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Equity Commitment under Uncertainty:

A Hierarchical Model of Real Option Entry Mode Choices

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Abstract: We develop a real option hierarchical model of entry mode choice and test predictions using a sample of US companies in Latin America and the Caribbean between 1980 and 2005. Probit results indicate that the choice between a real option non-equity mode and equity commitment is influenced by previous acquisition experience, R&D and advertising intensities, and country risk. The choice of the more flexible real option JV mode over WOEs is positively related to greater firm size and market-to-book ratio in countries with better infrastructure. In contrast, greater marketing intensity and lower country risk encourage WOEs.

Keywords: Real Options, Entry Mode, Latin America

I. Introduction

How companies choose to establish their operations in foreign countries often reflects the need for flexibility or control, which in turn is greatly dependent on the host country's political, economic, and financial stability (Li & Li, 2010; Brouthers, 2002; Shaver, 2013). In the context of emerging economies the real options perspective of equity commitment complements the leading theories of enterprise strategies and provides a natural framework to explore the effect of uncertainty on expansion choices (Hoskisson, Eden, Lau, & Wright, 2000; Brouthers, Brouthers, & Werner, 2008). At the core of the real options perspective is the prediction that toehold investments allow firms to defer large strategic investments until environmental contingencies at the host-country level are resolved or until information gathering and learning reduce informational uncertainty at the company level.

In recent literature, the real options perspective has been utilized in analyses that model joint ventures (JVs) as toehold options toward full acquisition. In the context of emerging markets, JVs can be seen as a real option entry mode that offers multinational enterprises (MNEs) a path to full ownership as exogenous uncertainty resolves (Kogut, 1991, Reuer & Tong, 2005; Tong, Reuer, & Peng, 2008). At the same time, partial acquisition toeholds as an option to full acquisition have also been examined from a real options perspective (Hennart & Reddy, 2000; Xu, Zhou, & Phan, 2010). For example, Folta & Miller (2002) develop this argument in the context of research-intensive industries, and show that toehold acquisitions provide opportunities for information gathering which gives the minority equity firm the advantage over outsiders when opportunities to buy-out the majority partner arise.

Outside of the real options treatment of MNE's entry mode choices, the broader entry-mode literature also considers the question of equity commitment in the context where the

alternative is a non-equity entry mode such as exports, licensing contracts, francizing, etc. For example, Pan & Tse (2000) develop a hierarchical model of entry mode where equity and non-equity modes offer different investment requirements and, therefore, require different levels of control. Specifically, non-equity entry modes require lower levels of control as they are much less investment intensive (Anderson & Gatignon, 1986). It would therefore, seem logical that integration of a real option non-equity category within the real option perspective would be an appropriate way to expand its predictions. However, non-equity entry as traditionally defined (i.e. exporting, licensing, and franchising) does not serve the meaning of an option as it does not offer the firm opportunities for information gathering that leads to subsequent ownership through equity modes (Fisch, 2006).

In this paper, we develop a real option hierarchical model of entry mode choice. We first propose *representative offices* as a suitable proxy for real option non-equity expansion that can be evaluated relative to the non-option equity expansion mode at the primary level of the hierarchy. At the secondary level of the hierarchy, the real option JV mode is evaluated relative to the non-option mode of wholly owned enterprises. We note that while representative offices have rarely been studied as an entry mode (a notable exception here is Quer & Claver, 2008), they are a form of international expansion that fits the real options notion of a toehold quite well. Specifically, like exports, representative offices preserve full flexibility for the MNE, but unlike exports, allow the firm to engage in information gathering and learning through market research, as well as build relationships with local officials and current and potential customers. We therefore posit that representative offices can be integrated as a non-equity entry mode within a real options framework and thus contribute to current research with an appropriate real options hierarchical model in the tradition of Pan & Tse (2000).

A second contribution of our analysis is our empirical focus on the countries of Latin America and the Caribbean (LAC). In a recent review of the literature on strategy research in emerging economics, Xu & Meyer (2013) noted that out of 260 published articles between 2001 and 2010, only 13 focused on one or more countries in LAC, and only 3 on the region as a whole. Thus, in comparison to Asia and Europe, MNE activity in LAC has remained relatively understudied (Canabal & White, 2008). For the purposes of our analysis, we hand-collect information on expansion strategies by US companies in LAC between 1980 and 2005. Specifically, we collect announcements made by U.S. publicly traded companies listed as operating in LAC during the sample period and record whether expansion takes place via representative offices, joint ventures, acquisitions, new plants, and wholly owned subsidiaries. We combine this information with company and host country characteristics to examine what factors contribute to the likelihood that firms choose the real option mode of non-equity over equity and the real option mode of JVs over wholly owned enterprises (WOEs).

Our empirical results based on probit models show that the probability of equity commitment is positively related to a company's investment experience, its marketing intensity, as well as the host country's political, financial and economic stability. As expected, the probability of expansion through the real option non-equity mode is significantly related to higher asset specificity. Results related to the choice between wholly owned operations and the real option joint venture mode show that, conditional on the decision to commit equity, firms with higher marketing intensity are more likely to invest through wholly owned operations in LAC countries with higher political and economic stability. Conversely, the probability of joint venture partnerships is, on average, positively related to larger firm size and higher market-to-book ratio in countries with active infrastructure development.

The rest of the paper is structured as follows. We develop our theoretical framework and testable hypotheses in Section II. Section III presents our estimation methodology and defines our variables. Section IV describes the sample construction and provides descriptive statistics. We discuss our empirical results in Section V and provide concluding remarks in Section VI.

II. Theoretical Framework and Hypothesis Development

In previous research, transaction cost economics (TCE) has emerged as popular theoretical framework guiding research on entry mode strategies in the presence of market imperfections (Zhao, Luo, & Suh, 2004; Anderson & Gatignon, 1986; Erramilli & Rao, 1993; Brouthers, 2002). The popularity of this theory is primarily due to its ability to provide testable links between market transaction costs and control costs in the presence of asset specificity (Brouthers & Nakos, 2004). For firms investing in emerging economies, higher transaction costs arise from incomplete or imperfect markets and institutions and TCE predicts that when firms internalize international foreign operations they achieve greater control over the utilization of proprietary assets. Over time, such predictions have found empirical support in a number of studies including Gatignon & Anderson (1988), Hennart (1991) and Pak & Park (2004), among others. However, a major deficit of the TCE framework is that it is static and thus unable to predict the effects of experience and learning, or the benefits of a "wait and see" approach in the presence of uncertainty.

The growing application of real option theory in recent studies is a direct response to the need for a framework that can explain how firms can both minimize control and investment uncertainties and capture growth opportunities as uncertainty is reduced (Dixit & Pindyck, 1994). For example, Xu et al. (2010) show how uncertainties associated with the institutional environment in China encourage a strategy of sequential acquisitions. In this analysis, investors seek minority

stake acquisitions to address endogenous (valuation) uncertainty and this becomes the real option entry mode allowing for potential full acquisition as informational asymmetries diminish and favorable conditions arise. Similarly, Li & Li, (2010) use a real options framework to evaluate the effect of demand uncertainty on ownership strategies. The authors find that the attractiveness of more flexible ownership strategies increases with demand volatility but not uniformly so across industries. Finally, Brouthers et al. (2008) also examine the effect of demand uncertainty on international entry mode choices such as exports, JVs and WOE. The authors find that by combining the TCE approach with real option insights they can significantly improve their predictions regarding the choice of entry mode as well as provide a more cohesive set of recommendations for decision-making by managers. Specifically, TCE variables alone do a good job in predicting the choice between the more flexible JV option and WOEs but fail to distinguish between exports and joint ventures. Yet an option to equity commitment (whether it involves cooperation or not) should logically exist and in the present study, we propose an alternative proxy for the non-equity entry mode in the form of representative offices. We develop the real option framework hierarchical model of real option entry mode choice below.

A. Hierarchical Model of Real Option Entry Mode Choices

The hierarchical entry mode choice model developed by Pan & Tse (2000) provides a starting point for conceptualizing a real options extension. At the primary choice level of this hierarch is the decision between equity and non-equity expansion. Once the decision to commit equity is made, managers evaluate factors at a secondary choice level where the option of partnering with local firms through JVs is weighed against the costs and benefits of setting up a wholly owned operation. The guiding rational behind viewing the choice of entry modes as a hierarchy is twofold. First, recognizing that managers often have limited analytical capacity, it is

reasonable to assume that they do not consider all modes of entry at every point in time but rather simplify the complex decision into a hierarchical process that permits them to focus on a smaller number of critical variables at each level of the hierarchy (Simon, 1955). Second, a hierarchical approach is a meaningful way to capture the real option perspective as it offers a concrete non-option mode as alternative at each level of the hierarchy.

In a real options context, higher investment risk increases the value of adopting lower equity investments while waiting for the resolution of uncertainty (McDonald & Siegel, 1986; Pindyck, 1991; Rivoli & Salorio, 1996). The option to wait becomes more valuable with increased asset specificity which implies greater internalization advantages and, at the same time, less reversible investments. A key requirement for an entry mode to qualify as a real option would be that it provides firms with a claim on future investments, otherwise opportunities may be pre-empted by rivals. We therefore evaluate how this occurs at each level of the hierarchical model.

(i) At the primary choice level of equity or non-equity expansion, we posit that the real option entry mode through representative offices provides a firm with the opportunity to engage in learning and information gathering which allows it to secure a favorable position to capitalize on investment opportunities in the host country ahead of other competitors. In contrast, equity commitment is not a real option at the primary choice level because it involves the use of resources to establish a foreign operation and thus precludes delay in investment.

(ii) At the secondary choice level between JVs and WOEs, a joint venture entry mode offers the firm the right to buy or sell its share of equity which serves to increase flexibility and potentially pre-empt acquisition bids by competitors. In contrast, the full acquisition mode

is not an option to wait since the firm fully realizes the downside risk and devaluation under uncertainty.

The relational framework in (i) and (ii) above is summarized in Figure 1. In preparation for our hypothesis development it is important to emphasize the difference between equity and non-equity real option modes with respect to the claims they offer on future investment opportunities (Folta & Leiblein, 1994). Knowledge gathering through the non-equity representative office mode results in firm-specific informational assets but it is possible that such knowledge can also be obtained via the real-option JV mode (Kogut, 1991). This suggests that the option characteristics at the secondary level are likely to be stronger due to the additional option to buy or sell equity in an investment as a response to changes in of uncertainty. From an empirical point of view this also means that factors explaining entry mode choice at different levels of the hierarchy are also likely to differ in their influence at each level which is an empirical regularity documented in previous literature (Pan & Tse, 2000; Brouthers et al., 2008).

B. Hypotheses

The hierarchical model presented above directly suggests two testable hypotheses related to the primary and secondary levels of entry mode choice. While any emerging country or region could be a good candidate for analysis during periods of economic, political, and financial uncertainty, our focus in this paper is on U.S. expansion strategies by U.S. companies in the countries of Latin America and the Caribbean for two reasons. First, as noted above and despite the voluminous entry mode literature, LAC has remained relatively understudied. Second, for U.S. companies in particular, LAC countries have a long history as investment destinations due to large markets, resources, and geographical proximity.[1] Yet despite the opportunities the region offers,

[1] Investment in LAC tends to be more geared towards resource- and market-seeking. Historically, the region has always attracted resource-seeking investments. However, a combination of external protectionism and a difficult

the economic, political and financial crises of the 1980s and 1990s have had a significant impact on the investment behavior of U.S. multinational firms (Tuman & Emmert, 2004; Nunnenkamp, 1997; Mortimore, 2000; Blanco, 2012). In the two and a half decades between 1980 and 2005, market-oriented reforms in LAC have significantly changed the investment landscape. For example, while macroeconomic reform and deregulation increased the appeal of existing investment opportunities by reducing investment risks and costs of operation. Privatization reforms have also served to create new foreign direct investment (FDI) opportunities where these have been previously limited or forbidden. Yet, despite favorable fundamentals, macroeconomic instability and political and economic uncertainty have been a persistent challenge for foreign investors throughout the region (Montero, 2008).

In the presence of such exogenous uncertainty, a key variable in the TCE and real options literature that increases the value of a "wait and see" approach is asset specificity. For example, Rivoli & Salorio (1996) show that the standard TCE-based prediction of internalization is reversed under strong uncertainty as firms with intangible assets choose to delay investment rather than expand through wholly-owned operations. In a similar vein, Smarzynska (2004) argues that investors with proprietary assets are more likely to undertake projects focusing on distribution and sales rather than local production in environments where property rights are not well enforced. In such circumstances, we would expect that firms with higher asset specificity (usually measured as higher research and development (R&D) intensity) will be more likely to set up a presence in LAC via low or no equity operations (toe-hold investments).

In addition to asset specificity, Brouthers et al. (2008) argue that strategic flexibility is an important determinant of whether firms choose equity or non-equity expansion. Strategic

business climate tends to tilt investments toward market seeking as opposed to efficiency seeking investments oriented towards exports (Reyes & Sawyer, 2011).

flexibility in their analysis derives from a company's experience with investments and this type of private company knowledge serves as an important asset in evaluating downside risks such as political uncertainty (Fisch, 2006). Strategic flexibility is also a firm characteristic that is developed in response to competitive pressures in the domestic market. For firms seeking to secure market share, the need to penetrate markets ahead of competitors can supersede the option value of more passive (low or no equity) entry, i.e. the option of establishing a smaller initial equity commitment which can be used as a platform for future expansion conditional on improvement in investment risk levels (Kogut, 1991). Doh (2000), Mascarenhas (1992), and Lieberman & Montgomery (1988) support the idea that firms will seek a head start over rivals in order to maintain their competitive position and defend market share. In this context, marketing intensity emerges as an important variable determining entry mode choices (Pan & Tse, 2000; Smit & Trigeorgis, 2004). Overall, we expect that firms with greater marketing intensities may also be ones that possess higher strategic flexibility relative to industry rivals and may be thus more likely to choose equity commitment entry modes in an effort to stay ahead of competition.

We also expect that firms will be more likely to commit to higher equity capital investments when market conditions are relatively stable and host country risk is relatively low. Recent research on emerging markets by Uhlenbruck, Rodriguez, Doh, & Eden (2006) supports this expectation. The authors find that firms' response to investment risk due to corruption is to commit low or no equity, rather than to forego participation in the market altogether. Our first hypothesis related to the choice between equity commitment and the real option non-equity entry mode is summarized as follows:

Hypothesis 1: *Firms with lower asset specificity, higher strategic flexibility, and higher marketing intensity are more like to choose equity commitment over the real option non-equity entry mode in countries with lower investment risk.*

To further develop our hypothesis regarding the choice between the real option joint venture mode and wholly-owned enterprises, we draw on the literature that analyzes flexibility and control in equity commitment. For example, Santangelo & Meyer (2011) show that institutional uncertainty increases the value of lower commitment and the preference for entry modes that give firms the option to increase future commitment as learning results in reduction of investment uncertainty. Similarly, Li & Li (2010) propose that, flexibility in the choice of ownership is more valuable in host countries with volatile market conditions but intense competition erodes the option value of choosing lower equity commitment.

Further insights can be derived from the awareness-motivation-capability perspective acquisition activity (Chen, 1996). Strategic orientation towards international expansion can be seen as a response to competitive pressure and smaller firms will compete more aggressively to secure growth opportunities in emerging markets through acquisitions (Haleblian, McNamara, Kolev and Dykes, 2012). In contrast, larger firms with less flexible structures may be slower to respond and since such firms often have greater market power, they would be less likely to take the short-cut to strategic growth via an acquisition under uncertainty. Asset specificity is also a key moderating factor in the choice between joint ventures and acquisitions (Rivoli & Solario, 1996; Paul & Wooster, 2008). Firms with more intensive marketing and R&D activities tend to also be more aggressive investors with a higher degree of tolerance for risk (Zahra & Covin, 1993; Schoenecker & Cooper, 1998; Robinson & Chiang, 2002). Thus, in high-growth environments, companies with higher asset specificity may be less concerned about uncertainty as they

aggressively pursue market share with high-equity commitment in wholly-owned operations (Dixit & Pindyck, 1994, 2000; Smit & Trigeorgis, 2004; Brouthers, 2002). We summarize these predictions below:

> Hypothesis 2: *Larger firms with stronger operating performance will pursue strategic growth opportunities through the real option joint venture mode under uncertainty; smaller firms and ones with higher asset specificity and will compete more aggressively for strategic growth opportunities through wholly owned enterprises.*

III. Estimation Methodology

The predictions formulated above can be tested empirically by focusing on two separate but related questions. First, what company and country characteristics explain the probability that companies will chose equity over non-equity expansion modes in LAC? Second, what factors contribute to the probability that expansion takes the form of joint-venture partnerships as opposed to wholly owned operations such as subsidiaries, new plants and acquisitions? We examine these two questions by estimating the following probit model:

$$\begin{aligned} \text{MODE}_i = {} & \beta_0 + \beta_1 \, SIZE + \beta_2 \, LEVERAGE + \beta_3 \, ACQ + \beta_4 \, MTB + \beta_5 \, RD + \beta_6 \, ADV + \beta_7 \, EMPL \\ & + \beta_9 GDPCAP + \beta_9 \, COMPRISK + \beta_{10} \, EDUC + \beta_{11} INFRSTR + \beta_{12} \, NATRES \\ & + \sum_{k=13}^{k=70} \gamma_k \, (Industry, Country, Year \text{ controls}) + \varepsilon_i \end{aligned} \quad (1)$$

Equation (1) is estimated with two versions of the dependent variable MODE. To evaluate choices at the primary level of the hierarchy, we first define MODE as equal to 1 if the company expands in the LAC region with equity commitment (i.e. acquisition, new plant, wholly owned subsidiary or joint venture) and zero if its expansion involves the real option representative office mode. To examine factors at the secondary level of choice between WOEs and real option JV

mode, we redefine the dependent variable such that it takes on the value of 1 if a company expands via WOEs and zero if it chooses JV.

The independent variables in equation (1) include firm and country characteristics as well as controls and the predicted signs on the test variables are presented in Table 1. To control for endogeneity, all firm-level variables are constructed using COMPUSTAT company data from the year preceding the announcement of expansion in LAC. Thus, SIZE is the natural log of a firm's total assets in the year preceding its announced expansion in LAC. LEVERAGE is EBITDA scaled by book value of assets. ACQ is the value of the firm's acquisitions and our measure of strategic flexibility. MTB is the market value of assets scaled by book value of assets and a proxy for growth opportunities and performance. RD is research and development expenditure scaled by sales and also our proxy for intangible assets at the firm level. ADV is advertising expenditure scaled by sales and measures the firm's marketing intensity. EMPL is number of employees scaled by sales and together with LEVERAGE is included to control for structural differences between firms.

Regarding country characteristics, GDPCAP is the natural log of GDP per capita in the year a firm announces expansion in LAC. COMPRISK is the ICRG index of composite country risk, obtained from the Political Risk Group.[2] This measure of risk was chosen for two reasons. First, it captures the unusual blend of political, economic, and financial risk characteristic of the region in the 1980s. The second reason is that the time series nature of the data required a measure of risk covering over two decades. EDUC is years of schooling and controls for labor quality. INFRSTR is total kilowatts of electricity produced in the host country annually and is a proxy for infrastructure. This variable is of particular importance in the context of LAC as poor infrastructure is a common problem in the region (Reyes and Sawyer, 2011). Finally, NATRES, also a control

[2] See http://www.prsgroup.com/icrg.aspx

variable, is the contribution of natural resources to the country's GDP (i.e. total natural resources rents as percent of GDP). Additional controls include industry, year, and country dummies. Industry controls are specifically constructed to capture MODE differences between firms from the five different 2-digit SIC classifications: (i) mining and construction; (ii) manufacturing; (iii) transportation and utilities; (iv) retail and wholesale trade; (v) services. These data related to country characteristics are obtained from the World Development Indicators.[3]

IV. Sample Construction of Entry Mode Data for U.S. Firms in LAC

We construct a unique sample tracking entry mode by U.S. publicly traded companies in Latin America and the Caribbean over the period 1980-2005. Names of firms with presence in the region were obtained from various editions of the Directory of US Firms in Foreign Countries compiled by Uniworld Business Publications Inc. We eliminated firms that are not publicly traded as their financial information is not consistently reported and focus on only publicly traded companies. To obtain announcements of expansion, we researched each company using the Lexis-Nexis (Academic Universe) database. We found such announcements for 491 unique companies, which collectively account for 1,090 observations in our sample. According to the information contained in the announcements, expansion modes in our sample include investments through acquisitions, new plants (and wholly owned subsidiaries), and JVs. In addition, announcements of expansion through non-equity operations such as representative offices were also collected as these provide our proxy for non-equity expansion in the estimation of our empirical model in equation (1).

Figure 2 provides an overview of the frequency of equity and non-equity expansions over

[3] See http://data.worldbank.org/data-catalog/world-development-indicators

time across the 28 countries for which we have observations in our sample.[4] A striking feature of this pattern is the relatively sparse record of entry between 1980 and 1990 which is consistent with the so called "lost decade" when macroeconomic and political instability stemming from a wave of financial crises was rampant throughout the region (Nunnenkamp, 1997). By contrast, the upsurge in frequency of U.S. investments in the 1990s was likely a reflection of the democratically elected leaders, a general liberalization of economic regimes and strong economic growth (Robinson, 1992). In the new millennium, the frequency of expansion once again declined in the aftermath of the increased macroeconomic instability the region experienced in the first half of the last decade, and worsened economic conditions in the US and around the world in the second half (Poulsen & Hufbauer, 2011).

A distinction between manufacturing and non-manufacturing companies is illustrated in Figure 3. The frequency of expansion by manufacturing companies outpaces that of non-manufacturing for most years through our sample period with the exception of 1995 and the first three years of the new millennium. We also present the frequency of expansion by entry mode in Figure 4 and for two different subsets of observations: total observations (1,090) and unique company observations corresponding to the very first announcement of expansion made by each company in the sample (491). Figure 4 shows that the most popular entry mode is acquisitions which suggest market seeking as a primary motive for expansion in Latin America (Kogut, 1991). The second most popular mode is joint ventures, which account for 102 out of the 491 unique observations, and 223 of the total observations in our sample (approximately one fifth). Finally, Table 2 presents descriptive statistics for the covariates in our estimations. We provide correlations

[4] These include: Argentina, Aruba, Bahamas, Barbados, Bermuda, Bolivia, Brazil, Cayman Islands, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay, Venezuela

and compute the variance inflation factors (VIF) for each variable. We note that all variables have VIFs less than 5 indicating that multicollinearity is not a concern in the results presented below.

V. Empirical Results and Discussion

A. Real Option Non-equity Expansion versus Equity Commitment

Our first set of results presented in Table 3 relate to factors explaining the probability of equity versus no equity commitment. We report results for the full sample (Model 1) as well two additional subsamples that help us evaluate the importance of experience. Specifically, our "New Entry" results reported under Model 2 are based on a subsample that includes only firms who entered the region after 1980. These help us to evaluate whether prior experience in the region changes the importance of firm and country characteristics that determine entry mode strategy. Additionally, in Model 3 we further constrain the sample to only include the very first announcement of expansion by firms entering post 1980 in an effort to identify whether repeat expansion changes the relative importance of entry mode determinants.

Our results lend strong support for Hypothesis 1 which, consistent with real options theory, predicts that firms with proprietary assets are more likely to choose a wait-and-see approach under uncertainty (Rivoli & Solario, 1996). The coefficients on R&D intensity are negative and highly significant throughout suggesting that, all else equal, higher R&D intensity decreases the likelihood of equity commitment upon expansion. The results in Model 3 also provide significant support for Hypothesis 1 with respect to the prediction that equity commitment is more likely for companies with higher acquisition activity and greater advertising intensity. We note that the estimated coefficients on Acquisitions and Advertising Intensity are of the expected sign and significant throughout. Our interpretation of these results is that prior experience with acquisitions

significantly increases the probability of equity commitment as does having higher advertising intensity. These firm characteristics are consistent with expansion strategies aimed at aggressive market penetration to capture market shares ahead of competitors.

In addition, as host-country composite risk increases, the preference for flexibility (no equity entry via representative offices) also increases. We note that higher values for our Composite Risk measure correspond to more stable host country environments. Thus the positive and significant coefficient on Composite Risk suggests that greater stability significantly increases the probability of equity commitment and specifically expansion through full ownership modes such as acquisitions, new plants and wholly owned subsidiaries. These results provide further support for Hypothesis 1 with respect to the prediction that there is a higher probability of equity commitment in the presence of lower country risk (higher values of the composite risk index). We note that the coefficients on Real GDP per Capita are insignificant throughout suggesting that for our sample, market size is not a significant determinant in the decision to expand with equity modes over representative offices.

B. Real option JVs versus Wholly-Owned Operations

Results for factors influencing the probability of choosing wholly-owned operations over real option JV mode are presented in Table 4 and the samples used in the three models are as described above. We find significant support for Hypothesis 2. *Size* is significant and negative throughout suggesting that larger firms that have a higher market-to-book ratio are more likely to undertake expansion through joint-venture operations. This is consistent with previous research which shows that larger firms are more likely to have the resources to absorb risk and therefore are less affected by risk conditions in the host country, which increases the probability of choosing joint venture operations, all else equal (Pan & Li, 2000). Related to this is the effect of higher

growth opportunities in Models 1 and 3. Firms with higher market-to-book ratios are more likely to have better internal organization and ability to manage assets also suggesting a better ability to mitigate risk.

Results in Table 4 also lend partial support to the prediction by Hypothesis 2 that firms with higher asset specificity will expand strategically through acquisitions. Advertising intensity is positively related to the choice of wholly owned operations as firms more aggressively competing for market share tend to take a shortcut to capturing strategic growth opportunities through WOEs. We note however that the strong and statistically significant role of R&D Intensity, for the choice between equity and no equity documented in Table 3, disappears when the analysis is turned to the choice between joint and wholly-owned operations. Finally, the results show that better infrastructure is of particular importance for joint ownership. One interpretation here is that host countries with better infrastructure are also more likely to have better institutions and present lower risk. Real GDP per capita is significant only in the case of "First Expansion" observations suggesting that country size in an important determinant when firms choose where to locate their first equity investment. On the other hand, Composite Risk is only significant for the Full Sample and consistent with the results in Table 3.

VI. Conclusions

The analysis in this paper contributes to the literature on entry mode choices by MNEs in several important ways. First, we propose a theoretical model that extends the hierarchical entry mode framework of Pan and Tse (2000) to include a real options perspective of the choice between toehold investments and (full) equity commitment. Second, we utilize data on expansion via representative offices as a novel way to position the non-equity real option within the hierarchical

entry mode choice model. This allows us to more carefully examine determinants of firms' choices to commit equity under uncertainty in the context of real options. Third, we use a unique sample of U.S. firms expanding in Latin America and the Caribbean over the span of 26 years to better explore the effects of changes in countries' economic and political risk on expansion strategies. To the best of our knowledge this is the first study to focus on this understudied region when it comes to enterprise strategies in emerging economies.

Our empirical results show that a number of the variables influence mode of entry choices in plausible ways subject to the usual controls. With respect to characteristics that determine whether firms choose to commit equity or not, we find that previous experience with acquisitions, R&D intensity, advertising intensity, and country risk are all associated with committing equity. Firms are more likely to commit to equity if they have prior experience with acquisitions and have some form of firm-specific asset. When we investigate the choice between the real option JV mode and wholly owned enterprises, we find that firm size and market-to-book positively correlate with the probability of the more flexible JV mode while greater marketing intensity and better quality of infrastructure encourage wholly owned operations.

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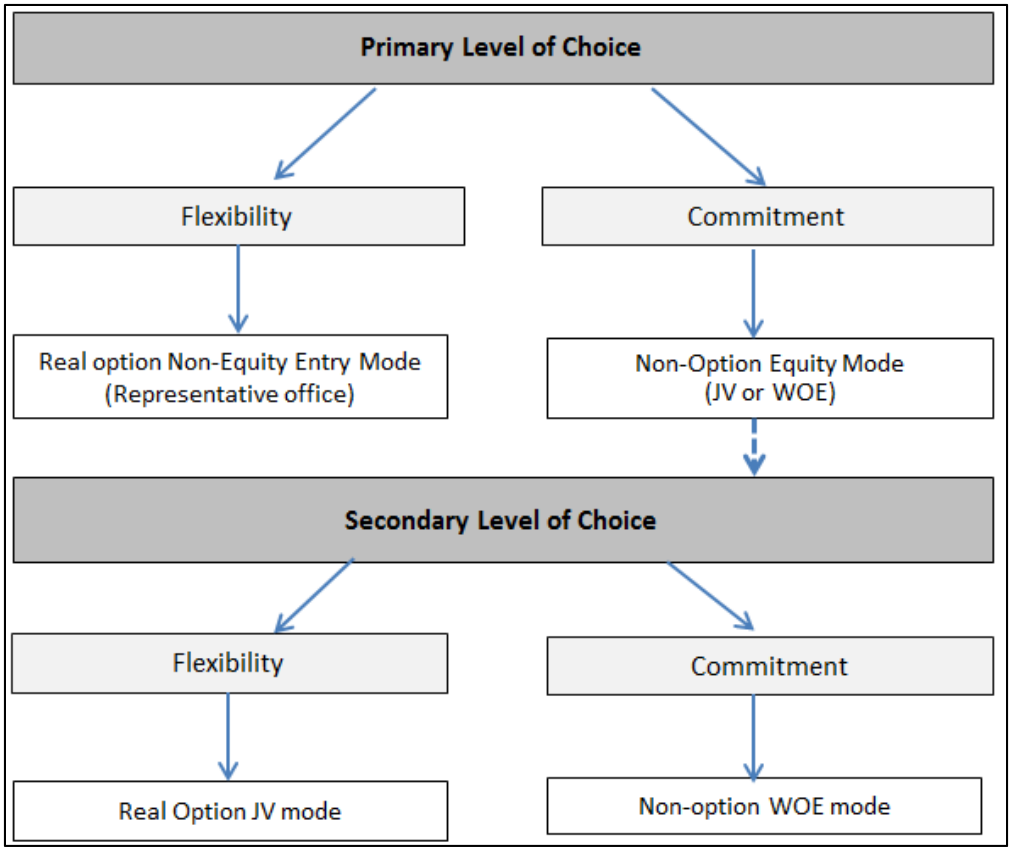

Figure 1. Hierarchical Model of Real Option Entry Mode Choices

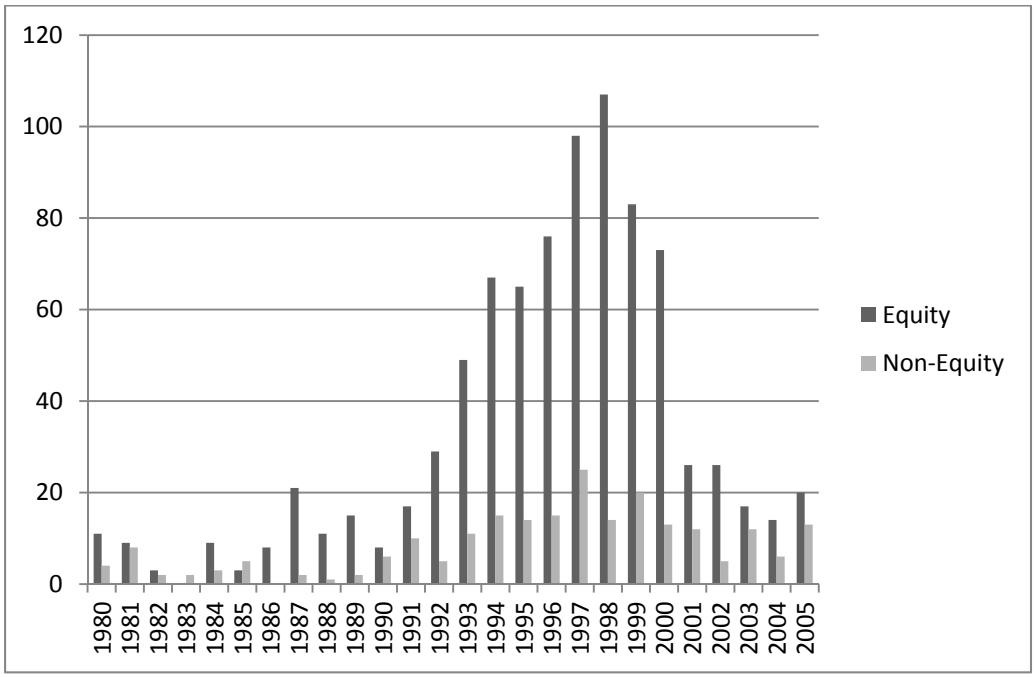

Figure 2. Equity versus Non-Equity Entry over Time, 1980-2005*

*Note: Equity modes include new plants, wholly owned subsidiaries, acquisitions, and joint ventures. Representative offices are considered a non-equity mode.

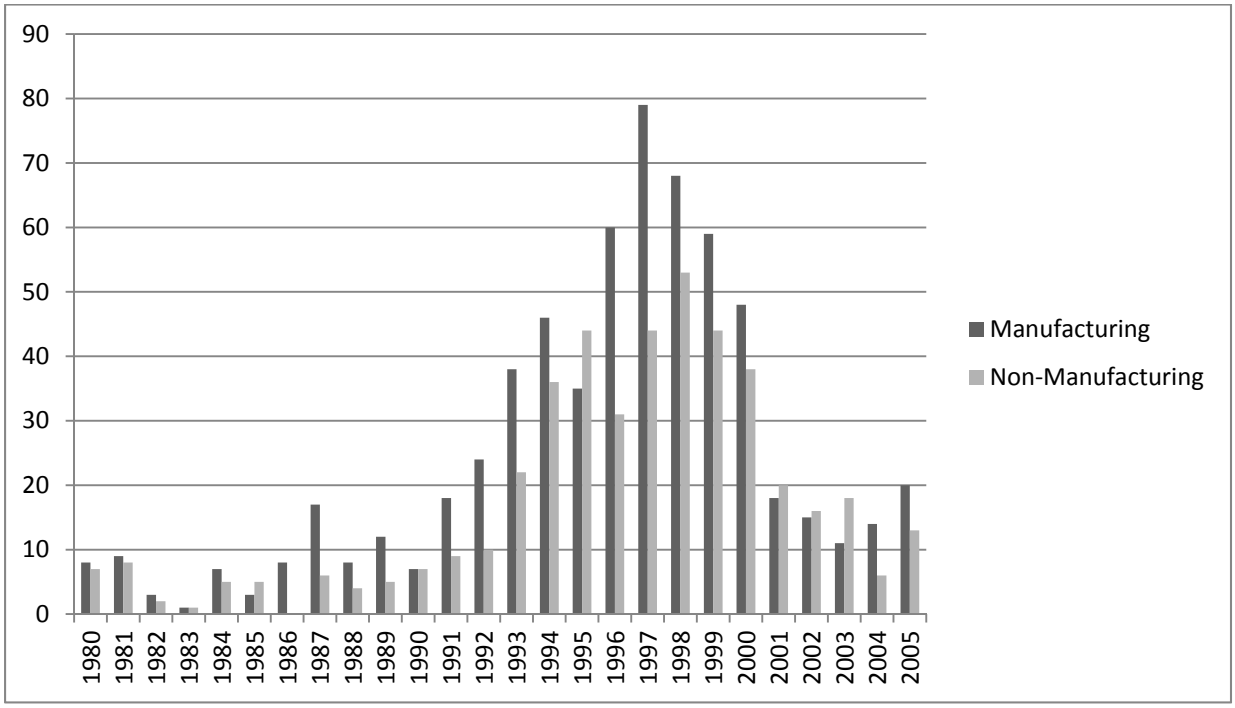

Figure 3. Frequency of Manufacturing and Non-Manufacturing Expansion by Year

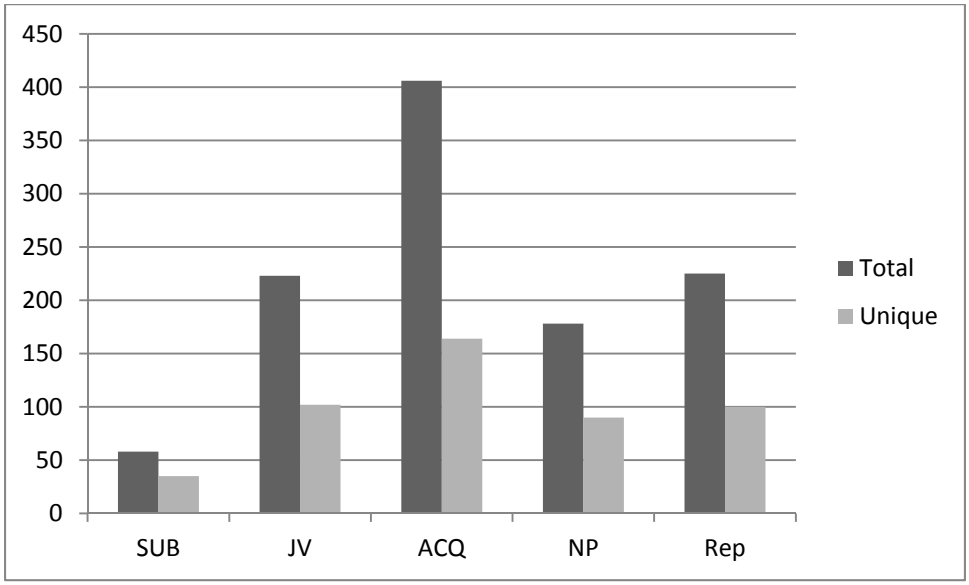

Figure 4. Entry Mode Frequency: Total and Unique Company Observations

Note: SUB = Wholly-owned subsidiaries; JV = Joint Ventures; ACQ = Acquisitions; NP = New Plants; REP = Representative Offices. Unique observations pertain to only the first instance a company announced expansion in the region.

Table 1 Hypotheses, Variables, and Expected Signs

Hypothesis		Testing Variable[1]	Expected sign
The choice between real option non-equity expansion and equity commitment			
Hypothesis 1	*Firms with lower asset specificity, higher strategic flexibility, and higher marketing intensity are more like to choose equity commitment over the real option non-equity entry mode in countries with lower investment risk.*	R&D	-
		ADV	+
		ACQ	+
		COMPRISK	+
The choice between real option joint venture expansion and wholly owned operations			
Hypothesis 2	*Larger firms with stronger operating performance will pursue strategic growth opportunities through the real option joint venture mode under uncertainty; smaller firms and ones with higher asset specificity and will compete more aggressively for strategic growth opportunities through wholly owned enterprises.*	SIZE	-
		MTB	-
		ADV	+
		R&D	+
		COMPRISK	+

[1] Testing and control variables are defined as follows:

(i) ***R&D*** is expenditures on R&D scaled by book value of assets in the calendar year containing firm's announcement of expansion in the Latin America and Caribbean region;

(ii) ***ADV*** is expenditures on advertising scaled by book value of assets in the calendar year containing firm's announcement of expansion in the Latin America and Caribbean region;

(iii) ***SIZE*** is the measure of firm size computed as the natural log of book value of assets

(iv) ***EMPL*** is the measure of firm labor intensity computed as number of employees scaled by sales.

(v) ***MTB*** is market-to-book value of assets;

(vi) ***ACQ*** is the value of firm's acquisitions in the calendar year prior to expansion in LAC and a proxy for firm experience with equity commitment;

(vii) ***COMPRISK*** is the International Country Risk Guide index of economic political and financial risk in the host country. Higher values correspond to less risky business and investment environment.

(viii) ***RGDP*** is the natural log of host-country GDP in the calendar year containing firm's announcement of expansion in that host country. Variable is a proxy for market size.

(ix) ***INFRSTR*** is the total kilowatt hours of electricity generated in the host country per year.

(x) ***EDUC*** is quantity and quality of the educational system measured as years of schooling and complied by Barro and Lee (2010).

Table 2 Descriptive Statistics

	Variable	*Mean*	*Std. Dev.*	*Min*	*Max*	*VIF*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
1	**Size**	7.91	1.93	1.76	12.62	1.2	1										
2	**Leverage**	0.001	0.03	-0.27	0.88	1.02	-0.06*	1									
3	**Acquisitions**	1.77	2.44	-3.86	8.76	1.11	0.24*	-0.03	1								
4	**Market-to-Book**	2.03	1.97	0	38.48	1.45	-0.13*	-0.04	-0.02	1							
5	**R&D Int.**	0.03	0.08	0	1.65	2.59	-0.15*	-0.002	-0.05	0.44*	1						
6	**Advertising Int.**	0.02	0.14	0	3.99	2.11	-0.05	-0.004	-0.01	0.05	0.65*	1					
7	**Employee Int.**	0.01	0.01	-0.02	0.18	1.12	-0.25*	-0.02	-0.004	0.02	0.13*	0.20*	1				
8	**GDP/Capita (log)**	8.39	0.48	6.44	11.00	2.05	-0.10*	0.14*	0.04	0.01	0.03	0.02	0.11*	1			
9	**Comp. Risk (log)**	4.21	0.09	3.68	4.41	1.64	-0.05	-0.04	0.12*	0.04	0.01	0.04	0.03	0.527*	1		
10	**Years School (log)**	1.92	0.20	1.02	2.27	1.79	0.01	-0.03	0.08*	0.04	0.03	0.05	-0.001	0.389*	0.49*	1	
11	**Electric. Prod. (log)**	25.26	1.30	20.5	26.72	1.65	-0.13*	0.05	0.05	0.07*	0.10*	-0.02	-0.001	0.394*	0.07*	-0.22*	1
12	**Nat. Resources (log)**	1.37	0.91	-2.20	4.08	1.08	0.01	-0.01	-0.14*	-0.05	-0.01	0.01	0.014	0.046	-0.09*	-0.02	-0.10*

* $p < 0.05$

Table 3 Probit estimations of the choice between equity and non-equity expansion.

Dependent variable MODE = 1 if a company expands in LAC through joint ventures, acquisitions, new plants, or wholly owned subsidiaries, and zero if the expansion is through a representative office. "Full Sample" = all companies and their observations; "New Entry" = only companies that expanded after 1980; "First expansion" = only first observations for companies that expanded after 1980. Robust standard errors are in parentheses. All tests are two-tailed and correspond to: * p<0.1; ** p<0.05; *** p<0.01.

		Model 1: Full Sample	Model 2: Post 1980 Companies	Model 3: First expansion by Post 1980 Companies
Firm-Specific Variables	**Size**	-0.046	-0.049	0.078
		(0.035)	(0.044)	(0.076)
	Leverage	0.413	0.375	3.424
		(3.843)	(3.533)	(3.191)
	Acquisitions	0.127	0.182	0.211
		(0.028)***	(0.039)***	(0.077)***
	Market to Book	0.043	0.062	0.070
		(0.037)	(0.043)	(0.049)
	R&D Intensity	-4.146	-5.324	-3.904
		(1.233)***	(1.520)***	(1.846)**
	Advertising Intensity	4.635	5.959	1.701
		(1.404)***	(1.738)***	(0.664)**
	Employee Intensity	19.999	18.017	35.765
		(12.555)	(14.046)	(19.859)*
Host Country Variables	**Real GDP per Capita**	0.175	-1.143	-5.347
		(1.443)	(1.978)	(4.498)
	Composite Risk	3.020	3.181	8.616
		(1.473)**	(1.862)*	(4.661)*
	Years of Schooling	2.381	2.064	3.693
		(1.541)	(1.834)	(3.761)
	Electricity Production	0.483	0.897	5.608
		(1.049)	(1.240)	(4.801)
	Natural Resources	-0.270	-0.399	0.048
		(0.234)	(0.298)	(0.666)
Industry, Year and Country Controls	**Mining &Construction**	1.330	0.940	8.267
		(0.396)***	(0.427)**	(1.074)***
	Transportation & Utilities	-0.275	-0.325	-0.386
		(0.164)*	(0.193)*	(0.452)
	Retail & Wholesale Trade	-0.303	-0.404	-0.926
		(0.251)	(0.265)	(0.388)**
	Services	-1.125	-1.140	-1.427
		(0.164)***	(0.193)***	(0.299)***
	Time Dummies	Yes	Yes	Yes
	Country dummies	Yes	Yes	Yes
	Constant	-27.634	-28.803	-139.550
		(25.086)	(30.701)	(123.505)
	Pseudo R^2	0.2162	0.2398	0.3759
	Num Obs	887	621	270

Table 4 Probit estimations of the choice between joint-venture and wholly-owned operations

Dependent variable MODE is 1 if a company expands in LAC through wholly owned operations (acquisitions, new plants, or wholly owned subsidiaries), and zero if the expansion takes place through a joint venture. "Full Sample" = all companies and their observations; "New Entry" = only companies that expanded after 1980; "First expansion" = only first observations for companies that expanded after 1980. Robust standard errors are in parentheses. All tests are two-tailed and correspond to: * p<0.1; ** p<0.05; *** p<0.01.

		Model 1: Full Sample	Model 2: Post 1980 Companies	Model 3: First expansion by Post 1980 Companies
Firm-Specific Variables	**Size**	-0.120	-0.114	-0.220
		(0.035)***	(0.043)***	(0.078)***
	Leverage	-2.332	-1.922	-12.027
		(3.091)	(2.766)	(4.701)**
	Acquisitions	0.008	-0.038	-0.004
		(0.022)	(0.028)	(0.058)
	Market to Book	-0.068	-0.039	-0.207
		(0.036)*	(0.040)	(0.096)**
	R&D Intensity	1.065	-0.769	2.147
		(1.486)	(1.656)	(3.271)
	Advertising Intensity	10.818	7.870	18.319
		(3.339)***	(3.833)**	(10.441)*
	Employee Intensity	24.668	15.076	10.932
		(12.577)**	(14.094)	(15.184)
Host Country Variables	**Real GDP per Capita**	-0.583	-0.741	18.271
		(1.840)	(2.126)	(6.391)***
	Composite Risk	2.997	2.821	-6.618
		(1.470)**	(1.779)	(4.475)
	Years of Schooling	-1.529	-0.821	-8.483
		(1.574)	(1.879)	(4.336)*
	Electricity Production	-3.459	-3.199	-8.460
		(1.169)***	(1.409)**	(3.171)***
	Natural Resources	0.160	0.435	2.643
		(0.284)	(0.351)	(0.830)***
Industry, Year and Country Controls	**Mining &Construction**	-0.785	-0.769	-0.202
		(0.221)***	(0.282)***	(0.634)
	Transportation & Utilities	0.081	0.082	-0.742
		(0.170)	(0.191)	(0.359)**
	Retail & Wholesale Trade	-0.474	-0.506	-0.381
		(0.233)**	(0.247)**	(0.417)
	Services	-0.041	0.269	0.524
		(0.206)	(0.223)	(0.438)
	Year Dummies	Yes	Yes	Yes
	Country dummies	Yes	Yes	Yes
	Constant	80.162	74.627	85.177
		(27.954)***	(33.143)**	(60.243)
	Pseudo R^2	0.1691	0.1779	0.3171
	Num Obs	754	529	218