Asia Pacific J Manage (2008) 25:153–169
DOI 10.1007/s10490-007-9066-z

REVIEWS

Real options and MNE strategies in Asia Pacific

Tony W. Tong · Jing Li

Published online: 10 November 2007

Abstract Asia Pacific offers a lot of promising growth opportunities, but it also presents high levels of uncertainty for multinational enterprises (MNEs). In this paper, we introduce real options theory as a theory of investment under uncertainty, and we discuss its implications for MNEs and their strategies with a focus on the emerging economies in Asia Pacific. We suggest that MNEs must recognize the various sources of uncertainty, as well as the various options embedded in their investments, and real options theory can help them structure and design their investments to benefit from uncertainty. In particular, MNEs need to develop the dynamic capabilities of managing real options in their investments to respond to the evolving economic and institutional environment in the region. This paper also provides several implications for policy makers in Asia Pacific to stimulate investment activities in the region and to help their firms venture successfully in the international market place.

Keywords Real options theory · Multinational enterprises · Asia Pacific · Emerging economies

Asia Pacific is playing an increasingly important role in the global economy in the 21st century. The stock of inward foreign direct investment (FDI) in Asia Pacific has

The authors contributed equally. We thank *APJM*'s Editor-in-Chief Mike Peng for his guidance on this project.

T. W. Tong (✉)
Leeds School of Business,
University of Colorado,
401 Koelbel Hall, Boulder, CO 80309, USA
e-mail: tony.tong@colorado.edu

J. Li
Faculty of Business Administration,
Simon Fraser University, 8888 University Drive,
Burnaby, British Columbia, CanadaV5A 1S6
e-mail: jingli@sfu.ca

surged from US$516 billion in 1995 to US$1,710 billion in 2005, representing 17% of the world FDI stock (UNCTAD, 2006a). Asia Pacific firms are also actively investing and expanding into other regions, and many of them are now important members of the world's multinational enterprise (MNE) community (Mathews, 2006; Collinson & Rugman, 2007). The stock of outward FDI from Asia Pacific has risen from US$504.8 billion in 1995 to US$1,384 billion in 2005, representing 13% of the world stock (UNCTAD, 2006a). In particular, the stock of outward FDI from the emerging economies in East Asia and Southeast Asia has increased from US $205 billion in 1995 to US$827 billion in 2005, commanding 7.7% of the world stock (UNCTAD, 2006a). In addition, the total export from the emerging economies in East Asia and Southeast Asia topped 18% of the world export in 2005 (UNCTAD, 2006b).

Despite the rapid economic growth and the tremendous growth opportunities, Asia Pacific in general is still considered a region with high uncertainties. These uncertainties represent an important feature of the business environment in this region, and they come in different types and affect firms in different ways. As one example, in most emerging economies in Asia Pacific, their underdeveloped institutions have led to high levels of uncertainty in the product, factor, and other markets (Khanna & Palepu, 1997). Currently, a number of countries in the region are also experiencing fundamental institutional transitions (Peng, 2003). For instance, during the transition from a central-planning to market-oriented economy, the Chinese government has constantly changed its business policies in order to maintain social and political stability (Lieberthal & Lieberthal, 2003), which has introduced further uncertainty to its business environment.

The large amounts of uncertainty and growth opportunities existing in Asia Pacific require multinational enterprises (MNEs), both Western and local, to use a systematic tool to structure their investments and operations in this region as well as in other parts of the world. In this paper, we introduce real options theory and discuss its implications for MNEs and their strategies with a focus on the emerging economies in Asia Pacific. Real options theory is a theory of investment under uncertainty. Originated in economics and finance (Myers, 1977; Dixit & Pindyck, 1994; Trigeorgis, 1996), real options theory has gained significant attention in the strategy field in the past decade (Kogut, 1991; Bowman & Hurry, 1993; McGrath, 1997; Folta, 1998; Reuer & Leiblein, 2000; Tong, Reuer, & Peng, 2008). In particular, real options theory's initial applications in strategy appeared in the domain of FDI and MNEs (Kogut, 1983, 1985, 1989), and the theory has made important contributions to international strategy research (see Li, 2007, for a critical review). However, existing research has yet to apply real options theory to examine MNEs' strategies in Asia Pacific (Bruton, Dess, & Janney, 2007). In this paper, we aim to partially fill this gap, and we believe that the high levels of uncertainty in the region provide an appropriate context to apply the theory. To be globally relevant (Peng, 2005), we examine both Western and Asia Pacific MNEs and discuss their strategies to deal with uncertainty. To be practically relevant, we draw from cases and examples to illustrate real options theory and the MNEs' strategies. Toward the end of paper, we also discuss the implications of real options theory for policy makers in Asia Pacific.

Real options theory and international strategy

Real options theory begins by drawing an analogy between real options and financial options. A financial option is a derivative security whose value is derived from the worth and characteristics of another financial security, or the so-called underlying asset. By definition, a financial option gives its holder the right, but not the obligation, to buy or sell the underlying asset at a specified price on or before a given date. Myers (1977) developed the notion of real options from his seminal idea that one can view firms' discretionary investment opportunities as a call option on real assets, in much the same way as a financial call option provides decision rights on financial assets. Formally stated, real options are investments in real assets, as opposed to financial assets, which confer the firm the right, but not the obligation, to undertake certain actions in the future (Trigeorgis, 1996). The discretionary decision right and the limited initial investment allow option holders to pursue opportunities that have significant upside potential while containing downside risk.

Real options theory contributes to international strategy research due to its unique views of uncertainty and the means it suggests to deal with uncertainty that remains a constant feature of international business. For example, real options theory maintains that international investments provide the MNE with a string of real options that can position the firm to exploit upside potential in different countries while limiting its downside exposure to various uncertainties (Kogut, 1983, 1985, 1989). More generally, compared to traditional theories in international strategy that would associate uncertainty with downside risk and propose MNEs to avoid uncertainty, real options theory suggests that uncertainty may also imply potential opportunities that MNEs can take advantage of. Indeed, real options theory provides a systematic framework for firms to analyze and potentially benefit from uncertainty, through the creation, maintenance, and exercise of various types of options.[1]

Real options in international investments

Li (2007) specifies that making an international investment creates real options when managers in the MNE obtain the right, but not the obligation, to undertake certain actions in the future (e.g., deferring, expanding, contracting, or abandoning). Therefore, the option value of an international investment lies in managerial flexibility in increasing or decreasing commitments according to the resolution of uncertainty. Below we provide examples of the real options that are often seen in international investments (see Table 1).

Growth options An international joint venture (IJV) provides an MNE with growth options. By investing in an IJV, the MNE is able to limit its downside losses to an

[1] Li (2007) and Li and Tong (2007) compare real options theory with traditional theories in international business strategy, such as internalization theory, transaction cost theory, and the stages model of internationalization theory. Tong and Reuer (2007a) provide an overview of real options theory in the strategy field; Li, Barclay, Madhavan and Mahoney (2007) review real options theory and its applications in various strategy contexts; and the review of Li (2007) and synthesis of real options research focuses on international strategy.

Table 1 Types of real options in international strategy.

Types of real options	Examples
Growth options	A firm that enters a foreign market through an international joint venture or a partial acquisition has the option to expand in the future while limiting its initial investments.
Abandonment options	When entering a market with low commitment modes such as export, licensing, or joint venture, a firm has the option to reduce commitment or withdraw from the market when uncertainty turns out unfavorable.
Deferral options	A firm has the option to delay entry into a market surrounded by high uncertainty in the economic and institutional environment.
Switching options	An MNE has the option to switch value chain activities across its network of foreign subsidiaries contingent on exchange rate and other input cost uncertainty.
Option interactions	A firm's early investment in a foreign country may gain valuable growth options but lose deferral options. Thus, the optimal investment timing and scale depends on the interactions of growth and deferral options.
Option portfolios	Multinational operations provide an MNE with a portfolio of switching options. The investment or divestment of one subsidiary affects the value of the option portfolio.

initial, limited commitment, while also positioning itself to expand, but only if uncertainty is resolved favorably (Kogut, 1991; Tong et al., 2008). Similarly, acquiring a minority stake of a foreign firm or engaging cross-border venture capital investments also provides growth options. In addition, an initial investment in a foreign country often carries a large growth option value, since the investment can unlock opportunities for future expansion (Kogut & Chang, 1996).

Abandonment options Just as an IJV confers an MNE growth options, the venture also provides the MNE with abandonment options, since the firm may sell its equity to its partner or another party, or dissolve the venture if uncertainty turns out unfavorable (Chi & McGuire, 1996; Chi, 2000). In addition to IJVs, low-commitment entry modes to a foreign market such as licensing or export also provide valuable abandonment options (Buckley & Casson, 1998; Li & Rugman, 2007). Compared to wholly owned subsidiaries, IJVs, as well as licensing and export, have limited initial investments and incur fewer losses when exiting a foreign market, and thus provide higher abandonment option values.

Deferral options Delaying investment into a foreign market surrounded by high levels of uncertainty provides valuable deferral options (Rivoli & Salorio, 1996). Campa (1993) finds that foreign firms that exported to the US deferred their investments to enter the market during the 1980s due to the fluctuations of the US dollar's real exchange rate. Deferring investment provides an MNE with the opportunity to wait for more relevant information in order to make informed decisions regarding whether to enter the market and how much to invest. Under conditions of uncertainty, MNEs may also use low-commitment entry modes to enter a foreign market due to the embedded deferral options.

Switching options A multinational operating network offers an MNE options to switch sourcing, production, or distribution within the network depending on how

uncertainty is resolved in the economic and institutional environment of the countries that comprise the network (Kogut & Kulatilaka, 1994; Reuer & Leiblein, 2000; Tong & Reuer, 2007b). MNEs are found to systematically exploit fluctuations of exchange rates by exercising the embedded switching options—that is, sourcing and substituting inputs from other countries in the production process (Rangan, 1998).

Option interactions An investment may provide multiple real options and these options may interact with each other (Trigeorgis, 1993). For example, an international investment provides growth options as well as deferral options. On the one hand, the option to defer an investment is valuable under uncertainty and irreversibility; on the other hand, the option to grow may also be valuable due to strategic advantages following timely investment and early commitment (Buckley & Casson, 1981; Kulatilaka & Perotti, 1998). Hence, the optimal timing of international investment depends on the relative importance of the two options (Rivoli & Salorio, 1996). Another example is the growth options and abandonment options embedded in an IJV (Chi, 2000).

Option portfolios A firm undertaking multiple investments may experience option portfolio interactions, in that options embedded in one investment may shape the value of other options held by the firm and therefore the overall value of the option portfolio (Merton, 1973). Multinational operations provide an MNE with a portfolio of switching options, yet the value of the switching options depends on the organization and other costs associated with managing the option portfolio (Tong & Reuer, 2007b). Consideration of the value of the option portfolio can affect the MNE's location decision for its subsidiaries (e.g., investment and divestment of the subsidiaries), and ultimately shape the geographic composition of the multinational network (Belderbos & Zou, 2006).

Drivers of option value in international investments

Real options theory provides a systematic tool to conceptualize and quantify factors that determine the value of real options. The option value of an international investment is mainly influenced by the following factors: level of uncertainty, nature of uncertainty, competition, and option exercise cost (Li, 2007). First, a high level of uncertainty increases the value of managerial flexibility embedded in an investment and thereby increases the option value of the investment. As uncertainty increases, firms are able to pursue more upside potentials while limiting downside risks to the initial investment; such asymmetric performance distribution leads to the positive relation between uncertainty and option value. For example, Kogut and Kulatilaka (1994) find that the value of a multinational network increases with the level of exchange rate volatility.

Second, the option value of an investment also depends on the nature of the uncertainty surrounding the investment, i.e., whether the uncertainty is exogenous or endogenous (Roberts & Weitzman, 1981; Pindyck, 1993). Exogenous uncertainty is not affected by firms' actions and can only be revealed over time, whereas

endogenous uncertainty can be decreased by firms through investments. When an investment contributes to uncertainty reduction and acquires new information, its option value is likely higher because a firm is better able to choose the right timing and conditions to exercise the options embedded in the investment (Pindyck, 1993). For example, Li and Rugman (2007) find that when market uncertainty is mainly endogenous, the option value of high-commitment entry modes is higher than that of low-commitment entry modes, because the former helps an MNE obtain and respond to market information in a more timely fashion.

Third, an increase in potential cash flows lost to competitors reduces the option value of an investment. When the market becomes competitive, or the option exercising right is not proprietary (i.e., many MNEs possess similar options), the option value of an investment is reduced (Rivoli & Salorio, 1996). On the contrary, if firms are able to preempt competition, they can create strong growth options by maintaining exclusive rights over these options (Tong & Reuer, 2006).

Last, option exercise cost will reduce the option value of an investment. Real options are often not included as a clause in formal contracts (Reuer & Tong, 2005), and thus option holders may not realize potential benefits from exercising the options due to the high exercise costs. For example, bargaining costs and the negotiation of an acquisition price between IJV partners *ex post* might diminish any value from exercising the growth option in the IJV (Chi & McGuire, 1996).

Applications of real options theory to international strategy

Real options theory contributes a new way of thinking to strategic decision making under uncertainty. Consideration of option value instills new insights into such strategic decisions as location choice, the choice of market entry/operation mode, and the timing of international investment (Li, 2007). These decisions are particularly relevant in our later discussions on how to apply real options theory to Asia Pacific. First, since multinational operations provide switching options, the choice of location in a multinational network should be strategic, in order to enhance MNEs' operational flexibility and benefit from uncertainty through the coordination of geographically dispersed subsidiaries (Tong & Reuer, 2007b). Second, in choosing among different operation modes, MNEs need to consider the values of different embedded options. In particular, it is important to compare the extent to which each investment mode offers the option to grow (recognize and exploit market opportunities) and the option to abandon (recognize market difficulties and exit the market) (Li & Rugman, 2007). Third, MNEs need to assess the relative importance of growth options and deferral options to determine the optimal timing of investments (Rivoli & Salorio, 1996). Deferring an investment is valuable under high uncertainty because by waiting, firms can obtain more information for decision making. However, if firms can gain strategic advantages following timely investment, the option to grow becomes valuable for future development. For example, Kulatilaka and Perotti (1998) suggest that by investing aggressively under high uncertainty, a firm may be able to preempt potential entries or force existing competitors to "make room" for its entry. If such strategic advantages are significant, the growth options will likely dominate the deferral options, thus increasing the likelihood of investment or leading to early investment.

Real options and Western MNEs' strategies

The large majority of the economies in Asia Pacific are emerging economies, and many of them are also experiencing fundamental institutional transitions. As a result, institutions are underdeveloped in the region and there still exist many institutional voids, such as inadequate legislation, non-transparent judicial systems, poor law enforcement, and inefficient market intermediaries (Khanna & Palepu, 1997; Luo & Tung, 2007). In addition, the political regime in many countries in the region has been unstable, presenting high political hazards for foreign investors.[2] These factors have contributed to the relatively high levels of uncertainty in the region, which will continue to be a persistent feature of the local business environment. In the following, we discuss different types of uncertainty in the region and Western MNEs' strategies to deal with these uncertainties. We focus our discussion on Asia Pacific's emerging economies, especially China, because of their highly uncertain business environment, but our analysis can also apply to the developed economies in the region.

Policy uncertainty

Policy uncertainty is relatively high in Asia Pacific (Peng, Wang, & Jiang, 2008). Western MNEs can deal with policy uncertainty in different ways, depending on whether they view such uncertainty as exogenous or endogenous. To the extent that such uncertainty is exogenous to firm actions, firms can incorporate real options analysis into their strategic decisions on market entry, expansion, contraction, or exit. For instance, several Asia Pacific countries have the policy to encourage FDI in certain industries, and restrict FDI in others for an unpredictable period of time. In latter industries, Western MNEs can create growth options by forming IJVs with, or acquiring partial equity in, the local firms. As one example, China has gradually relaxed its strict restrictions on FDI in the financial industry in recent years. As a response, Western banks such as Bank of America, Goldman Sachs, HSBC, and Royal Bank of Scotland all decided to take strategic stakes (up to 20%) in China's domestic banks through partial acquisition (EIU, 2007b). While creating growth options is valuable in restricted industries, exercising growth options is important in deregulated industries. For instance, as foreign ownership restrictions are being lifted in many industries in China, foreign firms have been active in exercising their growth options in JVs or partial acquisitions by buying out their partners' stakes. For instance, P&G has over the years bought out its partners' equity stakes in P&G Guangzhou Ltd., an IJV established by P&G, Hutchison Whampoa, and Guangzhou Foreign Trade Company in 1988 (SPC Asia, 2004).

While policy uncertainty is largely exogenous, certain firms may take actions to reduce part of the uncertainty to their favor. For example, Western MNEs can invest

[2] For example, EIU (2007a) reports that in Indonesia, corruption is still perceived to be rife despite a high-profile crackdown, legal uncertainty is still a concern, and bureaucracy remains problematic; in South Korea, labor market is still rigid and prone to disruptive unrest; and in Malaysia, progress in corporate governance and transparency in limited.

to build political capital with the local government and collaborate with it to develop and enforce the technological standard in the local market (Luo, 2001). Such investments can be viewed as "amplifying preinvestments" to reduce uncertainty (McGrath, 1997). Although such investments are costly, they can reward the firms by providing future growth options. Consider Microsoft's success in China. Microsoft understands the need to collaborate with the Chinese government in order to achieve long-term success in the market, and it helps develop local software capabilities by establishing global centers, providing training programs, and financing education in rural areas. Due to this as well as other efforts, the Chinese government requires the central and local governments to use legal software of Microsoft and also requires local manufacturers to load legal software on their computers (Fortune, 2007).

Input cost uncertainty

Input cost uncertainty refers to uncertainty over the cost of inputs such as labor, capital, raw materials, and transportation (Pindyck, 1993; Tong & Reuer, 2007b). Input cost uncertainty is generally considered exogenous to firm actions and is determined by market factors such as supply and demand conditions as well as government regulations. In response to input cost uncertainty, Western MNEs can develop switching options by investing in different locations in Asia Pacific or even in other regions, to take advantage of differences in input costs across countries and regions. For instance, during the Asian financial crisis in the late 1990s when local currencies deprecated significantly, Western MNEs such as ABB and GE reallocated their production flexibly to those countries to reduce their global cost structure and increase competitiveness (Fleming, 1998).

Market and technological uncertainties

Market and technological uncertainties are relatively high in Asia Pacific due to unstable industry structures, immature consumers, and evolving technological standards. As a response, Western MNEs can create real options and later decide to exercise or abandon these options according to the resolution of uncertainty. For example, Coca Cola built bottling JVs when it first entered China, and as the local market grew and uncertainty was resolved favorably, it acquired these JVs and achieved full ownership (www.coca-cola.com.cn). In contrast, Whirlpool exited its JV in China when market competition in China's home appliance industry became too intense to maintain profitability (Appliance Manufacturer, 1999). Facing market uncertainty, MNEs can also create options to switch outputs and maintain "product" flexibility by changing the output mix. For instance, a Western automaker investing in Malaysia can exercise the switching options between the local market and the export market by shifting the mix of automobiles to be made for local sale and for export.

While market and technological uncertainties are often exogenous in developed economies, such uncertainties may have an endogenous element in emerging economies, and Western MNEs can reduce such uncertainties to some extent by leveraging their experience and technological prowess. For instance, the MNEs can

build R&D centers in Asia Pacific and develop products or technologies tailored for Asia Pacific customers. Microsoft, for instance, has established R&D centers in India and China to develop locally relevant products by combining its superior technological capabilities with the insights of local companies and employees (Fortune, 2007). Such investments can not only reduce market uncertainty facing the MNEs but also create valuable growth options by giving them the opportunities to guide the local consumers and shape the consumption patterns. Western MNEs can also participate in the development of technological standards through partnerships with the local firms or governments to reduce technological uncertainty. For example, as environmental issues such as pollution have started to gain attention among emerging economies in Asia Pacific, Western firms can offer their expertise and collaborate with the locals to jointly develop technological standards for the local market (Child & Tsai, 2005). Since not all foreign firms have the resources or capabilities to collaborate with the local firms and governments in guiding consumers or developing technologies, those that are able to do so will gain valuable growth options and strategic advantages.

Partner uncertainty

Partner uncertainty includes behavioral uncertainty and resource uncertainty over the partners in collaborative relationships such as JVs, partial acquisitions, and other alliances. Behavioral uncertainty arises when a partner behaves opportunistically in order to gain from the partnership at the expense of the other party's benefits. Resource uncertainty arises when a foreign firm is not certain whether a local partner has the requisite resources or capabilities to commit to a partnership as agreed upon. In emerging economies in Asia Pacific, contract enforcement and intellectual property rights protection are weak, and legal means often cannot offer MNEs sufficient protection from potential opportunistic behaviors of their local partners.

Partner uncertainty is largely endogenous, and Western MNEs can reduce such uncertainty to some good extent through careful partner selection (Hitt et al., 2000). As network contacts and personal relationships play an important role in many Asia Pacific countries, selecting partners with favorable cooperative histories or through network contacts can limit opportunistic behaviors and reduce information asymmetry. Despite due diligence, however, there may still be some residual information that is hidden at the outset and can only be revealed over time after the partnership takes off. Therefore, Western MNEs should keep the expansion and abandonment options open, and exercise these options depending on the arrival of new information.

In this section, we have emphasized the option values of using alliances and other collaborative relationships in Asia Pacific, because of the MNEs' flexibility to stage their commitments and alter investment scales in response to evolving uncertainties. Despite these benefits, firms must be aware that exercising real options in partnerships can be costly because partners often will need to negotiate on the acquisition or divestiture price *ex post* (Chi, 2000). The recent incidence between Wahaha, China's largest soft drink producer, and Danone, a French food company, illustrates the cost of option exercise (Wall Street Journal, 2007a). Danone proposed to acquire Wahaha's equity share in their JV but encountered strong resistance from

the latter. The failed acquisition attempt not only has damaged their relationship in the JV, but may also hurt Danone's long-term growth in China.

Real options and Asia Pacific MNEs' strategies

Like their Western counterparts, a lot of Asia Pacific firms are now actively investing and expanding into the international market place, and many of them have emerged as world-class MNEs (Mathews, 2006; Luo & Tung, 2007; Yamakawa, Peng, & Deeds, 2008). Given their growing international presence, in this section we turn to Asia Pacific MNEs, particularly MNEs in the emerging economies of the region, and examine their strategies to deal with uncertainty. Most of the Western MNEs' strategies discussed above also apply to Asia Pacific MNEs, and therefore we will focus on some of the unique aspects of their strategies.

First, Asia Pacific MNEs need to confront policy uncertainty outside of Asia Pacific, because of the economic integration of the region to the rest of the world. The US and the European Union (EU) are the most important trade partners and investors in Asia Pacific, and their actions towards Asia Pacific will have a large impact on the business environment of this region. Governments in the EU and US may set up trade barriers on exports from Asia Pacific to protect their domestic companies and consumers. For example, the EU increased duties on shoes imported from China and Vietnam in 2006 (Wall Street Journal, 2006). Solely relying on one country for export therefore makes exporters vulnerable to trade barriers, and firms in Asia Pacific can consider creating switching options by investing in different countries within the region. Holding such switching options can not only hedge firms against risk, but also help them gain upside opportunities through "institutional arbitrage" (Kogut, 1983). For example, in the mid-1990s, when the US lifted the importation quotas once imposed on textiles and garments from Cambodia to help the country rebuild its economy, a lot of MNEs from China, Hong Kong, and Thailand rushed in to exploit the opportunity.

Asia Pacific MNEs can also consider investing in switching options in the broader NAFTA–EU–Asia triad. For instance, Asia Pacific exporters can establish subsidiaries in Eastern European countries to take advantage of their membership in the EU, in Mexico to make use of its membership in NAFTA, and in other developing countries which face fewer trade restrictions from developed economies. Dozens of Chinese firms, for example, have invested in Central and South America, the Caribbean, and Mexico to manufacture garments, footwear, bicycles, and household electrical appliances for export to the US without facing quotas or other restrictions (Luo & Tung, 2007).

Second, in international investments, Asia Pacific MNEs can use low-commitment investment modes to create growth options and benefit from the flexibility advantages, while actively learning and monitoring the environment in preparation for exercising these options. Compared to Western MNEs, most Asia Pacific firms are "latecomers" in international business and they lack technological capabilities (Mathews, 2006). One way to overcome the liability of lateness is through exporting. As mentioned earlier, many firms in Asia Pacific are exporters, and they can view exporting as providing an option to grow in overseas markets

(Kogut & Chang, 1996). Through exporting, especially in the form of original equipment manufacturing and contract production for Western MNEs, Asia Pacific firms can accumulate knowledge of the consumers' needs and quality standards in the export markets, and also learn managerial and technological competencies required for entering those markets (Hobday, 1995). When market and technological uncertainties are reduced and opportunities arise in those countries, these firms are well positioned to increase their commitment by establishing subsidiaries there. In earlier years, firms in Japan, Korea, and Taiwan have used this strategy to successfully enter the US market, and more recently this strategy has also been adopted by firms in China as well as other emerging economies in Asia Pacific (Child & Rodrigues, 2005; Wall Street Journal, 2007b).

Similar to exporting, firms in Asia Pacific can also view their JVs with Western MNEs in Asia Pacific as an option to enter international markets. Asia Pacific has attracted a significant amount of inward FDI and a large proportion takes the form of IJVs. Through interactions in the JVs, Asia Pacific firms can accumulate knowledge about foreign technology, management, and marketing skills, as well as understand partner behaviors and institutional differences. Moreover, when firms develop a trustworthy relationship with their Western partners, they obtain an option to expand the JV business to the export market, or to extend the JV relationship overseas. Hence, JVs in a country can be viewed as providing growth options not only for domestic growth but also for international expansion. A good case in point is the long-term relationship between Ranbaxy, an Indian pharmaceutical company, and Eli Lilly (Luo & Tung, 2007). Their good relationship started when they established a JV in India for helping Eli Lilly to enter the Indian market; Ranbaxy later developed a marketing alliance with Eli Lilly in the US to access the US market.

Compared to undertaking outward FDI directly in foreign markets, exporting and establishing JVs with Western MNEs in the domestic market can allow Asia Pacific firms to limit their initial investments, and still provide them with valuable growth options for exercise in the future. Employing such a strategy, Asia Pacific firms can take advantage of their current economic environment (i.e., heavily involved in exporting and inward FDI), and position themselves for international expansion while containing downside risk. As the firms reduce endogenous uncertainty by learning and recognize potential opportunities by environmental monitoring, they could exercise their growth options by undertaking outward FDI in the Western MNEs' home turfs.

Third, while the above strategies work for many Asian Pacific firms, some firms in the region have accumulated considerable resources and can tolerate more uncertainty (Child & Rodrigues, 2005), and they can consider using other strategies to deal with uncertainty in their international investments. Firms such as these can consider using commitment-intensive modes to enter high-uncertainty markets to preempt valuable growth options. Buckley et al. (2007) find that Chinese firms are interested in investing in countries with high political risks. A possible explanation is that such countries in general do not receive much inward FDI, so by committing to these countries, Chinese firms are likely to gain significant growth options in the forms of various strategic advantages. Other studies have found that a number of firms in emerging economies—many of them with little international experience—have recently devoted significant

resources to acquiring firms in advanced economies (Luo & Tung, 2007). Such acquisitions can give them direct access to the growth options available in those countries, as well as help them obtain much-needed technological and managerial assets in a more speedy fashion.

Although high-commitment investments can provide valuable growth options, firms must be aware of the caveats of such a strategy. As mentioned before, option exercise is as important as option creation for a firm to appropriate value from real options, and the value of a growth option may vanish if the option's exercise cost becomes too high. For instance, the growth options embedded in a full acquisition may have high option exercise costs due to the difficulty in post-acquisition integration. The post-acquisition integration challenge between TCL Group, a leading Chinese electronics company, and France's Thomson TV is a good case in point (Rugman & Li, 2007). The CEO of TCL recently admitted that acquiring Thomson's TV business was a failure, because TCL lacked international experience in acquisitions and was not able to transfer its competitive advantage (low cost manufacturing) to the French business. The integration challenge elevates the cost of exercising the growth options in the acquisition.

Policy implications for Asia Pacific

Whereas Asia Pacific offers a lot of investment opportunities, it also presents high levels of uncertainty for investors. Therefore, despite the success that Asia Pacific has achieved in international investment in the past decade, the great majority of the world's capital flows still take place within the Western developed economies (UNCTAD, 2006a, b). Below we use real options theory to illuminate this issue, and we also provide some policy suggestions for Asia Pacific to increase inward FDI and engage in outward FDI successfully.

To start with, uncertainty is an important variable in investment decision making, because it moves firms' investment thresholds from the net present value greater than zero decision criterion (Dixit & Pindyck, 1994). Unless very high levels of growth opportunities are also present, uncertainty tends to raise firms' investment thresholds and increase hurdle rates (Kulatilaka & Perotti, 1998). As firms intending to make investments in Asia Pacific need to confront high levels of uncertainty, they tend to have higher investment thresholds and require higher rates of return. This is why Western MNEs routinely require their investment project's net present value to be significantly greater than zero in emerging economies, in order to compensate for the value of deferral options that are lost if they make immediate investment (Butler, 2004).

Policy makers in Asia Pacific aimed to attract inward FDI must seek to reduce the levels of uncertainty in the business environment. Doing so can reduce the volatility of investment returns and lower the investment thresholds, therefore encouraging investments as well as increasing investment levels. In Asia Pacific, institutional sources of uncertainty are particularly relevant to investors. Because of the underdeveloped institutions in Asia Pacific (Khanna & Palepu, 1997), business policies are constantly changed, exchange rate is often unstable, and behavioral uncertainty is usually hard to curb. To reduce such uncertainties, policy makers in

Asia Pacific can work to reform and improve their political and economic institutions, by for example developing a stable government infrastructure and improving its legal system and law enforcement.

Irreversibility is another important determinant of firms' investment decisions. Investments are irreversible when their salvage value or best alternative-use value cannot be recovered vis-à-vis investment costs. With fully reversible investments, firms can invest and disinvest at their will regardless of uncertainty, because the downside loss is sufficiently contained (Dixit & Pindyck, 1994). However, most investments in the real world are at least partially irreversible. As irreversibility increases, the salvage value decreases, and firms' investment decisions will become more sensitive to conditions of uncertainty. For example, Campa (1993) finds that the more irreversible an investment is, the larger the negative effect of exchange rate uncertainty on inward FDI in the US.

Irreversibility occurs when investments are firm or industry specific, or subject to market imperfections (Dixit & Pindyck, 1994). Compared to Western economies, investments in Asia Pacific are often more irreversible, because the investments may be more country or institution specific, or surrounded by greater market imperfections due to the underdeveloped market institutions. Policy makers in Asia Pacific can work to build a market-oriented system, such as a competitive product market to promote free trade, an active labor market to facilitate employee mobility, and an efficient mergers and acquisitions market to assist asset sales. In addition, they can work on promoting rule of law and securing property rights against seizure and nationalization (Vonnegut, 2000). Such actions can reduce the irreversibility of investments and increase the value of abandonment options to the firms, which combine to lower their investment thresholds and stimulate investments.

A third effort to stimulate investment is to foster the development of more attractive growth opportunities. In the presence of significant growth opportunities, firms will compete to make early commitment and greater investments to capture the opportunities, since delaying investments may incur opportunity costs of waiting (Kulatilaka & Perotti, 1998). Therefore, growth opportunities, coupled with competition, tend to encourage speedy investment and business expansion despite the existence of uncertainty. Research shows that countries vary significantly in their growth opportunities, and such variance can be linked to cross-country differences in institutions, such as various formal and informal market-supporting mechanisms (Tong, Alessandri, Reuer, & Chintakananda, 2008). For instance, policy makers in Asia Pacific can consider following a real options perspective to improve aspects of their bankruptcy laws to encourage the development of growth opportunities (Lee, Peng, & Barney, 2007).

We offer the above suggestions for policy makers in Asia Pacific to increase inward FDI, but we believe that these suggestions can also apply to domestic investments in this region as well. To help expand outward FDI successfully, policy makers in Asia Pacific can provide support for their domestic firms to reduce institutional uncertainty surrounding their international investments. Such support can take a variety of forms. For example, as its domestic firms venture abroad, the Singapore government has established the Economic Development Board to provide guidance and directions. These efforts can help firms reduce

endogenous uncertainty by diminishing information asymmetry as well as improving their international experience and capabilities. Governments in several Asia Pacific countries are also involved in their firms' international initiatives by negotiating with foreign governments to reduce various trade and investment barriers. Such amplifying preinvestments can help Asia Pacific firms reduce exogenous uncertainty (e.g., policy uncertainty) and succeed in their international venture.

Conclusion

In this paper, we utilize the insights of real options theory to examine Western and Asia Pacific MNEs' strategies with a focus on the emerging economies in this region. Uncertainty is an important and persistent feature of the business environment in Asia Pacific. Our paper suggests that MNEs must recognize the various sources of uncertainty, as well as the various options embedded in their investments, and they can use options theory to make informed investment decisions. When facing high levels of uncertainty, especially that exogenous to firm actions, Western MNEs can limit their initial investments by establishing partnerships with local firms through JVs, partial acquisitions, and other alliances. Such investments provide MNEs with valuable growth options and abandonment options. They can exercise these options in response to new information by changing investment modes or scales. MNEs can also create switching options and reduce their sole reliance on one or two Asian countries by establishing a portfolio of locations for production and export. They can exercise the options by switching locations when new information is revealed regarding trade barriers, exchange rates, and other input costs. Another important strategy for MNEs is to collaborate with the local government in Asia Pacific so as to create valuable growth options. Through collaborations, MNEs can proactively reduce various uncertainties, as well as obtain valuable opportunities from the government such as participation in setting technological standards and guiding consumption trends.

Asia Pacific MNEs can also benefit from a real options approach to undertaking international investments. Asia Pacific firms can create switching options to hedge operating risk and exploit opportunities across countries through institutional arbitrage. As many firms in the region are latecomers to international business, they should take a cautious way of expanding overseas. Firms could view exporting and domestic JVs with Western firms as providing real options for international expansion. Through exporting to advanced economies and direct interactions with successful MNEs in the home market, Asia Pacific firms are able to accumulate knowledge of foreign markets, which can provide options for them to make direct investments in those markets in the future. Some firms in Asia Pacific, however, have accumulated considerable resources and capabilities for overseas investment. These firms can consider using high-commitment entry modes to speed up their investments in regions with high uncertainty but also high growth opportunities, in order to preempt valuable growth options and obtain other strategic advantages.

Guided by real options theory, policy makers in Asia Pacific can also take several concrete measures to achieve greater domestic and international investments. Policy

makers need to improve their business environment by reducing uncertainty and the irreversibility of investments. Doing so reduces the value of investors' deferral options and increases the value of abandonment options, thereby lowering their investment thresholds. To do so, policy makers can undertake continuous efforts to develop the institutions in their countries to stabilize the political regime, promote rule of law, establish a market-oriented economy, and foster the development of more attractive growth opportunities. Finally, policy makers can take several economic and political actions to help their firms reduce various endogenous and exogenous uncertainties in their venture into international markets.

In closing, we believe that real options theory provides a useful tool for MNEs and policy makers to structure and design their investment activities in Asia Pacific's dynamic environment. For MNEs, the theory suggests the need to develop the dynamic capabilities of managing real options, namely, the abilities to create, maintain, and exercise various options in their investments, to respond to the evolving economic and institutional environment in the region. For policy makers, real options theory gives them several directions to stimulate investment activities in the region and to help their firms expand overseas successfully. We hope our paper can inspire more future research on real options in international business in general and in Asia Pacific in particular.

References

Appliance Manufacturer. 1999. Asia to drive world appliance growth. 47(2).

Belderbos, R., & Zou, J. 2006. Foreign investment, divestment, and relocation by Japanese electronics firms in East Asia. *Asian Economic Journal*, 20(1): 1–27.

Bowman, E. H., & Hurry, D. 1993. Strategy through the options lens: An integrated view of resource investments and the incremental-choice process. *Academy of Management Review*, 18: 760–782.

Bruton, G. D., Dess, G. G., & Janney, J. J. 2007. Knowledge management in technology-focused firms in emerging economies: Caveats on capabilities, networks, and real options. *Asia Pacific Journal of Management*, 24(2): 115–130.

Buckley, P. J., & Casson, M. C. 1981. The optimal timing of a foreign direct investment. *Economic Journal*, 91: 75–87.

Buckley, P. J., & Casson, M. C. 1998. Models of the multinational enterprise. *Journal of International Business Studies*, 29: 21–44.

Buckley, P. J., Clegg, J., Cross, A. R., Liu, X., Voss, H., & Zheng, P. 2007. The determinants of Chinese outward foreign direct investment. *Journal of International Business Studies*, 38(4): 499–518.

Butler, K. C. 2004. *Multinational finance*. 3rd edition. Cincinnati, OH: South-Western College Publishing.

Campa, J. M. 1993. Entry by foreign firms in the United States under exchange rate uncertainty. *Review of Economics & Statistics*, 75(4): 614–622.

Chi, T. 2000. Option to acquire or divest a joint venture. *Strategic Management Journal*, 21(6): 665–687.

Chi, T., & McGuire, D. J. 1996. Collaborative ventures and value of learning: Integrating the transaction cost and strategic option perspectives on the choice of market entry modes. *Journal of International Business Studies*, 27(2): 285–307.

Child, J., & Rodrigues, S. B. 2005. The internationalization of Chinese firms: A case for theoretical extension? *Management and Organization Review*, 1(3): 381–410.

Child, J., & Tsai, D. 2005. The dynamic between firms' environmental strategies and institutional constraints in emerging economies: Evidence from China and Taiwan. *Journal of Management Studies*, 42: 95–125.

Collinson, S., & Rugman, A. M. 2007. The regional character of Asian multinational enterprises. *Asia Pacific Journal of Management*, 24(4): 429–446.

Dixit, A. K., & Pindyck, R. S. 1994. *Investment under uncertainty*. Princeton, NJ: Princeton University Press.

EIU 2007a. Business Asia July 2007. Economist Intelligence Unit.
EIU 2007b. Country profile on China 2007. Economist Intelligence Unit.
Fleming, C. 1998. ABB's net profit for 1997 declined 54% on provisions for Asian financial crisis. *Wall Street Journal Europe*, February 27–28: 3.
Folta, T. B. 1998. Governance and uncertainty: The tradeoff between administrative control and commitment. *Strategic Management Journal*, 19: 1007–1028.
Fortune 2007. How Microsoft conquered China. July 9, 2007.
Hitt, M. A., Dacin, M. T., Levitas, E., Arregle, J.-L., & Borza, A. 2000. Partner selection in emerging and developed market contexts: Resource-based and organizational learning perspectives. *Academy of Management Journal*, 43: 449–467.
Hobday, M. 1995. *Innovation in East Asia: The challenge to Japan*. Aldershot, UK: Edward Elgar.
Khanna, T., & Palepu, K. 1997. Why focused strategies may be wrong for emerging markets. *Harvard Business Review*, 75(4): 41–51.
Kogut, B. 1983. Foreign direct investment as a sequential process. In C. P. Kindleberger & D. B. Audretsch (eds.). *The Multinational Corporation in the 1980s*. Boston, MA: MIT Press.
Kogut, B. 1985. Designing global strategies: Profiting from operational flexibility. *Sloan Management Review*, 27(1): 27–38.
Kogut, B. 1989. A note on global strategies. *Strategic Management Journal*, 10: 383–389.
Kogut, B. 1991. Joint ventures and the option to expand and acquire. *Management Science*, 37: 19–33.
Kogut, B., & Chang, S. J. 1996. Platform investments and volatile exchange rates: Direct investment in the U.S. by Japanese electronic companies. *Review of Economics and Statistics*, 78: 221–231.
Kogut, B., & Kulatilaka, N. 1994. Operating flexibility, global manufacturing and the option value of a multinational network. *Management Science*, 40(1): 123–139.
Kulatilaka, N., & Perotti, E. C. 1998. Strategic growth options. *Management Science*, 44(8): 1021–1031.
Lee, S. -H., Peng, M. W., & Barney, J. J. 2007. Bankruptcy law and entrepreneurship development: A real options perspective. *Academy of Management Review*, 32(1): 257–272.
Li, J. 2007. Real options and international strategy: A critical review. *Advances in Strategic Management*, 24: 67–101.
Li, J., & Rugman, A. 2007. Real options and the theory of foreign direct investment. *International Business Review*, forthcoming.
Li, J., & Tong, T. W. 2007. Real options theory and international strategic management. In S. Tallman (Ed.). *A New Generation of Research in International Strategic Management*: 100–117. Aldershot, UK: Edward Elgar.
Li, Y., James, B. E., Madhavan, R., & Mahoney, J. T. 2007. Real options: Taking stock and looking ahead. *Advances in Strategic Management*, 24: 33–70.
Lieberthal, K., & Lieberthal, G. 2003. The great transition. *Harvard Business Review*, 81(10): 70–81.
Luo, Y. 2001. Toward a cooperative view of MNC-host government relations: Building blocks and performance implications. *Journal of International Business Studies*, 32(3): 401–419.
Luo, Y., & Tung, R. L. 2007. International expansion of emerging market enterprises: A springboard perspective. *Journal of International Business Studies*, 38(4): 481–498.
Mathews, J. A. 2006. Dragon multinationals: New players in 21st century globalization. *Asia Pacific Journal of Management*, 23(1): 5–27.
McGrath, R. G. 1997. A real options logic for initiating technology positioning investments. *Academy of Management Review*, 22: 974–996.
Merton, R. C. 1973. Theory of rational option pricing. *Bell Journal of Economics and Management Science*, 4: 141–183.
Myers, S. C. 1977. Determinants of corporate borrowing. *Journal of Financial Economics*, 5(2): 147–175.
Peng, M. W. 2003. Institutional transitions and strategic choices. *Academy of Management Review*, 28(2): 275–296.
Peng, M. W. 2005. From China strategy to global strategy. *Asia Pacific Journal of Management*, 22(2): 123–141.
Peng, M. W., Wang, D. Y. L., & Jiang, Y. 2008. An institution-based view of international business strategy: A focus on emerging economies. *Journal of International Business Studies*, forthcoming.
Pindyck, R. S. 1993. Investments of uncertain cost. *Journal of Financial Economics*, 34(1): 53–76.
Rangan, S. 1998. Do multinationals operate flexibly? Theory and evidence. *Journal of International Business Studies*, 29(2): 217–237.
Reuer, J. J., & Leiblein, M. J. 2000. Downside risk implications of multinationality and international joint ventures. *Academy of Management Journal*, 43: 203–214.

Reuer, J. J., & Tong, T. W. 2005. Real options in international joint ventures. *Journal of Management*, 31(3): 403–423.
Rivoli, P., & Salorio, E. 1996. Direct investment and investment under uncertainty. *Journal of International Business Studies*, 27(2): 335–354.
Roberts, K., & Weitzman, M. L. 1981. Funding criteria for research, development, and exploration projects. *Econometrica*, 49(5): 1261–1288.
Rugman, A., & Li, J. 2007. Will China's multinationals succeed globally or regionally? *European Management Journal*, forthcoming.
SPC Asia. 2004. P&G assumes 100% of China JV. 36: 6.
Tong, T. W., & Reuer, J. J. 2006. Firm and industry influences on the value of growth options. *Strategic Organization*, 4: 71–95.
Tong, T. W., & Reuer, J. J. 2007a. Real options in strategic management. *Advances in Strategic Management*, 24: 3–28.
Tong, T. W., & Reuer, J. J. 2007b. Real options in multinational corporations: Organizational challenges and risk implications. *Journal of International Business Studies*, 38(2): 215–230.
Tong, T. W., Alessandri, T. M., Reuer, J. J., & Chintakananda, A. 2008. How much does country matter? An analysis of firms' growth options. *Journal of International Business Studies*, forthcoming.
Tong, T. W., Reuer, J. J., & Peng, M. W. 2008. International joint ventures and the value of growth options. *Academy of Management Journal*, forthcoming.
Trigeorgis, L. 1993. The nature of option interactions and the valuation of investments with multiple real options. *Journal of Financial and Quantitative Analysis*, 28: 1–20.
Trigeorgis, L. 1996. *Real options: Managerial flexibility and strategy in resource allocation*. Cambridge, MA: MIT Press.
UNCTAD 2006a. *World investment report 2006*. Geneva, New York: United Nations.
UNCTAD 2006b. *Handbook of statistics 2006*. Geneva, New York: United Nations.
Vonnegut, A. 2000. Real option theories and investment in emerging economies. *Emerging Markets Review*, 1: 82–100.
Wall Street Journal. 2006. Walking a fine in shoe spat. January 10, 2006.
Wall Street Journal. 2007a. Danone seeks ways to fix China venture. June 13, 2007.
Wall Street Journal. 2007b. Chery assembly deal makes Chrysler a model in exporting from China. July 5, 2007.
Yamakawa, Y., Peng, M. W., & Deeds, D. L. 2008. What drives new ventures to internationalize from emerging to developed economies? *Entrepreneurship Theory and Practice*, forthcoming.

Tony W. Tong is an Assistant Professor of Strategic Management at the Leeds School of Business at the University of Colorado. He obtained his Ph.D. from The Ohio State University. His current research applies real options theory to study firms' corporate development activities and growth initiatives. His research in these areas has been published or accepted in journals such as the *Academy of Management Journal*, the *Journal of International Business Studies*, and *Organization Science*.

Jing Li is an Assistant Professor of International Business at the Faculty of Business Administration at Simon Fraser University, Canada. Her research focuses on alliance activities in China, capability building of Chinese firms, and applications of real options theory to international strategy. Her research in these areas has appeared in the *Journal of World Business*, *Advances in Strategic Management*, and *Managerial and Decision Economics*.