

**Distance-related barriers and the internationalisation of Finnish MNEs**

**Abstract**

This paper examines the question of the existence of distance-related barriers in the global economy that are likely to constrain the extent of cross-border economic activity. We adopt an institutional approach at the macro and micro levels to identify the sources of uncertainty affecting the internationalisation processes of firms. We then present recent empirical evidence using firm-level data on the internationalisation patterns of Finnish MNEs, including evidence for the smaller internationalising firms. Contrary to expectation, we find that the degree of entropy of the foreign activities of Finnish MNEs is not explained by size, and that some smaller MNEs exhibit patterns of internationalization that are more global than regional.

**Key words**

Multinational enterprises, internationalisation, institutions, entropy

## **Distance-related barriers and the internationalisation of Finnish MNEs**

### **Introduction**

The first great unbundling (Baldwin, 2006) took place during the first industrial revolution, when it first became possible to produce goods in a location that was different from where they were consumed. For the first time, people were no longer dependent on living off the land, but were instead paid a wage which they spent on necessities like food and shelter. This process facilitated economic agglomeration and led to the development of large cities. This in turn allowed for more specialization within specific industrial areas. The process of specialization was based on local advantages, some of which were geographical, and others which happened more by accident, dependent on the location of particular entrepreneurs. The first unbundling has persisted until today and, indeed, the analysis of regional clusters of economic activity from the point of view of both firm strategy and regional development regained prominence in the 1990s (Gordon & McCann, 2000; Porter, 1998; 2003).

However, alongside this process, which has been ongoing for more than 200 years, there is a much more recent development, which Baldwin (2006) has referred to as the second unbundling. This is the removal of any constraints of location on the production of intermediate inputs, so that products made or assembled in a particular location no longer need to draw from specialized inputs in or near that location, but can in fact be assembled from inputs that are located anywhere in the world.

The process of the second unbundling, which more commonly might be referred to as globalization, has a few distinguishing characteristics. Most prominent among these is an overall growth in trade, and particularly of intra-industry trade in intermediate products, that is

accompanied by an even more explosive growth in foreign direct investment. This has enabled the second unbundling of production to be extended to locations where managerial and entrepreneurial resources are not present to enable such production indigenously.

The second distinguishing feature of the contemporary global economy is the degree of interconnectedness between economic agents. At the level of the firm, this consists of relationships within the internal (ownership-based) and external (contractual) networks of activities (Lundan, 2002). On the aggregate level, the flows of intermediate inputs generate both inward and outward linkages between countries and economic areas. Indeed, it is this degree of interconnectedness that distinguishes contemporary globalization, which can be dated to the initial opening up of China in the beginning of the 1980s, from the first global economy, which reached its zenith on the eve of the First World War (Jones, 2004).

The disappearance of the first global economy taught the fundamental lesson that the process of globalization is reversible. Following the onset of the Great Depression and the enactment of the Smoot-Hawley Tariff Act in 1930, the world economy quickly imploded with the proliferation of beggar-thy-neighbour policies. Consequently, in light of history, any predictions or declarations of a truly global or borderless economy (Ohmae, 1990) are likely to overstate the case, and should be taken with a grain of salt.

Even before the onset of the current global financial crisis, the emerging global economy sparked a great deal of discussion concerning both the beneficial and detrimental consequences of growing interdependence (Gray, 2004; Hall & Kaufman, 2003). Indeed, in light of the recent events, it is understandable that the detrimental consequences of instantaneous contagion have occupied most of the recent discussion. At the same time, the current climate of gloom stands in contrast to the metaphor employed by Friedman (2006) of a 'flat' world, which depicts the global

interconnected economy as a source of some instability, but certainly also as a source of nearly boundless opportunity.

If something can be made cheaper in India or Vietnam, whether it be software programming or electronics manufacturing, the second unbundling offers new opportunities for entrepreneurial firms to add value by creating novel combinations of the available inputs. But even as one marvels at the economic opportunities presented by the contemporary global economy, one is also aware that even before the current crisis hit, in some important ways, the world economy was not as flat as it seemed.

### **Institutional barriers at the macro level**

What, then, do the borders of a flat world consist of? We think that fundamentally, such borders are institutional. North (1990; 2005) distinguishes between formal and informal institutions. Formal institutions are the legislative and regulatory bodies that are charged with the enforcement of formal, codified 'rules of the game'. Informal institutions consist of the norms, values and self-imposed codes of conduct that underpin the development of formal institutions. Institutions exist to counter uncertainties arising from human interaction, and more complex forms of economic exchange are likely to require the development of new institutions to facilitate exchange. North's (2005) recent work has emphasized the increasing role of uncertainty and complexity in the human environment, and hence the growing relevance of the inability of business actors to predict or forecast the nature and extent of change in that environment.

While much of the attention of economists on institutions has focused on comparative investigation of the design of formal institutions (Kaufmann, Kraay, & Mastruzzi, 2005; La Porta, Lopez-de-Silanes, & Shleifer, 1999), we believe that informal institutions are more likely to form

the root of persistently high transaction costs experienced by economic agents. Thus, for example, in the contemporary global economy, the norms and values that guide decision-making in the wealthy developed countries that are beginning to embrace post-materialist values<sup>1</sup>, are likely to differ considerably from those prevalent in the emerging economies, that are looking to lift large populations out of poverty, and to establish themselves as economic and political actors in the world arena.

In terms of the design of formal institutions, the recent events in the financial markets have increased the momentum for some kind of a supranational body to be created to oversee the global economy. There have of course been calls for such an agency in the past, and the agreements reached under the auspices of the GATT/WTO have to be considered a major institutional development in terms of creating an explicit framework of rules for the global economy. There have also been efforts by the OECD in the form of the MAI to create such rules to also govern FDI, and similar efforts have been pursued by the UN, although thus far without much result (Dunning & Lundan, 2009). Likewise, the emergence of globally integrated financial markets, and particularly the experience of crises such as the Mexican peso crisis, the Russian rouble crisis and the Asian financial crisis, led to calls for oversight of financial institutions, although primarily limited to the affected countries.

The current crisis has also brought to the fore calls that had been made many times in the past to provide oversight of the financial infrastructure of the global economy. In this sense, the meeting of the G-20 nations that took place in November 2008, was clearly not the new Bretton Woods, since it didn't pave the way for the development of any new institutions of oversight. It did, however, focus attention on the need to begin a more inclusive dialogue involving not just

the developed countries, but also the emerging economic powers, and to adjust the power balance within the existing institutions.

In the decade of the tumultuous 1930s, the solutions out of the crisis heavily emphasized Keynesian views on the role of the government as a countercyclical force in the economy. The leading economies of the time had broadly similar goals, and shared a number of key values. Consequently, the ideas of Keynes achieved a great degree of acceptance on both sides of the Atlantic, and formed the basis for the consensus that resulted in the creation of the Bretton Woods institutions.<sup>2</sup> Looking at the global economy today, it isn't clear, that an economic philosophy or a set of principles could be identified that could reconcile the substantial differences in terms of norms, values and objectives that prevail in different parts of the world. Thus, the challenge today is much more complex, and therefore a new Bretton Woods agreement, if and when it emerges, will have to break entirely new ground in terms of institutional design.

Indeed, on the macro level, the efforts to reform the formal institutional framework are beginning to expose in a much more concrete sense some of the differences in the underlying informal institutions between the major players. The reconciliation between those interests is unlikely to occur anytime in the near future, and if anything, the ongoing financial crisis is likely to reveal more of the underlying borders between some of the major economic powers in the global economy. Thus on the macro institutional level, we do not have a flat global economy, and the extent of the underlying divisions has perhaps not yet been completely appreciated.

One characteristic of an interdependent global economy is that it is likely to exhibit more of the Black Swan<sup>3</sup> type of phenomena than one where countries are more self-contained. By this we mean that relatively small causes can have major effects, and that predictions of the future

based on past data are inevitably going to be found inadequate. Of course, the economy has never been fully predictable, and ever since the seminal work of Knight (1921), we have had a very useful distinction between uncertainty and actuarial risk, where the latter can be conquered and hedged against based on past data. Genuine uncertainty cannot be countered this way, but financial theory would suggest that diversification is a way to reduce such exposures. However, even diversification requires knowledge of the existence or lack of correlation between different phenomena, which in a very interconnected economy may only become knowable after the fact.

This is what North (2005) refers to as a non-ergodic world, and it is what Dunning and Lundan (2008a; 2008c) consider to be of fundamental importance in understanding the connection between institutions as a response to uncertainty, and institutional change in the global economy. Individual citizens, entrepreneurs and governments are increasingly likely to face uncertainties that are not governed by actuarial risk but exhibit genuine uncertainty. Experimentation is likely to characterize the search strategies of people as they look for answers in such a fundamentally uncertain environment. Given that there are likely to be substantial differences in the objectives and the underlying norms and values of the actors, such experimental search strategies are likely to yield very different results in different parts of the world. Consequently, far from facing a flat global economy, the challenge on the macro level will be to reconcile the various institutional responses to control uncertainty.

### **Institutional barriers at the firm level**

When we shift to a lower level of analysis, and look at the global economy from the point of view of an individual firm or an entrepreneur, which is primarily the level at which Friedman's analysis is situated, the flat world is more apparent. The institutional achievements of the past

half a century have brought low tariffs in manufactured goods, and open, or even preferential, access to foreign investors.

Indeed, prior to the current financial crisis, there was much discussion concerning the growth in outsourcing, and particularly the sourcing abroad of intermediate inputs in services and higher value-added inputs involving advanced manufacturing operations and local R&D. Even so, in a large economy like the United States, where the share of foreign trade is still small as compared to domestic production, the growth in outsourcing is unlikely to be of significant influence to the economy. In smaller economies, the effects can of course be more pronounced, but here one needs to also take into account the effects of both insourcing and outsourcing. Whatever the final balance of benefits and costs turns out to be, in terms of the second unbundling of the modular components of production, the world economy would indeed seem to be quite flat.

However, the extensive historical cases presented by Chandler (1990) highlighted the basic truth that being able to produce at low cost would not be a sustainable source of competitive advantage, unless comparable investments in marketing and distribution were made in order to ensure full utilization of the production capacity. While the low cost advantage at the time was generally achieved through enormous investments in an overwhelming scale advantage, in today's global economy, making the initial investment in scale is not always necessary, since scale advantages can be sourced on the market. Nonetheless, it remains the case, that even when competitive advantage is based on a creative combination of modular inputs, the ability to sustain the advantage is dependent on the ability of the firm to expand its markets both domestically and abroad.

In a flat or borderless global economy, one would expect the largest MNEs to be able to source inputs from anywhere in the world, and also to have the resources and ability to sell their product anywhere in the world. Indeed, by the late 1990s, the idea of truly global strategy began to take hold (Yip, 2003; Yip, 1989). Following this strategy, global products or services were to be minimally tailored to suit local needs, and the central task of management was to assess where customization was truly necessary, and when it could be foregone.

But in spite of this push for global strategy, evidence is beginning to accumulate on some of the world's largest firms that in fact, the markets for their output are regional rather than global. This evidence has been brought forward most forcefully by Rugman and Verbeke (Rugman, 2001; Rugman & Verbeke, 2004; 2007), who have argued based on evidence of the sales of the Top 500 global firms, that only a fraction of them are global in the sense that they would enjoy substantial sales in all three parts of the Triad. In fact, Rugman and Verbeke (2004) found that only nine of the 365 firms from the Fortune Global 500 for which data was available could be properly considered global, in so far as they had sales of at least 20% in each Triad region, and no more than 50% in any one region. Thus they contended, that in reality, most of the largest MNEs appear to be strong only in their home region, or at most in two of the three main regions in the world. In other words, there appear to be barriers to the selling of products and services around the world that are difficult for even the largest multinationals to overcome.

These 'costs of foreignness' stem from many sources, among them cultural distance, differences in regulation and other institutional features (Dunning & Lundan, 2008b). They are particularly pronounced in the downstream (sales) activities of the firm, and affect the ability of firms to craft products and services that have a global appeal. These downstream activities are also at the centre of the Rugman and Verbeke argument, since they content that the preferences

prevalent in the firm's major markets influence corporate strategy to greater extent than decisions related to sourcing.

The earliest efforts by scholars to understand the extent and nature of such borders were undertaken by the Uppsala school, beginning with Johanson and Vahlne (1977; 1990). Their model predicted increasing resource commitment to foreign markets over time as a result of organisational learning and the accumulation of experience. It also predicted that firms would be likely to diversify their investments into countries with progressively higher levels of 'psychic distance'.<sup>4</sup>

The empirical studies of the model by Vahlne and Wiedersheim (1973), Hornell et al. (1973), Johanson and Vahlne (1977) and Nordstrom (1991) with respect to Swedish MNEs demonstrated that there was a positive and significant correlation between the actual or perceived psychic proximity between Sweden and other countries, and the geographical distribution of Swedish manufacturing and sales subsidiaries. In particular, the association was found to be most pronounced in the early stages of the firm's internationalisation process. The fact that, later on, this stages or process model of internationalisation also received empirical support in several studies outside of Scandinavia, allowed Johanson and Vahlne (1990) to reject the notion that this is specifically a Nordic model, applicable only to small, open, and wealthy home countries.<sup>5</sup>

Of course, if a limited search for alternatives and consequent reliance on psychically close locations is the result of organisational and individual constraints on information processing, it is entirely plausible that, over time, some firms would be able to develop organisational routines to overcome the search constraints, and to reduce the costs of further information. Indeed, built into a model of gradual learning is the idea that the increasing

resource commitment predicted by the model is likely to have less influence the more information and experience the firm acquires in the marketplace (Forsgren, 1989).

This would make the process model of internationalisation more applicable to initial internationalisation, but less to subsequent investments by established multinationals (Barkema, Bell, & Pennings, 1996; Kogut, 1983). In spite of this, the geographical pattern predicted by the Uppsala model is consistent with the evidence presented by Rugman and Verbeke concerning very large firms. It seems that distance matters, whether it is psychic distance, or geographic distance, which is often, although by no means always, correlated with psychic distance.<sup>6</sup>

One criticism that can clearly be levelled against the Rugman and Verbeke measure of internationalisation is that it limits attention to the geographic destination of the output of MNEs, and pays no attention to that of the sourcing of the inputs. Indeed, as Rugman and Verbeke (2004; 2007) themselves acknowledge, the upstream activities of MNEs are likely to be more easily internationalised than are its sales and distribution. It is also the case, that as the number of countries integrated to the global economy increases, the degree of globalisation of firms is likely to increase as well. This is, however, somewhat aside from the original point made by Rugman, which was that the home region is still likely to have a strong influence on corporate strategy, and that even when MNEs talk about being global, their decision-making must be informed by the demands and opportunities present in their most important markets, and particularly so when the profitability of the foreign operations lags behind those in the home country.<sup>7</sup>

Another obvious point of criticism is that the classification of firms depends on the threshold levels that are chosen by the researchers (Osegowitsch & Sammartino, 2008). In their response, Rugman and Verbeke (2008) contend that while different classifications are possible,

they do not change the basic pattern, which is that some of the largest MNEs in the world seem unduly dependent on sales in their home region. In a further study by Collinson and Rugman (2008), that employs a somewhat different classification, it was shown that the same home-region bias applies to large Japanese MNEs as well

Thus the evidence, such as it is, would seem to suggest that the flat world only applies to the sourcing of inputs, but not to the selling of the final product. At the same time, the attribution of causes to the patterns we observe depends on the measures we employ to assess internationalization. The second part of this paper will take a look at some recent evidence concerning the patterns of internationalization of Finnish MNEs. In contrast to the previous studies, we employ an entropy measure of internationalization to assess the pattern of internationalization of both large and small MNEs from Finland. We conclude by drawing some preliminary conclusions about what these patterns imply for the home countries of MNEs, and particularly for some of the smaller home countries.

### **Some empirical evidence from Finland**

In the period following the Second World War and extending until the late 1970s, internationalisation for Finnish firms mainly consisted of export-driven growth. From the 1980s onwards, however, Finnish firms began to internationalise their production, and the past decade and a half has seen a considerable increase in their outward foreign direct investment (FDI), which has been fuelled in part by an increase the number and volume of acquisitions of foreign firms (Lovio, 2006). The same period has also seen notable growth in other forms of internationalisation, like strategic alliances, particularly in research and development (R&D), and in contractual outsourcing (Ali-Yrkkö, 2006; Palmberg & Pajarinen, 2005).

As a consequence of these developments, in 2006 the outward investment stock of Finland amounted to €71.3 billion, or 43% of GDP, somewhat ahead of the European average. Investment within the EU-25 accounted for over 78% of the investment stock, and the euro area for nearly 45%. Even higher figures pertain to the ratio of foreign to total employment in large Finnish multinational enterprises (MNEs). This reached an average of 52% for the Top 30 MNEs (measured by total employment) in 2006, and up to 68% for a subset of manufacturing firms (Pajarinen & Ylä-Anttila, 2008).

### ***Sources and coverage of data***

The data used in this study comes from Orbis, a commercial database maintained by the Dutch company Bureau van Dijk Electronic Publishing. Our data is limited to Finnish parent firms that have at least 150 employees. Our sample contains 3,533 foreign affiliates belonging to 508 parent companies resident in Finland, that are located in 80 countries. The corresponding figure from Statistics Finland for year-end 2006 was 4,356 affiliates in 90 countries, suggesting that the smaller aggregate figures in our sample might be caused to some extent by the higher cut-off point in terms of parent size for our sample. Nonetheless, while the total number of affiliates is somewhat understated in our data, the distribution of affiliates is close to the real (Statistics Finland) values, which is particularly important for the subsequent analyses, since they concentrate primarily on the geographical distribution of activity.

In terms of the three measures of the extent of affiliate activities contained in Orbis, namely assets, turnover and employment, the most comprehensive data is available for assets and turnover, while the data on employment is missing considerably more often. Thus for example,

our figure of 205,737 for total employment in foreign affiliates is only 46% of the corresponding figure of 381,764 reported by the Bank of Finland.

For the majority of cases in the sample (74%) the parent data reflects the year end 2006, for 2% of the subsidiaries the data pertains to year-end 2007, and for 7% and 17% it pertains to 2004 and 2005 respectively. Since the figures in Orbis have been converted to US dollars, these had to be converted back to euros using representative year-end exchange rates from the IMF for 2004-2007.

Of the 2,470 affiliate companies for which ownership data is available in our sample, all are majority-owned, and 88% of these are wholly-owned affiliates. The average Finnish MNE parent has seven foreign affiliates, but this distribution is very highly skewed, as can be seen in Figure 1. Nearly a half, or 245 parents in the sample, are firms with only one foreign affiliate, while the most international firms have in excess of 100 affiliate companies abroad, with a maximum of 144. The total number of countries where affiliates of Finnish MNEs are present is 80, while the average number of countries for a Finnish parent firm is three, and the highest count is 53. Again, Figure 2 shows the extreme skewness of the distribution of the number of host countries per parent company.

The following section will move beyond these simple averages by paying more attention to the distribution of activities at the firm level by calculating so-called entropy measures of international diversification.

### ***Entropy measure of internationalisation***

There is a long tradition in the literature on business strategy and international business to assess diversification by means of entropy measures that aim to capture both the overall extent of

foreign activity, and the degree to which it is spread geographically. This literature dates back to the seminal studies by Rumelt (1974) and Jacquemin and Berry (1979), whose focus was on product diversification. Such studies followed in the wake of conglomerate building in the US in the 1960s and 1970s, and introduced the distinction between related and unrelated diversification, while also extending the concept of entropy to the activities of the firm.

As the internationalisation of firms progressed in the 1980s, scholars also became interested in expanding these concepts to encompass geographical diversification. The simple entropy measure employed here is the similar to that used by Palepu (1985), which itself is derived from the original Jacquemin and Berry (1979) entropy measure. The formula for the entropy measure used here is as follows:

$$\sum_{i=1}^N P_i \ln \left( \frac{1}{P_i} \right)$$

$$0 < P_i < 1, \sum_{i=1}^N P_i < 1$$

$$P_i = \frac{FA_i}{TA} \text{ or } P_i = \frac{FS_i}{TS} \text{ or } P_i = \frac{FE_i}{TE}$$

where  $P_i$  is the ratio of foreign assets (FA) in host country  $i$  (where  $i=1 \dots N$ ) to total assets (TA) or foreign sales (FS) to total sales (TS) or foreign employment (FE) to total employment (TE) of the firm. This proportion is multiplied by the natural logarithm of its inverse, and summed over the total number of host countries (N) in which the firm has activities.

A small difference between our measure and the entropy measure used in studies incorporating product and geographical diversification (Kim, 1989; Kim, Hwang, & Burgers,

1989; Vachani, 1991) is that here  $P_i$  is always greater than zero and less than one, and the sum of all  $P_i$  is also less than one. While in the case of product diversification it makes sense to consider the case of a firm with activities in only one segment, in the case of international diversification, the firm has to undertake activities in at least one foreign country in addition to the home country for the measure to be meaningful. Furthermore, while diversification across industry segments should sum up to one across all segments, the home country is qualitatively different from all of the host countries in the context of international diversification. Consequently, our measure excludes the home country activities from the diversification measure.

The benefit of a geographical entropy measure is that it captures the difference between the overall extent of activities that are undertaken outside of the firm's home country, and the distribution of such activities between host countries. Thus the entropy value for a firm that has 90% of its activities outside of the home country, but all of it in just one host country, is lower than that of a firm that has invested 45% in one host country and 45% in another. It is also lower than the entropy value of a firm which has only a half of its activities outside of the home country, but where such activities are evenly distributed between five different host countries. The first case could for instance illustrate the situation of a Canadian firm in the pulp and paper industry that has invested all of its productive capacity in the United States. The latter could for instance be a Finnish company whose foreign activities are divided equally between Sweden, Denmark, Germany, the UK and Russia.

Since the measure is meant to capture both the extent of foreign activity and its distribution between different host countries, calculating an entropy measure when there is only one foreign affiliate produces somewhat counter-intuitive results. Thus for example, a firm that

has a ratio of foreign to domestic assets of  $P_i=250/500=.5$  has an entropy score of .35, while another firm with a ratio of  $P_i=400/500=.8$  has an entropy score of .18. While we would generally consider the latter firm to be more international, the distribution of its stakes between the home and host country is more uneven, and it thus exhibits less entropy. Since parent firms with only one affiliate are nonetheless quite common (nearly a half in our sample), they are included in the analyses that follow.

We calculate total entropy measures for three variables of interest, namely the proportion of foreign assets, foreign turnover and foreign employment. In line with our definition, we have dropped all cases where the proportion of foreign activities to total activities was equal to or greater than one, suggesting erroneous data.<sup>8</sup>

Since the resulting number of missing variables for foreign employment is considerably higher than for the other two measures, we also introduce an alternative employment measure which includes interpolated values. Due to missing or incorrect values, we were able to calculate the simple entropy measures for a maximum of 279 parent companies. The average entropy measure when using assets was .26 and the average when using turnover was .30. The average when using employment was .36, but this measure was available for only 136 parent companies.

The interpolation of missing values for the employment measure was carried out in two ways; by using the existing values for turnover to predict the missing values by industry sector and by host country. Thus, for example, we interpolated the missing values for employment in the chemical industry based on the observed relationship between turnover and employment in the same industry. However, this method is clearly not without its flaws. To the extent that the existing observations happen to be drawn from larger firms in larger host countries, the

interpolated values might appear too large in the case of a small host country with missing values. The problem is analogous if interpolation is done by host country. In this case the existing data for a particular host country might be over-representative of sectors where turnover or employment are either higher or lower than average. Using these figures, average entropy for employment was .38 when calculated by host country (211 observations) and .44 when calculated by sector (225 observations). Since the values calculated by host country had a somewhat higher correlation with the original employment measure (.87 as opposed to .77), this measure was adopted in subsequent analyses.

Overall, the three measures of entropy pertaining to the three different measures of foreign activities are closely correlated with each other, with a Cronbach alpha of .97. Figures 3 and 4 show the degree of entropy by the size of the parent, as measured by total parent employment and turnover. To make the figures more readable, both figures exclude three observations where parent employment exceeds 30,000 or turnover exceeds €10 million. A similar pattern was also observed for parent assets, but this was omitted for space considerations. These figures reveal that, contrary to what one might expect, the degree of entropy appears to be quite independent of firm size. This suggests, that there are substantively international MNEs of smaller size in our sample, which warrant further investigation.

### ***Regional entropy***

In this section, we proceed to decompose the simple entropy measure to account for the regional groupings of countries. Following the approach introduced by Jacquemin and Berry (1979) and extended by Kim (1989) and Vachani (1991), the regional entropy measure employed here introduces a second index that takes into account the regional groupings of related countries.

Thus, for example, a firm with 50% of its assets abroad evenly divided between 10 different host countries in Europe should have a lower entropy score than an otherwise identical firm with 10 affiliates evenly divided, two of which are in the Americas and eight of which are in different European host countries.

It is possible to decompose the simple total geographic diversification (TGD) measure introduced earlier into two components, related geographic diversification (RGD) and unrelated geographic diversification (UGD). Specifically:

$$TGD = \sum_{i=1}^N P_i \ln \left( \frac{1}{P_i} \right)$$

$$RGD = \sum_{a=1}^M P_a \sum_{i \in a} P_{ia}^a \ln \left( \frac{1}{P_{ia}^a} \right)$$

$$UGD = \sum_{a=1}^M P_a \ln \left( \frac{1}{P_a} \right)$$

$$TGD = RGD + UGD$$

$$P_{ia}^a = P_{ia} / P_a$$

$$0 < P_{ia} < 1, \sum_{a=1}^M \sum_{i \in a} P_{ia} < 1$$

where  $P_{ia}$  is similar in construction to  $P_i$ , except that here the ratio represents activities in host country  $i$  within region  $a$  (where  $a=1 \dots M$ ) as a proportion of the total assets, sales or employment of the firm. Similarly,  $P_a$  is the ratio of the foreign assets, sales or employment in

region  $a$  to the total assets, sales or employment of the firm.  $P_{ia}^a$  is then simply the ratio of affiliate assets, sales or employment in a particular host country to the total in that region. The seven regions included in the analysis were the Nordic countries, the old EU-15, the new EU-12, Asia, NAFTA, South America and Other, which were selected based on the pre-existing knowledge of the regional patterns of the internationalization of Finnish firms.

Figure 5a plots regional entropy in relation to total entropy using the asset measure. If regional entropy accounted for all of the firms' entropy, the observations would fall on the 45-degree line. The extent to which observations lie below this line, indicates an increase in the extent of global diversification. These results demonstrate that, perhaps contrary to what might have been expected, between rather than within region entropy accounts for a large proportion of the entropy of Finnish firms. The plots for turnover and employment (omitted here for space considerations) are substantively similar, and confirm that while regional diversification is certainly present in the sample, more global patterns can be observed at both lower and higher overall levels of entropy.

It should be noted, however, that since the maximum potential degree of entropy is dependent on the number of regions included in the analysis, and we have defined three sub-regions for Europe, it is unlikely that many firms in our sample would be diversified within only one region. Nonetheless, due to the number of firms with only one foreign affiliate, for the full sample containing 326 parent firms, the average number of regions they had invested in was 1.77.

In order to test how sensitive our analysis is to the number of regions, we divided the world into four regions following Rugman and Verbeke. These four regions consisted of Europe, NAFTA, Asia and Other. Figure 5b shows a plot of regional entropy within the Triad using the

asset measure. Our expectation was, that the scores for regional entropy would likely be higher in the Triad-based analysis, and this was the result we obtained. Not surprisingly, these results confirm that regional entropy increases as the number of regions is reduced, implying that as a proportion of total entropy, regional entropy is likely to account for a larger share in the Triad-based analysis. Finally, we should also note, that the extent of missing data at the affiliate level suggests that all of our entropy measures are likely to understate the true values in all of the analyses performed here.

### **Discussion and conclusions**

The Finnish example demonstrates in many ways, the results are very much what we would expect in small open economies that have received relatively little inward investment. The economy is dominated by a few large domestic multinationals that are generally the most international firms in the economy. We would also expect that smaller multinational firms with fewer affiliates would be concentrated in the home region. However, instead of this, we see a number of firms that have relatively few foreign affiliates, but each one in a separate region. Thus we do not (always) see the expected Uppsala pattern of gradually learning from nearby markets before activities are expanded to more distant foreign markets.

We also find, that the degree of regional entropy is in fact related to firm size, while total entropy is not, whether we consider assets or turnover (sales). Firms that have established themselves in multiple regions find it easier to grow within one or two regions, suggesting that there is a relative advantage to expanding within one region before broadening exposure in another. However, the results also reveal a group of international companies that are smaller in size, but exhibit unexpectedly global patterns of internationalization.

Paradoxically, it is the largest MNEs that may be limited by the size of the market. It is possible, that their need to sell in large volumes makes them concentrate on the most familiar markets. Smaller firms may in fact have opportunities to reach global sales/assets quite rapidly, since access to the global has been greatly enhanced by technological development, and their relative share of the market is smaller. An extreme example of this tendency might be found in the emergence of the so-called born global firms. Such firms are generally defined as exporting a substantial proportion of their output within a few years of their inception (Gabrielsson & Kirpalani, 2004; Knight & Cavusgil, 2004), and have thus far been identified primarily in the ICT industry in small home countries such as Finland and Israel. It seems that the contemporary global economy is more flat for some firms, and mountainous for others.

In order to achieve the maximum benefits arising from the second unbundling, open economies need to be open in both directions. Firms have to be able to insource as well as outsource, and a large discrepancy between outward and inward flows might indicate the existence of barriers that we would suggest are primarily institutional. The present macro-level challenges demonstrate the non-ergodic uncertainty present in an interconnected economy, and consequently experimentation and flexibility by both firms and governments should be encouraged in order to identify viable ways forward.

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Figure 1. The distribution of number of affiliates per parent

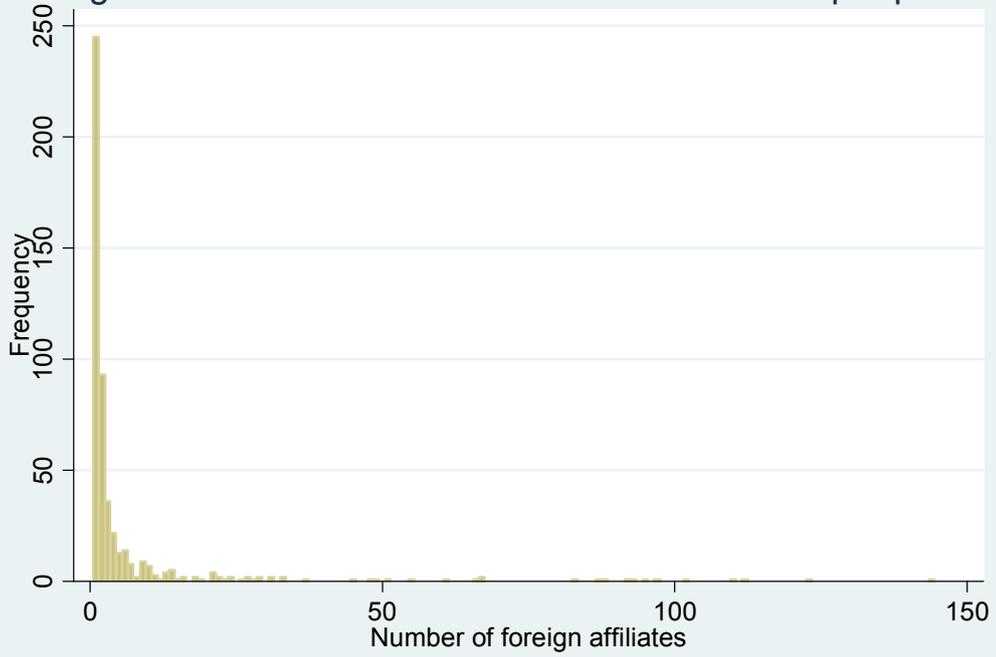
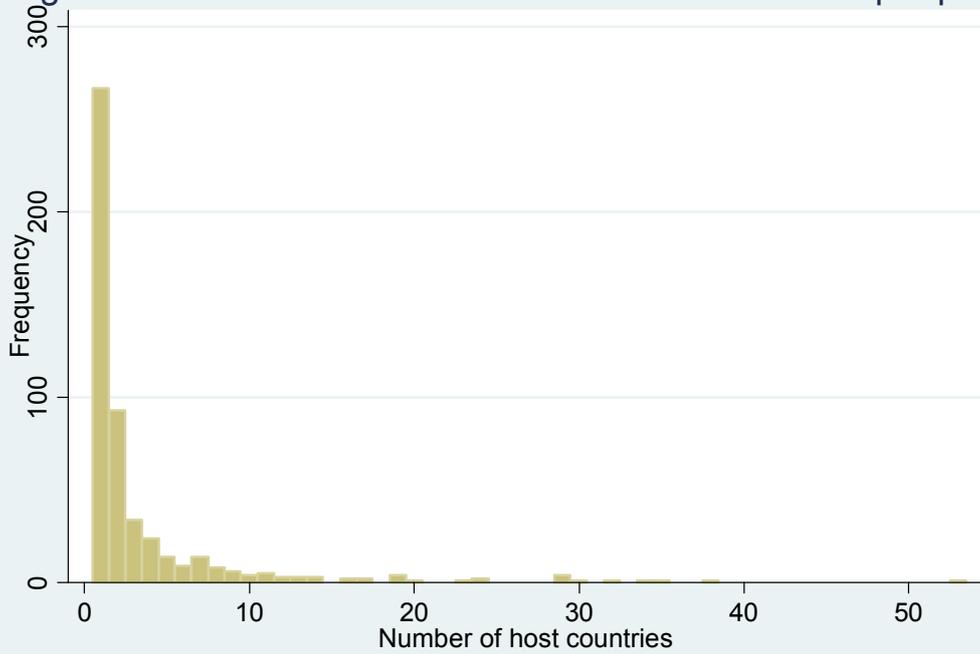


Figure 2. The distribution of number of host countries per parent



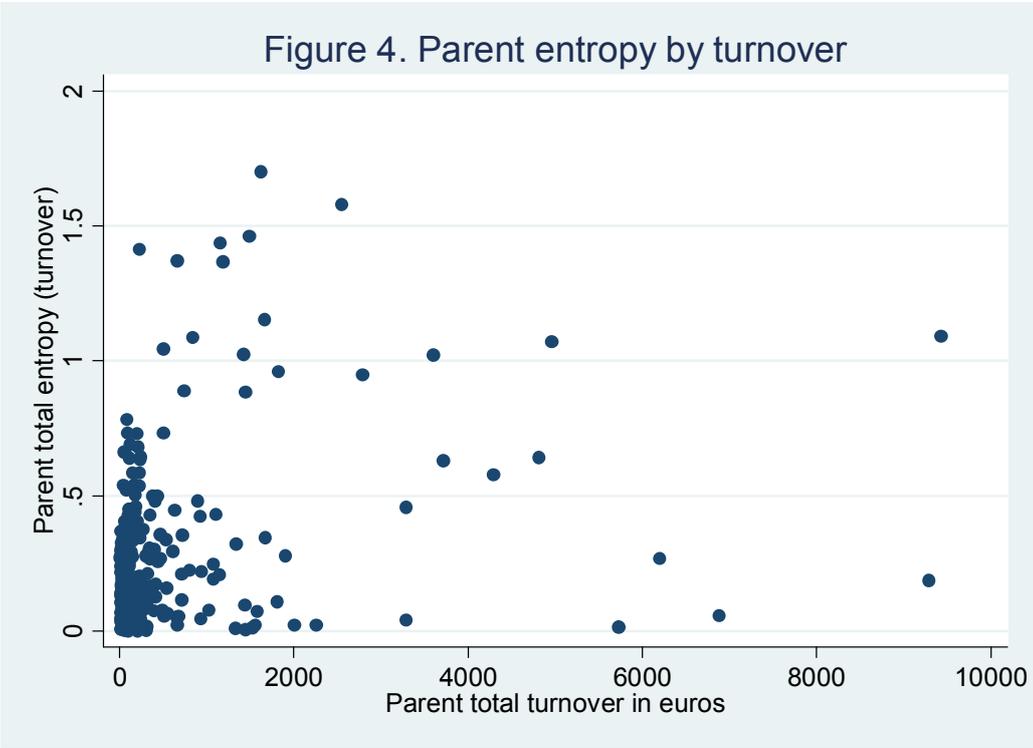
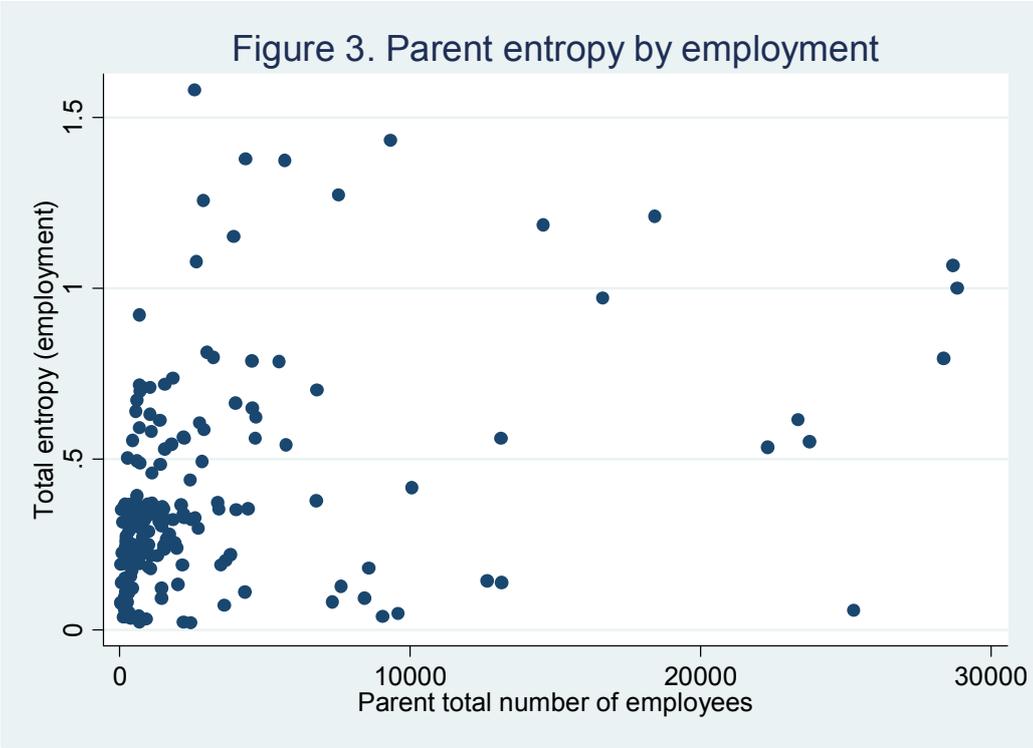


Figure 5a. Total and regional entropy (seven regions)

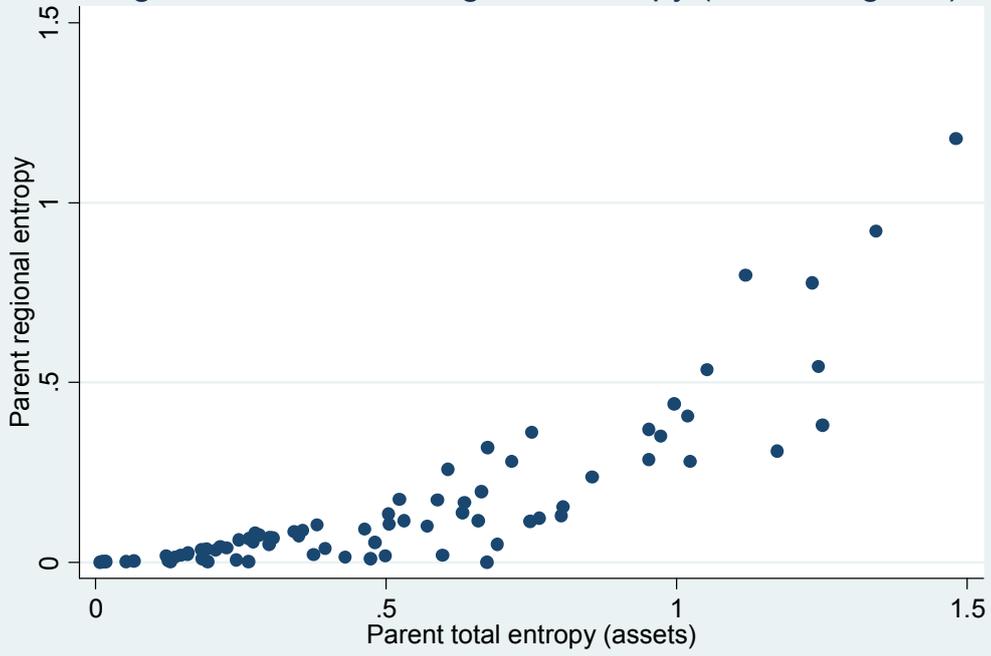
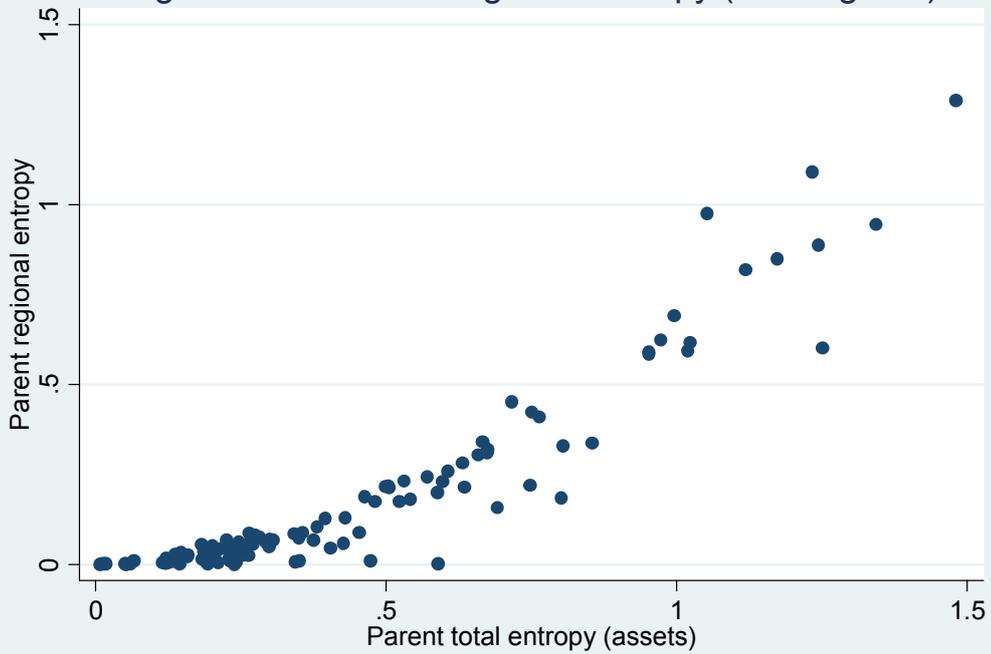


Figure 5b. Total and regional entropy (four regions)



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<sup>1</sup> At the height of the Great Depression, Keynes (1930) wrote that the most fundamental challenge for mankind over the next decennia was unlikely to be the economic problem (of survival), which he thought could be solved, but how to model human life once the subsistence problem had been solved for a large part of the population.

<sup>2</sup> Of course, there were rival ideas being expressed in the 1930s as well. For example, the ideas of Hayek (1944), that were motivated by the belief that only a free market could act as a bulwark against totalitarianism, were ignored at the time. They only resurfaced in the 1970s, once the inability of Keynesian policies to prevent stagflation became a pressing economic issue.

<sup>3</sup> The Black Swan refers to the notion that if all one has ever seen are white swans, one would have grounds to think that a black one is an impossibility. That is, until one was discovered in Australia.

<sup>4</sup> For further discussion and refinement of the concept of psychic distance, see O'Grady and Lane (1996) and Dow and Karunaratna (2006).

<sup>5</sup> More comprehensive reviews of the Uppsala model can be found in Petersen and Pedersen (1997) and Forsgren (2002).

<sup>6</sup> Indeed, the gravity models of international trade when applied to FDI suggest that geographical distance may be an important element in psychic distance (Bevan & Estrin, 2004; Egger & Pfaffermayr, 2004). See also Håkanson and Ambos (2008).

<sup>7</sup> See also Dunning et al. (2007) for a complementary macro-level view on the regionalization/globalization debate, and Flores and Aguilera (2007) on the pattern of US MNEs investments abroad.

<sup>8</sup> Such cases were caused by incorrect data for the parent or one or more of the affiliates, where the ratio of foreign to total activity was greater than one. In a few cases, a ratio greater than one was caused by partially owned affiliates of a considerable size being counted as wholly owned.