

# Cultural Compatibility and Joint Venture Instability

---A Theoretical Analysis \*

By

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## **Abstract**

Operational success of a venture firm essentially depends on the cultural compatibility of the partners. This paper draws attention to the country specific cultural characteristics and partner asymmetry as being the fundamental cause of joint venture instability and break down. Given that one partner has asymmetric information about the type of its partner, a separating equilibrium is more likely to be the outcome if high state nature is the realization.

**Key words:** Cultural compatibility, partner asymmetry, synergy and learning, joint venture instability.

**JEL classification number(s):** F23, L13.

# 1. Introduction

The importance of international joint venture (JV) as a form of business organization is evident from the rapidly growing number of JVs formed between firms across the border. Particularly, in the developing countries like India and China, JV as a form of business has become quite popular in the post-liberalization period.<sup>1</sup> JVs typically allow partners to tap into individual expertise in a mutually beneficial way--- for example, the foreign firm can minimize the risk and uncertainty of investing in an unknown environment, and the local firms can get the benefit of up-to-date technologies and global market access.

In spite of the growing interest in JVs, such a relation has been observed unstable and often short-lived. After forming a JV and operating for a few years, partners break up their ties; thereafter either they compete independently in the market, or one sells out its shares to the other or to a third party, or they liquidate their assets completely (Franko, 1971). Venture termination is an obvious indicator of instability. In a broader sense, instability also implies any unplanned changes in equity or profit shares or a major reorganization of the venture structure, including a shift of control.<sup>2</sup>

The theoretical literature on the formation of JVs is quite vast. This literature mostly deals with the strategic and incentive aspects underlying formation of JVs.<sup>3</sup> But so far only a few theoretical papers can be found on the instability and break down of JVs, although we have an extensive empirical literature on this issue.<sup>4</sup> Available theoretical models focus mostly on synergy and learning. This paper is an

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<sup>1</sup> According to Pekar and Allio (1994), the rate of alliance formation in the United States has been growing by over 25% annually since 1985. Just during 1988-1992, 20,000 alliances had been formed between the US firms and other country firms. For an earlier study see Hergert and Morris (1988). In China, out of one hundred seventy five thousand foreign investment projects approved during 1979 to 1993, about 75% took the form of a JV between a local firm and a foreign firm (Almanac of China's Foreign Relations and Trade 1994). In India, because of the government policy restriction so far, most of the foreign investments have come through JVs.

<sup>2</sup> Dymsha (1988) makes break down as equivalent to failure of the venture firm. Gomes-Casseres (1987) thinks that there are situations when organizational change may be necessary. But the conflicting fact is that JV termination or the change in equity structure is often not a mutually agreed decision (Hamel, Doz and Prahalad (1989)). Beamish (1987) and Pekar and Allio (1994) suggest how performance of JVs in developing countries may be improved.

<sup>3</sup> As a sample of the literature see Svejnar and Smith (1984), Marjit (1990), Chan and Hoy (1991), Yu and Tang (1992), Purkayastha (1993), and Al-Saadani and Das (1996).

attempt to provide a theoretical model explaining the instability problem where the source of such a problem lies in the incompatibility of the partners, to be explained very soon.

Instability and breakdown are documented in a number of studies made over the years. An earlier and pioneering work on this issue is by Franko (1971). Killing (1982) surveyed 37 international JVs and found that 36% of them performed unsatisfactorily. In Kogut (1989), out of a sample of 92 US based JVs, about half had terminated their relation by the 6<sup>th</sup> year. The average life span of venture in Harrigan's (1988) study is only 3.5 years. The study by the Mckinsey consultancy firm of more than 200 alliances shows that the median life span of a venture firm is only seven years, and in more than 80% of the cases it ends with one partner selling its stake to the other (Bleake and Earnst, 1995). The Miller et al. (1996) survey covers seventy JVs in six developing countries and finds that at least 27% of them were unlikely to survive. Cases of JV break down and instability in India are documented in Ghosh (1996) and Bhandari (1996-97), among others.

In the context of our paper the more important documentary evidence is that the incidence of instability in developing countries is much larger than that in developed countries. For example, Beamish (1985) shows that the JV instability rate in LDCs is 45-50%, which is much higher than the 36% level found in developed countries.<sup>5</sup> Accordingly, multinational managers assess 61% of the JVs as unsatisfactory performers. Our present paper provides a theoretical framework explaining why the incidence of JV instability and break down may be larger in the developing countries.

It must be understood at the outset that unlike any other alliances, JV is not an once-for-all relation; it is a dynamic relation the structure of which evolves over time. So even if the partners be equally poised initially, the perspectives of players change,

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<sup>4</sup> For a conceptual background and understanding of the problem of JV instability see, in particular, Dymsha (1988), Bleake and Earnst (1995) and Miller et al. (1996).

<sup>5</sup> See also Killing (1982) and Kogut (1989) for the similar prediction..

with one side ultimately gain disproportionately. This makes the JV relationship quite distinct from other alliances.<sup>6</sup>

From the empirical papers many factors could be identified as causing break down or instability of JVs. Partners are very much concerned about the ownership of equity structure and the control of the venture firm. Ownership determines the profit share, and control determines present and future policies of the venture. Most of the other factors are related to the question of equity shares and control. Partners fight each other on the question of introduction of new product or technology, extension and modernization, advertisement, dividend and investment policy. They differ in respect of resource use, source of supply, government tax and trade policy, etc. Miller et al. (1996) argue that source lies both in the negotiation as well as in the operation stage. Dymsha (1988) have analyzed the causes of success and failure of JVs. In the context of JVs in the LDCs, two factors crucially important are synergy gain due to combining complementary inputs and organizational learning. In fact, these factors are responsible for formation as well as break down of JVs. There is a lot of empirical support of this view. The studies by Kogut (1988), Hamel (1991), Hamel et al. (1989), and Mody (1993) may be worth mentioning. Beamish and Inkpen (1995) emphasize that foreign partners' knowledge about the local economic, political and cultural environment is a critical factor in the stability of international JVs. When foreign firms acquire local knowledge, the probability of JV instability increases substantially. The reason is that learning on other partner's knowledge reduces the synergy gain. So sustaining comparative advantages or organizational complementarity between the partners is the key factor to keep the relation alive for a long time.

Theoretical models built up around this idea are by Roy Chowdhury and Roy Chowdhury (1999), Sinha (2000), Lin and Saggi (1998) and Kabiraj (1999). Roy Chowdhury and Roy Chowdhury (2001) have constructed a two period model where in the beginning of each period firms simultaneously decide whether they form a JV or compete in Cournot fashion. Through a JV firms not only gain from

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<sup>6</sup> See Nakamura et al. (1996) for the experience of US-Japan joint ventures. In Balakrishna and Koza (1993) a JV structure is preferred to acquisition or merger because JV avoids a terminal sale and transfer of ownership and allows the partners to rescind their relationship at a relatively low cost.

complementary synergy and market concentration, but also they learn each other's knowledge. But learning reduces synergy gain and hence increases competitive incentives. The paper shows that the life cycle of a JV depends on the parameters like the market size, the extent of learning and the discounting rate. The paper also introduces moral hazard, and hence break down occurs when the moral hazard cost of forming the JV outweighs the potential synergy benefits. Lin and Saggi (1998) assume that after forming a JV partners decide the types of investment. If both invest on improving the supply of inputs (complementary investment), synergy goes up and JV lives up for a long time; if they invest on learning other's input (competitive investment), synergy falls and incentives to keep up the JV structure go down. In Sinha (2000), JVs are formed in the first period mostly because of the government policy restriction that does not initially allow the foreign firm to open a subsidiary. Then instability is caused by the change in the government policy and imitative innovation by the local partner. Kabiraj (1999), on the other hand, constructs a model to show that initially a JV is formed between a foreign firm and a local firm to combine the complementary strength of each, but the JV competes with a third firm in the industry. Then as the third firm acquires knowledge embedded in the foreign input, the competitive pressure from this outside firm causes break down of the JV. The paper also determines the optimal timing of break down.

In the present paper we shall draw attention to the country specific cultural characteristics and partner asymmetry as being the fundamental cause of JV instability and break down. Dymsha (1988) Beamish (1985), Miller et al. (1996), and Beamish and Inkpen (1995) have emphasized this factor in their analysis, but no theoretical work has been done so far. Joint ventures essentially depend on the compatibility of two partners. Often such 'compatibility' depends on the partner specific business and work culture. Papers by Beamish (1987), Berg and Friedman (1980) and Miller et al. (1996) etc. interpret JVs as marriage of two different cultures. Harrigan (1988) elaborates the issue and empirically demonstrates that cultural heterogeneity between business partners can create problems for the JVs whereas cultural homogeneity contributes towards success. The basic problem is that even after a very careful and tedious process of search for selecting right partners, one may not know how will the JV actually perform, how will the partners resolve unforeseen problems, how will the management, representing respective partner will react to

particular business problem, etc. Operational success of a venture might be jeopardized by coordination failures. Cultural difference encompasses many factors, and culturally asymmetric partners may have problems in continuing with a mutually beneficial JV.

In many emerging markets business holdings are family owned whereas foreign firms, typically from the western countries, are publicly held and professionally managed. These organizational differences may lead to differences in work-culture (Hofstede, 1980). Possibly the importance of cultural differences is reflected in Beamish (1985)'s observation that a JV formed between a developed and a developing country firm is more likely to break down than the one formed between firms from either both developed or both developing countries.

In the present paper we model this asymmetry by assuming that the host firm can be of two types --- it can match with the type of the foreign firm, or it has different type and hence mismatch. Foreign firm is assumed to be always of a known type. While the local firm knows its type, the foreign firm has only a prior belief about the type of the local firm. We assume that compared to mismatch situation, if match occurs between the partners, then a high payoff will occur with a high probability. So mismatch reflects lack of coordination between the partners. Then depending on the realization of venture payoffs, the foreign firm updates its belief. Hence in the light of the new information there are situations when one or both partners do not want to continue the relation. The JV structure may be retained if firms are successful in renegotiating a new contract. JV break down occurs when such renegotiations fail and partners compete independently. Using our simple structure one can pin down the condition for the continuity or break down of the JV. This depends on the ability of a renegotiated contract, offered by the foreign firm, to isolate a 'matched' partner from a 'mismatched' one. Typically, such a 'separation' very much contains the possibility of a break down.

The organization of the paper is as follows. The second section provides the model, the third section discusses the results, and the last section concludes the paper.

## 2. Model

Consider two firms, one foreign (F) and one domestic (D), which are capable of producing a homogeneous product for the local market. The life of the product is two periods only, i.e.,  $t = 0, 1$ . Since we shall focus in the paper on the problem of instability of JV, we assume that the firms have already formed a JV to gain in synergy by combining their complementary resources in which each firm has a comparative advantage to supply. Also it is assumed that by the end of the first period each of the firm is, without cost, capable of learning and acquiring knowledge embedded in the complementary inputs supplied by its partner. Learning is assumed symmetric and hence two firms will be perfectly identical at the end of the first period.

We further assume that the ‘type’ of the foreign firm is common knowledge. The foreign firm owns a culture that is known as corporate culture. The local firm can, however, be any of two types. It may possess the same culture as that of the foreign firm, and in that case the alliance is considered to be a ‘matching’ ( $m$ ) one, or its type is different from that of the foreign firm, and then it is a mismatch alliance ( $\bar{m}$ ) between two asymmetric entities. Let us denote these two types of local firm as A and B. The type of the local firm is determined by a nature’s move; with probability  $q$ ,  $D = A$ ; and with probability  $(1 - q)$ ,  $D = B$ . However, nature reveals the information only to  $D$  (and not to  $F$ ); hence there is an incomplete information. While  $D$  knows its type, but  $F$  has a prior belief that  $D = A$  with probability  $q$ .

JV formed between two dissimilar entities means that there is some coordination problem in the joint management of the venture firm. Hence we assume that if there is a match between the partners, a high payoff,  $H$ , is achieved with probability  $r$  and a low payoff with probability  $(1 - r)$ , whereas in case of mismatch,  $H$  and  $L$  are achieved with probabilities  $s$  and  $(1 - s)$ , respectively;  $s < r$ . Consider  $H$  as the monopoly payoff (i.e.,  $H = \pi^m$ ), given the production knowledge of the venture firm. Then  $L < H$  reflects the loss of profits due to potential conflicts between the partners. Let  $H = \theta L, \theta > 1$ . So  $\theta$  captures the effect of mismatch.



We have already noted that after the first period is over, two firms become symmetric with respect to their production knowledge, and hence if, for some reason, the JV breaks up, the market structure will be symmetric duopoly. In this case match or mismatch does not matter, each will derive a duopoly payoff,  $\beta H$ , where  $\beta$  is the ratio of duopoly to monopoly payoffs. As we assume that the learning effect is symmetric for the firms,  $\beta$  essentially captures the ratio between the symmetric duopoly profits ( $\pi_d$ ) and the JV profit. Now although firms learn through participation, they may still lose a bit of synergic gains while operating on their own. Let us denote by  $\tilde{\pi}_d$  as the symmetric duopoly profit when firms retain the entire synergic gain. So the difference between  $\tilde{\pi}_d$  and  $\pi^m$  captures only the concentration effect, whereas the difference between  $\tilde{\pi}_d$  and  $\pi_d$  captures the depreciation of synergic effects. Hence, we redefine  $\beta$  as  $\beta = \frac{\pi_d}{\tilde{\pi}_d} \frac{\tilde{\pi}_d}{\pi^m}$ . Note that  $\frac{\pi_d}{\tilde{\pi}_d} \leq 1$ . A higher  $\beta$  reflects smaller loss of synergic gains. Subsequently higher or lower  $\beta$  will reflect the learning capacity of the firms.

We denote  $\alpha_t (< 1)$  as the profit sharing rule under JV for the  $t$ th period, and suppose that initially firms have agreed to a sharing rule  $(\alpha_0, 1 - \alpha_0)$  where  $\alpha_0$  is the profit share of the foreign multinational and  $(1 - \alpha_0)$  is the share of the host firm.

We have the following structure of the game. In the first period F and D form a JV pooling their complementary strength and agree to the above sharing rule. There is an asymmetric information regarding the type of the local firm. The foreign firm has a prior belief about D's type. At the end of the first period, either H or L is realized. The firms, F, A and B, have different estimates regarding JV's profits based on their respective probabilities of achieving H and L. For example, based on prior beliefs about the type of the domestic firm, the probabilities of H and L as estimated by the foreign firm, are:  $P(H) = qr + (1 - q)s$  and  $P(L) = q(1 - r) + (1 - q)(1 - s)$ . Then based on the realization of H or L, the foreign firm updates its belief. While the expected payoff of the JV in the second period (if it is continued) as estimated by the domestic firm remains unchanged, but F's estimate changes based on its updated belief. Under the new scenario firms decide whether they will continue the same JV

relation, or renegotiate on a new sharing rule, or just break up and compete non-cooperatively in Cournot fashion.

The prior probability of matching is  $q$ . But based on updated information, the beliefs of match and mismatch are as follows: If  $H$  has occurred, then

$$\mu(m/H) = \frac{qr}{qr + (1-q)s} \text{ and } \mu(\bar{m}/H) = \frac{(1-q)s}{qr + (1-q)s}, \quad (1)$$

and if  $L$  has occurred, then

$$\mu(m/L) = \frac{q(1-r)}{q(1-r) + (1-q)(1-s)} \text{ and } \mu(\bar{m}/L) = \frac{(1-q)(1-s)}{q(1-r) + (1-q)(1-s)}. \quad (2)$$

Therefore, based on posterior (updated) beliefs,

$$P(H/H) = \mu(m/H)r + \mu(\bar{m}/H)s \text{ and } P(L/H) = \mu(m/H)(1-r) + \mu(\bar{m}/H)(1-s).$$

Similarly,

$$P(H/L) = \mu(m/L)r + \mu(\bar{m}/L)s \text{ and } P(L/L) = \mu(m/L)(1-r) + \mu(\bar{m}/L)(1-s).$$

Hence if JV is continued in the second period, the expected payoffs as estimated by the foreign firm are:

$$V_F(H) = P(H/H)H + P(L/H)L \quad (3)$$

if first period realization is H, and

$$V_F(L) = P(H/L)H + P(L/L)L \quad (4)$$

if L is the realization in the first period. However, the expected payoffs as estimated by A and B are:

$$V_A = rH + (1-r)L \quad (5)$$

$$V_B = sH + (1-s)L \quad (6)$$

Note that

$$r > P(H/H) > P(H/L) > s, \quad (7)$$

this means,

$$V_A > V_F(H) > V_F(L) > V_B. \quad (8)$$

Now if the firms terminate their JV relation at the beginning of the second period, then the market structure will be symmetric duopoly, because we assume symmetric learning. Then under symmetric duopoly, the payoff of each of F, A and B will be:

$$W \equiv W_F = W_A = W_B = \beta H = \beta \theta L \quad (9)$$

Let  $V_F(\alpha / X)$  denote the foreign firm's payoff in the second period from the JV when its share is  $\alpha$ , given that the last period realization of payoff is  $X$  where  $X$  is either  $H$  or  $L$ ;  $V_F(\alpha / X)$  is estimated based on the posterior beliefs given by (1) when  $X = H$ , and by (2) when  $X = L$ . Therefore,

$$V_F(\alpha / X) = \alpha V_F(X). \quad (10)$$

So, under the changed scenario, F will offer a new contract,  $(\alpha_1, 1 - \alpha_1)$ , and the local firm is to decide whether it will accept or reject it. Rejection of the offer means break down of the JV. This new offer will be based on maximization of foreign firm's payoff. Such an offer will leave the local firm to its reservation (duopoly) payoff. But F does not know the type of D.

Now, A will accept the JV offer of  $\alpha_1$  as long as

$$(1 - \alpha_1)V_A \geq W_A \quad \text{i.e.,} \quad \alpha_1 \leq 1 - \frac{W_A}{V_A} \equiv \alpha_a. \quad (11)$$

Similarly, B will accept any such offer so long as

$$(1 - \alpha_1)V_B \geq W_B \quad \text{i.e.,} \quad \alpha_1 \leq 1 - \frac{W_B}{V_B} \equiv \alpha_b. \quad (12)$$

It may be worked out easily to get

$$\alpha_a = 1 - \frac{\beta\theta}{r\theta + (1-r)} \quad \text{and} \quad \alpha_b = 1 - \frac{\beta\theta}{s\theta + (1-s)}. \quad (13)$$

Since  $r > s$ , we have

$$\alpha_a > \alpha_b. \quad (14)$$

The interpretation of the result is simple. Both A and B's reservation payoffs are the same, but A estimates a larger profit for the JV than that estimated by B. Hence A can tolerate a lower share for itself in the JV compared to B. Given the behavior of

the local firm, F will give an optimal offer, and the local firm will decide whether to accept or reject. Results are discussed in the next section.

### 3. Results

First, note that an offer,  $(\alpha_1, 1 - \alpha_1)$ , will be accepted by both the domestic firms if  $\alpha_1 \leq \alpha_b$ , and it will be rejected by both if  $\alpha_1 > \alpha_a$ . Hence if the foreign firm wishes to continue its operation through the JV, it will offer either  $(\alpha_a, 1 - \alpha_a)$  or  $(\alpha_b, 1 - \alpha_b)$  once it observes the realization, X, which is either H or L. Now if  $(\alpha_b, 1 - \alpha_b)$  is offered, both A and B will accept the offer and the JV structure will necessarily be retained, and in that case F's belief about the type of the local firm will be given by (1) if X = H, and by (2) if X = L. Thus by offering  $(\alpha_b, 1 - \alpha_b)$ , the foreign firm expects to receive a payoff

$$V_F(\alpha_b / X) = \alpha_b V_F(X). \quad (15)$$

But if  $(\alpha_a, 1 - \alpha_a)$  is offered, only A will accept the offer and B will reject. Hence JV will continue with probability  $\mu(m / X)$ , and the market will be duopoly with probability  $\mu(\bar{m} / X)$ , given that X is realized. Then by offering  $(\alpha_a, 1 - \alpha_a)$ , the foreign firm expects a payoff

$$\hat{V}_F(\alpha_a / X) = \mu(m / X) \alpha_a V_A + \mu(\bar{m} / X) W. \quad (16)$$

It is obvious that, given X, if

$$\hat{V}_F(\alpha_a / X) - V_F(\alpha_b / X) > 0, \quad (17)$$

the foreign firm offers  $(\alpha_a, 1 - \alpha_a)$ . In this case only A will accept the offer and the JV will continue; B will reject the offer and the JV will break down. Condition (17) includes both cases of continuity and break down. In case the inequality is reversed,  $\alpha_b$  will be offered, and both types will accept, and the JV will continue. Such a situation excludes the possibility of break down.

Validity of condition (17), that is, the possibility of both continuity and break down, can be discussed in terms of the primitives of the model. We have,

$$\alpha_b V_F(X) = \alpha_b [P(H / X)H + P(L / X)L] = \alpha_b [\mu(m / X)V_A + \mu(\bar{m} / X)V_B] \quad (18)$$

Hence, using (16), (18) and (12), we have

$$\hat{V}_F(\alpha_a / X) - V_F(\alpha_b / X) = \mu(m / X)V_A(\alpha_a - \alpha_b) + \mu(\bar{m} / X)(2W - V_B). \quad (19)$$

Since  $\alpha_a > \alpha_b$ , a sufficient condition for (17) to hold is given by

$$2W - V_B \geq 0. \quad (20)$$

This boils down to

$$\beta > \frac{s}{2} + \frac{1-s}{2\theta}. \quad (21)$$

Also note that to ensure that the foreign firm does not offer a contract which will be rejected by both firms, following must hold,

$$W < \max[\hat{V}_F(\alpha_a / X), V_F(\alpha_b / X)] \quad (22)$$

We are now in a position to write down the following proposition.

**Proposition 1:** *The separating equilibrium, where the foreign firm offers  $(\alpha_a, 1 - \alpha_a)$  and B type rejects, is more likely to be the outcome with realization H than with L.*

**Proof:** Since we are trying to compare  $\hat{V}_F(\alpha_a / X)$  with  $V_F(\alpha_b / X)$  for  $X = H, L$  based on which the foreign firm weighs between  $(\alpha_a, \alpha_b)$ , we assume that the foreign firm wishes to continue with the venture i.e., (22) is satisfied no matter what is the outcome. Otherwise the question of offering  $(\alpha_a, 1 - \alpha_a)$  or  $(\alpha_b, 1 - \alpha_b)$  does not arise. We can then show that incentive to offer  $(\alpha_a, 1 - \alpha_a)$  is likely to increase when the realization is changed from L to H.

Let  $\hat{V}_F(\alpha_a / L) = V_F(\alpha_b / L)$ . This implies that the foreign firm is indifferent between offering  $(\alpha_a, 1 - \alpha_a)$  and  $(\alpha_b, 1 - \alpha_b)$ . Also from (19) it must imply that  $2W - V_B < 0$ , as  $(\alpha_a - \alpha_b) > 0$ . As the realization is changed from L to H, since  $\mu(m / H) > \mu(m / L)$ , the weight attached to the positive coefficient  $V_A(\alpha_a - \alpha_b)$  in (19) increases. This implies  $\hat{V}_F(\alpha_a / H) > V_F(\alpha_b / H)$ , and therefore, the foreign firm will offer  $(\alpha_a, 1 - \alpha_a)$ , type A will accept and type B will reject.

If  $\hat{V}_F(\alpha_a/L) > V_F(\alpha_b/L)$  and  $2W - V_B < 0$ , the same argument holds, that is, as H replaces L, the difference between  $\hat{V}_F(\alpha_a/L)$  with  $V_F(\alpha_b/L)$  increases. If  $2W - V_B > 0$ , it does not matter what is the realization,  $(\alpha_a, 1 - \alpha_a)$  will be offered. Hence, out of three cases, where  $(\alpha_a, 1 - \alpha_a)$  is offered with the realization L, incentives for such an offer goes up with H in two cases, and in the last case no matter whether it is L or H,  $(\alpha_a, 1 - \alpha_a)$  will be offered. **QED**

Intuition of the result is simple. When H is the realization, the belief that the local firm is of A type becomes stronger. Hence to extract more payoffs, F will tend to offer a separating contract (since  $\alpha_a > \alpha_b$ ), and the likelihood that such an offer will be accepted is greater now. We follow up Proposition 1 into Proposition 2.

**Proposition 2** *If  $(r/2) + ((1-r)/2\theta) > \beta > (s/2) + ((1-s)/2\theta)$ , then independent of the outcome in the first period, the foreign firm offers  $(\alpha_a, 1 - \alpha_a)$ . If the local firm is of type A (B), JV continues (breaks down).*

**Proof.** From (21) we know that  $\beta > \frac{s}{2} + \frac{1-s}{2\theta} \Rightarrow \hat{V}_F(\alpha_a/X) > V_F(\alpha_b/X)$ . Hence,  $\max[\hat{V}_F(\alpha_a/X), V_F(\alpha_b/X)] = \hat{V}_F(\alpha_a/X)$ . One can check that  $\hat{V}_F(\alpha_a/X) - W > 0$  iff  $\frac{r}{2} + \frac{1-r}{2\theta} > \beta$ . Therefore, for  $\beta \in (\frac{s}{2} + \frac{1-s}{2\theta}, \frac{r}{2} + \frac{1-r}{2\theta})$ , the foreign firm will offer  $(\alpha_a, 1 - \alpha_a)$ . If the local firm is of type A, it will accept the offer and the JV will continue. Type B will reject and the JV will break down. **QED**

The condition in Proposition 2 makes sure that the foreign firm is interested in continuing the JV with the right type. It is straightforward to check that if  $\beta > \frac{r}{2} + \frac{1-r}{2\theta} > \frac{s}{2} + \frac{1-s}{2\theta}$ , the foreign firm will opt out of the JV (that is, (22) will be violated). So the JV will break down.

Another case is whether  $V_F(\alpha_b / X) > \hat{V}_F(\alpha_a / X)$  and (22) holds. This will mean JV will surely continue. Thus break down and confirmed continuation constitute two 'corner' solutions of the game. As we are interested in the simultaneous possibility of break down or continuation, we highlight such a case in Proposition 2. We shall now see what happens if some parameters undergo a change.

Let us define

$$\frac{r}{2} + \frac{1-r}{2\theta} = \bar{\beta} \quad \text{and} \quad \frac{s}{2} + \frac{1-s}{2\theta} = \underline{\beta}.$$

Check that

$$(\bar{\beta} - \underline{\beta}) = \frac{1}{2}(r-s)\left(1 - \frac{1}{\theta}\right) \quad (23)$$

The range  $(\bar{\beta} - \underline{\beta})$  increases with  $(r-s)$ . Higher is  $r$  relative to  $s$ , it is more likely that  $(\alpha_a, 1-\alpha_a)$  will be offered. High  $r$  or low  $s$  makes the profit from a rightly matched JV even greater than the one obtained under a mismatch. This induces the foreign firm to seek the right partner more aggressively.

On the other hand, a higher  $\theta$  increases  $(\bar{\beta} - \underline{\beta})$ . Note that as  $\theta$  increases, both  $\alpha_a$  and  $\alpha_b$  should fall as

$$\alpha_a = 1 - \frac{\beta}{r + \frac{1-r}{\theta}} \quad \text{and} \quad \alpha_b = 1 - \frac{\beta}{s + \frac{1-s}{\theta}}.$$

It can be easily checked that as  $r > s$ , when  $\theta$  goes up, the decline in  $\alpha_a$  is lower than that in  $\alpha_b$ . This implies that  $(\alpha_a - \alpha_b)$  should increase strengthening the possibility that  $\hat{V}_F(\alpha_a / X) > V_F(\alpha_b / X)$ . But as  $\bar{\beta}$  decreases, it weakens the possibility that the foreign firm will be at all interested in the continuation of JV. If initially  $\beta$  is very close to  $\bar{\beta}$ , a rise in  $\theta$  will tend to violate (22), and therefore, JV will break down. Given that initially  $\beta$  is well below  $\bar{\beta}$ , a rise in  $\theta$  allows for lower values of  $\beta$  to be consistent with condition (21). It is obvious that greater the difference between  $r$  and  $s$ , larger is the likelihood that the foreign firm will be interested in continuing with type A, but not with type B.

## 4. Concluding Remarks

Formation and break down of joint ventures is a lively topic of research that has helped building up a substantial literature in this area. In particular, the issue of break down of JVs has attracted growing research interest in recent times. Our paper contributes to the theoretical aspect of this line of research. We highlight the phenomenon of 'incompatibility' between partners as a possible cause of break down. Partners learn about each other only through an active participation in the operation of the venture. As time evolves, foreign firm gains information regarding the degree of compatibility by observing the performance outcome and updates its perception about the local partner. Contracts are renegotiated and the fate of the JV is decided subsequently.

We prove that if the 'good' and the 'bad' outcome are really far apart, JV will continue only with a 'compatible' partner. That is, the foreign partner will offer a contract that will surely be turned down by the 'mismatched' partner and will be accepted by the 'compatible' one. Such a 'separating' equilibrium depends also on the extent of learning. Higher learning (in the form of high  $\beta$  in the paper) will push the foreign firm to go on its own, and hence the possibility of break down of JV, no matter whether there is a match or a mismatch. However, such a possibility tends to disappear if the profit from a matched outcome is too large compared to the mismatched one.

One interesting feature of our analysis is that renegotiation will definitely occur at the end of the first period because beliefs are updated by the outcome and the foreign firm can always do better by offering a new contract. There are several empirical implications of our work.

First, our model suggests that a possible 'mismatch' will mean that the local firm will demand greater share of profits, since a good match will be happy with a lower share. Hence, conflicts and tussles are likely to occur between 'mismatched' partners. Second, instability tends to occur specially when 'bad' outcome is observed and it is



really far apart from the 'good' outcome. Third, like other models of break down, ours is also capable of predicting that 'learning' tends to cause joint venture instability.

One possible extension of the paper should be to look at a situation where the local firm can signal its type before the foreign firm gives an offer. It is also possible to think of a scenario where the foreign firm offers a menu and the local firm self-selects the type. One could also bring government policies in the picture. In fact, one interesting implication of our model is that if the local government restricts the share of the foreign firm, the JV is likely to break down because in that case the foreign firm cannot offer a contract that will distinguish a match from a mismatch.

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