

Ownership Increase in International Joint Ventures: The Within- and Across-Country Flexibility Perspective

Sangcheol Song¹

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Abstract We employ the real options perspective to examine how multinational corporations (MNCs) increase ownership levels in their international joint ventures (IJVs) to exploit (or utilize) both within- and across-country flexibility. This paper utilizes a rich dataset of South Korean firms' foreign affiliates to test hypotheses derived from the real options theory. It examines the roles of growth options that require small equity stakes under uncertainty as well as switching options that require controlling equity stakes to coordinate switching implementation. Specifically, we examine how the ownership of jointly-owned foreign subsidiaries changes under the influence of changing labor cost uncertainty. We utilize a two-stage model to address the sample selection bias associated with a subsidiary's choice of joint venture under the influence of high labor cost uncertainty. In the first stage, we run a probit model with a dummy variable for JVs and wholly-owned subsidiaries (WOSs) (1: JV, 0: WOS) as the dependent variable. In the second stage, we run a panel logistic regression model (STATA command, "xtlogit"). We found that MNCs engaged in greenfield IJVs increase their initial ownership when labor cost uncertainty within their host countries is favorably resolved. We also found that MNCs' tendency to increase their IJV ownership intensifies when their subsidiary networks are exposed to negatively correlated labor cost growth rates across countries. Taking within and across country flexibility perspective, this study adds new insights on MNC ownership changes, especially in IJVs. Based upon our findings, we conclude that MNCs make flexible ownership adjustments for their foreign subsidiaries in response to different uncertainty conditions within and across countries.

Keywords Ownership increase · IJVs · Flexibility · Labor cost uncertainty

✉ Sangcheol Song
ssong@sju.edu

¹ College of Business, Saint Joseph's University, Philadelphia, USA

1 Introduction

The real options theory posits that, under conditions of high uncertainty, firms benefit from strategic investments in real assets that permit them to “keep their options open” (Adner and Levinthal 2004a, b; Bowman and Hurry 1993; Cuypers and Martin 2010; Dixit and Pindyck 1994). The decision-making rights embedded in real options investments enable a firm to respond to environmental uncertainties with more flexibility and thus preserve valuable upside benefits in favorably resolved situations and limit downside risks in unfavorably resolved situations (Chi and McGuire 1996; Dixit and Pindyck 1994; Folta 1998; Kogut 1991; Kumar 2005; Reuer and Leiblein 2000; Tong and Reuer 2007). Foreign direct investment (FDI) also provides options that can safeguard multinational corporations’ (MNCs) decision-making rights (Kogut and Kulatilaka 1994; Lee and Makhija 2009a, b; McGrath and Nerkar 2004; Tong and Reuer 2007). These options are important for international business managers because MNCs need a high degree of flexibility to cope with macro-economic uncertainties within and across their host countries (Lee and Chung 2007; Chung et al. 2012; Cuypers and Martin 2010; Kogut and Kulatilaka 1994; Huchzermeier and Cohen 1996; Song et al. 2014). How MNCs retain and realize flexibility under uncertainty determines their performance and longevity (Belderbos and Zou 2009; Fisch and Zschoche 2012; Lee and Song 2012).

Recent research on real options in FDI examines two types of flexibility: within-country and across-country (Chung et al. 2012; Kogut and Kulatilaka 1994; Lee and Chung 2007; Song et al. 2014). Within-country flexibility is enabled through international investments that provide a foothold or platform in a host country with which the firm identifies and exploits growth opportunities and the potential for incremental investment (Chang 1996; Fisch 2008; Kogut 1991; Tong et al. 2008). This corresponds with the growth options in the real options literature. In one relevant study, Tong et al. (2008) studied the value of growth options associated with the international joint ventures (IJVs) of American MNCs. Across-country flexibility is attained by scattering operations across countries, allowing MNCs to transfer resources or relocate production among subsidiaries in various locations as a flexible response to cross-country cost or value differentials (Allen and Pantzalis 1996; Belderbos et al. 2014; Fisch and Zschoche 2011; Huchzermeier and Cohen 1996; Lee and Song 2012; Tang and Tikoo 1999). This corresponds with the switching options in the real options literature. In one relevant study, Chung et al. (2010) examined the switching options embedded in Japanese FDIs in Asian countries during the Asian economic crisis in the late 1990s. Fisch and Zschoche (2011) examined the relocation of employees across European countries using a German FDI dataset.

The inherent difference between these types of flexibility requires different ways of structuring a firm’s international investments. In particular, investment sizes and types have been actively studied as a crucial part of MNCs’ flexible strategies. From the real options perspective on FDI, determining the appropriate investment size is an important step in gaining flexibility. Small investments are considered to have

higher real options value since they provide MNCs with more flexibility to increase or decrease according to environmental changes in their host countries at relatively low costs. IJVs, as entry modes, provide more growth options with respect to acquisition or wholly-owned subsidiaries (WOSs) (Cuypers and Martin 2010; Li and Li 2010; Reuer and Tong 2005; Tong et al. 2008). Literature claims that IJVs serve as platform investments by which MNCs test host markets and gain preferential access to growth opportunities in favorable situations. Further, IJVs can also provide relatively easy and inexpensive exits from host markets in unfavorable situations (Kogut 1991; Kogut and Chang 1996; Kulatilaka and Perotti 1998; Reuer and Tong 2005; Tong and Li 2008).

However, the two flexibility perspectives may offer conflicting explanations of IJVs' real options effects. As discussed, an IJV is a reasonable choice from the within-country flexibility perspective; however, it may not be reasonable from the across-country flexibility perspective because the weak managerial control and governance associated with shared ownership may undermine the MNCs' coordination of jointly-owned subsidiaries across countries. Due to these countervailing effects, an investment that creates flexibility under certain conditions may be costly under others.

Considering these contrasting joint ownership aspects, this paper examines the conditions under which the two flexibility perspectives converge to explain MNCs' real options-based decisions on ownership changes. We focus on ownership changes in each MNC's IJV as their first-time investment in each host country since these investments are platforms for subsequent investment and thus have growth options value (e.g., Cuypers and Martin 2010; Tong et al. 2008). Specifically, we focus on MNCs' increase in ownership of their IJVs since an ownership increase reflects both the actual exercise of the growth options embedded in IJVs and the managerial control and coordination within IJVs. Additionally, to examine the potential within-IJV-heterogeneities that are less examined in prior studies, we compare the difference in the ownership increase in two IJVs investment modes (greenfield vs. acquisition) and two IJV ownership types (minority vs. majority). We also focus on labor costs within and across countries as a key macro-economic factor affecting production costs and product prices. We examine the potentially positive interplay between the two flexibility types by considering both favorably resolved labor cost uncertainty within countries and negatively correlated labor costs across countries as two environmental triggers for MNCs' ownership increase in their IJVs.

For our empirical tests, we used a sample of jointly owned first-time investments made between 1990 and 2009 by 147 publicly traded Korean manufacturing MNCs. Employing a panel data methodology, we found that MNCs increase the ownership levels of their IJVs, specifically, greenfield IJVs with respect to acquired IJVs, when labor cost uncertainty within the host country is resolved favorably and when labor costs across countries are negatively correlated. Thus, the two conditions under which MNCs' IJV ownership increases imply a convergence between the two flexibility perspectives.

2 Theory and Hypotheses

2.1 Within-Country Flexibility Perspective on Ownership Level

Foreign direct investment usually includes growth options within host countries because MNCs are entitled to decision-making rights without obligation, allowing them to increase their involvement flexibly and incrementally according to the changes in the host market's conditions (Kogut and Chang 1996; Kogut and Kulatilaka 1994; Kogut 1991; Tong et al. 2008). Foreign subsidiaries will increase their local commitment to host markets with considerable scope for growth by increasing their investments (Kogut 1991; Kogut and Kulatilaka 1994; Tong et al. 2008). However, foreign subsidiaries will reduce their investments or divest entirely if there is little or no scope for growth in a host market. Firms can thus adapt their strategy to the unique conditions of the host countries and avoid strategic errors by gathering information on the host countries' emerging economic conditions before making further investments.

The within-country growth option perspective endorses IJVs as MNCs' initial choice over WOSs or full acquisitions. The smaller firm outlays during first-time investments provide growth options that allow MNCs to monitor the host country's markets and adjust their initial investments to changing market conditions at relatively low costs. Using IJVs as first-time investments provides on-the-ground sensors of host market conditions that help MNCs test the market and gather market knowledge. Moreover, IJVs can serve as platform investments enabling MNCs to gradually increase their local involvement in response to evolving environmental changes (Cuypers and Martin 2010; Kogut 1991; Folta 1998; Marciukaityte et al. 2009; Reuer and Tong 2010; Tong et al. 2008; Xu et al. 2010). Reuer and Tong (2005) and Tong et al. (2008) found that IJVs tend to provide greater value as growth options. Similarly, Reuer and Tong (2010) found that established firms are more likely to form partnerships with firms with an initial public offering due to their more valuable growth opportunities.

2.2 Across-Country Flexibility Perspective on Ownership Level

Foreign direct investment also provides across-country switching options. A high FDI breadth or dispersed operations across multiple countries can act as switching options under across-country cost or value differentials (Allen and Pantzalis 1996; Huchzermeier and Cohen 1996; Lee and Makhija 2009b; Pantzalis et al. 2001). Having subsidiaries scattered among many locations allows MNCs to take advantage of cross-country macro-economic fluctuations by transferring resources and/or shifting value chain activities from costly sites to less costly sites (Fisch and Zchoche 2012; Huchzermeier and Cohen 1996; Kogut and Kulatilaka 1994; Lee and Makhija 2009a, b; Lee and Song 2012). The operational flexibility offered by multiple country options adds value to MNCs.

The across-country flexibility perspective endorses the view that MNCs should have more controlling stakes in their foreign subsidiaries. Firm headquarters must

coordinate and control these subsidiaries to make cross-country shifts or adjustments among them (Belderbos et al. 2014; Kogut and Kulatilaka 1994; Tong and Reuer 2007). In other words, switching requires coordinated efforts from both headquarters and foreign subsidiaries. Using IJVs does not furnish the parent MNCs complete control over the wholly-owned foreign subsidiaries or full acquisitions of which the MNCs have full control. Parent MNCs may have difficulty exercising control over their foreign subsidiaries, while still having the ability to make appropriately rapid decisions, in IJVs where they share significant proportions of ownership with other investors (Lee and Chung 2007; Tong and Reuer 2007). Additionally, the parent firms would have to consider the objectives of the partner firms, which may conflict with the firm's switching needs, and the time required to form a consensus would reduce the IJVs flexibility. These problems are significantly reduced, however, when firms possess controlling stakes in their foreign subsidiaries; this allows them to more easily shift production or sales across countries as necessary.

Though these two flexibility views imply different ownership preferences, we examine the conditions within which they consistently explain MNCs' ownership increase in their IJVs under changing labor costs within and across countries.

2.3 Within-Country Flexibility Perspective on Ownership Increase in IJVs: The Impact of Favorably-Resolved Within-Country Labor Cost Uncertainty

The within-country flexibility perspective argues that previously established platform investments allow MNCs to increase or decrease their involvement according to changing environmental conditions in their host markets. With within-country growth options, MNCs make flexible decisions incrementally and sequentially based upon a clear understanding of economic conditions, market demands, customers, and other local economic factors (Kogut and Chang 1996; Kogut and Kulatilaka 1994; Xu et al. 2010). As discussed, IJVs as platform investments allow for future incremental commitments (Kogut 1991; Tong et al. 2008).

The option to "wait and see" embedded in MNCs' platform investments in host countries is exercised when uncertainty is resolved (Adner and Levinthal 2004a; Bowman and Hurry 1993; Dixit and Pindyck 1994). When the uncertainty is resolved unfavorably, the option to wait and see is abandoned (Belderbos and Zou 2009; Kumar 2005); when the uncertainty is resolved favorably, the growth option is exercised by holding off on further investments or choices (Fisch and Zschoche 2012; Kogut 1991). The IJV as a foothold investment thus allows expansion at a relatively low cost if the market is more advantageous than initially envisioned (Slangen and Tulder 2009); MNCs increase ownership in their IJVs and sometimes change them into solely owned subsidiaries.

Labor is one of the important production factors among the external uncertainties MNCs face in their FDIs. Thus, changes in labor costs are among the most influential macro-economic sources of risk (Belderbos 2003; Belderbos and Zou 2007, 2009; Chen and Wu 1996; Fisch and Zschoche 2011, 2012; Richbell and

Watts 2000; Tang and Tikoo 1999). Labor cost uncertainty in a country may make it difficult for an MNC to determine an appropriate long-term structure for its investment. Therefore, changes in labor costs require flexible responses from firms to enable them to retain upside benefits by increasing their involvement in more favorable situations while curbing downside risks by shrinking their investment or completely divesting in unfavorable situations. In other words, foreign subsidiaries operating in host market environments characterized by high uncertainty need to make quick and flexible adjustments to sustain their performance and longevity.

When labor costs in their host countries rise and become unfavorable for production, foreign subsidiaries lose their price competitiveness and face restructuring pressures such as plant closures from their parent MNCs (Belderbos and Zou 2009; Chen and Wu 1996; Fisch and Zschoche 2011; McDermott 2010; Richbell and Watts 2000). However, when labor cost uncertainty is resolved favorably, MNCs exercise their within-country growth options by increasing their local commitment through increased ownership in their jointly owned first-time investments.

We thus propose the following:

Hypothesis 1: When labor cost uncertainty within host countries is resolved favorably, MNCs increase ownership in their IJVs.

2.4 Across-Country Flexibility Perspective on Ownership Increase in IJVs: The Impact of Negatively Correlated Across-Country Labor Costs

The across-country flexibility embedded in FDI becomes more important to MNCs when nations have different production costs (Chung et al. 2010; Fisch and Zschoche 2011; Huchzermeier and Cohen 1996; Kogut and Kulatilaka 1994). Being exposed to high production costs in one location without relocation options is problematic for MNCs. However, using an international network allows MNCs to exploit cross-country cost differentials. Operationally flexible responses to environmental challenges provide more value to and extend the life of MNCs. Thus, the divergence and convergence between sources of macro-economic uncertainties affect MNCs' decisions from the across-country flexibility perspective. Recent real options studies also consider inter-country correlations, seen as the macro-economic uncertainty factor, as the primary driver for MNCs' real options value and behaviors within and across countries. For example, Belderbos and Zou (2009) and Chung et al. (2010) examined inter-country correlations in exchange rates among all host countries in an MNC network. If the host countries' labor costs grow in the same direction, MNCs have less need to transfer resources or shift products among subsidiaries in different countries, as there is no room to exploit differences in costs or values across countries. If, however, the labor cost rates grow in different directions (i.e., if labor costs in different countries are more negatively correlated) and widen the cross-country cost differentials, MNCs are more likely to take advantage of their scattered operations and relocate production or sales volume from costly to less costly locations.

Furthermore, MNCs' ownership decisions will also be affected by the cross-country economic situation. As across-country flexibility is based upon MNCs' scattered operations and as their foreign subsidiaries operate in varying forms, MNCs must coordinate their subsidiaries for their own benefit. Thus, the effective control and coordination required for MNCs to implement switching among subsidiaries and realize across-country flexibility necessitates controlling stakes in foreign subsidiaries of interest (Allen and Pantzalis 1996; Boardman et al. 1997; Kogut and Kulatilaka 1994; Lee and Chung 2007; Reuer and Leiblein 2000; Tong and Reuer 2007). In contrast, when MNCs share ownership with other investors via IJVs, the shared ownership adversely affects MNCs' global coordination, including ownership adjustments among their foreign subsidiaries. Sharing ownership with other investors via IJVs makes it difficult to exercise the control necessary for timely decisions (Lee and Chung 2007; Tong and Reuer 2007), as MNCs must consider the objectives of their partners and obtain a consensus before making ownership changes. The need for coordination within JVs may conflict with the MNCs' switching needs, and the resulting delays may undermine the across-country flexibility required to implement global strategies.

Negatively correlated labor costs across countries trigger more switching needs in MNCs that are thus motivated to have higher controlling stakes in their foreign subsidiaries to acquire more of the control and coordination required to implement those switching needs and realize across-country flexibility. Across-country environmental conditions also motivate MNCs to increase their ownership in their IJVs.

Therefore, we propose the following:

Hypothesis 2: When labor costs across host countries are correlated negatively, MNCs increase ownership in their IJVs.

2.5 Interactive Effect of Within and Across-country Flexibility Factors on Ownership Increase in IJVs

In the two hypotheses above, we consider the influence of labor cost conditions within host countries and across host countries separately. Similarly, prior studies have tended to consider either within-country flexibility (e.g., Tong et al. 2008) or across-country flexibility (e.g., Chung et al. 2010; Fisch and Zchoche 2011). A few studies conceptually discuss the possibility that the two flexibility types coexist and affect MNCs' decisions (e.g., Chung et al. 2012; Lee and Chung 2007). Even though the two flexibility types require different units of analysis (subsidiary vs. parent MNC), they are expected to coincide given that the MNCs' decision is affected by within-country factors at the subsidiary level as well as across-country factors at the MNC portfolio level.

From the parent MNCs' standpoint, their global strategy toward ownership in their foreign subsidiaries may take into account within- and across-country factors simultaneously. Their need for the global coordination of dispersed operations across countries may affect their within-host-country ownership decisions as well. This interactive relationship between within- and across-country factors at the MNC

portfolio level is expected, given that MNCs attempt to increase their managerial efficiency through global configuration and coordination (Liow et al. 2009; Martinz and Jarillo 1991). The simultaneous consideration of subsidiary and network level factors is also sensible from the real options portfolio perspective. The real options view suggests that MNCs' global strategy is a portfolio of growth and switching options (Anand et al. 2007; Kogut and Kulatilaka 1994; Song et al. 2014; Tong and Reuer 2007). Accordingly, MNCs' effective management of the portfolio of their real options in their FDI may affect their longevity and performance (Song et al. 2014; Vassolo et al. 2004).

MNCs' strategy of ownership in their foreign subsidiaries including IJVs is better explained by the combined effect of within- and across-country factors. Specifically, MNCs' tendency to exercise the real options embedded in their IJVs by increasing the IJV ownership is positively affected by external positive signals (i.e., favorably resolved labor cost uncertainty within their host countries). Additionally, this tendency will be strengthened by another external positive signal (i.e., negatively correlated labor costs across their host countries). The exercise of real options will be realized more obviously by the MNCs' stronger need for global coordination to take advantage of the favorable cross-country situation. Inversely, the MNCs' timely and effective coordination will be possible by exercising the within-country growth options. A foreign investor aims to respond to within-country growth potential in flexible ways. At the same time, a foreign investor utilizes its subsidiaries as part of its parent MNC's network and switching options for other affiliates in strong need of cross-country flexibility.

Here, we expect a positive interaction between within-country growth options and across-country switching options, in which MNCs are more likely to increase their ownership to meet the switching needs associated with negatively correlated labor costs across countries. This motivation comes from both the within-country flexibility needed to exploit new market opportunities when labor cost uncertainty is resolved favorably and the parent MNC's across-country flexibility needed to exploit cross-country cost differentials and effectively coordinate subsidiaries. Considering within country flexibility only would be enough for a switch due to relevant costs of the switch, and thus considering across country flexibility would be critical to induce the switch.

We thus hypothesize the following:

Hypothesis 3: Under the influence of the two favorably changing labor cost conditions specified in H1 and H2, MNCs increase the ownership of their IJVs.

2.6 Heterogeneities in Ownership Increase within IJVs

In the three hypotheses above, we hypothesize the positive effects of within- and across-country factors on ownership increases in IJVs in general. Meanwhile, we below suggest additional hypotheses related to the potential heterogeneities in the increase of ownership among different types of IJVs according to two investment modes (greenfield vs. acquisition) and two ownership levels (minority vs. majority).

IJVs take two different forms according to their investment modes. First, in greenfield IJVs, MNCs jointly establish and own new joint ventures subsidiaries

with other companies. Since this type of IJV is started from scratch, they are considered a pure platform investment through which MNCs can adapt and learn about new environments in their host countries and increase their involvement in local markets through organic growth. Second, in acquired IJVs, MNCs purchase external firms partially. Unlike a full acquisition, this partial acquisition involves bidding MNCs to maintain partnership with target firms (Chen and Hennart 2004; Song 2014). Unlike greenfield IJVs that have an organic growth mode, acquired IJVs have different objectives, specifically to enhance MNC market power with reduced competitors in a market or industry, enter a target market or industry faster, acquire necessary assets or capabilities (Caprio et al. 2011; Hillman et al. 2009), or exert the “hostage effect” on target firms (Chen and Hennart 2004; López-Duarte and Vidal-Suárez 2008).

These differences imply potential heterogeneities in the increase of MNCs ownership within IJVs. Specifically, greenfield IJVs as investors from the beginning are expected to be more vulnerable to host country uncertainty and thus more responsive to changes in the macro-economic conditions of the host countries. This implies that MNCs engaged in greenfield IJVs have a higher motivation to exercise their growth options through increasing ownership when facing favorably changing environmental conditions within and across countries. Meanwhile, acquired IJVs are based upon already-established investments and are thus less vulnerable to the host country environment, are likely to pursue managerial purposes other than incremental adaptation and learning through organic growth, and are relatively less dependent on ownership-based control because they already possess a portion of target firms. This indicates that acquired IJVs have a relatively weak motivation to increase ownership.

Thus we predict that:

Hypothesis 4: The MNCs' ownership increase specified in H1 through H3 will be greater in greenfield IJVs than acquired IJVs.

IJVs also have two different forms according to their ownership levels. Minority IJVs are when MNCs own less than 50 %. The existing real option literature supports this ownership type as a more flexible ownership strategy under high levels of uncertainty. For example, Tong et al. (2008) argue that this is appropriate for higher growth options value for minority IJVs. Cuypers and Martin (2010) found foreign firms choose minority IJVs over majority IJVs under exogenous uncertainty in the Chinese market. Li and Li (2010) also found evidence regarding MNCs' preference for minority IJVs as a flexible ownership strategy under market demand uncertainty. Prior studies commonly argue that minority IJVs have more growth options through which MNCs can cope with external uncertainty with more flexibility and limited downside risks.

Prior studies commonly support that minority IJVs have more characteristics of growth options investments and are thus exercised (i.e., increased ownership) with more sensitivity to changing economic conditions within and across countries than majority IJVs. The prediction is also understandable from the MNCs' control and coordination perspective. Given that MNCs have control in majority IJVs while they

do not in minority IJVs, MNCs have a higher motivation to increase ownership in their minority IJVs in times of heightened switching needs.

Therefore, we hypothesize:

Hypothesis 5: The MNCs' ownership increase specified in H1 through H3 will be greater in minority IJVs than majority IJVs.

3 Research Methodology

3.1 Data and Sample

For empirical testing, we used a large sample of IJVs adopted as first time investments between 1990 and 2007 by publicly traded manufacturing firms listed on the Korean Stock Exchange (KSE). Here, IJVs were defined as investments with ownership levels of 5–95 % according to the traditional entry mode categorization. This sample was appropriate for this study since Korean firms were very active in creating FDI portfolios during the study period, experienced many variations in their external environmental uncertainties including labor costs across countries, and needed to cope with less familiar uncertainties and learn through real options thinking in consideration of their shorter internationalization history.

Many of the 147 MNCs studied entered their host countries in different years via JVs (i.e., IJVs have different operating years); thus, each MNC used an unevenly distributed JV during the observation period. We tested our hypotheses on an unbalanced panel data comprised of 2506 observations. The total observations were computed as about 255 samples (i.e., the total number of IJVs as the first-time investments of Korean MNCs) multiplied by 10 operating years on average (the operating years varied between samples).

Among the 255 IJVs, 187 were greenfield IJVs and 69 were acquired IJVs, and 119 were minority IJVs (5 to >50 %) and 136 were majority IJVs (50 to >95 %). Table 1 shows the distribution of the initial IJV ownership by ownership levels, the two investment modes (greenfield vs. acquired IJVs), and the two ownership types (minority vs. majority IJVs).

The database used to obtain Korean MNC financial information is maintained by DataPro, a well-known Korean financial data company. We also used databases maintained by the Bank of Korea, the Export and Import Bank of Korea, the Korea Trade Investment Promotion Agency (KOTRA), and the Korea Listed Companies Association to obtain information about Korean MNCs' foreign subsidiaries. Other information sources used to formulate some of our variables are described below.

3.2 Dependent Variable

We focused on ownership increase as the dependent variable of this paper. Ownership share carries several managerial meanings including flexibility

Table 1 Distribution of initial ownership within IJVs

Ownership range	No. of IJVs	Investment modes		Ownership types	
		Greenfield IJVs	Acquired IJVs	Minority IJVs (5 to >50 %)	Majority IJVs (50 to >95 %)
5 to >10 %	5	2	3	5	0
10 to >20 %	14	8	6	14	0
20 to >30 %	35	25	10	35	0
30 to >40 %	38	31	7	38	0
40 to >50 %	27	22	5	27	0
50 to >60 %	31	26	6	0	31
60 to >70 %	41	34	7	0	41
70 to >80 %	29	20	9	0	29
80 to >90 %	21	10	11	0	21
90 to >95 %	15	7	8	0	15
Total	255	187	69	119	136

retained, control shared, and profit earned. Thus, examining the ownership increase in IJVs allows us to examine the MNCs' treatment of IJVs as flexible ownership strategies under uncertainty in the international business (IB) setting, how MNCs' exercise their options embedded in IJVs by increasing ownership in flexible response to changing uncertainty conditions, and the MNCs' coordination of dispersed operations to exploit cost or value differentials across countries from the across-country flexibility perspective. We measured ownership increase in IJVs as a dummy variable (1: increase; 0: no increase) under the influence of within-country labor cost changes and across-country labor cost correlations.

3.3 Independent Variables

3.3.1 Favorably-Resolved Within-Country Labor Cost Uncertainty

To examine the directionality of changes in within-country labor cost uncertainty, we measured changes both in labor cost uncertainty and in labor cost growth rates. First, we measured labor cost uncertainty as the standard deviation normalized by the mean of four quarterly labor costs in each country at each year. A higher value indicated a heightened uncertainty level. We then computed the annual percentage changes in labor cost uncertainty in each country at each year. A positive value indicated lower uncertainty. Next, we computed the annual percentage changes in labor cost growth rates in each country at each year. Finally, we created a dummy variable (1: uncertainty drops and labor costs decrease; 0: otherwise). We drew our labor cost data from the OECD and Trading Economics databases.

Table 2 Measures of variables

Variables	Definitions and measures
Dependent variables	
Ownership increase	1: ownership increase, 0: no ownership increase in IJVs
Independent variables	
Labor cost uncertainty	Standard deviation of four quarterly labor cost growth rates at each country at each year, normalized by the mean
Favorably-resolved within-country labor cost uncertainty	1: lowered uncertainty (based upon annual percentage change in labor cost uncertainty) + decreased labor cost growth rates (based upon annual percentage change in labor cost growth rates), 0: others
Negatively-correlated across country labor costs	Annual percentage change in sum of the absolute values of the differences between labor cost growth rates of a host country and those of other host countries at the same year
Controls	
Subsidiary performance	Return on assets
Subsidiary size	Log (total subsidiary assets)
Subsidiary age	Operating years from its set up year
Investment mode	Greenfield: 1, acquisition: 0
Prior ownership level	Ownership ratio prior to ownership change
Value chain integration	1: being a part of a product' whole value chain, 0: otherwise
Number of JV partners	Number of other participating firms in JVs
JV partner types	1: JV between Korean firms and local firms, 0: JV between Korean firms and other foreign firms
Parent firm size	Log (total assets)
Parent R&D intensity	R&D expenditures/total sales
Parent advertising intensity	Advertising expenditures/total sales
International experience	Sum of all operating years of all subsidiaries as of the end of each year
Political risk	Euromoney risk index
Cultural distance	Kogut and Singh's index
Host country ownership controls	1: any host country controls on foreign ownership, 0: no controls

3.3.2 Negatively Correlated Across-Country Labor Costs

To determine the effects of cross-country labor cost differentials, we included the annual percentage changes in the total sum of the absolute differences in annual labor cost growth between the country hosting each IJV and each of the other affiliated subsidiaries' countries, following Fisch and Zschoche (2011). A larger value indicates more divergent and different directional labor cost movements among countries.

3.4 Control Variables

We controlled for a set of variables that are expected to affect increases in the equity stake in jointly owned first-time investments. First, we included each subsidiary's performance, measured as its return of asset (ROA). Larger and older subsidiaries typically have more slack resources for short-term losses or financial distresses, while smaller and younger subsidiaries, less encumbered by administrative heritage and overhead, are therefore more flexible in uncertain environments (Tong and Reuer 2007). Thus, we controlled for both subsidiary size, measured as the log of its investment amount, and subsidiary age, measured as its total years in operation since establishment. To control for the possibility that the existing equity stake level may affect subsequent levels, we included the ownership stake prior to ownership changes. To take potential differences in entry modes into account, we controlled for two investment modes, greenfield and acquisition. To account for the possibility that adjustments in ownership shares may be dependent upon functional integration within the entire international MNC network, we included a dummy variable (1: non-vertically integrated; 0: vertically integrated subsidiary), indicating that each jointly owned first-time investment is a part of the value chain (e.g., manufacturing a key part for a car) for a primary product of each MNC. We also controlled for the number of other participating firms in each IJV, given that a greater number may complicate or annul a firm's decision to change its ownership. We also incorporated a dummy variable indicating two JV partner types (1: between Korean firms and local firms; 0: between Korean firms and foreign firms) to control for the potential that responses to macro-economic changes are asymmetric by partner type.

Additionally, we controlled for a set of parent MNC-level variables such as parent firm size and intangible assets such as R&D and advertising intensity. Larger and more capable MNCs are more likely to expand internationally to exploit their resources and capabilities (Allen and Pantzalis 1996; Morck and Yeung 1991; Tang and Tikoo 1999; Tong and Reuer 2007). As Korean conglomerates (*Chaebols*) tend to be more international and have more network effects (i.e., by exploiting their international networks), we control for each MNC's Chaebol membership. We referred to the Korea Fair Trade Commission's list of Chaebols and developed a dummy variable (1: Chaebols; 0 non-Chaebols). We also incorporated the international experience that each parent MNC has accumulated through its overseas operations. Following Delios and Beamish (2001) and Padmanahan and Cho (1999), we measured this variable as the logged sum of all the operational years of an MNC's total number of foreign subsidiaries at the end of each year of the observation period.

We also controlled for a set of host country-level variables. Political risk and the cultural distance of each host country are expected to affect a subsidiary's ownership level (Barkema et al. 1996; Hennart et al. 1998; Hennart and Zeng 2002; Hill et al. 1990; Parkhe 1991; Serapio and Cascio 1996; Slangen and Tulder 2009). We measured political risk by consulting the EUROMONEY scores, while cultural distance measures were drawn from the index in Kogut and Singh (1988). Considering any host country controls on foreign ownership affects MNCs'

ownership strategies, we incorporated a dummy variable to indicate whether there are any host country controls on foreign ownership.

To control for the fixed effects associated with the potential difference among countries and industries, we added country and industry dummies to our model. We also included a time dummy variable (1: after the Asian economic crisis of 1998; 0: before 1998) to control for Korean MNCs' functional international integration after learning from the Asian economic crisis (Park et al. 2006) and their more advanced global strategy after learning from their initial internationalization up to the mid-1990s. Since flexibility is afforded by prior investments (Bowman and Hurry 1993), independent and control variables were lagged by 1 year. All interaction terms were centered to reduce any potential multicollinearity (Cohen et al. 2003).

We summarize the measures of all variables in Table 2.

3.5 Model Specification and Analytical Procedure

To examine the potential impact of MNCs' initial choice of IJVs over WOSs on their subsequent ownership strategy within IJVs, we employed the Heckman two stage model and controlled for potential selection bias. In the first stage, we used a probit model to test a choice between IJVs and WOSs. For the model, we included both within-country labor cost uncertainty and across-country labor cost correlation at the entry time of each investment, and other host-country level variables such as market demand uncertainty,¹ political risks, cultural distance, host country controls on ownership, and MNC-level variables such as R&D intensity, advertising intensity, Chaebol membership, and international experience.

The model for the first equation² is shown below:

1st stage equation

Choice of JV = f (labor cost uncertainty, labor cost correlation,
market demand uncertainty, political risks, cultural distance,
host country controls on ownership, MNC-level variables,
dummies, error term).

In the second stage, we tested the MNCs' ownership increase of their IJVs under the influence of favorably resolved labor cost uncertainty within their host countries and negatively correlated labor cost correlation across the MNCs' host countries. In addition to these labor cost variables, we included the Inverse Mills Ratio as the correction term generated from the first model, as well as other country-level, MNC-level, and subsidiary-level variables. For empirical testing, given that the dependent variable of this paper is a dummy variable indicating an ownership increase or not,

¹ We included this type of uncertainty based upon prior studies (e.g., Brouthers et al. 2008; Cuypers and Martin 2010; Li and Li 2010) that examined entry mode choice under the influence of market demand uncertainty from the real options perspective. We measured market demand uncertainty as the coefficient of variation (i.e., the ratio of the standard deviation to the mean of monthly retail sales) in each host country.

² The results of the 1st stage probit model are summarized in Appendix. The results support our real options based prediction that MNCs prefer JVs under the influence of high levels uncertainty.

Table 3 Descriptive statistics and correlation matrix

	M	SD	VIF	1	2	3	4	5	6	7	8	9	10
1	0.24	0.14	-	1.00									
2	0.09	0.25	1.10	0.05	1.00								
3	8.02	4.02	1.22	0.03	0.03	1.00							
4	6.82	5.12	1.10	0.02	0.02	0.06	1.00						
5	0.56	0.34	1.30	0.03	0.02	-0.03	0.06	1.00					
6	0.75	0.23	1.14	0.06	0.04	0.04	0.03	0.06	1.00				
7	0.92	0.12	1.20	0.02	0.02	0.01	0.02	0.05	0.04	1.00			
8	1.04	1.02	1.05	-0.02	-0.01	-0.01	0.02	-0.02	0.01	0.01	1.00		
9	0.95	0.02	1.08	0.03	0.01	0.02	0.01	0.02	0.03	0.04	0.04	1.00	
10	5.30	1.11	1.44	0.04	0.04	0.08*	0.10*	0.04	0.04	0.04	0.02	0.02	1.00
11	0.18	0.36	2.04	0.02	0.04	0.02	0.04	0.02	0.02	0.02	-0.01	0.03	0.12*
12	0.09	0.18	1.26	0.01	0.02	0.06	0.08*	0.01	0.02	0.03	-0.01	0.04	0.08
13	0.13	0.32	1.96	0.04	0.03	0.04	0.05	0.04	0.05	0.02	0.00	0.02	0.48*
14	1.24	1.18	2.00	0.04	0.04	0.04	0.06	0.04	0.04	-0.01	0.01	-0.01	0.12
15	16.4	5.08	2.26	-0.02	0.02	0.02	0.03	-0.02	0.02	0.03	0.01	0.03	0.02
16	1.56	1.10	1.42	-0.01	-0.01	-0.02	0.04	-0.02	0.01	0.02	0.02	0.02	0.04
17	0.02	0.01	1.03	0.02	0.01	0.01	0.02	0.03	-0.01	0.02	0.01	0.02	0.03
18	0.12	0.10	1.52	-0.04	-0.02	-0.02	0.04	-0.08*	0.02	0.01	0.03	0.01	0.02
19	0.26	0.14	1.20	0.06*	0.04	0.03	0.02	0.04	0.03	0.02	0.02	0.01	0.04
20	0.14	0.08	1.20	0.05	0.01	0.02	0.04	0.02	0.00	0.03	0.03	0.02	0.01
	M	SD	VIF	11	12	13	14	15	16	17	18	19	20
1	0.24	0.14	-										
2	0.09	0.25	1.10										
3	8.02	4.02	1.22										

Table 3 continued

	M	SD	VIF	11	12	13	14	15	16	17	18	19	20
4	6.82	5.12	1.10										
5	0.56	0.34	1.30										
6	0.75	0.23	1.14										
7	0.92	0.12	1.20										
8	1.04	1.02	1.05										
9	0.95	0.02	1.08										
10	5.30	1.11	1.44	1.00									
11	0.18	0.36	2.04	0.06	1.00								
12	0.09	0.18	1.26	0.12*	0.16*	1.00							
13	0.13	0.32	1.96	0.08	0.04	0.44*	1.00						
14	1.24	1.18	2.00	0.08	0.04	0.44*	1.00						
15	16.4	5.08	2.26	-0.02	0.00	0.08	0.04	1.00					
16	1.56	1.10	1.42	0.02	0.01	0.06	0.04	0.48*	1.00				
17	0.02	0.01	1.03	-0.02	0.02	0.03	0.01	0.05	0.04	1.00			
18	0.12	0.10	1.52	0.01	0.02	0.03	0.04	0.08	0.06	0.01	1.00		
19	0.26	0.14	1.20	0.02	0.04	0.02	0.02	0.04	0.02	0.01	0.02	1.00	0.04
20	0.14	0.08	1.20	0.02	0.02	0.03	0.02	0.03	0.02	0.02	0.01	0.03	1.00

1, ownership increase (dummy); 2, subsidiary performance; 3, subsidiary size; 4, subsidiary age; 5, investment modes; 6, prior ownership level; 7, value chain integration; 8, number of JV partners; 9, JV partner types; 10, parent MNC size; 11, parent MNC's R&D intensity; 12, parent MNC's advertising intensity; 13, parent MNC's Chaebol membership; 14, parent MNC's international experience; 15, political risk; 16, cultural distance; 17, host country ownership control; 18, labor cost uncertainty; 19, favorably-resolved within country labor cost (dummy); 20, negatively-correlated across-country labor costs

* p < 0.05; A STATA option, 'sidak sig.' is used for controlling for 'multiple comparison fallacy' in the Pearson correlation table and identifying those pairs significant at the 0.05 level (Hamilton 2006)

Table 4 Testing hypothesis 1–3 (dependent variable: ownership increase in IJVs)

	Control only			H4				H5		
	H1–H3			Model 3 (H3)	Model 4 (Greenfield IJVs)	Model 5 (acquired IJVs)	Model 6 (minority IJVs)	Model 7 (majority IJVs)		
	Model 1	Model 2 (H1)	Model 3(H2)							
Subsidiary performance	0.16 (3.00)**	0.14 (2.98)**	0.14 (3.02)**	0.16 (2.96)**	0.26 (3.64)**	0.10 (2.00)*	0.14 (2.94)**	0.32 (2.28)*		
Subsidiary size	0.22 (2.26)*	0.20 (2.28)*	0.22 (2.28)*	0.24 (2.32)*	0.32 (2.26)*	0.20 (1.90) [†]	0.26 (2.32)*	0.18 (1.96)*		
Subsidiary age	0.14 (1.96)*	0.14 (1.96)*	0.13 (1.98)*	0.14 (1.96)*	0.22 (2.00)*	0.10 (0.76)	0.28 (2.26)*	0.08 (0.74)		
Investment type	0.08 (1.54)	0.08 (1.64)	0.08 (1.60)	0.08 (1.64)	–	–	0.14 (2.00)*	0.06 (0.86)		
Prior ownership level	0.18 (2.08)*	0.16 (2.06)*	0.16 (2.04)*	0.16 (2.06)*	0.20 (2.26)*	0.14 (1.94)*	0.12 (1.90) [†]	0.22 (2.02)*		
Value chain integration	0.32 (2.60)**	0.32 (2.58)**	0.34 (2.62)**	0.34 (2.66)**	0.46 (2.88)**	0.26 (1.96)*	0.36 (2.34)*	0.18 (2.00)*		
Number of JV partners	–0.04 (1.88) [†]	–0.04 (1.86)	–0.04 (1.86) [†]	–0.04 (1.88) [†]	–0.04 (1.64)	–0.06 (1.96)*	–0.08 (2.02)*	–0.03 (1.80) [†]		
Parent firm size	0.10 (1.86) [†]	0.08 (1.88) [†]	0.08 (1.86) [†]	0.08 (1.90)*	0.12 (1.90) [†]	0.06 (1.26)	0.10 (1.94)*	0.04 (1.42)		
R&D intensity	0.06 (1.48)	0.06 (1.46)	0.06 (1.46)	0.05 (1.46)	0.08 (1.70)	0.04 (1.26)	0.06 (1.46)	0.02 (1.02)		
Advertising intensity	0.03 (0.80)	0.03 (0.76)	0.03 (0.78)	0.03 (0.80)	0.06 (0.92)	0.04 (0.46)	0.04 (0.78)	0.01 (0.32)		
Chaebol membership	0.10 (1.98)*	0.08 (1.96)*	0.08 (1.98)*	0.08 (2.00)*	0.12 (2.04)*	0.08 (1.82)	0.14 (1.96)*	0.06 (1.86) [†]		
International experience	0.08 (1.38)	0.08 (1.38)	0.08 (1.40)	0.07 (1.36)	0.12 (1.52)	0.08 (1.16)	0.10 (1.68)	0.04 (1.34)		
Political risk	–0.04 (1.02)	–0.04 (1.00)	–0.04 (0.98)	–0.04 (1.02)	–0.04 (1.00)	–0.06 (1.40)	–0.05 (1.74)	–0.02 (1.44)		
Cultural distance	–0.02 (0.70)	–0.02 (0.68)	–0.02 (0.70)	–0.02 (0.72)	–0.02 (0.54)	–0.04 (0.96)	–0.04 (0.89)	–0.01 (1.06)		
Host country ownership control	–0.04 (1.66)	–0.03 (1.64)	–0.03 (1.67)	–0.04 (1.70)	–0.06 (1.80)	–0.02 (0.88)	–0.07 (1.76)	–0.01 (1.20)		
Country dummies	Included	Included	Included	Included	Included	Included	Included	Included		
Industry dummies	Included	Included	Included	Included	Included	Included	Included	Included		
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included		
Favorably resolved within country labor cost uncertainty (a)	–	2.48 (2.52)**	–	2.98 (2.68)**	3.76 (2.68)**	2.14 (1.84) [†]	3.44 (2.60)**	1.78 (1.78)		
Negatively correlated across country labor costs (b)	–	–	1.64 (1.88) [†]	1.80 (1.96)*	1.98 (1.96)*	1.24 (1.16)	1.68 (1.88) [†]	1.20 (1.34)		



Table 4 continued

	Control only			H1-H3			H4			H5		
	Model 1	Model 2 (H1)	Model 3(H2)	Model 3 (H3)	Model 4 (Greenfield IIVs)	Model 5 (acquired IIVs)	Model 6 (minority IIVs)	Model 7 (majority IIVs)				
a × b	-	-	-	4.42 (3.86) ^{***}	5.48 (4.12) ^{***}	2.86 (2.22) [*]	4.98 (4.04) ^{***}	1.34 (1.94) [†]				
Intercept	0.69 (0.88)	0.64 (0.86)	0.66 (0.90)	0.68 (0.92)	1.00 (1.06)	0.78 (0.90)	1.06 (0.98)	0.89 (0.92)				
Inverse Mills ratio	1.18 (1.96) [*]	1.20 (1.94) [*]	1.18 (1.92) [*]	1.22 (1.98) [*]	1.34 (2.16) [*]	0.86 (1.88) [†]	1.12 (2.06) [*]	0.88 (1.90) [†]				
No. of observations	2506	2506	2506	2506	1884	622	1204	1302				
Chi square	110.46 ^{***}	126.62 ^{***}	120.90 ^{***}	154.26 ^{***}	164.20 ^{***}	124.96 ^{***}	158.30 ^{***}	122.82 ^{***}				

*** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.1

we ran a panel logistics regression using STATA10.³ The model for the second equation is as follows:

2nd stage model

Increase in JV ownership = f (favorably resolved labor cost uncertainty (a), negatively correlated labor cost growth rates (b), interaction terms (a × b), other country-level variables, MNC-level variables, subsidiary-level variables, dummies, error term).

To test H4 and H5 regarding the potential heterogeneity in ownership increase between greenfield and acquired IJVs, and between minority and majority IJVs, we employed a split sample method. This method has the advantage of no assumption of identical variances between split samples, allowing us to examine statistical differences between split samples (Belderbos and Zou 2009; Hoetker 2007). In addition to checking significance between two groups, we double-check whether there is the statistical difference between two split samples using the Wald test. The Wald test shows that the coefficients in the two subsamples are statistically different.

4 Results

4.1 Descriptive Analysis

Table 3 presents the descriptive statistics and correlation matrix for the variables. To diagnose any multicollinearity problems, we checked the variance inflation factors (VIF) for all variables. The VIF of each variable is around 1, indicating that none of the variables significantly affects the increase of other coefficients' variances and standard errors. The mean VIF is less than 3, substantially lower than the recommended cutoff of 10 or the more conservative cutoff of 4. These results indicate that multicollinearity is not a concern in this analysis.

4.2 Hypothesis 1: Ownership Increases Under Favorably Resolved Within-Country Labor Cost Uncertainty

Hypothesis 1 posits that MNCs tend to exercise growth options embedded in their IJVs by increasing ownership levels when labor cost uncertainty within their host countries is favorably resolved (i.e., when there is decreased labor cost uncertainty and labor cost growth within the host countries). Models 2 and 4 in Table 4 show that this hypothesis is strongly and significantly supported at the 1 % level ($\beta = 2.48$, $p < 0.01$ in model 2, $\beta = 2.98$, $p < 0.01$ in model 4 in Table 4).

³ We referred to a STATA command, "xtlogit."

4.3 Hypothesis 2: Ownership Increases Under Negatively Correlated Across-Country Labor Costs

Hypothesis 2 details the positive effect of negatively correlated labor costs among host countries on MNCs' increase of ownership level in their IJVs within their host countries for the purpose of global coordination to realize across-country flexibility. The pure effect of this across-country factor is supported at the 10 % level ($\beta = 1.64$, $p < 0.10$ in model 3 in Table 4), or the 5 % level ($\beta = 1.80$, $p < 0.05$ in model 3 in Table 4). This result implies that cross-country switching needs also motivate MNCs to adjust their within-country IJV ownership for effective global coordination.

4.4 Hypothesis 3: Ownership Increases Under Both Positively Resolved Within-Country Labor Cost Uncertainty and Negatively Correlated Across-country Labor Costs

Hypothesis 3 predicts a positive interactive relationship between within- and across-country flexibility factors in terms of their combined impact on MNCs' increase of ownership in their IJVs. The combined effect of the pushing factor within host countries (i.e., positively resolved labor cost uncertainty) and pulling factor across host countries (i.e., negatively correlated labor costs among countries) may strengthen MNCs' actualization of their real options through the ownership increase based on their flexible responses to changing environmental conditions within and across countries. This hypothesis is strongly supported at the 0.001 % level ($\beta = 4.42$, $p < 0.001$ in model 4 in Table 4).

4.5 Hypothesis 4: There is a Difference in the Ownership Increase Between Greenfield IJVs and Acquired IJVs

Hypothesis 4 addresses the potential difference in ownership increase between greenfield IJVs and acquired IJVs. This prediction comes from the different characteristics of two investment modes, greenfield and acquisition. We predicted that greenfield IJVs are more similar to pure growth options that learn the local environment in host countries from scratch, and are more sensitive and responsive to changing uncertainty conditions than acquired IJVs that have other reasons to enter host markets through purchasing established investments. The split sample analysis supports this prediction. Models 5 and 6 in Table 4 show that the group of greenfield IJVs exhibit stronger statistical significance in the three hypothesized relationships specified in H1 through H3: For H1, $\beta = 3.76$, $p < 0.01$ in cases of greenfield IJVs in model 5, $\beta = 2.14$, $p < 0.10$ in cases of acquired IJVs in model 6; For H2, $\beta = 1.98$, $p < 0.05$ in cases of greenfield IJVs in model 5, $\beta = 1.24$, $p > 0.10$ in cases of acquired IJVs in model 6; For H3, $\beta = 5.48$, $p < 0.001$ in cases of greenfield IJVs in model 5, $\beta = 2.86$, $p < 0.05$ in cases of acquired IJVs in model 6.

4.6 Hypothesis 5: There is a Difference in the Ownership Increase Between Minority IJVs and Majority IJVs

Hypothesis 5 also touches upon the potential heterogeneities in the ownership increase between minority IJVs and majority IJVs. According to the existing literature on IJVs from the real options perspective, minority IJVs have more characteristics of growth options. Thus, such IJVs allow MNCs to curb the downside risks associated with minimal outlays and also preserve upside potentials. We predicted that MNCs engaged in minority IJVs are more responsive to favorably changing environmental changes within and across countries. Models 7 and 8 in Table 4 present that the group of minority IJVs show stronger statistical significance in the three hypothesized relationships specified in H1 through H3: For H1, $\beta = 3.44$, $p < 0.01$ in cases of minority IJVs in model 7, $\beta = 1.78$, $p > 0.10$ in cases of majority IJVs in model 8; For H2, $\beta = 1.68$, $p < 0.10$ in cases of minority IJVs in model 7, $\beta = 1.20$, $p > 0.10$ in cases of majority IJVs in model 8; For H3, $\beta = 4.98$, $p < 0.001$ in cases of minority IJVs in model 7, $\beta = 1.34$, $p < 0.10$ in cases of majority IJVs in model 8.

Some of the control variables warrant further explanation. First, we found an incremental effect of larger ownership in JVs on subsequent ownership increases. As such, Korean investors with majority IJV ownership may tend to increase their ownership more easily and quickly due to their relatively strong bargaining power. Second, we found a meaningful difference in the dummy variable related to the value chain integration among non-vertically integrated cases. The non-vertically integrated cases, or the independent manufacturers of final products, are perhaps less vulnerable to functional integration and more affected by environmental changes, including labor cost changes. Further, first-time investments may also serve as platform investments for testing local markets rather than as elements of the overall value chain. Interestingly, we found no significant difference before and after the Asian economic crisis, likely because, as mentioned, jointly owned first-time investments in host countries played the symbolic role of platform investments and were thus affected by host market environments rather than by time differences. The positive sign of the Inverse Mills ratio implies that the IJV entries that were not “predicted” to be IJVs (i.e., in low labor cost uncertainty countries) are more likely to see later adjustments.

4.7 Robustness Checks

We conducted two robustness checks related to alternative measures for our primary variables. First, we measured the annual percentage change in labor costs during the 3 years previous to each year to capture the longitudinal effects on subsequent ownership increases under more favorable market growth conditions. The results are qualitatively similar to the original results supported by the annual percentage changes. Second, we verified the robustness of our host market uncertainty indicator by comparing another measure of labor cost uncertainty, measured as the standard deviation among quarterly rates during the 3 years previous to each year. This alternative measurement did not qualitatively affect the results.

5 Conclusions and Discussion

This paper is based upon the real options perspective and examined MNCs' flexible ownership adjustments under the influence of changes in labor cost growth rates within and across countries. We tested how uncertainties concerning within-country labor costs influence the ownership levels of IJVs as first-time investments in each country. We also tested how favorably resolved labor cost uncertainties affect ownership increases in IJVs. Additionally, we examined how differing labor cost growth rates across countries affect subsequent ownership changes. By considering both within- and across-country labor cost conditions, this study deepens the understanding of MNCs' flexible responses to the environmental uncertainties they face in their FDIs. This study also enhances the understanding of within-country flexibility at the subsidiary level and across-country flexibility for MNCs.

Our finding that MNCs respond to changing macro-economic conditions in their host countries, such as favorably resolved labor cost uncertainty and increase ownership in their IJVs, also supports the real options view of the dynamic aspects of firms' behavioral decisions. The real options perspective argues that firms exercise their options when their host markets offer considerable scope for growth. When host markets reveal considerable growth potential, foreign subsidiaries tend to increase their investment. Our results also confirm that MNCs increase their investment levels under favorable labor cost conditions in their host markets, supporting the real options literature concerning the effect of changing market conditions on exercising the growth options embedded in FDIs. Considering the managerial meanings and implications of the dynamic aspects of decision making from the real options perspective, more studies in diverse areas, including employment changes, evolutionary R&D projects, and exercising options to learn over time, should be conducted. One example of such a study is Fisch (2008) who examined the increased German MNC employment occurring with a subjective decrease in uncertainty and increased learning over time.

Our findings also show that MNCs' tendency to increase ownership is affected by the cross-country as well as the within-country economic situation. MNCs aim to respond to within-country growth potential in flexible ways while also attempting to structure their FDI by considering their whole international network switching options and their strong need for cross-country flexibility. Though the two flexibility types call for different units of analysis, they coincide as an MNC's ownership decision is affected by both within-country factors at the subsidiary level and across-country factors at the MNC portfolio level. Our incorporation of cross-country correlations in labor costs to examine MNCs' ownership adjustments helps consider both the within-country growth options and across-country switching options. This approach is expected to provide a more balanced and comprehensive view of MNCs' ownership strategy in their global markets than prior studies that considered only one type of multinational flexibility. The results of the across-country correlations among the labor cost growth rates provide a detailed consideration of the potential convergence or divergence among identical macro-economic factors across countries. The results also support Kogut and Kulatilaka's

(1994) argument that a lower correlation has a positive impact on overall volatility and the value of the underlying options. Our findings necessitate further consideration of the potential correlation and synchronization among sources of uncertainties across countries, thus going beyond a single-country analysis.

This research also considers more deeply the role of ownership in influencing the flexibility benefits of FDI. Higher ownership helps firms gain the control they need over their investments to enable them to flexibly shift operations across national borders. Lower ownership helps firms reduce outlays and the irreversibility of these investments. These findings underscore the very different but pertinent implications of ownership for multinational flexibility, reflecting control over the investment versus the scale of the investment. Omitting this variable can lead to very different implications. We believe that future work regarding multinational flexibility must not neglect the role of this factor.

This study also sheds light on why foreign investors are more responsive to ownership choices and changes than are domestic investors in IJVs in foreign countries. First-time investments in new or risky countries may imply more adaptation and management costs; thus, MNCs in those situations may need to decide between commitment and flexibility. They may prefer to obtain more controlling ownership stakes to benefit from first-mover advantages and/or compete against local firms. Meanwhile, to cope with uncertainty and the potential sunk-cost risks associated with their initial investments in those circumstances, MNCs may want to retain the flexibility embedded in small investments. Given the multiple sources of uncertainties MNCs face as outsiders in their host countries, they must be able to respond to unpredictable or uncontrollable changes in macro-economic factors in flexible ways. Thus, they must structure their FDI to enable their investments to carry more options and future decision rights that they can exercise at relatively low costs. Initial ownership choices and subsequent ownership changes therefore reflect MNCs' strategic directions and affect their performance and longevity. The positive impact of increased ownership on global coordination through across-country flexibility reveals a different dimension of ownership, seen from the across-country flexibility perspective rather than the ownership-based control perspective.

Another contribution of this study is its examination of the heterogeneities in ownership strategy within the same type of entry mode, based upon the limited prior studies. Specifically, we compared two IJV investment modes (greenfield vs. acquisition) and two IJV ownership types (minority vs. majority) to assess any potential heterogeneities in ownership increases in different investment types within IJVs. We found that greenfield IJVs and minority IJVs have a higher probability of an ownership increase than acquired and majority IJVs under the positive conditions within and across countries. We interpret these results that greenfield IJVs and minority IJVs have more characteristics of growth options, such as platform or springboard investments in their host countries, and more sensitivity and responsiveness to changing uncertainty conditions within and across countries. This finding describes which types of real options investments have more growth options value.

In addition to paying more attention to the contexts under which multinational flexibility creates value for firms and examining flexibility types more carefully, this research suggests a number of new directions for research on multinational flexibility. Future studies can examine other factors affecting the actualization of the two types of flexibility within international networks. For example, regional commonalities (i.e., the endogeneity associated with MNCs' intentional choice of investing regions), resources transferability or mobility, and intra-firm transactions can be taken into further consideration. It would be interesting to examine the potential asymmetric responses to macro-economic changes of different JV partners. This suggestion is based upon our prediction that local companies acting as JV partners are not likely to exit from their domestic markets and may thus not value flexibility in their ownership strategy very highly. Meanwhile, foreign companies acting as JV partners may consider exiting as a viable option and thus put more weight on creating a flexible ownership structure as part of their global strategy. They may also be more likely to carefully design and manage their ownership strategy to ensure that they conduct their core business in their host countries as they do in their home countries. Even though we controlled for the number of other participating firms and two JV partner combinations (i.e., Korean firms-local firms vs. Korean firms-foreign firms), we were unable to examine this issue in detail because most Korean cases comprised two-party JVs between Korean firms and local firms (JVs between Korean firms and other foreign investors account for just 5 % of the observations). Similar analysis should be conducted on datasets that include JVs consisting of local firms and other foreign firms. It would also be useful to have details on the core businesses of the foreign investors, which was unavailable due to data constraints.

Our discussion of MNCs' flexible ownership adjustments can be aligned with global strategy types. For example, parent MNCs pursuing global strategies tend to hold higher ownership levels in their foreign subsidiaries to have more effective control and coordination, while those pursuing multi-domestic strategies tend to give their foreign subsidiaries more autonomy regarding ownership levels. It would be useful to examine MNCs' ownership decisions while considering the potential interplay among types or levels of environmental risk, global strategy type, and headquarters-subsidiary relationship. To study the impacts of uncertainty on MNCs' ownership strategies, future research could consider the role of endogenous uncertainty within firms' international networks. At the subsidiary level, firms can overcome such uncertainty (including cultural differences) by learning from or cooperating with partners. However, at the portfolio level it is difficult to coordinate foreign operations in culturally distant countries. It would be interesting to consider how such endogenous uncertainty interacts with exogenous uncertainty in influencing the need for flexibility.

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Appendix: Choice of JVs over WOSs

Variables	Coefficient
Labor cost uncertainty	1.34 (3.28)**
Labor cost correlation	0.47 (1.24)
Market demand uncertainty	1.02 (2.24)*
Political risk	0.10(1.84) [†]
Cultural distance	0.08 (1.36)
Host country ownership control	-0.06 (1.94)*
R&D intensity	-0.09 (1.30)
Advertising intensity	-0.02 (0.66)
Chaebol membership	0.05 (1.60)
International experience	-0.10 (1.32)
Country dummies	Included
Industry dummies	Included
Year dummies	Included
Intercept	0.32 (0.68)
No. of observation	2506
Chi square	130.12***

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, [†] $p < 0.1$

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