Discussion Paper ERU/2018 – 01
March, 2018

A Theory of Joint Venture Instability under Inter-Partner Learning*

Tarun Kabiraj[a]
Indian Statistical Institute, India
and
Sarbajit Sengupta[b]
Visva-Bharati University, India

(March 2018)

---

* This is a revised version of the paper entitled `A Theory of Joint Venture Formation and Break-up' presented at the Asia-Pacific Thai Conference 2017..

Correspondence to: Tarun Kabiraj, Economic Research Unit, Indian Statistical Institute, 203 B. T. Road, Kolkata 700108, India. Fax: (91) (33) 2577 8893.

[a]E-mail: tarunkabiraj@hotmail.com;[b] E-mail: sarbajitsengupta@gmail.com.

A Theory of Joint Venture Instability under Inter-Partner Learning

Abstract

The primary reason why foreign and local partners form international joint ventures is the synergy between their different competencies. However, such enterprises may break up due to a host of internal and exogenous causes. The evidence indicates that inter-partner learning of each other's competencies during operation of the enterprise is an important reason for JV instability. This paper contributes to the theory of JV formation and instability based on synergy and inter-partner learning. We show that the JV is likely to break up if the learning effect is stronger than the synergy effect. Finally, we provide a comparative static analysis.

Keywords: International joint ventures; synergy; Inter-partner learning; joint venture instability; subsidiary.

JEL classifications: D21**;** F23; L13; L21.

1. Introduction

Joint venture is an important form of business widely practiced within and across countries. Joint ventures (JVs) are created when two or more legally independent firms agree on a project and jointly share business risks, returns and control. In contrast to merger and acquisition, the distinctive feature of JVs is that the parent firms retain their identity. Last three decades or so have witnessed formation of a large number of international JVs, particularly between foreign multinationals and developing country-based firms.[1] Restriction on foreign equity holding in the developing countries have prompted many foreign firms to enter these economies through JVs.[2] Incomplete information regarding the developing country market characteristics and the associated transaction costs have also induced the foreign firms enter through JVs (Sinha, 2001a; Marjit et al., 2004; and Stahler, 2014). Brouthers (2013) and Bowe et al. (2014) examine how market entry mode of a firm depends on transaction costs, institutional and cultural context variables.[3]

The empirical literature on JV formation points out that in case of cross-border JVs the partners exploit the mutual advantages of each. The foreign firms (FFs) have greater access to finance, superior technology and managerial and marketing skill than local firms (LFs). The LFs, on the other hand, have better knowledge of the local environment, prospective buyers and labor conditions, and better ties with the local government officials. Through JVs, firms can combine their complementary advantages leading to 'synergies', and minimize the financial risk and uncertainties due to imperfect information (Balakrishnan and Koza, 1993; Gomes-Casseres, 1989). In fact, incomplete information on either side is an important factor behind formation of international JVs (Marjit and Mukhjerjee, 2001; Beladi and Chakrabarti, 2008). The idea that firms choose the JV route when there exist *synergies* or *complementarities* between them is well documented in the literature (e.g., Wong and Leung, 2001; and Hauswald and Hege, 2009).

But in spite of the growing popularity of JVs as a form of business, one important feature is that the JV relationship is inherently unstable and fragile, and this has been a rule rather than an exception. JVs once formed are seen to operate for a few years and then either one partner

[1] One may look at Moskalev and Swensen (2007) for a comprehensive survey on JVs.
[2] See an analysis on this issue in Falvy and Fried (1986) and Gangopadhyay and Gang (1993).
[3] See also Kogut (1988), Steensma et al. (2000) and Mayroffer (2004) in this context. There is also a literature discussing the optimal mode of entry of a foreign firm to a host country. Based on demand and cost parameters and government policy variables sometimes joint venture comes out to be the optimal entry mode (see for instance, Kabiraj and Sinha (2015), Gorg (2000) and Buckley and Casson (1998)).

sells out its stake to the other or they mutually break up their relationship and compete independently. The average life of a JV is observed to be 5-7 years.[4]

This obviously calls for an explanation and finding the source of the problem. Our purpose in the paper is to provide an analysis of this issue. If we look at the existing literature carefully we find that there are two groups of causes. One group includes causes which are endogenous in nature but remain implicit at the time of JV formation, and the other group includes exogenous factors like the change of government policies, business shocks like technological change, or change of market structure due to entry or exit of firms, etc. Many of these factors cannot be predicted at the time of JV formation. For instance, in Sinha (2001b) and Mukherjee and Sengupta (2001), JV instability arises when the local government allows the foreign firm to hold 100% equity shares. So buy-out or adjustment of shares occurs in favor of the foreign firm with the threat of opening a foreign subsidiary. Then Banerjee and Mukherjee (2010) have studied JV instability induced by entry of a new firm in the industry, and in Kabiraj and Roy Chowdhury (2008) instability arises when the foreign firm comes up with a new innovation. While break-up of some joint ventures may be predicted at the time of JV formation, but most of the break-ups are unanticipated hence unintended. Unanticipated contingencies that occur in the external or internal connditions may impede continuation of operations (Makino et al. (2007)).

Makino et al (2007) find that the longevity or termination of JVs is significantly contingent on the initial conditions under which the JV is formed. In Mata and Portugal (2015), JVs those are created de novo are more likely to be closed down than those that were previously fully owned by one of the parties. Triki and Mayrhofer (2016) show that the establishment mode (Greenfield investment or partial acquisition) has a significant effect on the life of the international JV, but that the impact of ownership structure and the number of partners is not significant. In the context of a transition economy, Meschi, Phan and Wassmer (2016) claim that JV-based entries with high transactional and low institutional alignments have a significantly lower termination probability than JV-based entries with low transactional and

[4] Break-ups of JVs are widely documented in the literature. For instance, Killing (1982) surveyed 37 international JVs and found that 36% of these performed unsatisfactorily and ultimately the relations were wound up. The study of US based JVs by Kogut (1989) shows that by the sixth year about one half of the JVs in the sample of 92 JVs had been terminated. The Mckinsey consultancy firm has provided a thorough world-wide study of more than 200 alliances (JVs). The study shows that the median life span is only seven years. In more than 80% of the cases, it ends in one partner selling its stake to the other (see Bleake and Earnst, 1995). The International Finance Corporation (World Bank) conducted a study of seventy JVs in six developing countries (viz., India, Brazil, Mexico, Argentina, Turkey and the Philippines) and come up with the similar findings (Miller et al., 1996). The break-up of Hero-Honda JV in India is still fresh in the mind of everyone.

high institutional alignments. Westman and Thorgren (2016), on the other hand, have drawn attention to the unequal equity holdings of the partners in a JV leading to partner conflicts and ultimately demise of the JV. They have provided a study on a high-tech JV between a minority Swedish firm and a majority East European partner during 2005-14. They find that the initial inequality in equity holding may incite opportunistic behavior by the majority holder and lead to JV breakup. Hence they suggest that it is important to adequately formulate partnership agreements and carefully select partners to ensure a stable IJV.

Among the endogenous nature of factors leading to JV instability, many have suggested cultural diversity or mismatch of partners to be responsible for termination of an alliance (e.g., Folta and Ferrier, 2000; Lenartowicz and Roth, 2004; Westwood and Posner, 1997) Meschi and Riccio (2008) have studied a sample of 234 international joint ventures formed in Brazil between 1973 and 2004 and found that large national cultural differences between local and foreign partners increase the instability of international joint ventures. Kabiraj et al. (2005) provide a model of JV instability based on cultural mismatch or partner asymmetry.[5]

In the present paper we shall mostly focus on inter-partner learning as one of the principal reasons for break up of JV relations. There is an ample evidence of knowledge spillover or learning between partners. Long ago Gomes-Casseres (1987) observes that "*To the extent that the local firm learns from the MNE, its capability may expand to the point where it no longer needs the MNE, leading to a sale of the joint venture.…*". In emerging economies, international JV is an important vehicle for a LF to absorb the foreign partnetr's expertise in R&D and technology management, and for a FF to learn from the local partner the local business practices, distribution and customer characteristics and government relationships (Kogut, 1988; Hamel, 1991; Inkpen and Beamish, 1997; Lane and Lubatkin, 1998; Wong and Leung, 2001). The basic hypothesis is that as JV is formed, both parties may learn from each other and then may choose to break away from the JV in the future. Fang and Zou, (2010), in particular, observes that absorptive learning of the partners decreases one party's dependence on the other while joint learning increases their dependence. Nakamura (2005) has focused on the changing bargaining power of a JV partner that may lead to JV instability. Given an initial distribution of equity holdings of the JV partners, as learning by a partner takes place, its relative bargaining

[5] Malik and Zhao (2013), in contrary, have shown that cultural distance may increase the longevity of the JV relation. This happens when knowledge is context dependent and cultural distance between the partner delays knowledge transfer. This observation can be explained in terms of the model we are presenting in this paper.

power goes up. This results in redistribution of equity holdings in favor of the firm. In their paper on the JVs formed between Japanese and foreign firms, initially the foreign partners have superior technology and marketing and managerial skill; as a result, the foreign firms had larger bargaining power and ownership shares. But as Japanese firms come up with R&D and learning superior inputs in the JVs, their bargaining power is enhanced and their ownership shares increased. Nakamura (2005) has constructed a bargaining model and validated the above findings with data.

There are some theoretical works that explain JV instability or break up recognizing learning (other partner's knowledge) as one important factor, but in those papers learning alone cannot explain instability; often learning is associated with some other factors to explain JV instability. For example, in Kabiraj and Roy Chowdhury (2008) there is one sided learning (by the domestic firm) and instability arises when the MNC comes up with a new technology. In Marjit and Roy Chowdhury (2004), the FF is assumed to have access to capital. In Kabiraj (1999) the existing JV breaks up as the third firm in the industry imitates foreign firm's technology. Finally, Roy Chowdhury and Roy Chowdhury (2001) consider both sided learning but it is moral hazard combined with learning that explains the life cycle of JVs. In contrary, in the present paper we have provided an analysis of JV break up based on solely inter-partner learning.

The purpose of the present paper is to provide a theoretical framework that formalizes the important insight of several works discussed above. Theoretical literature often explains JV formation and JV break up separately. But we provide a model that explains JV formation as well as break up simultaneously. In our model JV break up is predicted at the time of JV formation. In that sense our paper provides a theory that explains the finding of intended termination, as observed by Makino et al. (2007). In our paper two important factors to explain joint venture formation and breakup are synergy and learning. We have shown that even when synergy does not lead to JV formation, the possibility of learning in the future can be a reason for JV formation currently. One important contribution of the present paper is that inter-partner learning of each other's complementary knowledge can alone explain JV breakdown or instability in view of the fact that empirical literature admits the importance of learning in explaining JV instability. In another respect the present paper is different from most of the other papers. We have assumed the host country market to be an oligopoly prior to entry of the

foreign firm. Therefore, when the foreign firm enters the host market by forming a JV with a local firm, the JV cannot emerge as a monopolist. By this we remove the bias in favor of the JV, that exists in most of the papers (including Roy Chowdhury and Roy Chowdhury, 2001).

Finally, our paper also indirectly provides a structure to study the effect of cultural homogeneity or heterogeneity on the stability of the JV relation. We have already noted that cultural incompatibility generally leads to JV breakup. However, we may presume that the degree of learning between the partners depends on the closeness or homogeneity of social and cultural background of the firms. Then cultural homogeneity in our paper will lead to a higher learning, hence a higher possibility of breakup of the relation. This clearly supports the empirical observation of the paper by Malik and Zhao (2013). They argued that when knowledge is context dependent, cultural distance between the partners will delay knowledge transfer, hence the JV will continue for a longer period.

In our paper whether a JV will be formed or not depends, to a large extent, on the synergy effect. If it is strong, JV is likely to occur. A JV may also occur to reap the benefit of learning in the future. On the other hand, whether the JV, so formed, will continue or break up depends on the extent of learning. In our paper the complex relation between the synergy and learning effects ultimately explains whether the JV will continue or it will be dissolved. In our paper we have recognized both types of learning, viz., variable cost learning and entry cost learning. Finally, we have provided a comparative static analysis of the results. One interesting result is that as entry cost falls, the possibility of entry through a JV and subsequently break up of the JV goes up.

The paper is organized as follows. In section 2 we describe the analytical framework. Then in section 3 we study the evolution of the form of business organization over time based on synergy and learning effect and derive the results under all possible assumptions. Section 4 provides a comparative static analysis. Finally, section 5 concludes.

2. Analytical Framework

Initially, there are two domestic firms (DFs) in the market with identical unit costs of production, $c_d > 0$; their entry or set up costs, if any, are already sunk and hence out of

consideration. Their unit cost of production consists of two components, i.e., $c_d = l_d + k_d$, where the first term consists of wage, raw material and marketing costs as well as costs of local liaising, while the second term comprises costs of capital and technology. There is also a FF willing to enter the market. It has unit cost of production $c_f = l_f + k_f$, where $l_d < l_f$ and $k_d > k_f$. In other words, the FF has typically access to cheaper sources of capital and technology in international markets but higher cost of labor – part of which is due to international recruits – and marketing compared to its domestic counterparts. For the purpose of simplicity we assume $c_d = c_f = c$ and it is easy to check that relaxing this assumption does not change the result (though it complicates the computation).

There are two periods. In period 1, a FF ventures into this market. It can enter either independently by forming a wholly owned subsidiary or by forming an international joint JV with a LF. It pays an entry cost $E > 0$ if it decides to enter through its subsidiary. This includes not only the cost of setting up plant and machinery but also the cost of building business networks, establishing supply chains as well as the cost of licensing and political contacts, etc. If the FF enters through a JV, it does not have to pay the entry cost. The FF in the second case makes a take-it-or-leave-it JV offer to one local firm chosen at random. We assume that the firm will accept the offer if it is not worse off.[6] If the offer is accepted, there will be two firms in the market, namely, the JV so formed and the stand-alone local firm. Finally, they play the Cournot game. Therefore, if entry occurs through an independent subsidiary, it will be a three-firm competition, and in case of JV it is a two-firm competition between the JV and the stand-alone local firm.

Now if the FF enters by opening its subsidiary in period 1, it might continue independently in period 2 or enter into a JV relation. Similarly, if it enters through a JV, it might continue with it in period 2 or break up the relation and form its own subsidiary. In the latter case, it is assumed that some of the costs other than setting up of plant and equipment can be saved. Hence in such a situation its net cost of opening a subsidiary will be βE where $0 \leq \beta \leq 1$. Since it is a two period game and the players move sequentially, the relevant equilibrium concept applicable here is subgame perfect Nash equilibrium (SPNE).

[6]Since the two local firms are identical, if the firm that has received the offer would reject it, it would not be in the interest of the firm to receive the offer subsequently since the post entry market structure is identical in both cases. Although it might happen that the stand-alone firm gets more profit in the first period compared to what the other firm gets by accepting the JV offer, the latter's loss must be compensated in period 2 for the JV offer to be acceptable at all.

Now assume that a JV formed between a domestic and a FF (but not between two local firms) leads to a *variable cost synergy* resulting in a cost reduction. This happens because of the better (low cost) technology of the FF coming together with the superior (low cost) local knowledge and distribution channels of the local partner. With synergy the JV will have a unit cost of $c' = (c - \varepsilon)$ where $\varepsilon > 0$ is the extent of cost saving due to synergy.

In the presence of other competing firms, cost synergy in the JV does not automatically imply that the profit of the JV would be larger than the constituent partners. Here JV is like a horizontal merger. Then, without cost synergy, such a JV formation would lead to a lower profit compared to the sum of the non-cooperative profits of the partners under competition (Salant et al., 1983). Thus it is only when synergy is strong enough that a JV is profitable. Hence we define:

Def 1: ***Overall Cost Synergy****: The cost synergy is said to be strong (weak) if the JV profit exceeds (falls short of) the sum of profits of the constituent units, i.e.*

$$A \equiv \Pi_{JV}(c', c) - 2\Pi(c, c, c) \gtrless 0 \qquad (1)$$

where $\Pi_{JV}(c', c)$ is the profit of the JV with (post-synergy) costs c' in the presence of a domestic competitor which has cost c, while $\Pi(c, c, c)$ is the profit of each competing firm under symmetric three-firm Cournot competition with cost c.

Positive synergy simply means that there exists $c' < c$ or $\varepsilon > 0$. Now, following the result of Salant et al. (1983), let us assume that $\Pi_{JV}(c, c) < 2\Pi(c, c, c)$, so that without synergy JV formation is not profitable. Thus there exists a critical cost level c^* such that for any $c' < c^*$, the JV is profitable, i.e., $\Pi_{JV}(c', c) > 2\Pi(c, c, c)$. Equivalently, there exists a critical variable cost synergy level ε^* such that when the synergy level is higher than ε^*, i.e., $\varepsilon > \varepsilon^*$, $\Pi_{JV}(c - \varepsilon, c) > 2\Pi(c, c, c)$.

In a usual one-period set up it is clear that whether a JV is formed or not depends on whether the synergy is 'strong' or 'weak'. Now we introduce *learning*. The partners forming the JV are assumed to learn complementary knowledge of each other after the first period. Thus if they break up the JV after one period, they do not revert to their initial (pre-JV) costs, but they start as new entities with cost lowered (at most) up to that of the JV. We say that there is *learning or endogenization with respect to the variable cost* if the post breakup cost of the constituent partners is lower than the initial (pre-JV) costs. The post JV break-up unit cost of the partners

is $c'' = (c - \lambda\varepsilon),\ 0 \leq \lambda \leq 1$ where λ is the learning parameter.[7] Thus if there is learning of the variable cost, we have $\Pi_p(c'', c'', c) - \Pi(c, c, c) > 0$, where $\Pi_p(c'', c'', c)$ is the post break-up profit of the firms who were previously members of the JV under three-firm Cournot competition (here the subscript p stands for the firms that previously participated in the JV). Note that we are defining learning (λ) as a proportion of the *variable cost synergy.* Therefore, it is not completely independent of synergy. Such learning accrues equally to both JV partners. In our paper λ will also captures the effect of cultural homogeneity or incompatibility between the partners in a joint venture. If the firms are close in terms of social and cultural background, learning will be easier, hence λ will be larger.

In contrary to other works, we consider another type of learning that may accrue to the FF only due to its participation in the JV. This is the reduction in entry cost relative to the set up cost of the FF that enters in period 1 through a wholly owned subsidiary.[8] This is, we call, *learning of entry cost*. This is captured as follows. The entry cost of the FF that sets up a wholly owned subsidiary after breaking up the JV is βE, with $0 \leq \beta \leq 1$. Clearly, the higher the learning, the lower is β and lower is the set up cost. So we define the overall learning of the FF as follows.

Def. 2. ***Overall Learning or Endogenization:*** *The overall learning effect for the FF is high (low) according as*

$$B \equiv 2[\Pi_P(c'', c'', c) - \Pi(c, c, c)] - \beta E \gtrless 0 \qquad (2)$$

Clearly, the first term of B gives the effect of learning or endogenizing the variable cost synergy, that is, the increase of gross payoffs of the ex-JV members together (gross of entry cost of the FF) after the JV breaks up and all three firms compete non-cooperatively, and the second term is the (net) cost of opening the foreign subsidiary after the JV breaks up. Hence B denotes the net effect of learning to enhance profits of the ex-JV members together after the JV breaks up. Therefore, the higher the variable cost learning (λ), the higher is the first term, while the higher the entry cost learning (β), the lower is the second term. This is different from positive learning as defined above. While we are defining learning in terms of two parameters, viz., λ and β, these cannot be indicated independent of variable cost synergy ε and entry cost

[7]Clearly, $\lambda = 0$ means no learning of variable cost synergy and $\lambda = 1$ means 100% learning.

[8] Entry cost comprises of various components, viz., (i) costs of doing business in a foreign country (e.g., cost of licensing / political lobbying, etc.) (ii) costs of setting up plant and equipment, and (iii) costs of building business networks (e.g., supply chains, distribution, recruitment). These costs can be avoided if the FF enters through a joint venture. However, if the JV breaks up and then the FF wants to open an independent subsidiary, some of those costs can be avoided.

E. For example, as synergy goes up (i.e., ε increases), automatically there is some positive learning effect in the sense that c'' falls even for unchanged λ and β.

If a JV is formed in the first period, each JV partner *learns* or *endogenizes* a part or percentage (λ) of the *synergy* (ε) at the end of the period so that if it breaks up, the cost of each post break-up JV partner is $c'' = (c - \lambda\varepsilon)$. In addition, the foreign partner *learns* or *endogenizes* a part or percentage β of entry cost, *E*. In the beginning of the second period the FF decides whether it will continue the JV relation or break it up. Similarly, if it entered via a fully owned subsidiary in the first period it can form a JV in the second period. After the second period the game ends.

With regard to notation, we do not put any subscript with the profit expression if the competing firms are identical. When the competing firms have different cost structures, we adopt the convention that the first/second cost term within the parentheses of the payoff expressions refers to the JV (if any exists), the next to the FF (if the JV is not formed or is broken up), the next to the local firm connected to the JV (under the same conditions), and the last to the stand-alone local firm. Thus, if the JV offer is accepted, the JV obtains profits $\Pi_{JV}(c', c)$ while the other local firm obtains the stand-alone profit, $\Pi_{\mathrm{D}}(c', c)$. In period 2, if the FF decides to break up the JV, its profit, given partial endogenization of the JV synergy, is $[\Pi_{\mathrm{P}}(c'', c'', c) - \beta E]$ since it has to incur the cost of setting up a separate establishment. The profits of the domestic partner and the stand-alone firm in the post breakup scenario are $\Pi_{\mathrm{p}}(c'', c'', c)$ and $\Pi_{\mathrm{D}}(c'', c'', c)$, respectively.

Finally, note that the possibility of entry by the FF in the form of opening a 100% owned subsidiary can arise if and only if the sum of its discounted payoffs from subsidiary over the length of two periods exceeds the entry cost, that is,

$$(1 + \delta)\Pi(c, c, c) > E \tag{3}$$

where δ is the common discounting factor; $0 < \delta \leq 1$. However, even if this condition holds, this does not mean that entry through subsidiary is optimal and that it will continue with the subsidiary. In the next section we discuss the evolution of the different forms of business organization that would emerge under the given parametric situations, hence we discuss the subgame perfect Nash equilibrium (SPNE) of the game.

Note that in our paper when JV occurs in the first period but it breaks up in the second period, this is fully anticipated. This supports the findings of intended break up of JVs (Makino et al., 2007).

3. The Optimal Form of Business Organization

In this section we examine whether the FF will enter through subsidiary or joint venture and whether it will continue with the same business form or switch to a different form in the second period. We discuss the problem under two scenarios: (i) $(1+\delta)\Pi(c,c,c) < E$ i.e., direct entry of the FF is not feasible, and (ii) $(1+\delta)\Pi(c,c,c) > E$ i.e., direct entry by the FF is possible. We discuss these in the following two subsections.

3.1 Independent Entry not Feasible, i.e., $(1+\delta)\Pi(c,c,c) < E$

In this subsection we consider the scenario when the FF cannot enter independently by opening its subsidiary, i.e. when $(1+\delta)\Pi(c,c,c) < E$. The FF will then explore whether it can enter by forming a JV with a local firm. Since the FF cannot otherwise enter, each local firm has a reservation payoff $(1+\delta)\Pi(c,c)$ which is profit in a two-firm Cournot competition. We assume that a local partner chosen arbitrarily will accept the JV contract if it gets at least its reservation payoff. Whenever the JV contract is accepted, the FF may continue with the JV relation, or it can terminate the relation in the beginning of the second period and then open up its subsidiary and operate independently. This possibility arises because the JV leads to synergy gain and learning. So we have the following two subcases.

3.1(a) JV Entry and Continuation

If the FF enters through a JV and continues with it in period 2, the second period payment to the local partner of the JV would be $\Pi_p(c'',c'',c)$ which is the profit in the post break-up three-firm Cournot competition after the partners have learned or endogenized the synergy. Hence the minimum payoff that the local partner have to be given in period 1 to accept the JV proposal is $[(1+\delta)\Pi(c,c) - \delta\Pi_p(c'',c'',c)]$. Therefore, the amount the FF gets if it makes an acceptable offer to the local partner to form the JV in period 1 and not to break it up in period 2, is given by

$$\widehat{\Pi}_{\mathrm{JJ}} = \left[\Pi_{JV}(c', c) - \{(1+\delta)\Pi(c, c) - \delta\Pi_p(c'', c'', c)\}\right] + \delta\left[\Pi_{JV}(c', c) - \Pi_p(c'', c'', c)\right]$$

$$= (1+\delta)[\Pi_{JV}(c', c) - \Pi(c, c)] \qquad (4)$$

Clearly, if $c' < c$, then $\Pi_{JV}(c', c) > \Pi(c, c)$; hence $\widehat{\Pi}_{\mathrm{JJ}} > 0$, that is, entry by forming an international joint venture with a local firm is always profitable for the FF if cost synergy is positive. The reason is simple. The JV merely replaces one of the local firms. Since the JV has a lower variable cost (due to synergy) and no additional entry cost (as the local firm is already in operation), it will always be able to make higher profits than the local firm it replaces. This result holds independent of whether the synergy effect is strong or not (that is, $A \gtrless 0$), and whether independent entry is possible or not. Its implication in the context of our paper is that the FF can always enter by forming a JV provided that it leads to a cost synergy due to the existence of complementary inputs. However, since there is also learning under the JV, the FF will decide whether at the end of the first period it will break up the JV relation and open its own subsidiary or continue with the JV relation.

3.1(b) JV Entry and Break-up

If the FF enters through a JV and breaks it up in period 2, the payment to the domestic partner in period 1 is the same as in the case where the FF enters through the JV and continues. After endogenization of the synergy in period 2 the post break-up foreign firm will get $\Pi_p(c'', c'', c)$ in a three-firm Cournot competition, but it has to pay a set up cost βE. By forming a JV in the first period the FF has saved a part of the entry cost of opening its subsidiary in the second period. Thus the amount the FF gets if it successfully forms a JV in period 1 but breaks it up in period 2, is

$$\widehat{\Pi}_{\mathrm{JS}} = \left[\Pi_{JV}(c', c) - \{(1+\delta)\Pi(c, c) - \delta\Pi_p(c'', c'', c)\}\right] + \delta[\Pi_F(c'', c'', c) - \beta E]$$

$$= \left[\Pi_{JV}(c', c) - (1+\delta)\Pi(c, c) + 2\delta\Pi_p(c'', c'', c) - \delta\beta E\right] \qquad (5)$$

Then comparing $\widehat{\Pi}_{\mathrm{JJ}}$ and $\widehat{\Pi}_{\mathrm{JS}}$, we have

$$\widehat{\Pi}_{\mathrm{JJ}} \gtrless \widehat{\Pi}_{\mathrm{JS}} \iff A \gtrless B$$

This states that when independent entry of the FF is not possible and synergy is positive, the FF will certainly enter in the first period by forming a JV with a local firm. However, whether the JV will survive or break up in the second period depends on whether cost synergy is

stronger or weaker than the overall learning effect. Note that learning effect is high if λ is high or β is low.

3.2 Independent Entry Feasible, i.e., $(1+\delta)\Pi(c,c,c) > E$

This is the case when the sum of its discounted two-period profits of the FF in three-firm Cournot competition is greater than its entry costs, that is, $(1+\delta)\Pi(c,c,c) > E$. This means, in this case the FF can always enter either independently or through a JV. Given that the FF always enters, there are four possible scenarios in this case.

3.2(a) Independent Entry and Continuation

In this case the FF's net payoff taking both periods under consideration is given by,

$$\Pi_{SS} = [\Pi(c,c,c) - E] + \delta\Pi(c,c,c) = (1+\delta)\Pi(c,c,c) - E \qquad (6)$$

Under the assumption Π_{SS} is always positive.

3.2(b) Independent Entry and subsequent JV formation

In period 1 the FF obtains Cournot profits in a three-firm competition minus the set up costs. In period 2 it obtains two-firm JV profits where the stand-alone domestic firm has unit cost *c*, but must pay the domestic firm the Cournot profit under three-firm competition -- what the latter would get by rejecting the JV offer. Hence under this case the FF's profit will be

$$\Pi_{SJ} = [\Pi(c,c,c) - E] + \delta\left[\Pi_{JV}(c',c) - \Pi(c,c,c)\right]$$

$$= \delta\Pi_{JV}(c',c) + (1-\delta)\Pi(c,c,c) - E \qquad (7)$$

Note that

$$\Pi_{SJ} \gtrless \Pi_{SS} \Leftrightarrow A \gtrless 0.$$

that is, when the FF enters by opening its subsidiary, in the second period it will form a JV with a local firm if the synergy effect is strong (i.e., $A > 0$), otherwise it will continue with the subsidiary.

3.2(c) JV Entry and Continuation

As formation of the JV in period 1 leads to endogenization of the synergy by each party, the domestic partner will demand $\Pi_P(c'',c'',c)$ in period 2 to stay within the JV because the local

partner will get this amount if the JV breaks up. Since the local partner gets $(1+\delta)\Pi(c,c,c)$ over the two periods by rejecting the JV offer, the minimum amount it must be given in period 1 to accept the JV proposal is: $[(1+\delta)\Pi(c,c,c) - \delta\Pi_P(c'',c'',c)]$. Thus the amount the FF gets if it makes an acceptable offer to the domestic partner to form the JV in period 1 and not to break it up in period 2, is given by

$$\Pi_{JJ} = \left[\Pi_{JV}(c',c) - \{(1+\delta)\Pi_D(c,c,c) - \delta\Pi_p(c'',c'',c)\}\right] + +\delta[\Pi_{JV}(c',c) - \Pi_p(c'',c'',c)]$$
$$= (1+\delta)[\Pi_{JV}(c',c) - \Pi(c,c,c)] \quad (8)$$

Note that when $A > 0$, that is, when the synergy effect is strong, we must have

$$\Pi_{JJ} > \Pi_{SJ} > \Pi_{SS}.$$

This means, even when independent entry of the FF is profitable, entry through subsidiary can never occur in a subgame perfect Nash equilibrium if synergy is strong (i.e., $A > 0$).[9] The intuition is that the profit from entry through the JV is the surplus in two-firm competition due to the strong cost synergy. The profit from independent entry, on the other hand, is the profit from three-firm competition net of entry cost. Even though the latter is positive,the former strictly dominates the latter.

3.2(d) JV Entry and Break-up

The payment to the domestic partner in period 1 is the same as in the previous case. After endogenization of the synergy in period 2 the foreign partner will get $\Pi_p(c'',c'',c)$ in three firm Cournot competition, but it has to pay the reduced set up costs βE. Thus the amount the foreign firm gets, if it successfully forms an JV in period 1 but breaks it up in period 2, is

$$\Pi_{JS} = \left[\Pi_{JV}(c',c) - \{(1+\delta)\Pi(c,c,c) - \delta\Pi_p(c'',c'',c)\}\right] + \delta[\Pi_p(c'',c'',c) - \beta E]$$
$$= \left[\Pi_{JV}(c',c) - (1+\delta)\Pi(c,c,c) + 2\delta\Pi_p(c'',c'',c) - \delta\beta E\right] \quad (9)$$

It is easy to check that

$$\Pi_{JJ} \gtrless \Pi_{JS} \Leftrightarrow A \gtrless B.$$

[9] We already know that if $(1+\delta)\Pi(c,c,c) < E$, entry through a subsidiary can never occur. Hence the possibility of entry through a subsidiary can arise only when $(1+\delta)\Pi(c,c,c) > E$ and $A < 0$.

It states that if a JV occurs in the first period, it will continue or break up in the second period according as $A \gtrless B$, that is, whether strong synergy is larger or weaker than the overall learning. The implication is that when $(1+\delta)\Pi(c,c,c) > E$ and $A > 0$, in the subgame perfect Nash equilibrium the FF will enter by forming a JV with a local partner, but the JV will break up in the second period if and only if the overall learning is stronger than the synergy effect; otherwise the JV will continue.

Now consider the case when the synergy effect is weak, i.e., $A < 0$. We have shown that $\Pi_{SS} > 0$ and $\Pi_{SS} > \Pi_{SJ}$. Then, $\Pi_{SS} > \Pi_{JJ}$ iff $A < -\frac{E}{(1+\delta)}$, and $\Pi_{SS} > \Pi_{JS}$ iff $A < -(E+\delta B)$.[10] Further define,

$$A_{min} = \min\{-\tfrac{E}{(1+\delta)},\ -(E+\delta B)\}.$$

Hence,

$$A_{min} = -\tfrac{E}{(1+\delta)} \text{ if } A > B, \text{ and } A_{min} = -(E+\delta B) \text{ if } B > A \qquad (10)$$

Therefore, given $(1+\delta)\Pi(c,c,c) > E$, if $A < 0$ but $A < A_{\min}$, then for the FF `enter through subsidiary and continue for both periods' will be the subgame perfect equilibrium irrespective of whether synergy is larger or smaller than learning. Here synergy is too weak to induce JV formation over subsidiary. Small synergy also means learning effect is small. Hence subsidiary formation and continuation with the subsidiary is optimal for the FF. On the other hand, when $(1+\delta)\Pi(c,c,c) > E$ and $A < 0$, but $A > A_{\min}$, entry must occur through a JV, but whether the FF will continue the JV or break it up depends on whether synergy is larger than learning, or learning is larger than synergy.

The discussion of this section is summarized in the following table (where JJ stands for entry through JV and continuation, SS for independent entry and continuation, JS for JV entry and break-up).

Table 1: The Optimal Forms of Business Organization

	$A > 0$		$A < 0$	
	$A > B$	$A < B$	$A > B$	$A < B$

[10] $\Pi_{JJ} - \Pi_{SS} = (1+\delta)A + E$ and $\Pi_{JS} - \Pi_{SS} = A + \delta B + E$.

$(1+\delta)\Pi(c,c,c) < E$	JJ	JS	JJ	JS
$(1+\delta)\Pi(c,c,c) > E$	JJ	JS	SS if $A < -E/(1+\delta)$	SS if $A < -(E+\delta B)$
			JJ if $A > -E/(1+\delta)$	JS if $A > -(E+\delta B)$

The important results of this section can be stated in the following proposition.

Proposition 1: *Entry of the FF through subsidiary can occur only if* $(1+\delta)\Pi(c,c,c) > E$, $A < 0$ *and* $A < A_{min}$, *and under these conditions subsidiary will continue. In all other cases entry occurs through forming a JV with a local firm. Then the first period JV will continue if and only if* $A \geq B$, *otherwise it will break up and subsidiary will occur in the second period.*

4. Comparative Static Analysis

We can now study the effect of a change of any parameter underlying the model on the subgame perfect equilibrium outcome. Note that this depends on:

(i) whether the FF can directly enter or not, i.e., whether $C \equiv (1+\delta)\Pi(c,c,c) - E \gtrless 0$;

(ii) whether synergy is strong or weak, i.e., whether $A \equiv \Pi_{JV}(c-\varepsilon, c) - 2\Pi(c,c,c) \gtrless 0$; and

(iii) whether synergy is larger or smaller than the overall learning, i.e., whether $A \gtrless B$, where $B \equiv 2[\Pi_P(c-\lambda\varepsilon, c-\lambda\varepsilon, c) - \Pi(c,c,c)] - \beta E$; hence we have $A - B = \Pi_{JV}(c-\varepsilon, c) - 2\Pi_P(c-\lambda\varepsilon, c-\lambda\varepsilon, c) + \beta E$.

First we prove the following Lemma.

Lemma 1:

(i) If δ *goes up, only C goes up;*

(ii) If E goes up, then both C and B fall, but $(A-B)$ increases;

(iii) If learning parameter λ increases or β falls, then B increases but $(A-B)$ falls;

(iv) If synergy increases, that is, ε goes up, both A and B increase, but the effect on $(A-B)$ depends on λ. In particular, for small λ, $(A-B)$ must go up. However, if λ is sufficiently large, $(A-B)$ can fall.

Proof: (i) and (ii) simply follow from inspection.

(iii) We have $\frac{d\Pi_P(c-\lambda\varepsilon,c-\lambda\varepsilon,c)}{d\lambda} > 0$ (see Appendix 1). Hence $\frac{dB}{d\lambda} > 0$ and $\frac{d(A-B)}{d\lambda} < 0$.

Similarly, $\frac{dB}{d\beta} < 0$ and $\frac{d(A-B)}{d\beta} > 0$.

(iv) We have $\frac{d\Pi_{JV}(c-\varepsilon,c)}{d\varepsilon} > 0$ (see Appendix 2). Hence $\frac{dA}{d\varepsilon} > 0$ and $\frac{dB}{d\varepsilon} > 0$. Therefore, the sign of $\frac{d(A-B)}{d\varepsilon}$ is ambiguous. Actually it depends on the size of λ. To see this, consider linear demand of the form, $P = a - bQ, a > c > 0, b > 0$. Then, $A - B = \frac{1}{72b}[8(a-c+2\varepsilon)^2 - 9(a-c+2\lambda\varepsilon)^2] + \beta E$. Therefore, $\frac{d(A-B)}{d\varepsilon} = \frac{1}{18b}[2\varepsilon(8-9\lambda^2) + (a-c)(8-9\lambda)]$. Then, $\frac{d(A-B)}{d\varepsilon} > 0$ at $\lambda = 0$, and $\frac{d(A-B)}{d\varepsilon} < 0$ at $\lambda = 1$. ■

Now, given Lemma 1 and our results in Proposition 1, we have the following comparative static results.

Proposition 2 (comparative static results):

(a) If firms become more impatient (i.e., δ falls), the possibility of independent entry by the FF will go down and entry through a JV is more likely to occur.

(b) If E rises, entry through a JV along with the possibility of JV break-up becomes less likely.

(c) If learning increases (i.e., either λ increases or β falls), the possibility of JV break-up goes up, provided that synergy is not too small (so that $A > A_{min}$).

(d) If the variable cost synergy parameter ε goes up, entry through a JV occurs but it breaks up in the second period when learning parameter λ is sufficiently large.

Intuitively, when the firm becomes more patient (i.e., δ rises), it assigns a greater value to future profits. Since entry costs are paid only once at the beginning, this leads to a rise in aggregate

profits from independent entry, making it more likely. On the other hand, a rise in the cost of entry, *E*, clearly induces the FF to enter through a JV where there is no entry cost. Further, a high entry cost also induces the FF to continue the JV instead of dissolving it and going it alone – in which case it would also have to pay a part of the entry cost. The latter also happens when the entry cost learning falls (i.e., β rises). A rise in the endogenous learning parameter, λ, raises the index of aggregate learning, making the JV partners' post break-up independent venture more profitable, hence the JV is more likely to breakup. To the extent learning depends on inter-partner interaction and relation, cultural compatibility between the partners will increase the rate of learning, making the JV relation more vulnerable and unstable. Thus our paper supports the finding of Malik and Zhao (2013). Cultural distances and incompatibility will result in a lower learning and hence longevity of the life and stability of the JV. This is generally the case when knowledge is context dependent, hence cultural difference will delay knowledge transfer. Finally, an increase in variable cost synergy parameter has two effects. First, it lowers the cost of the JV between a foreign and a local firm making it more attractive for the FF to enter through a JV. Second, while it raises the profitability of the JV on one hand, it also raises the post breakup profits of the ex-JV partners. Hence provided that the endogenous learning λ of the variable cost synergy is not too small, it may also induce a breakup of the JV; otherwise the enterprise would continue.

5. Conclusion

This paper explains formation as well as break-up of the JV relation between an existing domestic firm and a foreign entrant in the same frame of analysis focusing our attention to two important factors, viz., synergy and inter-partner learning. We consider the case when the JV break-up is intended or pre-conceived in the sense that the partners know at the stage of JV formation whether their relation will be dissolved after a definite date. In our framework there are more than one domestic firm in the market. The presence of other domestic firms rules out the incentive to appropriate monopoly profits. Hence the major incentive to form a JV comes from the realization of `synergy' that exists due to the complementary advantages of the FF and its domestic partner. This may also indirectly motivate the formation of JVs when the gains are realized following the break-up of the JV with the partners endogenizing the synergies partly or wholly through 'learning'.

We have shown that the FF enters through a JV if either entry cost is too high or synergy is 'strong'. We have also shown that even when the entry cost is low, the FF may prefer entry through a JV with a local firm. This is not only to gain from possible synergy and learning, but also to benefit from the lower cost of opening a subsidiary in the future after breaking up the existing JV. Whether the foreign firm will continue the JV or break it up to open its subsidiary depends on the complex relation between the synergy effect and the overall learning effect. In particular, JV breaks up if the learning effect is strong enough and it outweighs the synergy effect. Only when entry costs are low and synergy is 'weak', the FF enters independently and continues. Proceeding to comparative statics, we have shown that entry through a JV is more likely if entry cost or synergy increases or the discount factor falls. Higher entry cost and lower learning also make continuation of the JV more likely. Finally, learning depends among other factors on the inter-partner relationship and cultural compatibility. These factors affect the degree of learning, hence the decision to break up. In the context of our paper cultural compatibility implies higher learning, giving a higher chance of JV break up.

We conclude the paper by stating the fact that this paper has mostly focused on synergy and learning as two important factors for JV formation and instability. In practice, instability of international JVs may occur due to combination and interaction of numerous factors. These are in the domain of transaction cost economics, social exchange theory and bargaining power perspectives. The present paper may possibly be extended to the case where asymmetric learning may lead to a change of bargaining power of the respective partners asymmetrically, which ultimately will lead to a breakup of the JV relation.

APPENDIX

Appendix 1

Consider three firms, 1, 2 and 3, with their marginal costs of production $c_1 = c - \lambda\varepsilon$, $c_2 = c - \lambda\varepsilon$ and $c_3 = c$, respectively. The market demand function in inverted form is $P(q_1 + q_2 + q_3)$ with $P' < 0$. Then the profit function of firm i is:

$$\Pi^i = [\, P(q_1 + q_2 + q_3) - c_i]q_i$$

For Cournot equilibrium, the first order conditions (FOCs) are

$$\Pi_i^i = P(q_1 + q_2 + q_3) + q_i P'((q_1 + q_2 + q_3) - c_i = 0; i = 1, 2, 3$$

The second order conditions are: $\Pi_{ii}^i = 2P' + q_i P'' < 0$. Since quantities are strategic substitutes, we need that $\Pi_{ij}^i = P' + q_i P'' < 0,\ i \neq j$. Finally, for stable and unique equilibrium we need that the matrix of the second partial derivatives of the payoff functions is negative definite. Here the relevant matrix is:

$$H = \begin{bmatrix} \Pi_{11}^1 & \Pi_{12}^1 & \Pi_{13}^1 \\ \Pi_{21}^2 & \Pi_{22}^2 & \Pi_{23}^2 \\ \Pi_{31}^3 & \Pi_{32}^3 & \Pi_{33}^3 \end{bmatrix}$$

Therefore, we must have $|H| < 0$.

From the system of FOCs, the equilibrium q_i's are determined. Now focusing on the parameter λ, firm 1's optimal profit function is given by:

$$\Pi^1 = [P(q_1(\lambda) + q_2(\lambda) + q_3(\lambda)) - (c - \lambda\varepsilon)]q_1(\lambda)$$

Then,

$$\frac{d\Pi^1}{d\lambda} = [P + q_1 P' - (c - \lambda\varepsilon)]\frac{dq_1}{d\lambda} + q_1 P'\left[\frac{dq_2}{d\lambda} + \frac{dq_3}{d\lambda}\right] + q_1\varepsilon$$

$$= q_1 P'\left[\frac{dq_2}{d\lambda} + \frac{dq_3}{d\lambda}\right] + q_1\varepsilon \quad \text{(using the FOC of firm 1)}$$

Now, to study the effect of λ on q_i's, we can derive from the system of FOCs,

$$\begin{bmatrix} \Pi_{11}^1 & \Pi_{12}^1 & \Pi_{13}^1 \\ \Pi_{21}^2 & \Pi_{22}^2 & \Pi_{23}^2 \\ \Pi_{31}^3 & \Pi_{32}^3 & \Pi_{33}^3 \end{bmatrix} \begin{bmatrix} \frac{dq_1}{d\lambda} \\ \frac{dq_2}{d\lambda} \\ \frac{dq_3}{d\lambda} \end{bmatrix} = \begin{bmatrix} -\varepsilon \\ -\varepsilon \\ 0 \end{bmatrix}$$

Hence, $\frac{dq_2}{d\lambda} = \frac{\varepsilon}{|H|}[(\Pi_{21}^2\Pi_{33}^3 - \Pi_{31}^3\Pi_{23}^2) - (\Pi_{11}^1\Pi_{33}^3 - \Pi_{31}^3\Pi_{13}^1)]$

and $\frac{dq_3}{d\lambda} = \frac{\varepsilon}{|H|}[(\Pi_{11}^1\Pi_{32}^3 - \Pi_{31}^3\Pi_{12}^1) - (\Pi_{21}^2\Pi_{32}^3 - \Pi_{31}^3\Pi_{22}^2)]$

This gives, $\frac{dq_2}{d\lambda} + \frac{dq_3}{d\lambda} = \frac{\varepsilon}{|H|}\Pi_{31}^3[\Pi_{13}^1 + \Pi_{22}^2 - \Pi_{23}^2 - \Pi_{12}^1] = \frac{\varepsilon}{|H|}(P' + q_1P'')P' < 0$

Therefore, $\frac{d\Pi^1}{d\lambda} = q_1P'\left[\frac{dq_2}{d\lambda} + \frac{dq_3}{d\lambda}\right] + q_1\varepsilon > 0$

Similarly, it can be proved that $\frac{d\Pi^1}{d\varepsilon} > 0$.

Appendix 2

Consider the JV and one outside domestic firm (denoted by D) with marginal costs $c - \varepsilon$ and c , respectively. Then JV's profit function will be

$$\Pi_{\mathrm{JV}}(c - \varepsilon, c) = [P(q_{\mathrm{JV}} + q_{\mathrm{D}}) - (c - \varepsilon)]q_{\mathrm{JV}}$$

The effect of the change of ε on equilibrium profit is:

$$\frac{d\Pi_{\mathrm{JV}}}{d\varepsilon} = \left[P + q_{JV}P' - (c - \varepsilon)\right]\frac{dq_{JV}}{d\varepsilon} + q_{JV}P'\frac{dq_D}{d\varepsilon} + q_{JV}$$

$= q_{JV}P'\frac{dq_D}{d\varepsilon} + q_{JV}$ (using the FOC for this problem)

It is easy to show that $\frac{dq_D}{d\varepsilon} < 0$. Therefore, $\frac{d\Pi_{\mathrm{JV}}}{d\varepsilon} > 0$.

References

Balakrishnan, S. and Koza, M. P. (1993), "Information asymmetric, adverse selection, and joint ventures", *Journal of Economic Behavior and Organization*, 20, 99-117.

Banerjee, S. and Mukherjee, A. (2010), "Joint venture instability under entry", *International Review of Economics and Finance,* 19, 603-14.

Beladi, H. and Chakrabarti, A. (2008), "Foreign equity participation under incomplete information", *Journal of Economic Behavior and Organization*, 67, 279-295.

Bleake, J. and Ernst, D. (1995), ``Is your strategic alliance really a sale?", *Harvard Business Review, 73*, 97-105.

Bowe, M., Golesorkhi, S. and Yamin, Y. (2004), "Explaining equity shares in international joint ventures: combining the influence of asset characteristics, culture and institutional dofferences", *Research in International Business and Finance,* 31, 212-233.

Brouthers, K.D. (2013), "Institutional, cultural and transaction cost influences on entry mode choice and performance", *Journal of International Business Studies*, 44, 1-13.

Buckley, P. J. and Casson, M. C. (1998), "Analyzing foreign market entry strategies: extending the internalization approach", *Journal of International Business Studies*, 29, 539–561.

Falvy, R. E. and Fried, H. O. (1986), "National ownership requirements and transfer pricing", *Journal of Development Economics*, 24, 249-254.

Fang, E. and Zou, S. (2010), "The effects of absorptive and joint learning on the instability of international joint ventures in emerging economies*", Journal of International Business Studies,* 41, 906-924.

Folta, T. and Ferrier, W. (2000), "The effect of national culture on partner buyouts in cross-border biotechnology alliances", *Journal of High Technology Management Research, 11, 175–198.*

Gangopadhyay, S. and Gang, I. (1993), "Government policy for foreign direct investment", in B. Dutta et al. (eds.) *Theoretical Issues in Development Economics*, Oxford University Press.

Gomes-Casseres, B. (1987), **"**Joint Venture Instability: Is it a problem", *Columbia Journal of World Business*, Summer, 97-102

Gorg, H. (2000), "Analysing foreign market entry: the choice between greenfield investment and acquisitions", *Journal of Economic Studies*, 27, 165–181.

Gomes-Casseres, B. (1989), "Ownership structures of foreign subsidiaries: theory and evidence", *Journal of Economic Behavior and Organization*, 11, 1-25.

Hamel, G. (1991), "Competition for competence and inter-partner learning within international strategic alliances", *Strategic Management Journal*, 12, 83-104.

Hauswald, R. B. H. and Hege, U. (2009), "Ownership and control in joint ventures: Theory and evidences", *mimeo., Kogod School of Business, American University Washington D.C.*

Inkpen, A. and Beamish, P. W. (1997), "Knowledge, bargaining power, and the instability of international joint ventures", *Academy of Management Review*, 22, 177–202.

Kabiraj, T. 1999), ``A simple theory of joint venture breakdown", *Keio Economic Studies* 36, 87-98.

Kabiraj, T. and Roy Chowdhury, P. (2008), "Adoption of new technology and joint venture instability", *Research in International Business and Finance*, 22, 108-123.

Kabiraj, T. and Sinha, U.B. (2015), "Foreign entry, acquisition target, and host country welfare", *The Manchester School***,** 83, 725-748.

Kabiraj, T. and Lee, C. C and Marjit, S. (2005), "Cultural compatibility and joint venture instability --- a theoretical analysis", *Indian Economic Review*, 40, 209-220.

Killing, J. P. (1982), ``How to make a global joint venture work', *Harvard Business Review, 60*, 120-127.

Kogut, B. (1988), "Joint ventures: Theoretical and empirical perspectives", *Strategic Management Journal*, 3, 319–332.

Kogut, B. (1989), ``The stability of joint ventures: reciprocity and competitive rivalry", *Journal of Industrial Economics*, 38, 183-198.

Lane P. J. and Lubatkin M. (1998), "Relative absorptive capacity and interorganizational learning", *Strategic Management Journal*, 19, 461-477.

Lenartowicz, T. and Roth, K. (2004), "The selection of key informant in the IB cross-cultural studies", *Management International Review*, 44, 23–52.

Makino, S., Chan, C., Isobe, T., & Beamish, P. W. (2007), "Intended and unintended termination of international joint ventures", *Strategic Management Journal, 28, 1113–1132.*

Malik, T.H. and Zhao, Y. (2013), **"**Cultural distance and its implication for the duration of the international alliance in a high technology sector", *International Business Review, 22, 699–712.*

Marjit, S. and Mukherjee, A. (2001), "Technology transfer under asymmetric information: the role of equity participation", *Journal of Institutional and Theoretical Economics*, 157, 281-300.

Marjit, S. and Roy Chowdhury, P. (2004), "Asymmetric capacity costs and joint venture buyouts", *Journal of Economic Behavior and Organization, 54, 425-438.*

Marjit, S., Mukherjee, A., and Kabiraj, T. (2004), "Future technology, incomplete information and international joint ventures", *Research in Economics*, 58, 219-234.

Mata, J. and Portugal, P. (2015), "The termination of international joint ventures: Closure and acquisition by domestic and foreign partners", *International Business Review, 24, 677–689.*

Mayroffer, U. (2004), "The influence of national origin and uncertainty on the choice between cooperation and merger-acquisition: An analysis of French and German firms", *International Business Review, 13, 83–99.*

Meschi, P.X. and Riccio, E. L. (2008), "Country risk, national cultural differences between partners and survival of international joint ventures in Brazil", *International Business Review, 17, 250–266.*

Meschi, P.X., Phan, T.T., and Wassmer, U. (2016), "Transactional and institutional alignment of entry modes in transition economies. A survival analysis of joint ventures and wholly owned subsidiaries in Vietnam", *International Business Review*, 25, 946–959.

Miller, R. R., Glen, J.D., Jasperson, F.Z. and Karmakolias, Y. (1996), ``International joint ventures in developing countries: happy marriages?", *Discussion Paper* No. 29, International Finance Corporation, World Bank, Washington D. C.

Moskalev, S. A. and Swensen, R. B. (2007), "Joint ventures around the globe from 1900-2000: forms, types, industries and ownership patterns", *Review of Financial Economics*, 16, 29-67.

Mukherjee, A. and Sengupta, S. (2001), "Joint ventures versus fully owned subsidiaries: multinational strategies in liberalizing economies", *Review of International Economics*, 9, 163-80.

Nakamura, M. (2005), "JV instability, learning and the relative bargaining power of parent firms", *International Business Review*, 14, 465-493.

Roy Chowdhury, I. and Roy Chowdhury, P. (2001), "A theory of joint venture life-cycles", *International Journal of Industrial Organization,* 19, 319-343.

Salant, S. W., Switzer, S. and Reynolds, R. (1983), "Losses from horizontal merger: the effects of an exogenous change in industry structure on Cournot-Nash equilibrium", *Quarterly Journal of Economics*, 98, 185-199.

Sinha, U. B., (2001a), ``Imitative innovation and international joint ventures: a dynamic analysis", *International Journal of Industrial Organization,* 19, 1527-1562.

Sinha, U. B., (2001b), "International joint venture, licensing and buy-out under asymmetric information", *Journal of Development Economics,* 66, 127-151.

Stahler, F. (2014), "Partial ownership and cross-border mergers", *Journal of Economics*, 111, 209-237.

Steensma, K., Marino, L., and Weaver, K. (2000), "Attitudes toward cooperative strategies: A cross-cultural analysis of entrepreneurs", *Journal of international Business Studies, 31, 573–591.*

Triki and Mayrhofer. (2016), "Do initial characteristics influence IJV longevity? Evidence from the Mediterranean region", *International Business Review*, 25, 795–805.

Westman, C. and Thorgren, S. (2016), "Partner conflicts in international joint ventures: A minority owner perspective", *Journal of International Management*, 26, 168-185.

Westwood, R. I. and Posner, B. Z. (1997), "Managerial values across cultures: Australia, Hong-Kong and the United States", *Asia Pacific Journal of Management*, 14, 31–66.

Wong K., and Leung W., (2001), "International Joint Ventures, Moral Hazards, and Technology Spillovers" in http://faculty.washington.edu/karyiu/ papers /jv.pdf.