Location of Decision Rights Within Multinational Firms

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ABSTRACT

Using U.S.-based multinational firm data gathered over more than two decades, we examine factors associated with the location of decision rights within these firms, whether the inappropriate assignment of decision rights is associated with poor firm performance, and whether these firms relocate decision rights in response to their evolving environments. We find that a mismatch between the location of decision rights and a firm's environment is associated with weak firm performance. We also show that the likelihood a parent company will alter the assignment of decision rights to a subsidiary is

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increasing in the extent of a mismatch although this likelihood is decreasing in the strength of the subsidiary's performance.

1. Introduction

The globalization of business has been explosive. The largest retailer in the world, Wal-Mart Stores, had just 1% of its stores located outside the United States in 1993, but that number had grown to over 63% in 2013 (see Wal-Mart's annual reports). Multinational firms operate in various political, cultural, legal, and economic environments. The sheer size and scope of these firms heightens the need for their managers to obtain and process enormous quantities of information. As firm profit maximization depends on the collocation of decision rights with the knowledge necessary for making those decisions (Hayek [1945]), understanding the allocation of decision rights to foreign subsidiaries of multinational firms is becoming increasingly important. This study uses a large sample of U.S.-based multinational firms to examine factors associated with the location of decision rights, whether the inappropriate location of decision rights is associated with poor firm performance, and whether firms reassign decision rights as their environments evolve.

Multinational firms typically conduct their international activities through foreign-affiliated companies often operating in different currency environments. When preparing its consolidated financial statements, Generally Accepted Accounting Principles (GAAP) require a parent company to report its results and those of its foreign affiliates in a common reporting currency.[1] A parent must use one of two procedures to transform foreign currency financial statements. The procedure depends on the currency in which the foreign affiliate primarily makes its operating, investing, and financing decisions—termed its *functional currency*. To identify an affiliate's functional currency, the parent is required to distinguish between affiliates whose activities are integrated with the parent's domestic activities (e.g., the affiliate serves as a sales outlet for the parent company) and those whose activities are self-contained within the foreign environment (e.g., the affiliate produces and sells locally). Thus, the affiliate's functional currency serves as an indicator of the "real" location of decision making for each affiliate.

We study the location of decision rights using data available from the U.S. Bureau of Economic Analysis (BEA) for the years 1982, 1989, 1994, 1999, and 2004. Our sample consists of 5,700 firm-years (2,902 unique firms) and 45,990 subsidiary years (28,386 unique subsidiaries). We use a firm's declared functional currency for each of its foreign subsidiaries to measure

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[1] In line with GAAP, we define a *firm* as a U.S. parent and the set of legal entities in which the parent holds, directly or indirectly, more than a 20% equity interest. The term *parent* refers only to the domestic operation of the *firm*. We refer to a foreign *affiliate* as a legal entity in which the parent has, directly or indirectly, at least a 20% equity interest. We refer to a foreign *subsidiary* as a foreign affiliate in which the U.S. parent has, directly or indirectly, more than a 50% equity interest.

whether the firm has centralized or decentralized decision-making rights with respect to each subsidiary.

It has long been argued that firms should choose their organizational structure to match their environments (e.g., Lawrence and Lorsch [1967]). We regard a firm's organizational structure as describing the centralization or decentralization of decision rights with regard to each of its foreign subsidiaries. Thus, to understand the factors associated with firms' organizational structures, we model the assignment of decision rights to foreign subsidiaries (Besanko, Dranove, and Shanley [2000]). By comparing our prediction of the location of decision rights with the observed location for each subsidiary, we measure the lack of fit between a firm's organizational structure and its environment, which we term organizational *mismatch*. With this measure of organizational mismatch in hand, we develop and test two primary hypotheses.

The first hypothesis posits and we find that an organizational structure that is mismatched to a firm's environment is associated with weaker firm performance. Further, firms with inappropriately decentralized decision rights suffer significantly poorer performance than those with inappropriately centralized decision rights. The second hypothesis predicts and we show that the likelihood a parent will reassign decision rights is increasing in the extent of a mismatch but this likelihood is decreasing in the strength of its subsidiary's performance. Moreover, we find parents are less willing to reclaim decision rights from subsidiaries when those rights were previously inappropriately decentralized than they are to delegate decision rights that were previously inappropriately centralized. These observations suggest circumstances prompting firms to alter the location of decision rights; they also serve to validate our novel measure of decision rights.

Our study makes several contributions to the work examining the location of decision rights within multinational firms. First, using a large sample of firms spanning more than two decades, we establish that organizational structure is associated with firm performance and firms adjust their structure in response to their evolving environments. In contrast, there is little empirical research examining the organizational structure of multinational firms and firm performance (Leksell [1981], Habib and Victor [1991], Caves [1996]). A limitation of the antecedent work is that it uses relatively small samples, uses qualitative surveys of organizational structure, is limited to a cross-section of data, or focuses on a small set of industries.

Second, we develop a novel procedure for identifying the real location of decision rights by characterizing each subsidiary of a firm as being either centralized or decentralized. We recognize that decision making within firms is more complex and multidimensional than our dichotomous measure suggests. Nevertheless, our parsimonious measure of organizational structure has several desirable features: it allows us to examine the location of decision rights over a long time period, across a large number of firms, and is constructed using data gathered from independently audited financial statements. Our construct also can be used to measure and

compare the location of decision rights for multinational firms based in various countries.

Throughout this study, we identify the location of decision rights at the foreign subsidiary level using data the BEA collects. Accordingly, we consider an alternative measure of a multinational firm's organizational structure that uses *publicly* available data. The correlation between the measures constructed using confidential data at the subsidiary level and public data at the consolidated level is significantly positive, suggesting publicly available financial statements can help identify the location of decision rights within multinational firms.

To validate our construct, we provide evidence suggesting that the method multinational firms choose to account for their foreign operations is not motivated by the desire to exclude the functional currency translation adjustments from earnings and thereby reduce earnings volatility or to manage tax reporting outcomes. These findings support the validity of our measure.

The paper proceeds as follows: section 2 develops the testable hypotheses; section 3 explains our method for determining the location of decision rights within a multinational firm; section 4 describes the sample; section 5 details the research design; section 6 documents empirical results; section 7 includes robustness tests; and section 8 concludes.

2. *Hypothesis Development*

A firm is viewed as a mechanism that facilitates the efficient allocation of resources (Bolton and Dewatripont [1994]). A firm's *organizational structure* is the coordinating mechanism that assigns decision rights within the firm to achieve its aims; it describes how a firm uses a division of labor to assign tasks and to facilitate information flows (Besanko, Dranove, and Shanley [2000]).

Our study focuses on the assignment of decision rights, taking the boundary of the firm as given. In contrast, it does not explore the decisions to incorporate, acquire, or divest a subsidiary, which affects the boundary of the firm. Consequently, our interest in organizational structures differs from those studies that examine a firm's choice of legal form for an affiliate, such as a corporation or partnership, and those that investigate modes of foreign market entry, such as exporting, joint ventures, and licensing arrangements (see Guenther [1992], Desai, Foley, and Hines [2004]). Conditional on a U.S. parent having a foreign subsidiary (i.e., taking the boundaries of the firm as given), we focus on the organization of the firm and examine the location of decision rights.[2]

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[2] Issues surrounding changes in the boundaries of the firm are important (see Coase [1937]). However, examining firms' decisions to alter their boundaries by incorporating subsidiaries in foreign countries or divesting subsidiaries falls outside the scope of this study.

The appropriate location of decision rights within a firm has been widely debated (Friebel and Raith [2010]). The management and strategy literature focus on the way in which strategic initiatives determine the appropriate organizational structure (e.g., Egelhoff [1982], Habib and Victor [1991], Wolf and Egelhoff [2002], Csaszar [2012]). Using survey data, Bloom and Van Reenen [2007] examine multinational firms headquartered in different countries to explore the role of cultural, legal, and political factors in determining organizational structure. The industrial organization literature also studies the optimal decentralization of decision rights (e.g., Grossman and Hart [1986], Aghion and Tirole [1997], Rajan and Wulf [2006], Acemoglu et al. [2007], Alonso, Dessein, and Matouschek [2008], Hart and Holmstrom [2010]). The role of a firm's organizational structure appears in the international trade literature as a factor explaining differences in firm performance (Marin and Verdier [2008]). The finance literature examines how organizational structure influences firm capital structure, dividend payout, and investment decisions (Stein [2002], Graham, Harvey, and Puri [2011]). The accounting literature examines implications of organizational structure for performance evaluation, compensation, and budgeting (e.g., Baiman, Larcker, and Rajan [1995], Baldenius and Reichelstein [2006]).

In this study of multinational firms, we use the location of decision rights in the parent–subsidiary relation as an indication of a firm's organizational structure. Some foreign subsidiaries, although *owned* by a U.S. parent, conduct their activities relatively autonomously—that is, formal ownership need not reflect real control over the activities within a firm (Berle and Means [1932], Aghion and Tirole [1997], Bester [2009], Hart and Holmstrom [2010]). Accordingly, we identify the assignment of decision rights with respect to each foreign subsidiary; that is, we characterize each subsidiary as being either centralized or decentralized. While the location of decision rights in firms is more complex than this dichotomous construct captures (Milgrom and Roberts [1992]), our construct has the virtue that it allows us to parsimoniously characterize the assignment of decision rights for a large sample of firms over a long period.

One of the most enduring ideas in organization theory is that a firm's organizational structure must "fit" its environment (Ghoshal and Nohria [1993]). A firm's view of its environment is dynamic. Not only do firms learn about their environments but their environments also evolve. For instance, firms often deal with foreign demand uncertainty by testing the foreign markets with small export levels before moving production to a foreign market that they identify as being substantial (Akhmetova [2010]); as another example, the desirability of sourcing production that uses proprietary technology evolves as patent laws and other property rights in a foreign country change (Bilir [2011]). Accordingly, as a firm's understanding of its environment improves or its environment evolves, it may find that its organizational structure is mismatched with its environment.

A firm's ability to efficiently allocate resources, and thereby earn a superior rate of return, depends in part on the congruence of its organizational structure to its environment (e.g., Lawrence and Lorsch [1967], Caves [1996]). However, there is a dearth of large sample empirical evidence supporting this claim. Accordingly, our first hypothesis examines whether the inappropriate assignment of decision rights is associated with poor firm performance:[3]

> *H1:* An organizational structure that is mismatched to a firm's environment is associated with poor firm performance.

We study performance effects in H1 at the firm level because we expect the effect of an individual subsidiary mismatch to have negative consequences for the entire firm rather than to be contained within the subsidiary. The misallocation of decision rights to a subsidiary affects the performance of the entire firm as it distracts management of the parent company and creates coordination problems within the firm's value chain. To illustrate, consider Daimler AG's recent experience. After robust growth in 2011, Daimler AG's Mercedes car sales hardly grew in 2012 "in large part because of problems coordinating its two, often-dueling Chinese sales and distribution networks." Accordingly, Daimler reorganized its Chinese operations. It "combined the two competing sales channels and appointed a new board member charged with overseeing its business in China" (Fuhrmans and Geiger [2013]).

Further, the inappropriate assignment of decision rights might benefit a subsidiary at the expense of the parent. Consider the circumstance in which a subsidiary has inappropriately been allocated decision rights to distribute a product (e.g., cosmetics) in a foreign jurisdiction. To increase its profits, the foreign subsidiary lowers the price of the product. If the price in the foreign jurisdiction is low enough, however, a competing distributor can purchase the product in the foreign jurisdiction and import it into the parent's host country at a discount and thereby reduce the profit of the parent.[4]

A firm with an organizational structure poorly matched to its environment should alter it to align it more closely with its environment (Lawrence and Lorsch [1967]). That is, as the role of a firm's foreign subsidiaries in implementing the firm's strategy changes over time, matching the multinational firm's organizational structure to its environment may necessitate the reassignment of decision rights with respect to particular subsidiaries (Chandler [1962]).

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[3] All hypotheses are stated in the alternative form.

[4] More generally, it can be analytically established that the profits of a monopolist are higher than the aggregate profits of the industry when it contains two or more competing firms (see Tirole [1993]). Thus, a parent that fails to coordinate the activities of its subsidiaries might suffer lower profits.

It may be difficult to recognize when mismatches occur, particularly in rapidly changing environments. Even when mismatches are identified, influence costs may constrain the relocation of decision rights in a parent–subsidiary relation (Hart and Holmstrom [2010]). For instance, this relocation may necessitate renegotiation of employment contracts, changing the location of institutional knowledge, adjustment to accounting and internal control systems, or resolving conflicts arising from organizational politics.

We expect a subsidiary's performance to impact the likelihood that a parent will reassign decision rights. A subsidiary's poor performance may highlight the need for an organizational change. Further, this poor performance may encourage a firm to incur the costs to change the location of decision rights. Alternatively, we expect good subsidiary performance to enable a firm to tolerate an organizational mismatch for longer. Thus, we offer the following hypotheses:

H2a: The likelihood that a parent will alter decision rights in a subsidiary is increasing in the extent of a mismatch.

H2b: The likelihood that a parent will alter decision rights in a subsidiary in response to a mismatch is decreasing in the subsidiary's performance.

We examine H2a and H2b at the subsidiary level because changes in the location of decision rights, influence costs, and the ability to detect organization mismatch vary at the subsidiary level.

3. Location of Decision Rights in Multinational Firms

We rely on GAAP for U.S.-based multinational firms to identify the assignment of decision rights to foreign subsidiaries. When preparing consolidated financial statements that include financial statements of foreign subsidiaries, FASB ASC 830—*Foreign Currency Translation* (previously codified as FAS 52) requires that a parent determine a functional currency for each of its foreign affiliates. For a foreign affiliate of a U.S. parent, the functional currency is either the U.S. dollar (the parent's reporting currency) or a foreign currency (typically the subsidiary's host country currency). The functional currency is the currency in which an affiliate primarily makes its operating, investing, and financing decisions. Given the rationale underlying the functional currency choice (see Revsine [1984]), we use the functional currency designation for financial reporting purposes to identify the real location of decision making.[5] Specifically, when the affiliate's functional currency is the parent's reporting currency, we regard the

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[5] ASC 830 lists six factors (see http://www.fasb.org/pdf/aop_FAS52.pdf) to help firms identify foreign business activities that are carried out with a significant degree of autonomy (i.e., decision rights are decentralized). Managers and auditors should consider these factors when determining the functional currency. In section 7, we offer tests suggesting a firm's incentives to manage its earnings or tax-reporting outcomes do not drive its functional currency choice.

parent as retaining the decision rights or *centralizing* them; alternatively, when the affiliate's functional currency is the host country currency, we regard the parent as delegating the decision rights or *decentralizing* them.

To illustrate, consider Quest Software's accounting policy disclosure suggesting the centralization of decision rights:[6]

> In accordance with Statement of Financial Accounting Standards ("SFAS") No. 52, "*Foreign Currency Translation*," the United States Dollar is considered to be the functional currency for our foreign subsidiaries as such subsidiaries act primarily as an extension of our parent company's operations. The functional currency determination is primarily based on the subsidiaries' relative financial and operational dependence on the parent company.

Alternatively, Bayer AG, a Germany-based firm, has accounting policies suggesting the decentralization of decision rights:[7]

> The majority of consolidated companies outside the euro zone autonomously carry out their activities financially, economically and organizationally. Their functional currencies according to IAS 21 are thus the respective local currencies.

Firms must also disclose any change in their accounting policy regarding the functional currency designation. For instance, Universal Biosensors Inc. discussed in its annual report how changes in the operations of its Australian subsidiary prompted a change in its functional currency:

> In 2006, the Company significantly expanded its Australian based research activities. All of the Company's directors became and continue to be resident in Australia. All of the Company's expenditure on research and development is Australian dollar denominated. It also began planning for and successfully accomplished a capital-raising in Australian dollars and listed on the Australian Stock Exchange. The majority of cash and other monetary assets now held by the Company are denominated in Australian dollars. Due to these changes in circumstance, management are of the view that the functional currency of the Company changed in 2006 to Australian dollars.

To show how financial statements can be used to determine the location of decision making, we outline the requirements under ASC 830. There are two procedures for transforming an affiliate's financial statements expressed in a foreign currency into the parent's reporting currency. The

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[6] The illustrations we offer were found by searching annual reports for the term "functional currency" and do not necessarily imply that these firms are represented in our sample.

[7] Although our data restrict our focus to U.S. firms reporting under U.S. accounting standards, similar rules apply to non-U.S. firms reporting under the nearly identical International Accounting Standard No. 21—*The Effects of Changes in Foreign Exchange Rates* (IAS 21). Hence, our measure is useful for identifying the location of decision rights for multinational firms based in various countries.

appropriate procedure depends on the affiliate's functional currency. When an affiliate's activities are highly interdependent with the parent, the functional currency is the parent's reporting currency. In this case, the *Foreign Currency Translation Adjustments* (FCTAs) arising from changes in exchange rates are recognized on the *income statement*. On the other hand, when an affiliate's activities are autonomously carried out, the functional currency is the local currency. In this case, FCTAs are reported in accumulated other comprehensive income in the equity section of the *balance sheet*.

Importantly, because the assignment of decision rights may vary within a firm, many firms use not one but both of the two allowable methods under ASC 830 when transforming their foreign subsidiaries' financial statements. For example, Nacco Industries reports the following policy suggesting it has only retained the decision rights pertaining to its Mexican operations:

> Assets and liabilities of foreign operations are translated into U.S. dollars at the fiscal year-end exchange rate. The related translation adjustments are recorded as a separate component of stockholders' equity, except for NMHG's Mexican operations. The U.S. dollar is considered the functional currency for NMHG's Mexican operations and, therefore, the effect of translating assets and liabilities from the Mexican peso to the U.S. dollar is recorded in results of operations.

By using financial statement data for each foreign subsidiary of a multinational firm, we observe whether the translation adjustment is reported in its income statement or balance sheet and thereby identify the assignment of decision rights with respect to each subsidiary; see the appendix for further details.[8] The use of the translation adjustment in this way is novel. Moreover, this approach has the virtue that this identification is guided by GAAP and a firm's application of these reporting procedures is subject to external audit.[9]

This study emphasizes that foreign subsidiaries play different roles within an organization and, therefore, it considers the functional currency choice at the subsidiary level. In contrast, analyzing the FCTA reported in the consolidated financial statements at the firm level, which is the level of focus in studies examining the value relevance of the FCTA, would be less

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[8] To ensure the functional currency is indeed a *choice* of the parent, we restrict our sample of affiliate observations in two ways: First, we exclude affiliates in which the parent holds a noncontrolling interest. Second, we exclude affiliates operating in highly inflationary environments, defined by ASC 830 as a three-year inflation rate of approximately 100% or more. As the local currency is not considered stable enough to serve as a functional currency, the more stable currency of the reporting parent must be used instead.

[9] As an alternative measure, Li et al. (2012) consider the extent to which a CEO speaks in conference calls as a proxy for the extent to which the CEO possesses real authority. In contrast, our measure focuses on the headquarter–subsidiary relationship in multinational firms, and it is audited and available for a broader sample of firms.

powerful for our study (e.g., Soo and Soo [1994], Bartov and Bodnar [1996], Bartov [1997], Louis [2003], Şabac, Scott, and Weir [2005]). Specifically, a firm-level focus would fail to recognize that the accounting policy choice is determined subsidiary by subsidiary and is not a firm-level choice.

In our study, the location of decision rights is identified at the foreign subsidiary level using confidential BEA data. To identify the location of decision rights using publicly available data, we use the consolidated translation adjustment disclosed in a firm's 10-K filing (using changes in Compustat RECTA). We set a firm-level dichotomous variable equal to 1 if the consolidated balance sheet reports a nonzero translation adjustment in *accumulated other comprehensive income* and 0 otherwise. To compare these two constructs, we convert our dichotomous subsidiary-level measure to a continuous firm-level measure by weighting the subsidiary-level measure using the ratio of subsidiary sales to the firm's total foreign sales. The correlation between these two measures is significantly positive ($r = 0.42$), suggesting publicly available data can be used to identify a reasonable proxy for a firm's assignment of decision rights.[10]

4. Sample and Descriptive Statistics

We use firm-level data from the *Surveys of U.S. Direct Investment Abroad* conducted by the BEA. These surveys are legally mandated for the purpose of producing publicly available aggregate statistics on U.S. multinational company operations.[11] The data collected by the BEA vary by year and depend on whether a foreign affiliate meets the applicable reporting threshold. The reporting thresholds are lower in the benchmark than nonbenchmark survey years and, therefore, coverage is more complete in benchmark years. We use data from the BEA's "benchmark" survey years 1982, 1989, 1994, 1999, and 2004, which we label as measurement periods. The appendix discusses BEA data.

From the population of foreign affiliates reporting to the BEA, we exclude minority-owned affiliates and those that are ultimately owned by a non-U.S. parent, trust, estate, or partnership. Our final sample consists of 5,700 firm years (2,902 unique firms) and 45,990 subsidiary years (28,386 unique subsidiaries) in the benchmark survey years.

Table 1 presents information about the sample. Approximately three-quarters of the subsidiary years in the sample exhibit decentralized decision making. Moreover, the proportion of decentralized subsidiaries is increasing over time, suggesting an increasing trend toward decentralized decision

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[10] The use of publicly available data to identify the location of decision rights within multinational firms could be refined by scrutinizing firms' financial statement footnotes: see, for instance, the Nacco Industries example reported in section 3.

[11] See http://www.bea.gov/surveys/diasurv.htm and Mataloni [2003] for information about BEA data.

TABLE 1
Sample Composition for 45,990 Subsidiary Years

	Decentralized Subsidiaries $N = 34,686$	Centralized Subsidiaries $N = 11,304$
By Year		
1982	3,245	1,644
1989	7,016	2,652
1994	8,578	2,645
1999	9,150	2,794
2004	6,697	1,569
By Region		
Canada	3,842	1,025
Latin America	2,366	2,925
Europe	21,449	5,324
Africa	428	69
Middle East	39	81
Asia Pacific	6,562	1,880
By Industry		
Petroleum	933	1,091
Food	1,323	444
Chemical	3,598	924
Primary & fabricated metal manufacturing	1,251	289
Industrial machinery and equipment manufacturing	1,916	495
Electronic equipment manufacturing	1,334	592
Transportation equipment manufacturing	1,319	263
Other manufacturing	4,338	929
Wholesale trade	8,419	2,468
Banking	48	34
Financial, insurance, and real estate	4,346	2,113
Services	3,927	1,008
Other	1,934	654
Other Subsidiary Characteristics		
Median total sales ($ thousands)	25,053	16,819
Median total assets ($ thousands)	26,097	23,254
Median total employees	110	66

Table 1 reports the sample composition for the 45,990 subsidiary years partitioned according to the location of decision rights. Measurement periods correspond to the BEA benchmark survey years 1982, 1989, 1994, 1999, and 2004. Industry classifications are those used by the BEA when reporting statistics on U.S. international trade and investment (e.g., using three-digit International Standard Industrial Classification (ISIC) codes). To avoid disclosure of information on individual companies, we report medians as the mean of the five middle values.

making in multinational firms (see Malone [2004]). In 1982, approximately 66% of the 4,889 subsidiaries in our sample were decentralized, whereas, in 2004, over 80% were decentralized. This trend is also confirmed across firms; untabulated firm-level statistics show in 1982 that 27%, 40%, and 33% of firms report that all, some, or none of their subsidiaries are centralized, respectively. In 2004, this statistic shifted to 17%, 33%, and 50%. Further, decentralized subsidiaries are larger in terms of sales, assets, and employees.

The assignment of decision rights to subsidiaries also varies across industries. For instance, the petroleum industry exhibits a greater proportion of centralized subsidiaries, while the services industry displays a greater proportion of decentralized subsidiaries. This suggests that, when firms sell products that are relatively standardized (e.g., petroleum), the parent company is more likely to retain decision rights, whereas the opposite holds when products are more likely to be tailored to local tastes (e.g., services).

5. Research Design

To test our two hypotheses—an inappropriate organizational structure is associated with poor firm performance and firms adjust their organizational structure when poorly suited to their environments—we begin by describing the procedure to determine the appropriate location of decision rights.

5.1 MISMATCH CONSTRUCT

Firms face competitive forces that cause them to assign decision rights to subsidiaries in a fashion that is profit maximizing. In a large subsidiary-level data set that captures both cross-sectional and intertemporal variation in the assignment of decision rights, we believe that, on average, firms behave optimally. Individual firms, however, learn about their environments and dynamically converge to the optimal organizational structure. Therefore, a cross-sectional sample is expected to consist of actual firm choices that are distributed around the optimal choice. If the systematic portion of the model of the assignment of decision rights (fitted assignment of decision rights as a function of subsidiary, firm, and country characteristics) is the appropriate choice for a firm, then the residual from the model should adversely affect the firm's future performance. Klaas, Lauridsen, and Hakonsson [2010] propose an analogous approach for examining the performance implications arising from mismatches between a firm's observed organizational structure and the ideal organizational structure given its environment. Likewise, Ittner and Larcker [2001] and Ittner, Larcker, and Lambert [2003] use a similar approach to assess the effect on firm performance of suboptimal employee stock option grants.

5.1.1. Model of Assignment of Decision Rights. The dependent variable, denoted *Decentralized Sub*, is an indicator variable set equal to 1 if the functional currency is the subsidiary's host country currency, implying decision rights have been decentralized, and to 0 if the functional currency is the U.S. dollar, implying decision rights have been centralized.

Specifically, we fit the following model (where subscript i denotes a subsidiary and subscript t denotes the measurement period):

$$\Pr(\textit{Decentralized Sub}_{i,t} = 1) = G\left(\beta_0 + \sum_{j=1}^{13} \beta_j \textit{ Subsidiary Characteristics}_{i,t}\right.$$

$$+ \sum_{j=14}^{17} \beta_j \textit{ Firm Characteristics}_{i,t}$$

$$\left.+ \sum_{j=18}^{22} \beta_j \textit{ Country Characteristics}_{i,t}\right),$$

(1)

where $G(.)$ is the cumulative distribution function for a standard logistic random variable. We include year and industry fixed effects in all of our analyses.

As we use expression (1) to estimate a lack of fit between the location of decision rights and each subsidiary's environment, we require a comprehensive model explaining the allocation of decision rights within a multinational firm. The model includes subsidiary, firm, and country-level characteristics that capture activities in which an autonomous entity would be engaged as well as the reasons a parent would grant decision rights to a subsidiary. We motivate below each variable in the model and provide detailed variable definitions in table 2.

5.1.1.1. Subsidiary Characteristics. The subsidiary characteristics are motivated in part by the factors that GAAP recommends (see ASC 830) a firm consider when determining whether a subsidiary carries out its activities autonomously (see Revsine [1984]). Decentralized decision rights allow a firm to be more responsive to local, idiosyncratic demand factors (*LOCAL SALES*). Sourcing of goods and services from the United States should be less common in decentralized subsidiaries (*U.S. IMPORTS*). Local labor costs and financing activities in the local market should be more substantial for decentralized subsidiaries (*LOCAL COMPENSATION, INTEREST COVERAGE, LOCAL DEBT*). Further, decentralized subsidiaries are less likely to have intercompany transactions with its parent (*U.S. PAYABLES, U.S. RECEIVABLES*).

Other subsidiary characteristics are motivated using studies that examine organizational design and decision making in multinational firms (Stopford and Wells [1972], Goehle [1978]). Dividends from foreign subsidiaries address agency problems arising when information is asymmetrically distributed (Desai, Foley, and Hines [2007]), which are anticipated to be more prevalent in decentralized subsidiaries (*DIVIDEND*). Heightened product diversity should favor decentralization of decision rights (Bolton and Farrell [1990]) (*SALES MIX*). Aylmer [1970] suggests larger subsidiaries are assigned more decision rights (*RELATIVE SIZE*). Parent companies often maintain tighter control over new subsidiaries by centralizing

decision rights (Stopford and Wells, 1982) (*AGE*). Decentralized subsidiaries are less likely to employ expatriates when local knowledge and relationships are important, but more likely when expatriates help the parent coordinate and monitor the subsidiary's activities (Ahlstrom and Bruton [2010]) (*EXPAT*). Finally, decentralizing decision rights is more appropriate when information is "soft" and difficult to communicate (Stein [2002], Mian and Liberti [2009]) or when managers must be motivated to be creative (Aghion and Tirole [1994]) (*R&D*).

5.1.1.2. Firm Characteristics. The scale and scope of international business stresses managers' ability to coordinate their firms' activities, which favors decentralization (*% FOREIGN SALES, COUNTRIES*).[12] Vertical integration increases the need for centralized decision making to improve coordination within the firm (*INTERCOMPANY SALES*). Moreover, (Halperin and Srinidhi [1987, 1991]) argue that transfer prices necessary to account for intercompany transactions lead to efficiency losses in decentralized firms. Finally, we expect that a parent's experience in a country will affect the likelihood of delegating decision rights to subsidiaries operating in that country (*EXPERIENCE*).

5.1.1.3. Country Characteristics. Heightened local market competition favors the decentralization of decision rights (Aghion and Tirole [1997]) (*LOCAL COMPETITION*). A parent is more inclined to retain decision rights when a subsidiary operates in a country whose populace is tolerant of authority (*AUTHORITY ACCEPTABLE*) or operates in an unstable business environment (*FINANCIAL RISK, POLITICAL RISK, ECONOMIC RISK*).

5.2 RESEARCH DESIGN FOR H1

A firm's organizational structure impacts its ability to efficiently allocate resources. H1 posits that a firm's organizational structure ill-suited to its environment will hinder its ability to allocate resources efficiently, thereby harming its performance. To examine H1, we estimate the following firm-level pooled, cross-sectional ordinary least squares regression (where subscript k denotes a firm and subscript t denotes the measurement period):

$$
\begin{aligned}
Firm\,Performance_{k,t} = {} & \alpha_0 + \alpha_1 MISMATCH_{k,t}^{Firm} + \alpha_2 \,\%\,FOREIGN\,SALES_{k,t} \\
& + \alpha_3 MISMATCH_{k,t}^{Firm} \times FOREIGN\,SALES_{k,t} \\
& + Control\,variables_{k,t}.
\end{aligned}
\tag{2}
$$

The detailed variable definitions for this expression appear in table 4.

We determine *Firm Performance* as Return on Assets (*ROA*) because it is one of the most commonly used measures of financial performance and

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[12] When computing firm-level measures, we consider all affiliates rather than restricting our attention to subsidiaries.

is available for our sample of private and public firms. ROA_t^{Firm} is calculated as (Net income + interest expense (net of tax))/Total assets, and is adjusted each year by the firm's industry median ROA (see Stickney et al. [2010]). $MISMATCH_t^{Firm}$ aggregates $MISMATCH_t^{Sub}$ across all subsidiaries in an affiliated group, where $MISMATCH_t^{Firm}$ is the squared residual from estimating expression (1). Using the squared residual implies that larger mismatches are more likely to be detrimental to a firm's performance than smaller mismatches and that the effect on firm performance of one subsidiary organizational mismatch is not necessarily offset by that of another subsidiary. Further, to recognize that mismatches in larger subsidiaries may be more damaging to firm performance than mismatches in smaller ones, we weight the subsidiary-level measure, $MISMATCH_t^{Sub}$, by the ratio of subsidiary sales to the firm's total foreign sales.[13] Accordingly, the firm-level measure, $MISMATCH_t^{Firm}$, in expression (2) is increasing in the relative size of the subsidiaries whose decision rights are inappropriately allocated.

Based on H1, we predict that the coefficient on $MISMATCH_t^{Firm}$ will be negative; that is, $\alpha_1 < 0$. Alternatively, if firm performance is not sensitive to the inappropriate assignment of decision rights, then the sign should be nonnegative. Furthermore, to the extent that the model to estimate the mismatch measure (i.e., expression (1)) excludes affiliate, firm, or country attributes that explain the location of decision rights, $MISMATCH_t^{Firm}$ is a poor proxy for the inappropriate allocation of decision rights. This omission, however, biases against the finding that firm performance is negatively associated with the inappropriate assignment of decision rights.

As the mismatch construct relates to a firm's foreign subsidiaries, the hypothesized negative relation between mismatch and a firm's performance should be increasing in the proportion of a firm's worldwide operations represented by its foreign subsidiaries. Accordingly, we posit that the interaction term $MISMATCH_t^{Firm} \times \%\ FOREIGN\ SALES$ will be negative; that is, $\alpha_3 < 0$.

All continuous variables that are interacted are mean-centered throughout this study. Centering continuous variables (e.g., $MISMATCH_t^{Firm}$ and *% FOREIGN SALES*) before creating the interaction term is necessary to meaningfully interpret the coefficients in models that contain interactions of continuous variables (see Aiken and West [1991], Jaccard and Turrisi [2003]). The coefficient α_1 in expression (2) reflects a conditional relationship; specifically, without centering, α_1 is the effect of *MISMATCH* on the dependent variable *Firm Performance* when the proportion of foreign sales to worldwide sales variable, *% FOREIGN SALES*, equals zero. In a sample of multinational firms, however, a zero value for this variable is not sensible. By centering the continuous variables, α_1 is the effect of *MISMATCH* on *Firm Performance* for a firm with an average proportion of foreign sales. As

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[13] Our results are not sensitive to weighting by subsidiary assets or number of employees rather than sales.

H1 posits that both α_1 and α_3 will be negative, it is important that the main effect, captured by α_1, can be meaningfully interpreted.[14]

Finally, we control for cross-sectional differences in firm size (*FIRM SIZE)* and firm experience (*INTL EXPERIENCE*). Nissim and Penman [2001] document the time-series properties of various firm performance measures and find these measures revert to the mean fairly quickly.

5.3 RESEARCH DESIGN FOR H2A AND H2B

From time to time, a firm may find that its organizational structure is mismatched to its environment. H2 posits that the likelihood a parent will alter the assignment of decision rights to a subsidiary is increasing in the extent of the prior period mismatch and that this likelihood is decreasing in the subsidiary's prior period performance. We estimate the following pooled, cross-sectional logistic model (where subscripts t and $t-1$ denote the current and prior measurement periods, respectively, and subsidiary subscripts are suppressed):

$$
\begin{aligned}
\Pr(\Delta \textit{Decision Rights}_t = 1) = \ G(\delta_0 &+ \delta_1 \textit{MISMATCH}_{t-1}^{Sub} + \delta_2 \textit{ROA}_{t-1}^{Sub} \\
&+ \delta_3 \textit{MISMATCH}_{t-1}^{Sub} \times \textit{ROA}_{t-1}^{Sub} \\
&+ \textit{Control variables}_t).
\end{aligned}
\tag{3}
$$

The detailed variable definitions for this expression appear in table 5, panel A.

Our sample captures the five survey years 1982, 1989, 1994, 1999, and 2004. Therefore, the change in decision rights, denoted Δ*Decision Rights,* is an indicator variable equal to 1 if the assignment of decision rights to a subsidiary in the current survey year differs from that in the prior survey year (e.g., 1999 and 1994, respectively), and 0 otherwise. The construct $\textit{MISMATCH}_{t-1}^{Sub}$ is the squared residual from estimating expression (1) in the prior survey year. Our focus on the change in decision rights in expression (3) requires that we restrict our attention to subsidiaries in the sample for two consecutive benchmark surveys.

Based on H2a, the parent is predicted to change the assignment of decision rights to a subsidiary in response to the extent to which decision rights are inappropriately assigned. Accordingly, we predict the coefficient on $\textit{MISMATCH}_{t-1}^{Sub}$ to be positive; that is, $\delta_1 > 0$.

We further hypothesize that the subsidiary's past performance affects the firm's propensity to reassign decision rights. Ideally, we would like to identify the year of the change in the assignment of decision rights and the year of the subsidiary's performance that motivated the parent to alter the assignment. Given that our sample captures the five survey years 1982, 1989, 1994, 1999, and 2004, we are unable to identify the particular year in which the firm changed the assignment of decision rights and the performance of

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[14] While centering changes the main effects, thereby making them more meaningful to interpret, it does not change the coefficient estimate on the interaction effect.

the subsidiary in the year preceding the change. Instead, we measure the subsidiary's performance in the prior survey year. To the extent that this measure of performance differs from the subsidiary's performance that actually motivated the parent to reassign decision rights, the power of the test will suffer. With this caveat in mind, the subsidiary's performance, denoted ROA_{t-1}^{Sub}, is measured as the difference between the ROA of the subsidiary and the median ROA for all foreign subsidiaries (of U.S.-based multinationals) in the subsidiary's three-digit ISIC code.

When the assignment of decision rights to a subsidiary poorly suits its environment and it is performing badly, we anticipate that the parent will be more likely to change the organizational structure. Specifically, based on H2b, we predict the sign on the coefficient of $MISMATCH_{t-1}^{Sub} \times ROA_{t-1}^{Sub}$ to be negative; that is, $\delta_3 < 0$.[15]

We include several variables to control for cross-sectional differences in the likelihood a parent will alter the assignment of decision rights to a subsidiary. First, changes in a subsidiary's environment are expected to prompt the parent to reconsider the appropriateness of the assignment of decision rights (*ENVIRONMENT CHANGE*). Second, a firm might be less willing to relocate decision rights if the presence of influence costs makes it difficult; this cost is anticipated to be directly proportional to the subsidiary's size (*RELATIVE SIZE*). Third, we expect a parent to be more likely to evaluate the assignment of decision rights to a recently incorporated or acquired subsidiary (*AGE*).

6. Empirical Results

6.1 ESTIMATING THE MODEL OF ASSIGNMENT OF DECISION RIGHTS

Table 2 provides descriptive data for the regression variables included in expression (1) for our sample of 45,990 subsidiary years. All continuous variables are winsorized at the 1% and 99% levels. A univariate comparison of sample means suggests that decentralized and centralized subsidiaries exhibit different characteristics. Decentralized subsidiaries have greater financial and operating independence from their parent than centralized subsidiaries. Specifically, decentralized subsidiaries generate a larger portion of their total sales in their local markets (*LOCAL SALES* of 0.757 vs. 0.666), have fewer imported goods from the United States (*U.S. IM-PORTS* of 0.076 vs. 0.081), have more significant local labor costs (*LOCAL COMPENSATION* OF 0.187 vs. 0.149), raise a greater share of debt in their local markets (*LOCAL DEBT* of 0.592 vs. 0.512), and have smaller parent

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[15] The presence of income shifting within the firm (possibly for tax reasons) and the difficulty of allocating joint factors of production to each subsidiary reduce our ability to accurately determine a subsidiary's return on assets. Further, we do not have sufficiently detailed data to separate operating and financing activities when measuring performance at the subsidiary level.

TABLE 2
Descriptive Statistics for 45,990 Subsidiary Years

	Decentralized Subsidiaries N = 34,686			Centralized Subsidiaries N = 11,304			
	Mean	Med	Std	Mean	Med	Std.	
Subsidiary characteristics							
LOCAL SALES	0.757	0.988	0.360	0.666	0.984	0.430	*
U.S. IMPORTS	0.076	0.000	0.171	0.081	0.000	0.195	*
LOCAL COMPENSATION	0.187	0.151	0.166	0.149	0.098	0.172	*
INTEREST COVERAGE	15.722	1.667	40.137	10.701	0.390	30.061	*
LOCAL DEBT	0.592	0.729	0.339	0.512	0.638	0.377	*
U.S. PAYABLES	0.144	0.013	0.246	0.186	0.007	0.295	*
U.S. RECEIVABLES	0.029	0.000	0.097	0.051	0.000	0.148	*
DIVIDEND	0.196	0.000	0.397	0.169	0.000	0.374	*
SALES MIX	1.382	1.000	0.863	1.297	1.000	0.787	*
RELATIVE SIZE	0.105	0.021	0.210	0.105	0.014	0.225	
AGE	1.299	1.609	1.094	1.131	1.099	1.080	
EXPAT	0.105	0.000	0.307	0.132	0.000	0.339	*
R&D	0.005	0.000	0.016	0.003	0.000	0.013	*
Firm characteristics							
% FOREIGN SALES	0.379	0.384	0.165	0.380	0.392	0.174	*
COUNTRIES	2.906	3.135	1.021	2.926	3.219	1.102	*
INTERCOMPANY SALES	0.107	0.078	0.106	0.126	0.090	0.126	*
EXPERIENCE	1.659	2.079	1.207	1.512	2.079	1.227	*
Country characteristics							
LOCAL COMPETITION	5.430	5.500	0.389	5.232	5.220	0.454	*
AUTHORITY ACCEPTABLE	47.536	39.000	17.136	52.938	49.000	19.863	*
FINANCIAL RISK	8.455	7.500	5.497	10.958	10.000	7.705	*
POLITICAL RISK	19.980	19.000	8.277	23.740	20.000	11.800	*
ECONOMIC RISK	11.100	10.500	3.913	13.711	11.500	6.906	*

Table 2 reports descriptive data for the independent variables appearing in expression (1). Subsidiary characteristics: *LOCAL SALES* is the ratio of the subsidiary's local sales to its total sales. *U.S. IMPORTS* is the ratio of the subsidiary's U.S. imports to its total operating expenses. *LOCAL COMPENSATION* is the ratio of the subsidiary's compensation expense to its total operating expenses. *INTEREST COVERAGE* is the ratio of the subsidiary's earnings before interest and taxes to its interest expense. *LOCAL DEBT* is the ratio of the subsidiary's local debt to its total debt. *U.S. PAYABLES* is the subsidiary's ratio of payables to the parent (current liabilities and long-term debt) to its total liabilities. *U.S. RECEIVABLES* is the subsidiary's ratio of receivables from the parent (current and noncurrent) to its total assets. *DIVIDEND* equals 1 if the subsidiary paid a dividend to the parent in the current or in the two years prior to or subsequent to the current year (e.g., $t - 2$ to $t + 2$) and 0 otherwise. *SALES MIX* is the number of three-digit ISIC codes in which the subsidiary generates revenue. *RELATIVE SIZE* is the ratio of the subsidiary's total assets to the firm's total foreign assets. *AGE* approximates the subsidiary's age as the natural log of the number of years since the subsidiary first began reporting to the BEA. *EXPAT* equals 1 if the subsidiary employs a U.S. expatriate and 0 otherwise. *R&D* equals the ratio of the subsidiary's research and development expenditures to its total sales. Firm characteristics: *% FOREIGN SALES* is the ratio of the firm's foreign sales to worldwide sales. *COUNTRIES* is the natural log of the number of countries in which the parent company owns a foreign affiliate. *INTERCOMPANY SALES* is the ratio of the firm's affiliated sales to the sum of all affiliated and unaffiliated sales. *EXPERIENCE* is the natural log of the number of years that the parent has operated any foreign affiliate in the country of the affiliate's location. Country characteristics: *LOCAL COMPETITION* is taken from the *World Economic Forum Executive Opinion Survey*, and ranges in value from 1 to 7 where "Competition in the local market is 1 = limited in most industries and price-cutting is rare, 7 = intense in most industries as market leadership changes over time." *AUTHORITY ACCEPTABLE* is taken from www.geert-hofstede.com, and is a cultural index that ranks countries from 0 to 100 where higher values imply that a culture accepts and expects that power is distributed unequally. *FINANCIAL RISK, PO-LITICAL RISK*, and *ECONOMIC RISK* are taken from *Political Risk Services' International Country Risk Guide*. *FINANCIAL RISK* is an index that ranks countries from 0 to 50 where higher values imply higher risk that a country will be unable to finance its commercial and trade debt obligations. *POLITICAL RISK* is an index that ranks countries from 0 to 100 where higher values imply higher political instability. *ECONOMIC RISK* is an index that ranks countries from 0 to 50 where higher values imply a weaker economy. Measurement periods correspond to years for which BEA benchmark survey data are available: 1982, 1989, 1994, 1999, and 2004. To avoid disclosure of information on individual companies, we report medians as the mean of the five middle values. We winsorize continuous variables at 1% and 99%. ∗ indicates that the mean of the variable for the decentralized subsidiaries is significantly different from the mean of the variable for the centralized subsidiaries at $p \leq 0.10$.

TABLE 3

Subsidiary-Level Logistic Regressions of Decentralized Sub Indicator on Subsidiary, Firm, and Country Characteristics for 45,990 Subsidiary Years

| | Dependent Variable = Pr(*Decentralized Sub* = 1) | | | | | | | |
| | (1) | | (2) | | (3) | | (4) | |
Independent Variables	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value
Subsidiary characteristics								
LOCAL SALES	0.475	<0.001					0.582	<0.001
U.S. IMPORTS	−0.398	0.012					−0.353	0.032
LOCAL COMPENSATION	0.964	<0.001					0.824	<0.001
INTEREST COVERAGE	0.003	<0.001					0.002	<0.001
LOCAL DEBT	0.398	<0.001					0.289	0.001
U.S. PAYABLES	−0.090	0.271					−0.072	0.352
U.S. RECEIVABLES	−1.260	<0.001					−1.359	<0.001
DIVIDEND	0.206	0.002					0.253	<0.001
SALES MIX	0.079	0.171					0.123	0.037
RELATIVE SIZE	0.112	0.373					−0.157	0.354
AGE	0.020	0.502					0.057	0.107
EXPAT	−0.222	0.002					−0.179	0.024
R&D	6.103	0.020					3.065	0.191
Firm characteristics								
% FOREIGN SALES			0.586	0.080			0.414	0.238
COUNTRIES			0.034	0.491			0.119	0.111
INTERCOMPANY SALES			−3.152	<0.001			−2.942	<0.001
EXPERIENCE			0.055	0.070			−0.076	0.044
Country characteristics								
LOCAL COMPETITION					0.852	<0.001	0.912	<0.001
AUTHORITY ACCEPTABLE					−0.006	<0.001	−0.005	<0.001
FINANCIAL RISK					−0.037	<0.001	−0.038	<0.001
POLITICAL RISK					0.024	<0.001	0.021	<0.001
ECONOMIC RISK					−0.076	<0.001	−0.082	<0.001
INTERCEPT	−1.461	<0.001	−0.852	0.003	−3.847	<0.001	−5.365	<0.001
Likelihood ratio	3,231.5		2,619.5		5,094.6		7,086.2	
Pseudo-R^2	0.1009		0.0824		0.1560		0.2124	

See table 2 for variable definitions. We include subsidiary industry and year indicator variables in all specifications. Measurement periods correspond to years for which BEA benchmark survey data are available: 1982, 1989, 1994, 1999, and 2004. We report *p*-values based on tests using standard errors clustered by firm.

company payables (*U.S. PAYABLES* of 0.144 vs. 0.186) and receivables (*U.S. RECEIVABLES* of 0.029 vs. 0.051). With respect to firm characteristics, firms engaging in substantial intrafirm trade (*INTERCOMPANY SALES* of 0.107 vs. 0.126) are more likely to centralize decision rights. Decentralized and centralized subsidiaries also exhibit different country characteristics. Decentralized subsidiaries are more common in countries in which competition is pronounced (*LOCAL COMPETITION* of 5.430 vs. 5.232), the centralization of authority is not culturally acceptable (*AUTHORITY ACCEPTABLE* of 47.536 vs. 52.938), and risks are lower (*FINANCIAL RISK* of 8.455 vs. 10.958, *POLITICAL RISK* of 19.980 vs. 23.740, and *ECONOMIC RISK* of 11.100 vs. 13.711).

Table 3 reports statistics from estimating expression (1). Columns (1)–(3) summarize the results including only subsidiary, firm, and country characteristics, respectively, while column (4) includes all three sets of variables. Firm-level variables provide lower explanatory power than either subsidiary or country-level variables (based on the pseudo-R^2). This

observation suggests that the unique characteristics of each subsidiary's activities and environment primarily influence the assignment of decision rights, and it supports the tack taken in this study to measure the assignment of decision rights at the subsidiary level. Overall, the pseudo-R^2 from our estimation of expression (1) is 0.212, and the results are substantially similar to the univariate statistics discussed earlier with respect to differences between decentralized and centralized subsidiaries.

In addition, we find subsidiaries that have fewer U.S. expatriates (*EXPAT*) and pay dividends more frequently (*DIVIDEND*) are more likely to be decentralized. Hence, firms are less likely to employ expatriates to monitor decentralized subsidiaries and more likely to remit dividends to reduce the potential for agency conflicts in decentralized subsidiaries. As expected, subsidiaries with higher research and development expenditures (*R&D*) are also more likely to be decentralized. Interestingly, holding constant *FINANCIAL RISK* and *ECONOMIC RISK*, subsidiaries are *more* likely to be decentralized in countries with high *POLITICAL RISK*. We conjecture that managing political risk, unlike financial and economic risk, necessitates relationships with government officials in the host country—a task, perhaps, best assigned to a decentralized subsidiary whose employees have established relationships within the country.[16]

6.2 PERFORMANCE CONSEQUENCES OF A MISMATCH

Table 4, panel A, offers descriptive statistics for the variables in expression (2) for our sample of 5,700 firm years as well as for the variables that we use in subsequent exploratory tests. The mean (median) of $MISMATCH_t^{Firm}$ is 0.138 (0.06) and of % *FOREIGN SALES* is 0.270 (0.208).

Table 4, panel B, reports the results of our firm-level estimation of expression (2). The negative and significant coefficient on $MISMATCH_t^{Firm}$ in column (1b) suggests that ROA_t^{Firm} is decreasing in the extent to which the organizational structure supporting the firm's international business is poorly matched to its environment. Centering $MISMATCH_t^{Firm}$ and % *FOREIGN SALES* before calculating the interaction term in expression (2) implies that α_1 is the conditional relation of $MISMATCH_t^{Firm}$ on ROA_t^{Firm} for a firm with the mean level of % *FOREIGN SALES* (i.e., 27%). The negative and significant coefficient on the interaction between $MISMATCH_t^{Firm}$ and % *FOREIGN SALES* in column (2b) indicates that this negative performance consequence is greater when the mismatched organizational structure represents a greater proportion of the firm's operations. These results are consistent with H1. They provide large sample evidence that

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[16] *ECONOMIC RISK* and *POLITICAL RISK*, the two most highly correlated variables in table 2, are significantly, positively correlated ($r = 0.61$). Consequently, we reestimate expression (1) after replacing *FINANCIAL RISK*, *ECONOMIC RISK*, and *POLITICAL RISK* with the composite risk index in *Political Risk Services' International Country Risk Guide.* This change does not affect the tenor of any of the reported results.

T A B L E 4 : Panel A
Firm-Level Descriptive Statistics for 5,700 Firm Years

	Mean	Med.	Std.
ROA_t^{Firm}	0.001	0.001	0.067
$MISMATCH_t^{Firm}$	0.138	0.060	0.181
$DEC - MISMATCH_t^{Firm}$	0.040	0.022	0.063
$CEN - MISMATCH_t^{Firm}$	0.098	0.000	0.187
% FOREIGN SALES	0.270	0.208	0.169
FIRM SIZE	13.114	13.079	2.258
INTL EXPERIENCE	1.444	1.792	1.183

ROA_t^{Firm} equals (firm net income + firm interest expense × (1 − median industry effective tax rate))/total firm assets, minus the industry median *ROA* in year *t* (using three-digit ISIC codes). $MISMATCH_t^{Firm}$ aggregates $MISMATCH_t^{Sub}$ across all subsidiaries in an affiliated group, where $MISMATCH_t^{Sub}$ is the squared residual from estimating expression (1) as reported in table 3, column (4). $CEN - MISMATCH_t^{Firm}$ aggregates $MISMATCH_t^{Sub}$ across all subsidiaries in an affiliated group that are inappropriately centralized (i.e., the predicted value of *Decentralized Sub* from expression (1) is higher than the observed value). $DEC - MISMATCH_t^{Firm}$ aggregates $MISMATCH_t^{Sub}$ across all subsidiaries in an affiliated group that are inappropriately decentralized (i.e., the predicted value of *Decentralized Sub* from expression (1) is lower than the observed value). % FOREIGN SALES is the ratio of the firm's total foreign sales to the firm's total sales. FIRM SIZE is the natural log of the firm's total sales. INTL EXPERIENCE is the natural log of the number of years since the first year that the firm began reporting to the BEA. To avoid disclosure of information on individual companies, we report medians as the mean of the five middle values.

T A B L E 4 : Panel B
Firm-Level Ordinary Least Square Regressions of ROA on Organizational Structure Mismatch and Control Variables for 5,700 Firm Years

	Dependent Variable = ROA_t^{Firm}			
	(1b)		(2b)	
Independent Variables	Coeff.	*p*-value	Coeff.	*p*-value
$MISMATCH_t^{Firm}$	−0.012	0.049	−0.012	0.041
% FOREIGN SALES			−0.048	<0.001
$MISMATCH_t^{Firm}$ × FOREIGN SALES			−0.083	0.044
FIRM SIZE	0.001	0.002	0.001	0.251
INTL EXPERIENCE	0.000	0.712	0.001	0.246
INTERCEPT	−0.020	0.009	−0.008	0.291
Adjusted R^2	0.0091		0.0236	

See table 4, panel A, for variable definitions. We include firm industry and year indicator variables in all specifications. Measurement periods correspond to years for which BEA benchmark survey data are available: 1982, 1989, 1994, 1999, and 2004. All control variables correspond to the current measurement period. To facilitate interpretation of the main effects, we center continuous variables before creating interaction terms. We report *p*-values based on tests using standard errors clustered by firm.

poorer firm performance is associated with having an organizational structure that is incongruent with the firm's environment.

Before turning to address H2, we explore whether the performance consequence of an organizational mismatch varies depending on whether decision rights have been inappropriately centralized or decentralized. Indeed, Klaas, Lauridsen, and Hakonsson [2010] challenge the notion that all organizational structure mismatches would be equally detrimental to a firm's performance. They highlight, however, that there is a "lack of conceptual development" (p. 157) in the literature. We test whether the detrimental effect on firm performance of having subsidiaries that are inappropriately

decentralized differs from that associated with subsidiaries that are inappropriately centralized.

To do so, we extend expression (2) and separately include $CEN - MISMATCH_t^{Firm}$ and $DEC - MISMATCH_t^{Firm}$, which represent the mismatch construct for subsidiaries that are inappropriately centralized and decentralized, respectively. Specifically, $CEN - MISMATCH_t^{Firm}$ is computed in the same fashion as $MISMATCH_t^{Firm}$, except that it aggregates $MISMATCH_t^{Sub}$ only for subsidiaries that are inappropriately centralized (i.e., for which the predicted value of *Decentralized Sub* from estimating expression (1) is higher than the observed value), whereas $DEC - MISMATCH_t^{Firm}$ aggregates $MISMATCH_t^{Firm}$ only for subsidiaries that are inappropriately decentralized. The mean and median value of $CEN - MISMATCH_t^{Firm}$ are 0.10 and 0.00, respectively, whereas the mean and median values of $DEC - MISMATCH_t^{Firm}$ are 0.04 and 0.02, respectively.

Column (1c) of table 4, panel C, reports a significantly lower reduction in firm performance when subsidiaries are inappropriately centralized than when they are inappropriately decentralized ($F = 4.71$ for $CEN - MISMATCH_t^{Firm}$ vs. $DEC - MISMATCH_t^{Firm}$, $p < 0.03$). This finding suggests the performance consequence of inappropriately retaining decision rights is lower than that of inappropriately delegating decision rights. Further, although the results in column (2c) show that the incremental reduction in performance associated with the inappropriate assignment of decision rights increases in the relative size of the firm's foreign operations, the reduction in firm performance for higher levels of foreign activity is not significantly different across inappropriately decentralized and centralized subsidiaries ($F = 0.95$, $p < 0.331$).

T A B L E   4 : Panel C
Firm-Level Ordinary Least Square Regressions of ROA on Organizational Structure Mismatch and Control Variables for 5,700 Firm Years

	Dependent Variable $=ROA_t^{Firm}$			
	(1c)		(2c)	
Independent Variables	Coeff.	*p*-value	Coeff.	*p*-value
$CEN - MISMATCH_t^{Firm}$	−0.011	0.065	−0.011	0.060
$DEC - MISMATCH_t^{Firm}$	−0.041	0.003	−0.038	0.009
% FOREIGN SALES			−0.049	<0.001
$CEN - MISMATCH_t^{Firm}$ × FOREIGN SALES			−0.078	0.061
$DEC - MISMATCH_t^{Firm}$ × FOREIGN SALES			−0.166	0.039
FIRM SIZE	0.001	0.003	0.001	0.259
INTL EXPERIENCE	0.000	0.687	0.001	0.264
INTERCEPT	−0.019	0.015	−0.007	0.352
Adjusted R^2	0.0098		0.0244	

See table 4, panel A, for variable definitions. We include firm industry and year indicator variables in all specifications. Measurement periods correspond to years for which BEA benchmark survey data are available: 1982, 1989, 1994, 1999, and 2004. All control variables correspond to the current measurement period. To facilitate interpretation of the main effects, we center continuous variables before creating interaction terms. We report *p*-values based on tests using standard errors clustered by firm.

T A B L E 5 : Panel A
Subsidiary-Level Descriptive Statistics for 16,660 Subsidiary Years

	Mean	Med.	Std.
Δ *Decision Rights$_t$* $= 1$	0.132	0.000	0.338
$MISMATCH_{t-1}^{Sub}$	0.152	0.049	0.208
$CEN - MISMATCH_{t-1}^{Sub}$	0.104	0.000	0.217
$DEC - MISMATCH_{t-1}^{Sub}$	0.048	0.019	0.083
ROA_{t-1}^{Sub}	0.015	0.007	0.154
ENVIRONMENT CHANGE$_t$	0.080	0.056	0.078
RELATIVE SIZE$_t$	0.093	0.020	0.192
AGE$_t$	2.331	2.303	0.420

Δ*Decision Rights$_t$* is an indicator variable equal to 1 if the assignment of decision rights with respect to a subsidiary in the current measurement period (e.g., 1999) differs from that of the prior measurement period (e.g., 1994), and 0 otherwise. Measurement periods correspond to years for which BEA benchmark survey data are available: 1982, 1989, 1994, 1999, and 2004. $MISMATCH_{t-1}^{Sub}$ is the squared residual from estimating expression (1) as reported in table 3, column (4), in the prior measurement period. $CEN - MISMATCH_{t-1}^{Sub}$ is equal to $MISMATCH_{t-1}^{Sub}$ when *Decentralized Sub* is equal to 0 in the prior measurement period, and 0 otherwise. $DEC - MISMATCH_{t-1}^{Firm}$ is equal to $MISMATCH_{t-1}^{Sub}$ when *Decentralized Sub* is equal to 1 in the prior measurement period, and 0 otherwise. ROA_{t-1}^{Sub} is taken from the prior measurement period as (subsidiary net income + subsidiary interest expense × (1 – median country/industry effective tax rate))/total subsidiary assets minus the industry median *ROA*. *ENVIRONMENT CHANGE* is the absolute value of the difference in Pr(*Decentralized Sub* = 1) in the current measurement period relative to the prior measurement period. *RELATIVE SIZE* is the ratio of the subsidiary's total assets to the firm's total foreign assets in the current measurement period. *AGE* approximates the subsidiary's age in the current measurement period as the log of the number of years since the subsidiary first reported to the BEA. To avoid disclosure of information on individual companies, we report medians as the mean of the five middle values.

6.3 CHANGE IN DECISION RIGHTS

To examine the change in decision rights, we require that a subsidiary appear in consecutive benchmark surveys. Of the final sample of 45,990 subsidiary year observations, 16,600 observations appear in consecutive surveys and are used to test H2.[17] Table 5, panel A, reports that parents change the assignment of decision rights for about 13% of the 16,660 observations. Of these subsidiaries, only about 7% experience more than one change over the sample period. This observation suggests that multiple changes in the assignment of decision rights to a subsidiary are fairly rare and occur over a long period of time during which the subsidiary's environment and its role within the multinational firm are likely to have changed (e.g., see the Biosensors Inc. example offered in section 3).

Table 5, panel B, reports results from our subsidiary-level estimation of expression (3). We find evidence consistent with H2a. In column (1b), the positive and significant coefficient on $MISMATCH_{t-1}^{Sub}$ implies that a firm is more likely to alter the location of decision rights as those rights are more poorly matched to a subsidiary's environment. The average marginal effect for $MISMATCH_{t-1}^{Sub}$ is 0.3998. This approximates the effect on Pr(Δ*Decision*

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[17] The BEA performed benchmark surveys in 1982, 1989, 1994, 1999, and 2004, implying five or seven years between each survey. We cannot observe the assignment of decision rights before 1982. Accordingly, we exclude 4,889 subsidiary year observations in the 1982 benchmark survey year from the sample used to test H2.

T A B L E   5 : Panel B

Subsidiary-Level Logistic Regressions of Change in Decision Rights on Lagged Measures of Performance, Mismatch, and Control Variables for 16,660 Subsidiary Years

	Dependent Variable = Pr(Δ *Decision Rights$_t$* = 1)			
	(1b)		(2b)	
Independent Variables	Coeff.	*p*-value	Coeff.	*p*-value
$MISMATCH_{t-1}^{Sub}$	4.192	<0.001	4.195	<0.001
ROA_{t-1}^{Sub}			0.175	0.343
$MISMATCH_{t-1}^{Sub} \times ROA_{t-1}^{Sub}$			−1.274	0.035
$ENVIRONMENT\ CHANGE_t$	1.850	<0.001	1.863	<0.001
$RELATIVE\ SIZE_t$	0.468	0.002	0.469	0.002
AGE_t	−0.298	0.001	−0.298	0.001
$INTERCEPT$	−1.977	<0.001	−1.975	<0.001
Likelihood ratio	2,192.5		2,197.1	
Pseudo R^2	0.2279		0.2284	

See table 5, panel A, for variable definitions. We include subsidiary industry and year indicator variables in all specifications. To facilitate interpretation of the main effects, we center continuous variables before creating interaction terms. We report *p*-values based on tests using standard errors clustered by firm.

Rights$_t$ = 1) of a one-unit increase in $MISMATCH_{t-1}^{Sub}$.[18] Thus, for instance, if $MISMATCH_{t-1}^{Sub}$ increased by 0.1, then the probability of observing a change in decision rights would increase by about 0.1×0.3998 or 4%. The results in column (1b) imply that firms' response rate to an increase in mismatch is fairly low, suggesting the costs to altering the location of decision rights are substantial.

In column (2b), the negative and significant coefficient on $MISMATCH_{t-1}^{Sub} \times ROA_{t-1}^{Sub}$ implies that a parent is less likely to alter a subsidiary's decision rights in response to a mismatch when the subsidiary is performing well. This finding is consistent with H2b. We compute a significant marginal effect for $MISMATCH_{t-1}^{Sub} \times ROA_{t-1}^{Sub}$ of –0.0743 using the cross-derivative consistent with Norton, Wang, and Ai [2004]. We find substantial evidence of multinational firms adapting their organizational structures to their environments. This evidence suggests that, to remain competitive, firms ought to periodically evaluate the appropriateness of the assignment of decision rights within the firm and adjust them when necessary.

To understand the costs of reengineering a firm's organizational structure, we extend expression (3) to explore whether a firm's willingness to alter the assignment of decision rights varies asymmetrically with whether the rights were previously inappropriately centralized or decentralized. Relocating decision rights is costly because it may necessitate renegotiation of employment contracts, changing the location of institutional knowledge,

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[18] Unlike in a linear regression specification (where the marginal effect is the slope coefficient), the marginal effect is an approximation in logistic and other nonlinear models (Cameron and Trivedi [2009]).

T A B L E 5 : Panel C

Subsidiary-Level Logistic Regressions of Change in Decision Rights on Mismatch, Lagged Measure of Performance, and Control Variables for 16,660 Subsidiary Years

	Dependent Variable = Pr(Δ *Decision Rights$_t$* = 1)			
	(1c)		(2c)	
Independent Variables	Coeff.	*p*-value	Coeff.	*p*-value
$CEN - MISMATCH_{t-1}^{Sub}$	4.190	<0.001	4.194	<0.001
$DEC - MISMATCH_{t-1}^{Sub}$	3.369	<0.001	3.377	<0.001
ROA_{t-1}^{Sub}			0.193	0.295
$CEN - MISMATCH_{t-1}^{Sub} \times ROA_{t-1}^{Sub}$			−1.277	0.034
$DEC - MISMATCH_{t-1}^{Sub} \times ROA_{t-1}^{Sub}$			−2.299	0.095
$ENVIRONMENT\ CHANGE_t$	2.153	<0.001	2.168	<0.001
$RELATIVE\ SIZE_t$	0.462	0.002	0.463	0.002
AGE_t	−0.305	0.001	−0.307	0.001
$INTERCEPT$	−1.883	<0.001	−1.877	<0.001
Likelihood ratio	2,203.6		2,208.8	
Pseudo-R^2	0.2290		0.2295	

See table 5, panel A, for variable definitions. We include subsidiary industry and year indicator variables in all specifications. To facilitate interpretation of the main effects, we center continuous variables before creating interaction terms. We report *p*-values based on tests using standard errors clustered by firm.

and resolving conflicts arising from organizational politics (Milgrom and Roberts [1992], Hart and Holmstrom [2010]).

In table 5, panel C, the variables $CEN - MISMATCH_{t-1}^{Sub}$ and $DEC - MISMATCH_{t-1}^{Firm}$ indicate whether decision rights were inappropriately centralized or decentralized, respectively, in the previous period. In column (1c), the coefficient on $DEC - MISMATCH_{t-1}^{Firm}$ is significantly lower than the coefficient on $CEN - MISMATCH_{t-1}^{Sub}$ ($\chi^2 = 3.24$, $p < 0.072$), suggesting that a parent company is less likely to reclaim from a subsidiary decision rights that were inappropriately assigned in the previous period. We also interact both $CEN - MISMATCH_{t-1}^{Sub}$ and $DEC - MISMATCH_{t-1}^{Firm}$ with ROA_{t-1}^{Sub} in column (2c) and find that the parent's lower willingness to reassign decision rights at greater levels of subsidiary performance is not significantly different across inappropriately decentralized and centralized subsidiaries ($\chi^2 = 0.54$, $p < 0.463$).

The result in table 5, panel C (column 1c), that firms are less likely to fix the inappropriate delegation of decision rights implies that it is substantially more costly to retract decision rights from subsidiaries than it is to grant decision rights to them as their environments evolve (Hart and Holmstrom [2010]). Given this cost differential, it is economically rational for firms to tolerate weaker performance for longer when decision rights are inappropriately decentralized. Indeed, consistent with this claim, table 4, panel C (column 1c), reports that inappropriate decentralization of decision rights has a greater negative effect on firm performance than inappropriate centralization. Together, these observations suggest multinational firms should exercise caution before delegating decision rights to their subsidiaries.

7. Robustness Tests

Whether firms appropriately evaluate the circumstances underlying their functional currency choice and whether auditors attest to those assertions affects the construct validity of our measure. We perform several robustness tests to validate our measure of the functional currency choices as an indicator of the assignment of decision rights.

7.1 PROPORTION OF MANAGERIAL EMPLOYEES

A subsidiary with decision rights is expected to have a higher proportion of managerial employees to nonmanagerial employees than a subsidiary without decision rights. Thus, at the subsidiary level, we compare our measure of decentralization with the proportion of employees of the foreign subsidiary that are classified as managers. These data are available from the BEA but only for 2004. We observe a statistically significant correlation ($r = 0.13$, $p < 0.01$) between our measure *Decentralized Sub* and the proportion of managerial employees. This correlation is robust to including subsidiary size and industry as control variables. This finding supports using the functional currency choices as an indicator of the location of decision rights.

7.2 SEGMENT REPORTING

FASB ASC 280—*Disclosures About Segments of an Enterprise and Related Information* (previously codified as FAS 131) requires companies to report segment financial information in their financial reports consistent with the way they manage their businesses—termed the *management approach.* Galbraith [2000] notes that multinational companies adopt geographical divisions when products, markets, and brands are heterogeneous, and when competitors, suppliers, and customers are local. As many of these characteristics are expected to be associated with decentralized decision making, we posit that a multinational firm with a greater number of geographic segments is more likely to delegate decision rights to its foreign subsidiaries. We find a significantly positive correlation ($r = 0.11$, $p < 0.01$) between the number of geographic segments and a firm-level measure of decentralization (where *Decentralized Sub* is weighted by the ratio of subsidiary sales to the firm's total foreign sales). This correlation is robust to controls for firm size, percent foreign sales, and firm industry. It corroborates our measure of decentralization as a proxy for the assignment of decision rights within multinational firms.

7.3 EARNINGS MANAGEMENT

It is well recognized that firms strategically choose accounting policies and procedures to manipulate their results to attain some reporting objective. Because firms might choose policies to translate the results of their subsidiaries to manage their earnings, we test whether firms' accounting policy choices are associated with earnings management incentives.

It seems implausible that a firm would choose its functional currency to effectively manage earnings upward or downward each period. This manipulation would require the firm to predict the direction of the movement in foreign exchange rates, anticipate a subsidiary's net monetary position, and justify to the firm's independent auditors that the subsidiary's evolving environment necessitated the change in accounting policy.

In contrast, it seems plausible that a firm might choose the functional currencies of its subsidiaries to reduce earnings volatility (Doupnik and Evans [1988]). The FCTA is only reflected in earnings when the subsidiary's functional currency is the parent's reporting currency, the U.S. dollar. Further, the adjustment included in earnings only arises from the translation of monetary assets and liabilities. Therefore, the firm's expected earnings volatility is greatest when a subsidiary with high net monetary exposure is expected to experience substantial fluctuations in the exchange rate between the U.S dollar and the subsidiary's local currency.

To test for earnings management, it is not sufficient to examine the direct effect of the variability of changes in foreign currency rates on the firm's functional currency choice. In section 5.1.1, we posited that an unstable business environment, which includes exchange rate volatility, would be associated with centralized decision rights. Focusing only on the main effect, therefore, does not necessarily separate the earnings management incentive for choosing the functional currency from our thesis that the functional currency choice reflects the assignment of control rights. Accordingly, we examine the interaction between the subsidiary's translation exposure and exchange rate volatility.

In this light, we extend expression (1) and estimate the following model (where subscript i denotes a subsidiary and subscript t denotes the measurement period):

$$
\begin{aligned}
\Pr(&\textit{Decentralized Sub}_{i,t} = 1) \\
= G\Bigg(&\beta_0 + \sum_{j=1}^{22} \beta_j \textit{ Subsidiary, Firm, and Country Characteristics} \\
&+ \beta_{23}\textit{ SUBSIDIARY TRANSLATION}_{i,t}\textit{ EXPOSURE} + \beta_{24}\textit{FX RISK}_{i,t} \\
&+ \beta_{25}\textit{ SUBSIDIARY TRANSLATION EXPOSURE}_{i,t} \times \textit{FX RISK}_{i,t}\Bigg).
\end{aligned}
\tag{4}
$$

The detailed definitions for this expression are provided in table 6. *SUBSIDIARY TRANSLATION EXPOSURE* measures the net monetary exposure of a subsidiary to changes in foreign currency exchange rates and *FX RISK* measures expected exchange rate variability between the subsidiary's local currency and the U.S. dollar. A positive and significant coefficient on the interaction term (i.e., $\beta_{25} > 0$) would imply that firms chose functional currencies to reduce earnings volatility.

Table 6, column (1), reports the results of estimating expression (4). The coefficient on the interaction between *SUBSIDIARY TRANSLATION*

T A B L E 6

Subsidiary-Level Logistic Regressions of Decentralized Subsidiary on Variables Reflecting Financial Reporting Incentives and Tax Reporting Incentives

	Dependent Variable = $\Pr(Decentralized\ Sub = 1)$			
	(1)		(2)	
Independent Variables	Coeff.	p-value	Coeff.	p-value
FX RISK	−0.079	<0.001	−0.077	<0.001
TRANSLATION EXPOSURE	0.012	0.871		
TRANSLATION EXPOSURE × FX RISK	0.015	0.503		
SUBSIDIARY TAX RATE			1.898	0.083
SUBSIDIARY TAX RATE × FX RISK			−0.009	0.901
Include table 3 variables?	Yes		Yes	
N	45,990		41,101	
Likelihood ratio	6,983.8		6,000.7	
Pseudo-R^2	0.2096		0.2046	

FX RISK is taken from *Political Risk Services' International Country Risk Guide* and is an index that ranks countries from 0 to 10, where higher values imply that the subsidiary's local currency is expected to have higher exchange rate instability against the U.S. dollar. *TRANSLATION EXPOSURE* equals the absolute value of the subsidiary's monetary assets (i.e., total assets minus inventory and property, plant, and equipment) minus monetary liabilities (i.e., trade payables, short-term debt, and long-term debt) scaled by the subsidiary's total assets. *SUBSIDIARY TAX RATE* is the ratio of the cumulative income tax expense to the cumulative undistributed pretax earnings for each subsidiary. We include all subsidiary, firm, and country characteristic variables from table 3, column (4) in the regression. Measurement periods correspond to years for which BEA benchmark survey data are available: 1982, 1989, 1994, 1999, and 2004. To facilitate interpretation of the main effects, we center continuous variables before creating interaction terms. We report p-values based on tests using standard errors clustered by firm.

EXPOSURE and *FX RISK* is insignificant.[19] Further, with regard to the main effects, only the coefficient on *FX RISK* is significant. This coefficient is negative, implying expected exchange rate variability is associated with firms choosing the U.S dollar to be the functional currency. This functional currency choice contributes to greater earnings volatility, all else equal, than the alternative of choosing the subsidiary's local currency as the functional currency. This finding is consistent with an unstable business environment being associated with centralized decision rights and inconsistent with a firm choosing a functional currency to manage earnings.

7.4 TAX REPORTING INCENTIVES

Tax planning incentives might motivate a firm's functional currency choice. The foreign currency translation rules for tax purposes were

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[19] All results reported in table 6 exclude *FINANCIAL RISK* as *FINANCIAL RISK* and *FX RISK* are significantly correlated ($r = 0.67$) and *FX RISK* is a more direct measure of expected exchange rate variability. The results in table 6 are not sensitive to including *FINANCIAL RISK* (though the main effect on *FX RISK* becomes insignificant). Further, the results in table 6 are qualitatively unaffected if we use the coefficient of variation of the subsidiary's local currency exchange rate against the U.S. dollar over the previous 12 months as an alternate measure of *FX RISK*. Based on computing the cross-derivative (Norton, Wang, and Ai [2004]), the marginal effect on the interaction term in expression (4) is insignificant. The mean (median) of *FX RISK* is 1.38 (1.00) and the mean (median) of *SUBSIDIARY TRANSLATION EXPOSURE* is 0.284 (0.207).

adopted as part of the Tax Reform Act of 1986 and were modeled after the guidance in FAS 52 that the Financial Accounting Standards Board released in 1981. A key difference between financial accounting and tax reporting is that translation adjustments are not included annually in U.S. taxable income; rather, foreign subsidiary earnings are subject to U.S. tax on a deferral basis and are only included in U.S. taxable income upon repatriation. Hence, the functional currency of a subsidiary for tax reporting purposes generally becomes relevant only in the event of repatriation.[20] Therefore, strategically choosing the functional currency to achieve a tax reporting objective requires that firms predict both exchange rates *and* the timing of future repatriations from each subsidiary. Although it might be difficult for firms to predict future exchange rates, they do control the repatriation of foreign earnings. Hence, we consider whether our results are robust to tax reporting incentives.

A key tax-planning objective of a U.S.-based multinational firm is to efficiently utilize foreign tax credits that its existing subsidiaries generate. This entails offsetting foreign taxes paid on repatriations from high-tax jurisdictions with foreign taxes paid on repatriations from low-tax jurisdictions with the aim of reducing or eliminating any residual U.S. tax liability while attempting to eliminate any excess foreign tax credit that might expire unused. Importantly, exchange rate volatility can frustrate foreign tax credit planning by adversely affecting the firm's effective tax rate.

Upon repatriation, and regardless of an affiliate's functional currency, U.S. taxable income includes the dividend amount translated into U.S. dollars at the spot foreign exchange rate. The foreign tax credit is computed as the product of the proportion of the accumulated earnings of the subsidiary remitted to the U.S. parent and the total foreign income taxes the subsidiary paid. If the functional currency is the U.S. dollar, both the earnings and taxes paid are maintained in U.S. dollars. If the functional currency is the subsidiary's local currency, the earnings are maintained in the subsidiary's local currency while the taxes paid are maintained in U.S. dollars.

In the absence of exchange rate volatility, a firm would be indifferent for tax reporting purposes between choosing either the U.S. dollar or the subsidiary's local currency as the functional currency. In contrast, when the functional currency is not the U.S. dollar, the foreign tax credit relative to the U.S. taxable income inclusion varies with changes in exchange rates,

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[20] Taxable income is not reported on a consolidated basis. The functional currency choice, therefore, has more prominent implications for financial reporting than it does for tax reporting. Furthermore, based on discussions with practitioners, it is common practice for firms to designate a functional currency for each subsidiary for financial reporting that the independent auditors verify and then to use that functional currency choice for tax reporting purposes. Indeed, the tax code expressly permits a firm highlighting the functional currency determined under FAS 52 as support for determining the functional currency for tax purposes.

which in turn creates volatility in the firm's expected effective tax rate (see Moore [2010], Blouin, Krull, and Robinson [2012b]).

To manage its effective tax rate, a firm facing heightened foreign currency exchange rate volatility is expected to prefer using the parent's currency as the functional currency. This prediction, however, also is consistent with the greater exchange rate volatility being associated with a firm preferring to centralize decision rights, as posited in section 5.1.1. Therefore, to separate tax management incentives for choosing the functional currency, we examine whether the interaction between the subsidiary's effective tax rate and the expected exchange rate variability affects the firm's choice of functional currency. Specifically, in an environment in which firms anticipate volatile exchange rates, we expect that they will be more likely to choose the U.S. dollar to be a subsidiary's functional currency as the subsidiary's effective tax rate increases. This choice raises the likelihood of firms fully utilizing their foreign tax credits.

To test for these tax-reporting incentives, we extend expression (1) and estimate the following model (where subscript i denotes a subsidiary and subscript t denotes the measurement period):

$$
\begin{aligned}
&\Pr(Decentralized\ Sub_{i,t} = 1) \\
&= G\Bigg(\beta_0 + \sum_{j=1}^{22} \beta_j\, Subsidiary,\ Firm,\ and\ Country\ Characteristics \\
&\quad + \beta_{23} SUBSIDIARY\ TAX\ RATE_{i,t} + \beta_{24} FX RISK_{i,t} \\
&\quad + \beta_{25} SUBSIDIARY\ TAX\ RATE_{i,t} \times FX\ RISK_{i,t} \Bigg).
\end{aligned}
\tag{5}
$$

The detailed variable definitions for this expression appear in table 6. *SUBSIDIARY TAX RATE* is the ratio of the cumulative income tax expense to the cumulative undistributed pretax earnings for each subsidiary (Blouin, Krull, and Robinson [2012a]).[21] A negative and significant coefficient on the interaction term (i.e., $\beta_{25} < 0$) would imply that firms choose functional currencies to reduce uncertainty about foreign tax that credit utilization associated with future repatriation. We focus on the interaction term because the importance of exchange rate uncertainty should be increasing in foreign tax rates due to the potential of creating excess tax credits that may expire (Dodonova and Khoroshilov [2007]).

Table 6, column (2), reports results of estimating expression (5). The coefficient on the interaction between *SUBSIDIARY TAX RATE* and *FX RISK* is insignificant.[22] Hence, taking the boundaries of the firm as fixed, we do

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[21] The mean (median) for *SUBSIDIARY TAX RATE* is 0.299 (0.314). This regression excludes 4,889 observations in 1982 as the tax reporting rules for foreign currency translation were introduced in the Tax Reform Act of 1986.

[22] Based on computing the cross-derivative (Norton, Wang, and Ai [2004]), the marginal effect on the interaction term in expression (5) is insignificant.

not find evidence that firms choose a subsidiary's functional currency to manage tax-reporting outcomes.

Regarding the main effects, we find that the coefficient on *FX RISK* is negative and significant. Although this finding suggests that heightened expected exchange rate variability is associated with firms choosing the U.S. dollar to be a subsidiary's functional currency to manage their effective tax rates, it is also consistent with firms choosing to centralize decision rights when there is exchange rate risk. We find that the coefficient on *SUBSIDIARY TAX RATE* is only marginally significant: Indeed, when we compute *SUBSIDIARY TAX RATE* as the median effective tax rate by country year as in Desai, Foley, and Hines [2001], we obtain similar results to those reported in table 6 except that the main effect on *SUBSIDIARY TAX RATE* fails to be significant. This observation notwithstanding, it is the interaction between a subsidiary's effective tax rate and the expected exchange rate variability that we believe will influence a firm's tax-reporting incentives, and this interactive effect is not significant.

7.5 SUBSIDIARY DIVESTITURE

This study focuses on the assignment of decision rights within the context of an existing firm—it takes the boundaries of the firm as given. To this point, therefore, we have not explored the decision to incorporate or acquire a new subsidiary or divest of an existing subsidiary—factors that affect the boundary of the firm. However, as an alternative to reassigning decision rights to a subsidiary, a firm might divest of the subsidiary. This section considers a firm's choice to alter its boundaries.

Subsidiaries cease to exist as part of a multinational group for several economic reasons, including liquidations, reorganizations, and divestitures. In addition, when a subsidiary's growth fails to keep pace with increases in the BEA reporting materiality thresholds, as reported in the appendix, the firm need not disclose operating and financial data for the subsidiary, and hence, it would disappear from the survey data. Using the BEA data set, therefore, we cannot reliably distinguish between subsidiaries that disappear due to reorganizations (i.e., liquidations or merger), divestitures, or reporting materiality.

Nevertheless, with this caveat in mind, we offer some exploratory analysis of a firm's choice to divest of a subsidiary. We estimate the following model (where subscript i denotes a subsidiary and subscript t denotes the measurement period):

$$\Pr(Sub\,Disappears_{i,t} = 1) = G(\beta_0 + \beta_j\,MISMATCH_{t-1}^{Sub} + \beta_2\,ROA_{t-1}^{Sub} + Control\ variables_t), \tag{6}$$

where $Sub\ Disappears_{i,t} = 1$ when a subsidiary in the previous measurement period $t-1$ does not exist within the multinational group in the current measurement period t. The detailed variable definitions for this expression appear in table 5, panel A.

TABLE 7

Subsidiary-Level Logistic Regressions of Subsidiary Disappearance on Measures of Mismatch, Performance, and Control Variables for 37,724 Subsidiary Years

Dependent variable = $\Pr(\textit{Sub Disappears}_{i,t+1} = 1)$		
Independent Variables	Coeff.	p-value
$MISMATCH_t^{Sub}$	0.177	0.001
ROA_t^{Sub}	−0.694	<0.001
$RELATIVE\ SIZE_t$	0.285	<0.001
AGE_t	−0.332	<0.001
$INTERCEPT$	−0.0234	0.693
Likelihood ratio	2,733.6	
Pseudo-R^2	0.0699	

Sub Disappears$_{i,t+1}$ = 1 when an existing subsidiary in period t does not exist within the multinational group in period $t + 1$, and 0 otherwise. See table 5, panel A, for the remaining variable definitions. The specification includes subsidiary industry and year indicator variables. We report p-values based on tests using standard errors clustered by firm.

Table 7 reports the results of estimating expression (6). We find the probability that a particular subsidiary does not exist in the subsequent measurement period is positively associated with the mismatch construct, $MISMATCH_{t-1}^{Sub}$, and negatively associated with the subsidiary's performance, ROA_{t-1}^{Sub}. The latter result is consistent with the divestiture literature (e.g., Thomas [2002]). It is also consistent, however, with mismatched or poorly performing subsidiaries falling below the increasing BEA reporting thresholds over time. We view these results as exploratory because using BEA data to understand firms' divestiture decisions requires imposing a number of strong assumptions as to why specific subsidiaries leave the multinational group. Examining a firm's decision to alter its boundaries by incorporating subsidiaries in foreign countries or divesting subsidiaries falls outside the scope of this study.

8. Conclusion

We examine the location of decision rights within U.S.-based multinational firms. This setting provides a powerful environment within which to study the location of decision rights. Not only are cultural, economic, and legal differences substantial in this setting, requiring that multinational firms exercise great care when assigning decision rights, but the particular accounting procedures multinational firms use to translate their subsidiaries' foreign currency–denominated financial statements allow for a parsimonious characterization of the extent to which decision rights have been centralized or decentralized. We use this accounting choice to identify whether decision rights are assigned to a subsidiary or retained by the parent of a multinational firm. By comparing the observed assignment of decision rights to a subsidiary with the predicted assignment based on subsidiary, firm, and country characteristics, we measure the extent to which the firm's assignment of decision rights is mismatched to its environment.

Using this measure of organizational mismatch, we explore two primary hypotheses.

The first hypothesis posits and we find that an organizational structure that is mismatched to a firm's environment is associated with poor firm performance. Further, firms that have inappropriately decentralized decision rights experience significantly weaker performance than those that have inappropriately centralized decision rights.

The second hypothesis predicts and we find that the likelihood that a parent will alter decision rights in a subsidiary is increasing in the extent of a mismatch, but this likelihood is decreasing in the strength of the subsidiary's performance. To fix the organizational mismatch, we find that firms are less inclined to reclaim decision rights from subsidiaries when those rights were previously inappropriately decentralized than they are to delegate decision rights that were previously inappropriately centralized. Thus, it appears that it is more costly for a firm to retract decision rights from a subsidiary than it is to grant them. The presence of differential costs rationalizes our finding that firms experience significantly weaker performance when decision rights are inappropriately decentralized than when centralized—it is more costly for these firms to reengineer their inapt organizational structures.

In conclusion, we establish that organizational structure affects firm performance and firms adjust their organizational structure as their environments change. We suggest that the costs of inappropriately centralizing decision rights are lower than the costs of inappropriately decentralizing decision rights. Accordingly, multinational firms should exercise caution before delegating decision rights to its subsidiaries operating in environments that are likely to evolve.

APPENDIX

The International Investment Division of the Bureau of Economic Analysis conducts annual surveys of U.S. multinationals and their foreign affiliates. The first benchmark survey in the annual survey sequence was performed in 1982. The parent is also required to report information about its domestic operations. There are penalties for noncompliance and the BEA staffs check the forms for accuracy and completeness. To be reported on the BEA Benchmark Surveys of U.S. Direct Investment Abroad, a foreign affiliate must meet a specific size threshold in terms of assets, sales, or net income or loss. The size thresholds were $3 million in the 1982, 1989, and 1994 benchmark surveys. The size thresholds were $7 million and $10 million in the 1999 benchmark survey and 2004 benchmark survey, respectively. Specifically, we used the following surveys (see http://www.bea.gov/surveys/diasurv.htm): BE-10B(LF) (Long Form) Report for Nonbank Foreign Affiliate, BE-10B(SF) (Short Form) Report for Nonbank Foreign Affiliate, and BE-10B (BANK) Report for Bank Foreign Affiliate.

Estimates are made for at least some foreign affiliates that are below the reporting thresholds so that the BEA universe of foreign affiliates is essentially complete in each year. In the 1982, 1989, and 1994 benchmark surveys, no estimates were made for affiliates below the $3 million threshold. However, for the 1999 and 2004 benchmark surveys, estimates are made for foreign affiliates irrespective of their size. While we do not use any of the estimated operating and financial data in our study, we do include these foreign affiliates, such as the number of countries in which the parent company conducts international business through foreign affiliates, when computing firm-level variables.

The information collected by the BEA includes a set of financial statements for each foreign affiliate, as well as some additional financial, investment, and operating data. The instructions to the reporting company (i.e., the parent) are to "translate foreign affiliate financial statements, that is, balance sheets and income statements from the host country currency to U.S. dollars using FAS 52, as would be required to incorporate foreign statements into the U.S. [parent's] financial statements for reports to shareholders." Thus, we can observe the outcome of the translation process at the affiliate level, prior to the consolidation of the affiliates' financial and operating data with that of the parent company.

We capture the current year and prior year account balance for each affiliate. We determine an affiliate's functional currency as the parent's currency (U.S. dollar) when we do not observe changes in an affiliate's translation adjustment *equity* account and determine the functional currency as the subsidiary's local currency when we observe these changes. This is consistent with FAS 52, which states that, when the functional currency is the foreign currency, translation adjustments that arise from consolidating that foreign operation are not included in net income, but rather go directly to equity. We exclude BEA estimated data and only infer account changes, and thus, functional currencies from affiliate data reported by each company in a particular survey year.

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