

Supervising Across Borders: The Case of Multinational
Hierarchies

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THE CASE OF MULTINATIONAL HIERARCHIES**

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ABSTRACT

This paper examines how multinational corporations (MNCs) selectively assign supervisory responsibilities to units in countries with varying levels of institutional quality. Arbitrating across institutional contexts is an important function of MNCs, but it also creates coordination challenges. The choice of organization structure, such as the differential assignment of supervisory responsibilities, is an important tool for managing these coordination challenges. Using data on the business activities and supervision relationships within U.S. multinational manufacturers in 1996–2008, I find that frontline subsidiaries in countries with weaker institutions are more likely to be supervised by foreign rather than domestic supervisory units. Foreign supervision is even more likely when subsidiaries in weak-institution countries conduct activities that are more central to or interdependent with their parents' global operations. These findings confirm that MNCs use differential supervision to enhance global coordination. The paper highlights one of the most unique features of MNCs: a multinational hierarchy that resides within firm's boundary but across national borders. It also connects MNCs' hierarchical structure with institutional imperfections that give rise to the emergence of the firm in the first place.

INTRODUCTION

Scholars in law, finance, development economics, and strategy have long argued that firm growth is undermined in countries with weak institutions, such as countries with insufficient transparency, inefficient judicial systems, and ambiguous property rights. This is largely because weak institutions increase domestic firms' costs for sourcing inputs, distributing products, and mobilizing resources (North, 1990). Interestingly, however, weak national institutions do not impose an equally binding constraint on multinational corporations (MNCs). In fact, MNCs often employ their unique organizational form to arbitrage between varying institutional constraints and reallocate resources across national borders, effectively putting "sovereignty at bay" (Kobrin 2001, Vernon 1971, p.3). For example, MNCs can circumvent trade barriers through foreign direct investment and internal sourcing (Caves 1996), or leverage differences in tax regimes by redistributing operations and profits among host countries (Desai et al. 2004). They can also compensate for underdeveloped local financial markets with internal capital markets (Antràs et al. 2009), or mitigate appropriability risks in countries with weak intellectual property rights protection (IPR) by sourcing from their units in weak IPR countries innovations that are of greater value internally than to potential competitors (Zhao 2006). Although these arbitrage strategies provide a basis for competitive advantage of MNCs vis-à-vis their domestic counterparts, it also imposes coordination challenges. In this paper, I investigate the organization structures that MNCs employ to manage these coordination challenges.

I direct the lens at an important but understudied structural choice available to MNCs: differential supervision, or employing local or foreign supervision for their overseas subsidiaries. I argue that differential supervision facilitates coordination of subsidiaries in host countries with varying levels of institutional quality. Institutions affect firm coordination in two important ways (North 1990). First, institutions shape the availability of *complementary information*, which affects joint decision-making. Second, through the prevailing rule of law and enforcement mechanisms, institutions affect the clarity of *property rights* and, consequently, the risk that assets valuable for joint tasks may be expropriated. In response, MNCs operating in weak-institution countries (WICs) can manage coordination challenges by

specifying *internal channels of information flow* and reallocating *decision rights* through an organizational hierarchy. Reducing the supervisory responsibilities of units in WICs and increasing the supervisory responsibilities of units in strong-institution countries allows an MNC to (1) integrate scarce local information with complementary regional and international data, and (2) reduce expropriation risks by limiting the exposure of corporate resources to a host country's weak property rights.

This is illustrated in Figure 1. This U.S. MNC operates in two foreign countries, A and B. If both countries have strong institutions, then each subsidiary in A and B is expected to report to supervisory units in its own country (SU_A or SU_B) to ensure fit with the local environment (represented by the solid lines of command) or to report to corporate headquarters or regional supervisory units, with A and B having equal probability to host regional supervisory units. However, if country A is a weak-institution country and country B is a strong-institution country, the MNC may “reallocate” supervisory responsibilities for some subsidiaries in country A (e.g., U3) to supervisory units in country B (represented by the dotted line of command). Moving supervision of U3 away from country A allows the MNC to engage U3 in global operations while mitigating its exposure to country A's institutional risks, giving the MNC a unique competitive advantage relative to domestic firms operating in any single country.

Insert Figure 1 about here

In addition to institutional differences at the country level, this paper explores differences in the impact of institutions at the firm level. In particular, because coordination is more important when activities are interdependent, this paper examines the extent to which an MNC unit is engaged in tasks that are interdependent with its parent firm's global activities. Greater task interdependence generates greater demand for coordination, which in turn magnifies the impact of institutions on the allocation of supervisory responsibilities.

I tested my hypotheses using data on the business activities and organization structures of U.S. multinational manufacturers from 1996 to 2008. My results show that MNC frontline subsidiaries in host countries with weaker institutions are more likely to be supervised by a foreign (as opposed to domestic) supervisory unit, especially when the subsidiaries' tasks are more central to their MNC parent's global operations or when their tasks are interdependent with a greater number of tasks performed by other subsidiaries.¹ This suggests that selectively allocating supervisory responsibilities is an important managerial lever for MNCs in coordinating global operations.

This paper relates to the literature on the trade-off between adaptation and coordination within multidivisional firms. In particular, it relates to studies about headquarters–subsidiary relationships within MNCs (Birkinshaw et al. 2006). Whereas most previous studies focused on the allocation of decision rights between the headquarters and a subsidiary as an independent dyad, this paper examines whether supervisory responsibilities for a subsidiary are assigned to a local or a foreign supervisory unit. It identifies the mechanism of differential supervision—that is, local supervision being granted to some subsidiaries but not to others—for selective intervention/coordination within MNCs. Local supervision of subsidiaries implies local autonomy for the local supervisory unit and subsidiaries as a *group*. In contrast, foreign supervision of frontline subsidiaries implies less local autonomy. By shifting the focus of analysis to allocation of the supervisory responsibilities, I hope to highlight one of the most unique features of MNCs: a multinational hierarchy that resides within a firm's boundary but across national borders.

This paper also relates to the literature on MNCs' institution strategy, a topic that prior MNC headquarters–subsidiary relationship studies have not sufficiently explored. Those studies more often focused on product market conditions and held the institutional environment constant, whereas in reality, MNC subsidiaries' institutional environments are no less critical than their product markets. The MNC institution strategy literature explicitly examines MNCs' global strategy in dealing with weak institutions,

¹ In this study, unless otherwise specified, subsidiaries refer to MNC subsidiaries at the front line of business. In contrast, supervisory units refer to divisions, departments, groups, or non-frontline subsidiaries that the frontline subsidiaries report to. They include, but are not limited to, regional headquarters.

albeit mainly through the choice of subsidiary location or ownership type. By extending the analysis to MNCs' use of differential supervision, this paper connects MNCs' hierarchical structure with institutional imperfections or voids (Khanna and Palepu 2000) that give rise to the emergence of the firm in the first place. It also complements an emerging body of work that examines how MNCs circumvent institutional obstacles when their location and ownership choices are limited (Alcácer 2006, Zhao 2006).

In addition to the academic literature, the study also has implications for public policy and international business. One of the most significant features of MNCs is the extent to which they move resources across national borders (Dunning 2001). According to Kobrin (2001), because of these movements, MNCs are viewed as a compensating instrument for intrinsic cross-border market failures, and are uniquely positioned to take advantage of the asymmetry between an increasingly integrated global economic system and a still segmented political system. The MNCs' ability to operate worldwide systems against the limited reach of any national authority "creates asymmetries of both information and jurisdiction" (p. 187). The increasing interdependencies among MNC activities around the globe weaken national governments' control over their national economic actors and economic policy. MNCs have emerged as a source of private authority and gained increasing decision-making power vis-à-vis national states. This study sheds light on one important mechanism for MNCs to adapt their organization in response to national institutions: the allocation of supervision responsibilities across national borders.

RELATED LITERATURE

Headquarters–Subsidiary Relationship within MNCs

MNC headquarters and their overseas subsidiaries both face trade-offs in managing their relationships. Like in all multidivisional firms, MNC headquarters need to balance the opposing demands for adaptation and coordination (Lawrence and Lorsch 1967). In fact, this trade-off is particularly salient for MNCs. On the one hand, product demand and production conditions are usually more heterogeneous across countries than within countries, requiring a greater level of adaptation (Bartlett and Ghoshal 1989). On the other

hand, to realize their competitive advantage of global arbitrage, MNCs need to coordinate their subsidiaries across a number of countries (Kogut 1983). This tradeoff creates a dilemma for MNC headquarters when it comes to the design of headquarters–subsidiary relationships: the more autonomous a firm’s subsidiaries are, the better they can adapt to idiosyncratic local conditions, but the less they can be coordinated around broad corporate objectives.

MNC subsidiaries also face trade-offs. On the one hand, they need to adapt to local business environment to remain locally competitive (Rugman and Verbeke 2001). On the other hand, they need access to unique resources possessed by MNC headquarters, such as knowledge, management skills, global product reputation, production technology, and financial capital (Bartlett and Ghoshal 1989). Autonomy enables local adaptation and optimization of local decision making, but an overly local focus might hinder subsidiaries’ ability to access corporate knowledge and resources.

The literature has studied in great detail the benefits and costs of subsidiary autonomy. Autonomy is useful for firms operating in diverse product markets (Bartlett and Ghoshal 1989). It allows subsidiaries to better adapt to their immediate task environment (Lawrence and Lorsch 1967). It provides flexibility and creativity in local problem solving (Eisenmann and Bower 2000). It also saves time by localizing communication and information processing (Radner 1993). At the same time, an overly local focus hinders coordination. Locally autonomous teams may become isolated (Hass 2010, Monteiro et al. 2008). The benefits of local autonomy also vary by contingencies. For example, a more autonomous structure enhances a firm’s ability to adapt to its environment, but only if the environment is simple and the interdependencies between organization units are low. If the level of interdependencies is high, greater autonomy for each unit may jeopardize efforts in other units, hamper coordination, and hurt performance at the firm level (Rivkin and Siggelkow 2003).

Whereas the literature has proposed many coordination mechanisms to manage MNC headquarters–subsidiary relationships (Martinez and Jarillo 1989), one particular mechanism has been understudied: the intermediary units in MNCs’ formal hierarchical structure. This alone is unsatisfactory because (1) individuals (such as chief executive officers, or CEOs) and organization units (such as the general office

in headquarters) face limits in their cognitive capacity (Cyert and March 1963); (2) the diversity and complexity of global businesses taxes the attention of the top management teams (Bouquet and Birkinshaw 2008); and (3) multilayer hierarchical structures with intermediary units are a prevalent phenomenon within real MNCs. These intermediary units connect corporate headquarters with subsidiaries at the front line of businesses; they reduce span of control for the corporate headquarters and provide greater attention to resource allocation within a subgroup of subsidiaries (Birkinshaw et al. 2006).

To study the role of intermediary supervisory units, I draw insights from the organization theories. The literature suggests that intermediary units assist in information processing and communication (Tushman and Nadler 1978). They solve problems emerging from multiple subordinate units (Eisenmann and Bower 2000), make joint decisions for multiple subordinate units (Marschak and Radner 1972), and exercise authority over assets useful for joint tasks—tasks to be jointly carried out by multiple subordinate units (Hart and Moore 2005). They set priorities when subordinates have different opinions (Hart and Moore 2005) and resolve conflicting expectations (Simon 1991). Together, these functions alleviate the coordination burden on top management.

Unfortunately, prior studies on MNCs have largely focused on the MNC headquarters–subsidiary dyads and overlooked the intermediary supervisory units. They do not examine which unit (foreign or local) immediately above the frontline subsidiary in the corporate hierarchy has been granted the supervisory responsibility for the subsidiary. Therefore, the literature missed the most unique dimension of MNC structure: the allocation of formal supervisory responsibilities across national borders, where institutional environments differ.

Dealing with Weak Institutions

Although the MNC literature has a long tradition of studying integration and subsidiary autonomy based on a host country's environment, much of this prior work has focused on cross-country differences in product market, knowledge endowment, and technology capabilities (Ambos et al. 2010, Rugman and Verbeke 2001), with the subsidiaries' institutional environments kept constant. This treatment is at odds

with the reality of international business, in which MNCs with global networks of economic activities are constantly expanding into countries with institutions that are vastly different from those in their home countries. How could MNCs leverage their organization structure to manage the heterogeneous institutional environments facing their overseas subsidiaries is therefore an urgent question for the organization and strategy scholars.

Institutions are humanly devised constraints that structure human interactions (North 1990). They include formal rules, laws, and constitutions, as well as informal norms of behavior and conventions. This study focuses on formal institutions. Strong institutions help firms grow. For example, law and order promotes the development of local financial markets, which in turn supply capital for firms' investments (Demirguc-Kunt and Maksimovic 1998, Rajan and Zingales 1998). Efficient judicial systems increase incentive for innovation: firms in research and development (R&D)-intensive industries are larger in countries with better patent protection (Kumar et al. 2001).

The literature on MNC strategies for combatting weak institutions may be usefully partitioned into two related themes: location and ownership. Accordingly, it has been suggested that MNCs can either (1) select locations with the greatest market or production opportunities and the least institutional constraints on creating value (Chang and Park 2005), or (2) pick ownership types (e.g., wholly owned subsidiaries versus joint ventures or alliances) that help safeguard value (Anderson and Gatignon 1986, Oxley 1999). Both strategies have limitations, however. Location choices are limited primarily because arbitrage opportunities and institutional constraints often accompany each other: if MNCs only go to locations where institutions are strong, then their comparative advantage over domestic firms trading across borders will be significantly dampened. Ownership choices are similarly insufficient. MNCs' ownership choices may be affected not only by governance considerations but also regulatory or normative pressures in their host countries (Svejnar and Smith 1984, Yiu and Makino 2002). Therefore, we need to broaden the search to include other design choices such as hierarchical structure.

In sum, the MNC headquarters–subsidiary literature and the MNC institution strategy literature offer insights as well as opportunities. The opportunities arise from the as-yet missing link between the varied

institutional environments MNCs operate in and their deployment of hierarchical structure across those environments.

HYPOTHESIS DEVELOPMENT

Even though the link between institutional quality and MNCs' hierarchical structure has yet to be formally established in the literature, anecdotal evidence of such a link can be found in a number of classic books on MNCs (Galbraith 2000, Ghemawat 2007, Gupta et al. 2008, Hill 2012).

According to these books, MNCs organize their subsidiaries along a number of dimensions. Some MNCs organize by global functional areas. For example, IBM located its global procurement center in China, global service delivery center in India, and global internal Web design centers in Brazil and Ireland. Hyundai established R&D centers in Germany, Japan, and the United States to supervise R&D subsidiaries in Europe, Asia, and North America, respectively. Some MNCs reorganize by global product divisions. For example, Eaton Corporation located its global center for light and medium truck transmissions in Amsterdam, the Netherlands (overseeing subsidiaries in Argentina, Brazil, India and Mexico) and its global center for automotive control business in Strasbourg, France. MNCs can also organize by customer profiles or technologies. Based on each subsidiary's function, business segment, customer portfolio, technology or geographic location, it can report to different supervisory units.

MNCs allocate supervisory and coordination responsibilities across host countries mostly based on the countries' location-specific advantages. For example, when Procter & Gamble (P&G) was selecting a place to locate its headquarters for Global Business Services, it picked Costa Rica over against other low-cost places such as Mexico (which ranks lower than Costa Rica in terms of institutional quality). P&G explained that the selection was made based on Costa Rica's political stability, business climate, and telecommunications infrastructure (Luxner 2001). Microsoft is yet another example. Both China and India are among the fastest-growing markets for Microsoft, and its research centers in the two countries have become major powerhouses for research programs such as language and speech technologies, which are invaluable for Microsoft to localize its products. However, neither the Chinese nor the Indian research

center reports to Microsoft's country headquarters in China or India; they both report to Microsoft Research based in Redmond, Washington, mostly as a result of concerns over high piracy and appropriation risks in these countries (Khanna and Choudhury 2007). These anecdotal examples motivate my theoretical development in this section.

Cross-border Supervision in Weak-Institution Countries

Over the last two decades, MNCs have increasingly dispersed their production networks to take advantage of locational advantages and global production scale, causing "the increasing interconnectedness of production processes in a vertical trading chain that stretches across many countries, with each country specializing in particular stages of a good's production sequence" (Hummels et al. 2001, p.76). Such a global value chain allows MNCs to exploit differences between their local units' business environments for synergies at the corporate level (Ghemawat 2007). It also requires effective coordination across national borders. One way to coordinate is to selectively grant autonomy to local units. Following prior studies (e.g., Rivkin and Siggelkow 2003), I conceptualize autonomy as the degree of freedom enjoyed by managers in making decisions, and as the amount of reporting they need to present to, and approval they need to seek from, parties above them in the corporate hierarchy. Also following prior studies (Ambos et al. 2010, Bouquet and Birkinshaw 2008), I assume that supervision decisions are partially reflected in the structural position of the units, and that a lower level of direct monitoring is associated with a higher level of subsidiary autonomy.

Coordination means managing interdependent tasks across business units (Malone and Crowston 2001, Puranam et al. 2012). It entails making joint decisions and synchronizing joint actions for units undertaking these interdependent tasks. Both joint decision-making and joint action synchronization are subject to institutional influences.

Joint decision-making requires the gathering, interpreting and synthesis of information (Tushman and Nadler 1978), and institutions affect the quality of joint decision making by influencing the availability of information (Arrow 1959, North 1990). Both government and corporate information affect business

decision making (Gelos and Wei 2005). First, national and regional economic indicators published by governments on consumption, production, capacity utilization, and inflation help firms smooth their production cycles across multiple plants, and synchronize procurement, production, and delivery. Without these complementary data, local information—about a locally contained demand or supply shock, for example—becomes less valuable. Second, without effective regulations for financial and accounting disclosure, fair competition, and IPR protection, firms will share less information with their investors, customers, and industry peers; they will instead practice more trade secrecy in their host country. This further reduces the amount of business information available in the local environment. Finally, in addition to domestic government and corporate information, institutions may regulate the availability of international information through censorship.

The lack of reliable information in WICs hurts local businesses. For example, when a number of transitional economies first opened their borders for foreign investment, there were few regulations that promoted information disclosure. Market intelligence was difficult to collect. It has been shown that a severe lack of information (or the perception of it) encourages economic agents to herd in their behavior based on observed patterns of others rather than on fundamentals (Bikhchandani et al. 1992, Garcia-Pont and Nohria 2002). As a result, domestic firms gambled with perceived business opportunities and followed each other's past successful moves, often into overly crowded markets with thin profit margins.

In response to the lack of local information, both domestic firms and MNCs can increase their local information-seeking efforts. For MNCs, they can hire local managers or station their foreign managers locally so that these managers are on the ground and embedded in the local context to develop the ability to understand the nuances of local politics and market information. However, if MNCs merely increase their effort in seeking local information, as their domestic competitors do, they will not gain much competitive advantage. This is because MNCs' competitive advantage comes from global or regional coordination in order to move resources across national borders (Dunning 2001), which needs more than isolated local information. Cross-border coordination also needs complementary information, which is often not available in WICs but available in strong-institution countries where policies are more

transparent, rules and norms for disclosure are stronger, and censorship is less prevalent. MNCs have to strike a balance between seeking both local and complementary information. One solution is to have local subsidiaries in weak-institution countries specialize in collecting local information but add a layer of supervisory units in strong-institution countries to synthesize local information in weak-institution countries with complementary information collected in strong-institution countries. Firms with units in both weak-institution and strong institution countries will have more tools for information synthesizing and coordination. MNCs enjoy this unique organizational advantage.

In short, MNCs can partially solve the problem of information scarcity in a subset of their external environment by changing internal channels of information. Local supervision should decrease as the reliability of local information—relative to the information available elsewhere in the organization—decreases (Harris and Raviv 2005). For example, MNCs sometimes set up strong local presence or hire consultants in WICs to collect local information. However, they almost always combine local information with additional local, regional, or global data in regional hubs such as Hong Kong and Singapore, where better institutions support knowledge and information sharing. Armed with a superior quality and quantity of information, MNC supervisory units in these hubs coordinated MNCs' regional activities, including reporting, competitor intelligence, and strategy formation (Enright 2000). The collocation of resource allocation and strategic decision making with information gathering and sharing makes coordination more efficient (Benito et al. 2011).

Whereas making joint decisions depends on sufficient information, synchronizing joint actions between organization units requires that each unit have control over its resources to take the necessary actions. As today's global companies build up increasingly tightly yet broadly connected global production networks, they rely more and more on the control of their core resources to fulfill quality and speedy delivery on a global scale. MNC subsidiaries carrying out adjacent productive processes along a global value chain increasingly rely on each other's input to deliver their own output. Institutions affect the coordination of joint actions by influencing the clarity of property rights, which provide the ultimate right of control over assets (Alchian and Demsetz 1972). By protecting property rights against

expropriation and corruption, institutions help to align ownership and control rights, thereby facilitating coordination (North 1990).

Guarding against expropriation risk is not just about protecting the underlying resources. More importantly, it is about protecting the integrity of the decision rights with respect to the use of these assets (e.g., decisions about applying resources to new geographic markets or about launching new products). Even though local supervision gives local units flexibility to allocate resources and better adapt to local environments, it also exposes local managers to influence from the local environment. Therefore, units that operate in countries with weak property right protection and high levels of corruption are at greater risk of losing their operations than units in strong institution countries. Losing operations in one country may negatively affect subsequent operations of MNC units in other countries. In addition, the lack of predictability and reliability inherent to assets in WICs makes it difficult to coordinate joint productive activities.

Each MNC subsidiary has a double personality: it is both a local corporation and a unit in a multinational network under the control of its MNC parent (Kobrin 2001). When local units are delegated supervisory responsibilities, they are expected to conform more with host country institutions than with an MNC's internal anticorruption practices. They will be subject to greater pressure from corrupt local entities. Corrupt entities in the host country will demand more bribery from autonomous local units than from units under foreign supervision (Spencer and Gomez 2011). Therefore, reassigning supervisory responsibilities to a unit in a foreign country will limit an MNC's exposure to expropriation risks in the subsidiary's host country. In addition, as centralization demonstrates to internal and external stakeholders that headquarters' policies are being enforced (Gates and Egelhoff 1986), nonlocal supervision signals the MNC's overall commitment to global objectives and reinforces its anticorruption reputation, discouraging bribery requests from corrupted entities in the host country.

In sum, operating simultaneously across countries with a variety of institutional quality allows MNCs to strategically allocate supervisory responsibilities. To coordinate with activities in WICs, MNCs are more likely to employ foreign supervision.

Hypothesis 1 (H1). MNC subsidiaries in host countries with weaker institutions are more likely to be under foreign supervision.

Task Interdependence and Cross-Border Supervision

Task interdependence in this study refers to intermediate inputs being supplied from one unit to another or passed back and forth in successive stages of production (Thompson 1967). It exists in the network of value-chain activities interrelated through physical input–output feedback loops that transfer and transform information and materials (Baldwin 2008, Porter 1985, Sturgeon 2002). MNCs’ global productive network can be viewed as a system of interdependent tasks. For example, Toyota’s global pickup truck production process will collect common engines and manual transmissions from Asian plants to assembly bases in Asia, Latin America and Africa and distribute to almost all major markets around the world (Ghemawat 2007). As MNCs keep segmenting their value chains and dispersing each of their value chain activities to optimal location, their subsidiaries are becoming more and more diverse and interdependent at the same time, demanding “collaborative information sharing and problem solving, cooperative support and resource sharing, and collective action and implementation”(Bartlett and Ghoshal 1987, p 47). Among all the interdependent subsidiaries, those with tasks more central to MNCs’ global operations, or those with tasks interdependent with a greater number of tasks performed by other subsidiaries, require more multilateral coordination.

Task interdependence makes autonomy in decision making less effective. When decision variables are highly interdependent, autonomy implies that individual decisions will be made based on partial information and will not be globally optimal (Marschak and Radner 1972). Similar arguments can be made of autonomy causing joint action to be less effective. According to Galbraith and Lawler (1993), the more imperative the need for lateral coordination between subunits, the greater the need for hierarchical intervention that deals with increasingly aggregated levels of the organization system. For example, if the subsidiaries are highly interdependent because they share resources, technology, or customers, it is

important for their common supervisors to forge business directions (regarding common technology and product strategy) so that the subsidiaries' operations do not conflict with each other. In addition, for issues that cannot be resolved laterally between subsidiaries, a common boss helps to speed up or finalize joint decisions and allows uncertainties to be resolved more quickly.

The coordination challenges in WICs as a result of information scarcity will be more detrimental for an MNC if its WIC subsidiaries also perform more central tasks. A lack of complementary information makes it harder for supervisory units in WICs to aggregate, benchmark, evaluate and synthesize discrete local information so as to make decisions. Decision errors for a central subsidiary will have a greater adverse effect on other subsidiaries than decision errors for a peripheral subsidiary. Even if these other subsidiaries are outside WICs, they will find it harder to predict the decisions made in WICs and schedule their own actions accordingly. Therefore, assigning supervisory responsibilities for central subsidiaries to a country outside the WIC where information is more abundant will help manage coordination challenges for the MNC.

Similarly, the coordination challenges in WICs as a result of property rights ambiguity will be more harmful to an MNC if its WIC subsidiaries also perform more central tasks. A lack of clear property rights protection makes it harder for supervisory units in WICs to fend off expropriation and maintain full control of MNC assets and resources in the host countries. Protecting the assets and resources of a central subsidiary is more critical for other subsidiaries than protecting the assets and resources of a peripheral subsidiary. Therefore, assigning supervisory responsibilities for central subsidiaries to a country outside WIC where expropriation risk is low will help manage coordination challenges for the MNC.

In sum, a central subsidiary's failure to perform a task can have a cascading effect on all dependent subsidiaries. Therefore, when a subsidiary's task is more tightly integrated into its MNC parent's global network, less local autonomy should be granted. When subsidiaries located in WICs are also responsible for tasks that are more central to MNCs' global operations, the MNC parent should be even more likely to employ foreign supervision for them.

Hypothesis 2(H2) MNC subsidiaries in countries with weak institutions are more likely to be under foreign supervision when their tasks are more central to their parent's global operations.

EMPIRICAL RESEARCH DESIGN

The hypotheses were tested based on the geographic location and business activities of U.S. manufacturing MNCs, and the supervision relationships within them, in 1996-2008. The level of analysis is MNC subsidiary-year: I estimate the probability that an MNC subsidiary will be supervised by a supervisory unit in the same host country rather than a supervisory unit in a different country. This empirical setting is suitable because, first, manufacturing often entails multiple stages of production and requires large quantities of intermediate inputs. This provides large variation in business activities across firms and their subsidiaries in the same primary industry. Second, firms in the manufacturing sector face fierce global competition and intense pressure to outsource and restructure, making their decisions about firm scope and structure critical to firm growth. For example, in the automotive industry, Toyota beat General Motor (GM) in first-quarter global car sales in 2007, ending more than 75 years of GM dominance (Chozick and Shirouzu 2007). Sliding market shares and profits put U.S. automakers under tremendous pressure to restructure their overly cumbersome production systems and relocate more component production and processes to overseas affiliates. One of Ford's key restructuring initiatives was to sell 17 U.S.-based component plants and 6 component facilities (Ford Motor Company 2007). At Renault-Nissan, worse-than-expected earnings reports raised so much skepticism about CEO Carlos Ghosn's ability to manage the company's complex global businesses that Ghosn was forced to turn over responsibilities for North American markets to another executive and establish multiple regional offices (Morse and Shirouzu 2007). Finally, by focusing on U.S. MNCs only, I controlled for heterogeneity in home-country institutions that could either affect MNCs' political capability or strategy (Holburn and Zelner 2010).

Data and Sample

Testing the hypotheses requires data on (1) MNC subsidiaries' business activities and their interdependence with other units, (2) each subsidiary's geographic location and the quality of institutions at those locations, and (3) the assignment of supervisory responsibilities for each subsidiary. Information about MNC subsidiaries was drawn from the Directory of Corporate Affiliations (DCA), provided by LexisNexis. For firms with more than 300 employees and \$10 million in revenue, DCA describes reporting/supervision relationships between their units (groups, departments, divisions, subsidiaries, etc.) to the seventh level of corporate linkage (LexisNexis 2005). Based on my conversation with DCA analysts, "reporting" includes mainly hierarchical authority in supervision. This is because a major usage of the database is for potential suppliers, customers, acquirers, investors, and other business partners to easily identify which supervisory unit makes the relative decisions for a subordinate unit in a business segment and/or geographic area. LexisNexis collects information from the companies, annual reports, and business publications in the LexisNexis database; it also contacts each company to verify the information. Its analysts extensively edit and validate the content to prevent errors before database entry. DCA also reports the segments (four-digit Standard Industrial Classifications codes, or SICs) of each subsidiary, and supplies detailed street addresses for most of them. (A small number of missing street addresses were added by searching company websites.) The DCA data set for publicly traded U.S. firms in 1996-2008 contains 1,902 MNC parent companies with primary industries in the manufacturing sector.

Here is an example from the DCA data set. Ford Motor Company's main industry is SIC 3711 ("motor vehicles and passenger car bodies"). In addition, it has subsidiaries operating in SIC 6141 ("personal credit institutions"). Among those operating in SIC 6141, the Belgian and Spanish subsidiaries report locally, whereas the Italian and Brazilian subsidiaries report to divisions in the United States. This is consistent the fact that Belgium and Spain rank higher than Italy and Brazil in terms of institutional quality. In addition, Ford Motor has subsidiaries operating in SIC 3724 ("aircraft engines and engine parts"). In contrast to the Spanish subsidiary operating in SIC 6141, the Spanish subsidiary operating in

SIC 3724 reports not locally but to supervisory units in Sweden. This is consistent with my task centrality arguments. Engine manufacturing is more central to Ford's global operations than personal credit card business, therefore, we observe that the Spanish subsidiary in the engine business reports to Sweden, a country with higher institutional quality than Spain, but the Spanish subsidiary in the personal credit card business reports locally.

Financial information about MNC parents was extracted from Compustat. The data sets were matched by company names. Ambiguous matches were further verified using company websites. A total of 1,602 (84%) MNC parent companies were matched.

Macroeconomic and institutions data about each host country were collected from the World Bank and other multinational organizations. Among the 125 countries hosting MNC subsidiaries in the sample period, data were available for 111. One hundred small MNCs had no operations in these 111 countries and were dropped from the sample. To control for the possibility that some units were established to facilitate tax evasion, I excluded units located in tax havens and units that had supervising units in tax heavens.² Because my measure of task centrality relies on intersegment relationships, I also dropped 94 MNCs that operated in one segment only. Finally, I dropped observations with missing values.

I focused on organization units that represent the lowest level of profit-center responsibility and, therefore, can be compared across firms. Consequently, I included only frontline subsidiaries (subsidiaries that have no subordinate subsidiaries). For each subsidiary I identified a supervisory unit based on the corporate hierarchy reported in DCA. In all, my final sample includes 1,332 MNCs with 14,886 subsidiaries in 96 foreign countries, for a total of 70,901 subsidiary-year observations.

Unfortunately, existing measures of institutional quality are mostly comprehensive and do not break down into information availability or property rights. Therefore, as a robustness check, I collected

² Tax havens are those listed by Hines and Rice (1994, Appendix 2) and Organisation for Economic Co-operation and Development (2002).

regional measures of transparency and the rule of law from the World Value Surveys (WVSs), in order to relate foreign supervision more directly to information and property rights. WVS is an ongoing, cross-country project coordinated by the Institute of Social Research at the University of Michigan. The WVS samples from populations representing more than 88% of the world total to assess the social, moral, religious, and political values of different cultures across regions within each surveyed country. Therefore, the regional survey also allows me to control for unobserved heterogeneity across countries. The survey is carried out in three to five-year cycles. The most recent cycles covered 1994-1998, 1999-2004, and 2005-2008. I manually matched each subsidiary location with regions covered by the WVS. I was able to match locations for 7,595 (49%) frontline subsidiaries from 1,087 (81%) MNC parents to WVS regions, resulting in a total of 20,561 subsidiary-year observations. These matched WVS regions are in 45 non-tax haven and non-island countries.

Variables

My dependent variable is local supervision. I estimated the probability that a subsidiary shares a host country with its supervisory unit, indicating more local supervision. The dummy variable, *LocalSupervision*, is 1 if a subsidiary is supervised by a supervisory unit in the same host country as opposed to a supervisory unit in a different country.

The main independent variable, *QualityofInstitutions*, is the average value of the Worldwide Governance Indicators (WGIs) developed by the World Bank Group (Kaufmann et al. 2010). WGIs are reported annually along six dimensions of governance: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. Because these indicators are highly correlated ($\rho=0.68-0.95$), I used their average value to measure a country's overall quality of institutions in a given year. As would be expected, there is high correlation between current and lagged estimates of a country's governance. Nevertheless, many countries show significant governance changes over time. WGI authors report that, between 2000 and 2009, 18 countries experienced changes significant at the 75% confidence interval in each of the six indicators, and 54

countries experienced a significant change in at least one of the six indicators (Kaufmann et al. 2010). Table 1 presents the list of 81 foreign countries hosting my sample MNC units during 2008, ranked by average WGI.

Insert Table 1 about here

For estimations based on WVSs at the regional level, I measured the quality of institutions based on local residents' confidence in the rule of law (the police and the justice system) and information transparency (the press). Respondents chose from one of the four answers: a great deal of confidence, quite a lot of confidence, not very much confidence, or no confidence at all. Following prior studies that use WVS to measure institutions (Bloom et al. 2012), I used the percentage of respondents who reported "a great deal" or "quite a lot" of confidence.

TaskCentrality reflects the centrality of the focal subsidiary's task in the MNC's task system. For each subsidiary, I calculated the number of same-MNC subsidiaries (in or outside the United States) whose primary segments have significant input-output flows to and from the focal subsidiary's primary segment, as a percentage of the number of all subsidiaries of the same MNC parent. In robustness checks, I used a dummy variable to measure whether the subsidiary and its MNC parent have significant input-output flows to and from one another; the results are similar.

To construct the measure, I used the Benchmark Input-Output (IO) "Use" tables provided by the U.S. Bureau of Economic Analysis (BEA). The Tables contain the value of pair-wise commodity flows among IO industries and can be converted to commodity flows among SIC industries through an IO-SIC concordance (Fan and Lang 2000). They are updated every five years. Because the BEA changed the IO industry coding system in 1997, I used the 1992 tables to ensure comparability. Except for the code change, coefficients in the tables have been fairly stable over time (Fan and Lang 2000). The use of IO-table coefficients as proxies for inter-segment relationships within diversified firms has been adopted by studies in finance, economics, and management (Schoar 2002, Villalonga 2004, Zhou 2011). In their

study, Alfaro and Charlton (2009) used the input-output tables to identify subsidiaries that provide inputs to their parent firms.

For each MNC-year I constructed a task matrix. If an MNC has N subsidiaries (U.S. and foreign) in a given year, the task matrix is an $N \times N$ matrix whose entries (i, j) and (j, i) are set to x 's if subsidiary i 's and subsidiary j 's primary segments on average contribute more than 1% of the input to one another according to the IO tables. Based on the task matrix I then counted the total number of x 's in row i divided by N as a measure of task centrality for subsidiary i .

Besides the factor variables of institutional quality and task centrality, I added several control variables. I included year dummies to capture macroeconomic, political, and cultural factors that could change the propensity to local supervision over time. At the host-country level, I controlled for the gross domestic product (GDP) (in constant year 2000 dollars), which reflects a country's general level of development (such as human capital) and is expected to have a positive correlation with local autonomy. I also controlled for telecommunication using the number of Internet users per 100 people in the population. Better telecommunication technology would make it easier to transfer complementary information collected throughout the organization to local units, increasing the efficiency of local autonomy. Additionally, to further dilute the impact of tax regimes on organization structure, I controlled for the effective corporate income tax rate.

At the level of MNC parent firms, I first controlled for firm age and size. Older firms have more experience dealing with heterogeneous environments and are more likely to develop coordination knowledge and routines (Nelson and Winter 1982), facilitating autonomy. Top management teams at larger firms are also more likely to be overloaded and to prefer more delegation (Aghion and Tirole 1997). In addition, to capture each MNC's experience and scale of operations by country, I controlled for the number of frontline subsidiaries an MNC has in each country. An MNC's country-specific experience enhances its local political capability to manage weak institutions (Holburn and Zelner 2010), facilitating local supervision. A larger number of local operations also raises the importance of local coordination and decision making, encouraging local supervision.

At the subsidiary level, I first controlled for the business need for local supervision. A subsidiary that operates in a different business segment than its MNC parent benefits more from local adaptation and therefore local supervision. This is because, when an MNC parent does not possess expertise in a subsidiary's business, the subsidiary needs to source more skills from local environment (Chang and Rosenzweig 2001). It is therefore more likely to be supervised locally. I then controlled for subsidiary age. Older subsidiaries should be more experienced with local institutions and should therefore require less supervision from outside the host country. Older subsidiaries are also more likely to develop higher capabilities and require less resources from their parent headquarters; therefore they will demand more autonomy (Birkinshaw and Hood 1998). I do not have data on subsidiary size. Instead, I controlled for a subsidiary's product scope (number of four-digit SICs in which it operates). Subsidiaries undertaking a wider range of activities are expected to be larger and be supervised locally.

Table 2 provides descriptive statistics of the sample. There is large variation across countries in the quality of institutions. The WGI has a mean value of 0.26 and a standard deviation of 0.86. The host countries in the sample have an average GDP of \$0.27 billion in constant 2000 dollars, an average effective corporate tax rate of 30%, and an average of 19 Internet users per 100 people. At the MNC parent level, an average MNC in the sample has about \$1.8 billion ($\exp(7.48)$) in sales, is about 51 ($\exp(3.94)$) years old, and operates 1.4 ($\exp(0.32)$) frontline subsidiaries in each host country. At the subsidiary level, the average age is 32.5 ($\exp(3.48)$) years old. Local supervision is observed in about 6% of the subsidiary-year observations. Table 2 also shows that an average subsidiary operates in 1.24 segments, and has significant input-output flows with 30% of its MNC parent's other subsidiaries. Among subsidiaries, 63% operate in a primary segment different from their corporate parent.

Insert Table 2 about here

Table 3 presents two preliminary analyses of the span of control for supervisory units in countries of different institutional quality. First, if coordination is indeed more difficult in WICs as I argued in the

theory section, we would expect supervisory units in WICs to have narrower span of control (controlling for the total number of subsidiaries in a host country). Based on this intuition, column (1) in Table 3 estimates the maximum span of control (the maximum number of subsidiaries supervised by any supervisory unit of an MNC in a host country) against institutional quality. The results show that indeed, supervisory units in weaker institution countries have a narrower span of control. Second, if coordinating WIC subsidiaries is more difficult, we would expect supervisory units in strong-institution countries to have narrower span of control if a larger proportion of their subordinate subsidiaries are in WICs. Accordingly, column (2) estimates the span of control for each supervisory unit in strong-institution countries. I split the countries into two groups: strong-institution countries whose institutional quality is above the median level of institutional quality for all countries in a given year, and weak-institution countries whose institutional quality is at or below the median level. I then included only supervisory units in strong-institution countries for this analysis. For each supervisory unit, I calculated its span of control as the number of subsidiaries across all countries that directly report to it. As an independent variable I used the percentage of the supervisory unit's subsidiaries that are in WICs. The results show that indeed, supervisory units in strong-institution countries have a narrower span of control if a larger proportion of their subordinate subsidiaries are in weak-institution countries. Therefore, Table 3 confirms my intuition and provides an indirect support for H1.

 Insert Table 3 about here

Model Specification

I adopted the following logit model:

$$E[LocalSupervision_{jict} = 1] = \beta_0 + \beta_1 I_{ct} + \beta_2 K_{jict} + \beta_3 I_{ct} * K_{jict} + U_{jict} \Phi + F_{it} \Gamma + C_{ct} \Lambda \tag{1}$$

where $LocalSupervision_{jict}$ is a dummy variable that equals 1 if subsidiary j of MNC i in host country c and year t is supervised by a unit in the same host country,³ I_{ct} is the quality of institutions in country c and year t , and K_{jict} is task centrality of subsidiary j of MNC i in year t . The subsidiary-, MNC Parent-, and host-country-specific characteristics are denoted by U_{jict} , F_{it} , and C_{ct} respectively. Hypothesis 1 predicts that $\beta_1 > 0$. H2 predicts that $\beta_3 > 0$.

Because the residuals of a given MNC may be correlated across countries as a result of unobserved firm heterogeneity, and the residuals of a given country may be correlated across firms as a result of unobserved country heterogeneity, I adjusted standard errors to account for these two dimensions of within-cluster correlation (Petersen 2009).

RESULTS

Table 4 presents estimations based on Equation (1). Column (1) contains only control variables at the country level. As expected, subsidiaries in higher GDP countries were more likely to be supervised locally. Telecommunication positively affected local supervision and tax rate negatively affected local supervision, although these coefficients are not statistically significant. Column (2) adds quality of institutions; it had a significant and positive impact on local supervision.

 Insert Table 4 about here

Column (3) adds MNC parent characteristics. As expected, subsidiaries of larger MNCs were more likely to be supervised locally. The impact of MNC age was positive but not significant. Also as expected, the more subsidiaries an MNC operated in a host country, the more likely they were to be supervised locally. Column (4) adds unit characteristics. The coefficients were not statistically significant.

³ I ran a robustness check to estimate the probability that a subsidiary reports to a supervisory unit in a country with stronger institutions than the subsidiary's host country on a smaller sample where institution data for the supervisory unit's host country are available. Results were similar.

With all control variables in place, the quality of institutions continued to have a positive impact on local supervision. Thus, H1 is supported.

Column (5) adds task centrality, and column (6) adds its interaction with institutional quality. Results show that task centrality was negatively correlated with local supervision: the more a subsidiary was interdependent with an MNC's global operations, the less likely it was supervised locally. This negative effect was amplified for units in countries with weaker institutions. Thus, H2 is supported.

The impact of institutional quality on local supervision became weaker when more control and independent variables were added, but it remained economically and statistically significant. A marginal-effect analysis based on column (6) suggests that increasing the quality of institutions by one point, while keeping all other variables at their mean values, increased the probability of local supervision by 1.4%.

Finally, Table 5 moves the logit analysis in Equation (1) from the country level to the regional level. Variables are comparable to those in Table 4, but institutional quality is measured by residents' confidence in regional transparency and the rule of law. Column (1) includes the same country-level control variables as in Table 4. Column (2) uses country dummies to control for unobserved country-level heterogeneity. The results are similar: though statistically weaker than the country-level results, they are still supportive of H1 and H2.

Insert Table 5 about here

Overall, the results in Tables 3-5 show that, consistent with my hypotheses, subsidiaries located in weak-institution countries or regions were less likely to be supervised locally, and that this effect was stronger when the subsidiaries' activities were more central to their MNC parents' global operations. In addition to these main results, I ran a host of robustness checks to control for additional factors that might influence local supervision, including factors at the MNC level (total levels of hierarchy, R&D intensity, etc), the industry level (growth, capital and R&D intensity, competition, etc.), and the country level (language, distance to the United States in terms of knowledge, globalization, geography, financial

development, demography, administration, country dummies, etc.); the results were similar. I also ran a conditional logit model with MNC fixed effects; the sample size is smaller but the results are similar.

DISCUSSION AND CONCLUSION

This paper examines how MNCs may use organization structure to manage the effects of institutional quality on business activities across countries. The supervision relationships with respect to overseas subsidiaries of U.S. multinational manufacturers in 1996–2008 show that MNCs do, indeed, strategically assign supervisory responsibilities to enhance coordination across diverse global operations.

This paper's core theoretical contribution is establishing differential supervision as a mechanism for selective intervention and managing coordination challenges across heterogeneous institutional environments. It also supports a view of the firm as a complex system of interdependent activities that must be actively coordinated to realize benefits from integration (Zhou 2011, 2013). Although a primary function of MNCs is to exploit arbitrage opportunities arising from transaction costs across institutional environments, internalizing transaction costs creates coordination challenges as well. A hierarchical structure across national boundaries allows differential supervision, thereby balancing the trade-off between adaptation and coordination. The finding that MNCs may design their organization structures to mitigate institutional obstacles also complements existing studies on MNCs' location and ownership choices.

This study offers implications for managers as well as policy makers. It highlights a channel through which MNCs "redistribute" managerial responsibilities away from WICs. During the past two decades, governments in developing countries have been working to improve "hard" conditions—building infrastructure, giving special tax breaks or subsidies to MNCs, and raising the educational level of their labor force—to attract foreign direct investments. These incentives may attract foreign investments, but MNCs in these countries may only engage in fragmented business activities aimed mainly at leveraging a cheaper labor force, engineering talent or market potential, without delegating substantial corporate or

regional responsibilities to local management teams. To the extent that managers make decisions about resource allocation on a daily basis, institutional quality will have a profound impact on the sustainable development of the host country's economy.

This study has a few limitations that invite future research. First, it treats subsidiaries' locations and tasks as predetermined and studies their impact on organization structure. It does not further investigate why some firms choose to integrate certain productive activities at certain locations while others standardize and outsource them. Although firms can certainly alter their task systems—rather than their organization structures—to make coordination easier, the literature suggests that firms often make decisions about tasks based on factors other than coordination. For example, firms may integrate certain activities to leverage their core competencies into adjacent value chain activities (Leiblein and Miller 2003), to accommodate differential positioning strategies for their products (Argyres and Bigelow 2010), or to preserve an integral knowledge of product architecture that deters imitation (Ethiraj et al. 2008). These corporate, product, and R&D strategies may constrain firms from adopting independent task systems and present opportunities for organization design. How firms endogenously choose their organization structures and their tasks at each location is left for future study.

In addition, the measure of “differential supervision” is based on the physical location of the supervisory units. I conceptualized that if the subsidiary reports to a foreign rather than local unit, then less autonomy is given to the group of supervisory units and frontline subsidiaries in the country as a group. My data set does not allow me to capture the exact decisions that are made by the subsidiaries and those that are made by the supervisory units. Although the paper is not about the delegation of specific decision rights with respect to each subsidiary, it will still be important to learn exactly what activity types are supervised by foreign versus local supervisory units. This is a topic left for future study when detailed data about allocation of decision-making rights between supervisory units and subsidiaries become available.

Despite its caveats, this paper connects organization structure with institutional imperfections that give rise to the emergence of the firm in the first place. It theorizes and quantifies the relationships

between interdependence, organization structure, and institutions using a large sample of firms. This effort will hopefully deepen our understanding of the firm and its integration mechanisms, and motivate future research exploiting the rich and complex reality of the firm.

References:

- Aghion P, Tirole J. 1997. Formal and real authority in organizations. *Journal of Political Economy* **105**(1) 1-29.
- Alcácer J. 2006. Location choices across the value chain: How activity and capability influence collocation. *Management Science* **52**(10) 1457-1471.
- Alchian AA, Demsetz H. 1972. Production, information costs, and economic organization. *The American Economic Review* **62**(5) 777-795.
- Alfaro L, Charlton A. 2009. Intra-industry foreign direct investment. *American Economic Review* **99**(5) 2096–2119.
- Ambos TC, Andersson U, Birkinshaw J. 2010. What are the consequences of initiative taking in multinational subsidiaries? *Journal of International Business Studies* **41**(6) 1099-1118.
- Anderson E, Gatignon H. 1986. Modes of foreign entry: A transaction cost analysis and propositions. *Journal of International Business Studies* **17**(3) 1-26.
- Antràs P, Desai MA, Foley CF. 2009. Multinational firms, fdi flows, and imperfect capital markets. *The Quarterly Journal of Economics* **124**(3) 1171-1219.
- Argyres N, Bigelow L. 2010. Innovation, modularity, and vertical deintegration: Evidence from the early u.S. Auto industry. *Organization Science* **21**(4) 842-853.
- Arrow KJ. 1959. Rational choice functions and orderings. *Economica* **26**(102) 121-127.
- Baldwin CY. 2008. Modularity, transactions, and the boundaries of firms: A synthesis. *Industrial and Corporate Change* **17**(1) 155-196.
- Bartlett CA, Ghoshal S. 1987. Managing across borders: New organizational responses. *MIT Sloan Management Review* **29**(1) 43-54.
- Bartlett CA, Ghoshal S. 1989. *Managing across borders: The transnational solution*. Harvard Business School Press, Boston, MA.
- Benito GRG, Lunnan R, Tomassen S. 2011. Distant encounters of the third kind: Multinational companies locating divisional headquarters abroad. *Journal of Management Studies* **48**(2) 373-394.
- Bikhchandani S, Hirshleifer D, Welch I. 1992. A theory of fads, fashion, custom, and cultural-change as informational cascades. *Journal of Political Economy* **100**(5) 992-1026.
- Birkinshaw J, Braunerhjelm P, Holm U, Terjesen S. 2006. Why do some multinational corporations relocate their headquarters overseas? *Strategic Management Journal* **27**(7) 681-700.
- Birkinshaw J, Hood N. 1998. Multinational subsidiary evolution: Capability and charter change in foreign-owned subsidiary companies. *The Academy of Management Review* **23**(4) 773-795.
- Bloom N, Sadun R, Reenen JV. 2012. The organization of firms across countries. *Quarterly Journal of Economics*, forthcoming.
- Bouquet C, Birkinshaw J. 2008. Weight versus voice: How foreign subsidiaries gain attention from corporate headquarters. *Academy of Management Journal* **51**(3) 577-601.
- Caves RE. 1996. *Multinational enterprise and economic analysis (cambridge surveys of economic literature)* 2nd ed. Cambridge University Press, Cambridge.
- Chang S-J, Park S. 2005. Types of firms generating network externalities and mncs' co-location decisions. *Strategic Management Journal* **26**(7) 595-615.
- Chang S-J, Rosenzweig PM. 2001. The choice of entry mode in sequential foreign direct investment. *Strategic Management Journal* **22**(8) 747-776.
- Chozick, Shirouzu. 2007. Gm slips into toyota's rearview mirror *The Wall Street Journal*.

Company FM. 2007. Ford motor company report 2006: Fourth-quarter and full-year results *Ford Press Release*.

Cyert RM, March JG. 1963. *A behavioral theory of the firm*. Prentice-Hall, Englewood Cliffs, NJ.

Demirguc-Kunt A, Maksimovic V. 1998. Law, finance, and firm growth. *Journal of Finance* **53**(6) 2107-2137.

Desai MA, Foley CF, James R. Hines J. 2004. Foreign direct investment in a world of multiple taxes. *Journal of Public Economics* **88**(12) 2727-2744.

Dunning JH. 2001. The key literature on ib activities: 1960-2000. A.M. Rugman, T.L. Brewer, eds. *The oxford handbook of international business*. Oxford University Press, 36-68.

Eisenmann TR, Bower JL. 2000. The entrepreneurial m-form: Strategic integration in global media firms. *Organization Science* **11**(3, Special Issue: Cultural Industries: Learning from Evolving Organizational Practices) 348-355.

Enright MJ. 2000. Regional clusters and multinational enterprises: Independence, dependence, or interdependence? *International Studies of Management & Organization* **30**(2) 114-138.

Ethiraj SK, Levinthal D, Roy RR. 2008. The dual role of modularity: Innovation and imitation. *Management Science* **54**(5) 939-955.

Fan JPH, Lang LHP. 2000. The measurement of relatedness: An application to corporate diversification. *The Journal of Business* **73**(4) 629-660.

Galbraith JR. 2000. *Designing the global corporation*. Jossey-Bass.

Garcia-Pont C, Nohria N. 2002. Local versus global mimetism: The dynamics of alliance formation in the automobile industry. *Strategic Management Journal* **23**(4) 307-321.

Gates SR, Egelhoff WG. 1986. Centralization in headquarters-subsidiary relationships. *Journal of International Business Studies* **17**(2) 71-92.

Gelos RG, Wei S-J. 2005. Transparency and international portfolio holdings. *The Journal of Finance* **LX**(6) 2987-3020.

Ghemawat P. 2007. *Redefining global strategy: Crossing borders in a world where differences still matter*. Harvard Business Review Press.

Gupta AK, Govindarajan V, Wang H. 2008. *The quest for global dominance: Transforming global presence into global competitive advantage*. Jossey-Bass.

Harris M, Raviv A. 2005. Allocation of decision-making authority. *Review of Finance* **9**(3) 353-383.

Hart O, Moore J. 2005. On the design of hierarchies: Coordination versus specialization. *Journal of Political Economy* **113** 675-702.

Hass MR. 2010. The double-edged swords of autonomy and external knowledge: Analyzing team effectiveness in a multinational organization. *Academy of Management Journal* **53**(5) 989-1008.

Hill CWL. 2012. *International business*. McGraw-Hill/Irwin.

Hines JR, Jr., Rice EM. 1994. Fiscal paradise: Foreign tax havens and american business. *The Quarterly Journal of Economics* **109**(1) 149-182.

Holburn GLF, Zelner BA. 2010. Political capabilities, policy risk, and international investment strategy: Evidence from the global electric power generation industry. *Strategic Management Journal* **31**(12) 1290-1315.

Hummels D, Ishii J, Yi K-M. 2001. The nature and growth of vertical specialization in world trade. *Journal of International Economics* **54**(1) 75-96.

Kaufmann D, Kraay A, Mastruzzi M. 2010. The worldwide governance indicators: Methodology and analytical issues. *World Bank Policy Research Working Paper No. 5430*

Khanna T, Choudhury P. 2007. Microsoft in china and india, 1993-2007. *HBS Case 9-708-444*.

Khanna T, Palepu K. 2000. Is group affiliation profitable in emerging markets? An analysis of diversified indian business groups. *Journal of Finance* **LV**(2) 867-891.

Kobrin SJ. 2001. Sovereignty @ bay: Globalization, multinational enterprise, and the international political system. A.M. Rugman, T.L. Brewer, eds. *The oxford handbook of international business*. Oxford University Press, 181-205.

Kogut B. 1983. Foreign direct investment as a sequential process. C.P. Kindleberger, D. Audretsch, eds. *The multinational corporation in the 1980s*. MIT press, Cambridge, Massachusetts, 38-56.

Kumar KB, Rajan RG, Zingales L. 2001. What determines firm size? *CEPR Working Paper*.

Lawrence PR, Lorsch JW. 1967. Differentiation and integration in complex organizations. *Administrative Science Quarterly* **12** 1-47.

Leiblein MJ, Miller DJ. 2003. An empirical examination of transaction- and firm-level influences on the vertical boundaries of the firm. *Strategic Management Journal* **24**(9) 839-859.

LexisNexis. 2005. Faqs.

Luxner L. 2001. Procter & gamble decided to consolidate its back-office operations for all the americas in one place. *Marketplace: Executive Briefing*.

Malone TW, Crowston K. 2001. The interdisciplinary study of coordination. G.M. Olso, T.W. Malone, J.B. Smith, eds. *Coordination theory and collaboration technology (volume in the computers, cognition, and work series)*. Lawrence Erlbaum, 816.

Marschak J, Radner R. 1972. *Economic theory of teams*. Yale University Press, New Haven, CT.

Martinez JI, Jarillo JC. 1989. The evolution of research on coordination mechanisms in multinational corporations. *Journal of International Business Studies* **20**(3) 489-514.

Monteiro LF, Arvidsson N, Birkinshaw J. 2008. Knowledge flows within multinational corporations: Explaining subsidiary isolation and its performance implications. *Organization Science* **19**(1) 90-107.

Morse, Shirouzu. 2007. Nissan's ghosn gives up u.S. Duties in reshuffle *The Wall Street Journal*.

Nelson RR, Winter SG. 1982. *An evolutionary theory of economic change*. Harvard University Press, Cambridge, MA.

North DC. 1990. *Institutions, institutional change, and economic performance*. Cambridge University Press, New York.

OECD. 2002. Towards global tax co-operation.

Oxley JE. 1999. Institutional environment and the mechanisms of governance: The impact of intellectual property protection on the structure of inter-firm alliances. *Journal of Economic Behavior & Organization* **38**(3) 283-309.

Petersen MA. 2009. Estimating standard errors in finance panel data sets: Comparing approaches. *Review of Financial Studies* **22** 435-480.

Porter ME. 1985. *Competitive advantage: Creating and sustaining superior performance*. The Free Press, New York.

Puranam P, Raveendran M, Knudsen T. 2012. Organization design: The epistemic interdependence perspective. *Academy of Management Review*, forthcoming.

Radner R. 1993. The organization of decentralized information processing. *Econometrica* **61**(5) 1109-1146.

Rajan RG, Zingales L. 1998. Financial dependence and growth. *American Economic Review* **88**(3) 559-586.

- Rivkin JW, Siggelkow N. 2003. Balancing search and stability: Interdependencies among elements of organizational design. *Management Science* **49**(3) 290-311.
- Rugman AM, Verbeke A. 2001. Subsidiary-specific advantages in multinational enterprises. *Strategic Management Journal* **22**(3) 237–250.
- Schoar A. 2002. Effects of corporate diversification on productivity. *The Journal of Finance* **57**(6) 2379-2403.
- Simon HA. 1991. Organizations and markets. *Journal of Economic Perspectives* **5**(2) 25-44.
- Spencer J, Gomez C. 2011. Mnes and corruption: The impact of national institutions and subsidiary strategy. *Strategic Management Journal* **32**(3) 280–300.
- Sturgeon TJ. 2002. Modular production networks: A new american model of industrial organization. *Industrial and Corporate Change* **11**(3) 451-496.
- Svejnar J, Smith SC. 1984. The economics of joint ventures in less developed countries. *The Quarterly Journal of Economics* **99**(1) 149.
- Thompson JD. 1967. *Organizations in action*. McGraw Hill, New York.
- Tushman ML, Nadler DA. 1978. Information processing as an integrating concept in organizational design. *The Academy of Management Review* **3**(3) 613-624.
- Vernon R. 1971. *Sovereignty at bay*. Basic Books, New York.
- Villalonga B. 2004. Diversification discount or premium? New evidence from the business information tracking series. *Journal of Finance* **59**(2) 475-502.
- Yiu D, Makino S. 2002. The choice between joint venture and wholly owned subsidiary: An institutional perspective. *Organization Science* **13**(6) 667-683.
- Zhao M. 2006. Conducting r&d in countries with weak intellectual property rights protection. *Management Science* **52** 1185-1199.
- Zhou YM. 2011. Synergy, coordination costs, and diversification choices. *Strategic Management Journal* **32**(6) 624-639.
- Zhou YM. 2013. Designing for complexity: Using divisions and hierarchy to manage complex tasks. *Organization Science* **24**(2) 339-355.

Figure 1. MNC structures under different institutional environments

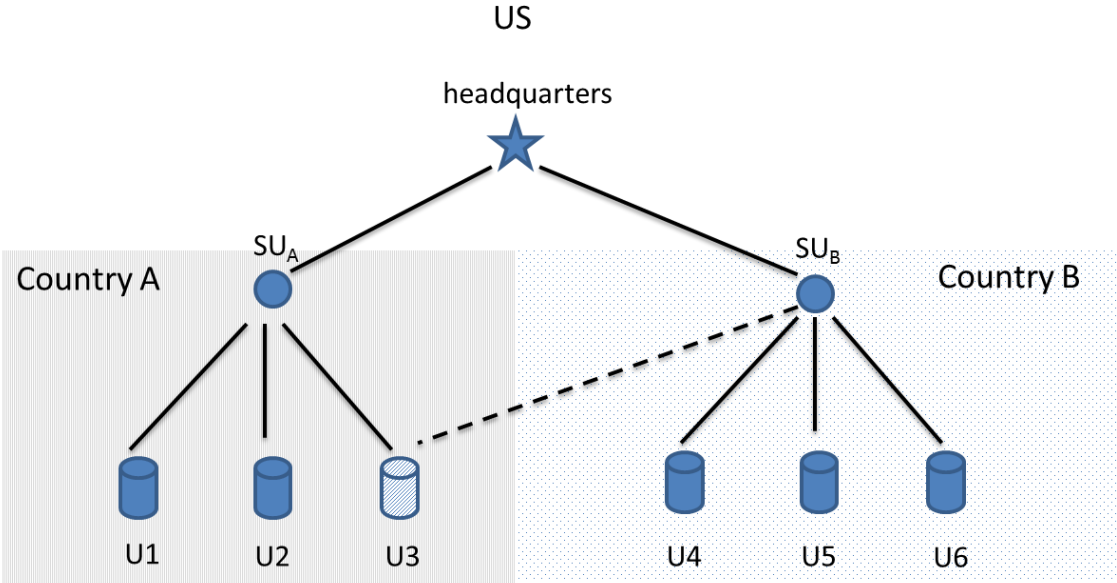


Table 1. Countries Hosting Sample MNCs Ranked by World Bank Governance Indicators (2008)

RANK	COUNTRY	WGI	RANK	COUNTRY	WGI	RANK	COUNTRY	WGI
1	DENMARK	1.796	28	LATVIA	0.651	55	ZAMBIA	-0.295
2	FINLAND	1.764	29	POLAND	0.629	56	THAILAND	-0.298
3	SWEDEN	1.745	30	ISRAEL	0.592	57	PERU	-0.298
4	NEW ZEALAND	1.715	31	GREECE	0.570	58	BOSNIA AND HERZEGOVINA	-0.329
5	NETHERLANDS	1.674	32	COSTA RICA	0.556	59	GUYANA	-0.381
6	NORWAY	1.666	33	ITALY	0.547	60	COLOMBIA	-0.383
7	AUSTRALIA	1.652	34	SOUTH AFRICA	0.407	61	UKRAINE	-0.395
8	CANADA	1.648	35	CROATIA	0.379	62	CHINA	-0.465
9	AUSTRIA	1.624	36	MALAYSIA	0.263	63	PHILIPPINES	-0.484
10	ICELAND	1.600	37	BULGARIA	0.256	64	INDONESIA	-0.501
11	GERMANY	1.503	38	TRINIDAD & TOBAGO	0.185	65	FIJI	-0.525
12	UK	1.478	39	ROMANIA	0.178	66	EGYPT	-0.528
13	BELGIUM	1.260	40	GHANA	0.065	67	HONDURAS	-0.535
14	FRANCE	1.241	41	BRAZIL	0.039	68	GUATEMALA	-0.545
15	JAPAN	1.203	42	JAMAICA	-0.038	69	VIETNAM	-0.555
16	CHILE	1.153	43	TURKEY	-0.053	70	GABON	-0.608
17	PORTUGAL	1.086	44	TUNISIA	-0.054	71	KENYA	-0.681
18	ESTONIA	1.036	45	SURINAME	-0.061	72	PARAGUAY	-0.695
19	SLOVENIA	0.976	46	SERBIA AND MONTENEGRO	-0.081	73	RUSSIA	-0.727
20	SPAIN	0.949	47	EL SALVADOR	-0.090	74	BOLIVIA	-0.741
21	CZECH REPUBLIC	0.888	48	MEXICO	-0.137	75	CAMBODIA	-0.785
22	HUNGARY	0.813	49	INDIA	-0.171	76	ECUADOR	-0.865
23	MAURITIUS	0.782	50	SENEGAL	-0.250	77	ANGOLA	-0.988
24	SLOVAKIA	0.778	51	SAUDI ARABIA	-0.251	78	NIGERIA	-1.042
25	SOUTH KOREA	0.703	52	ARGENTINA	-0.266	79	PAKISTAN	-1.086
26	LITHUANIA	0.687	53	DOMINICAN REPUBLIC	-0.269	80	VENEZUELA	-1.145
27	URUGUAY	0.673	54	MOROCCO	-0.277	81	IVORY COAST	-1.359

Table 2. Variable definition and summary statistics

	Definition	Mean	SD	Min	Max
<i>Country level variables^a</i>					
<i>QualityofInstitutions</i>	Average value of Worldwide Governance Indicators	0.26	0.86	-1.70	1.96
<i>HostCountryGDP</i>	GDP per World Development Indicators, in billions of constant year 2000 dollars	0.27	0.63	0.001	5.21
<i>HostCountryTaxRate</i>	Effective corporate income tax rate	30.37	6.94	5	50
<i>HostCountryTelecommunication</i>	Internet users per 100 people per World Development Indicators	18.64	22.51	0.001	92.14
<i>MNC parent level variables</i>					
<i>MNCSize^{b,e}</i>	Log (sales in million dollars)	7.48	2.04	-2.99	12.48
<i>MNCAge^{b,e}</i>	Log (years since MNC establishment)	3.94	0.84	-2.99	5.45
<i>LocalScale^{c,e}</i>	Log (number of MNC subsidiaries in the country)	0.32	0.52	0.05	4.23
<i>Subsidiary level variable^d</i>					
<i>LocalSupervision (1,0)</i>	Equals 1 if the MNC subsidiary is supervised by a unit within the same host country	0.06	0.23	0	1
<i>TaskCentrality</i>	Percentage of MNC subsidiaries whose primary segments are interdependent with the focal subsidiary's primary segment	0.30	0.27	0	0.99
<i>SubsidiaryProductScope</i>	Number of segments (four-digit SICs) in which the subsidiary operates	1.24	0.67	1	10
<i>Subsidiary-MNC_DifferentBusinesses (1,0)</i>	Equals 1 if the subsidiary operates in a different four-digit SIC than its MNC parent (1,0)	0.63	0.48	0	1
<i>SubsidiaryAge^e</i>	log (years since subsidiary establishment)	3.48	0.88	-2.99	6.14

^aN=1067 country-year observations.

^bN=13490 MNC-year observations.

^cN=45968 MNC-host country-year observations.

^dN=71054 MNC subsidiary-host country-year observations.

^elog value.

Table 3. Span of Control and Institutions

	(1) Maximum span of control for MNC supervisory units in a host country	(2) Span of control for MNC supervisory units in strong-institution countries
<i>QualityofInstitutions</i>	0.015*** [0.005]	
<i>Number of subordinate subsidiaries in WICs as a percentage of total number of subordinate subsidiaries in all countries</i>		-13.002*** [0.446]
<i>MNCSize</i>	0.014 [0.009]	0.033 [0.092]
<i>MNCAge</i>	-0.043** [0.017]	-0.594** [0.271]
<i>LocalScale</i>	0.372*** [0.005]	1.131*** [0.081]
<i>HostCountryTaxRates</i>	-0.001 [0.000]	0.037 [0.022]
<i>HostCountryTelecommunication</i>	0.001*** [0.000]	-0.018 [0.014]
<i>HostCountryGDP</i>	0.004* [0.002]	2E-14 [1E-13]
<i>Constant</i>	0.023 [0.093]	6.110*** [1.535]
Year dummies	Yes	Yes
MNC fixed effects	Yes	No
Unit fixed effects	No	Yes
Observations	45,968	16,719
Adjusted R ²	0.232	0.715

Notes. Column (1) shows linear estimates of the maximum span of control for MNC supervisory units in a host country, based on data from U.S. multinational manufacturers in 1996–2008. The unit of analysis is MNC-country-year. Column (2) shows linear estimates of span of control for MNC supervisory units in strong-institution countries. The unit of analysis is MNC supervisory unit-year. Standard errors that account for clustering at both the firm and country level appear in parentheses.

*Significant at the 10% level; **significant at the 5% level; ***significant at the 1% level (two-tailed tests).

Table 4. Supervision, Institutions, and Task Centrality

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>LocalSupervision (1,0)</i>					
<i>QualityofInstitutions</i> (H1)		0.747*** (0.240)	0.626*** (0.193)	0.625*** (0.193)	0.636*** (0.193)	0.288** (0.154)
<i>TaskCentrality</i> (1,0)					-0.717 (0.469)	-2.676*** (0.960)
<i>QualityofInstitutions</i> <i>xTaskCentrality</i> (H2)						1.396** (0.558)
<i>Subsidiary-</i> <i>MNC_DifferentBusinesses</i> (1,0)				-0.057 (0.261)	-0.188 (0.207)	-0.194 (0.208)
<i>SubsidiaryProductScope</i>				-0.089 (0.125)	-0.098 (0.120)	-0.099 (0.121)
<i>SubsidiaryAge</i>				-0.032 (0.092)	-0.026 (0.095)	-0.026 (0.093)
<i>MNCSize</i>			0.210** (0.100)	0.210** (0.099)	0.230** (0.096)	0.233** (0.097)
<i>MNCAge</i>			0.092 (0.159)	0.109 (0.155)	0.105 (0.153)	0.104 (0.153)
<i>LocalScale</i>			0.661*** (0.135)	0.655*** (0.137)	0.647*** (0.136)	0.641*** (0.135)
<i>HostCountryTaxRates</i>	-0.003 (0.012)	-0.004 (0.009)	-0.005 (0.006)	-0.005 (0.007)	-0.005 (0.006)	-0.005 (0.006)
<i>HostCountryTelecommunication</i>	0.027*** (0.006)	0.004 (0.006)	0.003 (0.004)	0.003 (0.004)	0.003 (0.004)	0.003 (0.004)
<i>HostCountryGDP</i>	0.254*** (0.079)	0.278*** (0.064)	0.211 (0.189)	0.214 (0.185)	0.217 (0.175)	0.228 (0.179)
<i>Constant</i>	-3.373*** (0.480)	-4.162*** (0.426)	-6.855*** (1.069)	-6.667*** (1.128)	-6.605*** (1.122)	-6.161*** (1.125)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	70,901	70,901	70,901	70,901	70,901	70,901
Pseudo R2	0.090	0.096	0.180	0.180	0.183	0.186
Log-likelihood	-14065	-13966	-12672	-12666	-12619	-12581

Notes. This table shows the logit estimates of the likelihood that a subsidiary is supervised by a supervisory unit in the same country versus a foreign country, based on data from U.S. multinational manufacturers in 1996–2008. Standard errors that account for clustering at both the firm and country level appear in parentheses.

*Significant at the 10% level; **significant at the 5% level; ***significant at the 1% level (two-tailed tests).

Table 5. Foreign vs. Local Supervision: World Value Survey

	(1)	(2)
	<i>LocalSupervision (1,0)</i>	
<i>QualityofInstitutions</i> (H1)	2.988*	1.983*
	(1.562)	(1.057)
<i>TaskCentrality</i> (1,0)	-1.150*	-2.062*
	(0.700)	(1.088)
<i>QualityofInstitutions xTaskCentrality</i> (H2)	4.045*	4.394**
	(2.389)	(2.014)
Constant	Yes	Yes
Subsidiary controls	Yes	Yes
MNC parent controls	Yes	Yes
Country controls	Yes	No
Country dummies	No	Yes
Observations	20,561	19,313
Pseudo R2	0.226	0.160
Log-likelihood	-1578	-3101

Notes. This table shows the logit estimates of the likelihood that a subsidiary is supervised by a supervisory unit in the same country versus a foreign country, based on data from U.S. multinational manufacturers in 1996–2008. Control variables are the same as those included in Table 4. Standard errors that account for clustering at both the firm and country levels appear in parentheses.

*Significant at the 10% level; **significant at the 5% level; ***significant at the 1% level (two-tailed tests).