

Are Governance Mode and Foreign Location Choices Independent?

Leiblein, Michael J.; Møller Larsen, Marcus; Pedersen, Torben

Document Version
Accepted author manuscript

Published in:
Global Strategy Journal

DOI:
[10.1002/gsj.1420](https://doi.org/10.1002/gsj.1420)

Publication date:
2022

License
Unspecified

Citation for published version (APA):
Leiblein, M. J., Møller Larsen, M., & Pedersen, T. (2022). Are Governance Mode and Foreign Location Choices Independent? *Global Strategy Journal*, 12(2), 273-307. <https://doi.org/10.1002/gsj.1420>

[Link to publication in CBS Research Portal](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

If you believe that this document breaches copyright please contact us (research.lib@cbs.dk) providing details, and we will remove access to the work immediately and investigate your claim.

Download date: 04. Jul. 2025



ARE GOVERNANCE MODE AND FOREIGN LOCATION CHOICES INDEPENDENT?

Michael J. Leiblein

Fisher College of Business
Ohio State University
leiblein.1@osu.edu

Marcus M. Larsen

Copenhagen Business School
&
BI Norwegian Business School
mml.si@cbs.dk

Torben Pedersen

Bocconi University
torben.pedersen@unibocconi.it

ABSTRACT

This article explores the relationship between organizational governance and location choices. While the existing literature provides significant intuition regarding the factors that influence these choices, it often assumes that governance and location choice are independent from one another. This article tests the veracity of this assumption in the global semiconductor industry. We report evidence of significant correlations across choices regarding how to govern and where to locate production, evidence of a reciprocal relationship between governance and location choices, and evidence suggesting how interdependence between governance and location choices affects the stability of relationships highlighted by extant theories. We conclude with implications for future theoretical and empirical research based on the existence of these interdependent effects.

Keywords: governance choice, location choice, economic organization, interdependence

Manuscript accepted at Global Strategy Journal

INTRODUCTION

How to govern and where to locate the execution of a task represent two of the canonical decisions addressed by the field of global strategy. One may think of examples of domestic vertical integration such as Carnegie Steel's decisions to acquire domestic iron ore used in US steel production and examples of non-domestic vertical integration such as Ikea's decision to purchase a non-domestic (Romanian) forest for use in its furniture production activities. One may also consider examples of domestic and global outsourcing such as Apple's decision to outsource and offshore electronics assembly to Foxconn in China, Boeing's decisions to outsource design and manufacturing of airline components to both domestic and foreign suppliers, or the decision by Danish shoe manufacturer ECCO to offshore the production of shoe uppers to its own subsidiary in Vietnam. At least in practice, casual observation suggests that firms choose a range of governance and location choices.

A great deal of academic attention has been devoted to understanding the factors that influence governance and location choices. Well-received theory emphasizes how exchange-, problem-, and/or firm- attributes such as asset specificity (e.g., Williamson, 1985), problem complexity (e.g., Nickerson and Zenger, 2004), and firm capability (e.g., Argyres, 1996) affect decisions whether to manage an activity within the firm or through an arms' length contract. Similarly influential research emphasizes how local economic (Buckley and Ghauri, 2004; Dunning, 1998), social (Kogut and Singh, 1988), and political (Henisz and Macher, 2004) conditions affect location choice.

While the above theories, and the empirical work that tests them, often assume an independence across governance and location choices, the employment of *distinct* combinations suggests that these choices are related. We are not the first to put forth this observation. Several scholars call for exploration of the interdependence between governance and location choices (e.g., Asmussen, Benito, and Petersen, 2009; Buckley, Devinney, and Louviere, 2007; Mudambi and Venzin, 2010). Moreover, foundational frameworks such as the Eclectic Paradigm (e.g., Dunning, 1988) or the Uppsala Model (e.g., Johanson and Vahlne, 1977) highlight important contingencies

between attributes of governance choice and exchange, ownership, and location attributes. Yet, we are unaware of large-scale empirical research that explores the ramification of interdependence between governance and location choices.

This paper examines whether governance and foreign location choices are independent or interdependent. In responding to this deceptively simple question, we aim to advance our understanding of the boundary conditions associated with existing theory. These aims are consistent with Bacharach's (1989: 498) statement that "if a theory is to be properly used or tested, the theorist's implicit assumptions which form the boundaries of the theory must be understood." We report a series of findings from a large sample of production sourcing decisions that demonstrate that governance (location) choices have a direct and economically significant influence on location (governance) choices in the global semiconductor industry. Additional estimations suggest how inclusion of governance and location choices affect our understanding of the antecedents to these choices. Overall, our paper suggests new opportunities to bridge the governance and location literature streams by highlighting the importance of interdependent choices and choice sets (e.g., Leiblein, Reuer, and Zenger, 2018; Van den Steen, 2018) and more fully recognizing the correlations and potential feedback loops between governance and location choices.

RESEARCH ADDRESSING GOVERNANCE OR LOCATION CHOICE

The nature of our research question suggests it may be useful to highlight central and familiar literature that assumes that governance and location choices are independent. The first broad literature stream underlying our research focuses on the choice between different forms of organizational governance. Theories of economic organization such as transaction cost economics (e.g., Klein, Crawford, and Alchian, 1978; Williamson, 1975, 1985), property rights (e.g., Grossman and Hart, 1986), and the problem solving perspective (e.g., Nickerson and Zenger, 2004) address how governance decisions mitigate exchange hazards and facilitate efforts to search for superior performance. Theories of competitive advantage such as the resource-based view (e.g., Barney, 1991;

Peteraf, 1993), knowledge-based view (e.g., Grant, 1996), or contractual learning perspective (e.g., Mayer and Argyres, 2004) describe how governance decisions are influenced by the desire to access or leverage productive capabilities. Current theorizing asserts that these perspectives are so tightly intertwined that they should be integrated into a single theory of the firm (Argyres and Zenger, 2012).

The transaction cost, problem solving, and knowledge-based literature streams draw associations between characteristics of business transactions and discrete forms of organization. Transaction cost logic assumes that exchanges between actors vary in observed levels of uncertainty, frequency of occurrence, and the degree to which they incur durable, specific investments (Williamson, 1975; 1985). The problem solving perspective assumes problems vary in terms of their decomposability (Nickerson and Zenger, 2004) and complexity (Macher, 2006). These theories further assume that the canonical forms of organization—market, hybrid, and hierarchy—vary in administrative coordination mechanisms, incentive intensity, and dispute resolution (Williamson, 1991) as well as communication channels, information codes, and search heuristics (Grant, 1996; Nickerson and Zenger, 2004).

Standard applications of these theories emphasize how attributes of the exchange environment affect the choice of organizational form. For instance, transaction cost theory claims that firms should internalize transactions involving specific investment in the presence of market uncertainty in order to avoid market exchange hazards and enable coordinated adaptation in the face of unexpected disturbances. While highlighting distinct causal mechanisms, the transaction cost, knowledge-based, and problem-solving perspectives all imply that it is most efficient to organize simple transactions with low levels of complexity and uncertainty within a market and to organize more specific, complex, or poorly structured transactions within a hierarchy. Substantial empirical support exists for these

claims, particularly regarding the association between asset specificity and governance (Zhao, Lou, and Suh, 2004; Macher and Richman, 2008).¹

The resource-based view (RBV) of the firm proposes that firm-level capabilities affect governance decisions. The RBV assumes that initial endowments of non-tradable resources, experience, or founding conditions (e.g., Barney, 1991; Cockburn, Henderson and Stern, 2000; Peteraf, 1993) lead to substantive differences in the distribution of productive capabilities across firms. The basic idea, when applied to governance decisions, is that firms should internally govern exchanges where costly to trade experiences and resources provide a comparative advantage against other firms and outsource exchanges where the firm is at a comparative disadvantage (e.g., Argyres, 1996; Leiblein and Miller, 2003; Brahm and Tarziján, 2014). For instance, Jacobides and Hitt (2005: 1210) assert that “Firms with greater productive capabilities in a stage of production will tend to perform this activity internally, and contract with another firm through the ‘market’ where they are deficient.” This work highlights how initial conditions, history, and experience affect the development and persistence of capability as well as governance choices.

The second broad literature stream underlying our research question addresses the globalization of economic activity and the organization of Multinational Enterprises (MNEs). A key inquiry in this literature relates to the antecedents and outcomes associated with decisions regarding the foreign location of MNE activities (e.g., Caves, 1996; Alcácer, 2006). With a point of departure in work by scholars such as Hymer (1960), Dunning (1980), and Buckley and Casson (1976), the location for foreign investments is treated as a deliberate choice with the primary goal of generating or protecting profits (Buckley *et al.*, 2007). Recent reviews summarize associations between assessments

¹ Internalization theory also addresses questions regarding the boundaries of the firm (e.g., Buckley and Casson, 1976). While both transaction cost and internalization theory relate “market imperfections” to governance choice, transaction cost theory emphasizes the bounded rationality of decision-makers while internalization theory emphasizes asymmetric information and differences in property rights across a domestic and non-domestic context.

of comparative advantages, expropriation risks, and knowledge transfer problems and location choice (e.g., Kim and Aguilera, 2016; Nielsen *et al.*, 2017).

Inspired by Ricardian resource endowments, discussions of location specific advantages emphasize how firms can realize the benefits associated with a host country's infrastructure and institutional environment (Dunning, 1998). This research argues that firms choose to place their activities where they perceive location-specific advantages to be highest. The resulting empirical work indicates that firms internationalize activities to gain access to factors such as growing markets (Hennart and Park, 1993; Woodward and Rolfe, 1993), new technologies, skills, or knowledge (Chung and Alcácer, 2002), or other effects arising from clusters of firms performing similar activities (e.g., Krugman, 1991; Porter, 2000). The evidence further indicates that firms prefer to locate in countries with favorable political, infrastructural, and institutional conditions (Henisz and Macher, 2004) or in countries where they have prior experience (Henisz and Delios, 2001).

This research underscores the benefits and costs implied by location choices. While firms choose locations to gain access to assets and expertise, the degree of intellectual property protection and the potential for expropriation of assets or profits via nationalization also affect these choices. It is proposed that firms avoid locating activities in governments where policymaking authority is more concentrated (Henisz, 2000) or where interest-group conflict is likely due to factors such as income inequality and/or ethnolinguistic conflict (Holburn and Zelner, 2010). More generally, a lack of familiarity with local customs and market conditions may create a “liability of foreignness” (e.g., Hymer, 1976; Zaheer, 1995). For instance, the lack of familiarity with local cultures and institutions may lead firms to favor exchanges with others in proximate regions (Davidson, 1980; Barkema, Bell, and Pennings, 1996). As a result, firms often locate their activities where the “psychic distance”—in language, education, culture and industrial development—is manageable (Johansson and Vahlne, 1977). Empirical research demonstrates that measures of experiential, cultural, geographic, and

knowledge-related distance influence firms' location targets and internationalization paths (e.g., Davidson, 1980; Mudambi, 1998; Pedersen and Petersen, 2004).

Consistent with the theoretical literature on governance and location choice, the empirical literature often estimates models that imply that managers make governance (or location) choices without consideration of their location (or governance) choices. For instance, Walker and Weber (1984, 1987) test associations between measures of competition, experience, uncertainty, and the governance of automotive component production but do not take into account the geographic context of the buyer or supplier. Leiblein and Miller (2003) explore the relationship between indicators of experientially derived capabilities, transaction hazards, and the governance of production of semiconductor devices. While they control for the headquarters location of the focal firm, they do not examine whether or how the location where the activity occurs affects governance choice. Bigelow and Argyres (2008) demonstrate that industry experience and transaction costs influence make-buy choices in a sample of early US automotive firms but do not consider the interdependence with the location of activity. Brahm and Tarziján (2016) explore the interaction between delegation and governance decisions in the Chilean construction industry and find that the vertical integration decision positively influences the decision to centralize decision-making but they do not have measures of location characteristics and cannot explore whether governance and location choices influence one another. In sum, even when empirical research on governance choice controls for conditions associated with location, it generally fails to explore whether or how attributes associated with the headquarters location or the context where the activity is performed affect governance choice.

We observe related limitations in empirical research on location choice. For example, Makino, Lau and Yeh (2002) explore the location decisions of firms from newly industrialized economies, and find that firms' motivation and capabilities impact where they internationalize. While they control for entry-mode, they do not assess whether or how the selection of a governance form affects location choice. Henisz and Macher (2004) examine location decisions among semiconductor firms, and find

that firms with advanced technological capabilities are more likely to locate in countries with greater technological sophistication and to avoid locations where they face greater expropriation hazards. However, as their sample includes only wholly-owned subsidiaries they cannot examine whether comparatively similar effects are observed when firms outsource activities to particular countries. Flores and Aguilera (2007) study how the foreign location behavior of the top 100 US MNCs has changed between 1980 and 2000, but do not consider whether or how governance decisions affect location choice.

In sum, well-received research often assumes that governance and location choices are independent.² As indicated in Equation (1) and (2), a governance choice study might test whether exchange- and firm-attributes affect the choice set of {Market, Hierarchy}, while a location choice study might test whether firm- and location-attributes affect the choice set of {China, Denmark, France, or the US}. It remains unclear, however, whether and how these choices (or the conditions associated with these choices) affect what we know about the factors leading to governance and location choice.

$$\text{Governance \{Market or Hierarchy\}} = f\{\text{Exchange- and Firm-Attributes}\} \quad (1)$$

$$\text{Location \{Country}_j\} = f\{\text{Location- and Firm-Attributes}\} \quad (2)$$

RESEARCH ADDRESSING INTERNATIONAL ENTRY MODE CHOICE

While foundational theories treat governance and location as separate and independent choices, theories of international entry mode at least partially recognize the potential linkages between these decisions. For example, assuming a broader conception of exchange hazards than in Williamsonian transaction costs, internalization theory claims that hierarchy-based modes of international entry are superior to market-based entries whenever “markets in intermediate products are imperfect [because]

² In addition to the papers referenced in our review, several other notable studies examining the antecedents to governance choice downplay the role of location (e.g., Hoetker, 2005; Jacobides and Winter, 2012; Kapoor and Adner, 2012; Mahoney and Qian, 2013; Mayer and Solomon, 2006; Mesquita and Brush, 2008). Similarly, other notable location choice studies downplay the role of governance (e.g., Fisch and Zschoche, 2012; Martin and Solomon, 2003).

there is an incentive to bypass them creating an internal market” (Buckley & Casson, 1976: 33). The eclectic framework (Dunning, 1988) recognizes both the governance and location dimension when it suggests that FDI is more likely to occur whenever a firm sees advantages associated with *ownership* (e.g., a unique resource), *location* (e.g., market size, efficiency opportunities; etc.), and *internalization* (e.g., high asset specificity; uncertainty). The Uppsala model associates the development of knowledge about non-domestic markets and operations with both the commitment of increasing levels of resources to a given market over time and entry into more distal models over time (e.g., Johanson & Vahlne, 1990).

While these frameworks recognize the importance of both governance and location choices, they also make implicit assumptions regarding the nature of associations between these choices. For example, the eclectic paradigm assumes that locations do not constrain ownership and internalization choices. However, if there is some underlying dependence between governance and location choices that affects the OLI variables we could estimate genuinely different associations between ownership and FDI. These different associations are possible because the partial derivative between (say ownership and FDI) has no definitive meaning when the OLI variables are interdependent. In this instance, we need to either focus on the joint governance and location decision or more carefully state something like ‘FDI is a function of location advantage holding resources and internalization advantages constant’ until we understand the nature of the underlying causal relations. Relatedly, while the Uppsala model (Johanson and Vahlne, 1977) explains how the relationship between governance and location may coevolve over time, it was not designed to address the interdependence between these choices. Instead, the Uppsala model attributes changes in governance and location to learning and reduced levels of psychic distance.

The international entry mode literature provides an alternative means to consider interdependence between governance and location choices. Research in this tradition suggests that the environment may favor selection of particular configurations of governance-location choices and that

the optimal mode of foreign entry is a reflection of transaction-specific assets, free-riding potential, and uncertainties derived from country risks such as political instability and economic fluctuations (Anderson and Gatignon, 1986). Related empirical literature suggests the use of governance mechanisms varies across geographic locations. For instance, Shane (1994) suggests that national differences in the propensity to trust a partner influences perceptions of transaction costs and desirability of geographic diversification and entry mode choice. In a study comparing the entry mode choices made by US firms entering the Japanese market and Japanese firms entering the US market, Makino and Neupert (2000) report that US firms tend to choose to enter via a Joint Venture (as compared to wholly-owned subsidiary) more frequently than their Japanese counterparts. In a review of studies associating variables such as advertising intensity, R&D intensity, country risk, and cultural distance on the choice of ownership based entry modes, Zhao, Luo, and Such (2004) conclude that the moderating effects of location, country or origin, and industry type raise concerns about the generalizability of TCE determinants (of ownership) across national settings.^{3, 4}

A related strand of research on technology transfer extends this logic. Prominent research in this stream highlights that the optimal choice of entry mode as a vehicle to transfer knowledge is associated with both the nature of technology and broader legal, economic and social environment of the host country (Davidson & McFetridge, 1984; Teece, 1977). More specifically, the costs of

³ Consistent with the arguments in this paper, Oxley (1999) finds that US firms are more likely to use equity (rather than non-equity) joint ventures in alliances with partners in countries where intellectual property protection is weak. More recently, Handley and Angst (2015) argue that contractual governance (in supply networks) is more effective in individualistic and low uncertainty avoidance countries, while relational governance is more appropriate in high uncertainty avoidance and more collectivist cultures.

⁴ While the concepts of governance and entry mode choice are often used synonymously, differences in the usage of the terms exist across the theory of the firm and entry mode literatures. In the theory of the firm literature, governance choice often refers to choices to arrange an exchange via market (e.g., spot contracts or licensing agreements to acquire an input), hybrid (long-term, relational, or equity alliances to collaborate on the development of an input), or hierarchical (employment contracts, internal development, mergers, or acquisitions) governance (e.g., Williamson, 1991). This literature pays limited attention to the timing of these choices. In contrast, the international entry mode literature focuses on entry mode choices, often stressing distinctions between non-equity modes (e.g., licensing, contracting, or exporting agreements), equity modes (e.g., minority or majority equity joint ventures), or wholly-owned subsidiaries (e.g., accessed via acquisition or greenfield investment) and by its very nature only focuses on the initial (entry mode) choice.

protecting intellectual property increase with the complexity of the transferred technology and deficits in the institutional protections afforded by the host country (Buckley and Casson, 1976; Oxley, 1997). An implication is that exchange characteristics and the institutional environment jointly affect governance. For instance, Oxley (1999) shows how alliance governance choices may be used to offset challenges from institutions with weak intellectual property protection.⁵

While the above literature describes situations where the choice sets are interdependent, specific strands of research assume different sequences of governance and location decisions. For instance, the entry mode and technology transfer literature suggest a tacit premise that location choice precedes governance choice (e.g., Gatignon and Anderson, 1988; Zhao *et al.*, 2004). We contrast this assumption with papers documenting the phenomena of “born globals” which assume that governance choice precedes location choice (e.g., Knight and Cavusgil, 2004). More broadly, we imagine a manager trained to think in a way consistent with the Uppsala model or the entry mode literature might select location (a choice set of say {China, Denmark, US}) prior to confronting governance choice (a choice set of {Market or Hierarchy}). That is, the governance choice would be conditional on the location choice. Alternatively, noting the costs of vertical integration, a manager of a small firm aware of the concept of “born globals” might focus first on governance (a choice set of {Market or Hierarchy}) and then location (making location conditional on governance). From an empirical perspective, these cases imply equations such as (3) and (4).

$$\text{Governance \{Market, Hierarchy \} | Location choice} = f\{\text{Attributes A}\} \quad (3)$$

$$\text{Location \{Country 1, Country 2, ... \} | Governance choice} = f\{\text{Attributes B}\} \quad (4)$$

We are not the first to note the varying assumptions underlying various decision-making models associated with FDI processes. For instance, in a study comparing different sequences of

⁵ There are also reasons to believe that some multinationals may invest in countries with relatively weak institutional protection when they own complementary assets that offer protection against the risk of expropriation (Zhao, 2006).

foreign ownership and diversification mode, Ruiz-Moreno, Mas-Ruiz, and Nicolau-Gonzálbez (2007) find that governance decisions precede diversification decisions. While Ruiz-Moreno *et al.* (2007) examines whether governance and location choices are independent, their methodology requires that the first stage choice restricts the alternatives in the second stage choice set. The assumptions underlying this method are inconsistent with our theory and data (which allows the full choice set in both the first and second stage). Asmussen, Benito, and Petersen (2009: 146) build a formal model of foreign operation mode configuration that explicitly embraces “the *interdependencies* between foreign operation mode decisions across countries and over time.” Similar to our effort, Asmussen *et al.* (2009) highlight the predictive limitations of approaches that ignore the potential interdependencies across these choices. The natural implication of these arguments is that work that assumes independence may be misattributing associations between exogenous characteristics highlighted by existing theory and governance or location choice.

In sum, research addressing governance and location choice has generated important insights regarding the association between particular exchange characteristics, national attributes, and decisions regarding the governance and location of an activity. However, this broad body of research has been conducted using varied assumptions regarding the existence and nature of associations between governance and location choices.⁶ As a result, it is unclear whether: (a) there are boundary conditions to existing theories due to the association between governance and location, (b) any observed interdependence across governance and location choices is due to

⁶ There may be good reasons to restrict the choice set in a given study. For instance, Alcácer and Chung (2007) investigate the extent firms go abroad to access technology via Greenfield investment. They choose to test their hypotheses using a sample of first-time foreign entrants to the United States in order to avoid confounding historical effects and their focus on Greenfield investments. This choice is consistent with the assumption that including acquisitions in the sample would unduly restrict location choice (to areas where viable targets existed).

Alternatively, data limitations may inhibit the ability to fully test the interdependence across governance and location choices. For instance, Martin, Swaminathan, and Tihanyi (2007: 105) claim that most IB research fits into one of three categories. One category analyzes choices between a single home and a single host country (or region); a second examines investment flows from multiple home countries to a single host country; and a third studies investments from a single home country into multiple, heterogeneous host countries. They conclude, “... these three categories of studies far exceed in number those studies that examine both multiple home countries and multiple host countries.”

underlying attributes of these choices (e.g., dispute resolution in governance and the strength of institutions in a given location) or unobserved variation across samples, or (c) any observed interdependence affects our understanding of the causes of governance and location choice.

We proceed by exploring the extent to which governance and location choice are interdependent using a question-based approach. Our paper begins by comparing pairs of governance and country choices. In doing so, we consider whether and how choice sets such as {Market-Country 1, Hierarchy-Country 1, Market-Country 2, Hierarchy-Country 2, ...} are associated with standard exchange, firm, and location attributes highlighted in the literature. First, we explore whether any association between governance and location choices exists. Second, we examine whether and how governance or location choice directly affect one another. Finally, we explore whether the association between antecedents to governance (location) choices highlighted in the literature are stable across location (governance subsamples). Bettis *et al.* (2014: 950) suggest this type of approach “is appropriate when existing theory provides a useful frame for a baseline argument but is not robust enough for precise hypotheses.” A point consistent with other prominent statements regarding efforts to identify boundary conditions to existing theory (e.g., Bachrach, 1989) and the importance of searching for anomalies that might guide further theory development (e.g., Christensen and Raynor, 2003).

RESEARCH DESIGN

Empirical context

The empirical context for our study is international production-sourcing decisions in the global semiconductor industry between 1990 and 2005. There are several reasons to believe this context is suitable for this study. First, during our sample frame there has been a notable shift in the governance and location of semiconductor production. Independent contract manufacturers emerged in the semiconductor industry in the late 1980s and grew to account for twenty-four percent of worldwide

production by 1999 (Leachman and Leachman, 1999). During this time, the location of production also shifted with Asian (excluding Japan) producers obtaining nearly forty percent of global capacity by the late 1990s (Leachman and Leachman, 1999). Second, firms continued to exhibit a range of governance and location choices-- from vertically integrated hierarchies to market contracting and from purely domestic to highly multinational operations—throughout this time. Third, prior research in this industry independently examines choices regarding governance (e.g., Leiblein and Miller, 2003; Monteverde, 1995) and location (e.g., Henisz and Macher, 2004; Martin and Salomon, 2003), but not their potential interdependence.

Sample

To compile our sample we draw on secondary data from annual semiconductor industry reports entitled “Profiles: A Worldwide Survey of IC Manufacturers and Suppliers” and “Strategic Reviews” published by the Integrated Circuit Engineering Corporation (ICE) and IC Insights, respectively. The ICE and IC Insights reports provide annual firm- and facility-level information for the years 1990 through 2005. These data have been supplemented with accounting data obtained from the Wharton Research Data Service (WRDS), industry-wide sales data from the Semiconductor Industry Association, institutional data obtained from Henisz’s (2000) political constraints index, the World Bank, and the Kogut and Singh (1988) composite index of cultural distance.

While the development and sale of a semiconductor device involves several distinct steps (including design, production, assembly, and distribution), the production step is both economically important and subject to global competition. Thus, the unit of analysis for this paper is the decision by a semiconductor provider to integrate into production (fabrication). We record the chosen governance mode (e.g., hierarchy, joint venture, or market contract) and the foreign location (e.g., country) of the production site for each production decision observed in our sample.

The complexity and uncertainty underlying production activities varies across both product-markets and process technologies. Following industry practice, we focus on seven product-markets:

analog devices, application specific ICs (ASICs), general-purpose logic (e.g., field programmable devices), discrete and optoelectronic devices, memory devices, microprocessors and other micro components, as well as sensors and telecommunications devices (see Semiconductor Industry Association, 2016). Each product-market employs a variety of process technologies. These process technologies may be mapped to the line-widths reported in the end-product circuitry (e.g., 0.5, 0.35, 0.12 micron line-widths). Since semiconductor firms often design production lines for a particular process technology and product, we count a distinct observation for each process technology–product-market combination. For example, a firm in our sample may sell memory devices using 0.25-micron technology, memory devices using a 0.35-micron technology, and Application Specific Integrated Circuits (ASICs) using a 0.5-micron technology. We record these combinations of process technology and product market as three separate observations. We control for any interdependence among observations in a single company by stratifying models by company in the statistical analysis.

Our sample describes 3,084 unique production decisions—1,247 internal production (hierarchy) decisions; 336 joint venture decisions; and 1,501 external production (market contract) decisions. The majority of the production decisions are located in the US (20.0%), followed by Japan (19.7%), and Taiwan (19.4%). Table 1 provides an overview of the frequencies between governance choice (3 modes) and location choice (19 locations). When estimating the a two-stage least square (2SLS)- and the (conditional/binary) logistic models we limit the analyses to the seven largest host countries (indicated with an asterisk in Table) and the “make and buy” cases to ensure sufficient sample coverage. This reduced sample adds up to 2,410 production decisions.

****Insert Table 1 about here****

Empirical approach

To explore the potential association between governance and location decisions, we follow an incremental, step-by-step process that applies several different statistical models.

Our first step is to conduct a Cochran-Mantel-Haenszel (CMH) test. The CMH test is an inferential test for the association between two binary variables. The CMH test examines the *weighted association* of a set of frequency tables and generates a common odds ratio statistic. Based on the frequency table presented in Table 1, our application of the CMH test estimates the degree of association among the governance (market, joint venture, or hierarchy) and location (countries) decisions in our sample. The null hypothesis underlying this analysis is that governance and location choice are conditionally independent.

Second, we run a two-stage least squares (2SLS) model with instrumented variables that control for governance and location choices. The 2SLS model allows us to examine whether governance and location choice directly affect one another. We address this by replacing the actual values of the endogenous regressors (governance choice and location choice) with predicted values based on multiple instruments (Kennedy, 1985). We conduct two sets of estimations including eight equations (one equation on the make or buy choice and seven equations on the location choice for the seven locations most frequently observed in our data). In the first set of equations, we develop an instrument for governance choice and use it to test whether governance choice predicts location choice. In the second set of equations, we develop instruments for each of the location choices and use them to test whether location choice predicts governance choice. The 2SLS models provide an indication of interdependence by allowing us to assess whether an increase in one choice causes an increase or decrease in the other. The null hypotheses underlying these analyses are that governance choice does not affect location choice and that location choice does not affect governance choice.

Third, we estimate a conditional logistic model for location choice and a binary logistic model for governance choice. We estimate a conditional logistic model for location choice with three samples—a pooled sample as well as split samples for market and hierarchical governance. The conditional logistic model is frequently used in the location choice literature. Our application of this model allows us to test whether location attributes affect location choices differently in the case of

market or hierarchy sub-samples. Similarly, we estimate a binary logistic model for governance choice with eight samples—the pooled sample and each of the seven prominent countries in our dataset. These models indicate whether the governance variables have the same effect on the governance choice across the seven countries. The null hypotheses underlying these analyses are that the associations between traditional indicators of governance and location choice are stable across location and governance sub-samples.

In sum, the CMH test provides an indication of the degree of correlation between governance and location choices in our data. The 2SLS with instrumented variables model provides a test of the influence of governance choice on location choice (and location choice on governance choice). The conditional/binary logistic models indicate whether the effects of traditional antecedents to governance and location choice vary across sub-samples in our data. As such, each of the models builds upon the prior in an effort to provide insight regarding the association between the governance and location choice and its ramifications for existing theory.

Variable construction

In order to conduct the tests outlined above, we construct two sets of dependent variables. The first dependent variable specifies the chosen governance mode and the second the chosen location. In addition, we include a number of independent variables frequently employed in the existing literature. In the following, we describe the variables supporting the two sets of decisions.

Governance choice. Our research design allows for three governance modes: hierarchy, hybrid, and market. We define the governance choice to be “hierarchy” when the focal firm owns the relevant production facilities, “hybrid” when more than one firm pools investment in the facility (e.g., joint venture or equity investment), and “market” when the focal firm contractually outsources production to another firm that owns the production facilities. The CMH test provides a test statistic for the degree of association across these governance choices. In subsequent analyses, we restrict the sample to

“hierarchy” or “market” decisions due to limitations in the number of observations available for the hybrid governance and location choice pairs.

Variables supporting governance choice. We construct exchange, firm-experience, and firm-context explanatory variables based on established literature. In semiconductor production, some devices are more difficult to produce than others. The complexity of Analog and Application Specific Integrated Circuit (ASIC) devices require intense coordination and specific investment between the design and production functions due to their inherently high degree of customization to user needs. Advanced dynamic random access memory (DRAMs) and flash memory devices require intense coordination and specific investment between the research and production functions due to their tendency to utilize leading edge technology. In an effort to capture the exchange complexity underlying various semiconductor devices and to retain compatibility with prior empirical work (e.g., Monteverde, 1995; Macher, 2006), we operationalize *problem complexity* by assigning exchanges involving analog, advanced memory, or customized ASIC products (with the value 1), and zero otherwise.

To measure the uncertainty associated with an exchange, we follow Levy (1985) and capture the variance surrounding a time trend in the demand for similar products. Specifically, we measure *demand uncertainty* as the sum of squared errors from a regression of the relevant product-market’s historical unit demand for the five years preceding the integration decision. The segment-level demand data employed in this measure are obtained from quarterly reports of units delivered, provided by the Semiconductor Industry Association.

Prior work indicates that it is most appropriate to model an interactive association between uncertainty and problem complexity.⁷ For instance, in transaction cost economics, the exchange hazards and market contracting costs that lead to vertical integration are most likely to occur in the

⁷ As a practical matter, our primary findings are not sensitive to inclusion or exclusion of this interaction term.

presence of specific investments undertaken under incomplete contracts. As uncertainty increases the likelihood of contractual incompleteness, the risks of renegotiation are particularly likely for specific investments made in uncertain situational contexts. In the problem solving perspective (Nickerson and Zenger, 2004), problem complexity and uncertainty are thought to jointly and interactively increase organizational challenges. While market forms of organization are often sufficient to address simple and well-defined problems, increasing levels of problem complexity and uncertainty require the use of governance forms that provide more authority, consensus, and coordination. We also control for the number of *available suppliers* by counting the number of firms that supplied production and had capacity to manufacture at the relevant process technology during our sample period. This variable provides a ready control for potential supplier bargaining power *ex ante*.

To construct a second set of experiential variables relating to the governance decision, we draw on insights provided by resource- and capability-based theories. First, we measure a firm's *production experience* to indicate whether a particular firm has the necessary skills to produce the specific process technology. Production experience is likely associated with improved capability and an increase in the propensity to choose internal governance. Operationally, we estimate the cumulative number of semiconductor devices the firm has produced using the relevant process technology over the prior five years.

Next, we measure a firm's *sourcing experience* as the cumulative number of unique sourcing relationships formed over the last five years with firms that have the ability to produce at the relevant process. This measure assumes that experience with relevant partners is essential in aiding in the identification of future partners as well as assisting the ability to effectively negotiate, monitor, and enforce contracts (e.g., Reuer, Zollo, and Singh, 2002). That is, the greater the experience with relevant partners, the higher the likelihood the firm has developed specific organizational routines that allow them to efficiently collaborate with other prospective partners, and thus, the more viable external governance modes.

We also include several firm context variables to control for further unobserved heterogeneity and alternative explanations related to the governance choice. We measure a firm's product-market *diversification strategy* as the number of product-market subfields in which the firm sells semiconductor devices. This variable captures the extent to which a firm is able to hedge against demand uncertainty and technological obsolescence through diversification or by switching the use of its existing production technology across product-markets (e.g., Ioulidou *et al.*, 2020). We control for firm *tenure*, measured as the number of years since the firm was established, and *facility maturity*, measured as the number of years since the facility that conducts the production process was established.

Location choice. The second dependent variable underlying our study relates to the decision where to perform a given activity. Accordingly, we measure location choice as the (host) country where the firm performs the relevant production activity. More specifically, we create indicator variables to identify the country where firms locate their international production activities (e.g., US, Taiwan, Japan, Germany, France, UK, and South Korea) and assign these variables the value 1 if the production facility is located in that country and otherwise 0.

Variables supporting foreign location choice. In conjunction with our review of the literature on foreign location choice, we construct a number of explanatory variables relating to both the absolute and relative level of attractiveness of a prospective host location. We have grouped these variables into categories capturing the geographic context, the geographic distance between a firm's headquarters and the host location, and relevant experience within a particular host geography.

The first variable capturing geographic context is a measure of institutional quality for a potential host location. This is the political constraints (*polcon*) measure developed by Henisz (2000) (see also Henisz and Macher, 2004). The *polcon* index provides an indicator of the ability of political institutions to make credible commitments to an existing policy regime. Next, we measure the *country technological environment* as an indication of the extent firms seek out locations due to the innovative

capacity of a country). Firms may choose locations as a way to access technological knowledge and assets. Hence, the greater the technological environment of a given location, the higher the likelihood that the firm locates its operations in that location. To operationalize this variable, we record the average technological sophistication of the last five production facilities opened within the country prior to the prospective decision (see also, Henisz and Macher, 2004). We also include a number of macro-economic variables of a particular host location-year to capture additional country-specific variation that may drive firms' location decision. Specifically, we include measures of the *size of the population (logarithm)* and *economic growth in country* (growth in GDP per year) to proxy for the market potential of a particular host location. To capture the cost level of a particular host location (a proxy for efficiency-seeking location choices), we include measures of the *wage level* of a country in a given year, using data on wage per hour in manufacturing from the International Labour Organisation (measured in 2013 US\$ prices) and *GDP per capita (logarithm)* of a country in a given year.

The next group of variables relaxes the assumption that the level of attractiveness of a host location is the same for all firms. To capture this, we include two traditional distance measures: *geographical distance*, measured as the logarithm of the air miles between the home country headquarters and the location of production; and *cultural distance* between two locations, based on the Kogut and Singh index (Kogut and Singh, 1988). Specifically, the larger the distance between the two locations, the higher the transportation and coordination costs, which *ceteris paribus* make the location less attractive.⁸

Finally, we include two variables of the relative experience of foreign expansion: First, we include a variable capturing the *firm experience in host market*, measured as the logarithm of cumulative years of experience that a firm has had production facilities within a given host country. More experience in a host location reduces the liability of foreignness (Zaheer, 1995) and nurtures the

⁸ While we are aware of critiques of the Kogut-Singh index (e.g., Shenkar, 2001), as the dominant measure applied in the empirical international strategy literature including it in our study facilitates comparison with extant work.

development of capabilities for subsequent location decisions (Henisz and Delios, 2001). Second, the prior investment decisions of multiple populations of firms can provide information to investing firms, we therefore include a measure of *the experience of domestic firms in host location* operationalized as the logarithm of the number of years of host-country fab operating experience by domestic semiconductor firms in each sample year.

RESULTS

Table 2 reports zero-order correlations and descriptive statistics for all the independent variables included in the models. The table indicates that high bivariate correlations exist between several standard indicators of governance and location choice. For instance, high bivariate correlations exist between the number of available suppliers and experience of domestic firms in host location (0.43); sourcing experience and firm experience in host market (0.38); production experience and spatial distance (0.26); and problem complexity and experience of domestic firms in host location (0.24). The strong statistical associations among several historical indicators of governance and location choice further highlight the potential bias for studies that fail to fully control for these characteristics and the importance of this analysis.

Insert Table 2 about here

A CMH-test of general association

Table 3 reports the results from several CMH tests of association between governance and location choices based on the full sample and various sub-samples obtained from Table 1. The first row of results includes the whole sample (all country locations) and governance choice with two (hierarchy or market) and three (hierarchy, hybrid, or market) governance choices. These tests yield CMH-statistics with values of 559.4 ($p < 0.0001$) and 864.5 ($p < 0.0001$), respectively. In both cases, the CMH-statistics lead us to reject the null hypothesis of conditional independence and to conclude that governance and location choices are highly correlated with each other.

The ensuing rows in Table 1 report CMH statistics for tests across a series of sub-samples. We test associations between governance and location choices for the seven countries that include the largest fraction of transactions in our sample, the twelve countries with the smallest fraction of transactions in our sample, a subset of Asian countries (e.g., China, Japan, South Korea, Singapore, and Taiwan), and a subset of remaining Western countries. Finally, in the last row we divide the locations into the three regions of Asia, Europe and North America. In all cases, the CMH-statistics lead us to reject the hypothesis that governance and the location choices are independent ($p < 0.0001$).

Insert Table 3 about here

A 2SLS test with instrumented variables for the governance and location choices

In order to test more directly the causal associations between governance choice and location choice, we model a 2SLS system of equations with instrumented variables for the governance and location choices. Our 2SLS model employs an instrumental variable approach.⁹ After performing a number of tests to identify the strongest set of instrumental variables that do not lead to over-identification, we selected the following nine variables as instruments for the location choices: Polcon, Country technological environment, Distance, Population, GDP per capita, Wage, Economic growth, Kogut & Singh-index, and Experience of domestic firms in host country. Taken together these instrumental variables explain between 15%-67% of the variation in the seven location decisions. To test for over-identification, we regress the residual from the governance equation on the instruments for the model (Sargan, 1958). The R -squared value in this regression is very low (0.047), and none of the predictors are statistically significant. We also inspected the bivariate correlations between instruments and residuals, all of which were insignificant and close to zero. While we cannot rule out

⁹ In the first step, we estimate the effect of the instrumental variables on the treatment. In our case, the treatment regards location choice (Table 4) or governance choice (Table 5). Essentially, we are splitting the treatment into two parts-- the part explained by the instrumental variables and the part explained by everything else. The first of these two parts-- the adjusted treatment variable is explained by our instrumental variables and is exogenous to the rest of the model. In the second step, we estimate our model using the adjusted treatment variable (governance-hat or location-hat) to assess the correlation between the adjusted treatment and the outcome variable.

the presence of endogenous correlation, these tests, in combination, suggest our models leverage an appropriate set of instrumental variables.

****Insert Table 4 about here****

Table 4 shows the simultaneous equation system with the seven instrumented location choices regressed on the governance (hierarchy or market contract) decision. The left-hand column lists the variables in our models. The next seven columns report the results from regressions used to develop our instrumental variables for location choice. These results, not surprisingly, indicate that the location variables highlighted in the literature explain a large fraction of the variance in location choices. In the USA, Japan and Taiwan sub-samples, the models explain more than one-half of the variation in location decisions. The explanatory power is slightly lower for South Korea and the European countries Germany, Great Britain and France, where it ranges from 16%-31%.

The right-most column (titled “Hierarchy”) in Table 4 reports our main results. This model adds the instrumental variables for the seven largest countries in our sample. This model shows that the exchange and firm-characteristics highlighted by the theory of the firm literature continue to be associated with governance choice even after inclusion of the additional location choice variables.¹⁰ The results also indicate that six out of the seven location choices significantly affect the governance decision. The coefficient is strongly positive ($p < 0.001$) for Taiwan, Germany, Great Britain and France. Holding typical exchange and firm-attributes constant, firms that have production performed in these countries are much more likely to organize via hierarchy rather than organize via market contract (outsource) semiconductor production. The coefficient for Japan ($p < 0.002$) and the USA are also positive and significant but not equally strong ($p < 0.02$). South Korea is the only location choice that does not demonstrate a statistically significant association with governance decisions in our

¹⁰ Exchange characteristics such as problem complexity and demand uncertainty remain positively correlated with the decision to internalize an exchange. Production experience remains positively associated with the decision to internalize an exchange. The variables for number of suppliers remains negatively associated with the hierarchical choice. In sum, the findings from this sample are consistent with extant work (e.g., Macher and Richman, 2008).

models. These results indicate that location choices have a direct and pivotal influence on governance choice. That is, these results reject the null hypothesis that location choice does not affect governance choice.

****Insert Table 5 about here****

Table 5 presents the results for the instrumented governance choice variable regressed on the seven location choices highlighted in our sample. The left-hand column lists the variables in our regression equations. The next column reports the regressions used to develop our instrumental variable for governance choice (e.g., Hierarchy). As above, we conduct several analyses to identify the best set of instrument variables. The five variables: Problem complexity, Demand uncertainty, Production experience, Available suppliers and Facility Maturity explain no less 42% of the variation in the governance choice and the Sargan-test for over identifying restrictions indicate that the instruments are uncorrelated with the residuals of the seven location choices ($R\text{-square} < 0.064$).

We present our main results in the seven rightmost columns (each titled with individual country names) in Table 5. These models report whether governance choice (Hierarchy) affects location choice beyond traditional location attributes highlighted in the literature. The results indicate that governance choice has a significant ($p < 0.005$) effect on the location decision in six of the seven locations in our sample. The choice of hierarchical governance is positively associated with location choice in the USA, Germany, Great Britain, and France. The choice of hierarchical governance is negatively associated with the decision to locate in Japan or South Korea. These models indicate that the inclusion of the instrumented governance choice variable leads to instability in the association between several geographic variables and location choice. This implies that governance choice circumscribes at least some of our theories of location choice. We also note different patterns of results across Asian and Western countries. As above, these results offer strong support for our hypothesis that governance and location choices are interdependent. These results lead us to reject the null hypothesis that governance choice does not affect location choice.

Conditional and binary logistic tests of coefficient stability

Finally, we explore whether tests of existing theory using traditional factors associated with governance and location choices are stable across suitable sub-samples. As these tests are exploratory, we state the most basic of null hypotheses—that the associations between traditional indicators of governance and location choice are stable across location and governance sub-samples. Table 6 reports results from a binary logistic model estimating governance choice across sub-samples for the largest 7 countries in our data. In addition, for comparison, the first column reports results from a model including all observations. We categorize these antecedent variables into groups associated with the exchange context, firm-specific experience, and other firm contextual controls to ease comparison.

****Insert Table 6 about here****

Visual inspection of the coefficients in Table 6 indicates that the associations traditionally highlighted in the governance choice literature are largely robust across the split samples. For instance, the coefficients for production experience remains directionally stable irrespective of location choice (albeit at somewhat lower magnitudes in Asian countries other than Taiwan). The effect due to other predictors of governance choice, such as problem complexity or available suppliers, are robust in some settings but not others. For instance, the effect of problem complexity remains at least marginally statistically significant in the expected direction in the UK, Taiwan, and the US and the effect of available suppliers remains statistically significant in the expected direction in Japan, Taiwan, and the US. Thus, our analysis increases our confidence in logic associated with predictions regarding indicators of exchange context or firm-specific experience and governance choice suggested by theories including transaction cost economics, industrial organization, and the resource-based view.

Nevertheless, Table 6 also indicates instances of instability. For instance, while UK firms with high levels of sourcing experience tend to outsource production, the US sub-sample reports the opposite association. Similarly, while firm tenure is associated with a higher propensity to outsource an exchange in the French sub-sample, the Japanese sub-sample indicates the reverse. While we are

reticent to draw conclusions from associations identified in a single sample, these anomalous findings raise questions regarding the boundary conditions of existing theory. More generally, the results from this dataset suggest that exchange characteristics tied to a firm's ability to manage environmental uncertainty or sourcing partnerships—characteristics that are embedded in and attached to specific locations—are more fragile across locations than other contextual variables.

Similarly, we estimated a series of conditional logistic models on location choice using the market and hierarchical governance sub-samples as well as the full sample. As above, our goal is to compare the stability of coefficients within groups of traditional antecedent variables associated with geographic context, geographic distance, and firm experience variables on location choice. Visual inspection of the coefficients in Table 7 indicate that the association between indicators of experience in a host location and location choice are remarkably robust across both market and hierarchical governance sub-samples. This increases our confidence in extant explanations of firms' location choice that emphasize the role of experience in foreign expansion.

At the same time, our results indicate variation in the effect of other location attributes on the location choice across the governance subsamples. For instance, political constraints are negatively associated with location choice in the hierarchical governance sub-sample and positively associated with location choice in the market governance sub-sample. This observation lends credence to the idea that firms anticipate the cost of investing fixed assets in countries where the risk of expropriation is high but are less concerned with protecting assets shared via market contracts in these settings—perhaps due to their ability to leverage other complementary assets (Zhao, 2006). Similarly, the popular Kogut and Singh cultural index measure is negatively associated with location choice in the hierarchical sub-sample and positively associated with location choice in the market sub-sample, perhaps lending support to critics of this measure (e.g., Berry, Guillen, and Nan, 2010; Shenkar, 2001). While we urge caution when speculating about the factors that might underlie these mixed

associations, we again see evidence for an interaction across governance and location choice.¹¹ In this set of models, the experience attributes appear to be most generalizable across contexts.

****Insert Tables 7 and 8 about here****

At this point, an astute reader may ask whether it is possible to determine whether a simultaneous or nested (sequential) choice structure better fits our data. Do firms in our study tend to choose governance and location choice at the same time or do they tend to complete one choice prior to the other? While we cannot offer a specific test of these data structures, we can generate statistics that allow us to compare the model fit for the two single-stage structures (governance or location choice) and the simultaneous single-stage structure (governance and location choice).

Table 8 reports these statistics. The left most column lists model fit statistics. Lower scores for the Akaike Information Criterion (AIC), Schwartz Criterion (SC), and -2 log Likelihood (LL) statistic indicate superior models with less information lost, greater closeness of fit, and more accurate predictions. The adjusted Estralla and Veall-Zimmermann statistics provide pseudo-R-squared measures of fit for equations with dichotomous dependent variables. The remaining columns indicate the value of the overall statistics for a binomial logit model used to estimate governance choice (market or hierarchical governance), a multinomial logit model used to estimate location choice (with our seven most frequently observed countries), and a multinomial logic model used to estimate fourteen unique combinations of governance and location choice. In all models, we utilize the full complement of exchange context, firm experience, firm context, geographic context, geographic distance, and geographic experience variables. That is, all the covariates included in the models presented in Tables 6 & 7.

¹¹ An astute reader might compare the findings in Tables 4 and 6 with those reported in Tables 5 and 7. Whereas the former tables report findings on whether governance and location choices in the presence of instrumental variables determines location and governance, respectively, the latter provide a straight forward analysis of the stability of findings across sub-samples of location and governance mode.

Our objective is to understand whether the simultaneous (governance and location choice) model fits the data better than the independent (governance or location choice) models. The statistics reported in Table 8 indicate that the simultaneous model has lower values for the variance related measures (AIB, SC and -2LL) than the sum of these statistics for the two independent models. This indicates that the simultaneous model explains more of the variance in our dataset than the models that separately treat these choices. This inference is also reflected in the pseudo R-square statistics as the simultaneous model has the highest value for the adjusted Estrella and Veall-Zimmermann statistics. Overall, Table 8 indicates that the simultaneous model is superior to the separate models.

DISCUSSION AND CONCLUSION

This paper examines whether governance and location choices are independent. Our goal is two-fold. First, to provide large-scale empirical evidence regarding the association between these choices. Second, to determine whether predictions from prominent theories of governance and location choice are robust to any interdependence across these choices. In doing so, the article addresses calls for empirical research that explicitly examines the implications of interdependence across prominent boundary decisions (e.g., Buckley *et al.*, 2007; Mudambi and Venzin, 2010; Shaver, 2013) and is consistent with calls for research that better integrates classic work on strategic choice with insights from international business (Teece, 2020; Buckley, 2021). As Kogut (1989: 383) states, the field of global strategy needs to develop an understanding of "what is different from what we already know ... when we move from a domestic to an international context."

Our paper yields three primary empirical findings. First, we demonstrate that strong associations exist across the governance form used to manage an exchange and the foreign location where firms choose to conduct this exchange in the global semiconductor industry. This correlation indicates empirical research exploring governance (location) choice that does not control for location (governance) choice *may* be under-specified. Second, our 2SLS analyses indicate that a direct

association exists between instrumented governance choice variables and location choice as well as between instrumented location choice variables and governance choice. Conditional on choosing hierarchy firms are more likely to choose to locate in the US, Germany, UK, or France and less likely to choose to locate in Japan, Taiwan, or South Korea. Conditional on choosing to locate in the US, Japan, Taiwan, Germany, UK, France, or South Korea, firms are more likely to choose Hierarchical governance. This correlation highlights the contextual boundaries associated with prior theory. Nevertheless, associations between exchange hazards (e.g., problem complexity), firm capability (e.g., production experience), and governance choice highlighted in the theory of the firm literature remain robust to inclusion of location controls. Finally, a series of binary logistic and conditional logistic models suggests the stability of the effects of traditional exchange and firm experience variables on governance choice and the effects of firm in country experience on location choice. Overall, these results add to the cumulative body of evidence regarding important management theories by demonstrating both the degree of interdependence across these choices and the relative robustness of predictions from important theories as they apply to new contexts (e.g., Bettis *et al.*, 2014).

Implications and Extensions

According to Tallman and Pedersen (2015: 273), “International strategy involves the study of cross-border activities of economic agents or the strategies and governance of firms engaged in such activity.” However, prior research has found it challenging to integrate national dissimilarities into extant theories of governance and location choice. Our findings suggest a way to direct and focus effort aimed at integrating theories of governance and location choice—to consider how governance and location choice simultaneously (or reciprocally) affect one another. For example, our findings are consistent with the idea that legal protections afforded by hierarchical governance provide a partial substitute for the legal protections afforded by countries with weaker legal institutions (e.g., Oxley, 1999). Our findings are also consistent with the idea that the “rich communication” that exists within a firm (e.g., Monteverde, 1995) is also likely to be more valuable when coordinating complex activities

across individuals separated by large cultural or geographic distances. While these arguments exist at a more granular level of analysis than we can test in this paper, they suggest a starting point for research regarding the conditions that lead to a particular sequence or reciprocal pattern of causation across governance and location pairs. More broadly, when is it possible for governance and institutions to substitute for one another? Such work promises to shed light on the mechanism(s) supporting the interdependence between governance and location choices illustrated by our 2SLS models.

Another avenue through which to refine our theories of governance and location is to explore whether and how firms alter their choices in response to technological or geopolitical shocks. If we can assess the factors that jointly affect governance and location choices over time, we can explore whether and how firms make changes to their existing pairs of governance and location choices. For instance, a firm may produce semiconductor chips in a particular country to gain access to skilled labor only to find that the technical requirements or political environment change. What are the adjustment costs firms face when attempting to rectify such situations? Is it easier to alter a governance or a location choice? Are certain choice combinations more irreversible than others? If commitment is the dynamic of strategy (Ghemawat, 1991), do governance or location choices imply greater commitment?

The juxtaposition of theories of governance and location choice also raises questions regarding the timing and sequencing of these choices. Do firms choose location and then governance, governance and then location, or make governance and location choices simultaneously? The results from the 2SLS models estimated with our sample suggest the possibility that governance has a causal effect on location choice and that location has a causal effect on governance choice. Given this evidence, future research might explore whether there are conditions wherein we might expect one sequence to be more likely or more effective than the other. Alternatively, if there are reasons to believe that certain conditions favor one sequence of choices over another, it may be useful to examine whether and why certain firms struggle to identify the appropriate sequence of choices. Does the presence of experience

indicate valuable resources or shared beliefs among entrenched top management teams that lead to the persistence of inefficient choices?

One particularly interesting way to conceive of the factors that affect the sequencing of choices is to consider whether and how firm-specific factors affect preferences for particular governance forms or locations. In addition to the focus on production experiences demonstrated in our study, one can imagine a management team with strong beliefs about the importance of entering a particular country framing the problem as one of governance choices conditional on the attributes of the (already chosen) country. One might also think about this as country – governance pairings. That is, if we enter country x, then we might choose to internalize production; if we enter country y, then we will outsource production; and, if we enter country z we might choose some third method of governing production. Finally, if we frame the problem via a governance capability lens, one might assume that the firm aims to leverage its internal production or outsourcing skills and then evaluate potential country choices based on these governance skills. While it is difficult to ascertain these decision-making dynamics from public data sources, our findings suggest the importance of experimental research that analyzes whether and how problem framing affects governance and location choices.¹²

This article also has implications to the broader field of strategic management. A fundamental issue in the field is why firms differ in their choices (Rumelt, Schendel, and Teece, 1991). Recent work defines the field of strategic management as the study of interdependent choices (Leiblein, Reuer, and Zenger, 2018) that guide subsequent choices (e.g., van den Steen, 2017). This paper establishes that governance and location choices are interdependent—there is systematic variation in choices that violates the predictions from extant theories of governance and location choice. In so doing, it highlights the importance of understanding the underlying sources of this interdependence. Whether and why do close competitors choose distinct combinations of governance and location choices? Do

¹² We are indebted to Kyle Mayer for helping us to elaborate this point.

some firms more easily recognize the implications of this interdependence, incorporate it into their decision-making apparatus, and reach an optimal configuration of these two choices instead of paying vivid attention to the particularities of the individual decision?

One way to explore why close competitors vary in their choice of distinct governance and location choices leverages insights from research on behavioral and organizational processes. Classic work in international business and management emphasizes that resource allocation (e.g., Bower, 1970; Burgelman, 1983) and foreign investment decisions (e.g., Aharoni, 1966) are jointly influenced by the economic features of a project as well as the personal goals, available information, and power differences across a management team. Presumably, these behavioral attributes lead to systematic differences in decision-making styles that affect the framing and sequencing of choices such as those involving governance and location choices. For instance, a top management team that has recently gone through an alliance-training program (or even certification process such as that provided by the association of strategic alliance professionals) may be primed to choose a governance form prior to a country location. However, the effect need not be so direct. We imagine any experience that affects the manner in which a management team cognitively frames a problem or creates shared beliefs that lead the team to one approach over another will affect the sequencing of actions and associations between these choices in a manner that leads to their co-determination.

The findings presented in this paper also suggest a need to more carefully consider our understanding of the consequences of these interdependent choices. Existing work suggests that performance is enhanced by the formation of a discriminating alignment between exchange attributes and governance choices (e.g., Leiblein, Reuer, and Dalsace, 2002; Masten, Meehan, and Snyder, 1991; Novak and Stern 2008). However, the evidence of strong correlations between governance and location choices suggests the importance of reconceptualizing “fit” in terms of governance-location pairs. If governance and location choices are interdependent, what tradeoffs do managers make when assessing the costs and benefits associated with these decisions? Do governance and location choices

affect performance equally? Is it possible that governance (location) choices affect technical (financial) outcome measures more readily than location (governance) choices?

In addition to the direct performance implications of governance and location choices, the findings presented in this paper suggest that future work may productively explore whether and when governance and location choices act as strategic complements or substitutes. Are there conditions under which an increase in one choice causes or forces an increase or decrease in the other choice? (e.g., super- or sub-additive). Building on Simon's (1962) description of decision-making in complex systems, a prominent strand of literature in the field of strategic management explores how webs of complex, complementary choices may yield superior performance relative to peers (e.g., Siggelkow, 2002). Using the procedure outlined in Athey and Stern (1998) and applied in other recent articles (e.g., Cassiman and Valentini, 2016; Grimpe and Sofka, 2016), our paper suggests opportunities to explore whether and when pairs of governance and location choices are super- or sub-additive.¹³

Limitations and Conclusion

There are, of course, limitations in our study that deserve to be recognized. First, our study covers a single industry. While our context provides us with rich, exchange-level data across private and public firms active in many countries, the generalizability of our findings is still limited. Second, our dataset covers a single time-period (1990 through 2005). While this data is relatively unique in including exchange characteristics, governance choices, and location choices (Martin, Swaminathan, and Tihanyi, 2007; Shaver, 2013), its age does not allow us to comment on contemporary outsourcing trends and location patterns. Likewise, while we believe our ability to pair governance choice, home country location, and the location where an activity is performed represents a contribution, we acknowledge that we cannot address the full complexity of the decision-making process. We only observe the “final result” of a firm's decisions. Thus, future research may provide a closer scrutiny of

¹³ In public talks, Steven Postrel has identified potential challenges to applying the concept of “supermodularity” or the “cross-partial derivative approach” to assess organizational complementarities. At present, the authors of this paper are not aware of a superior method to estimating these effects.

how such interdependent decisions are enacted -- perhaps by focusing on decision-making processes. Third, our study imperfectly captures the effect of a firm's full portfolio of activities on subsequent choices. Our data cannot address differences in firm-level awareness, skills, or training that affect these complex governance and location decision-making processes. Moreover, while we control for production and sourcing experience as well as prior in-country experience, our data do not allow us to control for network position in general, or proximity to knowledge and markets in particular (e.g., Nachum, Zaheer, and Gross, 2008). Finally, our model does not capture the sequence of governance and location decisions. As noted above, firms may sequence their location decisions over time—taking into account learning needs, market requirements, and competitor actions (e.g., Alcácer, Dezső, and Zhao, 2015). These limitations open up additional avenues for future research.

In conclusion, this paper takes a step forward in exploring the interdependence of extant theory regarding the antecedents of governance form and location choice. Our discussion emphasizes the complex and ostensibly asymmetric interactions underlying the interdependence between governance and location choices. Our analysis reveals that decisions regarding the governance and location through which particular activities are performed are highly interdependent, that exchange- or location hazards signal important, independent challenges for managers, and that governance mode and location choices are at least partial substitutes.

REFERENCES

- Alcácer J. (2006). Location choices across the value chain: How activity and capability influence collocation. *Management Science*, 52(10), 1457-1471.
- Alcácer J., & Chung W. (2007). Location strategies and knowledge spillovers. *Management Science*, 53(5): 760-776.
- Alcácer J., Dezső C., & Zhao M. (2015). Location choices under strategic interactions. *Strategic Management Journal*, 36(2), 197-215.
- Anderson E., & Gatignon H. (1986). Modes of foreign entry: A transaction cost analysis and propositions. *Journal of International Business Studies*, 17(3): 1–26.
- Aharoni Y. (1966). *The foreign investment decision process*. Harvard University: Boston.
- Argyres NS. (1996). Evidence on the role of firm capabilities in vertical integration decisions. *Strategic Management Journal*, 17(2): 129–151.
- Argyres N., & Zenger T. (2012). Capabilities, Transaction Costs, and Firm Boundaries. *Organization Science*, 23(6): 1643-1667.
- Asmussen C.G., Benito G.R.G., & Petersen B. (2009). Organizing foreign market activities: From entry mode choice to configuration decisions. *International Business Review*, 18(2): 145-155.
- Athey S., & Stern S. (1998). *An empirical framework for testing theories about complementarity in organizational design* (No. w6600). National Bureau of Economic Research.
- Bachrach, S. (1989). Organizational Theories: Some criteria for evaluation. *Academy of Management Review*. 14(4): 496-515.
- Barkema H.G., Bell J.H.J., & Pennings J.M. (1996). Foreign entry, cultural barriers, and learning. *Strategic Management Journal*, 17(2): 151–166.
- Barney J.B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.
- Berry, H., Guillén, M. F., & Zhou, N. (2010). An institutional approach to cross-national distance. *Journal of International Business Studies*, 41(9), 1460-1480.
- Bettis R.A., Gambardella A., Helfat C., & Mitchell W. (2014). Quantitative empirical analysis in strategic management. *Strategic Management Journal* 35: 1411–1413.
- Bigelow L.S., & Argyres N. (2008). Transaction costs, industry experience and make-or-buy decisions in the population of early US auto firms. *Journal of Economic Behavior & Organization*, 66(3): 791-807.
- Brahm F., & Tarziján J. (2016). Toward an integrated theory of the firm: The interplay between internal organization and vertical integration. *Strategic Management Journal*, 37(12): 2481-2502.
- Buckley, P.J. (2021). Fundamental issues in strategy: A comment. *Strategic Management Review*, forthcoming.
- Buckley P.J. & Ghauri, P.N. (2004). Globalisation, economic geography and the strategy of multinational enterprises. *Journal of International Business Studies*, 35: 81–98
- Buckley P.J., Devinney T.M., & Louviere J.J. (2007). Do managers behave the way theory suggests? A choice-theoretic examination of foreign direct investment location decision-making. *Journal of International Business Studies*. 38(7): 1069-1094.
- Buckley P.J., & Casson M.C. (1976). *The Future of the Multinational Enterprise*. Homes and Meier, London, U.K
- Cassiman B., & Valentini G. (2016). Open innovation: Are inbound and outbound knowledge flows really complementary? *Strategic Management Journal*, 37(6), 1034-1046.
- Caves R.E. (1996). *Multinational Enterprise and Economic Analysis*. Cambridge University Press, New York.
- Christensen, C.M., & Raynor, M.E. (2003). Why hard-nosed executives should care about management theory. *Harvard Business Review*, 81(9), 66-75.

- Chung W., & Alcácer J. (2002). Knowledge seeking and location choice of foreign direct investment in the United States. *Management Science*, 48(12): 1534-1554.
- Cockburn I.M., Henderson R.M., & Stern, S. (2000). Untangling the origins of competitive advantage. *Strategic Management Journal*, 21(10/11): 1123-1145.
- Davidson W.H. (1980). The location of foreign direct investment activity: Country characteristics and experience effects. *Journal of International Business Studies*, 12 (Fall):9-22.
- Davidson, W.H, & McFetridge D.G. (1985). Key characteristics in the choice of international technology transfer mode. *Journal of International Business Studies*, 16(2), 5-21.
- Dunning J.H. (1980). Toward an eclectic theory of international production: Some empirical tests. *Journal of International Business Studies*, 11: 9-31.
- Dunning J.H. (1998). Location and the multinational enterprise: A neglected factor? *Journal of International Business Studies*, 29(1): 45-66.
- Flores R.G., & Aguilera R.V. (2007). Globalization and location choice: an analysis of US multinational firms in 1980 and 2000. *Journal of International Business Studies*, 38(7): 1187-1210.
- Ghemawat, P. (1991). *Commitment*. Simon and Schuster.
- Grant R.M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, 17(S2), 109-122.
- Grimpe, C., & Sofka, W. (2016). Complementarities in the search for innovation—Managing markets and relationships. *Research Policy*, 45(10), 2036-2053.
- Grossman S.J., & Hart O.D. (1986). The costs and benefits of ownership: a theory of vertical and lateral integration. *Journal of Political Economy* 94: 691–719.
- Handley, S.M., & Angst, C.M. (2015). The impact of culture on the relationship between governance and opportunism in outsourcing relationships. *Strategic Management Journal*, 36(9), 1412-1434.
- Henisz W.J. (2000). The institutional environment for multinational investment. *Journal of Law, Economics, and Organization*, 16(2): 332-364.
- Henisz W.J., & Delios A. (2001). Uncertainty, imitation, and plant location: Japanese multinational corporations, 1990-1996. *Administrative Science Quarterly*, 46(3): 443-475.
- Henisz W.J., & Macher J.T. (2004). Firm- and country-level trade-offs and contingencies in the evaluation of foreign investment: The semiconductor industry, 1994-2002. *Organization Science*, 15(5):537-554.
- Hennart J.F., & Park Y.R. (1993). Greenfield vs. acquisition: The strategy of Japanese investors in the United States. *Management Science*, 39(9), 1054-1070.
- Hoetker G. (2005). How much you know versus how well I know you: selecting a supplier for a technically innovative component. *Strategic Management Journal* 26: 75–96.
- Holburn G.L., & Zelner B.A. (2010). Political capabilities, policy risk, and international investment strategy: Evidence from the global electric power generation industry. *Strategic Management Journal*, 31(12): 1290-1315.
- Hymer S.H. (1960/1976). *The International Operations of National Firms: A Study of Direct Foreign Investment*. The MIT Press, Cambridge, MA.
- Iouliaou, S.P., Leiblein, M.J., & Trigeorgis, L. (2020). Multinationality, portfolio diversification, and asymmetric MNE performance: The moderating role of real options awareness. *Journal of International Business Studies*, 1-21.
- Jacobides M., & Hitt L. (2005). Losing the forest for the tree? Productive capabilities and gains from trade vs. transactional hazards as drivers of vertical scope. *Strategic Management Journal*, 26: 1209-1227.
- Jacobides, M.G., & Winter, S.G. (2012). Capabilities: Structure, agency, and evolution. *Organization Science*, 23(5), 1365-1381.

- Johanson J., & Vahlne J.E. (1977). The internationalization process of the firm-a model of knowledge development and increasing foreign market commitments. *Journal of International Business Studies*, 23-32.
- Kapoor R., & Adner R. (2012). What firms make vs. what they know. *Organization Science*, 1227-1248.
- Kennedy, P. (1985). *A guide to econometrics* (2nd ed.). Cambridge, Massachusetts: MIT Press.
- Kim, J.U., & Aguilera, R.V. (2016). Foreign Location Choice: review and Extensions. *International Journal of Management Reviews*, 18:133-159.
- Klein B., Crawford R., & Alchian A. (1978). Vertical integration: appropriable rents and the competitive contracting process. *Journal of Law and Economics*, 21: 279–326.
- Knight G.A., & Cavusgil S.T. (2004). Innovation, organizational capabilities, and the born-global firm. *Journal of International Business Studies*, 35(2), 124-141.
- Kogut, B. (1989). A Note on Global Strategies. *Strategic Management Journal*, 10(4), 383-389.
- Kogut B., & Singh H. (1988). The effect of national culture on the choice of entry mode. *Journal of International Business Studies*, 19(3): 411-432.
- Krugman P.R. (1991). *Geography and trade*. MIT Press, Cambridge, MA.
- Leachman R.C., & Leachman C.H. (1999). *Trends in Worldwide Semiconductor Fabrication Capacity*. Report CSM-48, Engineering System Research Center, Berkeley.
- Leiblein M.J., & Miller D.J. (2003). An empirical examination of transaction- and firm-level influences on the vertical boundaries of the firm. *Strategic Management Journal*, 24(9): 839–859.
- Leiblein, M.J., Reuer, J.J., & Dalsace, F. (2002). Do Make or Buy Decisions Matter? The Influence of Governance on Technological Performance. *Strategic Management Journal*. 23(9): 817–833.
- Leiblein, M.J., Reuer, J.J., & Zenger, T.R. (2018). What Makes a Decision Strategic? *Strategy Science*. 3(4): 558–573.
- Levy D.T. (1985). The transactions cost approach to vertical integration: an empirical examination. *Review of Economics and Statistics*, 67: 438–445.
- Macher J.T. (2006). Technological development and the boundaries of the firm: A knowledge-based examination in semiconductor manufacturing. *Management Science*. 52(6): 826-843.
- Macher J.T., & Richman B.D. (2008). Transaction cost economics: An assessment of empirical research in the social sciences. *Business and Politics*, 10:1
- Mahoney J., & Qian L. (2013). Market frictions as building blocks of an organizational economics approach to strategic management. *Strategic Management Journal*, 34: 1019-1041.
- Makino S., & Neupert K.E. (2000). National culture, transaction costs, and the choice between joint venture and wholly-owned subsidiary. *Journal of International Business Studies*, 31(4): 705-713.
- Makino S., Lau C.M., & Yeh R.S. (2002). Asset-exploitation versus asset-seeking: Implications for location choice of foreign direct investment from newly industrialized economies. *Journal of International Business Studies*, 33(3), 403-421.
- Martin X., & Salomon R. (2003). Tacitness, learning, and international expansion: A Study of foreign direct investment in a knowledge-intensive industry. *Organization Science*, 14(3): 297-311.
- Martin X., Swaminathan A., Tihanyi L., Ketchen D.J., & Bergh D.D. (2007). Modeling international expansion. *Research Methodology in Strategy and Management*, 103-119.
- Masten S.E., Meehan J.W., & Snyder E.A. (1991). The costs of organization. *Journal of Law Economics and Organization*, 7: 1-25.
- Mayer K.J., & Argyres N.S. (2004). Learning to contract: Evidence from the personal computer industry. *Organization Science* 15: 394–410.
- Mayer K.J., & Salomon R. (2006). Capabilities, contractual hazards, and governance: Integrating resource-based and transaction cost perspectives. *Academy of Management Journal* 49: 942–959.
- Mesquita L.F., & Brush T.H. (2008). Untangling safeguard and production coordination effects in long-term buyer-supplier relationships. *Academy of Management Journal*. 51(4): 785-807.

- Monteverde K. (1995). Technical Dialog as an Incentive for Vertical Integration in the Semiconductor Industry. *Management Science*, 41(10): 1624-1638.
- Mudambi R. (1998). The role of duration in multinational investment strategies. *Journal of International Business Studies*, 239-261.
- Mudambi R., & Venzin M. (2010). The strategic nexus of offshoring and outsourcing decisions. *Journal of Management Studies* 47(8): 1510-1533.
- Nachum L., Zaheer S., & Gross S. (2008). Does it matter where countries are? Proximity to knowledge, markets and resources, and MNE location choice. *Management Science*. 54(7):1252–1265.
- Nickerson J.A., & Zenger T.R. (2004). A knowledge-based theory of the firm—The problem-solving perspective. *Organization Science*. 15(6): 617-632
- Nielsen B.B., Asmussen C.G., & Weatherall C.D. (2017). The location choice of foreign direct investments: Empirical evidence and methodological challenges. *Journal of World Business*, 52(1): 62-82.
- Novak S., & Stern S. (2008). How does outsourcing affect performance dynamics? Evidence from the automobile industry. *Management Science*, 54(12): 1963-1979.
- Oxley J.E. (1997). Appropriability hazards and governance in strategic alliances: a transaction cost approach. *Journal of Law, Economics and Organization*, 13(2): 387–409
- Oxley J.E. (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.
- Pedersen, T., & Shaver, J.M. (2011). Internationalization revisited: The big step hypothesis. *Global Strategy Journal*, 1(3-4), 263-274.
- Pedersen T., & Petersen B. (2004). Learning about foreign markets: Are entrant firms exposed to a "shock effect"? *Journal of International Marketing*, 103-123.
- Peteraf M. (1993). The cornerstones of competitive advantage: A Resource-based view. *Strategic Management Journal*, 14: 179-192.
- Porter M.E. (2000). Location, competition, and economic development: Local clusters in a global economy. *Economic Development Quarterly*. 14(1): 15-34.
- Reuer J.J., Zollo M., & Singh H. (2002). Post-formation dynamics in strategic alliances. *Strategic Management Journal*, 23(2), 135-151.
- Ruiz-Moreno F., Mas-Ruiz F.J., & Nicolau-Gonzálbez J.L. (2007). Two-stage choice process of FDI: Ownership structure and diversification mode. *Journal of Business Research* 60(7): 795-805.
- Rumelt R.P., Schendel D., & Teece D.J. (1991). Strategic management and economics. *Strategic Management Journal*, 12(S2), 5-29.
- Sargan J.D. (1958). The estimation of economic relationships using instrumental variables. *Econometrica: Journal of the Econometric Society*, 393-415.
- Semiconductor Industry Association. (2016). SIA Review of Global and US Semiconductor Competitive Trends.
- Shane, S.A. (1994). The effect of national culture on the choice between licensing and direct foreign investment. *Strategic Management Journal*, 15: 627-42.
- Shaver J.M. (2013). Do we really need more entry mode studies? *Journal of International Business Studies*, 44(1), 23-27.
- Shenkar, O. (2001). Cultural distance revisited: Towards a more rigorous conceptualization and measurement of cultural differences. *Journal of International Business Studies*, 32(3), 519-535.
- Siggelkow N. (2002). Evolution toward fit. *Administrative Science Quarterly*, 47(1), 125-159.
- Simon, H.A. (1991). The architecture of complexity. In *Facets of systems science* (pp. 457-476). Springer, Boston, MA.

- Tallman, S., & Pedersen, T. (2015). What is international strategy research and what is not. *Global Strategy Journal*, 5(4), 273-277.
- Teece D.J. (1977). Technology transfer by multinational firms: The resource cost of transferring technological know-how. *The Economic Journal*, 87(346), 242-261.
- Teece D.J. (2020). Fundamental issues in strategy: Time to reassess? *Strategic Management Review*, 1(1): 103-144.
- Van den Steen E. (2018). A formal theory of strategy. *Management Science*. 63(8): 2616-2636.
- Walker G., & Weber D. (1984): A transaction cost approach to make-or-buy decisions. *Administrative Science Quarterly*, 29: 373-391.
- Walker G., & Weber D. (1987). Supplier competition, uncertainty, and make-or-buy decisions. *Academy of Management Journal*. 30(3): 589-596.
- Williamson O.E. (1975). *Markets and Hierarchies: Analysis and Antitrust Implications*. Free Press: New York.
- Williamson O.E. (1985). *The Economic Institutions of Capitalism*. Free Press: New York.
- Williamson O.E. (1991). Comparative Economic Organization: The Analysis of Discrete Structural Alternatives. *Administrative Science Quarterly*, 36(2): 269-296.
- Woodward D.P., & Rolfe R.J. (1993). The location of export-oriented foreign direct investment in the Caribbean Basin. *Journal of International Business Studies*, 24(1), 121-144.
- Zaheer S. (1995). Overcoming the liability of foreignness. *Academy of Management Journal* 38(2): 341–363.
- Zhao, M. (2006). Conducting R&D in Countries with weak intellectual property rights protection. *Management Science*, 52 (8), 1185-1199.
- Zhao, H., Luo, Y., & Suh, T. (2004). Transaction cost determinants and ownership-based entry mode choice: A meta-analytical review. *Journal of International Business Studies*, 35(6): 524-544.

Are Governance Mode and Foreign Location Choices Independent?

Table 1. Frequency table of governance mode and location choice.

Country Location	Hierarchy		Hybrid (J&V)		Market Contract		Sample Total	
	Vertical integration				Outsourcing			
	Frequency	% Country Total	Frequency	% Country Total	Frequency	% Country Total	Frequency	% Sample Total
1. Australia	11	100	0	0	0	0	11	0.4
2. Austria	18	37.5	0	0	30	62.5	48	1.6
3. Belgium	8	100	0	0	0	0	8	0.3
4. Canada	1	33.3	0	0	2	66.7	3	0.1
5. Czech rep.	2	22.2	0	0	7	77.8	9	0.3
6. China	20	100	0	0	0	0	20	0.7
7. Finland	2	100	0	0	0	0	2	0.1
8. France*	157	69.5	3	1.3	66	29.2	226	7.3
9. Germany*	149	48.7	46	15.0	111	36.3	306	9.9
10. Israel	21	50.0	0	0	21	50.0	42	1.4
11. Italy	66	100	0	0	0	0	66	2.1
12. Japan*	141	23.2	46	7.6	421	69.2	608	19.7
13. S. Korea*	4	2.7	0	0	142	97.3	146	4.7
14. Malaysia	2	50.0	0	0	2	50.0	4	0.1
15. Netherlands	0	0	5	100	0	0	5	0.2
16. Singapore	51	40.5	1	0.8	74	58.7	126	4.1
17. Taiwan*	190	31.8	120	20.1	288	48.1	598	19.4
18. UK*	200	84.0	0	0	38	16.0	238	7.7
19. USA*	204	33.0	115	18.6	299	48.4	618	20.0
Total	1,247	40.4%	336	10.9%	1,501	48.7%	3,084	100%

*indicates one of seven countries with largest number of total observations.

Table 2. Summary statistics and correlation matrix for the independent variables ($n = 3,084$).

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Governance Variables	1. Problem complexity	1.00																	
	2. Demand uncertainty	0.08	1.00																
	3. Available supplier	0.50	0.14	1.00															
	4. Production experience	-0.01	0.10	-0.02	1.00														
	5. Sourcing experience	0.04	0.14	0.09	0.42	1.00													
	6. Diversification strategy	-0.12	0.13	0.01	0.45	0.46	1.00												
	7. Tenure	-0.08	0.18	-0.02	0.56	0.44	0.49	1.00											
	8. Facility Maturity	-0.14	0.03	0.02	0.19	0.12	0.35	0.24	1.00										
Location Variables	9. Polcon	-0.06	0.01	-0.05	-0.01	0.06	-0.03	-0.04	0.12	1.00									
	10. Wage-level	-0.06	0.01	-0.02	0.22	0.20	0.17	0.11	0.33	0.53	1.00								
	11. Ctry. Tech. Environ	0.08	0.02	0.01	-0.14	-0.10	-0.19	-0.18	-0.33	-0.01	-0.33	1.00							
	12. GDP per capita	-0.01	0.04	-0.01	0.15	0.12	0.07	0.05	0.23	0.51	0.55	-0.14	1.00						
	13. Population	-0.05	0.03	-0.05	0.19	0.08	0.06	0.04	0.04	0.43	0.38	-0.01	0.34	1.00					
	14. Economic growth	0.03	0.09	0.02	0.04	0.05	0.06	0.02	-0.01	0.02	0.05	-0.02	0.08	0.08	1.00				
	15. Distance	0.04	0.05	0.04	-0.26	-0.04	-0.06	0.01	-0.07	0.01	-0.03	0.10	0.08	0.13	0.01	1.00			
	16. Kogut & Singh index	0.14	-0.06	0.10	-0.14	0.05	-0.23	-0.19	-0.22	-0.01	-0.15	0.26	-0.15	-0.05	0.01	0.32	1.00		
	17. Domestic firm experience in host market	0.24	0.14	0.43	0.05	0.19	0.16	0.11	0.20	0.22	0.32	-0.07	0.38	0.45	0.06	0.17	0.13	1.00	
	18. Focal firm experience in host market	-0.03	0.07	0.03	0.31	0.38	0.33	0.35	0.44	0.44	0.28	-0.31	0.24	0.14	0.01	-0.06	-0.11	0.32	1.00
	Mean	0.52	0.37	3.82	11.2	5.81	15.4	23.9	4.1	0.41	12.6	0.49	10.0	4.17	0.21	3.79	2.00	4.01	1.15
	Std. dev	0.49	1.14	0.49	6.02	1.54	14.1	16.6	4.7	0.14	4.6	0.12	0.49	1.16	1.09	0.39	0.69	1.31	0.86
	Minimum values	0	-2.52	1.61	0	0	1	0	0	0	0.2	0.12	5.87	1.14	-0.98	2.54	0.24	0.69	0
	Maximum values	1	5.37	4.74	17.1	8.12	78	60	19	0.72	22.4	0.79	10.7	7.17	9.63	4.19	4.17	6.90	2.77

Table 3. Cochran-Mantel-Haenszel Statistics on general association (p-values in parentheses)

Location frequency		Governance frequency	
		2 modes (hierarchy vs. buy)	3 modes (incl. joint venture)
Country locations	All country locations	559.4 (0.0001) N=2,748	864.5 (0.0001) N=3,084
	The 7 most frequent country locations	425.8 (0.0001) N=2,410	624.7 (0.0001) N=2,740
	The 12 less frequent country locations	108.3 (0.0001) N=338	395.3 (0.0001) N=344
	Asian country locations	155.6 (0.0001) N=1,346	263.3 (0.0001) N=1,513
	Western country locations	213.9 (0.0001) N=1,402	382.6 (0.0001) N=1,571
Region locations	Regions (Asia, Europe and North America)	325.8 (0.0001) N=2,748	401.4 (0.0001) N=3,084

Are Governance Mode and Location Choices Interdependent?

Table 4: 2SLS-model with instrument variables:

Locations determining the choice of hierarchy or market contract. N=2,748 observations (p-values in parentheses)

		USA	Japan	Taiwan	Germany	UK	France	S Korea	Hierarchy
Location Variables	Intercept	0.20 (0.001)	0.20 (0.001)	0.18 (0.001)	0.09 (0.001)	0.08 (0.001)	0.08 (0.001)	0.06 (0.001)	-0.07 (0.26)
	Polcon	-0.14 (0.001)	0.17 (0.001)	-0.01 (0.32)	-0.02 (0.007)	-0.04 (0.001)	0.01 (0.09)	0.07 (0.001)	
	Ctry. Tech. Environ	-0.06 (0.001)	0.09 (0.001)	0.01 (0.007)	0.03 (0.001)	-0.06 (0.001)	0.03 (0.001)	-0.04 (0.001)	
	GDP per capita	0.35 (0.001)	-0.10 (0.001)	0.04 (0.001)	-0.07 (0.001)	-0.07 (0.001)	-0.04 (0.001)	-0.06 (0.001)	
	Wage-level	-0.32 (0.001)	0.22 (0.001)	-0.29 (0.001)	0.13 (0.001)	0.12 (0.001)	0.09 (0.001)	-0.07 (0.001)	
	Population	0.31 (0.001)	-0.04 (0.001)	-0.11 (0.001)	0.02 (0.002)	-0.04 (0.001)	0.01 (0.10)	0.01 (0.93)	
	Economic growth	0.01 (0.003)	-0.03 (0.001)	0.01 (0.84)	0.01 (0.14)	-0.01 (0.03)	0.02 (0.001)	0.01 (0.44)	
	Distance	0.03 (0.001)	0.01 (0.06)	-0.04 (0.001)	0.03 (0.001)	0.01 (0.44)	-0.08 (0.001)	0.02 (0.001)	
	Kogut & Singh index	0.02 (0.001)	0.07 (0.001)	-0.03 (0.001)	-0.07 (0.001)	-0.11 (0.001)	0.05 (0.001)	0.04 (0.001)	
	Domestic firm experience in host market	-0.03 (0.001)	0.12 (0.001)	0.11 (0.001)	-0.06 (0.001)	0.02 (0.001)	-0.08 (0.001)	-0.01 (0.005)	
	Focal firm experience in host market	-0.01 (0.33)	-0.04 (0.001)	0.01 (0.42)	0.03 (0.001)	-0.04 (0.001)	0.05 (0.001)	0.01 (0.99)	
Governance Variables	Problem complexity								0.05 (0.001)
	Demand uncertainty								0.04 (0.001)
	Problem complexity * Demand uncertainty								0.04 (0.002)
	Available suppliers								-0.07 (0.001)
	Production experience								0.21 (0.001)
	Sourcing experience								0.07 (0.001)
	Diversification strategy								-0.03 (0.001)
	Tenure								-0.08 (0.001)
Instrumental Variables	Facility Maturity								0.16 (0.001)
	USA Hat								0.15 (0.02)
	Japan Hat								0.21 (0.002)
	Taiwan Hat								0.66 (0.001)
	Germany Hat								0.87 (0.001)
	UK Hat								0.63 (0.001)
	France Hat								0.24 (0.001)
	South Korea Hat								0.10 (0.41)
Model Statistics	F-value	556.8 (0.001)	364.7	384.0	49.3 (0.001)	126.4	75.1 (0.001)	86.1 (0.001)	88.4 (0.001)
	R-square	0.67	(0.001)	(0.001)	0.15	(0.001)	0.22	0.24	0.34
	Adj. R-square	0.67	0.57	0.58	0.15	0.32	0.21	0.24	0.34
			0.57	0.58		0.31			

Table 5: 2SLS-model with instrument variables:

Governance choice determining locations. N=2,410 observations (p-values in parentheses)

		Hierarchy	USA	Japan	Taiwan	Germany	UK	France	S Korea
	Intercept	0.44 (0.001)	0.16 (0.001)	0.28 (0.001)	0.19 (0.001)	0.12 (0.001)	0.02 (0.06)	0.03 (0.001)	0.08 (0.001)
Governance Variables	Problem complexity (PC)	0.04 (0.001)							
	Demand uncertainty (DU)	0.01 (0.98)							
	Problem complexity * Demand uncertainty	0.06 (0.001)							
	Available suppliers	-0.07 (0.001)							
	Production experience	0.22 (0.001)							
	Sourcing experience	0.02 (0.05)							
	Diversification strategy	0.05 (0.001)							
	Tenure	-0.03 (0.001)							
	Facility Maturity	0.16 (0.001)							
Location Variables	Polcon		-0.14 (0.001)	0.16 (0.001)	-0.01 (0.36)	-0.02 (0.01)	-0.04 (0.001)	0.01 (0.03)	0.06 (0.001)
	Ctry. Tech. Environ		-0.04 (0.001)	0.08 (0.001)	0.01 (0.41)	0.01 (0.20)	-0.04 (0.001)	0.04 (0.001)	-0.04 (0.001)
	GDP per capita		0.34 (0.001)	-0.09 (0.001)	0.06 (0.001)	-0.05 (0.001)	-0.09 (0.001)	-0.05 (0.001)	-0.06 (0.001)
	Wage-level		-0.32 (0.001)	0.22 (0.001)	-0.30 (0.001)	0.12 (0.001)	0.12 (0.001)	0.09 (0.001)	-0.05 (0.001)
	Population		0.30 (0.001)	-0.03 (0.001)	-0.10 (0.001)	0.03 (0.001)	-0.05 (0.001)	-0.01 (0.92)	0.01 (0.98)
	Economic growth		0.02 (0.001)	-0.03 (0.001)	-0.01 (0.06)	-0.01 (0.03)	-0.01 (0.14)	0.02 (0.001)	0.01 (0.21)
	Distance		0.04 (0.001)	0.01 (0.83)	-0.04 (0.001)	0.02 (0.001)	0.01 (0.02)	-0.07 (0.001)	0.01 (0.004)
	Kogut & Singh index		0.01 (0.002)	0.08 (0.001)	-0.03 (0.001)	-0.06 (0.001)	-0.12 (0.001)	0.04 (0.001)	0.03 (0.001)
	Domestic firm experience in host market		-0.03 (0.001)	0.12 (0.001)	0.11 (0.001)	-0.06 (0.001)	0.02 (0.001)	-0.08 (0.001)	-0.01 (0.003)
	Focal firm experience in host market		0.01 (0.56)	-0.03 (0.001)	-0.01 (0.09)	0.01 (0.50)	-0.05 (0.001)	0.05 (0.001)	0.01 (0.06)
IV	Hierarchy Hat		0.08 (0.001)	-0.17 (0.001)	-0.02 (0.24)	0.06 (0.002)	0.14 (0.001)	0.09 (0.001)	-0.05 (0.001)
Model Statistics	F-value	218.2 (0.001)	506.2 (0.001)	337.4 (0.001)	348.4 (0.001)	45.63 (0.001)	120.5 (0.001)	70.6 (0.001)	80.6 (0.001)
	R-square	0.42	0.67	0.58	0.58	0.16	0.33	0.22	0.24
	Adj. R-square	0.42	0.67	0.57	0.58	0.15	0.32	0.22	0.24

Table 6: Binary logistic models on governance choice for each of the seven countries – split samples (p-values in parentheses)

		All observations	Split samples						
			USA	Japan	Taiwan	Germany	UK	France	South Korea
Governance Variables	Intercept	0.43 (0.001)	0.37 (0.001)	0.25 (0.001)	0.41 (0.001)	0.54 (0.001)	0.35 (0.001)	0.25 (0.006)	0.09 (0.001)
	Problem complexity	0.04 (0.001)	0.04 (0.092)	0.04 (0.014)	0.04 (0.012)	0.01 (0.966)	0.08 (0.001)	0.01 (0.954)	-0.01 (0.323)
	Demand uncertainty	0.02 (0.068)	-0.02 (0.444)	0.05 (0.090)	0.04 (0.105)	0.12 (0.004)	-0.01 (0.529)	0.02 (0.627)	-0.04 (0.097)
	Problem complexity* demand uncertainty	0.04 (0.003)	0.13 (0.001)	-0.10 (0.001)	0.03 (0.219)	-0.09 (0.023)	0.04 (0.110)	0.13 (0.016)	0.01 (0.801)
	Available suppliers	-0.07 (0.001)	-0.08 (0.001)	-0.03 (0.011)	-0.07 (0.001)	-0.04 (0.186)	-0.02 (0.460)	-0.02 (0.542)	0.01 (0.827)
	Production experience	0.20 (0.001)	0.14 (0.001)	0.10 (0.001)	0.37 (0.001)	0.17 (0.001)	0.68 (0.001)	0.67 (0.001)	0.07 (0.001)
	Sourcing experience	0.02 (0.007)	0.10 (0.001)	0.09 (0.001)	0.06 (0.001)	0.03 (0.392)	-0.14 (0.001)	-0.01 (0.859)	-0.01 (0.885)
	Diversification strategy	0.01 (0.321)	0.11 (0.001)	-0.10 (0.001)	-0.28 (0.001)	-0.01 (0.994)	-0.02 (0.269)	-0.01 (0.990)	0.11 (0.006)
	Tenure	-0.03 (0.010)	0.05 (0.024)	0.09 (0.001)	-0.26 (0.001)	0.08 (0.008)	0.15 (0.001)	-0.09 (0.012)	-0.11 (0.001)
	Facility Maturity	0.20 (0.001)	0.16 (0.001)	0.20 (0.001)	0.09 (0.001)	0.22 (0.001)	0.08 (0.001)	0.20 (0.001)	0.10 (0.001)
Model Statistics	N	2,410	503	562	478	260	238	223	146
	F-value	195.50 (0.001)	55.03 (0.001)	69.30 (0.001)	114.04 (0.001)	28.93 (0.001)	19.10 (0.001)	17.71 (0.001)	7.35 (0.001)
	R-square	0.42	0.50	0.53	0.69	0.51	0.43	0.43	0.33

Table 7: Conditional logistic model on location choice for make and buy – split samples (p-values in parentheses)

		All Observations	Split samples	
			Make	Buy
Location Variables	Polcon	0.16 (0.001)	-0.11 (0.049)	0.41 (0.001)
	Ctry. Tech. Environ	-0.15 (0.003)	-0.28 (0.001)	-0.07 (0.269)
	Wage	-0.20 (0.005)	0.01 (0.998)	-0.37 (0.001)
	GDP per capita	0.22 (0.013)	0.25 (0.076)	0.12 (0.345)
	Population	-0.32 (0.001)	-0.56 (0.001)	-0.04 (0.480)
	Economic growth	-0.11 (0.001)	-0.13 (0.001)	-0.04 (0.389)
	Distance	0.44 (0.001)	0.87 (0.001)	0.31 (0.001)
	Kogut & Singh index	0.43 (0.001)	-0.22 (0.008)	0.64 (0.001)
	Domestic firm experience in host market	0.85 (0.001)	0.83 (0.001)	0.91 (0.001)
	Focal firm experience in host market	0.74 (0.001)	0.76 (0.001)	0.73 (0.001)
Model Statistics	Number of observations	2,410	1,045	1,365
	Number of cases	16,870	7,315	9,555
	Log likelihood	-2,385	-904	-1,287
	AIC	4,790	1,829	2,594
	McFadden's LRI	0.49	0.56	0.52
	Veall-Zimmerman	0.83	0.86	0.84

Table 8: Comparisons of overall model fit

	Binomial logic model of governance choice	Multinomial logit model of location choice	Multinomial logit model of governance & location choice
	(2 choices)	(7 choices)	(14 choices)
Akaike Information Criterion	1876.2	255.1	1560.1
Schwartz Information Criterion	1988.7	929.5	2821.3
-2 log Likelihood	1838.3	27.1	1066.1
Adjusted Estralla	0.59	0.79	0.84
Veall-Zimmermann	0.70	0.71	0.73