

MNEs Linkages in Small Developed Economies: The Home/Foreign Effect

Abstract

There remains much uncertainty as to how the interaction between foreign and domestic MNEs and their local business partners leads to changes in firm-specific resources in the context of small economies. In this paper, we look at the role of foreign MNEs in inter-firm relationships in small economies. Using results from a questionnaire administered amongst top executives of domestic and foreign firms, we find that the extent of linkage creation is more pronounced in New Zealand and Finland, and least so in Singapore and the Netherlands, but that the intensity – in terms of resource exchange – of linkages is highest in Singapore, Finland and the Netherlands. Linkage creation by foreign firms is lower than that of domestic firms, but high degrees of firm autonomy mitigate this gap in the case domestic output and contributions to suppliers. However, differences in linkage creation between foreign and domestic firms remain, and – contrary to our expectations – are even higher between older firms than between new establishments suggesting that younger firms form more, and more intensive, linkages in small, advanced economies.

1. INTRODUCTION

The globalization of the world economy has brought forward new challenges for new small economies, in as much as they need to define their comparative advantages carefully to attract and retain MNEs within their boundaries, whether those are foreign-owned or locally-owned MNEs. In this paper, we look at the role of MNEs in generating inter-firm relationships in small economies.

MNEs contribute to and gain from activities in various locations worldwide. There remains uncertainty as to how this interaction with the host/home economy leads to changes in firm-specific resources in the case of small economies. For instance, MNEs benefit from intra-firm exchange of resources (Gupta and Govindarajan, 2000; Forsgren et al., 2005; Ghauri, 2002), as well as learn from the environment in which they operate (Dunning, 1998). In so doing, MNEs optimise configuration and coordination of resources worldwide. Cross-fertilization whereby MNEs benefit from and contribute to host economies is most likely to occur in industrialized countries where both firm capabilities and linkages between global MNEs and local firms, are strong (Le Bas & Sierra 2002; Giroud & Scott-Kennel, 2009). One of the assumptions is that the potential for inter-firm relations and resource sharing is facilitated in dynamic environments where firms strongly benefit from working together or in close proximity to each other.

The global-local interface is more acute in small advanced economies, in particular those that rely heavily on international business activities (van den Bulcke & Verbeke 2001; Scott-Kennel, 2007), and with high potential for mutual learning through foreign-local firm interaction (Benito et al. 2002). Although one can anticipate a strong and natural overlap between the developmental needs of MNEs and the small economies (Pearce, 2009: 90), little is known about this interaction. The first objective of this paper is to investigate linkages creation by MNEs in selected small developed open economies.

The second objective of this paper is to compare MNEs depending on whether they are *locally-* or *foreign-*owned firms. International business research has shown that MNEs possess superior technological and managerial advantages, and that MNEs have overall a positive impact in the countries where they operate (Fortanier, 2008). Few studies, however, have focused on the comparison between locally- and foreign-owned MNEs in a country. The literature has shown that MNEs knowledge is diffused to local firms and enhances endogenous firms' own capabilities (Giroud, 2003; Lall and Narula, 2004; Hoekman and Javorcik Smarzynska, 2006), yet those studies focus solely on foreign-owned firms and omit

to compare the same effect from locally-owned MNEs. Castellani and Zanfei (2006), however, have shown in the case of Italy that the potential for learning is larger for local MNEs (i.e. Italian MNEs impact more positively on other Italian firms than foreign-owned MNEs). Thus, the second objective of this paper is to investigate the differences in linkage creation depending on whether the MNE is locally owned, or foreign-owned.

The potential for learning from linkages is not an automatic process. Some studies have already shown a number of determinants for linkages creation (see amongst others studies by Scott-Kennel, 2007; Giroud and Mirza, 2006; Belderbos et al, 2001; Iguchi, 2008). Linkage formation depends upon individual firms' objectives and activities (Cantwell and Mudambi, 2000; Marin and Bell, 2006). For instance, some studies have shown that the developmental impact of foreign subsidiaries via vertical linkages is enhanced when firms have more autonomy in their decision making, when they possess technological competencies (UNCTAD, 2001: 137; Cantwell and Iguchi, 2005; Jindra et al., 2009), and when higher levels of embeddedness occur (Saliola and Zanfei, 2009); other studies point to differential relationships inherent to industry specificities (Chen et al., 2004). Hence, the third objective of this paper is to analyse how individual firms' objectives and activities impact upon linkages formation in small developed economies.

In the first half of the paper, we discuss the role of MNEs in small economies, before developing hypotheses regarding MNEs' vertical linkages and the key determinants for linkages creation in small economies. In the second half of the paper, we conduct a list of regression models, using a large-scale firm-level dataset. Data was collected by means of an internet-based survey conducted in Belgium, Finland, Ireland, the Netherlands, New Zealand and Singapore. We find that, overall, MNEs activities generate similar linkage outcomes across small economies. However, there exist distinctions depending on ownership, heterogeneity and location.

2. MULTINATIONALS IN SMALL OPEN ECONOMIES

With the globalization of the world economy, MNEs have begun to resemble more of an inter-organisational network, incorporating both intra- and inter- firm exchange (Ghoshal and Bartlett, 1990). For host and home economies, and small advanced economies in particular, this trend suggests that only truncated value-chains, or selected value-chain activities are likely to be located in specific regions or countries. This trend, combined with open character of small advanced countries provides for a unique context to test the effects of globalization,

and in particular, the interaction between global and local business networks. On the one hand, their size means they must rely heavily on international activities relative to their larger country counterparts, but on the other, it also means they are less than optimal locations for market- or efficiency-seeking investment by multinational corporations. MNEs tend to focus on countries or regions with large consumer markets, large ‘workshops’ or specialized competencies that can be acquired to tapped into as part of a ‘global factory’ (Buckley & Ghauri 2004). The adoption of a global network approach to strategy makes location more, rather than less, important for MNEs and has implications for nature and impact of MNE activity on firms within the host economies they operate in (Narula & Lall 2004).

Given that small advanced economies are not likely to be the focus of global strategies and host increasingly truncated value chains, many consider the development of specialized or niche areas of knowledge might be the best path towards a virtuous cycle of competitive advantage. Such a path would serve to promote outward FDI by national MNEs and attract inward FDI by foreign MNEs, thus drawing on resources and advantages at home and abroad (Maskell & Hannibalsson 1998; Andersson, 1998). Thus, in a small advanced economy reliant on both global and local sources of competitiveness, inward and outward FDI can play an important role in the upgrading of *local firm* capability. Yet, there are few studies that adopt a holistic approach to studying this role within the small advanced economy context.

The experiences of small advanced countries with regards to FDI have been mixed. Some have been more attractive to foreign MNEs (for example, Singapore, Belgium and Ireland) than others (eg. Israel, Norway and Finland). Others have been extremely successful at internationalising ‘home-grown’ MNEs (eg. Denmark, Switzerland and Sweden). Still others have accumulated foreign direct investment stocks abroad (eg. Norway, Switzerland, Belgium and the Netherlands) while others appear to have made little progress (eg. Ireland, Israel and New Zealand).

In this paper, we target six small economies, namely Belgium, Finland, Ireland, the Netherlands, New Zealand and Singapore. These economies are *small, developed* economies, highly competitive with a dynamic business environment characterized by open borders facilitating business transactions. All six are listed amongst the top 25 most competitive economies in the world (GCF, 2009). Each of these countries demonstrates different patterns of accumulation of inward and outward investment stocks. This is largely attributable to their historical patterns of economic development.

The Netherlands has been involved in international trade and investment since the days of Dutch-East India Company, and today remains the headquarters country for some of the world's largest and best-known MNEs as well as a base for export-oriented foreign subsidiaries (Hogenbirk and van Kranenburg, 2006). As a developed economy with favourable social economic policy and location next to its giant neighbour, Germany, it has also attracted considerable inflows of FDI.

In contrast, New Zealand - as a relatively young country - occupies a much more recent trading past. As part of the British Commonwealth it attracted inward market-seeking investment from the 1930s onwards that was made to avoid both the costs of distance and protectionism. Industry oriented towards the export of agricultural and horticultural products meant overseas markets were largely serviced from home. New Zealand's policy stance has been, until very recently, 'hands-off' with regard to both attracting inward FDI and encouraging outward FDI (Scott-Kennel, 2004). Even today, despite being a developed nation economically, inward FDI still exceeds outward FDI.

Both Ireland and Singapore have relied heavily on foreign firms for their economic development, but with differing experiences. Ireland only recently attracted inward FDI (since the 1980s), while Singaporean firms are internationalizing with rising levels of outward FDI. Both however have strong regional ties explaining their internationalisation (the European Union membership for Ireland, the dynamic ASEAN environment for Singapore), as well as historical ties to the United States (for Ireland). Evidence of Ireland's success is shown by the fact that foreign owned enterprises account for almost half of all employment (compared to 19% in other OECD countries) (OECD, 2001) and have been a key contributors to the transformation of a largely agricultural nation into a knowledge and export-driven economy (Barry and Kearney, 2006).

3. DETERMINANTS OF LINKAGES

In this paper, we define *vertical linkages* as all value chain relationships created between MNEs and local firms in one individual country (i.e. the country can be a host country if the MNE is foreign-owned, or the home country if the MNEs holds its headquarters locally). We subcategorize vertical linkages into backward and forward linkages. Backward linkages include all upstream relationships with local suppliers, including key suppliers and subcontractors (UNCTAD, 2001). Forward linkages include all downstream relationships developed between foreign subsidiaries and customers, (sales) agents and distributors.

Domestic firms can benefit from spillovers and transfer of knowledge embodied in products, processes and technologies of the MNE. Many enhance their productivity as a result of access to and/or use of new enhanced products and inputs offered by MNEs (Dunning and Lundan, 2008; Driffield et al., 2002; Javorcik, 2004; including in services, see Miozzo & Grimshaw, 2008). We acknowledge that MNEs also benefit from and contribute to other business partners, essentially through local alliance formation and joint-ventures. Such linkages are referred to as collaborative or *horizontal linkages*.

To date, international business studies have focused on linkages creation in host economies to further understand the interaction between MNEs activities and capabilities enhancement of local firms in host countries (Giroud, 2003; Lall and Narula, 2004; Hoekman and Javorcik Smarzynska, 2006; Ivarsson and Alvstam, 2009). Such studies point to the technological superiority of the MNE resulting from their competitive advantages often arising from the ability to exploit comparative advantages in multiple locations. MNEs operate more as integrated businesses, with decentralised decision-making centres (Bartlett et al., 2008), learning from diverse environments thanks to inter- and intra-firm exchange of resources (Gupta and Govindarajan, 2000; Forsgren et al., 2005; Ghauri, 2002). MNEs embeddedness in diverse locations enables them to learn from business partners (Forsgren et al., 2005; Saliola and Zanfei, 2009), but also to benefit host business partners (Le Bas & Sierra 2002). MNEs develop both internal and external networks. Their internal networks enhance the interconnectiveness between large number of subsidiaries located throughout the world; while their subsidiaries (or indeed the headquarters too) set up linkages with firms in host economies and institutions that enable them to exploit knowledge assets and gain access to local resources, a process which, in turn, also benefits local firms. Thus, MNEs learn to compete in diverse markets and accumulate knowledge from access to numerous sources of competitive advantages (Dunning, 1998).

Foreign versus local MNEs

One can further differentiate the environment as either the home- or source-country environment (for what we refer to as locally-owned MNEs) or the host-country environment (for the foreign-owned MNEs). Factors such as the level and structure of resource endowments, size and specificities of markets, government policies, etc... influence the type of firms that operate in a particular environment, but also the potential for linkage formation. Although studies have focused on showing the technological superiority of MNEs, surprisingly few of those compare activities of locally-owned and foreign-owned MNEs

within individual environments. This can likely be attributed to the emphasis on subsidiaries rather than headquarters, particularly in the more recent literature (Barner-Rasmussen et al., *forthcoming*). The literature has shown that MNEs' knowledge is diffused to local firms and enhances endogenous firms' own capabilities, yet those studies focus on foreign-owned firms and omit to compare the same effect from locally-owned MNEs. One exception is the study conducted by Castellani and Zanfei (2006). They look at differences in spillovers across and within multinationals, differentiating between parent companies, foreign and local affiliates in the Italian manufacturing sector. Results indicated that locally-owned MNEs exhibit a higher propensity to carry out innovative activities and to establish cooperative linkages with local firms than foreign-owned subsidiaries.

In line with this study, we suggest that locally-owned MNEs (i.e. MNEs for whom the headquarters are located in the country of study) benefit from an enhanced understanding of the local environmental factors, and facilitated business relations with other local firms. Foreign-owned MNEs have to face concerns of *liability of foreignness*, they have incurred high fixed costs of learning business practices in the host country, have had to adapt to a different cultural context. In addition, locally-owned MNEs may be already located in more dynamic business areas, next to long-established business partners. For these reasons, our first hypothesis is that locally-owned MNEs create more linkages in the economy than foreign-owned MNEs:

H1 Linkage creation is higher for locally-owned MNEs than for foreign-owned MNEs.

Characteristics of the MNE locally

MNEs operate a complex network of subsidiaries in several locations. The international business literature argues that parent companies tend to be the main source of proprietary advantages of the multinational enterprise (UNCTAD, 2005). Only part of the technological, managerial and organizational capabilities are transferred and shared internationally. Evidently, MNEs can accumulate knowledge and capabilities through in-house R&D activities at the source location as well as through learning from external linkages in each location where subsidiaries are based. Thus, foreign subsidiaries can be reliant on foreign sources of technology rather than creating their own host-country specific technology and R&D (Manea and Peace, 2006), but in some cases they also accumulate knowledge and capabilities through local R&D activities (Cantwell and Piscitello, 2005).

This technological potential matters to the linkage creation of firms in host economy. Marin and Bell (2006) suggest that the presence of knowledge creating and accumulating activities in foreign subsidiaries increases likelihood of knowledge spillovers to domestic firms. Depending on the geographical setting and history of the subsidiary, each will present a unique profile of capabilities (Birkinshaw & Hood, 2001). The nature of linkages is related to this profile of capabilities; and linkage intensity is likely to be higher in subsidiaries with their own technological capabilities. Therefore:

H2a Technological capability developed locally in the MNEs is positively associated with the extent and intensity of vertical linkages with domestic firms.

H2b For MNEs in the manufacturing (in particular those in producer-driven networks, as opposed to buyer-driven), the extent of local linkages with domestic firms is expected to be higher than for MNEs in the services sector, but there are no expected distinctions for intensity.

H2c MNEs with larger operations locally generate higher extent and intensity of vertical linkages with domestic firms.

While some firms can forge local linkages more quickly than others, and depending on the sector the tendency to engage in inter-firm relationships can vary, studies have argued that the longer a firm has been in operations, the more linkages it forges in the economy. In the developing countries' context, the length of time a foreign subsidiary has been in operation is often related to being an early or a late entrant, with fewer local suppliers or buyers at first and more as the host economy develops and as the MNE becomes more familiar with the local business environment (Lim and Fong, 1982). In addition, foreign subsidiaries gain increased autonomy over decision-making over time, thereby gaining more freedom in choosing local business partners. In many studies, the length of operations also reflects the level of embeddedness in the host economy. Therefore studies have argued that the longer the firm is in operation in a country, the more linkages are created (McAleese and McDonald, 1978; Driffield and Noor, 1999; Görg and Ruane, 2001; Tavares and Young, 2006; Kiyota et al., 2008). This also appears to hold even if the firm changes hands (is acquired post-establishment) (Scott-Kennel, 2007), but interestingly this may not always lead to enhanced knowledge exchange between business partners (Giroud, 2007). Thus,

H2d The longer the MNE has been in operation, the more linkages it possesses.

While studies have not, to date, compared linkages between locally- and foreign-owned MNEs in a given economy, linkages studies have drawn to a variety of other determinants (see amongst others studies by Scott-Kennel, 2007; Giroud and Mirza, 2006; Belderbos et al., 2001; Iguchi, 2008). Linkage formation depends upon individual firms' objectives and activities (Cantwell and Mudambi, 2000; Marin and Bell, 2006). For instance, some studies have shown that the developmental impact of foreign subsidiaries via vertical linkages is enhanced when firms have more autonomy in their decision making, and when they possess technological competencies (UNCTAD, 2001: 137; Cantwell and Iguchi, 2005; Jindra et al., 2009). Thus, little is known, still, about linkages determinant in small advanced economies.

Much of the literature focuses on MNE subsidiaries and their embeddedness in host economy. The international management literature analyses the systems through which foreign firms build capabilities from their activities in diverse country contexts (Bartlett et al., 2008; Forsgren, 2005) while economic development literature concentrates on the impact of foreign subsidiaries on locally-owned firms (Smarzynska, 2006; Fortanier, 2008). This subsidiary-focused approach has led to evidence that emphasizes the importance of autonomy on the ability to create linkages and develop business relationships in host economies. This is related to the literature on subsidiary roles (see for instance Schmidt et al., 2002; Birkinshaw & Hood, 2001). White and Poynter (1984) argued that subsidiaries with a broad autonomy in regard to market, product, and value-adding scope (world/regional mandate subsidiary), have sufficient autonomy, authority and capabilities to generate independent competencies (Young & Tavares, 2004: 221). Firms with autonomy over decision-making will be able to select their business partners independently, and with enhanced competencies will also create closer links. In their study of foreign subsidiaries in the Malaysian electronics industry, Cantwell and Iguchi (2005) argue that autonomous subsidiaries used a wider range of local inputs creatively (Cantwell & Iguchi, 2005: 61). Such studies indicate that firms with autonomy over decision-making with regard to key activities create more linkages locally and engage in more knowledge exchange with local business partners. As a result:

H3a MNEs with a greater level of autonomy over decision making for key functional activities generate more local linkages than firms with less autonomy.

In the following section, we provide details of the survey and database utilised to test the hypotheses.

4. METHODOLOGY

4.1 Data collection

In order to test our hypotheses, we sent out a survey in the selected six small open economies (Belgium, Finland, Ireland, the Netherlands, New Zealand and Singapore). The survey was conducted between July 2008 and February 2009 among the largest 500 firms (domestic and foreign) in each country (representing an overall sample of 3000 firms). The survey was conducted mostly online, meaning that respondents were invited and reminded via email to complete a web-based questionnaire (using software and server from *2ask.net*), although when requested a paper copy of the questionnaire was provided to the respondent. The personal email addresses of the managing director (in case of foreign subsidiaries) or the local area/country manager (in case of domestic firms) were collected through the use of published databases or individual phone calls to the company.

In designing the online questionnaire, we closely followed the instructions from Dillman's (2007) book on mail and internet surveys with respect to personalization, wording, question order and layout. The survey was pilot-tested twice among a total of 65 people (26 in the first pilot, 39 in the second), including academic colleagues with a research interest in linkages, business managers, and MSc students in business administration. Their feedback was incorporated to ensure user friendliness and avoid misinterpretation of questions. The final survey took on average 12 minutes to complete. The survey was conducted in English in Ireland, New Zealand and Singapore, while respondents in Belgium, the Netherlands and Finland could choose between answering English version or (respectively) a French, Dutch or Finnish version. Finally, the study was endorsed by several organizations. A total of 393 responses were received, representing an overall response rate of 13.1%. The sample is composed of 68 firms for Belgium/the Netherlands, 85 for Finland, 70 firms for Ireland, 135 firms for New Zealand and 39 for Singapore. There are a total of 58 firms operating in the low to medium-low tech manufacturing sector, 65 in the high to medium-high tech manufacturing sector, 139 in low knowledge intensive services, 86 in knowledge intensive services, and 45 in Other sectors.

4.2 Variable definition: Dependent variables

Linkage quantity

We measured the quantity of both backward linkages and forward linkages by the percentage of total inputs purchased in the country of survey (backward) and the percentage of total output sold to customers in the country of survey (forward). Inputs are defined as including all raw materials, intermediate and final goods and services purchased, and outputs as including both intermediate and final goods and services sold.

Linkage quality

The quality of local linkages is conceptualized as representing the amount of (relevant) knowledge that is exchanged between the surveyed MNEs and local firms. We identified three types of local linkages between MNEs and local firms: with buyers, suppliers and with local business partners (e.g. in joint ventures or alliances), representing both forward and backward vertical linkages, and horizontal linkages, respectively. In order to assess the extent of knowledge exchange, we asked respondents for each of these three types of local firms, to what extent they *contributed* to resources and knowledge, and to what extent they *benefited* from resources and knowledge from these firms. Respondents were asked to answer on 7-point Likert scales (ranging from 1-‘not at all’ to 7-‘very much’, including an option for not applicable) for four types of knowledge: i) technical know-how, R&D and innovation, ii) organizational & managerial routines, iii) marketing know-how and market information, iv) training and development of human resources.

The final measures of linkage quality (six in all) were made by taking the mean of these four items (for each of the three groups of local firms, and for knowledge contributed and received). Factor analyses and inter-item correlation coefficients show excellent results with respect to the reliability of the scales.

[Table 1 approximately here]

4.3 Variable definition: independent variables

Foreign

A dummy variable indicating if the firm is foreign-owned (1) or domestically-owned (0).

Autonomy

Autonomy is measured by taking the mean of four questions on the degree of autonomy in strategic decision making of the firm (measured on a 7-point Likert scale) in the following areas: i) R&D and product or service design, ii) production and processes, iii) procurement

and choice of suppliers and iv) marketing, distribution and sales. Respondents had the opportunity to select not applicable. The four items of the scale load on a single factor (with an Eigen-value of 2.5 and 63% of the variance explained) and have an inter-item correlation coefficient of 0.80 (which is commonly regarded as an excellent score).

Age

Firm age is measured by the log of the number of years since the date of establishment.

Size

We control our analysis for firm size, measured by the number of employees in the country.

Country

We control for the country of survey via dummy variables for each of the countries surveyed, apart for the Netherlands and Belgium, which were combined due to their close geographical position.

4.4 Empirical analysis

The empirical analysis starts with descriptive statistics for the entire set of data as well as the domestically- and foreign-owned firms, and includes the results of t-tests testing for differences between the two groups. In addition, comparisons between country samples are made using F-tests. Subsequently, we test our main hypothesis via the following regression model:

$$Link = \delta_i + \beta_1 dNL + \beta_2 dIR + \beta_3 dSG + \beta_4 dNZ + \beta_5 Size + \beta_6 Age + \beta_7 Autonomy + \beta_8 Foreign + \varepsilon$$

Where *Link* represents the dependent variables of linkage quantity and quality that were defined in section 4.2, and δ_i represents the set of industry dummies. In order to test the hypotheses that the difference between foreign and domestic linkage is reduced when foreign firms get older, have more autonomy, or are in higher-tech industries we include an interaction effect in the model between age (resp. autonomy, size, and industry) and ownership as follows:

$$Link = \delta_i + \beta_1 dNL + \beta_2 dIR + \beta_3 dSG + \beta_4 dNZ + \beta_5 Size + \beta_6 Age + \beta_7 Autonomy + \beta_8 Foreign + \beta_9 Foreign \times Age + \varepsilon$$

The regression models were estimated using GLS regressions with heteroskedasticity-corrected standard errors. In all models, VIF statistics were well below 2, indicating that multicollinearity is not a problem in our analyses.

5. RESULTS

5.1 Descriptive statistics

Table 2 shows the descriptive statistics for all the variables in the model, as well as the means for these variables for both the group of domestic and for foreign firms. The table shows that domestic firms have significantly more local inputs than foreign firms, and that domestic firms have also more local output than foreign firms, but not significantly so. With respect to the quality of local linkages, domestic firms appear to benefit more from the local business environment (suppliers, buyers and other business partners) than foreign firms, and also to contribute more to the local business environment (but only significantly so for contributions to *suppliers*). In addition, domestic firms are larger (but not significantly so), significantly older, and have more strategic decision making autonomy than foreign subsidiaries.

[Table 2 approximately here]

Cross-country differences on the variables in our analysis are displayed in table 3. We find significant differences between firms in each country in quite a few areas. First of all, the percentage of local purchases and sales – the quantity of local linkages – is much higher in New Zealand and Finland than it is in Singapore and European countries. The benefits derived from the local business environment – especially with respect to suppliers – are highest in Finland, and lowest in Ireland. Contributions to the local environment are highest in the case of New Zealand and lowest for Ireland. Among all countries in our analysis, Finnish firms are by far the largest (in terms of employees) and the oldest. Firm autonomy is highest in New Zealand, and lowest in Ireland. There is no difference in the amount spent on R&D the highest level is found in the Netherlands/Belgium and lowest in New Zealand.

[Table 3 approximately here]

The correlations among the variables can be found in table 4. This table shows a substantial correlation among the various variables measuring the quality of local linkages, but much less so between the quantity and quality variables, indicating that these are indeed separate

dimensions of the local embeddedness of firms. As for the relations between the independent and dependent variables, table 4 gives some initial indications that the data support our hypotheses. Firm size (nr of employees) is positively correlated with the quality of local linkages - both with respect to the contributions to, and benefits from, local business partners. Firm age is positively related with benefits derived from buyers and other business partners, while firms with high autonomy are more prone to local purchasing than those without such autonomy. Only R&D expenditure does not appear to be correlated with the quality or quantity of linkages.

[Table 4 approximately here]

5.2 Regressions

The results of the regression analyses for each of the eight dependent variables are displayed in tables 5 and 6. Table 5 shows the regression models using the complete sample (including domestically owned firms). Though the results are not always significant, we do find important indications that support our hypothesis that foreign firms are less likely to create local linkages – both in terms of quality (primarily with respect to the benefits derived from local buyers, suppliers and other business partners) and quantity (primarily with respect to the degree of local sourcing). Furthermore, we find that firm size positively affects the quantity of locally purchased inputs, and is positively related to the benefits derived from suppliers and buyers, and contribution made to all kinds of local firms. Firm age does not appear to have an important linear affect on the quantity or quality of linkages. Also autonomy has no significant relationship with the dependent variables, though this may be partly due to the the fact that domestic firms (with high autonomy values) are included.

We do find significant differences across countries and across industries with respect to linkages. Compared to the reference category (Finland), firms in the Netherlands sell a smaller share of their sales locally. Also in Singapore, sales to, but also purchases from, local firms are relatively low. But the qualitative contribution firms make to buyers and other business partners is significantly higher. In Ireland, firms report to benefit significantly less from local suppliers, buyers and business partners. In New Zealand, firms sell relatively more locally, report fewer benefits from buyers and suppliers, but higher contributions to buyers and other business partners.

[Table 5 approximately here]

Finally, the coefficients for the industry dummies ('other' as the reference category), indicate that in manufacturing and knowledge intensive services, domestic inputs are generally lower. The share of domestically sold output is lower in manufacturing and low knowledge services (that include trade). Firms in services – both low knowledge intensive and knowledge intensive – report significantly higher contributions to local firms.

Table 6 reports the results of the models including the interaction effects. These results allow us to test our hypotheses, on how linkages by foreign firms may differ according to the degree of autonomy, age, size, and technology intensity (industry) of foreign subsidiaries. While the models were estimated including all variables as specified in the methodology section, only the coefficients for the relevant variables are reported in the table (due to space). Table 6 shows that foreign subsidiaries with higher degrees of autonomy will sell more to local markets, and contribute more knowledge to local suppliers, but that autonomy does not affect the other dependent variables. When estimating linear interaction effects between foreign ownership and firm age, we did not find any significant effects, but when allowing for a non-linear (quadratic) relationship, we find that the age of a foreign subsidiary does not affect the quantity of linkages, but does influence the quality of linkages. We hypothesized that foreign firms that are longer established are more similar to domestic firms, and have therefore more local linkages, the results appear to contradict our expectations. Primarily contributions to buyers and business partners start at a relatively high level, but diminish as firms grow older. Only after a certain age does this effect become (slightly) positive again.

[table 6 approximately here]

The results on the interaction effects with firm size are as hypothesized: larger firms have qualitatively better linkages – though not quantitatively so. Finally, important differences exist between linkages of foreign firms (compared to domestic firms) across industries – primarily for the contributions they make to local firms. Particularly the benefits derived from suppliers and other business partners in knowledge intensive services and high-tech manufacturing are reported to be relatively low. Foreign firms contribute the least (compared to domestic firms) to domestic suppliers, buyers and other business partners in high tech manufacturing. Contributions to suppliers specifically are also relatively low in low-tech manufacturing and knowledge intensive services.

6. DISCUSSION AND CONCLUSION

This paper has sought to investigate, using a unique dataset of MNEs in small advanced economies in both Europe and Asia-Pacific, the extent, quality and determinants of local linkage formation. The results of our analysis of a sample of nearly 400 firms in such countries reveal some interesting and potential useful findings.

With regard to our first objective, which was to compare the activities of MNEs in New Zealand, Ireland, the Netherlands, Singapore and Finland, our results appear to echo the geographical locations and historical development of these economies. In comparison with Asia-Pacific, in Europe international business is much more well-established and regional economic integration has brought countries closer together in terms of both trade and investment. However, also within Europe contrast remains the norm rather than consistency. The firms in the Netherlands are by far the largest (in terms of employees) and the oldest, reflecting the market's size and its long international history. Benefits derived from the local business environment by respondent firms as well as contributions to the same environment also highest in the Netherlands.

In contrast, and we would suggest perhaps as a consequence of its relatively recent promotion of export-oriented inward FDI without corresponding development of other aspects of the business environment, MNEs derive the least benefit from, and make the fewest contributions to, the local environment in Ireland. The same thing goes for the contributions to the local environment, where firm autonomy is also the lowest of the three countries. Bringing New Zealand into the picture, we get a different view again. Here the quantity of local linkages and firm autonomy is much higher than in Europe. Perhaps this is as a result of geographic distance, which makes inter-firm transfer of inputs more costly and time consuming, or perhaps it is the nature of the environment which has always fostered a sense of 'making do' with what's locally available.

The second objective of this paper was to contrast the results in terms of *locally-* or *foreign-*owned firms. Here, our findings support those of Castellani and Zanfei (2006) who find that locally-owned MNEs (usually headquarters) are more embedded via linkage than foreign-owned MNEs. Specifically, local MNEs not only source and supply more often than foreign MNEs (usually subsidiaries), but also benefit from, and contribute to, local suppliers,

customers and partners via linkages. These results are controlled for firm size, so the fact that headquarters are typically larger than subsidiaries should not be influencing this result.

Our third and final objective was to analyse how individual firms' objectives and activities impact upon linkages formation in small developed economies. Although this has been the subject of some prior research, few studies have explicitly considered linkages in small advanced economies. In line with these studies, we find that firms that are larger and older achieve greater benefits from their relationships with local partners; and larger firms with more autonomy are also more likely to contribute to such partners and to source more locally, respectively. However, our results find that in the context of small advanced economies, older foreign firms form fewer linkages. Given our other results, this might suggest a trade-off between linkage quality and quantity, and older firms have had the chance to develop their strongest linkages with local partners whilst reducing the number of relationships overall. Another explanation might be that newer foreign firms are more likely to have been acquired by their foreign parents recently, and have maintained existing relationships locally. Interestingly, we also find that firms with high levels of R&D spending are more likely to contribute resources to buyers and other business partners. In line with research that suggests local innovation contributes to local linkages, these findings underscore the importance of the influence of proximate location of specific value-chain activities on the quality of local linkages.

In conclusion, this paper has highlighted a number of useful findings within the context of small advanced economies. First, and not surprisingly perhaps, is that individual country experiences are very different, most likely as a result of differences in geographic, institutional and economic features. Second, there is an important role played by the local MNE that has suffered neglect by researchers and policy-makers alike. Indeed in more recently developed economies such Ireland and New Zealand the emphasis remains on manufacturing and exporting from the local base, rather than outward investment. Given the global nature of business today, this strategy overlooks the opportunities for cross-fertilization of ideas and knowledge that may result from outward investment by local MNEs that retain a base at home. Third, the determinants of linkage quality and quantity may not be as clear cut in small advanced economies given that their activities will always be influenced by and reliant on their larger neighbours, trading partners and key markets abroad.

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Appendix 1. Sample distribution across countries and sectors

	NL+BE	SG	IR	NZ	FI	TOTAL
						L
Manufacturing: low & medium-low tech (M_LT)	8	2	8	16	24	58
Manufacturing: high & medium-high tech (M_HT)	9	6	18	16	16	65
Services: low knowledge intensity (S_LKI)	34	20	21	45	19	139
Services: knowledge intensive (S_KI)	12	8	13	41	12	86
Other	5	3	10	17	10	45
Total	68	39	70	135	81	393

Table 1. Overview of linkage quality variables (4 item scales of knowledge transfer)

	Eigenvalue factor	% variance explained	Cronbach's alpha
Benefit from suppliers	2.42	60	.78
Benefit from buyers	2.89	72	.87
Benefit from other business partners	3.08	77	.90
Contribute to suppliers	2.65	66	.83
Contribute to buyers	2.78	69	.85
Contribute to other business partners	3.17	79	.91

Table 2. Descriptive statistics and comparison between domestic and foreign firms

	N	Mean	st.d.	Domestic firms	Foreign firms	t-value	
Foreign (y/n)	393	0,43	0,50				
Linkages – % local purchases	393	47,2	34,7	55,2	36,5	5,49	***
Linkages – % local sales	393	55,9	40,9	60,1	50,3	2,35	**
Benefit from suppliers	393	3,4	1,4	3,6	3,2	2,82	***
Benefit from buyers	393	2,6	1,4	2,7	2,5	1,65	*
Benefit from other business partners	393	2,8	1,6	3,0	2,5	2,96	***
Contribute to suppliers	393	2,7	1,4	2,8	2,7	1,12	
Contribute to buyers	393	3,2	1,6	3,2	3,2	0,00	
Contribute to other business partners	393	2,7	1,6	2,9	2,5	2,04	**
Employees – domestic	392	916	1550	1068	715	2,25	**
age (y of establishment)	391	48,7	43,8	57,2	37,5	4,49	***
Autonomy	393	5,9	1,3	6,6	5,1	13,29	***
R&D/Sales %	386	4,4	8,6	4,5	4,3	0,26	

*** p< 0.01; ** p< 0.05; * p< 0.10

Table 3. Descriptive statistics and comparison across countries

	NL+BE	SG	IR	NZ	FI	F	
Linkages – % local purchases	44,1	25,6	39,3	57,2	50,1	8,33	***
Linkages – % local sales	46,0	29,0	48,1	76,0	50,3	16,73	***
Benefit from suppliers	3,5	3,3	3,0	3,4	3,8	3,56	***
Benefit from buyers	2,7	2,6	2,2	2,5	3,2	5,98	***
Benefit from other business partners	3,0	2,6	2,3	2,6	3,4	5,70	***
Contribute to suppliers	2,9	2,7	2,5	2,7	2,9	0,90	
Contribute to buyers	3,3	3,1	2,6	3,5	3,3	3,75	***
Contribute to other business partners	2,6	2,5	2,3	3,0	2,8	2,24	*
Employees – domestic	993	773	442	787	1545	5,58	***
age (y of establishment)	62,1	30,4	32,7	42,8	70,4	12,42	***
Autonomy	5,8	5,9	5,4	6,3	6,1	5,12	***
R&D/Sales %	5,6	4,5	4,2	3,5	5,2	0,85	

*** p< 0.01; ** p< 0.05; * p< 0.10

Table 4. Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Domestic input	1.00										
(2) Domestic output	0.38 ***	1.00									
(3) Benefit from suppliers	0.15 ***	0.18 ***	1.00								
(4) Benefit from buyers	0.06	0.05	0.55 ***	1.00							
(5) Benefit from other bus partners	0.18 ***	0.12 **	0.46 ***	0.53 ***	1.00						
(6) Contribute to suppliers	0.09 *	0.01	0.44 ***	0.54 ***	0.44 ***	1.00					
(7) Contribute to buyers	0.00	0.12 **	0.27 ***	0.49 ***	0.33 ***	0.55 ***	1.00				
(8) Contribute to other bus partners	0.18 ***	0.13 **	0.30 ***	0.39 ***	0.64 ***	0.50 ***	0.49 ***	1.00			
(9) Employees – domestic	0.10 **	-0.02	0.11 **	0.15 ***	0.09 *	0.11 **	0.07	0.10 **	1.00		
(10) Age	0.05	0.02	-0.01	0.10 **	0.12 **	0.04	0.05	0.09 *	0.33 ***	1.00	
(11) Autonomy	0.23 ***	0.14 ***	0.09 *	0.06	0.10 **	-0.02	-0.01	0.14 ***	0.10 **	0.11 **	1.00
(12) R&D/Sales %	0.01	-0.08	0.01	0.07	0.06	-0.01	0.07	0.09 *	0.00	-0.07	0.02

*** p<.01; ** p<.05; *p<.10

Table 5 GLS Regression results – full sample

	Domestic input	Domestic output	Benefit from suppliers	Benefit from buyers	Benefit from other bus partners	Contribute to suppliers	Contribute to buyers	Contribute to other bus partners
Constant	51.96 *** 3.63	44.84 *** 2.81	3.69 *** 6.09	2.32 *** 3.69	3.93 *** 5.67	2.74 *** 4.17	3.03 *** 4.47	2.33 *** 2.97
Foreign	-9.06 ** -2.25	-1.33 -0.28	-0.40 ** -2.46	-0.38 * -1.89	-0.58 *** -2.70	-0.46 ** -2.26	-0.26 -1.29	-0.34 -1.48
Employees (log)	4.90 * 1.82	4.68 1.53	0.35 *** 3.19	0.42 *** 3.29	0.18 1.29	0.32 ** 2.36	0.26 * 1.86	0.31 * 1.95
Age (log)	-1.77 -0.36	5.93 1.19	-0.43 ** -2.13	-0.14 -0.67	-0.27 -1.18	-0.34 -1.59	-0.18 -0.83	-0.26 -0.99
Autonomy	1.70 1.14	0.95 0.56	0.02 0.36	0.05 0.70	-0.02 -0.21	-0.03 -0.36	-0.05 -0.70	0.08 0.88
<i>Country dummies</i>								
NL-BE	-4.22 -0.79	-10.59 * -1.80	-0.05 -0.23	-0.10 -0.39	0.07 0.28	0.34 1.58	0.35 1.33	0.27 1.08
SG	-19.78 *** -3.63	-26.07 *** -3.47	0.02 0.07	0.08 0.26	0.15 0.40	0.54 1.49	0.72 ** 2.27	0.85 ** 2.26
IR	-5.15 -0.99	-0.91 -0.14	-0.43 * -1.92	-0.57 ** -2.42	-0.73 *** -2.87	0.18 0.75	-0.20 -0.74	0.04 0.12
NZ	5.80 1.32	20.68 *** 4.06	-0.30 * -1.68	-0.37 * -1.86	-0.35 -1.61	0.18 0.93	0.61 *** 2.72	0.69 *** 2.99
<i>Industry dummies</i>								
M_LT	-36.15 *** -6.75	-41.45 *** -5.64	-0.24 -0.92	-0.16 -0.56	-0.24 -0.74	0.21 0.71	0.27 0.84	-0.03 -0.09
M_HT	-23.25 *** -3.78	-39.43 *** -5.38	-0.34 -1.36	-0.21 -0.77	-0.27 -0.90	0.09 0.33	0.39 1.25	-0.36 -1.16
S_LKI	-7.50 -1.38	-11.42 * -1.69	0.13 0.52	0.21 0.71	0.31 0.98	0.55 * 1.89	0.65 ** 2.14	0.31 0.97
S_KI	-23.01 *** -4.45	-6.79 -1.08	0.27 1.18	0.06 0.22	0.07 0.24	0.55 ** 2.10	0.53 * 1.74	-0.02 -0.07
N	391	391	375	331	310	341	351	297
F-value	19.23 ***	17.28 ***	3.50 ***	3.81 ***	3.47 ***	2.11 **	2.53 ***	3.24 ***
R ²	0.25	0.30	0.11	0.11	0.11	0.07	0.08	0.11

*** p<0.01; ** p<0.05; * p<0.10.

T-values based on heteroskedasticity corrected standard errors below the coefficients.

Table 6 GLS Regression results – interaction effects

	Domestic input	Domestic output	benefit from suppliers	benefit from buyers	benefit from other bus partners	contribute to suppliers	contribute to buyers	contribute to other bus partners
<i>Autonomy</i>								
Foreign	-11.11	-39.51 *	-0.77	-1.30	-1.34	-2.39 ***	-0.43	-0.54
	-0.55	-1.88	-1.00	-1.32	-1.41	-2.85	-0.51	-0.52
Autonomy	1.48	-3.20	-0.02	-0.05	-0.10	-0.24 **	-0.07	0.05
	0.55	-1.18	-0.18	-0.36	-0.81	-2.11	-0.66	0.40
Foreign x autonomy	0.34	6.26 *	0.06	0.15	0.13	0.32 **	0.03	0.03
	0.11	1.88	0.48	0.97	0.80	2.29	0.20	0.19
<i>Age</i>								
Foreign	45.33	-8.84	0.93	1.44	3.82 *	0.93	2.91	3.70 **
	0.98	-0.23	0.60	0.72	1.93	0.55	1.62	2.02
Age(log)	19.52	-25.55	1.05	-0.67	-1.07	-0.34	-0.72	-0.89
	0.53	-0.76	0.79	-0.54	-0.77	-0.22	-0.65	-0.53
Age(log)2	-7.67	8.98	-0.45	0.18	0.34	0.01	0.21	0.24
	-0.66	0.81	-1.01	0.43	0.74	0.02	0.53	0.45
Foreign x age(log)	-87.80	-6.39	-1.47	-2.60	-5.81 **	-2.00	-4.56 *	-5.81 **
	-1.40	-0.11	-0.67	-0.93	-2.09	-0.84	-1.81	-2.29
Foreign x age(log)2	32.38	7.34	0.36	0.88	1.82 *	0.67	1.55 *	1.97 **
	1.56	0.38	0.47	0.94	1.94	0.85	1.81	2.31
<i>Size</i>								
Foreign	-37.36 ***	-38.58 **	-0.44	-0.58	-1.54 **	-1.23 *	-0.51	-1.11
	-2.81	-2.55	-0.74	-0.91	-2.15	-1.73	-0.71	-1.42
Employees (log)	0.47	-1.14	0.35 **	0.39 **	0.03	0.20	0.22	0.19
	0.14	-0.32	2.47	2.33	0.19	1.15	1.23	0.91
Foreign x Employees (log)	11.27 **	14.83 ***	0.01	0.08	0.37	0.30	0.10	0.29
	2.35	2.64	0.06	0.33	1.45	1.21	0.38	1.06

*** p< 0.01; ** p<0.05; * p< 0.10.

T-values based on heteroskedasticity corrected standard errors below the coefficients.

All other variables are included in the models but not reported.

Table 6 GLS Regression results – interaction effects (continued)

	Domestic input	Domestic output	benefit from suppliers	benefit from buyers	benefit from other bus partners	contribute to suppliers	contribute to buyers	contribute to other bus partners
Industry								
Foreign	-11.06	-13.39	0.46	0.26	0.73	1.15 ***	1.18 **	0.83
	-0.97	-0.90	1.28	0.58	1.33	2.64	2.00	1.60
M_LT	-35.51 ***	-60.52 ***	-0.22	-0.02	-0.35	0.62 *	0.70 *	0.53
	-4.63	-6.52	-0.72	-0.05	-0.91	1.85	1.72	1.15
M_HT	-24.11 ***	-47.22 ***	-0.11	-0.02	-0.13	0.56 *	0.88 **	0.07
	-3.36	-6.08	-0.35	-0.07	-0.37	1.84	2.57	0.19
S_LKI	-8.70	-10.36	0.27	0.30	0.50	0.78 **	1.07 ***	0.49
	-1.41	-1.37	0.91	0.81	1.36	2.27	3.13	1.28
S_KI	-23.21 ***	-6.61	0.57 **	0.29	0.62 *	0.97 ***	0.76 **	0.12
	-3.95	-0.96	2.09	0.88	1.76	3.41	2.16	0.30
Foreign x M_LT	0.31	37.31 **	-0.64	-0.65	-0.80	-1.79 ***	-1.66 **	-1.71 **
	0.02	2.14	-1.33	-1.07	-1.18	-3.23	-2.28	-2.41
Foreign x M_HT	3.42	26.99	-1.05 **	-0.78	-1.05	-2.08 ***	-2.10 ***	-1.81 ***
	0.23	1.46	-2.20	-1.46	-1.64	-3.85	-3.01	-3.05
Foreign x S_LKI	3.93	2.75	-0.78 *	-0.53	-1.20 *	-1.45 **	-1.78 **	-1.08 *
	0.29	0.16	-1.66	-0.88	-1.83	-2.58	-2.58	-1.68
Foreign x S_KI	1.40	7.02	-1.15 ***	-0.84	-1.99 ***	-1.88 ***	-1.32 **	-1.05 *
	0.11	0.44	-2.69	-1.59	-3.18	-3.71	-2.01	-1.69

*** p< 0.01; ** p<0.05; * p< 0.10.

T-values based on heteroskedasticity corrected standard errors below the coefficients.

All other variables are included in the models but not reported.