with informal labor.² This cost might increase due to growing concerns from international agencies for fair trade, labor solidarity, the violation of women and child labor laws, and safety and social security measures. If this is the case, any labor contracts for informal labor use involving these concerns must consider an additional cost for direct hiring that would affect the decision to participate in the value chain and the forms of participation. The abundant labor in developing countries indeed helps companies to produce at a cheaper wage cost due to the existence of the informal sector, which bypasses the laws relating to working conditions, decent wages, social security, and environmental regulations, and the use of this labor helps companies to evade tax burdens to a large extent. A state in the developing world often strategically does not strictly enforce such regulations for firms to help companies remain competitive, allow informal labor to survive in the sector due to the inability to subsidize the sector or offer gainful employment to all sections of the working population (Boadway and Sato 2009; Prado 2011; Maiti and Bhattacharyya 2020). This may not be possible for a multinational enterprise (MNE) in the presence of rising global concerns regulating the access to such labor and the vigorous enforcement of such regulations. Moreover, the use of informal labor becomes an issue in the fair trade literature of international trade and may violate

¹Refer to Eppinger and Kukharsky 2021; Antràs and Helpman 2006; Chor and Ma 2020 for contractual frictions and contracting institutions, Gorodnichenko, Kukharsky, and Roland 2018; Gorodnichenko, Kukharsky, and Roland 2024; Oke, Maltz, and Erik Christiansen 2009 for cultural differences, Kukharsky 2016 for managerial orientation, and Kukharsky 2020; Bolatto et al. 2023 for IPR.

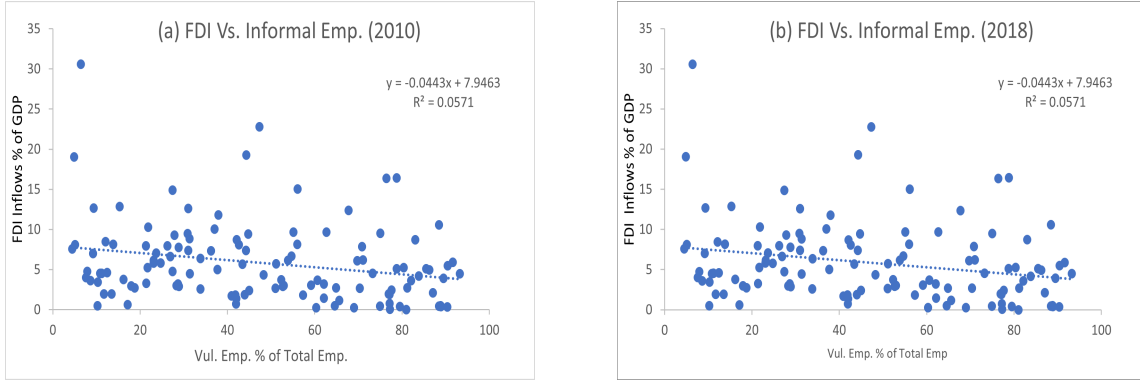
²There is no uniform definition used to define the informal sector. Some countries define it based on registration, account maintenance, the amount of labor, and capital. In this study, any contract executed by a set of laborers that bypasses existing rules and regulations related to occupational health, safety, and working conditions and compensation is defined as informal. The informal labor term includes working in unregistered manufacturing units without compliance with taxation and regulations and working in registered units that lack protection or benefits for casual, part-time, temporary or contract workers with no social security benefits or less than subsistence wages.

free competition. The violation of such regulations involves a huge loss of reputation for MNCs, even if there are no regulatory costs. This paper aims to shed light, theoretically and empirically, on the effects of the existence of such a cost for informal labor on the ownership and global sourcing decisions of MNEs.

When the headquarters of a company establish a contract with the labor-abundant affiliate country, the contractual frictions defined in the property-rights and transaction-costs theories suggest that some costs exist due to the incompleteness of contracts for a formal set of workers executing the work (Alchian and Demsetz 1972; Williamson 1989; O. Hart and Moore 1990). If informal workers do the work, then there may emerge legal/extra-legal costs (punishment, fine, penalty, bribe, etc., for halting production, compensatory allowance, and bribing government officials to avoid the legal cost) or reputation costs (like the loss of brand value, goodwill, and customers). All these may inflate the effective cost of hiring informal labor. There is growing concern about the poor working conditions in developing and emerging countries such as Bangladesh, Pakistan, India, Brazil and South Africa. Many of these countries could not raise the level of formal employment despite spectacular economic growth in the recent past. This became even more difficult after the global financial crisis of 2008, which destroyed significant amounts of financial capital. As a result, these countries have been pursuing strategies to raise foreign capital that may accelerate employment growth to some extent. According to Carney et al. 2019 and Bruno, Campos, and Estrin 2018, it is unclear whether the spillovers from FDI to the host economy will be positive in emerging markets when institutions are weaker.

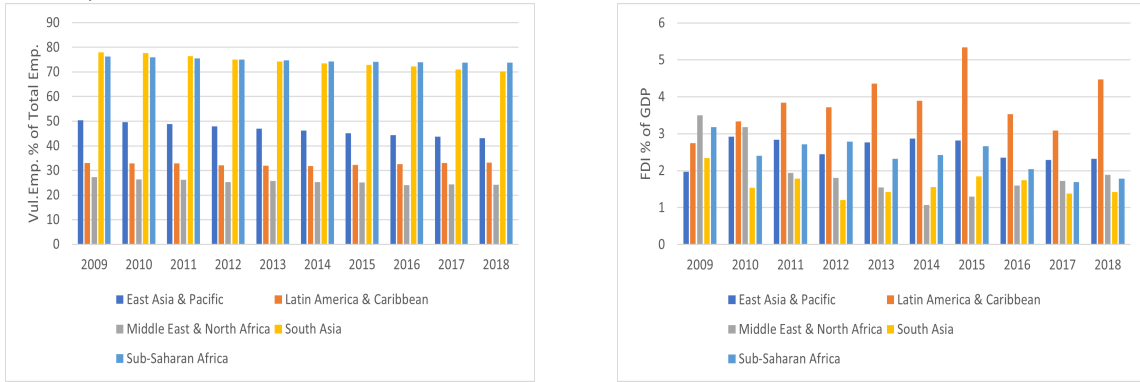
It is evident that FDI inflows show a declining trend with a rise in vulnerable employment in 120 countries; refer to Figure 1. For the developing countries, the FDI inflow is not high on average in countries that had high informal employment from 2009–2018 (see Figure 2). This paper shows that their FDI inflows remain low, despite abundant informal labor, due to the high reputation and legal costs of accessing this labor due to international regulations regulating MNEs. The existence of the informal sector may prompt international stakeholders to act more than domestic ones. Such reputation and legal costs may arise if there are any mishaps at the manufacturing plant or complaints from labor unions for violations of labor laws and regulations that vary between domestic and foreign firms because of international regulatory agencies and their effective regulations. Domestic firms in developing countries often do not face or may face much lower costs for using informal labor in production. Although a domestic firm can manage to bypass labor regulations, this may not be possible for multinational firms operating under

Figure 1: FDI vs. Informal Employment: 120 Countries



Source: World Development Indicators

Figure 2: FDI and Informal Employment from 2009–2018 in the Developing World (Regionwise)



Source: World Development Indicators

similar circumstances. In that case, this difference results in the variation of the effective cost of accessing informal labor, which may affect a multinational enterprise's decision to either integrate or outsource. Therefore, foreign firms may face a trade-off in developing countries concerning whether to use informal labor or formal workers. This occurs despite the preferential treatment given in several emerging and developing countries for foreign direct investment.

Some international agencies are quite vigilant in regulating MNCs' access to informal labor in the developing world. For example, the International Labor Office (ILO) adopted a tripartite declaration to force multinational enterprises to implement social policies for workers at its 204th session (November 1997). Subsequently, this declaration was amended at its 279th session (November 2000), 295th session (March 2006), and 329th session (March 2017).³ Very recently, in March 2017, the MNE declaration

³Refer to Černič 2020; Bonnet, Vanek, and M. Chen 2019; Calatayud, Candelas, and Fernández 2008;

was further amended by considering the increased foreign investments and participation in global supply chains. The declaration clearly stated that MNEs are responsible for identifying, preventing, mitigating, and accounting for actual and potential labor rights violations through their business relationships' operations, products, or services. Moreover, the amendment addressed enforcing the arrangement for social security, labor rights, the transition from the informal sector to the formal sector, wages, due diligence processes, grievance mechanisms, and access to remedies for victims of business-related human rights violations. Furthermore, the declaration encouraged multinational enterprises to contribute to social and economic progress and realized the requirement for decent work for all those who work, whether they work in the informal economy or the formal economy. The ILO declaration provides some grounds for the court to impose penalties on MNCs in case of any violation of human rights. In the case of any mishap at the production site, labor unions become active, and stakeholders decide to favor labor. These declarations create pressure for foreign firms, and firms must keep in mind the expected costs of violation before making decisions about integration or outsourcing. Any violations of the declaration principles may invite higher penalties and compensatory costs under integration compared to outsourcing. The existing literature is silent on the impact of such regulations on foreign firms' ownership decisions for developing countries.

In developing countries, a sizable share of the working population works in the informal sector, revealing a degree of impoverishment, with more than 2 billion people representing 60% of workers and 80% of enterprises (Bonnet, Vanek, and M. Chen 2019). The urban component of informality offers substantial direct and indirect employment in the “modern” economy (in the sense proposed by Lewis, 1954 Gollin 2014), mainly in the manufacturing and service sectors. The self-employed and micro-enterprises account for almost 70% of employment in the Middle East and North Africa, and more than 80% in South Asia and sub-Saharan Africa (Tenkate et al. 2019). India officially records 63 million micro-enterprises, employing 107 million people.⁴ The unregistered enterprises, casual workers, and subsistence traders likely account for a further 200–300 million people. From 1999–2011, most new jobs created in India were informal jobs (Artuc, Porto, and Rijkers 2019). Likewise, Africa has an estimated 300 million workers in the informal sector (Jayaram et al. 2020). In Bangladesh, 85% of all workers are employed informally, as the export growth of this country has increased significantly in recent years (Artuc, Porto, and Rijkers 2019).

The MNEs aim to take advantage of large informal sectors and are often caught by

Meeran 2011, and various ILO publications for informal labor related amendments and details.

⁴Refer to <https://msme.gov.in> for data.

international agencies for gross violations of various regulations relating to labor relations and working conditions. Evidence in the developing world has increasingly revealed how much labor regulations encourage international agencies to enforce the regulation vigorously and compel the MNEs to provide compensation for violations. To understand an account of these additional legal burdens, consider the following case studies of well-known multinational companies. First, multinationals employ millions of workers in garment factories in Bangladesh by violating safety norms, such as fire safety and building safety norms, and they pay the lowest wages of any of the garment industries in the world.⁵ In 2013, the large building of “Rana Plaza”, a garment factory in Bangladesh run by well-known MNEs, where more than 2000 workers were doing their jobs, collapsed in less than 90 seconds. This killed 1134 workers due to the violation of building safety norms. Brands were held accountable, and two major multinationals had to pay millions of dollars after the global unions accused them of failing to compel suppliers to fix their factories. This forced brands and retailers to act, and roughly 250 brands signed two initiatives the—“Accord on Fire and Building Safety”—in Bangladesh. Moreover, facing the threat of being cut off from Western buyers, thousands of factory owners invested in safety norms.⁶ This case study highlights that violations of labor and safety norms may inflate the extra-legal costs or compensation amounts to be borne by the multinational firm.

The second case study highlights the governance failure of the human resource manager of Wistron Corporation concerning plant workers at its new mobile phone assembly plant located in Narasapura in the Kolar district, 57 km from Bengaluru, India.⁷ There was a breakout at the Wistron plant due to the violation of Apple’s “Supplier code of conduct” in December 2020. Wistron failed to implement proper working-hour management processes and to pay workers on time, and it underpaid wages to contract workers

⁵Bangladesh has the third largest garment industry in the world after the People’s Republic of China and Viet Nam, with more than 4000 factories and more than 5 million workers. The industry represents 16% of the country’s GDP, with 34 billion dollars of exports in 2019. More than 200 well-known branded clothing companies source their garments from Bangladesh: <https://cleanclothes.org/campaigns/past/rana-plaza>.

⁶The findings of Collins and Yates 2023 contribute to the understanding of emerging hybrid governance mechanisms, combining multi-organizational cooperative action with traditional capital-labor dynamics to influence labor regulation in global production networks in new and contradictory ways.

⁷Wistron Corporation is a Taipei, China-based electronics giant, one of Apple’s key manufacturers of select iPhone models in India. The company hired close to 10500 employees, mostly local Kannada-speaking candidates in a phased manner, source <https://www.hindustantimes.com/india-news/wistron-violence-what-exactly-happened-at-karnataka-apple-plant>.

and housekeeping staff; female workers were working overtime without proper legal authorization. This resulted in labor unrest, causing a massive loss to the plant's property. Finally, Wistron had to restructure its management team and set up a 24-hour hotline for employees to address anonymous complaints. It was forced to address how workers were treated at its southern India plant. This incident highlights the importance of good governance and points out an additional cost for any violation of the regulations for using informal labor.

Similarly, Nike's shoe plant in Viet Nam highlights the rampant violations of labor laws.⁸ Ernst & Young inspected the Nike shoe factory in 1997 and reported a dismal picture of thousands of young women, most under age 25, who were forced to work 65 hours a week in excessive heat, noise, and foul air for slightly more than \$10 a week. Nike faced criticism from human rights and labor groups that stated that Nike treated workers poorly even as it lavished millions of dollars on star athletes to endorse its products. As a result, Nike had to sharply cut overtime, improve safety and ventilation, and reduce the use of toxic chemicals. There are similar examples of international laws around the developing world regulating access to informal labor. The additional cost implications in all three case studies arise due to labor regulations.

Furthermore, a global FairTrade system changes how trade works through better prices, decent working conditions, and a fairer deal for farmers and workers in developing countries; GoodWeave works to stop child labor in global supply chains. The FairTrade or GoodWeave mark on a product means producers and businesses have met internationally agreed-upon standards such as economic, environmental, and social criteria issued by FLOCERT or certifies that no child, forced, or bonded labor was used in making the product. It also means that the company supports purchasing support programs that educate children and improve working conditions for adults in producer communities.⁹ Violating these standards may result in suspension until remedial actions are undertaken and verified or, ultimately, the decertification of the product.

Production is highly fragmented today, as different stages of production are carried out across factories, relying on various suppliers coordinated by the multinational enterprise affiliate. Using the informal sector in developing economies is an inevitable factor to take advantage of in the value chain (Narula 2019). A substantial share of the labor force in many emerging and developing countries is employed in the informal sector, yet the informal sector is nearly absent in theoretical and empirical work on trade (Dix-Carneiro et al. 2021). Applying informal labor in considering international trade and competition

⁸Refer to www.nytimes.com/1997 and www.washingtonpost.com/1997.

⁹Refer to <https://www.fairtrade.net/about/fairtrade-system> and <https://goodweave.org>.

has received much interest in the recent literature. Most of these papers argued that a typical firm, in response to increased foreign/import competition, intends to reduce its labor costs by lowering worker's benefits, replacing permanent workers with part-time labor, or subcontracting with firms in the informal sector. Furthermore, rigid labor laws prohibit a smooth adjustment to changes in the demand for labor, leading to a rise in informality resulting from trade openness. P. Chakraborty and Sundaram [2019](#) found robust evidence of the Chinese competition in domestic markets of India, inducing a firm to outsource manufacturing activities to informal firms. This is also true for the increased participation in global value chains (GVCs). This strategy of obtaining a cost advantage through informal labor is the basis for participation in manufacturing value chains, especially in Asia. For example, Bose and K. V. Ramaswamy [2020](#), using three-digit formal time series data for 46 industries from 1988–2014, provided significant evidence that Indian manufacturing firms responded to globalization by hiring more contract workers. Both industrial and service sector firms receive contracts and foreign investments for production and outsource some of the output (often intermediate goods) to the firms in the informal sector (Park and J. V. Chen [2007](#)). There is a general perception that labor-abundant developing countries often attract foreign direct investment from developed countries to economize on labor costs. Thus, the following questions arise: Does this perception work favorably for an abundant labor country with a vast informal sector when regulated differently from foreign firms? How does the dual treatment of firms impact the behavior of the headquarters firm's decision regarding the ownership of an affiliate firm?

Active participation in global value chains requires high labor productivity and technological capability or a low cost of production at the firm level. Such requirements depend upon the levels of infrastructure, openness to trade, good governance, logistics, investor-friendly regimes, predictable and stable tax rules, and other factors. Most export-oriented industries across developing countries must meet these requirements, but they are also necessary to attract FDI. The financial sectors of many countries are in distress after the global financial crisis of 2008, and many countries, as a result, are experiencing slow economic growth. Therefore, many of the policy initiatives that these countries announce from time to time are meant to attract significant foreign capital inflows and increase global participation to push exports and productivity. For capital-constrained countries, participation in GVCs is more remunerative through extending firm boundaries (integration) since it helps in seeking large FDI inflows from the capital-rich developed world and, thereby, facilitates rapid industrialization and helps in increasing the size and

scale of firms, which may have spillover effects and benefits. The literature in this area is steadily growing.

Antràs 2003 designed a theoretical framework that combines a Grossman-Hart-Moore view of the firm with a Helpman-Krugman view of incomplete contracting with a property-rights approach for the firm's boundaries. It was incorporated into a standard trade model with imperfect competition and product differentiation to pin down the boundaries of multinational firms and the international locations of production to predict the patterns of intra-firm trade.¹⁰ Kukharskyy 2016 offered an alternative framework with a repeated-game model of global sourcing in which final-goods producers decide whether to engage with their suppliers in relational contracting and whether to integrate a supplier into a firm's boundaries or deal with the latter at arm's length. The model predicts that the likelihood of vertical integration increases in the long-term orientation of cooperating parties. Gorodnichenko, Kukharskyy, and Roland 2018 developed an incomplete contracting global sourcing model. The model using the transaction-cost theory (TCT)¹¹ approach, brings cultural distance into multinational firms' decision to integrate or outsource. Kukharskyy 2020 considered the dissipation of knowledge and under-investments into relationship-specific assets in an incomplete contractual global sourcing model. Furthermore, the model predicts that the attractiveness of integration increases as the parent firm's knowledge capital increases and decreases with an increase in the affiliate's physical capital in a joint production process. Furthermore, substantial IPR protection in the affiliate's country is predicted to mitigate the effect of knowledge intensity on the attractiveness of integration. These works have ignored the existence of the informal sectors in the affiliate countries.

Several studies using various indicators of good governance (voice and accountability, government effectiveness, the rule of law, political stability and the absence of violence, regulatory quality, and the control of corruption) highlighted that countries with sound governance infrastructure are likely to attract more FDI inflows (e.g., Busse and Hefeker 2007, Bannaga et al. 2013, Bellos and Subasat 2012, Subasat and Bellos 2013, Kurul and Yalta 2017, and Jiang 2022) because private investments cannot be protected in an environment characterized by poor governance (weak protection of property rights, high levels of corruption, or excessive regulations and bureaucracy). Likewise, poor governance brings additional costs to FDI and increases uncertainty (Globerman and Shapiro 2003

¹⁰See Antràs and Rossi-Hansberg 2009; Antràs and Chor 2013; Antràs and Yeaple 2014; and Antras 2015 for overviews.

¹¹Williamson 1985 asserted that the firms jointly maximize their surplus under integration and that the individual maximization of profits occurs under outsourcing forms of organization.

and Asiedu 2006). The strategic competition model designed by Maiti and Mukherjee 2013 shows the relation between good governance and inward FDI by analyzing the effect of governance on the non-production costs in the domestic economy. It shows that good governance by the domestic country reduces domestic marketing and distribution costs, which are likely to affect the domestic and foreign firms symmetrically, irrespective of the exporting or FDI decisions made by the foreign firm. Although these studies recognize the costs arising out of weak governance, they do not look at the decision on the ownership issue.

To guide our empirical investigation, we design a simple model of firm boundaries suitable for labor-abundant countries based on the seminal work of distinguished trade economists. The theory model combines within sector heterogeneity Melitz 2003 with the structure of firms Antràs 2003 when contracts are incomplete. The two-country, two-stage model is further inspired by the work of Antras and Helpman 2004, Gorodnichenko, Kukharskyy, and Roland 2018, and Kukharskyy 2020. The model explains the relationship between two parties across two countries under incomplete contracts—a firm’s headquarters (HQ) in the North and an affiliate manufacturing producer (M) in the South. HQ and M collaborate to produce a differentiated variety of final goods by combining two stages of production. We extended the global production model, built on Antras and Helpman 2004, by incorporating informal labor with reputation and legal costs for foreign firms. The extended model clearly shows how the subcontracting of a part of the production to domestic informal units by a multinational enterprise’s affiliate firm may result in reputation and legal costs, and this may act as a deterrent to integrating the manufacturing affiliate firm into the firm boundary of a foreign enterprise, hence containing the FDI inflows into abundant-labor and capital-constrained countries. These reputation and legal costs may reduce the profits of the HQ enterprise under integration. Uncertainty about these unforeseen costs could be one of the possible reasons for low FDI inflows despite the availability of abundant cheap labor in developing countries. The literature has not yet analyzed the direct effect of informal labor on firm boundaries nor its interaction with governance indicators and the capital intensity. This paper adds to the literature by extending the global sourcing model and extensively investigating the model’s theoretical propositions using country-, industry-, and firm-level data sets—this involves dynamic panel two-step system GMM (generalized method of moments) estimation using country-level annual data, controlling for time-fixed effects. Furthermore, logit and OLS regression techniques are applied to pooled cross-sectional firm-level data, and the OLS (ordinary least square) technique is applied to industry-level data, controlling

for country, industry, and sector fixed effects to check for robustness.

The remainder of the paper is organized as follows. Section 2 presents the theoretical framework. Section 3 presents the equilibrium results under complete and incomplete contracts using the transaction cost theory approach. Section 4 conducts a regression analysis to answer our main question, and finally, section 5 provides the concluding remarks.

2 Theoretical Framework

We build a theoretical framework to investigate the impact of access to the informal sector on the outcome of the FDI decision. A rich literature exists on the decision between integration and outsourcing made by the headquarters firm. We shall adapt the two-country, two-stage model of firm boundaries developed by Antràs [2003](#), Gorodnichenko, Kukharsky, and Roland [2018](#) and Kukharsky [2020](#) and extend it on two counts, firstly by splitting labor into two types, i.e., formal and informal laborers. The Cobb-Douglas production function is modified to accommodate the informal labor of developing countries. Secondly, we consider additional reputation and legal costs that may arise from violating labor laws and regulations such as the ILO declaration, FairTrade, and GoodWeave. We assume that these costs arise only under integration, not outsourcing. The intuition behind this assumption is that HQ redefines its firm boundary by integrating affiliate firms into its boundary. Therefore, HQ possesses rights over the physical assets of the affiliate firm and is responsible for bearing all of the reputation and legal costs arising in the international or domestic markets. In contrast, firms do not redefine boundaries under outsourcing, so affiliate manufacturers, not headquarters, are responsible for bearing these costs if they arise. Governments of labor-abundant countries are typically more focused on production and employment generation. Therefore, the strict enforcement of regulations on working conditions, child labor, social security benefits, and wages are either ignored, or the national government may not be willing to enforce them strictly for the affiliate firms. Therefore, such costs do not occur for affiliate firms^{[12](#)} or if they occur, are much lower than the costs imposed on MNEs under integration. This treatment of informal labor, violations of labor laws and regulations, and the emergence of reputation and legal costs are not considered in Antràs [2015](#).

¹²In capital-rich developed countries, regulations are strictly adhered to, as per all six worldwide governance indicators, based on the average rankings of high-income Organization for Economic Cooperation and Development (OECD) countries; North America is very high (85 on a scale of 100), and South Asia and East Asia and the Pacific scored 36 and 58 on a scale of 100 in the year 2020.

The model explains the business relationship between two parties—a firm’s headquarters (HQ) and an affiliate manufacturing producer (M). The production of goods requires two parties and relationship-specific investments into capital and labor: a firm’s headquarters is in the North, and an affiliate manufacturing firm is in the South. Both HQ and M differ in terms of resource endowments. The headquarters firm specializes in research and development, technology adoption, and product design, which it shares with the affiliate manufacturer. The affiliate firm sources this partial production from the headquarters country and puts its relationship-specific investment into labor to produce or assemble the intermediate or final goods.¹³ The affiliate country is labor-abundant, and to save on costs, it either subcontracts a part of the production to the domestic informal manufacturing units or integrates informality by hiring informal workers. Final goods sold in international markets may cause reputation and legal costs under international labor laws. This may reduce the profits of the HQ enterprise under integration (FDI). An additional assumption is that one informal worker unit produces one output unit for simplicity. We equate the units of output produced by informal workers to the number of informal laborers employed.

Against this backdrop, the relationship between the two parties is plagued by a well-known hold-up problem¹⁴ and, therefore, the associated under-investment in factors of production by both parties. Following the transaction cost theory developed by Rordan and Williamson 1985, we assume that the integration by the HQ firm will reduce the problem of hold-up inefficiencies (Gorodnichenko, Kukharsky, and Roland 2018). These reputation and legal costs may outweigh the benefits of integration. Thus, the HQ manager may decide to engage in arm’s-length relations instead. The basic structure of the demand and supply of goods is built on Antràs 2003. It is a two-stage production process, where stage one of production is carried out in the headquarters country, and stage two is undertaken in a manufacturing affiliate country; it involves the assembly of final goods or the production of intermediate goods using formal and informal labor.

2.1 Basic Structure

Consider a world comprising J countries that produce goods in $S + 1$ sectors, using a single factor of production: labor, which is inelastically supplied and freely mobile across

¹³The choice of intermediate or final goods does not change our results.

¹⁴The hold-up problem arises in situations where one or both parties make investments into relationship-specific and non-contractible assets. This leads to ex-ante under-investment in relationship-specific inputs. Both parties anticipate that ex-post bargaining will not provide them with the full marginal revenue created by the respective input.

sectors. S sectors produce a continuum of differentiated varieties of goods, and one sector produces a homogeneous good Z . Assuming constant elasticity of substitution (CES) preferences, the utility function for identical preferences is given by

$$U = \beta_z \log Z + \sum_{s=1}^S \beta_s \log Q_s$$

The preferences show a unit elasticity of substitution across sectors, so industry shares are constant, where

$$Q_s = \left[\int_{w \in \cap_{S(j)}}^{\infty} q(w)^{\frac{\sigma-1}{\sigma}} dw \right]^{\frac{\sigma}{\sigma-1}}, \sigma > 1$$

The preferences here are of the Dixit and Stiglitz 1977 type: there is a continuum of differentiated goods varieties available to consumers at an elasticity of substitution greater than 1, which enters preferences symmetrically. Q_s is the total quantity demanded of all the varieties of goods within sector S , and w is one type of variety belonging to sector S . The subscript j refers to importing countries. This is a representation of the multi-sector Melitz model. Consumers in country j will optimally allocate a share β_s of the total expenditure E_j to differentiated-good sector s .

Consumers allocate spending across varieties to maximize Q , which gives the following demand function for a single variety w in country j :

$$\text{Max} \left[\int_{w \in \cap_{S(j)}}^{\infty} q(w)^{\frac{\sigma-1}{\sigma}} dw \right]^{\frac{\sigma}{\sigma-1}}$$

subject to

$$\int_0^1 p_j(w) q_j(w) \leq \beta E_j \quad (1)$$

The maximization of the above optimization problem yields the following demand function for variety w :

$$q_j(w) = \beta E_j P^{\sigma-1} p_j^{-\sigma(w)} \quad (2)$$

The price function for each variety w is

$$p_j(w) = (\beta E_j)^{\frac{1}{\sigma}} P^{\frac{\sigma-1}{\sigma}} q_j(w)^{\frac{-1}{\sigma}}$$

The price index of all the varieties available in country j is

$$P = \left[\int_{w \in \omega_j}^S p_j(w)^{1-\sigma} dw \right]^{\frac{1}{1-\sigma}}$$

The demand function yields the following revenue function after substituting for the price expression:

$$R = pq$$

$$R = \left(\beta E_j \right)^{\frac{1}{\sigma}} P^{\frac{\sigma-1}{\sigma}} q^{\frac{\sigma-1}{\sigma}}$$

Final goods are produced using Cobb-Douglas production technology. This production function is an extension of the production function used by Antràs 2003. Here, we split labor into two types, formal (L_1) and informal (L_2), to suit the conditions of abundant labor countries:

$$q_j(w) = \phi \left(\frac{H}{\eta} \right)^{\eta} \left(\frac{L_1}{1-\eta} \right)^{\mu(1-\eta)} \left(\frac{L_2}{1-\eta} \right)^{(1-\mu)(1-\eta)} \quad (3)$$

where H denotes the share of production undertaken by HQ, and η and $(1-\eta)$ denote the intensity of the HQ country's share and the intensity of the labor share of the affiliate firm, which is further split into formal and informal labor. L_1 and L_2 denote the formal and informal workers in the affiliate manufacturing country, and $\mu(1-\eta)$ and $(1-\mu)(1-\eta)$ are the intensity of the formal and informal workers used in production. The manufacturing affiliate outsources a part of the production, i.e., $(1-\mu)(1-\eta)$, to the domestic informal manufacturing units or hires informal workers to save on production costs. ϕ is the firm-specific productivity level, which differs for each firm; therefore, firms are heterogeneous in terms of technology.

By substituting the Cobb-Douglas production function equation into the above revenue expression, we get the following revenue expression:

$$R = \left(\beta E_j \right)^{\frac{1}{\sigma}} P^{\frac{\sigma-1}{\sigma}} \left(\phi \left(\frac{H}{\eta} \right)^{\eta} \left(\frac{L_1}{1-\eta} \right)^{\mu(1-\eta)} \left(\frac{L_2}{1-\eta} \right)^{(1-\mu)(1-\eta)} \right)^{\frac{\sigma-1}{\sigma}} \quad (4)$$

The total cost expression of final goods production using two stages of production, which includes HQ's share of the capital cost and the two types of labor costs in the affiliate country, is given by

$$C = W_H F + \left(\frac{q}{\phi} \right) \left(W_H \right)^{\eta} \left(W_{L_1} \right)^{\mu(1-\eta)} \left(W_{L_2} \right)^{(1-\mu)(1-\eta)} \quad (5)$$

Let W_H denote the cost of capital in terms of the wage rate of the HQ country, and W_{L_1} , and W_{L_2} are the wage rates of formal and informal labor, whereby all factor prices are assumed to be exogenous to the firms. By the analogy of Antràs 2003, the $W_H H$ share of HQ's input cost is assumed to be borne by HQ, while the labor costs, $W_{L_1} L_1$ and $W_{L_2} L_2$, are borne by the affiliate. For simplicity, we refrain from including

any fixed production costs in the model, as including these costs would not affect our results. Second, all inputs are assumed to be relationship-specific, that is, customized to a given relationship, and they possess no value for a third party. Once the investment into capital and labor has been made, HQ and M bargain over the surplus ex-post. This bargaining process is modelled as generalized Nash bargaining. Each party obtains his or her outside option if the bargaining fails (i.e., payoffs under no trade) plus a fraction of ex-post gains from trade (quasi-rent), defined as the net revenue of both parties' outside options. The fraction of quasi rent shared by HQ and M is given by β and $(1 - \beta)$, where $\beta \in (0, 1)$, respectively. Following Kukharsky [2020](#), under generalized Nash bargaining,¹⁵ the surplus is distributed as β_0 and $(1 - \beta_0)$ between HQ and M, where $0 \in (\text{Integrate/FDI: I, Outsource: A})$. The distribution of the surplus is sensitive to the ownership structure.

Under outsourcing, HQ does not own the rights to the physical assets of the affiliate manufacturer. In this case, if bargaining fails, the outside option of HQ is zero, and it is non-zero for the manufacturing affiliate; the results are vice-versa under integration. Manufacturing affiliates can only produce a fraction $\delta \in (0, 1)$ of the output under outsourcing if bargaining fails because they cannot exploit resources in the absence of HQ as effectively as they can in the presence of HQ. Therefore, if q is replaced with δq in the revenue equation, the manufacturer's outside option under outsourcing thus reads $\delta^\alpha R$, where R is the equilibrium revenue.¹⁶ Similarly, under integration, HQ can only produce a fraction $\gamma \in (0, 1)$ of the output if bargaining fails; therefore, the outside option of HQ is $\gamma^\alpha R$. Remember that Nash bargaining yields each party's outside option plus a fraction of the quasi-rent. HQ's payoffs from ex-post bargaining under arm's-length and integration approaches are given by $0 + \beta(R - 0 - \delta^\alpha R)$ and $\gamma^\alpha R + \beta(R - \gamma^\alpha R - 0)$. Thus, the revenue shares accruing to HQ and M under an arm's-length/outsourcing approach are β_A and $(1 - \beta_A)$, where β_A is equal to $\beta(1 - \delta^\alpha)$. Similarly, the shares of revenue accruing to HQ and M under integration are $\beta_I = \{\gamma^\alpha + \beta(1 - \gamma^\alpha)\}$ and $(1 - \beta_I)$.

Once HQ and M form a relationship, HQ decides whether to integrate (I) a manufacturing producer into its firm's boundaries or transact with the producer at arm's length (A). This paper assumes that ownership is a binary choice between integration and outsourcing. Following Gorodnichenko, Kukharsky, and Roland [2018](#), we assume that the hold-up problem can be eliminated by integrating M into the HQ firm's boundaries. The

¹⁵Under Nash bargaining, each party obtains his or her outside option (i.e., payoffs under no trade) plus a fraction of the quasi rent (ex-post gains from trade), defined as the net revenue of both parties' outside options (Kukharsky [2020](#)).

¹⁶ $\alpha = \frac{\sigma-1}{\sigma}$.

HQ firm can easily state the type of formal labor requirement in the contract, and no transaction cost is incurred under any form of organization. However, affiliate firms hiring informal workers must incur minimum exogenous transaction costs since there exists no contract for informal workers.¹⁷ The following section first solves the model under the hypothetical case of complete contracts, and then the model is solved for both outsourcing and integration under incomplete contracts.

3 Equilibrium

3.1 Complete Contracts

Before analyzing the trade-offs of the choice between the integration and outsourcing forms of the ownership structure, it is instructive to consider first the hypothetical case of the maximization of a firm's profits under complete contracts. If courts could verify and enforce investments into capital and labor by contracting parties, HQ and M would stipulate the shares of capital, formal labor, and informal labor by maximizing their joint profit:

$$\max_{H, L_1, L_2} \Pi = R - C \quad (6)$$

Substituting equations (4) and (5) into the above profit expression, we get:

$$\Pi = (\beta E_j)^{\frac{1}{\sigma}} P^{\frac{\sigma-1}{\sigma}} \left(\phi \left(\frac{H}{\eta} \right)^\eta \left(\frac{L_1}{1-\eta} \right)^{\mu(1-\eta)} \left(\frac{L_2}{1-\eta} \right)^{(1-\mu)(1-\eta)} \right)^{\frac{\sigma-1}{\sigma}} - W_H H - W_{L_1} \mu L_1 - W_{L_2} (1-\mu) L_2 \quad (7)$$

The maximization of the above profit function based on the headquarters' share and formal and informal labor (H , L_1 , and L_2) will yield the following optimal values for H , L_1 , and L_2 :

$$H = \frac{\eta R(\sigma-1)}{\sigma W_H}, \quad L_1 = \frac{R(\sigma-1)(1-\eta)}{\sigma W_{L_1}}, \quad L_2 = \frac{R(\sigma-1)(1-\eta)}{\sigma W_{L_2}} \quad (8)$$

Substituting these optimal values of H , L_1 , and L_2 back into equations (5) and (3) will yield the profit and revenue equations under complete contracts:

$$\Pi_c = \frac{1}{\sigma} B \phi^{\sigma-1} (W_H)^{\eta(1-\sigma)} (W_{L_1})^{\mu(1-\eta)(1-\sigma)} (W_{L_2})^{(1-\mu)(1-\eta)(1-\sigma)} \quad (9)$$

¹⁷Transaction costs are assumed to be negligible since the informal sector constitutes a large percentage, on average 65%, of the workforce in developing countries. Furthermore, informal sector workers are not unionized and have no bargaining strength. Including transaction costs will not change our model results; hence, for simplicity's sake, they are ignored.

where $B = \beta E_j \left(\frac{\sigma}{(\sigma-1)P} \right)^{1-\sigma}$; B is a measure of market demand:

$$R_c = \beta E_j P^{(\sigma-1)} \left[\phi \left(\frac{\sigma-1}{\sigma} \right) W_H^{-\eta} W_{L_1}^{-\mu(1-\eta)} W_{L_2}^{-(1-\mu)(1-\eta)} \right]^{\sigma-1} \quad (10)$$

Revenue in the above equation (10) depends on wages, their share parameters, the elasticity of substitution, the firm's productivity, and the expenditure share. When the contracts are complete, there is no risk in hiring informal labor. However, contractual frictions exist in the case of incomplete contracts. Since the courts cannot fully verify the research and development (R&D), technology transfer, and investment in physical capital and labor, the division of the surplus will be implemented through ex-post bargaining under incomplete contracts. Furthermore, if informal workers are hired, it is risky to violate labor laws because this may result in reputation and legal costs in case of any mishap. Therefore, the key decision of the headquarters firm is to determine the extent of control it wants to exercise over stages of production. The basic way this is done is by exercising control over the physical assets of manufacturing units. This process is called internalization. There are two approaches to internalization: transaction-cost theory (TCT) and property-rights theory (PRT).¹⁸ We solve the model using the TCT approach here. Refer to Appendix A for the results of the PRT approach.¹⁹

3.2 Incomplete contracts TCT Approach:

It is hard to believe that both agents can incorporate all aspects of production into a formal or complete contract. Furthermore, ensuring that a court of law can understand and enforce such a contract is complicated. Since the manufacturing inputs of both parties are customized and can not be easily sold at full price to alternative customers, this results in lock-in effects in production. Lock-in effects and incomplete contracting lead to a situation of bilateral monopoly, in which case terms of exchange will be determined ex-post after both agents have made initial investments that are sunk by then and have a relatively low value outside the business relationship. The combination of incomplete contracts and lock-in effects leads to the hold-up problem. Under outsourcing, there will

¹⁸See Antràs and Chor 2013; Antras, Pol 2014; Antras 2005; Antras and Helpman 2004; Helpman, Antras, and Antràs 2008; Antras 2015, Antras, Pol 2014, O. Hart and Moore 1990 for the PRT approach. G. M. Grossman and Helpman 2002; G. M. Grossman and Helpman 2003; G. M. Grossman and Helpman 2005 McLaren 2000 and G. M. Grossman, Helpman, and Szeidl 2005 for the TCT approach.

¹⁹In the PRT approach, bargaining occurs under integration and outsourcing as hold-up prevails even within firm boundaries. Therefore, each partner non-cooperatively and independently determines its investment share.

not be joint profit maximization, as in the case of complete contracts, and renegotiation will be through generalized Nash-bargaining. There are various stages of the game:

1. The headquarters firm decides the location and type of ownership and then fixes the lump sum payment (equivalent to the license fee) to be paid by the manufacturing affiliate firm. We assume an independent affiliate firm makes a lump-sum transfer to the HQ firm. This ensures that the entire surplus from this relationship accrues to the HQ. Hence, at stage 1, the HQ firm chooses the location and ownership structure that maximizes the overall surplus from the relationship.
2. At stage 2, HQ and M undertake specific investments and choose investment levels independently and non-cooperatively under outsourcing, as per the TCT approach of Williamson 1985. The affiliate firm outsources a part of production to the domestic informal units or hires informal workers. We assume that the domestic state imposes no reputation and legal costs on the affiliate firm.

Under integration, HQ and M undertake specific investments and jointly maximize their profits. HQ possesses rights over the physical assets of the affiliate firm and can enact formal labor investment decisions by fiat. In case of any mishap at the affiliate manufacturing plant or reports of violations of labor laws, reputation and legal costs may be imposed on the headquarters firm.

3. Parties get together at stage 3 to renegotiate the division of surplus via generalized Nash bargaining, where the HQ firm obtains a fraction of surplus of β_0 and $(1-\beta_0)$ goes to the affiliate manufacturing firm. The distribution of profit is sensitive to the ownership structure.
4. Final goods are produced, and the revenue is realized and distributed among parties according to the agreed-upon sharing rule.

This game is solved using backward induction.

3.3 Equilibrium under Outsourcing:

Each party, non-cooperatively and independently, decides to invest in the respective assets in a way that maximizes their payoffs. The following gives the maximization problems of HQ and M at stage 1.

The HQ maximizes its share of the surplus at stage 2 to get the optimal level of H :

$$\max_H \beta_A R - W_H H \tag{11}$$

$$H = \frac{\beta_A \eta R(\sigma - 1)}{\sigma W_H} \equiv H_A(\text{outsourcing}) \quad (12)$$

The affiliate manufacturer maximizes its share of the surplus at stage 2 to obtain optimal values of L_1 (formal) and L_2 (informal) labor:

$$\max_{L_1, L_2} (1 - \beta_A)R - W_{L_1} \mu L_1 - W_{L_2} (1 - \mu) L_2 \quad (13)$$

$$L_1 = \frac{(1 - \beta_A)R(\sigma - 1)(1 - \eta)}{\sigma W_{L_1}} \equiv L_{1A}(\text{outsourcing})$$

$$L_2 = \frac{(1 - \beta_A)R(\sigma - 1)(1 - \eta)}{\sigma W_{L_2}} \equiv L_{2A}(\text{outsourcing}) \quad (14)$$

β_A denotes the share of revenue obtained by HQ under outsourcing. After maximizing profits, this non-cooperative game yields optimal H_A , L_1 , and L_2 . A compact way to represent the above ex-ante problem faced by the headquarters producer under an incomplete contract is

$$\max \beta_A R - W_H H + S \quad (15)$$

subject to

$$(1 - \beta_A)R - S - W_{L_1} \mu L_1 - W_{L_2} (1 - \mu) L_2 \geq 0 \quad \text{Participation Constraint}$$

$$\max_H \beta_A R - W_H H \quad \text{Incentive Compatibility Constraint}$$

$$\max_{L_1, L_2} = (1 - \beta_A)R - W_{L_1} \mu L_1 - W_{L_2} (1 - \mu) L_2 \quad (16)$$

where S represents the ex-ante lump sum transfer payment made by the affiliate manufacturer to the HQ, which ensures that the chosen organizational form maximizes the joint surplus from this relationship in the face of contractual incompleteness. Since $0 < \beta_A < 1$ and $0 < (1 - \beta_A) < 1$, comparing equations (8), (12), and (14) implies that optimal levels of H_A , L_{1A} , and L_{2A} obtained under incomplete contracts are lower than the optimal levels under complete contracts. Thus, outsourcing leads to under-investment in all inputs compared to the case of complete contracts. By substituting these optimal values in equations (12) and (14) back into the revenue and profit equations, we get the following expressions:

$$R_A \equiv R = \left(\beta E_j \right)^{\frac{1}{\sigma}} P^{\frac{\sigma-1}{\sigma}} \left(\phi \left(\frac{H}{\eta} \right)^{\eta} \left(\frac{L_1}{1 - \eta} \right)^{\mu(1-\eta)} \left(\frac{L_2}{1 - \eta} \right)^{(1-\mu)(1-\eta)} \right)^{\frac{\sigma-1}{\sigma}}$$

$$= \left(\beta E_j \right)^{\frac{1}{\sigma}} P^{\frac{\sigma-1}{\sigma}} \left(\phi \left(\frac{\beta_A \eta R(\sigma - 1)}{\sigma W_H \eta} \right)^{\eta} \left(\frac{(1 - \beta_A)R(\sigma - 1)(1 - \eta)}{\sigma W_{L_1}(1 - \eta)} \right)^{\mu(1-\eta)} \right. \\ \left. \left(\frac{(1 - \beta_A)R(\sigma - 1)(1 - \eta)}{\sigma W_{L_2}(1 - \eta)} \right)^{(1-\mu)(1-\eta)} \right)^{\frac{\sigma-1}{\sigma}} \quad (17)$$

$$R_A = \left(\beta_A^\eta (1 - \beta_A)^{1-\eta} \right)^{\sigma-1} R_c$$

where R_c refers to revenue under complete contracts. The overall profit expression under outsourcing thus is equal to

$$\pi_A = R - W_H H - W_{L_1} \mu L_1 - W_{L_2} (1 - \mu) L_2$$

By substituting the revenue back into the profit equation under incomplete contracts, we get

$$\pi_A = R_A - W_H \frac{\beta_A \eta R_A (\sigma - 1)}{\sigma W_H} - W_{L_1} \mu \frac{(1 - \beta_A) (\sigma - 1) R_A (1 - \eta)}{\sigma W_{L_1}} - W_{L_2} (1 - \mu) \frac{(1 - \beta_A) R_A (\sigma - 1) (1 - \eta)}{\sigma W_{L_2}} \quad (18)$$

After solving the above equation (18), profit under an incomplete contract reduces to:

$$\pi_A \equiv \pi = \left(\beta_A^\eta (1 - \beta_A)^{1-\eta} \right)^{\sigma-1} \frac{R_c}{\sigma} \left(\sigma - (\sigma - 1) \left(\beta_A \eta + (1 - \eta) (1 - \beta_A) \right) \right) \quad (19)$$

Lemma 1 *Profit and revenue under outsourcing will be lower than profit under a complete contract, i.e. $\pi_A < \pi_c, R_A < R_c \forall \{\eta, \beta_A, \epsilon(0, 1)\}$.*

Proof: A simple comparison of equations (17) and (19) with equations (10) and (9), shows that, for any given level of revenue, outsourcing is associated with lower levels of investment in all inputs and thus low overall profit and revenue compared to the case of complete contracts. Intuitively, each party anticipates the future hold-up by the counterpart and reduces the provision of its inputs. This leads to a reduction of revenue relative to the case of complete contracts.

3.3.1 Firm Decision: FDI vs. Outsourcing

Under integration, the HQ firm eliminates the hold-up inefficiencies that plague transactions between two independent parties by integrating affiliate manufacturers into its boundaries. Reputation and legal costs may emerge in case of any mishap at the affiliate firm's plant due to the violation of labor laws and regulations.

The notion of reputation and legal costs is captured by adding the marginal cost of labor to the expected per-unit reputation and legal costs. The probability of reputation and legal costs ρ is an increasing function of the proportion of informal labor used, i.e., $\rho(1 - \mu)$ and λ represent the per-unit additional reputation and legal costs.

Assumption 1: $0 \leq \rho(1 - \mu) \leq 1$, $\rho'(1 - \mu) > 0$, $\rho''(1 - \mu) > 0$

The integration model is based on the premise that both parties jointly maximize their surplus under the firm boundaries of HQ. The property rights are with the HQ firm; therefore, it will bear the full reputation and legal costs if they are imposed. The joint profit maximization problem under integration thus reads

$$\max_{H, L_1, L_2} \pi = R - W_H H - W_{L_1} \mu L_1 - W_{L_2} (1 + \rho(1 - \mu)\lambda)(1 - \mu)L_2 \quad (20)$$

$$\begin{aligned} H &\equiv \frac{\eta R(\sigma - 1)}{\sigma W_H} = H_I(FDI), & L_1 &= \frac{R(\sigma - 1)(1 - \eta)}{\sigma W_{L_1}} = L_{1I}(FDI), \\ & & L_2 &= \frac{R(\sigma - 1)(1 - \eta)}{\sigma W_{L_2}(1 + \rho(1 - \mu)\lambda)} = L_{2I}(FDI) \end{aligned} \quad (21)$$

By substituting the optimal values²⁰ of H , L_1 , and L_2 from equation (21) into the revenue function equation (4) and profit function, we get

$$\begin{aligned} R_I &\equiv R = \beta E_j P^{\sigma-1} \left(\phi \left(\frac{\sigma-1}{\sigma} \right) W_H^{-\eta} W_{L_1}^{-\mu(1-\eta)} \left((W_{L_2}(1 + \rho(1 - \mu)\lambda))^{-(1-\mu)(1-\eta)} \right)^{\sigma-1} \right. \\ & \quad \left. R_I = B \phi^{\sigma-1} \left(W_H^\eta W_{L_1}^{\mu(1-\eta)} (W_{L_2} + \rho(1 - \mu)\lambda)^{(1-\mu)(1-\eta)} \right)^{1-\sigma} \right. \end{aligned} \quad (22)$$

where $B = \beta E_j \left(\frac{\sigma}{(\sigma-1)^P} \right)^{1-\sigma}$, and B is a measure of market demand:

$$\pi_I = \frac{1}{\sigma} B \phi^{\sigma-1} (W_H)^\eta (1-\sigma) (W_{L_1})^{\mu(1-\eta)(1-\sigma)} \left(W_{L_2}(1 + \rho(1 - \mu)\lambda) \right)^{(1-\mu)(1-\eta)(1-\sigma)} \quad (23)$$

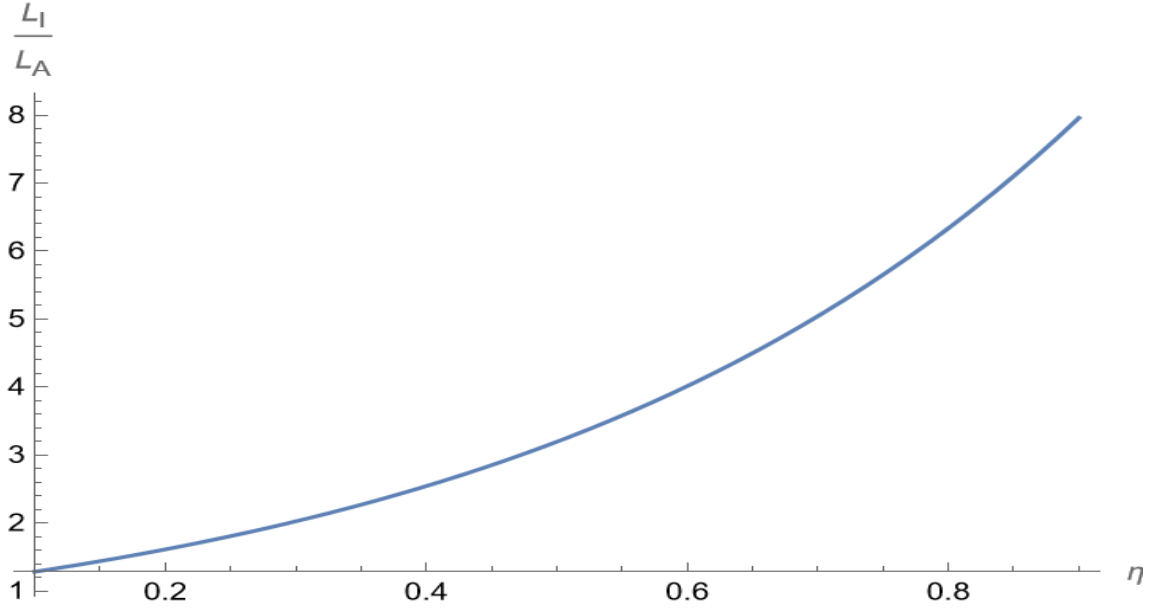
Lemma 2 *The headquarter share and formal labor share will be greater under FDI (integration) than outsourcing, i.e., $H_I > H_A$, $L_{1I} > L_{1A}$, and $L_{2I} < L_{2A}$ for $\beta_A \in (0, .5)$ and $1 < \eta < 1$ for any given level of revenue (R).*

Proof: Compare equation (21) with equations (12) and (14) for the result.

The shares of HQ and formal labor are greater under integration since HQ and the affiliate firm independently decide their investments and maximize their profits under outsourcing. Intuitively, the integration eliminates the hold-up inefficiencies from the

²⁰Substitute revenue equation (4) into the profit equation (20) and maximize the results to get the optimal values.

Figure 3: Ratio of Formal Labor under Integration and Outsourcing



Source: Author's Simulation

viewpoint of HQ and, thereby, enhances incentives for HQ to invest better in capital; the affiliate manufacturer also does not under-invest in formal labor. Since technology or capital is being transferred from HQ to the affiliate manufacturer, as the capital intensity of production increases, the affiliate manufacturer must hire a good number of formal laborers to operate the advanced machinery. Figure 3 depicts the rising ratio of equilibrium formal employment under integration and outsourcing as the capital intensity or HQ share increases. Formal workers are assumed to be better trained to operate specific types of technologically advanced machinery and instruments. Informal workers are more engaged in physical/manual work and, hence, technically less trained to operate the latest technology. However, for a given level of R , the relationship $L_{2I} > L_{2A}$ or $L_{2I} < L_{2A}$ cannot be determined without ambiguity.

By comparing equation (21) with equation (8), we get

$$L_{2I} = \frac{R_I(\sigma - 1)(1 - \eta)}{\sigma W_{L_2}(1 + \rho(1 - \mu)\lambda)} < L_2 = \frac{R_c(\sigma - 1)(1 - \eta)}{\sigma W_{L_2}} \quad (24)$$

The effective cost of informal workers increases due to the reputation and legal costs. Furthermore, due to the under-provision of all inputs, i.e., the headquarters' share and formal and informal labor under integration, the revenue and profits are lower under integration than under the best level, i.e., under complete contracts. This can be seen by comparing equations (22) and (23) with equations (9) and (10), i.e., $\pi_c > \pi_I$ and

$R_c > R_I; \forall \{\eta, \mu \in (0, 1) \text{ and } \sigma > 1\}$ since $W_{L_2}(1 + \rho(1 - \mu)\lambda) > W_{L_2}$. Therefore, we can write Proposition 1.

Proposition 1 *The higher cost of accessing informal sector labor due to rising reputation and legal costs reduces the employment of informal labor under integration, i.e., $L_{2I} < L_2$.*

Using a simple Antràs 2003 framework, our model delivers vital predictions, i.e., high usage of informal labor, ceteris paribus, decreases HQ's incentive to integrate an affiliate manufacturer partner into its firm boundaries due to rising reputation and legal costs. Another critical prediction suggests that as the capital intensity of production increases or HQ's share increases, the negative impact of high informal labor usage on the relative attractiveness of integration due to high reputation and legal costs is mitigated under the plausible parameter space. The intuition behind this prediction is that the benefit of integration in reducing the hold-up problem from the headquarters viewpoint is to incentivize the headquarters firm to invest in capital. Hence, integration is a preferred organizational form in capital-intensive industries.

Now, we compare the profits earned under integration and outsourcing to choose the organizational form of ownership. At stage 1, HQ chooses an organizational form that maximizes the joint surplus. HQ prefers integration over outsourcing if and only if $\pi_I \geq \pi_A$. To determine the attractiveness of integration vs. arm's-length transaction, we take a ratio of the profits under integration and arm's-length transaction, $\theta = \frac{\pi_I}{\pi_A}$, where integration dominates outsourcing if $\theta \geq 1$. Using equations (23) and (19), this ratio is given by

$$\theta = \frac{(1 + \rho(1 - \mu)\lambda)^{(1-\mu)(1-\eta)(1-\sigma)}}{(\beta_A^\eta(1 - \beta_A)^{1-\eta})^{\sigma-1} \left(\sigma - (\sigma - 1)(\beta_A\eta + (1 - \eta)(1 - \beta_A)) \right)} \quad (25)$$

We can show that the attractiveness of FDI (integration) vs. outsourcing falls as the expected reputation and legal costs increase due to the high usage of informal workers, i.e., $\rho(1 - \mu)\lambda$. Taking the first derivative of equation (25) w.r.t. $\rho(1 - \mu)\lambda$, we get

$$\begin{aligned} \frac{\delta\theta}{\delta\rho(1 - \mu)\lambda} &= \frac{(1 - \mu)(1 - \eta)(1 - \sigma)(1 + \rho(1 - \mu)\lambda)^{(1-\mu)(1-\eta)(1-\sigma)-1}}{\left(\beta_A^\eta(1 - \beta_A)^{(1-\eta)} \right)^{\sigma-1} \left(\sigma - (\sigma - 1)(\beta_A\eta + (1 - \eta)(1 - \beta_A)) \right)} \\ \frac{\delta\theta}{\delta\rho(1 - \mu)\lambda} &= -\theta \frac{(1 - \mu)(1 - \eta)(\sigma - 1)}{(1 + \rho(1 - \mu)\lambda)} < 0 \end{aligned} \quad (26)$$

for all $0 < \mu, \eta, \beta_A < 1$, $\sigma > 1$, $0 < \rho(1 - \mu)\lambda < 1$, and $\theta > 0$.

Proposition 2 *The relative attractiveness of integration versus outsourcing decreases with a higher fraction of output outsourced by the affiliate manufacturer to domestic informal units or if more informal labor is hired, raising expected reputation and legal costs.*

The direction of this effect is not surprising, given that the cost of integration is assumed to be increasing with the proportion of informal labor used. As the proportion of hired informal workers increases, the chances of mishaps and the imposition of reputation and legal costs increase.²¹ The HQ firm finds it difficult to ensure by fiat the labor investment in the manufacturing unit, and the optimal number of informal workers hired decreases. The resulting fall in labor is further aggravated by under-investment in capital by HQ; thus, the optimal share falls due to a fall in revenue. Both effects lead to falling overall profits from integration (π_I) and decrease the relative attractiveness of integration versus outsourcing, i.e., θ .

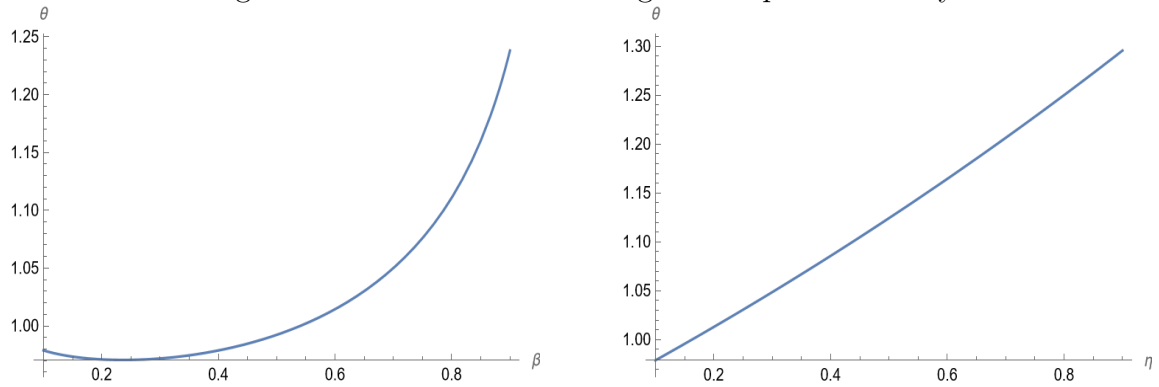
Proposition 3 *(i) The willingness to integrate increases with the rising bargaining power of the headquarters firm (β) and rising capital intensity (η). (ii) The negative effect of informal labor on the relative attractiveness of FDI (integration) is mitigated by the rise in the capital intensity of the headquarters firm with a rising share of β , i.e., $\frac{\delta^2 \theta}{\delta \rho(1-\mu) \lambda \delta \eta} > 0$ for $\beta_A \in [1/2, 1)$; if instead, $\beta_A \in (0, 1/2)$, the effect will be amplified by the capital intensity: $\frac{\delta^2 \theta}{\delta \rho(1-\mu) \lambda \delta \eta} < 0$.*

Proof: Refer to Appendix B for the mathematical proof of Proposition 3. In Figure 4, the right panel depicts the positive association between the profit ratio (θ) and capital intensity (η), and the left panel depicts the same for the bargaining power (β). Figure 5 shows that for $1/2 < \beta < 1$, the negative effect of reputation and legal costs on the attractiveness of integration is mitigated for capital-intensive firms.

The intuition behind this interaction effect is that the main benefit of integration lies in improving HQ's incentives to invest in relationship-specific capital, R&D, and technology. This investment is vital in capital-intensive industries. Therefore, the negative impact of informal labor on the relative attractiveness of integration is less pronounced in capital-intensive industries, where HQ's investment in capital, R&D, and technology should be incentivized most. With the increase in the capital intensity, the required amounts of both types of labor, i.e., L_{1I} and L_{2I} , fall.

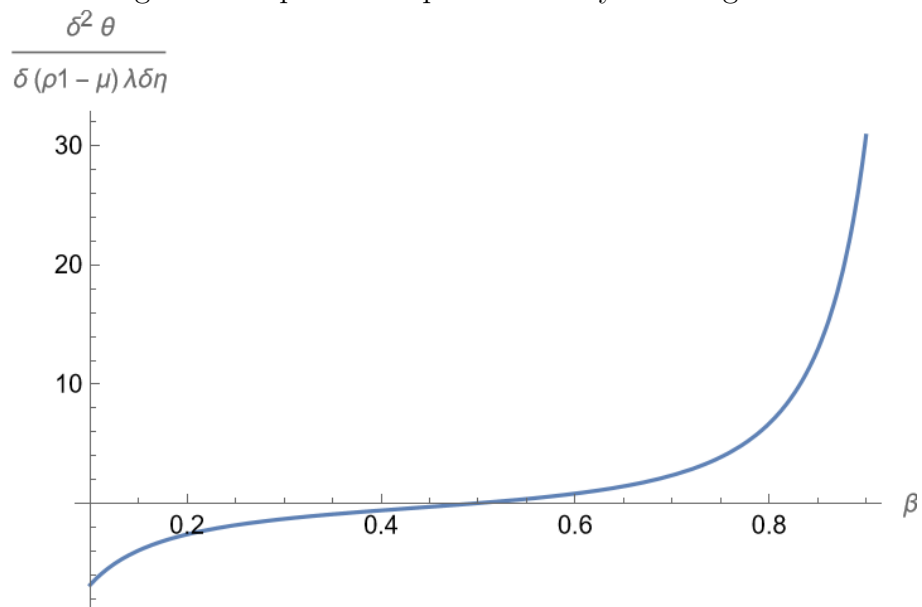
²¹Proposition 2 is also proved using the PRT approach; refer to Appendix A for the results.

Figure 4: FDI vs. Profit Sharing and Capital Intensity



Source: Author's simulation

Figure 5: Impact of Capital Intensity on Integration



Source: Author's simulation

4 Empirical Investigations

The model discussed in the previous section suggests that foreign firms' access to an extensive informal sector results in reputation and legal costs and decreases the attractiveness of integration or FDI. As the capital intensity of the HQ firm increases, it mitigates the fall in the attractiveness of integration. To investigate whether these propositions are borne out in the data, we use two different datasets, country-level panel data and the pooled cross-sectional data of firms and industries, to prove the robustness of our results. To rule out alternative explanations, each econometric model uses an extensive list of controls that affect the use of informal labor, proxies for reputation and legal costs, FDI inflows, foreign ownership shares, several other potential determinants of international make or buy decisions, and time, country, and industry fixed effects.

C. H. Nguyen [2021](#) showed a positive relationship between the labor force and FDI inflows from 1995–2018 in Viet Nam. Economic theory and practice in developed and developing countries confirm the positive relationship between the labor force and FDI attraction. This means that other factors being constant, the increase in the labor force at a sufficient and diversified level will attract FDI inflows into any country, but it is only suitable for countries attracting FDI projects using more labor (Cung and Hung [2020](#)). Baez-Morales [2014](#) examined the impact of informal labor markets on the flows of FDI and whether this impact is similar for both developed and developing countries. Based on panel data for a sample of 65 countries for the period 1996–2009, the regression results show a significant positive impact of informal labor markets on the flows of FDI. These positive effects were felt up to a certain level of informality, above which the effect became negative.

FDI is crucial in meeting financial capital needs, helping with technology transfer, and creating more jobs in the host country. It also helps economies increase competitiveness and productivity, thereby increasing exports and enhancing opportunities for growth and development (Dimitrova, Rogmans, and Triki [2020](#)). Abundant literature on the determinants of FDI inflows postulates that trade openness, infrastructure, capital formation, market size, governance measures, informal labor, inflation, and exchange rates are important variables in understanding the behavior of FDI inflows. There is abundant literature on FDI determinants, which examine how investments are made in a particular country. Still, there needs to be conclusive empirical evidence as to which determinants are the most significant and their effects on foreign investments. Apart from considering the informal labor and indicators of reputation and legal costs, some of the other determinants of FDI considered as control variables in this section are explained

below.

The market size reflects the total demand of local consumers in a country where foreign firms are looking for investment. The GDP of the host country usually measures the market size. A. Chakrabarti [2001](#) argued that the larger the market size in a host country, the better the opportunity for foreign direct investment inflows, as a significant market is required to utilize resources and exploit economies of scale efficiently. Pärletun [2008](#) also found that the GDP significantly and positively impacts FDI inflows. Jordaan et al. [2004](#) mentioned that FDI will move to countries with larger and expanding markets with greater purchasing power, where firms can potentially receive a higher return on their capital.

We consider the ratio of imports plus exports to the GDP and tariffs as alternative measures of the openness of an economy. The impact of openness on FDI depends on the type of investment. When investments are market-seeking, trade restrictions can positively impact FDI. The reasons stem from the “Tariff Jumping Hypothesis,” which argues that foreign firms that seek to serve local markets may decide to set up subsidiaries in the host country if it is difficult to import their products into the host country. In contrast, multinational firms engaged in export-oriented investment may prefer to be located in a more open economy since increased imperfections accompanying trade protection generally imply high export transaction costs. In our paper, we assume FDI is less likely to be market-seeking; therefore, there is a positive relationship between FDI and the trade-GDP ratio and a negative relationship between FDI and tariffs. Mottaleb and Kalirajan [2010](#) and Kumari and Sharma [2018](#) found that the market size and trade openness are significant and dominant factors in their work.

Good infrastructure increases the productivity of investments and, therefore, stimulates FDI inflows. We use the GFCF-to-GDP ratio and telephone connections per 1000 people as a proxy for infrastructure. Measures such as railway lines, air traffic, and broadband networks could also be used to measure infrastructure, but data are only available for some countries. Allen et al. [2012](#) examined the relationship between infrastructure and FDI in India for 2002 and 2007 and found a positive relationship between physical infrastructure and FDI inflows. Behname [2012](#) and Wahid, Sawkut, and Seetanah [2009](#) found a positive relationship between physical infrastructure and FDI inflows. It is well established that a host country with sound policies, regulations, and macroeconomic conditions is more attractive for FDI Younsi and Bechtini [2019b](#); Younsi and Bechtini [2019a](#).

We take two proxy measures of reputation and legal costs at the country level: the

regulatory quality and control of corruption. The regulatory quality indicator captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. The control of corruption indicator reflects perceptions of the extent to which public power is exercised for private gain, including petty and grand forms of corruption and the “capture” of the state by elites and private interests. Furthermore, the total informal payment and severity of corruption are two proxy measures considered at the firm and industry levels. Both may prove to be a major financial and administrative burden on firms, creating an unfavorable business environment by undermining the operational efficiency of firms and raising the costs and risks associated with doing business.

We intend to empirically verify the theoretical predictions of the model using alternative data sources and estimation techniques. We conduct our analysis in three steps. First, we exploit country-level measures of reputation and legal costs and apply a two-step system GMM technique to deal with the endogeneity problem of data. Due to the paucity of foreign ownership data at the country level, we use rich firm-level and industry-level data from the World Enterprise Survey (WES) to source foreign ownership data along with other alternative measures of reputation and legal costs, such as total informal payments and the severity of corruption. We use the linear probability estimation technique for the binary dependent variable and the ordinary least square (OLS) for continuous dependent variables with heteroskedasticity-corrected robust standard errors to deal with the pooled cross-section data.

4.1 Cross-Country Results: Generalized Method of Moments

Our empirical analysis is based on a panel of 80 countries from 2000 to 2019. The data are sourced from the World Development Indicators (WDI) and World Governance Indicators (WGI) databases. To examine the empirical implementation, our econometric baseline model is as follows:

$$\begin{aligned} \log FDI_{it} = & \beta_0 + \beta_1 \log FDI_{i,t-1} + \beta_2 \log FDI_{i,t-2} + \beta_3 Informal_labor_{it} + \\ & \beta_4 Informal_labor_{it}^2 + \beta_5 Reputation_cost_{it} + \\ & \beta_6 Reputation_cost_{it} \times Informal_labor_{it} + \alpha_j X_{it} + \gamma_t + \epsilon_{it} \end{aligned} \quad (27)$$

In the above equation, i refers to the country, and t denotes the year. FDI_{it} is the FDI inflows in country i for the year t . To capture the persistence of FDI inflows and to correct for omitted variable bias, we take two period-lagged FDIs to show that FDI inflows depend on past levels of FDI, i.e., $\log FDI_{i,t-1}$ and $\log FDI_{i,t-2}$. This reflects the

possibility that the effects of changes in the independent variables are distributed over multiple periods. We take FDI inflows as a proxy variable for a foreign ownership share in the affiliate manufacturing firm. Many capital-constrained countries favor the FDI (integration) mode of participation in global value chains because it ensures the flow of financial capital into affiliate manufacturing firms. Thus, the higher the capital inflows, the higher the share that the headquarters firm puts into an affiliate manufacturing firm; hence, the higher the integration will be. The variable *Informal_labour_{it}* denotes the percentage of informal workers in the country *i* at period *t*. We take vulnerable labor data from the WDI as a proxy for informal labor. *Reputation_cost_{it}* captures informal workers' reputation and legal costs. We take the control of corruption and regulatory quality indices as proxy variables for reputation and legal costs using the WGI. The main variables of interest in the model are informal labor and the interaction of informal labor with reputation and legal costs proxy measures. The expected sign of the coefficient of informal labor, i.e., β_3 , is positive, and the sign of β_6 is negative for the interaction term. *X_{it}* contains controls such as the GDP, tariffs, trade-to-GDP ratio, GFCF-to-GDP ratio, and telephone connections. The expected sign of the coefficients of these control variables is positive for the GDP, the trade-to-GDP ratio, the ratio of GFCF-to-GDP, and telephone connections, and it is negative for tariffs.

There could be the presence of reverse causality between FDI inflows and informal labor data, which may lead to the issue of endogeneity in the regression model due to the omission of control variables such as the availability of a skilled labor force and the productivity levels of the respective industry. This may cause the omitted variables bias problem. Informal labor can negatively affect productivity levels, as it can affect investment decisions, technology adoption, and access to capital, among other factors. Lastly, one can envision many channels through which selection bias can manifest. The manufacturing units of developed countries may select affiliate partners in countries with good-quality infrastructure and governance structures, and so on. To account for and correct these issues, we employ system GMM Blundell and Bond 1998 and Arellano and Bover 1995 in estimating the dynamic framework of our model. The dynamic structure stems from the presence of lagged endogenous variables in the model to capture the inertia and persistence of the endogenous variable. The identification is based on "internal" instruments using lagged levels and the differences of the regressors via a two-step system GMM estimator. The system GMM estimator is well-suited for handling some of the issues relevant to our analysis, such as endogenous independent variables, the persistence of the dependent variables, fixed effects, and the possibility of within-panel

heteroskedasticity and autocorrelation. The system GMM combines into one system the regression in differences (Arellano and Bond 1991) and the regression in levels (Arellano and Bover 1995). To obtain robust results using the system GMM, lagged differences serve as instruments in the level regressions, while lagged levels serve as instruments in the difference regressions. The consistency of the estimators relies on the assumptions that the errors are serially uncorrelated and that the instruments are truly exogenous. These assumptions are tested using the Arellano-Bond AR (2) test for autocorrelation (to ensure that errors in the first-difference regression exhibit no second-order serial correlation) and the Hansen and Singleton 1982 J test of over-identifying restrictions (to ensure that the instruments are exogenous). Given the concern that the proliferation of instruments may lead to a loss of efficiency, we chose to keep the number of instruments below the number of groups by restricting the number of lags to be used as instruments or by “collapsing” the instrument matrix (Roodman 2009). We report robust (Windmeijer) standard errors clustered by country. The standard errors in two-step estimation tend to be severely downward biased without Windmeijer’s finite-sample correction (Roodman 2009).

The results obtained from the system GMM regressions are reported in Table 1. The specification tests reported in the table are satisfactory. The hypotheses of the lack of second-order residual serial correlation (AR2 test) and no correlation between the error term and the instruments (Hansen test) cannot be rejected, supporting the dynamic specification and the instruments used in the estimation process. The notes below the table provide the list of right-hand-side variables treated as endogenous. The principal coefficients of interest, $\beta_3, \beta_4, \beta_5$, and β_6 , consistently show the expected signs with acceptable levels of statistical significance.

As expected, the coefficient of informal labor β_3 , shows statistically significant positive signs in all three GMM specifications. The estimation results support the theory hypotheses that the availability of low-cost labor (informal) in abundant-labor countries attracts FDI inflows. The paper uses two proxy variables for reputation and legal costs: the control of corruption and regulatory quality. The coefficients of the interaction terms of informal labor with the regulatory quality and informal labor with the control of corruption, β_5 and β_6 , have a statistically significant negative sign in all three specifications, supporting Proposition 1 of our theoretical model. It is hypothesized that as the affiliate manufacturer hires informal workers or outsources a part of the production to domestic informal units, this may lead to rising reputation and legal costs of managing informal labor incurred by the headquarters firms; this dampens the positive impact of informal

Table 1: Impact of Informal Labor on FDI Inflows at the Country Level: Two-Step System GMM Regression

VARIABLES	(1) $\ln FDI_{it}$	(2) $\ln FDI_{it}$	(3) $\ln FDI_{it}$
L1. log FDI	0.461*** (0.0614)	0.376*** (0.0786)	0.385*** (0.0745)
L2. log FDI	0.269*** (0.0635)	0.203*** (0.0656)	0.213*** (0.0615)
Informal Labor	0.0352** (0.0172)	0.0584*** (0.0218)	0.0553** (0.0269)
(Informal Labor) ²	-0.000421** (0.000206)	-0.000743*** (0.000276)	-0.000665* (0.000349)
log GDP	0.232** (0.103)	0.389*** (0.112)	0.345*** (0.106)
Tariffs	-0.0167 (0.0102)	-0.00355 (0.0137)	-0.00167 (0.0134)
Control of Corruption	0.386** (0.170)	0.561*** (0.202)	
Informal \times Control of Corruption	-0.00709** (0.00353)	-0.0120** (0.00500)	
Trade/GDP		0.00349*** (0.00105)	0.00294** (0.00122)
GFCF/GDP		0.00452 (0.0156)	0.00508 (0.0172)
Telephone	-0.00586 (0.00557)	-0.00713 (0.00567)	-0.00682 (0.00602)
Regulatory Quality			0.705** (0.276)
Informal \times Regulatory Quality			-0.0129* (0.00713)
Constant	0.00342 (1.411)	-1.521 (1.364)	-0.939 (1.783)
Observations	1,084	1,038	1,038
Number of Countries	80	78	78
Arellano-Bond AR2	.443	0.716	0.637
Hansen Chi2	.099	0.125	0.103
Year FE	YES	YES	YES

Source: Author's Estimation.

Notes: (i) Robust standard errors at the country level are in parentheses; (ii) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; (iii) Endogenous variable: log FDI; (iv) Lagged dependent variables are treated as pre-determined and instrumented with their first lags; (v) All exogenous variables are used as instruments; (vi) Control of corruption and regulatory quality are two proxy measures used to account for reputation and legal costs.

labor on FDI inflows. These extra costs reduce the profits under integration, lowering the attractiveness of integration.²²

The lagged dependent variables turn out to be significant across all three specifications. Thus, the past levels of FDI are crucial in helping firms make decisions regarding current FDI flows. Variables such as the log GDP and trade openness, representing a country's economy's market size and orientation in the context of trade policy and trade relations with the outside world, yield statistically significant positive coefficients in all three equations. This implies that FDI inflows respond positively to an increase in the country's market size and a favorable trade policy environment. The coefficients of tariffs and telephone lines are negative in sign but not statistically significant. In contrast, the coefficient of the ratio of the GFCF to the GDP is positive but not statistically significant. The results of all three GMM specifications are in line with the expected results and support our theory hypotheses.

4.2 Firm Level Analysis

4.2.1 Data and Econometric Specification

In this section, we examine how the emergence of reputation and legal costs in countries with abundant informal labor affects the firm boundary decisions of foreign enterprises. We utilize a rich cross-section of firm-level survey data from the World Bank to achieve this objective. The World Bank Enterprise Survey²³ (WBES) involves a face-to-face interview of the enterprise's owner or the managers drawn from the stratified random sample. The survey aims to gather information about a country's investment climate and helps develop policies and programs that enhance economic growth and employment. The survey provides detailed firm-level information on various dimensions such as infrastructure, sales, innovation, finance, employment, productivity, land, and other related firm-level aspects. The standardization of the survey questionnaire was done in 2006, which allows for a cross-country comparison. WBES surveys are not carried out at regular intervals. Therefore, we restrict our analysis to the post-2006 period.

²²The positive sign of the reputation and legal costs coefficient implies that higher reputation and legal costs instill faith in foreign countries that the affiliate country has a safe environment to invest in. However, the negative sign of the interaction terms of the regulatory cost and informal labor indicates that with high informality, the fear of the imposition of reputation and legal costs in case of violations of work norms increases and, therefore, reduces the willingness to integrate.

²³Kindly refer to <http://www.enterprisesurveys.org>

To investigate the impact of firm-specific measures of reputation and legal costs and capital intensity on a firm's boundary decision, we estimate the following econometric model:

$$\begin{aligned}
FOS_{ijct} = & \alpha_0 + \alpha_1 Informal_Labor_{ijct} + \alpha_2 Informal_Labor_{ijct}^2 + \alpha_3 Reputation_Costs_{ijct} \\
& + \alpha_4 Informal_Labor_{ijct} \times Reputation_Costs_{ijct} \\
& + \alpha_5 Reputation_Costs_{ijct} \times Capital_Intensity_{ijct} + \alpha Z_{ijct} + \gamma_j + \delta_c + \epsilon_{ijct} \quad (28)
\end{aligned}$$

In the above equation, i represents the firm, j captures the industry affiliation of the firm, c represents the country where the firm operates, and t denotes time. Our dependent variable, FOS_{ijct} , represents the foreign ownership share²⁴ in firm i of industry j in country c for the year t . By construction, our dependent variable takes two alternative forms. The first is a binary variable, which takes values of one and zero. It takes a value of one if there is any foreign ownership share in the affiliate firm, and it is zero otherwise.²⁵ For the second form, we take the continuous form for the entire spectrum of shares of HQs in their affiliate firms. We consider the log of total informal payments as a proxy measure for the reputation and legal costs— $Reputation_Costs_{ijct}$. The percentage of temporary workers²⁶ is taken as a proxy for informal workers— $Informal_labor_{ijct}$.

The measure of the capital intensity, $Capital_Intensity_{ijct}$, is constructed by taking the ratio of the amount of capital invested required to hypothetically purchase the machinery and equipment in use now in their current condition to the number of full-time permanent production workers. We take a log of this measure as a proxy for the capital intensity of affiliate firms. We also account for a host of firm-specific control variables represented by Z_{ijct} , such as the firm's age, size, foreign inputs, national sales in the domestic market, political instability, and infrastructure index. We design an infrastructure index by considering variables such as electricity, access to land, tax administration, the transportation of goods, supplies, and inputs, and access to finance. All these variables are measured on an ascending scale of the severity of the obstacle from 0 to 4, where 0 indicates no obstacle, and 4 indicates a very severe obstacle to the current operations of the establishment. To remove the scale effect and facilitate interpretation by keeping the values from 0 to 1, we divide the individual variable values by 4 and the sum of all variable

²⁴The foreign ownership share is taken as a proxy variable for FDI.

²⁵We do not consider here the IMF definition of foreign ownership with an equity stake of more than 10% since our interest is to investigate whether foreign firms are willing to invest in affiliate firms as the share of informal labor rises, not to participate in the firm's management decisions.

²⁶Temporary workers are defined as all paid short-term employees with no guarantee of the renewal of the employment contract and who work for eight or more hours per day.

values by 5. Similarly, we divide the values of the political instability variable ranging from 0 to 4 in ascending order of severity by 4 to remove the scale effect. The expected signs of the coefficients of these control variables are positive for size and foreign inputs and negative for age, infrastructure index, national sales, and political instability.²⁷ We capture country-specific and industry-specific fixed effects. The data do not have a firm identifier that allows the firm-specific effects to be captured. The coefficient δ_c controls for heterogeneity across countries concerning time-invariant characteristics (such as history or geography) and relatively stable factors (e.g., the quality of institutions). The industry fixed effect, γ_j , controls for a broad spectrum of industry-specific factors (such as contractibility, the relationship specificity of the inputs, capital intensity, etc.)

We estimate the econometric model using the OLS technique with heteroskedasticity-corrected robust standard errors and the linear probability model for continuous and binary-dependent foreign ownership variables for robustness. The key variables of interest in our analysis are informal labor, its interaction with reputation and legal costs, and the interaction of reputation and legal costs with capital intensity. The respective coefficients are $\alpha_1, \alpha_3, \alpha_4$, and α_5 . Since the evidence documenting this association from the firm boundary is sparse, against this backdrop, we would expect a positive α_1 and negative α_3 and α_4 to prove our Proposition 2. If Proposition 3, which states that the negative impact of reputation and legal costs is mitigated by the capital intensity of the affiliate industry, is true, we would expect a positive α_5 .

4.2.2 Results

We start our empirical investigation of the econometric model from equation (28) by cleaning²⁸ the repeated cross-section data for 28,822 manufacturing firms across 23 industries in the form of two-digit groups. After cleaning the data, our final sample consists of firms across 31 countries.²⁹ The countries are selected based on the share of informal labor in the total workforce. Countries for which more than 50% of the total workers are part of the informal workforce are selected.

²⁷Refer to Appendix B.1 (Tables B4 and B3) for variable definitions and summary statistics.

²⁸Data are cleaned by dropping those observations for which no data are available, the surveyed individual answered either “don’t know” or “does not apply,” or the survey stated “application rejected,” “refused to respond,” or “application still in process”.

²⁹WBES surveys are not carried out regularly. Moreover, WBES collects sensitive information on aspects of bribery and crime. As a result, the identity of the survey respondent is kept confidential. Given the respondent’s anonymity and the survey year’s specificity, it is unfeasible to construct a true firm-level panel structure (Gopalan, Reddy, and Sasidharan 2022).

Table 2 presents the results of our GVC integration³⁰ and informal labor investigation. Columns 1 and 2 present the logit model results with the binary foreign ownership outcome variable, and columns 3 and 4 take continuous foreign ownership as an outcome variable. We regress foreign ownership against informal labor, reputation and legal costs, interaction terms, control variables, and country- and industry-specific fixed effects. The variables of interest are informal labor, reputation and legal costs, the interaction between informal labor and reputation and legal costs, and the interaction between the capital intensity and reputation and legal costs. The results are consistent with our theoretical predictions that the relative attractiveness of integration decreases with rising reputation and legal costs. The results show a significant positive association; in columns 1 and 2, the positive significant coefficient of informal labor increases the likelihood of higher foreign ownership in firms hiring more informal labor. In contrast, a significant negative coefficient of the interaction terms of informal labor and reputation and legal costs suggests that the positive effect of informal labor on firm boundaries or integration is mitigated for firms with high reputation and legal costs. The direct and interaction effects retain the predicted sign and are significant in column 2. Columns 3 and 4 verify the robustness of our results and show the results of rerunning the regression model using continuous foreign ownership as a dependent variable. The coefficient of informal labor is positive and significant at 11%, implying higher HQ ownership shares in their affiliate manufacturer, which hires more informal labor. We also find that the significant and negative sign of the interaction term mitigates the positive impact of informal labor. The results also verify our theoretical predictions of Proposition 3, which states that the capital intensity of the headquarters firm mitigates the negative effect of reputation and legal costs (arising from the usage of high informal labor) on the relative attractiveness of integration. The positive significant coefficients of the interaction terms of the capital intensity and reputation and legal costs in columns 2 and 4 mitigate the negative impact of reputation and legal costs given by the interaction term of informal labor and reputation and legal costs on the relative attractiveness of integration.³¹

Furthermore, the negative significant coefficient of the control variable age and the positive significant coefficient of size imply that younger and bigger firms have higher foreign ownership shares. The coefficient of national domestic sales is negative and sig-

³⁰Our theory model takes care of vertical integration in trade, where two firms integrate and jointly produce.

³¹Refer to Appendix B.1 (Tables B1 and B2) for the robustness of the above results. Equation (28) is re-estimated by taking the total number of temporary workers as a proxy for informal workers and the severity of corruption as a proxy for reputation and legal costs.

nificant, implying that firms making most of their sales in the domestic market (inward-oriented) attract less foreign integration. The coefficient of foreign inputs is positive and significant, indicating that firms using imported inputs attract higher foreign ownership. The negative significant coefficient of the infrastructure index indicates that firms with poor infrastructure will attract less foreign ownership.

4.3 Industry/Country Level Analysis

4.3.1 Econometric Specification and Data

This section measures and examines the impact of industry-specific measures of reputation and legal costs and capital intensity³² on the ownership decision of foreign enterprises. We use the following econometric specification to investigate the impact:

$$\begin{aligned} FOS_{jct} = & \alpha_0 + \alpha_1 Informal_Labor_{jct} + \alpha_2 Informal_Labor_{ijct}^2 + \alpha_3 Reputation_Costs_{jct} \\ & + \alpha_4 Informal_Labor_{jct} \times Reputation_Costs_{jct} \\ & + \alpha_5 Reputation_Costs_{jct} \times Capital_Intensity_{jct} + \alpha Z_{jct} + \delta_c + \gamma_j + \epsilon_{jct} \end{aligned} \quad (29)$$

In the above equation, j represents the industry, c represents the country where the industry operates, and t denotes time. The dependent variable FOS_{jct} is the foreign ownership share in the industry j of country c for the year t . By construction, our dependent variable takes the actual foreign ownership share of the HQs in their affiliate industries. The total informal payment is considered a proxy for reputation and legal costs— $Reputation_Costs_{ijct}$. The temporary workers as a percentage of total workers is taken as a proxy for informal workers ($Informal_labor_{ijct}$). We also account for industry-specific control variables represented by Z_{jct} , such as the firm's age, foreign inputs, national sales, political instability, and infrastructure index.³³ The measure of the capital intensity— $Capital_Intensity_{ijct}$ is again constructed by taking the ratio of the total amount required to purchase the machinery and equipment to the number of full-time permanent production workers. We take a log of this measure as a proxy for the capital

³²The data are in the form of a two-digit international standard industrial classification (ISIC) for a set of 23 industries across 31 countries using WBES.

³³(i) Since data are sourced from WBES, all variables' definitions remain the same, as explained in section 4.2.1. (ii) A data cleaning mechanism similar to that in the above section is used (iii) to construct industry-level data. We aggregate firm-level data for relevant variables such as temporary workers, informal payments, permanent production workers, and funds required to buy machinery and equipment and (iv) take the mean value of variables such as the foreign ownership share, foreign inputs, national sales, age, infrastructure index, and political instability.

Table 2: Impact of Informal Labor on Foreign Ownership Shares:
Results of Logit and OLS Models

VARIABLES	(1) F-Ownership Binary Dep. Logit	(2) F-Ownership Binary Dep. Logit	(3) F-Ownership Continuous OLS	(4) F-Ownership Continuous OLS
Informal Labor	0.0334** (0.0161)	0.0335** (0.0161)	0.0568 (0.0368)	0.0527 (0.0375)
(Informal Labor) ²	-6.72e-05 (4.23e-05)	-6.87e-05 (4.35e-05)	-3.88e-05 (3.11e-05)	-3.65e-05 (3.06e-05)
Informal×Reputation Cost	-0.00144* (0.000844)	-0.00142* (0.000837)	-0.00457** (0.00193)	-0.00446** (0.00201)
Capital×Reputation Cost		0.00860** (0.00386)		0.243** (0.111)
Age	-0.00987 (0.0103)	-0.00917 (0.00991)	-0.199** (0.0986)	-0.195** (0.0960)
Size	0.621*** (0.204)	0.595*** (0.204)	3.149* (1.894)	3.386* (1.878)
National Sales	-0.0106*** (0.00307)	-0.0101*** (0.00315)	-0.195*** (0.0510)	-0.194*** (0.0514)
Foreign Inputs	0.00423* (0.00256)	0.00426 (0.00261)	0.114*** (0.0395)	0.113*** (0.0392)
Political Instability	-0.194 (0.420)	-0.222 (0.427)	-0.264 (3.993)	-0.551 (3.920)
Infra Index	-1.269** (0.622)	-1.339** (0.635)	-13.02** (5.756)	-12.41** (5.920)
Capital Intensity		-0.167* (0.0968)		-3.459** (1.596)
Reputation Cost	0.0755 (0.0525)		0.547 (0.507)	-3.115* (1.744)
Constant	-1.576 (1.026)	-0.0519 (1.284)	13.24 (9.233)	56.97** (22.57)
Observations	413	413	568	568
R-squared			0.335	0.343
Industry FE	YES	YES	YES	YES
Country FE	YES	YES	YES	YES

Source: Author's Estimation.

Notes: (i) Robust standard errors at the firm level are in parentheses for columns 3 and 4; (ii) *** p<0.01, ** p<0.05, * p<0.1; (iii) Total informal payment is taken as a proxy measure to account for reputation and legal costs; (iv) Columns 1 and 2 give the result of the logit model, whereas columns 3 and 4 give the results of the OLS technique; (iv) Firm-level fixed effects cannot be captured due to missing firm identifier information in the data.

intensity of firms in the affiliate country. The expected signs of the coefficients of these control variables are positive for foreign inputs and negative for age, infrastructure index, national sales, and political instability.³⁴ Country-specific and industry-specific fixed effects in the model capture unobserved heterogeneity across countries and industries.

The econometric model is estimated using the OLS technique with heteroskedasticity-corrected robust standard errors. The key variables of interest in our analysis are informal labor, reputation and legal costs, the interaction term of reputation and legal costs with informal labor, and the interaction term of reputation and legal costs with capital intensity. The respective coefficients are $\alpha_1, \alpha_3, \alpha_4$, and α_5 . Since the evidence documenting this association for the firm boundary is sparse, against this backdrop, we would expect a positive α_1 and negative α_3 and α_4 to prove Proposition 2. If Proposition 3, which states that the negative impact of reputation and legal costs is mitigated by the rising capital intensity of the headquarters industry, is true, we would expect a positive α_5 .

4.3.2 Results

Table 3 presents the results of our global value chain integration and informal labor investigation at the industry level. We start our empirical investigation of the econometric model equation (29) using continuous foreign ownership as an outcome variable in all four columns. We regress foreign ownership against informal labor, reputation and legal costs, capital intensity and control variables. We also control for country-specific and industry-specific fixed effects. In columns 1 to 4, the positive significant coefficient of informal labor increases the attractiveness of integration (FDI). A significant negative coefficient of interaction term of informal labor and reputation and legal costs suggests that the positive effect of informal labor on the firm boundary or integration is mitigated in industries with high reputation and legal costs. The direct and interaction effect coefficients retain the predicted sign and are significant in columns 1 to 3, which control for country-specific fixed effects.³⁵ Columns 3 and 4 include an additional interaction term of the capital intensity and reputation and legal costs. The positive coefficient results verify our theoretical predictions of Proposition 3, which states that the negative effect of reputation and legal costs (arising due to the usage of high informal labor) on the relative attractiveness of integration is mitigated as the industry's capital intensity increases. Furthermore, regarding controls, the results confirm the above firm-level analysis.

³⁴Refer to Appendix B.1 for variable definitions.

³⁵The negative sign of reputation and legal costs and the interaction term of reputation and legal costs and informal labor explain the indirect mechanism of low FDI inflows with rising reputation and legal costs due to high informality.

Table 3: Results of the Effect of Reputation and Legal Costs and Capital Intensity on Foreign Ownership Shares: OLS Models

	Dependent Variable: Foreign Ownership			
	(1)	(2)	(3)	(4)
Informal Labor	0.000354** (0.000163)	0.000289** (0.000140)	0.000298** (0.000143)	0.000354** (0.000165)
Informal×Reputation Cost	-2.48e-05** (1.17e-05)	-1.73e-05** (8.55e-06)	-1.79e-05** (8.78e-06)	-2.19e-05** (1.02e-05)
Capital×Reputation Cost			0.0398 (0.0411)	0.0497 (0.0431)
Reputation Cost	-0.740 (0.618)	0.00680 (0.330)	-0.564 (0.550)	-0.741 (0.615)
National Sales		-0.190** (0.0738)	-0.193*** (0.0739)	-0.184** (0.0782)
Age		-0.244 (0.169)	-0.239 (0.167)	-0.246 (0.175)
Political Instability		-1.824 (6.570)	-1.639 (6.550)	-1.411 (6.765)
Infra Index		4.406 (14.68)	3.638 (14.71)	2.359 (16.07)
Foreign Inputs		0.234*** (0.0642)	0.233*** (0.0639)	0.219*** (0.0669)
Constant	34.12** (17.25)	21.46 (13.92)	23.09* (13.72)	33.50* (17.04)
Observations	276	276	276	276
R-squared	0.425	0.402	0.404	0.425
Country FE	YES	YES	YES	YES
Industry FE	NO	NO	NO	YES

Source: Author's Estimation.

Notes: (i) Robust standard errors at the industry level are in the parentheses; (ii) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; (iii) Total informal payment is taken as a proxy measure to account for reputation and legal costs.

5 Conclusion

The paper investigates the ownership decision of foreign firms in a labor-abundant country in the presence of informal labor. A large share of workers in a typical developing economy do not find jobs in the formal sector and survive in the informal sector. This paper argues that a foreign firm faces non-production costs in the form of reputation loss and legal punishment for using informal workers under integration, which discourages direct investment. This paper offers some anecdotal evidence in support of such costs being associated with informal contracts. Such obligations amount to the recommendations of international organizations, for example, the ILO Tripartite Declaration of Principles, concerning multinational enterprises and social policy (ILO 2017). The declaration clearly defined the appropriate rules and regulations, policies, measures, and actions to be taken by governments to minimize violations and resolve the difficulties arising in working MNEs. Adhering to these measures increases the cost of operation for MNEs in abundant-labor developing countries. Violations of the ILO Declaration, FairTrade, or GoodWeave principles increase the chances of mishaps and the resultant reputation loss (like the loss of brand value, goodwill, and customers) or legal/extra-legal costs (punishment, fine, penalty, bribe, etc., for halting production, compensatory allowance, and bribing government officials to mitigate the legal cost). All these may inflate the effective cost of hiring informal labor, which becomes higher under FDI than under outsourcing. Our theoretical framework extended the standard model with firm heterogeneity to capture this notion of a penalty for using informal labor or production in informal units.

The model shows a rise in reputation and legal costs in the case of a mishap at an affiliate manufacturing plant using many informal workers or a higher fraction of the output being outsourced to domestic informal units, resulting in the falling attractiveness of integration. Under integration, there is an expansion of firm boundaries, and the headquarters firm has rights over the physical assets of the affiliate firm. Therefore, when the products are sold, reputation and legal costs may emerge in case of any mishap in the informal unit due to poor working conditions or any other violation of international labor rules and regulations. However, these costs may not arise under outsourcing since the developing countries' governments may not impose these costs on domestic firms; even if they arise, they will be small, and HQ firms would not be responsible for them. This framework suggests that the attractiveness of FDI (integration) falls with the rise in additional reputation and legal costs and with the lower bargaining power of the headquarters using both the TCT and PRT approaches.

We conduct a detailed empirical investigation of the theory model predictions using

extensive country-, industry-, and firm-level data, employing disaggregated measures of reputation and legal costs at each step. We considered WDI, WGI, and WBES datasets: we used country-level panel data for 80 countries from 2000 to 2019 and pooled cross-sectional firm-level and industry-level data for 31 countries. We used a two-step GMM estimation technique for the dynamic country-level panel data, a linear probability model and the OLS technique for the pooled cross-sectional firm-level data, and the OLS technique for the industry-level data. Across datasets, controls, and estimation approaches, we consistently find the positive effect of informal labor on the attractiveness of integration (FDI). This impact is dampened due to the rising reputation and legal costs. We also find that the negative impact of reputation and legal costs is mitigated by the rising capital intensity of a headquarters firm at the industry and firm level. These findings are robust to controlling for unobserved heterogeneity across countries and industries. The states in developing countries must provide a minimum wage, social security coverage, and acceptable occupational health, safety, and working conditions to attract FDI. This may raise the level of formal employment.

In future work, the theoretical framework developed in this paper can be extended to include the partial relationship specificity of the investment, the partial contractibility of the contracts, and the technology upgrading of firms. Furthermore, the model can be extended to environments with multiple affiliates operating in various countries to better understand the organization of multinational enterprises around the globe.

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Appendix

A Equilibrium under Outsourcing and Integration Using PRT Approach

The bargaining mechanism occurs under integration and outsourcing, following the PRT of S. J. Grossman and O. D. Hart 1986 and O. Hart and Moore 1990. Each party non-cooperatively and independently chooses its investment level; hence, there is no exogenous transaction cost. The reputation and legal costs occur only in the case of integration since the property rights are with the HQ firm. The distribution of the surplus is sensitive to the ownership structure, which determines both parties' payoffs after the current relationship breakdowns. The HQ firm's and affiliate manufacturer's maximization problems at stage 2 are given by the following: HQ and M maximize their share of the surplus at stage 2 to get the optimal levels of H , L_1 , and L_2 .

The profit maximization exercise of both HQ and M under integration is given as follows:

$$\max_H \beta_I R - W_H H \quad (\text{A.30})$$

$$H_I \equiv H = \frac{\beta_I \eta R(\sigma - 1)}{\sigma W_H} \quad (\text{A.31})$$

$$\max_{L_1 L_2} (1 - \beta_I) R - W_{L_1} \mu L_1 - W_{L_2} (1 + \rho(1 - \mu)\lambda)(1 - \mu)L_2 \quad (\text{A.32})$$

$$L_1 = \frac{(1 - \beta_I) R(\sigma - 1)(1 - \eta)}{\sigma W_{L_1}} = L_{1I}, \quad L_2 = \frac{(1 - \beta_I) R(\sigma - 1)(1 - \eta)}{\sigma W_{L_2} (1 + \rho(1 - \mu)\lambda)} = L_{2I} \quad (\text{A.33})$$

The profit maximization exercise of both HQ and M under outsourcing is given as follows:

$$\max_H \beta_A R - W_H H \quad (\text{A.34})$$

$$H_A \equiv H = \frac{\beta_A \eta R(\sigma - 1)}{\sigma W_H} \quad (\text{A.35})$$

$$\max_{L_1 L_2} (1 - \beta_A) R - W_{L_1} \mu L_1 - W_{L_2} (1 - \mu)L_2 \quad (\text{A.36})$$

$$L_1 = \frac{(1 - \beta_A) R(\sigma - 1)(1 - \eta)}{\sigma W_{L_1}} = L_{1A}, \quad L_2 = \frac{(1 - \beta_A) R(\sigma - 1)(1 - \eta)}{\sigma W_{L_2}} = L_{2A} \quad (\text{A.37})$$

By substituting these optimal values back into the revenue and profit equations, we get the following expressions for profits under integration:

$$\begin{aligned} \pi_I \equiv \pi = & (\beta_I^\eta (1 - \beta_I)^{1-\eta})^{\sigma-1} \left(\sigma - (\sigma - 1)(\beta_I \eta + (1 - \eta)(1 - \beta_I)) \right) \frac{1}{\sigma} B \phi^{\sigma-1} (W_H)^{\eta(1-\sigma)} \\ & (W_{L_1})^{\mu(1-\eta)(1-\sigma)} W_{L_2} (1 + \rho(1 - \mu)\lambda)^{(1-\mu)(1-\eta)(1-\sigma)} \quad (\text{A.38}) \end{aligned}$$

Similarly, the profits under outsourcing are the following:

$$\pi_A \equiv \pi = (\beta_A^\eta (1 - \beta_A)^{1-\eta})^{\sigma-1} \left(\sigma - (\sigma - 1)(\beta_A \eta + (1 - \eta)(1 - \beta_A)) \right) \frac{1}{\sigma} B \phi^{\sigma-1} (W_H)^{\eta(1-\sigma)} (W_{L_1})^{\mu(1-\eta)(1-\sigma)} (W_{L_2})^{(1-\mu)(1-\eta)(1-\sigma)} \quad (\text{A.39})$$

At stage 1, HQ chooses an organizational form that maximizes the joint surplus. HQ prefers integration over outsourcing if and only if $\pi_I \geq \pi_A$. To determine the attractiveness of integration vs. arm's-length transaction, consider the ratio of profits under integration and arm's-length transaction, $\theta = \frac{\pi_I}{\pi_A}$, where integration dominates outsourcing if $\theta \geq 1$:

$$\theta = \frac{(\beta_I^\eta (1 - \beta_I)^{1-\eta})^{\sigma-1} (\sigma - (\sigma - 1)(\beta_I \eta + (1 - \eta)(1 - \beta_I))) (1 + \rho(1 - \mu)\lambda)^{(1-\mu)(1-\eta)(1-\sigma)}}{(\beta_A^\eta (1 - \beta_A)^{1-\eta})^{\sigma-1} (\sigma - (\sigma - 1)(\beta_A \eta + (1 - \eta)(1 - \beta_A)))}$$

$$\frac{\delta \theta}{\delta \rho(1 - \mu)\lambda} = \frac{-(1 - \mu)(1 - \eta)(\sigma - 1) (\beta_I^\eta (1 - \beta_I)^{1-\eta})^{\sigma-1} (\sigma - (\sigma - 1)(\beta_I \eta + (1 - \eta)(1 - \beta_I))) (1 + \rho(1 - \mu)\lambda)^{(1-\mu)(1-\eta)(1-\sigma)-1}}{(\beta_A^\eta (1 - \beta_A)^{1-\eta})^{\sigma-1} (\sigma - (\sigma - 1)(\beta_A \eta + (1 - \eta)(1 - \beta_A)))}$$

$$\frac{\delta \theta}{\delta \rho(1 - \mu)\lambda} = -\theta \frac{(1 - \mu)(1 - \eta)(\sigma - 1)}{(1 + \rho(1 - \mu)\lambda)} < 0 \quad (\text{A.40})$$

for all $0 < \mu, \eta, \beta_A, \beta_I < 1$, $\sigma > 1$, $0 \leq \rho(1 - \mu)\lambda \leq 1$ and $\theta > 0$. This proves Proposition 2.

The direction of this effect is not surprising given that the probability of the imposition of reputation and legal costs is assumed to be increasing with the proportion of informal labor used. As the proportion of hired informal workers increases, it may become expensive for HQ's manager to integrate the affiliate manufacturer. This may lead to falling total profits under integration. The resulting fall in labor is further aggravated by under-investment in the capital by HQ; thus, the optimal share falls due to a fall in revenue. Both effects lead to a fall in overall profits from integration π_I , which decreases the relative attractiveness of integration versus outsourcing, i.e., θ .

B Mathematical Appendix

Proof of Proposition 4

The first-order derivative of θ from equation (25) after simplification is

$$\text{Proof: } \frac{\delta \theta}{\delta \rho(1 - \mu)\lambda} = \frac{(1 - \mu)(1 - \eta)(1 - \sigma)(1 + \rho(1 - \mu)\lambda)^{(1-\mu)(1-\eta)(1-\sigma)-1}}{(\beta_A^\eta (1 - \beta_A)^{1-\eta})^{\sigma-1} \left(\sigma - (\sigma - 1)(\beta_A \eta + (1 - \eta)(1 - \beta_A)) \right)} \quad (\text{B.41})$$

Take the second-order derivative of $\frac{\delta\theta}{\delta\rho(1-\mu)\lambda}$ with respect to η :

$$\frac{\delta^2\theta}{\delta\rho(1-\mu)\lambda\delta\eta} = \left[\frac{\delta Numerator(N)}{\delta\eta} Denominator(D) - Numerator(N) \frac{\delta Denominator(D)}{\delta\eta} \right] \div Denominator^2 \quad (B.42)$$

$$N = (1-\mu)(1-\eta)(1-\sigma)(1+\rho(1-\mu)\lambda)^{(1-\mu)(1-\eta)(1-\sigma)-1} \quad (B.43)$$

$$\begin{aligned} \frac{\delta N}{\delta\eta} = (1-\mu)(1-\sigma) \left[(1+\rho(1-\mu)\lambda)^{(1-\mu)(1-\eta)(1-\sigma)-1} \frac{\delta(1-\eta)}{\delta\eta} \right. \\ \left. + (1-\eta) \frac{\delta(1+\rho(1-\mu)\lambda)^{(1-\mu)(1-\eta)(1-\sigma)-1}}{\delta\eta} \right] \quad (B.44) \end{aligned}$$

$$\begin{aligned} \frac{\delta N}{\delta\eta} = (1-\mu)(\sigma-1)(1+\rho(1-\mu)\lambda)^{(1-\mu)(1-\eta)(1-\sigma)-1} \left[1 - (1-\mu)(1-\eta)(\sigma-1) \ln(1+\rho(1-\mu)\lambda) \right], \\ \frac{\delta N}{\delta\eta} > 0 \quad (B.45) \end{aligned}$$

$$D = \left(\beta_A^\eta (1-\beta_A)^{1-\eta} \right)^{\sigma-1} \left(\sigma - (1-\sigma)(\beta_A\eta + (1-\beta_A)(1-\eta)) \right) \quad (B.46)$$

$$X = \left(\beta_A^\eta (1-\beta_A)^{1-\eta} \right)^{\sigma-1} \quad (B.47)$$

$$Y = \left(\sigma - (\sigma-1)(\beta_A\eta + (1-\beta_A)(1-\eta)) \right) \quad (B.48)$$

X and Y are > 0 , and this implies that $D > 0$:

$$\begin{aligned} \frac{\delta D}{\delta\eta} &= \frac{\delta X}{\delta\eta} Y + \frac{\delta Y}{\delta\eta} X \\ \frac{\delta X}{\delta\eta} &= (\sigma-1) \left(\beta_A^\eta (1-\beta_A)^{1-\eta} \right)^{\sigma-1} \left(\ln\beta_A - \ln(1-\beta_A) \right) \quad (B.49) \end{aligned}$$

$$\begin{aligned} \frac{\delta X}{\delta \eta} &> 0, \forall \beta_A \in \left(\frac{1}{2}, 1\right) \\ \frac{\delta Y}{\delta \eta} &= -(\sigma - 1)(2\beta_A - 1), \frac{\delta Y}{\delta \eta} > 0, \forall \beta_A \in \left(\frac{1}{2}, 1\right) \\ \frac{\delta N}{\delta \eta} D &> \frac{\delta D}{\delta \eta} N \text{ for } \beta_A \in [1/2, 1) \implies \frac{\delta^2 \theta}{\delta g(1-\mu)\delta \eta} > 0, \text{ and } \frac{\delta N}{\delta \eta} D < \frac{\delta D}{\delta \eta} N \text{ for } \\ \beta_A &\in (0, 1/2) \implies \frac{\delta^2 \theta}{\delta g(1-\mu)\delta \eta} < 0. \end{aligned}$$

Tables

Table B.1 presents the regression model equation (28) results, using corruption as an alternative proxy for reputation and legal costs. The results of all four columns verify our theoretical predictions of Propositions 2 and 3. There exists a significant positive association between foreign ownership and informal labor. This positive effect of informal labor on integration is mitigated by high corruption costs. The negative significant coefficient of the interaction terms of informal labor and corruption costs verifies Proposition 2. Furthermore, the positive significant coefficients of the interaction terms of capital intensity and corruption costs mitigate the negative impact of reputation and legal costs, verifying Proposition 3. Table B.2 presents the results of the regression model equation (28), using the total number of informal workers instead of the proportion of informal workers and total informal payment as a proxy for reputation and legal costs. The results verify Propositions 2 and 3.

Table B.1: Impact of Corruption Cost and Capital Intensity on Foreign Ownership Shares, Results of Logit Model

VARIABLES	(1) F-Ownership Binary	(2) F-Ownership Binary	(3) F-Ownership Binary	(4) F-Ownership Binary
Informal Labor	0.00137*** (0.000427)	0.00131*** (0.000446)	0.00141*** (0.000433)	0.00144*** (0.000459)
(Informal Labor) ²	-1.40e-07*** (5.37e-08)	-1.40e-07*** (5.41e-08)	-1.44e-07*** (5.48e-08)	-1.57e-07*** (5.62e-08)
Informal×Corruption	-0.00175** (0.000824)	-0.00158* (0.000864)	-0.00188** (0.000838)	-0.00207** (0.000892)
Corruption×Capital Intensity			0.00680 (0.00820)	0.0330*** (0.0102)
Age	0.00867*** (0.00203)	0.00663*** (0.00226)	0.00839*** (0.00206)	0.00611*** (0.00230)
National Sales	-0.0215*** (0.000815)	-0.0229*** (0.000948)	-0.0215*** (0.000826)	-0.0228*** (0.000958)
Foreign Inputs	0.0147*** (0.000838)	0.0164*** (0.00104)	0.0147*** (0.000848)	0.0162*** (0.00106)
Political Instability	0.0778 (0.103)	0.401*** (0.129)	0.0151 (0.117)	0.156 (0.146)
Informal×Political Instability	0.00265** (0.00109)	0.00296** (0.00115)	0.00276** (0.00111)	0.00336*** (0.00118)
Infra Index	-0.103*** (0.0352)	-0.0911** (0.0389)	-0.115*** (0.0370)	-0.129*** (0.0406)
Constant	-1.145*** (0.0896)	-2.328*** (0.878)	-1.126*** (0.0905)	-2.101** (0.879)
Observations	13,219	13,199	12,953	12,934
Industry FE	NO	YES	NO	YES
Country FE	NO	YES	NO	YES

Source: Author's Estimation.

Notes: (i) Robust standard errors are in parentheses; (ii) *** p<0.01, ** p<0.05, * p<0.1; (ii) Corruption is taken as a proxy measure to account for reputation and legal costs.

Table B.2: Results of Reputation and Legal Costs and Capital Intensity on Foreign Ownership Shares: Logit and OLS Models

VARIABLES	(1) F-Ownership Binary Dep. Logit	(2) F-Ownership Binary Dep. Logit	(3) F-Ownership Continuous OLS	(4) F-Ownership Continuous OLS
Informal Labor	0.0263*** (0.00923)	0.0754*** (0.0203)	0.326** (0.153)	0.317** (0.141)
(Informal Labor) ²	-1.54e-05* (9.18e-06)	-2.35e-05* (1.24e-05)	-0.000131 (8.96e-05)	-6.81e-05 (9.41e-05)
Capital×Reputation Cost	0.0279** (0.0115)	0.0451* (0.0238)	0.118 (0.0876)	0.216** (0.103)
Informal×Reputation Cost	-0.00120** (0.000551)	-0.00410*** (0.00122)	-0.0172* (0.00983)	-0.0191** (0.00901)
Reputation Cost	-0.368** (0.180)	-0.533 (0.399)	-1.251 (1.333)	-2.496 (1.634)
Age	-0.0217 (0.0138)	-0.0532** (0.0234)	-0.167** (0.0699)	-0.250*** (0.0758)
Size	0.849*** (0.299)	0.984** (0.399)	2.149 (1.492)	2.868* (1.643)
National Sales	-0.0113*** (0.00412)	-0.0197*** (0.00614)	-0.148*** (0.0515)	-0.169*** (0.0528)
Foreign Inputs	0.0176*** (0.00407)	0.0102* (0.00554)	0.159*** (0.0351)	0.119*** (0.0385)
Political Instability	0.233 (0.527)	-1.124 (0.902)	-0.145 (2.937)	-0.605 (3.643)
Infra Index	-1.220 (0.904)	-3.317** (1.354)	-12.38*** (4.367)	-13.59** (5.578)
Capital Intensity	-0.341* (0.177)	-0.588 (0.398)	-1.658 (1.208)	-2.885** (1.321)
Constant	0.539 (2.348)	0.758 (7.054)	34.46** (17.17)	43.23** (18.55)
Observations	562	408	562	562
R-squared			0.224	0.363
Industry FE	NO	YES	NO	YES
Country FE	NO	YES	NO	YES

Source: Author's Estimation

Notes: (i) Robust standard errors at the firm level are in parentheses for columns 3 and 4; (ii) *** p<0.01, ** p<0.05, * p<0.1; (iii) Total informal payment is taken as a proxy measure to account for reputation and legal costs; (iv) Columns 1 and 2 give the results of the logit model, whereas columns 3 and 4 give the results of the OLS technique; (iv) Firm-level fixed effects can not be captured due to missing firm identifier information in the data.

Table B.3: Summary Statistics

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
Age	2151	19.20	15.68	0	97
Size	2151	1.94	.807	1	3
F-Ownership	2151	7.9	25.62	0	100
National Sales	2151	86.99	27.72	0	100
Foreign Inputs	2151	23.44	31.30	0	100
Corruption	2151	1.846	1.514	0	4
Infra Index	2151	1.78	1.067	0	4.75
Temporary Labor	2151	13.49	102.05	0	4324
Political Instability	2151	1.613	1.434	0	4
Electricity	2151	1.868	1.536	0	4
Finance	2151	1.472	1.214	0	4
Access to Land	2151	0.893	1.134	0	4
Tax Administration	2151	1.517	1.240	0	4
Transport	2151	1.380	1.283	0	4
Production Workers	2151	115	380	1	7000
Capital Expenditure	2151	3.49e+9	3.09e+10	0	1.00e+12

Table B.4: Variable Definition

Variable	Definition	Expected Sign
F-Ownership	Binary variable taking value 1 or 0 OR Percent of firm owned by private foreign individuals, companies and organizations	
Informal Labor	Number of temporary workers	+
Foreign Inputs	Percent of total material inputs used of foreign origin	+
National Sales	Percent of annual sales in domestic markets	-
Age	Number of years firm has been in operation	-
Informal Payments	Total annual informal payment	-
Size	= 1 if firm is a small firm (workers <20) = 2 if firm is a medium firm (workers = 20–99) = 3 if firm is a Large firm (workers ≥ 100)	+
Log of Capital Intensity	Log(machinery cost/production workers)	+
Corruption	Scale variable taking values from 0 to 4 (values divided by 4 to descale)	-
Political Instability	Scale variable taking values from 0 to 4 (values divided by 4 to descale)	-
Infrastructure Index	Average of finance, transport, land, electricity, tax administration obstacles	-