Monitoring Costs, Asset Characteristics, and Alliances Structure in Domestic and Cross-boarder Alliances

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ABSTRACT

Applying insights from the measurement branch of transaction costs analysis, this paper proposes that the relative specificity and opacity of assets contributed by alliance partners is significantly related to the ownership shares of the equity invested in the alliance. In particular this paper argues as well as empirically demonstrating that the link between assets specificity and opacity ownership structure in alliances is reinforced or strengthen in the context of cross border alliances.

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1. Introduction

This paper develops and test hypotheses linking the equity ownership structure (i.e. the share of alliance equity owned by each partner) of cross border alliances to the relative specificity and opacity of the assets contributed by alliance partners.

Our basic argument, which we derive through applying insights from the measurement branch of transaction cost economics, is as follows: alliances are structured, in part, so as to economise on monitoring costs. Each partner's share of alliance capital reflects the monitoring costs associated with measurement (and hence monitoring) costs associated with the asset that partner contributes. The partner whose assets give rise to greater monitoring costs will own a larger share of the alliance capital. In this way alliance equity capital share helps to minimise monitoring costs because, in effect, it provides a collateral guarantee function. In our study, we focus on specificity and opacity characteristics of the assets contributed by the alliance's partners as these characteristics are shown to be highly correlated with measurement costs.

We extend this basic argument to the cross board context. Thus, *ceteris paribus*, measurement costs associated with a given level of asset specificity or opacity are likely to be greater in cross boarder alliances and, therefore, the relationship between equity capital shares and relative monitoring cost of partners' assets is expected to be stronger than in domestic alliances. We test hypotheses based on the above arguments for 442 UK-based alliances (this samples includes alliances with both UK partners as well as UK and Foreign partners). This study is potentially an important contribution to knowledge; although a substantial body of research has examined the determinants of alliance structure, the focus has mostly been on the choice between

equity versus non-equity alliances (Folta 1994; Garcia Canal 1996; Foss and Robertson 2000; Reuer and Ragozzino 2006), the determinants of the share of equity capital contributed by each party have not been extensively examined. Those studies that have examined the distribution of equity in alliances have tended to associate it with contextual conditions (such as the role of cultural and other inter-country differences) external to the alliance (Blodgett 1991; Gary and Yan 1992; Yan and Gray 1994; Pan 1996; Chadee and Qiu 2001). While these factors are clearly important, what is lacking is a coherent explanation of how the distribution of capital share in the alliance may also be influenced by differences in the nature and characteristics of the assets contributed by each partner in the alliance. In fact, an important question is how the nature of the assets and the contextual factors such as culture/psychic distance *interact* in determining the capital share in alliances. In this paper we endeavor to shed some light on this question. We do so by first examining the guarantee role of equity capital in all alliances and then by arguing this guarantee role is more important in cross boarder alliances.

This paper is organized as follows. Section 2 provides a theoretical understanding of measurement cost and guarantee role of equity capital in alliances. Section 3 outlines why partners' assets specificity or opacity impacts upon the equity capital share of the alliance partners and particularly in cross boarder alliances. It also specifies the hypotheses. Section 4 sets out methodology, data source, sample and discuses the empirical proxies used to measure the extent of specificity and opacity of assets and the other firm-level factors that may influence the equity contribution in alliances. The empirical results are discussed in section 5 and section 6 concludes.

2. Theoretical Background: Measurement Costs and Alliance Structure

2.1 Measurement Costs in Market Transactions

In this section we develop an explanation of the determinants of equity distribution in alliances in terms of 'measurement costs'. Measurement costs are a pervasive feature of transactions and arise due to the performance variability of virtually all goods and services (Akerloff 1970; Barzel 1982; 1985; Hart and Moore 1990). Barzel defines measurement costs as arising from lack of homogeneity such that no two units of the 'same' product or service will perform in an identical way. He argues that differences in the value of various units of the 'same', apparently homogenous, good is the property right of the owner (seller) of the product who may nevertheless choose to put in the public domain. We may interpret this as the variability in the performance inducing the owner to provide a guarantee to the (buyer) – by allowing the buyer to examine the quality of the good in question. Another influential study in the realm of measurement cost is Akerloff's (1970) celebrated discussion of the market for 'Lemons'. The Lemon problem arises due to information asymmetry with regard to quality; buyers cannot *ex ante* know about the quality of the product and may thus refrain from purchasing. The solution to the Lemon problem lies in the seller providing level of guarantee to the buyer relating to the future performance of the product. More generally, the measurement strand of transaction cost economics is committed to a fundamental proposition relating to contractual structure in the presence of performance variability. The proposition states that, in order to maximise the value of an exchange, the party whose contribution has a greater effect on outcome variability should bear more of the variability in the payoff resulting from exchange. 'Bearing the variability' may take different forms depending on the type of

exchange or transaction. For example in market transactions between firms as sellers and households as buyer, the sellers' proactive provision of information relevant to (or guarantee of) future performance of durable products is a common feature of market economies. A similar logic applies to the ownership structuring of alliances. We consider this below.

2.2 The Guarantee Function of Equity in Alliance Structure

As Buckley and Casson (1988) have noted, each party in an alliance has an inalienable de facto right to pursue his/her own interest as the expense of the other. The governance issue in alliances is therefore rooted in the potential variability in the alliance performance arising primarily from cooperation problems. Under the assumption of self interest or its stronger form of opportunism, collectively beneficial outcomes fail to arise due to actions motivated by the private benefit to individuals (Camerer and Kenz 1996; 1997; Foss 2001). Although agency theory focuses on how to formulate the best contract in order to govern the relationship between parties (Jensen and Meckling 1976), it is also acknowledged that the information requirement of such contractual agreements may be quite daunting as the contract would need, in particular, to provide a mutually agreed mechanism for the monitoring of each of the parties behaviour germane to alliance performance. In fact it would seem that an 'optimal' contract in the context of alliances is particularly subject to problems of bounded rationality, asymmetric information and enforcement cost that transaction cost analysis highlights as impediments to complete contracting (Williamson 1979; 1985; Hart 1995). As Teece (1992) argues, given that complete ex- ante contracting is not feasible, the alliances partners' commitment to jointly own the venture in

accordance to a negotiated share of the equity capital provides a mechanism for distributing residuals.

We consider that 'negotiated' (whether explicitly or implicitly) shares of the capital invested in the alliances are likely to reflect key characteristics of the assets contributed by each party. The important characteristics of assets in this context are those that give rise to monitoring cots (entailed in 'measuring' the relative contributions of the partners to alliance performance). Monitoring costs arise from a combination of information asymmetry and opportunism The party (A) who contributes an asset which is more easily 'measurable' (in relation to alliance performance) is less likely to behave opportunistically, primarily due to the fact that such behaviour is easily detectable (and can be punished). The opposite is likely to be the case for the party (B) whose performance is more difficult to measure (again due to the characteristics of the contributed assets). In this scenario, the former party (A) would need a credible 'guarantee' that the second party (B) would not behave opportunistically. Therefore party (B) should bear the larger proportion of the value of residual claim compared to party (A). This clearly translates to party (B) having a larger share of the equity capital invested in the alliances. In this way an optimal alliance structure can be obtained that allows for constraining agency hazard through residual clamiancy. In the next section we develop this argument by linking capital shares of partners to specificity and opacity of the assets contributed by the alliance parties. These characteristics reflect the monitoring and measurement costs.

3. Partner's Asset Specificity and Opacity and Equity Shares in Alliances

3.1 Asset Specificity and Asset Opacity

The characteristics of assets and their implication for organisational governance and performance are rooted in several school of thoughts such as transaction costs and resource based view of the firm (Barney 1991; Peteraf 1993; Tsang 2000; Luo 2002a; Ainuddin *et al.* 2007). The specificity and opacity of assets employed in a transaction has a significant impact on the efficiency (transaction costs) of alternative governance structures (Williamson 1991; Hennart 1994). Specific assets can be defined as those that have a shadow price higher than their market price or the opportunity cost for their owner (e.g., intangible assets like R&D, and brand name). Asset specificity does not raise valuation difficulties or ambiguities pre se – the value of the asset can be determined but it will be expected to vary depending on the transactional context (and the partners may have different valuations). By contrast asset opacity is essentially a consequence of valuation difficulties, following Vicente-Lorente (2001), they are assets that, due either to their nature or the firm's actions, posses a value that can not be easily determined. Thus asset opacity arises when information germane to valuation cannot be communicated to outsiders (e.g., tacit knowledge rooted in social complexity, human resource deployment, culture and value). The key difference between asset specificity and asset opacity can be highlighted in the following terms: opacity of assets results from a 'transfer barrier' precluding imitation or substitution. By contrast specific assets may be transferable although there may be a diminution of value of a firm's asset when it is used by outsiders.

As noted already, in an alliance the parties contractually agree to bind their assets for a joint purpose. As a consequence the party whose assets are less specific becomes more dependent on the party contributing the more specific assets than vice versa. The

former becomes vulnerable to the performance variability stemming from the specific assets deployed in the alliance. In particular because the cost of the non-performance (e.g., due to lack of sufficient management input), are shared, the party with the specific assets may have an incentive to contribute less effort than if s/he was the sole owner. To alleviate this problem, and to facilitate the acquiescence of the party with the non specific assets to bind his/her resources in the venture, it would be necessary for the owner of the specific asset to own a large share of the capital invested in the alliance. Thus;

H1a: The equity share in alliances is positively related to the relative asset specificity of the partners.

Asset opacity is likely to have a similar consequence. The performance of the venture is likely to be influenced by presence of opaque assets such as tacit managerial skills and competences, the existence of private information held by the parties (such as data bases, customers trade secrets) and the prevalence of assets that may be difficult to transfer such as good will. The party whose assets are less opaque become more dependent on the party contributing opaque assets. Again to alleviate this dependence and to facilitate acquiesce of the party with the non opaque assets to bind his/her resources in the venture, it would be necessary for the owner of the opaque asset to own a large share of the capital invested in the alliance. Thus;

H1b: The equity share in alliances is positively related to the relative asset opacity of the partners.

3.2 Asset Specificity and Asset Opacity in Cross – border Alliance Context

As noted earlier, although prior research has examined alliance structure, the focus has mostly been on the choice between equity versus non-equity alliances (Folta 1994; Garcia Canal 1996; Foss and Robertson 2000; Colombo 2003; Reuer and Ragozzino 2006), the determinants of the equity capital contributed by each party have not been extensively examined. Those studies that have examined the distribution of equity in alliances have tended to associate it with contextual conditions external to the alliance (Blodgett 1991; Pan 1996; Chadee and Qiu 2001; Luo 2002b).

We consider that inter-country differences strengthen the guarantee function of equity capital in cross border alliances. Our reasoning is that the perceived uncertainty/ variability associated with a given level of asset specificity will be greater in cross border alliances and thus the guarantee function of the equity share gains an enhanced significance in such a context. In the domestic context, the alliance partners are to some degree, embedded in the same socio-cultural, economic and institutional milieu as each other, and as a consequence face relatively few 'search and deliberation' problems (Rangan 2000) in interpreting the information and clues emanating from their partners behaviour. By contrast, in the cross-border context greater 'search and deliberation obstacles will be encountered in interpreting partner behaviour. Studies highlighting the 'liability' of foreignness also speak to similar concerns (Hymer 1976; Zaheer 1995; Nachum 2003). Following Barkema *et al.* (1996; 1997), cross–border alliances face a 'double-layered acculturation' task in as much as their understanding of partner behaviour is complicated by their relatively poor appreciation of (foreign market) context of the partner. Such extra barriers to understanding or interpreting

partner behaviour and, more importantly, the implications of this for alliance performance are rooted in the psychic distance managers perceive with respect foreign business environments (O'Grady and Lane 1996; Evans and Mavondo 2002; Yamin and Sinkovics 2006). This supports the argument that in alliances between partners of different nationality the uncertainty perception associated with a given level of asst specificity /opacity is 'magnified' compared to that in domestic alliances. Accordingly our expectation is that the relationship between partner equity capital share and assets specificity and opacity should be greater when alliance partnership is cross border. Thus;

H2a: The relationship between equity shares and asset specificity is stronger in cross border alliances.

H2b: The relationship between equity shares and asset opacity is stronger in cross border alliances.

Following Rugman (2005), information acquisition and processing by firms regarding a partner is easier if both parties belong to the same region. This is partly because psychic and physical distances between partners' country will generally be greater if they are not in the same region. In addition to the distance effect, however, there is a specifically regional effect in terms of 'rules of engagement' which, as Rugman (2005) points out, differ between the Triad regions. Inter-regional differences and the distance between the partner countries increase the cost of knowledge acquisition (Eriksson *et al.* 1997) relating to the 'foreign' partner thus *ceteris paribus* partners may acquire less information pertaining to partner behavior the greater the psychic

/physical distance and if the countries are not in the same region. This reasoning supports extending the logic behind H2a and H2b generally with respect to the psychic distance or proximity between the country/regions of alliance partners[i]. Thus;

H3a: In cross boarder alliances, the relationship between equity shares and asset specificity becomes stronger the greater the psychic distance between partners regions.

H3b: In cross boarder alliances, the relationship between equity shares and asset opacity becomes stronger the greater the psychic distance between partners regions.

4. Methodology

4.1 Sources of data & sample selection

The sample used for this study includes alliances formed only by two partners during 1995-2000 from Thomson Financial data base. This gave a sample including 1800 alliances during this period. We only consider alliances based in UK so as to control for diverse regulatory and jurisdictional requirements of the countries in which the alliance is located. Given the above consideration, as well as the availability of detailed financial data for each party in the alliance, the actual number of observations is reduced to 442 alliances. These alliances are formed between UK/Foreign partners (China, Europe and US) including 100 observations for UK/UK partners. We segment the foreign partners on the basis of their respective region. Within our sample we observed three regional categories: US 33%, China (consists of China, Hong Kong, Taiwan, and Macau) 40% and Europe 27%. Public announcements of alliances are

obtained using the SDC Platinum JV/Alliances database provided by Thomson Financial. This database is the industry standard for information on joint ventures/alliances, M&A and share repurchases on a worldwide basis. Accounting and financial data for each partner is extracted from Thomson Datastream. We also incorporate dummy variables to control for the partner's industry on the basis of their 2-digit SIC codes. We obtain the following industry sectors: manufacturing (31%), transportation, communication and utilities (27%), mineral industry (24%) and construction (18%).

4.2 Dependent Variable

In the specification of our dependent variable we distinguish between minority and majority equity share contributions through the use of a categorical dependant variable, with alliance partners with less (more) than 50% equity shares categorised as minority (majority) contributors, respectively. Alliances where partners each contribute 50% equity are categorised as equal contributors (Hu and Chen 1993; Pan 1996). Thus using this classification, the dependent variable (Y) assumes value of 0, reflecting a negotiated equity contribution of less than 50%, Y = 1; captures the probabilities of a 50% equity contribution and Y=2; signals an equity contribution of more than 50%.

4.3 Independent Variables

4.3.1 Explanatory Variables

Drawing from previous studies, we proxy the specificity of assets using R&D intensity, as the ratio of R&D expenses to total sales, specific human capital, as the ratio of total sales to the total number of employees and cost of sales, as the ratio of selling expenses to total sales (Titman and Wessels 1988; Hennart 1991; Balakrishnan and Fox 1993; Vicente-Lorente 2001; Lu and Hebert 2005). R&D intensity is used as a proxy for intangible assets which are assumed to be more strategic than tangible assets. The specific human capital proxy is the turnover per employee and it is used as a measure of the productive efficiency of the firm, with more productive firms postulated to have more specific human capital. The cost of sales is assumed to capture partially the costs of promotion and advertising[ii]. These proxies are an observable measures for stock of specific assets that generate economic rent and have an imperfect market. To capture asset opacity we consider ratio of the firm's intangible assets to its total assets. The intangible assets include non monetary assets such as trade secrets (e.g., customer lists), copyrights, patents, trade marks and good will. Asset specificity and opacity are assumed to be the main effects and positively related to the equity capital contribution among alliance partners.

4.3.2 Control Variables

This section documents the controls we introduce for the other relevant firm-level factors that may influence equity contribution, thereby enabling the analysis to avoid unwarranted attribution of equity share determination to specific and opaque assets as a result of omitted variable bias. In financial economics literature assets specificity and opacity are related to capital structure of the firm and such assets reveal higher cost of liquidation as they suffer larger loss of value when firm is liquidated. In this context

we specify a number of potential firm-level drivers that are highlighted as important determinants of capital structure and the mode of financing. These factors, their expected sign, and our empirical measures selected on the basis of the referenced prior literature are as follows:

- Growth options, (+). Ggrowth options are capital assets that add value to a firm, but can not be easily collateralized[iii]. This is proxy by the ratio of capital expenditure to total assets (Rajan and Zingales 1995; Anderson 2003).
- Firm size, (-). Collateral requirements are mainly of relevance for smaller firms and leverage ratios appear to be (inversely) related to firm size. This is defined as the natural logarithm of sales (Titman and Wessels 1988; Colombo and Stanca 2006).
- Earnings Variability, (+). A firm's optimal debt level is a decreasing function of the variability of its earnings. This is measured as the percentage change in operating income between the pre-alliance and the year alliance is formed (Balakrishnan and Fox 1993; Genser 2006).
- Profit, (+). 'Pecking order theory' (Myers and Majluf 1984), predicts that profit will be negatively related to leverage because of the inherent advantages associated with internal financing. This is measured by the ratio of operating income to total sales (Harris and Raviv 1991; Colombo and Stanca 2006).

4.3.3 Interaction Effects

Hypotheses 2 and 3 are tested through estimation of interaction effects. The interaction effects are based on multiplying the proxy measures for asset specificity

and opacity (main effects) with (foreign partners) regional dummies. In order to know which partner has what kind of equity ownership three 0-1 dummy variables for US, Europe and China is created respectively. The analysis includes the interaction between these three 0-1 dummy variables and the main effect variables[iv].

4.4 Specification of the Model

The logistic regression is often used in studies on ownership strategies (Gomes-Casseres 1990; Hennart 1991; Pan 1996; Chadee and Qiu 2001). Previous research suggests that the equity share contribution is not exactly on a percentage continuum (Contractor 1990; Pan 1996; Chadee and Qiu 2001). A certain percentage difference in the equity ownership has very different strategic implications. For example, the difference between a 25% or 26% equity ownership is obviously not the same as that between a 49% and a 50% equity ownership. The decision on equity ownership is primarily a categorical one, and is often driven by the need of control over the venture. Therefore the first key decision is whether to go for a minority, a 50%, or a majority equity share (Pan 1996). Because of the categorical and ordinal nature of the dependent variable , i.e., y = 1, ..., j + 1 and 0 < 1< 2, an ordered logit model is more appropriate (Pan 1996; Chadee and Qiu 2001) and takes the following general form:

$g(pr(Y \leq i \mid X)) = \alpha_i + \beta' x$ where $0 \leq i \leq j$ and $\alpha_i, ..., \alpha_j$ and j intercept parameters and β is the vector of slop coefficients.

5. Discussion of Results

The Pearson correlation coefficients and summary of descriptive statistics are reported in Table 1 and Table 2 respectively. When a large number of interaction terms involving one variable are included in the model, the likelihood of multicollinerarity problem could exist. Because some of the correlations among the variables were high, the original variables were rescaled using procedures recommended by Aiken and West (1991)[v]. Table 3 presents results from ordered-logit model including all the main effects, including specificity and opacity of assets and control variables for the prediction of equity contribution. The main effect coefficients are represented in column 1 and interaction results indicating the level of significance in the differences on equity participation among US, Europe and China are reported in column 2.

5.1 Fit of the Model

Table 3 reports that estimated ordered logit regressions are statistically significant at the 1% level for both models according to the relevant models Chi-squared statistic. Furthermore, the percentage of correctly predicted outcomes ranges from 68% to 70%. Overall the model including the interaction terms as well as main effects has a greater explanatory power at 70% (Table 3 column 2) . This suggests the fraction of cases where the actual outcome, the likelihood of the equity capital contribution being more than 50%, particularly in cross border alliances corresponds to the predictions. It is also noted that Table 3 column 2 gives the highest value for McFadden's R^2 (0.39) and therefore, it is the most preferred model of the regressions. In the light of these result, the regressions appear to have reasonable explanatory and predictive ability.

5.2 Main Effects

As expected the positive relationship between asset specificity proxy by specific human capital, R&D intensity and cost of sales and equity participation indicates that specific assets are statistically significant in predicting the likelihood of increased equity contribution (majority ownership). These variables in general are significant at 1% to 5% level. The proxy for opacity of assets, the level of intangible assets also exhibits a positive and significant coefficient at 5% level suggesting that relative opacity of assets increases the likelihood of larger equity capital contribution. These results give supports to H1a and H1b and in general they are consistent with previous findings that suggest the level of equity ownership is positively related to the level of a firm's ownership specific advantages (Dunning 1988; Gatignon and Anderson 1988; Pan 1996; Dunning 2000). Our results is also consistent with the Lu and Hebert (2005) finding that partners increased equity contribution appear to be positively related to the presence of highly proprietary R&D assets. In addition, partners transferring specific and opaque assets to the alliance, with 'inadequate ownership shares might find that the efficient exploitation of their assets is hampered. For example, their assets may be utilised for purposes that are not specified in the agreement or in ways that could be damaging to their interest (Oxley 1997; Steensma and Lyles 2000). Thus an alliance structure that assigns to the partner contributing specific or opaque assets a greater share of the equity capital may enhance the performance of the alliance.

5.3 Interactions Effects

As regards to H2a and H2b a comparison of the full model (specificity and opacity of assets and their interactions with regional dummies and control variables, column 2) with the main effects-only model (specificity and opacity of assets and control variables column 1) reveals that when the interactions terms are included the model has a greater interpretive power when testing separately for the effect of all interaction terms they accounts for a substantial amount of variation in equity contribution (chi square $\chi^2_{(9)} = 53$ $\rho = 0.002$). This underscores the impact of specific and opaque assets on the level of equity contribution in cross boarder alliances. This result supports the view that the perceived uncertainty/ variability associated with relative specificity and opacity of partners' assets is greater in cross boarder alliances. This result is consistent with existing literature (Barkema *et al.* 1996; 1997; Eriksson *et al.* 1997) where in cross boarder transactions (including within alliances) entail higher information and knowledge acquisition costs.

The significance of regional dummies in case of Europe and Chinese partners at 5% level in column 2 highlights that there are significant differences across the three foreign origins in respect to their equity participation. When other factors are held constant, the overall results suggest that on average the Chinese partners hold the highest share of equity capital followed by European and US partners. The results of interaction terms give support to H3a and H3b. The relationship between equity shares and assets specificity or opacity becomes stronger the greater the psychic distance between partners' origin. With respect to what leads these partners to have a larger equity capital shareholding, interactions with three main effects are significant (Column 2.2). They are R&D intensity, specific human capital and level of intangible assets. The results show that the Chinese partners are more likely to have a larger

equity capital shareholding based on the level of their R&D intensity, specific human capital and their intangible assets compare to the European or US partners. The interaction of R&D intensity is significant for Chinese and EU partners at 1% to 5% level. The interaction effects are also significant for specific human capital for Chinese and European partners also at 1% to 5% level respectively. The interaction terms between level of intangible assets (proxy for opacity of assets) and foreign partners' origin was only significant for Chinese partners at 5% level. These results indicate that in cross boarder alliances as the psychic distance between partner's increases so is the need to guarantee and hence provision of a larger equity capital. In this context there are higher monitoring and/or measurement costs stem from barriers to understanding and interpreting Chinese partners' behaviour/ asset contribution to the cross boarder alliance. The literature exhibits mixed results in regards to country origin of partners and their preferred level of equity capital ownership in cross boarder alliances. Chadee and Qiu (2002) find that European partners have the lowest equity capital shareholding in their alliance with Chinese partners followed by US. While Pan (1996) and Hu and Chen (1993) find that partners from Hong Kong have the lowest equity share in their Chinese alliances. However this study provides new insight into determinants of equity capital shareholding based on partners' assets specificity or opacity and monitoring costs in cross boarder alliances.

With respect to the control variables the coefficient signs for growth and profit variables are both positive as expected and statistically significant at 5% level. The inclusion of the growth variable enables a further analysis to be undertaken of the effects of specific assets on equity contribution. This follows as growth options are also partially captured by our proxy for R&D intensity therefore, similarly signed

effects could be expected. Profit of the partner firms impacts positively on their level of equity participation in alliances. These results extend existing findings in the alliance literature indicating the importance of transaction costs with regard to the preferred level of equity ownership (Gomes-Casseres 1989; Hennart 1991; Nakamura and Yeung 1994).

The variables capturing a partner firm's size and earning variability are not significant one possible explanation for these results is that these factors may be considered industry characteristics to some extent and, therefore, are captured by their corresponding industry group dummies. The industry dummy variables are jointly significant at the 5% level for the manufacturing and transportation, communication and utilities sectors based on a Wald test.

6. Conclusion

Although many studies have examined the formation and management of cross border alliances, the questions of what determines the share of equity capital owned by partners has not been a main focus. What is more , as noted in the introduction, most previous studies on this issues have been concerned with the impact of factors 'outside' the alliances , mostly relating with cultural distance between the nationalities of partners. Even though previous studies have acknowledged that ownership of equity is related to the perceived need to govern the intra- alliances interdependencies, the influence of the nature of the assets contributed on such interdependence has not a major plank of previous research. Thus this paper's main contribution is to provide theoretical argument as well as empirical evidence that focusing on the relative

specificity and opacity of the assets contributed provide a significant clue to the ownership structure of the alliance. Furthermore our results confirm the insight of previous studies as to the importance of contextual factors such as cultural and psychic differences in structuring of alliances (Blodgett 1991; Gary and Yan 1992; Pan 1996; Chadee and Qiu 2001; Luo 2002b). However we show that this factor strongly interacts with and reinforces the impact of assets characteristics on alliance ownership structure.

Our study has clear limitations. We have only considered UK based alliances; our findings cannot necessarily be generalised to alliances based in any other country. Furthermore, due to data constraints we have captured cultural and psychic distance rather crudely, largely at the regional level. Capturing cultural and psychic differences at the individual country level would have put on findings on a more robust basis.

Table 1: he Pearson Correlation Matrix for Independent Variables (n = 442)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
A	1	-0.14	-0.05	0.02	-0.04	0.09	-0.04	-0.16	0.07	-0.11	0.21	0.02	-0.14	0.02	0.35	0.16	-0.01	0.06	0.3 1	0.07
B		1	0.08	-0.21	-0.02	0.14	0.19	0.13	-0.18	-.04	-0.19	-0.04	0.03	0.21	-0.12	0.15	0.02	0.03	0.17	-0.04
C			1	-0.03	0.08	0.12	0.04	0.30	0.63	0.06	-0.36	-0.10	-0.01	-0.15	0.18	0.04	0.43	-0.24	-0.11	0.19
D				1	-0.07	-0.04	-0.02	-0.22	0.09	0.00	0.04	0.15	-0.12	0.7	-0.04	0.02	-0.18	0.01	0.05	0.00
E					1	-0.11	0.23	0.10	-0.16	0.18	0.07	-0.01	0.06	-0.3	0.02	-0.26	0.08	0.36	0.23	-0.09
F						1	0.09	-0.03	0.56	0.11	-0.19	-0.04	-0.21	0.1	0.36	0.01	-0.09	-0.05	-0.27	-0.22
G							1	0.29	-0.02	-0.9	-0.05	0.24	-0.48	0.14	0.14	-0.06	0.07	-0.10	0.06	0.00
H								1	0.04	-0.11	0.08	-0.15	0.29	-0.06	-0.66	0.14	-0.01	0.03	0.02	0.11
I									1	-0.16	0.03	0.42	0.06	0.1	0.22	0.34	0.38	0.12	0.06	0.02
J										1	0.10	0.02	0.19	0.11	0.92	-0.02	0.04	-0.07	-0.39	-0.09
K											1	0.09	0.23	0.43	-0.13	0.05	-0.14	0.03	0.25	0.13
L												1	0.01	0.02	-0.14	0.22	0.23	0.41	0.02	0.07
M													1	0.35	0.12	-0.07	0.02	-0.11	-0.10	-0.10
N														1	0.08	0.12	-0.11	-0.06	0.03	-0.06
O															1	-0.08	0.00	0.09	0.18	-0.01
P																1	-0.02	0.03	-0.20	0.03
Q																	1	0.13	0.08	0.25
R																		1	0.02	0.02
S																			1	-0.12
T																				1

A= R&D intensity B= Cost of sales C= Specific human capital D= Intangible assets E= Earning variability F= Growth G= Profit H= Firm size
I= US partners J= Chinese partners K= European partners L= US*R&D intensity M= China*R&D intensity N= Europe*R&D intensity O= US*Specific human capital
P= China*specific human capital Q= Europe*specific human capital R= US*intangible assets S= China*intangible assets T= Europe*intangible assets

Table 2: Summary of Descriptive Statistics

Variables	Mean	S.D.
A	1.029	0.090
B	1.689	0.244
C	224.488	321.121
D	2.137	13.955
E	10.039	1.327
F	1.119	0.802
G	22.997	0.277
H	14.851	3.208

Country of origin

	Numbers	Precent
US: Partners from US	146	33
China: Partners from China (including Hong Kong, Taiwan and Macau)	177	40
Europe: Partners from European Countries	119	27
Sector		
Manufacturing	137	31
Transportation, communication and utilities	119	27
Mineral industry	106	24
Construction	80	18
Ownership share		
Minority: 1-49%	141	32
Equal: 50/50%	146	33
Majority: >50%	155	35

Table 3. Results of the Ordered Logit Analysis

	Ordered logit model			
Model	1		2	
Constant	164.045	(0.188)	-366.078	(0.324)
R&D intensity	58.7784	***(0.007)	59.051	***(0.002)
Cost of sales	33.630	**(0.018)	37.477	**(0.044)
Specific human capital	1.431	***(0.001)	2.213	**(0.016)
Intangible assets	7.097	***(0.005)	5.136	***(0.009)
Earning variability	1.315	(0.343)	0.763	(0.361)
Growth	15.428	**(0.047)	14.014	**(0.046)
Profit	54.773	**(0.042)	48.437	**(0.058)
Firm size	-0.148	(0.318)	-115.202	(0.330)
US			-1.96	(0.341)
Europe			2.23	**(0.023)
China			7.68	**(0.043)
US*R&D intensity			-3.004	(0.632)
Europe*R&D intensity			5.835	**(0.042)
China*R&D intensity			8.512	***(0.002)
US*Intangible assets			-4.325	(0.247)
Europe*Intangible assets			-7.284	(0.497)
China* intangible assets			9.004	**(0.031)
US*specific human capital			-6.287	(0.447)
Europe*specific human capital			4.169	**(0.025)
China*specific human capital			12.414	***(0.002)

A. Models Statistics:

Log likelihood function	-57.362	-50.312
Restricted log likelihood	-87.237	-82.428
Chi-squared	62.450	70.233
p-value of Chi-squared	0.005	0.002
Predicted	68%	70%
McFadden's R^2	0.342	0.390

B. Contribution of Interaction Terms:

Chi square χ^2 53.0 with 9 df ($\rho = 0.002$)

C. Wald test for Industry:

Industry wald χ^2 2.143 ($\rho = 0.032$)

P values in parentheses * significant at 10% level, ** significant at 5% level, and *** significant at 1%

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[i] In this study we use a mix of individual countries and regions (namely, 'Europe' for all non – UK partners and 'China', incorporating Hong Kong, Taiwan and Macau partners). Although psychic distance, as a concept is usually applied to inter –country differences, its extension to the regional level is reasonable in the context of the present study as we are comparing Europe, US and Chinese partners. Specifically we expect that psychic distance is lower between Europe and US than between these regions and China.

[ii] Data limitation meant that we were unable to obtain direct advertising costs.

[iii] As firms generally engage in R&D to generate future investment and growth options, the ratio of R&D to net sales also serves as an indicator of growth potential.

[iv] The analysis included interaction between the foreign origin variable (a dummy variable, coded 0 if the foreign partner is from US, 1 from Europe and 2 from China) and all effect variables. This is to identify a subset of effect variables that had significant differences across US, Europe and China. The final analysis included the interaction between three regional dummies and the subset of main effect variables.

[v] All continues variables were centred by subtracting the corresponding variable mean from each value and dummy variables were recoded using weighted effects coding (Darlington 1990). Such rescaling, however, does not affect the substantive interpretation of the coefficients (Aiken and West 1991).