Is the Strategic Asset Seeking Investment Proclivity of Chinese MNEs Different to that of Developed Market MNEs? A Comparative Analysis of Location Choice and Orientation

Dylan Sutherland*
Durham University Business School
Durham University
Durham, UK
dylan.sutherland@durham.ac.uk
Phone: +44 191 3345394

John (Andy) Anderson
John Deere Endowed Faculty Fellow
University of Northern Iowa
Cedar Falls, IA (USA)
john.r.anderson@uni.edu

Peter Hertenstein
Judge Business School
University of Cambridge
Cambridge, UK
ph463@cam.ac.uk

*Corresponding Author

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Abstract: Do emerging market MNEs acquire strategic assets in psychically distant developed markets to augment the firm-specific advantages they lack? This question is central to current conceptual discussion of their FDI strategies. To date, however, empirical testing has focused on emerging market MNE FDI location choices in isolation to *indirectly* infer facts about strategic asset seeking orientation. There are two weaknesses with this approach. First, comparative analysis with developed market MNEs is limited. Second, the focus on geographical location choices does not account for important direct, firm-level evidence on the strategic assets found in foreign subsidiaries. To address these gaps, we first undertake a *comparative* location choice study of Chinese MNE and developed market MNE FDI in the US. Second, we test corresponding firm-level US subsidiary data using logit modelling to explore whether there are differences between Chinese and developed market MNEs. Our results indicate similarities, rather than differences, in the strategic asset seeking behavior of Chinese and developed market MNEs. This calls into question whether theoretical extension is necessary to explain the behavior of emerging market MNEs as well as the value of indirect, location choice approaches to the analysis of strategic asset seeking FDI.

Keywords: China, Outward FDI, Location Choice, Emerging Market, Developed Economy, Comparative Study

1. Introduction

Extant theory on the internationalization strategies of MNEs suggests they invest abroad in order to exploit pre-existing firm-specific advantages (FSAs) in new markets. This idea, however, has, been questioned owing to the rise of emerging market (E)MNEs, especially those from China. Chinese (C)MNEs, some argue, are not typically seen to possess traditional ownership advantages, ones that may be meaningfully exploited in developed markets (Deng 2009; Rugman and Li 2007). Their outward FDI strategies are therefore considered poorly explained by existing theory, prompting calls for new or revised theoretical contributions to explain their behaviors (Buckley et al. 2007; Child and Rodrigues 2005; Luo and Tung 2007; Mathews 2006). The enigmatic situation of FDI flows from CMNEs to developed markets has now spurred significant amounts of research on the topic (Sutherland and Anderson 2015). Many of these comment upon the nature of CMNEs' strategic asset seeking (SAS) orientation.

SAS FDI is generally considered to involve processes that augment areas of perceived competitive disadvantages in CMNEs. This is done through the acquisition of a variety of (often intangible) assets, such as brand names, technologies and managerial competencies (Dunning 2009; Mathews 2006; Sun et al. 2012). CMNE SAS strategies are thought to be driven by their comparatively low levels of strategic assets in comparison to their developed market (D)MNE competitors (Luo and Tung 2007; Rui and Yip 2008). Some argue SAS investments are especially common among CMNEs, as they look to rapidly catch-up with their DMNE counterparts (Rui and Yip 2008), aided at times by state support (Wang et al. 2012) and a number of other favorable domestic home market conditions. This includes: access to complementary local resources (Hennart 2012); asymmetries in liabilities of foreignness (Petersen and Seifert 2014); business group affiliation (Yiu 2011); and the imperative to catch-up and learn from foreign rivals (Child and Rodrigues 2005; Mathews 2006). Much research has thus highlighted CMNE FDI behavior as being characterized by comparatively rapid, high risk investments, often to psychically distant developed markets. Many

of these investments seem to be undertaken with a view to acquiring the strategic assets CMNEs lack for the purposes of firm-level catch-up (Luo and Tung 2007; Mathews 2006). This 'asset augmentation' approach in CMNEs, undertaken to develop firm-specific advantages (FSAs), is considered distinct from the more traditional type of FSA 'exploitation' strategies seen in DMNEs (Kedia et al. 2012).

We contend the mooted SAS FDI orientation of CMNEs in developed markets has gained particular prominence in academic circles because of its important implications for theory (Hennart 2012; Luo and Tung 2007; Mathews 2002; Ramamurti 2012; Rui and Yip 2008). Interestingly, however, discussion and reflection upon the type of systematic empirical evidence required to support the SAS thesis, as well as detailed and rigorous testing of the actual claim, is still very limited. Here, therefore, we look to directly explore this issue. To this end, we first summarize the empirical evidence related to the CMNE SAS claim, focusing particularly on the dominant location choice type studies. Second, we develop several hypotheses related to the SAS orientation of CMNEs as well as two tests of CMNE SAS. One test uses comparative location choice methodologies, the other an alternative, more direct approach using firm-level data. As well as some differences between CMNEs and DMNEs, we interestingly also find strong similarities. Thus, contrary to much previous research, we are reluctant to conclude that CMNEs are truly different because of their SAS orientation or the role of underlying FSAs driving such strategies. Our discussion further reflects upon the challenges involved in testing the SAS thesis with regards to CMNEs and DMNEs as distinct groups and capturing the role of underlying FSAs as drivers of SAS activity.

2. Literature Review and Hypothesis Development

2.1 Strategic Asset Seeking and CMNEs: Theoretical Perspectives

The question of whether CMNEs acquire strategic assets in psychically distant developed markets to augment the FSAs they lack is central to current conceptual discussion and empirical investigation of EMNE FDI strategies (Cuervo-Cazurra 2012; Hennart 2012; Narula 2012; Ramamurti 2012). It is hypothesized EMNEs may try to 'springboard' to the technological frontier using non-incremental learning processes by directly acquiring cutting edge capabilities from their developed market counterparts (Luo and Tung 2007). This behavior, it is pointed out, seems at odds with traditional theories of the MNE, which start from the premise that firms internationalize using FSAs (Hennart 2012; Mathews 2006; Ramamurti 2012). Much of the literature on CMNEs, therefore, emphasizes differences, not similarities, between DMNEs and CMNEs. Luo and Tung (2007), for example, advocate the 'springboard perspective', arguing CMNEs investing in developed countries:

> seek sophisticated technology or advanced manufacturing know-how by acquiring foreign companies or their subunits that possess such proprietary technology. *They differ sharply from advanced market MNEs*, which generally leverage and *exploit their ownership specific competitive advantages in foreign countries*
> (Luo and Tung 2007, p. 485) (emphasis added).

Why else might CMNEs look to acquire strategic assets in psychically distant developed markets? Based on the growing belief EMNEs do undertake SAS to augment their FSAs, a considerable number of plausible conceptual arguments have been developed. These can be grouped into two main categories. The first, which focuses mainly on the nature of the domestic home market, puts forward reasons for forces that may encourage SAS in *all* emerging market businesses. This includes; the 'link-leverage-learn' (LLL) argument (Mathews 2006); the 'institutional perspective' and so called 'home country effects' (Anderson and Sutherland 2015a; Hertenstein et al. 2017); the impact of 'complementary local resources' (Hennart 2012); asymmetries in liabilities of

foreignness (Petersen and Seifert 2014); and related to domestic market institutional voids, the important role of business group affiliation (Yiu 2011). All of these arguments can and have been applied to the case of CMNEs.

The second category relates directly to the nature and role of state led institutional support (Yao et al. 2010; Yiu 2011). In this argument, particularly relevant to the Chinese case, EMNEs have strong relationships with domestic state institutions which support their growth, via such things as domestic imperfect capital markets. CMNEs, in particular, are thought to frequently have close affiliation to the state and its institutions and are encouraged to internationalize by their home country governments (Wang et al. 2012). This includes active industrial policies to promote nascent CMNEs to engage in cross-border SAS (Cui and Jiang 2012; Deng 2009; Luo et al. 2010; Wang et al. 2012). As Deng (2009) notes, 'Chinese firms are expected to respond to government's development plan by building and/or acquiring strategic assets in order to compete successfully in the global landscape' (p.75). Luo and Tung (2007) and others (Deng 2009; Lu et al. 2011; Wang et al. 2012) echo this view, arguing that the asset seeking behaviors of CMNEs in general are supported 'by several critical forces, including: home government support for going global' (Luo and Tung, 2007, p. 491). These arguments stress the exclusive nature of state-business relationships in emerging markets such as China, where state ownership remains pervasive in its largest MNEs.

In short, a variety of arguments emphasizing differences, not similarities, between CMNEs and DMNEs, have been put forward to explain why CMNEs may engage intensively in SAS FDI. The need for accelerated internationalization supported by idiosyncratic domestic market institutions has led to the general acknowledgement that CMNEs are different to their DMNE counterparts with regards to their SAS orientation for FSA augmentation purposes.

2.2 Empirical Support for the SAS Hypothesis: Evidence from Location Choice Studies

At an empirical level, location choice methodologies are among the most commonly used approach to test whether CMNEs undertake SAS. For example, Buckley et al. (2007) and Ramasamy et al. (2012), in widely cited papers, looked at CMNE location choices. Both include SAS proxies as key explanatory variables in their cross-country studies. A prediction in the literature is that CMNEs may be different to DMNEs, in so far as their investment location choices, driven by asset seeking orientations, would gravitate to locations rich in such assets. The empirical evidence for the asset seeking hypothesis, despite the large volumes of conceptual discussion of SAS in CMNEs, is, however, actually rather mixed (see Table 1). Early studies, like that of Buckley et al. (2007), found no such evidence. Later works, like that of Rodríguez and Bustillo (2011) (which also used patents as a proxy for strategic assets) and Wang and Yu (2012) (using high tech exports), found similar results – no significant attraction of Chinese FDI to asset rich locations. In total four studies, all using aggregated national level OFDI flow and stock data, have found no evidence of SAS in CMNEs. By contrast, five other studies, all using firm-level data (though different methodologies, incorporating count and continuous (i.e. FDI volume) data), do find evidence of SAS, albeit predominantly in state-owned CMNEs.

******* TABLE 1 ABOUT HERE *******

One possibility for the clear and noticeable discrepancy in findings between the firm-level and official FDI stock and flow data might be that the firm-level data is better at capturing the actual locations (and volumes) in which CMNEs invest. Official data collection procedures, for example, are recognized for their inability to properly capture 'round-trip' and 'onward-journey' FDI. That is, FDI that transits via tax havens and offshore financial centers (or other convenient jurisdictions). In the Chinese case, it has been shown that CMNEs extensively use Hong Kong, the Cayman Islands and British Virgin Islands as transit points for FDI (Sutherland and Anderson 2015).

Official data struggles to deal with such routing, capturing, for example, only the initial outward FDI, but not the onward leg. Small island economies are unlikely to score highly as strategic asset rich hosts on the basis of the most commonly used proxies (like patent counts), potentially creating a bias in studies that use official data, thus leading them away from the finding that SAS is important.

CMNE location choice studies cover different time periods, use a variety of methods and also employ different proxies for strategic assets, making it difficult to compare their results. In general, however, those studies not finding SAS among CMNEs have relied upon aggregated country-level FDI data (or data compiled by OECD guidelines). By contrast, studies that have used FDI collected directly at the firm-level, do find support for SAS. A considerable industry therefore exists, both theoretical and empirical in nature, exploring the SAS phenomena. To date, however, there have been limited attempts to compare the SAS location choices of CMNEs with DMNEs. Only Jindra et al. (2016), to our knowledge, have empirically explored SAS in EMNEs with that in DMNEs as distinct groups. They do not, however, comment in detail on the specific case of China. Our first hypothesis therefore seeks to explore the SAS hypothesis within a comparative CMNE-DMNE framework. As the majority of firm-level (which we also use here) data is supportive of the asset seeking hypothesis and there is strong theoretical justifications for it (Hennart, 2012; Luo and Tung, 2007; Mathews, 2006), we hypothesize:

> Hypothesis 1: The outward FDI of Chinese MNEs is more strongly attracted to strategic asset rich *locations* than DMNEs.

The prediction of comparative differences in the location choices between DMNEs and CMNEs is based on the argument that CMNEs act on their pressing need for strategic assets that may help them develop FSAs and, ultimately, 'catch-up' with DMNEs (Mathews, 2006; Child and Rodrigues, 2005). SAS requires that not only do CMNEs locate in asset rich regions but also that

they acquire and subsequently use the acquired or developed strategic assets. A further, arguably more important hypothesis derived from the CMNE and EMNE literatures, is that the actual asset seeking *orientation* of CMNEs will be greater than that of DMNEs. By orientation we mean that the acquired or created (in the case of greenfield FDI) foreign subsidiaries will not simply be located in particular locations but that they will actually possess strategic assets. Thus, we draw a distinction between *location* and *ownership* of strategic assets. We refer to this latter concept, incorporating possession and ownership, as the SAS orientation. Location choice alone, it may be argued, does not directly measure the volume or quality of strategic assets latent in foreign subsidiaries. Ideally, therefore, we should measure whether the target firm or greenfield FDI project actually owns or has generated – or stated the intention to generate in the case of greenfield FDI – strategic assets.

Hypothesis 2a: FDI projects of CMNEs have a greater SAS *orientation* than DMNEs.

As noted, a key prediction of the EMNE literature is that the influence of pre-existing FSAs differs between CMNEs and DMNEs. Specifically, CMNEs are considered to undertake SAS from positions of relative FSA weakness, so as to augment, rather than exploit, existing ownership advantages (Kedia et al. 2012). This is to say, it is specifically because CMNEs lack FSAs (brands and technologies, for example) that they undertake SAS related FDI. To date, however, as location choice methodologies have focused primarily on country level proxies to measure possible motivations for FDI, they have not incorporated adequate firm-level information to explore the important role of pre-existing FSAs as drivers of SAS. As noted, however, it is generally stressed in the EMNE literature that the underlying role of FSAs as a driver of SAS is different in EMNEs *vis a vis* DMNEs (Makino et al. 2002). For EMNEs, it is argued weaker FSAs will lead to a stronger SAS orientation (when compared with DMNEs) – thus it is argued there is an inverse relationship between the two. Conversely, the exact relationship between FSAs and SAS is generally not discussed in detail for DMNEs in this literature. We can assume, however, the impacts of FSAs on

SAS orientation is envisaged to be different for DMNEs vis a vis CMNEs. A further hypothesis we consider, therefore, is whether the relationship between SAS FDI and pre-existing FSAs differs between CMNEs and DMNEs.

> Hypothesis 2b: The underlying impact of FSAs as a driver of SAS FDI differs between CMNEs and DMNEs**.**

Finally, as noted, there is a rather mixed bag of location choice based results regarding whether CMNEs are strategic asset seekers. There are numerous possibilities for this, including the aforementioned differences in sampling periods, methodologies (i.e. count versus volume, for example), data sources (firm-level versus aggregated official FDI flows) and host countries or units. Nonetheless, the lack of consensus with regards to such a crucial empirical question – because of its considerable importance to the conceptual debate related to mainstream international business theory – leads us to ask whether location choice approaches are a reliable and accurate means of exploring the SAS nature of CMNEs. One further approach for exploring the reliability of location choice methodologies for inferring SAS orientation is to consider our location choice results in light of those obtained from exploring orientation. If location choice studies are an appropriate way of exploring the SAS question, we might expect that the results from our firm-level approach looking at possession and ownership (hypothesis 2a) would match and correspond with those from the indirect location choice method (hypothesis 1). This leads to our final hypothesis, allowing us to validate if, and in what senses, the location choice results accurately capture the degree of SAS taking place. Our third hypothesis touches upon the question of how we might develop appropriate methodology for exploring SAS activities in MNEs.

> Hypothesis 3: Location choice modeling results (hypothesis 1) are consistent with those found for SAS orientation modeling results (hypothesis 2a).

3. Data and Methodology

To comparatively test location choice and verify SAS orientation we look at Chinese, British and German FDI to the United States (US). CMNEs now account for significant FDI flows to developed markets (UNCTAD 2013) and, more importantly for the testing of our hypotheses, are often considered to undertake SAS. Germany and UK are among Europe's largest outward investors with numerous well-established, representative MNEs with reliable firm-level FDI data. We selected the US as our host country as it is the single most important source of intangible strategic assets and thus ideal for exploring CMNE and DMNE SAS activities. Second, sub-national and inward FDI data is comparatively reliable and detailed for the US. We use the commercial databases Thomson ONE to identify acquisition investments and the Financial Times fDi Markets Database for greenfield investments. Unlike official FDI data, these sources use global ultimate ownership[1] to identify parent firms. As such, they avoid the aforementioned problem associated with the use of onward journey and round-trip FDI which plagues officially compiled FDI statistics (Beugelsdijk et al. 2010; Buckley et al. 2015). While the firm-level focus allows us to overcome issues associated with aggregated stock and flow FDI data, it also allows us to directly collect data on the numbers of patents and trademarks found in the US targets of our investing MNEs, as well as other important firm-level data in the investing firm. This allows us to meaningfully test SAS orientation and, importantly, the impact of pre-existing FSAs.

First, conventional location choice modelling is employed to test whether CMNEs and DMNEs locate in states with high levels of strategic assets (hypothesis 1). Composite interactive dummies are used to estimate the SAS coefficient between states which receive CMNE and/or DMNE investment *vis a vis* those that do not. This allows for significance testing of the differences on the coefficients of the key SAS proxy in the location choice model. Second, logit modelling using

[1] Global ultimate ownership data identifies the ultimate parental investor as well as final destination of cross-border investments. Intermediate investments, such as those routed through tax havens, are not included in these data.

firm-level data is used to capture the likelihood of a MNE parent acquiring (or developing via greenfield FDI) strategic assets in the US. This allows us to explore differences in SAS orientation and differences in drivers between CMNEs and DMNEs. Composite dummies are also used in the logit model, testing the underlying influence of FSAs on SAS propensity in CMNEs versus DMNEs (hypotheses 2a and 2b). Finally, we compare the two sets of results (for hypotheses 1 and 2a) to explore our third hypothesis.

3.1. Location Choice Modelling

To address our first hypothesis we use foreign subsidiary count data and negative binomial modelling methodology. We use subnational US state investment frequency count data for the dependent variable in the location choice model. The US offers adequate heterogeneity in its state-level economies and consistent availability of data across state borders. Count data are commonly used in past location choice studies (i.e. Amighini et al. (2013); Anderson and Sutherland (2015); Coughlin (2012); Ramasamy et al. (2012); Zhou et al. (2002)). By using count data all observations, regardless of investment size, are weighted equally. Ideally, we would also use the value of investments to investigate location choice determinants. Reliable data for FDI investment values are, however, difficult to obtain. When confronted with the same issue using one of the same databases we use here (Financial Times fDi Markets Database for greenfield FDI), Amighini et al. (2013) note 'given the problem of reliability and availability of the value of investments, researchers using this database [fDi Markets] have mostly estimated count data models' (p. 315).

Our dependent variable, FDI count per state, is taken from commercial databases, including Thomson ONE for acquisition investments and the Financial Times fDi Markets Database for greenfield investments. This FDI data set comprises the majority of non-real estate greenfield and acquisition transactions. We include all deals using a 10% ownership threshold for FDI to lock in control (following OECD and IMF guidelines), and minimum values of around $500,000 for

greenfield investment, for which detailed reporting exists.[2] Between 2003-2013 there were 465 Chinese greenfield deals and 235 Chinese acquisition deals, giving a total of 700 FDI projects. During the corresponding period there were 1,467 German and 1,864 British greenfield deals and 461 German and 1,605 British acquisition deals. This totaled 1,928 German and 3,469 British deals.

CMNE location choice studies commonly use patents as an explanatory variable to proxy SAS intensity. While there is no 'theoretically established variable best suited to capture strategic-asset-seeking FDI' (Alon 2010, p. 11) patents are often used. Conceptually, the notion of a strategic asset is rather broad, as reflected in the use of different proxies by different studies. Nonetheless, within the conceptual literature the idea of technology and brand seeking have come to be seen as vital elements of SAS (Luo and Tung, 2007; Mathews, 2006; Child and Rodrigues, 2005). Fortunately, we are able to effectively measure technological innovation and branding activity through the use of granted patents and registered trademarks at the state level (hypothesis 1).

With the exception of our main explanatory variable (strategic assets), all our independent location choice variables use commonly adopted proxies derived from two distinct literature sets (Table 2). The first consists of Chinese outward FDI location choice studies. The second examines FDI location choices in the US market. The most commonly used independent variables in the former literature set are: GDP, GDP per capita, patents, natural resource exports, trade, distance, cultural proximity, GDP growth and inflation. The most commonly used variables in the latter literature set are: GDP per capita, education, wage, unions, unemployment, tax rates, manufacturing density, geographic size and distance. In addition to our main explanatory variable, our unique collection of independent variables reconciles the most commonly used variables in previous Chinese FDI and US inward FDI location choice studies: market size (GDP per capita), unionization rate,

[2] The Financial Times fDi Markets database does not typically report greenfield FDI values under $500,000.

corporate tax rate, natural resources endowment, GDP growth, unemployment and geographic size (Table 2).

The Chinese dummy variable employed represents whether Chinese investment took place in state *i* in year *t*, where one represents state *i* in year *t* received FDI from China and zero otherwise. The interaction term for strategic assets equals zero if there was not any Chinese FDI and the number of strategic assets in state *i* in year *t* otherwise. Independent variables are lagged one calendar year (i.e. levels of unionized employees in 2005, for instance, are estimated against investment levels in 2006). We lag our data as the location choice is generally made on historical data rather than current or future information.

******* TABLE 2 ABOUT HERE *******

3.1.2 Location Choice Negative Binomial Model Definition

The location choice base model is estimated as follows:

$FDI_{it} = f(\beta_1 \text{STRATEGIC ASSETS}_{it}, \beta_2 \text{MARKET SIZE}_{it}, \beta_3 \text{UNION}_{it}, \beta_4 \text{TAX}_{it}, \beta_5 \text{NATURAL RESOURCES}_{it}, \beta_6 \text{GDP GROWTH}_{it}, \beta_7 \text{UNEMPLOYMENT}_{it}, \beta_8 \text{GEOGRAPHIC SIZE}_{it})$

where FDI_{it} is the count of FDI from China, UK and Germany into state *i* in year *t*.

In our balanced panel data set, all 50 states are included for all 11 years (2003-2013). The variances of N_{it} in our models were significantly different from the mean, which breaks a key assumption of Poisson models (Wooldridge 2002). In this case, negative binomial models are preferred. Further, the results of likelihood-ratio tests indicate negative binomial models best fit our data. Finally, results from performing the Hausman test deemed random effects models to be most suitable.

3.2 SAS Orientation: Comparative Firm-Level Approaches

To explore our second hypothesis we use logit modelling methodology in order to understand the impact of SAS orientation on firm-level, cross-sectional data for both the CMNE and DMNE groups. The logit base model is expressed as:

$$\text{STRATEGIC ASSETS}_i = f\,(\beta_1\text{CHINA}_i, \beta_2\text{FSAs}_i, \beta_3\text{EMPLOYEE}_i, \beta_4\text{AGE}_i, \beta_5\text{NET INCOME}_i, \beta_6\text{ASSETS}_i, \beta_7\text{HIGH TECH MANUFACTURING INDUSTRY}_i, \beta_8\text{MEDIUM TECH MANUFACTURING INDUSTRY}_i, \beta_9\text{LOW TECH MANUFACTURING INDUSTRY}_i, \beta_{10}\text{KNOWLEDGE INTENSIEVE SERVICE INDUSTRY}_i, \beta_{11}\text{LESS KNOWLEDGE INTENSIEVE SERVICE INDUSTRY}_i)$$

Where $\text{STRATEGIC ASSETS}_i$ denotes a binary variable for the activity of SAS by Chinese, British or German firm *i* in the United States. Our dependent variable is a binary variable where one represents a SAS investment, and zero otherwise. To empirically explore our concept of SAS orientation we are interested in, among other things, whether the US subsidiary possesses patents and/or trademarks (for acquisitions). As noted, patents have commonly been used as a SAS proxy and brands are also normally included in most conceptual discussions of SAS (albeit empirical testing on brands is not commonly undertaken, as location choice approaches struggle to find suitable proxies). We consider a MNE in this case to have engaged in a SAS acquisition if it acquired a US target company engaged in patenting and/or trademarking activity. In the case of greenfield investments, by contrast, we define the stated investment activities of 'Design, Development and Testing' and 'Research and Development' as an investment with a SAS orientation. These investment activity classifications transcend industry and sub-industry boundaries and are one suitable way, we contend, of measuring actual SAS orientation.

The logic behind this test is that CMNEs when compared to DMNEs, other things being equal, may have a stronger likelihood of acquiring or developing strategic assets in the US (hypothesis 2a). Firm-level logit modelling, moreover, allows us to control for possible firm and industry-level influences that may influence SAS and thus capture differences in SAS orientation. Most

importantly, it allows us include a proxy for FSAs. There are, admittedly, no ideal proxies for FSAs, as the concept itself is broad. Nonetheless, the focus in much of the EMNE literature identifies the ability to generate technologies and brands as key FSAs that EMNEs lack (and that DMNEs possess) (Verbeke and Kano 2015). We therefore include an explanatory variable measured by the sum of existing patents and trademarks recorded in the parent firm. To test hypothesis 2b (i.e. differences between FSAs as a driver of SAS) we incorporate an interaction dummy variable.

Using the same FDI projects used in the location choice, we matched target and parent firms to obtain firm-level parent control variables in the ORBIS (Bureau Van Dijk) database. Of the 6,097 Chinese, British and German firm-level investments undertaken in the US from 2003-2013, 5,407 firm observations report data for at least one of our variables of interest. Of the 5,407 firm observations with some level of data availability, we include 2,918 firm observations with adequate data availability across independent variables.

Other independent control variables include: number of employees in the parent firm (to control for size); firm age; net income (profitability); total assets; and following Jones and Temouri (2014) we classify two-digit NACE industry codes into high, medium and low technology manufacturing industries as well as knowledge intensive and less knowledge intensive service industries (Table 3). This provides for further insights into the role of technological intensity on SAS orientation. We also include a dummy variable for Chinese investment where one equals a CMNE, and zero otherwise, and additional interaction terms between the CMNE dummy and the other explanatory variables. This allows us to explore in what ways CMNEs may be different in their SAS orientation.

******* TABLE 3 ABOUT HERE *******

4. Results

Location choice model estimations broken down by country of origin groupings are presented in Table 4. The location choice modeling results are generally similar in signs and significance levels across country samples. Our key variable of interest, the CMNE*SAS interaction, is positive and significant at the 1% level. We interpret this to indicate that CMNEs are more strongly attracted to strategic asset rich states than the DMNE comparator group. Note also, however, that the DMNEs we test are also significantly attracted to strategic asset rich states: the coefficient on strategic assets is consistently significant across the samples. It only loses significance in the final model (with the interaction). This, however, is most likely owing to the high degree of multicollinearity between the SAS and SAS interaction variables. Table 5, showing pairwise correlations, confirms this. Thus, we find qualified support for hypothesis 1, in so far as CMNE FDI is more strongly attracted by strategic asset rich locations than DMNE FDI, though *both* are attracted by state-level strategic asset availability.

******* TABLE 4 ABOUT HERE *******

******* TABLE 5 ABOUT HERE *******

Firm-level model estimations are presented in Table 6. Interestingly, models using firm-level data do not find CMNEs to be significantly more likely to have a stronger SAS *orientation* than DMNEs. The CMNE intercept dummy variable is insignificant. Looking at the interactions on high, medium and low-technology manufacturing and high and low knowledge intensive services, a significant difference (at the 5% level) was found in the SAS orientation of CMNEs. In contrast to the location choice modeling results (hypothesis 1), however, this shows CMNEs are significantly *less* likely to engage in SAS in the high-technology manufacturing group when compared to DMNEs. The results from firm-level models, therefore, indicate hypothesis 2a is not supported: CMNE FDI does not have a greater SAS orientation than DMNE FDI. As regards

hypothesis 2b, although we find the FSA proxy to be negative and significant, the interaction term is not significant. This implies the underlying role of FSAs is similar in both CMNEs and DMNEs.

******* TABLE 6 ABOUT HERE *******

As a further robustness check we estimated models using patents alone and trademarks alone. These produced analogous sign and significance level results for each alternative main explanatory variable in all three models. We also estimated models using two-digit NACE code dummy variables, instead of our broader industry groupings. This produced the same results as models using aggregated industry groupings, albeit size (as measured by employees and total assets) had a positive impact on SAS.[3]

Finally, it is clear hypothesis 3 is not supported owing to the contradictory findings of the two modelling exercises (based upon the same firm-level samples). This implies SAS *location* choice tells us little about actual SAS *orientation* as we have measured it.

5. Discussion

5.1 Bridging Disconnects Between Theory and Empirics: Incorporating an International Comparative Angle and Acquirer FSAs

The theoretical literature on EMNEs, in general, stresses the comparative differences between EMNEs and DMNEs in their SAS orientation. It additionally emphasizes the different underlying role of FSAs in driving SAS. Mathews (2006), for example, makes direct contrasts between his LLL model and the OLI model. He argues EMNEs seek to catch-up and do so by developing their limited FSAs through linking, leveraging and learning. This drives accelerated internationalization. Similarly, Luo and Tung (2007), Child and Rodrigues (2005) and Rui and Yip (2008), and others,

[3] Models estimations for patents alone; trademarks alone; and models using two-digit NACE codes are not reported. Please, contact the authors for a copy of these results.

explicitly attempt to develop theories based around DMNE and EMNE/CMNE differences – specifically their relative lack of FSAs as a driver of SAS. Yet, despite this clear conceptual link between the different *comparative* asset exploitation and augmentation approaches between DMNEs and CMNEs, to date direct comparative empirical testing has remained limited to only one location choice study (Jindra et al. 2016). By contrast, all other studies identified in Table 1 have focused on China in isolation. None of these studies, moreover, attempts to empirically explore how underlying FSAs, or more appropriately, lack thereof, influences SAS. A contribution we make, therefore, is to use an international comparative perspective. Our use of firm-level data, moreover, allows for the investigation of the potential role of underlying FSAs as drivers of SAS. This is important, as theoretical contributions stress that CMNE strategy and behavior can only be judged *vis a vis* DMNEs and that the underlying impact of FSAs as a driver of SAS will be different between the two (i.e. FSA augmentation in CMNEs versus exploitation approaches in DMNEs). Thus far there has existed a clear disconnect between theory and the empirical testing of that theory.

Interestingly, our findings regarding comparative *location choice* are in line with existing research that uses *firm-level* data looking at CMNEs in isolation. This research has universally found, in contrast to empirical location choice studies that use official aggregated FDI flows and stocks (i.e. like MOFCOM data), that CMNEs are indeed strategic asset seekers in the sense their FDI gravitates towards strategic asset rich locations. While we do find some locational evidence for asset seeking, more important (and challenging) is our interpretation of the *comparative* findings between DMNE and CMNE location choices. Our results are actually very similar to the only other comparative location choice testing yet undertaken, that by Jindra et al. (2016) which compares EMNEs (i.e. not only CMNEs) with DMNEs as groups. Their findings show that the coefficients on their two proxies capturing regional strategic assets are significant. This is true for both EMNEs and DMNEs, though with the coefficient for the former (EMNEs, using an interactive dummy variable) being significantly larger than the latter. We interpret our results to show an identical

pattern, with state-level strategic assets significantly attracting both DMNEs and CMNEs, albeit the latter being even more strongly attracted (the coefficient for the interactive dummy variable again being significant).[4] Jindra et al. (2016) cautiously interpret their own results 'seem to support the argument that investors from emerging market economies *use foreign direct investment to implement knowledge and asset seeking type of strategies in order to augment their ownership specific assets*' (p. 214, emphasis added).

While this is certainly one possible interpretation, Jindra et al. (2016) in their location choice study do not include a firm-level proxy for FSAs. They are therefore unable to say exactly what the relationship between underlying FSAs and SAS is for EMNEs. Thus the question of whether EMNEs are unique with regards to their FSA augmentation strategies still remains unanswered (albeit a general propensity towards asset rich regions is observed). When we probe into how the underlying FSA drivers of SAS may vary between CMNEs and DMNEs using our firm-level logit modelling approach, however, we find there are no significant differences. Both CMNEs and DMNEs exhibit a significant and negative relationship between SAS and their FSAs. The coefficients on these variables, moreover, do not significantly differ between the two groups. As both CMNEs and DMNEs develop stronger FSAs, therefore, this suggests they are *both* less inclined to asset seek. This idea of similarities between CMNEs and DMNEs, as opposed to the differences much discussed in the theoretical and empirical literature, is therefore reinforced by our logit modelling results.

Petersen and Seifert (2014) may speak for many when they note: 'A remarkable characteristic [of EMNEs] has been their tendency to acquire strategic assets in developed markets' (p. 376), we argue more caution is required in asserting that CMNE SAS FDI orientation is really different to

[4] We base this on fact that the strategic asset coefficient is statistically significant in all samples, albeit not the final model incorporating the interactive dummy. The reason for this apparent lack of significance, however, can be explained by the high levels of multicollinearity between the two SAS variables (see correlations in supporting table between strategic assets and Chinese MNE*strategic assets).

that of DMNEs. Our comparative approach using a direct measure of SAS to establish a proxy for SAS *orientation* and an explanatory variable to capture FSAs suggests that reaching this conclusion based on location choice approaches alone is problematic. This is because while a firm may locate in an asset rich location it may not necessarily undertake SAS. In other words, using a location choice approach leaves us to infer much about what the firm is actually doing from the geography of its investments. The location choice approach, moreover, has so far not included the FSA drivers in its empirical modelling of FDI location choice. We argue, therefore, that it is still too early to suggest the tendency of CMNEs to undertake SAS owing to an FSA deficit is one of their 'remarkable' characteristics.

5.2 Are CMNEs really different?

There is considerable emphasis in some current literature on the differences, not similarities, between CMNEs and DMNEs. Indeed, there appears to be widespread belief among many scholars that CMNEs, and EMNEs more generally, are typified by their stronger (when compared to DMNEs) SAS orientation and FSA augmentation strategies. This, we suggest, is likely because of the considerable influence that a number of early articles on EMNEs have wielded. Articles by Child and Rodrigues (2005), Mathews (2006), Rui and Yip (2008) and Luo and Tung (2007), in particular, elevated the idea of asset seeking as a central plank in the creation of a new, alternative theoretical model, to the OLI paradigm. Subsequently, a great volume of research has pursued this line of reasoning, placing SAS at the center of discussions of CMNEs (and other EMNEs). Despite this great interest, however, the supporting empirical evidence has been surprisingly weak. Serious discussion of how one might go about systematically testing the SAS thesis, moreover, remains noticeable largely by its absence from current mainstream debate. This might explain the large number of single country location choice studies which look to indirectly infer SAS, rather than looking directly at the available firm-level evidence. The question of how the SAS thesis and its variants (i.e. LLL, 'springboard' arguments, asymmetries in liabilities of foreignness,

complementary local resource arguments, etc.) may be best tested still requires further careful consideration. If these new theories cannot be adequately tested (i.e. that they are verifiable or otherwise falsifiable) their value may be brought into question.

Taking a contrarian viewpoint, in line with our evidence, one might equally argue that SAS is vital for DMNEs that lack but wish to further develop their FSAs. In an era characterized by greatly increased global 'hyper competition', all MNEs are increasingly forced to compete on the basis of their intangible assets (Nolan 2012). The past three decades, for example, have been typified by increased global FDI activity, primarily concentrated in global 'mega-mergers' (i.e. deals exceeding one billion dollars) orchestrated by DMNEs (UNCTAD 2013). This was referred to by some as a 'global big business revolution' as it was accompanied by a radical transformation in the ways in which DMNEs did business (Nolan 2012). Not only did DMNEs become more internationalized, their business models evolved considerably. This involved the increased outsourcing of physical production activities (often to larger, more capable suppliers, organized in tiers) accompanied by a growing focus on their core competitive strengths, particularly as embodied in their intangible assets, such as brands, technologies and innovative managerial and production processes. MNEs from developed markets, therefore, have undergone considerable transformations, often involving the intensification of knowledge-based, intangible asset led competition, orchestrated via SAS. Indeed, our results suggest that all MNEs, not just CMNEs, seek to augment their FSAs via SAS.

Following our finding that CMNEs are not different to DMNEs in their SAS orientation or the underlying FSA drivers, we are compelled to discuss an extension of the asset seeking argument - namely that CMNEs are successfully using SAS for the purposes of 'accelerated internationalization' (i.e. Tan and Mathews (2015)) and rapid firm-level catch-up (Matthews, 2006; Child and Rodrigues, 2005; Luo and Tung, 2007). Acquiring strategic assets, *per se*, is not

adequate for catch-up: productive use must also be made of them. Strategic assets are only of use if they help the firm compete. While the jury is still out on the post-acquisition performance of CMNE targets *vis-à-vis* DMNE targets (Anderson et al. 2015), finding both CMNEs and DMNEs are similar in their SAS orientation and underlying FSA drivers raises questions as to whether this really is a strategy that is unique to CMNEs and whether they are catching up with DMNEs in relative or absolute terms. In fact, DMNEs still 'control a large proportion of the world's stock of advanced technologies' (Criscuolo 2009, p. 869).

6. Conclusion

The analysis of CMNEs cross-border investment strategies, particularly their SAS orientation, has become a hot topic in the International Business literature. The SAS question is stressed as being important because of its theoretical implications: do we need new theories for CMNEs, and EMNEs more generally, that can explain their SAS orientation? Indeed, the view that CMNEs are strategic assets seekers in psychically distant developed markets has become quite widely accepted. Within this debate, however, it is striking that there has been no systematic comparative empirical research on the outcomes of CMNE and DMNE FDI with respect to actual acquired strategic assets, as opposed to geographic locations. The role of underlying FSA drivers, moreover, has been largely overlooked. We argue here, on the basis of our investigation into what we call the comparative SAS *orientation*, that the CMNE and EMNE literatures should be more circumspect in emphasizing SAS for the purposes of FSA augmentation as a strategy unique to EMNEs, or CMNEs as a specific class of EMNE. In turn, the claim that new theories are required to explain their behavior needs further qualification, as the extent to which CMNEs are truly different remains unproven.

6.1 Further research and limitations

Future research should attempt to address the current disconnect between EMNE related theories and empirical testing of those theories. It should engage in further systematic comparative analysis of CMNEs with DMNEs using firm-level data. For example, while we have shown that the differences between CMNEs and DMNEs may be exaggerated, it is possible that in earlier periods (not covered by our Chinese data) such differences did in fact exist (i.e. CMNEs have become more like DMNEs but only in recent times). Future research, therefore, might want to further consider historical data using our firm-level type comparative approaches to see if this is the case. Additionally, it might also consider MNEs from other emerging markets – such as India or Brazilian MNEs – where asset seeking is thought to take place. Further research, moreover, is required to meaningfully quantify the concept of a strategic asset and also consider the best proxy for modelling FSAs. We have used patent and trademark volume data here, which lacks any measurement of the quality or real value of such intangible assets. While this seems like a reasonable first stab at addressing these important questions, future research could improve upon this method by exploring if alternative measures of intangible assets yield similar results (using, for example, Tobin's Q Ratio). Quantifying such 'intangible' assets is, self-evidently, not straightforward and requires more attention. Finally, this study does not directly test catch-up considerations. Future research will do well to consider how catch-up can be meaningfully measured in both relative and absolute terms. For it is the longer-term outcomes of SAS strategies that are arguably of greatest interest and importance.

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Table 1: Summary of location choice studies exploring the SAS orientation of Chinese MNEs

Authors and year of Study	Type of FDI Data used in the empirical study	Chinese FDI to where?	Time period	SAS proxy in the host countries	Evidence of strategic asset seeking?
Huang and Wang (2013)	Two sources: NDRC, 216 firms; Zhejiang, 1,270 projects. Probit model.	Rest of world	NDRC, 2003-11; Zhejiang, 2006-2008	A national index of high-tech exports	**Yes** Mainly for large investors like SOEs, SMEs more market seeking
Buckley et al. (2007)	Approved OFDI data	Rest of world	1984-2001	Patents, number	**No**
Kang and Jiang (2012)	MOFCOM (FDI stock), panel data OLS	8 East Asian countries	1995-2008	Patent applications (WIPO) in host countries	Patents dropped owing to high levels of multicollinearity
Hurst (2011)	MOFCOM, FDI flows	OECD and non OECD	2003-2008	Private property right protection, laws and enforcement	**No** Negative and significant
Ramasamy et al. (2012)	Firm-level data, 63 Chinese listed companies, Poisson model (count data)	59 countries, 1350 projects	2006–2008	Registered patents (number); and exports of high technology products/total exports	**Yes** But attraction is to commercially viable technologies, rather than core research content (i.e. patents insignificant), SOEs
Rodríguez and Bustillo (2011)	OECD/National/ASEAN, FDI stocks (volume)	36 countries (OECD focus)	1995-2009	Granted patents, number	**No**
Jindra et al. (2016)	ORBIS, firm-level data (probability of investment, count model used)	European Union, at 100+ sub-regional levels	1996-2010	R&D expenditures in region, share of science and technology employees in region	**Yes** Comparisons with DMNEs included (DMNEs also asset seek)
Amighini et al. (2013)	915 greenfield cross-border investments, taken from fDi Markets data	109 host countries	2003-2008	Human capital (gross secondary school enrolment rate), R&D, share of GDP	**Yes** But only in SOEs
Wang and Yu (2012)	Official FDI flows	150 host countries	1991-2009	High technology exports/all manufactured exports	**No**
Alon (2010)	FDI Intelligence, Financial Times, firm-level data	103 host countries	2003-2007	R&D expenditure	**Yes** But only in SOEs

Table 2: Location choice model variables, descriptions and data sources

Variable	Description	Data Source
FDI	Frequency count of investing country (i.e. China, Germany or UK) FDI projects in the host state	Thomson ONE and FT fDi Markets Database
Chinese investment	Dummy variable where 1=state 'i' in time 't' received Chinese FDI and 0 otherwise	Thomson ONE and FT fDi Markets Database
Strategic Assets	Sum of granted national utility patents and federally registered trademarks	United States Patent and Trademark Office – Annual Performance and Accountability reports: 2003-2013
Market Size	Gross state product per capita	US Department of Commerce – Bureau of Economic Analysis
Unions	Percentage of employees represented by a union	US Department of Labor – Bureau of Labor Statistics
Taxation	State corporate tax rate (highest marginal tax rate)	Tax Foundation; Each state's tax forms and instructions; Commerce Clearing House; Federation of Tax Administrators
Natural Resources	Raw material exports - HTS codes for chapters 25, 26, and 27 (earths and stones, ores, and fuels) divided by total state exports	US Bureau of the Census – Foreign Trade
GSP Growth	Year-on-year growth rate	US Department of Commerce – Bureau of Economic Analysis
Unemployment	Percentage of population which is unemployed	US Department of Labor – Bureau of Labor Statistics
Geographic Size	Square miles of state land excluding federal land	US Bureau of the Census - Geography

Table 3: Logit model variables, descriptions and data sources

Variable	Description	Data Source
Strategic assets (acquisitions)	Dummy variable where the presence of trademarks and/or patents in the acquisition target firm = 1 and 0 otherwise	Orbis
Strategic assets (greenfield)	Dummy variable where the stated investment activity is 'Design, Development and Testing' or 'Research and Development' = 1 and 0 otherwise	Financial Times fDi Markets
Chinese MNE	Dummy variable where the ultimate beneficial owner of the investing firm is of Chinese origin = 1 and 0 otherwise	Thomson ONE Banker; Financial Times fDi Markets
FSAs	Number (count) of patents and trademarks in the investing firm	Orbis; United States Patent and Trademark Office
Employees	Number (count) of world-wide employees	Orbis
Firm age	Number (count) of years from organization incorporation to 2015	Orbis
Net income	Total net income before taxes	Orbis
Total assets	Total firm-level assets	Orbis
High tech manufacturing industry	Dummy variable where manufacturing firms included in NACE 2-digit codes: 21 and 26 = 1 and 0 otherwise	Orbis; Eurostat
Medium tech manufacturing industry	Dummy variable where manufacturing firms included in NACE 2-digit codes: 19; 20; 22; 23; 24; 25; 27; 28; 29; 30 and 33 = 1 and 0 otherwise	Orbis; Eurostat
Low tech manufacturing industry	Dummy variable where manufacturing firms included in NACE 2-digit codes: 10; 11; 12; 13; 14; 15; 16; 17; 18; 31; 32 = 1 and 0 otherwise	Orbis; Eurostat
Knowledge intensive service industry	Dummy variable where manufacturing firms included in NACE 2-digit codes: 50; 51; 58; 59; 60; 61; 62; 63; 64; 65; 66; 69; 70; 71; 72; 73; 74; 75; 78; 80; 84; 85; 86; 87; 88; 89; 90; 91; 92 and 93 = 1 and 0 otherwise	Orbis; Eurostat
Less knowledge intensive service industry	Dummy variable where manufacturing firms included in NACE 2-digit codes: 45; 46; 47; 49; 52; 53; 55; 56; 68; 77; 79; 81; 82; 94; 95; 96; 97; 98; 99 = 1 and 0 otherwise	Orbis; Eurostat

Table 4: Location choice results disaggregated by ultimate home ownership of investing firm for time period 2003-2013

2003-2013	**China**	**UK; Germany**	**China; UK; Germany**	**China; UK; Germany**
Strategic Assets	.0000361 **	.0000328 ***	.0000309 ***	.0000034
	(.0000147)	(.0000007)	(.0000007)	(.0000122)
Market Size	.000111 ***	.0000801 ***	.0000875 ***	.0000861 ***
	(.0000259)	(.000012)	(.0000117)	(.0000115)
Unions	-.0419397	-.0092367	-.0184353	-.0200748
	(.0256888)	(.0147688)	(.0144614)	(.014468)
Tax	-5.28595 **	-2.70108 **	-3.31989 ***	-3.245342 ***
	(2.346652)	(1.26587)	(1.208241)	(1.164536)
Natural Resources	-.0050431	.0412499	.0632924	.0296794
	(1.49142)	(.6589458)	(.6403741)	(.6251836)
GDP Growth	-.0535417 ***	-.0053179	-.0114003	-.0130067 *
	(.0169227)	(.0073385)	(.0070786)	(.0068631)
Unemployment	.1266064	.0546978 ***	.0646124	.0570165 ***
	(.029199)	(.0116605)	(.0112814)	(.0113392)
Geographic Size	-.00000068	-.0000004 **	-.00000048	-.00000037 *
	(.00000030)	(.0000001)	(.00000018)	(.00000021)
Chinese MNE* Strategic Assets				.0000368 ***
				(.0000108)
CONSTANT	-2.61525	-.0325713	-.2284835	-.0547549
	(1.18996)	(.572872)	(.5575578)	(.5610843)
LLH	-605.600	-1320.514	-1366.969	-1360.9811
Swartz AIC	2.228454	4.828142	4.999889	4.981749

Coefficient reported with standard error in parentheses. LLH = Log Likelihood. AIC = Akaike Information Criterion (lower values indicate a better fitting model). Asterisks ***, **, * denote 1%, 5% and 10% significance levels, respectively.

Table 5: Correlation matrix for location choice models

Variables		1	2	3	4	5	6	7	8	9	10
1	Strategic Assets	1.0000									
2	Market Size	0.4033	1.0000								
3	Unions	0.2273	0.3943	1.0000							
4	Tax	0.0457	0.0113	0.1803	1.0000						
5	Natural Resources	-0.1314	0.0910	0.1624	-0.0260	1.0000					
6	GDP Growth	-0.0749	0.0960	-0.0757	-0.0609	0.0984	1.0000				
7	Unemployment	0.1886	-0.1044	0.0930	-0.0869	0.0388	-0.4436	1.0000			
8	Geographic Size	0.0447	0.2523	0.1430	-0.0952	0.4506	0.1373	0.0701	1.0000		
9	Chinese MNE	0.3041	0.1006	0.1273	-0.1377	-0.0980	-0.1648	0.3489	0.0099	1.0000	
10	Chinese MNE* Strategic Assets	0.8039	0.1900	0.2605	-0.0404	-0.0829	-0.0771	0.2742	0.1364	0.5384	1.0000

Table 6: Chinese, German and UK firm-level logit models for time period 2003-2013

2003-2013	**Aggregated industry: China; UK; Germany**	**Aggregated industry: China; UK; Germany – with interactions**
Chinese MNE dummy	-.1599833	.4078555
	(.2356601)	(.9818726)
FSAs	-.00002 **	-.000018 **
	(.0000008)	(.0000008)
Employees	.0000009	.0000011
	(.0000007)	(.0000007)
Firm age	.0013488	.001021
	(.0011957)	(.0012112)
Net income	-.00000008	-.00000002
	(.00000017)	(.00000016)
Total assets	.00000001	.00000001
	(.00000002)	(.00000001)
High-tech manufacturing industry	1.690061 ***	1.867799 ***
	(.2416807)	(.2501754)
Medium-tech manufacturing industry	.4956509 **	.5166172 **
	(.2395694)	(.249161)
Low-tech manufacturing industry	.6965222 **	.7746712 **
	(.2926518)	(.3010029)
High knowledge intensive service industry	.756281 ***	.8014603 ***
	(.2207597)	(.2284893)
Low knowledge intensive service industry	.2785345	.2494834
	(.2476765)	(.2577451)
Employees-interaction		.0000001
		(.0000007)
FSAs-interaction		-.0000065
		(.0000685)
Firm age-interaction		.0297375
		(.0188477)
Net income-interaction		.0000046
		(.0000034)
Total assets-interaction		-.00000001
		(.00000001)
High-tech manufacturing industry-interaction		-3.671373 **
		(1.552221)
Medium-tech manufacturing industry-interaction		-.5692711
		(1.024965)
Low-tech manufacturing industry-interaction		-2.360616
		(1.715237)
High knowledge intensive service industry-interaction		-.5058821
		(1.044561)

Low knowledge intensive service industry-interaction		.6009683 (1.056142)
CONSTANT	-2.012293 (.2152441)	-2.062768 (.2228239)
LLH	-1493.573	-1474.2264
Swartz AIC	1.033337	1.026922

Coefficient reported with standard error in parentheses. LLH = Log Likelihood. AIC = Akaike Information Criterion. Asterisks ***, **, * denote 1%, 5% and 10% significance levels, respectively.