POZNAŃ UNIVERSITY OF ECONOMICS REVIEW
Volume 12 Number 4 2012

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Institution for risk sharing: international joint venture

Abstract: International joint venture as a form of business organization has become quite important in the post-liberalization period. Although an international joint venture has an independent legal status, it is organized for the joint benefit of the foreign and local firm. An international joint venture, defined as an agreement about revenue and cost-sharing rules, can be designed to enhance the level of foreign direct investment under the presence of economic risk. For example, foreign direct investment in economies in transition and emerging markets may be discouraged by fluctuations in the value of local currency or market risk when the entire revenue is generated through local sales. We argue that a properly designed joint venture scheme between an international firm (source country) and a local partner (host country) may resolve such an economic incentive problem.
Keywords: international joint venture, foreign investment, risk sharing, forms of cooperation, contract theory, multinational firm.
JEL codes: F20, F21, O19.

Introduction

National and especially international joint venture as a form of organization in business and management has become quite important in emerging markets and economies in transition. This is evident from the rapidly growing number of joint ventures formed between firms across the border (see Figures 1 and 2). Creating and formation and also break down of international joint ventures are topics of research in international business, economics and finance [for example Kabiraj 2007; Lukas 2012].

International joint ventures are intermediate forms for cooperation, i.e. a form between a simple contract and a takeover. Typically joint ventures require a transfer of assets and control. A joint venture can be seen as a flexible mechanism that allows domestic and foreign partners to form a business entity which operates in one or many countries. Moskalev and Swensen [2007] describe in detail the geo-

graphic distribution of the various types of joint ventures. They found a substantial country clustering of joint ventures.

In recent years increasing use has been made of international joint ventures as an institutional choice of achieving access to foreign markets. In particular international joint ventures are popular institutional forms chosen by countries in transition to market economies in order to attract foreign investment and technology. International joint ventures are formed in different areas for the purpose of technology, market distribution systems, financial resources, cooperative research and risk sharing in many industries, such as natural resources (gas and oil), chemicals, construction, car industry and manufacturing. The two following figures show the number of independent joint ventures for the main countries (Figure 1) and for the main industries (Figure 2).

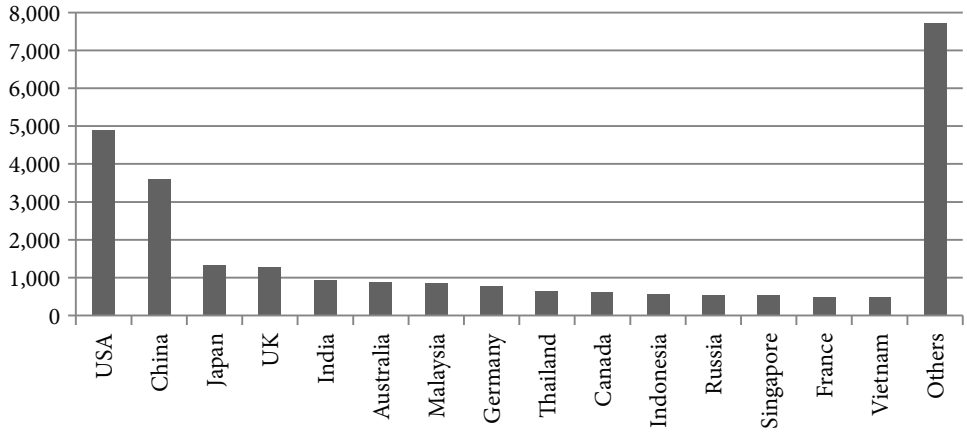

Figure 1. Number of independent joint ventures firms for different countries from 1990–2000

Source: [Moskalev & Swensen 2007]

Economic theory of a general equilibrium is one of the most important achievements in the history of economic thinking. However, it appeared that the general equilibrium analysis was not a fully satisfactory theoretical instrument. Strategic interactions between agents, asymmetric information, adverse selection and moral hazard cannot easily be integrated into a general equilibrium analysis. The theory of contracts originates in these failures of a general equilibrium analysis. The theory of contracts covers a lot of topics and many varied situations. It can be applied to forms of international cooperation. Joint ventures are business entities created by partners in order to achieve a mutual task.

Basic theoretical elements of the economic analysis of joint ventures are the transaction cost theory and the theory of property rights. The risk-sharing approach of

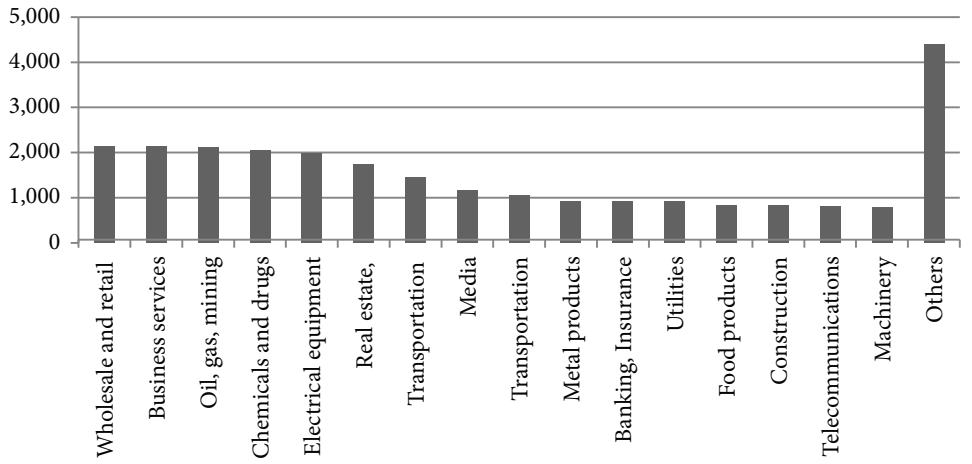

Figure 2. Number of independent joint ventures firms for different industries from 1990–2000
Source: [Moskalev & Swensen 2007]

international joint ventures was analysed in this context by Marjit [1990], Marjit, Broll & Mallick [1995], [1999], Horstmann & Markusen [1996], Broll, Marjit & Mukherjee [2003] and others. Recently some studies have justified national and international joint ventures as an organisational form to mitigate adverse selection and moral hazard problems which characterize partner-specific investments [e.g. Chowdhury & Chowdhury 2001; Kabiraj, Lee & Marjit 2005; Salanié 2005]. However, none of these studies discusses the role of joint ventures in eliminating the risk associated with world prices or foreign exchange rate fluctuations. Given the fact that a large number of international joint ventures are set up to serve the local market of economies in transition such fluctuations, for example in the spot exchange rates, may be quite important in the decision making process of multinational firms and foreign investors. In our context it means that high exchange rate volatilities will have a profound and adverse impact on the expected utility of foreign firms.

One of the issues that have received considerable attention in international economics is the effect of exchange rate risk on the volume of international trade, international capital flows and foreign direct investments [Broll & Wahl 1998; Wong 2007]. The hedging literature focuses on transactions in competitively traded financial assets to hedge against price and exchange rate fluctuations. The purpose of the present paper is to build up a simple framework to show how international joint ventures can act as a risk sharing arrangement when exchange rates are subject to random movements. Economies in transition often do not have forward markets for currencies, interest rates and commodities, which has been true for Ukraine, for example. This creates problems for risk management of international firms as

well as economies in transition. We show that international joint ventures may be designed to protect partially against revenue risks.

International joint venture can be regarded as a non-market institution for risk sharing. In particular we show that for a risk-averse international firm a joint venture with a local partner (1) would increase the tolerable level of risk, (2) reduce the tolerable level of minimum expected return and (3) improve the level of foreign investment.

A foreign firm decides on whether to undertake a full ownership foreign direct investment, or to form a joint venture with a local partner [see Svejnar & Smith 1984; Darrough & Stoughton 1989; Spencer & Raubitscheck 1996; Zhao 1997]. We ask the following question: Is it possible to develop an investment sharing scheme under which the multinational firm will invest more than in the case of missing risk sharing markets? It can be shown that a risk sharing equilibrium can be constructed which is fully incentive-compatible for the multinational firm and the host country firm.

Consider a situation where an international firm (from a source country) can invest I initially and earn a discounted cross return R in terms of the country's currency. The socially desired outcome is that a project should be realized if and only if $R > I$, where revenues and investment costs are measured in the host country's currency. If the future spot exchange rate e_1 between the host and the source country's currency is uncertain, net profit of the international firm in the source country's currency is risky: $y = Re_1 - Ie_0$, where e_1 is the uncertain spot exchange rate for $t = 1$ and $e_0 = 1$ is the given exchange rate at time $t = 0$. The spot exchange rate is defined in the source country's currency per unit of the host country's currency. Hence, $e_1 > 1$ (<1) will denote an appreciation (depreciation).

The international firm is risk averse and maximizes the expected utility of its own currency profit. When there is no risk sharing market offered by financial markets, and the firm has mean-variance preferences then the firm's expected utility with a constant degree of absolute risk aversion $\alpha/2 > 0$ is given by:

$$E(y) - \frac{a}{2}\mathrm{var}(y)$$

with the uncertain income y as defined above.

1. With joint venture foreign investment is more likely

In this section we show that with a joint venture arrangement foreign investment is more likely. We start with the benchmark, i.e., no joint venture.

No joint venture (benchmark case)
For a given variance of the exchange rate one can define a critical level of the expected exchange rate $E(e_1) = \mu_1^c$ which takes all expected utility of the foreign investor away (i.e. the expected break-even exchange rate has to satisfy $\mu_1 \geq \mu_1^c$):

$$R\mu_1^c - I - \frac{a}{2}R^2 \operatorname{var}(e_1) = 0.$$

Therefore, we can write

$$\mu_1^c = \frac{I}{R} + \frac{a}{2}\operatorname{var}(e_1)R.$$

Hence for any expected exchange rate lower than the critical level μ_1^c foreign investment will not take place. We assume that $\mu_1 < \mu_1^c$, i.e., foreign investment is not optimal.

Joint venture
We introduce a joint venture in the following way. For any given expected exchange rate and exchange rate risk the foreign firm offers a sharing rule θ to a local firm where $0 < \theta < 1$ is the share of gross profits and the share of investment of the foreign firm. The question is whether such a sharing rule exists, such that the system generates greater economic benefits than the benchmark case. With an international joint venture the income function of the international firm is given by $y = \theta R e_1 - \theta I$. The participation constraint for the local firm $(1 - \theta)(R - I) > 0$ must be fulfilled. It is expected that $R\,\mu_1 > I$ i.e., without risk aversion foreign direct investment is possible. If the exchange rate is expected to depreciate, $\mu_1 > 1$, hence $R\,\mu_1 > I$ and $R > I$. Therefore the expected utility of the international firm is

$$\theta R\mu_1 - \theta I - \frac{a}{2}\theta^2 R^2 \operatorname{var}(e_1).$$

Now we can show the role of a joint venture with a local firm. For a given exchange rate risk $\operatorname{var}(e_1)$ by a joint venture the critical expected exchange rate is lower then μ_1^c, which implies that foreign investment may be promoted by sharing revenue and cost with a local firm.

With such a sharing arrangement we obtain the critical expected exchange rate

$$\mu_1^{JV} = \frac{I}{\mathrm{R}} + \frac{a}{2}\theta R \operatorname{var}\,(e_1) < \mu_1^c \text{ as } \theta \in (0, 1). \tag{1}$$

Consider exchange rate expectations of the firm: $\mu_1^{JV} < \mu_1 < \mu_1^c$. Therefore, for such expectations $\mu_1 \in (\mu_1^c, \mu_1^{JV})$ foreign investment is feasible through a joint ven-

ture scheme. A lower expected return is acceptable due to risk reduction by cost and revenue sharing.

2. With joint venture higher risk is acceptable

For a given expected spot exchange rate μ_1 we can show that a joint venture may increase that tolerable level of exchange rate risk of a foreign investment. This can be shown as follows.

No joint venture (benchmark case)
With no sharing arrangement the expected utility of the international firm is zero if the risk is equal to $\text{var}(e_1)^c$. We obtain

$$R\mu_1 - I - \frac{a}{2}R^2 \text{var}\ (e_1)^c = 0. \tag{2}$$

Or we can write

$$\text{var}(e_1)^c = (R\mu_1 - I) / \frac{\alpha}{2}R^2. \tag{3}$$

For all $\text{var}(e_1) > \text{var}(e_1)^c$ no foreign investment will take place.

Joint venture
By an international joint venture with a local firm, under the participation constraint $(1 - \theta)(R - I) > 0$ which is feasible as $R > I$, we obtain a critical risk level:

$$\text{var}(e_1)^{JV} = (R\mu_1 - I) / \frac{\alpha}{2}\theta R^2 \tag{4}$$

which implies $\text{var}(e)^{JV} > \text{var}(e)^c$. A higher foreign exchange rate risk is acceptable for the international firm with a joint venture. For a given expected exchange rate a joint venture implements foreign investment if the exchange rate risk is between: $\text{var}(e)^{JV} > \text{var}(e) > \text{var}(e)^c$. Without a risk sharing arrangement foreign investment will not be forthcoming.

Suppose that the international firm expects the exchange rate to appreciate. In that case $R\,\mu_1 > 1$ does not necessarily imply that $R > I$. Hence, a joint venture may not be possible and there is no need for an international joint venture. But there may be cases where $R > I$, and is not too large. The international firm goes into a joint venture with a firm in the host country simply to reduce exchange rate risk.

3. Higher foreign investment with joint venture

For a given exchange rate expectation and exchange rate risk represented by μ_1 and var(e), respectively, we can show that foreign investment may be increased by a joint venture. In the following we assume that the revenue function $R(I)$ is a strictly concave function of I : $R'(I) > 0$ and $R''(I) < 0$. We start with our benchmark case of no joint venture.

No joint venture
With endogenous foreign investment I the expected utility is given by:

$$\max R(I)\mu_1 - I - \frac{a}{2}R(I)^2 \operatorname{var}(e_1). \tag{5}$$

The first-order condition for optimal foreign investment level is,

$$R'(I^*)\left[\mu_1 - aR(I^*)\operatorname{var}(e_1)\right] = 1, \tag{6}$$

with the second-order condition

$$R''(I^*)\left[\mu_1 - aR(I^*)\operatorname{var}(e_1)\right] - aR'(I^*)^2 \operatorname{var}(e_1) < 0, \tag{7}$$

by the concavity of the revenue function. For a meaningful level of investment $\mu_1 > aR(I)^2\operatorname{var}(e_1)$ at the optimum. If μ_1 is quite large foreign investment would be possible and there is no need for a joint venture. But there may be cases where $R > I$ and μ_1 is not too large and the foreign firm goes into a joint venture simply to reduce risk exposure.

Joint venture
With a joint venture and endogenous foreign investment level I the international firm maximizes the expected utility

$$\max \theta R(I)\mu_1 - \theta I - \frac{a}{2}\theta^2 \left(R(I)\right)^2 \operatorname{var}(e_1), \tag{8}$$

subject to the participation constraint for the local firm: $(1 - \theta)(R - I) > 0$. The first-order condition for optimum foreign investment level, I^0, implies the expected marginal benefit equal to marginal cost:

$$R'(I^0)\left[\mu_1 - aR(I^0)\operatorname{var}(e_1)\theta\right] = 1. \tag{9}$$

For a given μ_1 and $\text{var}(e_1)$ it can be proved that $I^0 > I^*$. We obtain

$$\frac{dI}{d\theta} = \frac{R'(I^0)aR(I^0)\text{var}(e_1)}{\Delta} < 0. \tag{10}$$

With the second-order condition $\Delta < 0$. For given expectations and risk, foreign investment will increase if the share θ is reduced. Hence, $I^0(\theta < 1) > I^*(\theta = 1)$. This result is due to the fact that the marginal benefit from investment increases as share θ is reduced. At $I = I^*$, if we choose a cost and revenue share $0 < \theta < 1$, and I^* would increase up to I^0.

Proposition. *In the case of a multinational firm facing project- or country-specific risk, there exists an international public-private joint venture that dominates a full ownership foreign direct investment.*

Conclusions

In this paper we have explored some of the implications of exchange rate risk for foreign investment of an international firm. In particular, we have analysed the impact of exchange rate volatility on the optimal international investment policy of this firm and have found some indication that a joint venture with a local partner might act as a means of risk sharing. This result may design a strategy for attracting international firms to economies in transition and emerging markets.

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