INTERNATIONALIZATION TRAJECTORIES OF MULTINATIONAL ENTERPRISES: 1990-2004

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Abstract

Despite the substantial amount of IB research, it remains remarkably unclear how, *at the corporate level*, firms expand and withdraw their international activities *over time*. The absence of longitudinal studies is not due to a failure to recognize the importance of such analyses, but rather the notorious difficulties in gathering reliable internationalization data over time. This paper addresses this empirical issue by using a dataset on the internationalization of sales, assets and employment of 233 firms between 1990 and 2004. These data were manually collected from corporate sources; to enable a substantial number of within-time-series corrections for a range of methodological problems, that otherwise would have resulted in large biases. Using factor and cluster analyses, the paper subsequently identifies six distinct internationalization trajectories – patterns over time with respect to the level, pace, variability and temporal concentration of international expansion. In addition to a first exploration of the antecedents of such strategies (focusing on sector and home country differences), a range of suggestions for further research on the determinants and performance implications of these trajectories is offered.

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1. INTRODUCTION

Understanding the nature, characteristics and determinants of the internationalization strategies of multinational enterprises (MNEs) is one of the key research foci within the International Business domain. Various theoretical models have been developed to explain how and why internationalization comes about, such as Dunning's eclectic paradigm that in itself encompasses several theories of international business (Dunning, 1988, 2000, 2001), and the more process-oriented learning models of the Uppsala school on the stages of foreign involvement (Johanson and Vahlne, 1977; Johanson and Wiedersheim-Paul, 1975; Vermeulen and Barkema, 2002). These theoretical contributions have been reflected in a large amount of empirical work on for example the determinants of FDI (Loree and Guisinger, 1995; Blonigen, 2005) or on entry mode choice (Makino and Neupert, 2000; Brouthers, 2002; Kogut and Singh, 1988).

Such studies take the individual investment decision – either aggregated at the national level in the investigation of the determinants of FDI, or at micro-level in entry mode research – as their key research object. However, internationalization is more than a series of 'one-off' decisions made separately for each country (Fletcher, 2001). In order to measure internationalization at the MNE level, a range of indicators has been developed including for example the Network Spread Index (Ietto-Gillies, 1994), or entropy measures of international diversification (Hitt et al., 1997). The most important (and often-used) indicator remains however the degree of internationalization (DOI). The DOI measures foreign activities as a proportion of a firm's total activities, where activities may constitute sales or assets (most commonly), but also the number of employees or subsidiaries. These may be either combined in a composite index (Sullivan, 1994; 1996; and UNCTAD's TransNationality Index), or used as separate dimensions (Ramaswamy et al., 1996).

The degree of internationalization has been used to explore both the determinants (for example, Autio et al., 2000; Tihanyi et al., 2000) and performance outcomes (see e.g. Lu and Beamish, 2004; Contractor et al., 2003) of international expansion at the firm level. So far however, only limited

attention has been paid to the dynamic change in a firm's degree of internationalization. Most studies have used the degree of internationalization in a relatively static way, focusing on cross-sectional comparisons rather than changes over time within a framework of long-term corporate strategy. Only a few recent studies have explicitly and empirically addressed how, at the corporate level, firms expand (and withdraw, see Benito and Welch, 1997) their international activities over time, and to what extent different patterns or clusters of strategies can be distinguished among such processes. Or, as Maitland et al. (2005: 436) noted, there is still "limited understanding of how the MNE is created as an integrated system of strategically allocated resources, rather than a simple aggregation of discrete affiliate or country level decisions." This is an important omission, as there are indications that differences in the internationalization process affect the extent to which firms are able to reap the benefits from international expansion. In addition, a longitudinal analysis of growth across borders can shed light on the growth of the firm in general, and allows for a study of the various strategies that firms have used in driving economic globalization, hereby furthering our understanding of this prominent process.

The reason for the absence of longitudinal studies has not been the lack of recognition of the importance of such analyses. Rather, data have been notoriously difficult to gather and to compare reliably over time. This paper aims to address this empirical issue by presenting a dataset on the internationalization of sales, assets and employment between 1990 and 2004 of a sample of 233 of the largest firms worldwide, from the US, Eruope and Asia. These data were manually collected from corporate sources in order to document in detail the reporting methodologies used. This enabled within-time-series corrections for a wide range of methodological problems, that otherwise would have resulted in large biases and discontinued time-series. Using hierarchical and non-hierarchical clustering techniques, we explore to what extent the way in which firms expand internationally can be analyzed and clustered into different 'types', or trajectories. A trajectory is defined as a distinct pattern over time with respect to the level, pace, variability, and temporal concentration of international expansion. Identifying typologies (here: trajectories) is an important academic tool to enhance our understanding of these firms, to guide further research and theory development, and to provide anchors for policy makers and managers. It has therefore often been used in international business

research, primarily with respect to organizational structure (from Chandler's (1962) M and U-forms, to Bartlett and Ghoshal's (1989) transnational firm, and Birkinshaw's (2001) typology of subsidiary roles). No such typologies are yet available for internationalization strategies as a whole. In developing such a characterization of internationalization trajectories, we pay not only attention to the level, pace and temporal concentration of international expansion, but also to the difference between the relative (DOI) and absolute growth (in US dollar value or number of employees) of international activities.

Due to our method of sample selection in which we take 1995 as our bench-mark year, we do not only include the present-day 'winners' of globalization, but also a set of firms that were large in the mid-1990s but at present do not make the Fortune 500 list anymore. This reduces the survivors-bias in our sample. In addition, we add to existing research on the degree of internationalization by paying extensive attention to the methodological complexities that are associated with comparisons between firms and over time. The degree of internationalization appears to be a relatively simple indicator, but is in fact quite difficult to measure. We show that failing to account and correct for a range of methodological problems results in severe biases in the measures of internationalization, and results in changes over time that are solely due to methodological discrepancies instead of changes in firm strategy.

By taking this particular empirical approach, our paper also complements the two recent studies that have explored dynamic changes in internationalization via the establishment of foreign subsidiaries instead of the DOI: those by Maitland et al. (2005), and by Vermeulen and Barkema (2002). Maitland et al. (2005) examined the clustered versus non-clustered growth (in time) of firms in the 1900-1975 period using a sample of 181 US-based multinationals from the HBS Multinational Enterprise database. Vermeulen and Barkema (2002) analyzed the pace, rhythm and scope of international expansion of 22 Dutch firms between 1967 and 1992. While our time period is shorter than that of Vermeulen and Barkema (2002) and substantially shorter than that of Maitland et al. (2005), our study covers a more recent period that is particularly interesting given the large increases in internationalization and globalization since the fall of the Berlin Wall in 1989. In addition, our sample includes a larger number of firms that are also distributed across multiple home bases. This

enables more general conclusions than samples based on the American (or Dutch) context alone. Thirdly, by focusing on the degree or internationalization of sales, assets and employment, instead of on the number of individual investments, we are able to more precisely document not only the size, but also the nature (e.g. labour versus capital intensive) of the international involvement.

The remainder of this paper is organized as follows. First in section 2, the various theoretical approaches to explaining internationalization are briefly reviewed, as well as a selection of the wide range of empirical studies on the causes and effects of internationalization. Section 3 starts the empirical part of this paper with a discussion on measuring the degree of internationalization and a detailed explanation of our own data collection method. Section 4 details the methodology, including the sample and empirical estimation approach. The results of the analyses are presented in section 5, while section 6 discusses and concludes.

2. THE INTERNATIONALIZATION OF MULTINATIONAL ENTERPRISES

How the internationalization of firms comes about, and for what reasons, is a question that is central in the area of International Business. Contributions answering this question are dominated by three theoretical perspectives, that highlight the role of firm specific advantages, of factor endowments and transaction costs, respecitvely. The eclectic paradigm by John Dunning (1988, 2000, 2001) combines these three approaches as Ownership advantages, Location advantages and Internalization advantages. Ownership advantages constitute of those (intangible) assets or characteristics that allow firms to compete effectively with local entities in foreign countries. Hymer (1960, published 1976) was first to point out that since firms operating across borders faced intrinsic disadvantages in the competition against local firms due to communication costs, language and cultural differences, lack of knowledge of the local market, exchange rate risks and (potentially) a less favourable treatment by host governments, they needed to have some specific advantage to offset these disadvantages (see also Caves, 1971; Lall and Streeten, 1977). Examples of ownership advantages – also often called a firm's resources (Ghoshal and Nohria, 1989; Wernerfelt, 1984; Barney, 1991), firm-specific advantages (Rugman and Verbeke, 2001), or competitive advantages (Porter, 1985, Birkinshaw, 2001) – include

the ownership of property rights, economies of scale, privileged access to product or factor markets, and technological and managerial knowledge and know-how. In particular the intangible ownership advantages are related to the firm's home market (Caves, 1971), where the institutional context, such as the education system, may strongly influence firms.

Locational advantages refer to the characteristics of foreign locations that motivate firms to produce abroad, instead of serving foreign markets through exports. An early contribution that pointed at the importance of these advantages for international production is Ray Vernon's product cycle model (1966) that suggested that some cost structures and market characteristics would be best suited for newly developed products (e.g. in the US), and others would favour more standardized or unskilled-labour intensive production (in developing countries). Generally, four main clusters of locational advantages attracting FDI are identified: markets; natural resources; factors contributing to the efficiency of production (particularly low labour costs); and strategic assets (resources that have specific strategic, synergic (complementary) value for the firm (Dunning, 2000, 1993).

Finally, Internalization advantages arise from market failures and determine why international activities are internalized within a single firm, and not conducted at arm's length. The main concept here is transaction costs – the negotiating, monitoring and enforcement costs that have to be borne to allow exchange between two parties (Jones and Hill, 1988). Building on the work of Coase (1937), both Buckley and Casson (1976: 33) and Hennart (1977) argued that profit maximising firms operating in a world of market imperfections, face incentives to circumvent imperfections by internalising these markets. Internalization occurs when the costs of organizing and transacting is lower within firms than via the market (Teece, 1986). Especially in markets for knowledge and intermediate product markets transaction costs due to uncertainty and complexity, or information asymmetry, may be high. Bounded rationality and opportunism also discourage market transactions and stimulate internalization (Dunning, 1993).

While the internalization theory has remained dominant in the past two decades in explaining the existence and growth of the MNE (Dunning, 2001), critics have emphasized that transaction cost approaches pay little attention to how domestic firms internationalize (Yeung, 1998, Morgan and Katsikeas, 1997), or to the internationalization process itself. This question regarding the process of

internationalization was first addressed by a group of Swedish scholars, in what has become known as the Uppsala model of internationalization (Johanson and Vahlne, 1977; Johanson and Wiedersheim-Paul, 1975). They distinguished four stages of internationalization, in which firms start by irregular exports to a host market, consequently export through an agent, in the third stage establish a sales subsidiary and finally, locate production in the host country. Experience with host country supply and demand conditions is a key variable in explaining the degree (and success) of internationalization (see also, Ruigrok and Wagner, 2003). As experience grows, the 'psychic distance' decreases and firms commit greater levels of resources to the host market (Hadley and Wilson, 2003; Whitelock, 2002).

These theoretical issues have been empirically tested in papers on a range of topics, including for example the determinants of FDI at the national level, and of entry mode choice. As regards the determinants of FDI, a distinction is generally made between traditional determinants related to factor endowments, labour and capital costs, and demand conditions, and the non-traditional locational advantages that have recently received more attention, including policy variables such as investment incentives, performance requirements and taxes (Loree and Guisinger, 1995; Blonigen, 2005), institutional factors such as property rights and government quality (Loungani et al, 2002; Biswas, 2002), and agglomeration effects (Porter, 1998). Traditional determinants of FDI appear however not to have lost their relevance in explaining investment in the age of globalization (Nunnenkamp and Spatz, 2002). Finally, also the distance – geographical, cultural, administrative (i.e. institutions) and economic – between the home and host country remains an important deterrent of FDI (Ghemawat, 2001; Van Tulder and Van der Zwart, 2006; Xu and Shenkar, 2002).

With respect to the determinants of the entry mode decision, many scholars have used (and confirmed) transaction cost theory – with particular attention to the role of cultural distance - to explain when joint ventures, and when wholly owned (acquisition or greenfield) subsidiaries (Makino and Neupert, 2000; Brouthers, 2002; Kogut and Singh, 1988) are used to enter a country. Also location factors such as markets and investment risk, as well as firm strategic factors and ownership advantages (size, experience) determine the mode of international expansion (Kim and Hwang, 1992; Agarwal and Ramaswami, 1992). In case of a weak fit between the organization and its host country context firms can also adopt disinvestment strategies (see for example Van Everdingen et al., 1997). Others

explored the performance implications of various entry modes, concluding that those effects are dependent upon host country context or firm-specific factors such as resources and organizational control (Woodcock et al., 1994; Slangen, 2006; Siripaisalpipat and Hoshino, 2000), firm strategy (Busija et al., 1997) or entry sequence (Pan et al., 1999). In more longitudinal settings, Chang (1995) studied sequential foreign market entry.

The determinants of internationalization have not only been studied at the national levels of analysis or for individual investment decision, but also at the corporate level for the degree of internationalization of a firm. In these studies, country, industry, and firm specific variables such as size, R&D intensity, and experience (age) have been found to affect the degree of internationalization of the firm (see for example Autio et al., 2000; Peng and Delios, 2006; Tihanyi et al., 2000; Hitt et al., 2006). But especially the effect of the degree of internationalization on performance remains a much researched and fervently debated issue (Lu and Beamish, 2004; Contractor et al., 2003). Over the past three decades, theoretical explanations have proposed different balances between the costs and benefits of internationalization. The S-curve hypothesis has received significant recent attention (Contractor et al., 2003, Lu and Beamish, 2004) as an attempt to integrate the negative performance effects of the 'liability of foreignness' in the early stages of internationalization (Zaheer, 1995) with learning effects, economies of scale and scope and transaction cost internalization in the second stage (positive performance effects) (Ruigrok and Wagner, 2003; Caves, 1996; Teece, 1986), and finally the internationalization threshold based on the prohibitive coordination costs of 'overstretch' in the final stage (Geringer et al., 1989, Gomes and Ramaswamy, 1999). In addition, recent studies addressed the role of moderating factors in the internationalization-performance relationship, such as the ownership of intangible assets (Lu and Beamish, 2004; Kotabe et al., 2002); the (geographic) dispersion of international activities (Vachani, 1991, Goerzen and Beamish, 2003); and the organizational structure of international activities (Fortanier et al., 2007). Vermeulen and Barkema (2002) found that the internationalization process (the pace and rhythm of expansion) could very well explain the circumstances under which internationalization is beneficial.

Reviewing the evidence cited above, it appears that most of the studies on how internationalization comes about have focused on one-off decisions (Fletcher, 2001). Though

empirical studies often refer to the larger overarching paradigms (OLI, or the stages models) that dictate the determinants and steps of internationalization, empirically, the analysis focuses on individual investment decisions (e.g. their entry modes), or analyzes the determinants of internationalization using investment aggregated at the national level (FDI) rather than at the organizational level. In the evaluation of the performance impact of international expansion, internationalization is measured as a firm-wide construct – often as the degree of foreign-to-total sales, or foreign-to-total assets – but the analysis focuses primarily on the *levels* of internationalization, and on the cross-sectional dimension, whereas only limited attention is paid to the time dimension and dynamic change (a notable exception is Vermeulen and Barkema, 2002). An overall picture on the extent and way in which the largest firms worldwide have expanded their international operations in the past 15 years is hence still absent.

This is an important lacuna in the literature for several reasons. First of all, there are important indications that different internationalization processes also lead to different performance outcomes (Vermeulen and Barkema, 2002). Secondly, a longitudinal analysis of growth across borders can shed light on the growth of the firm in general, a process in which path-dependencies and firm resources and capabilities are closely intertwined (Jones and Khanna, 2004; Penrose, 1957). Finally, a study of the various strategies that firms have used in driving economic globalization, hereby furthering our – yet limited (Rugman and Verbeke, 2004) – understanding of this prominent process. This may have important consequences for the theoretical and empirical studies into both the determinants of globalization and its broader societal implications.

It is important to note that this relative lack of longitudinal studies is not caused by an absence of interest in or appreciation of such studies, but rather by the difficulties in collecting reliable data over a longer period of time (see Vernon, 1999). This paper aims to address this issue by documenting the differences in internationalization and international expansion over time for a substantive period (1990-2004) that covers the most recent surge in international activity by MNEs. This period basically represents the take-off of the modern era of globalization, with global FDI inflows booming from a level of around US$ 200 billion in 1990 – after decades of only limited growth - to a peak of US$ 1400 billion in 2000 (UNCTAD, 2006). The main research question of this paper is to what extent the

way in which firms expand internationally can be analyzed and clustered into different types, or trajectories. We ask: if internationalization is path-dependent (as it is often considered to be), do all MNEs follow different individual paths, or can we identify clusters of different paths (trajectories) over time? A derivative question that this paper addresses is to what extent these trajectories are influenced by country and sector dynamics.

Identifying typologies is an important academic tool to enhance our understanding of these firms, to guide further research and theory development, and to provide anchors for policy makers and managers. It has therefore often been used in international business research, primarily with respect to organizational structure. One of the first typologies of organizational structure was proposed by Chandler (1962) who introduced (amongst others) the functional organization (Unitary or U-form) and the diversified product organization (Multidivisional or M-form). Other examples include Perlmutter's (1969) distinction of ethnocentric (home-country oriented), poly-centric (host-country oriented) or geo-centric (world-oriented) organizations; and the typology of Prahalad and Doz (1987) based on their Integration-Responsiveness grid. Porter (1986) identified several strategy configurations based on dispersion and coordination of international activities (see also Ruigrok and Van Tulder, 1995). One of the most well-known typologies of the organization for international firms was developed by Bartlett and Ghoshal (1989). In particular their 'transnational firm' that was argued to be best positioned to simultaneously achieve the contradicting competitive objectives of global efficiency and national responsiveness gained followers as others proposed similar organizational forms such as the heterarchy (Hedlund and Rolander, 1990) and the horizontal organization (White and Poynter (1990). Often these organizational structures were combined with, or further substantiated by, typologies of the various roles that subsidiaries could have within such structures (see e.g. Birkinshaw and Morrison, 1995; Birkinshaw, 2001). However, since the focus of these typologies is on the organization, and not on the spread and extension, of international activities, they would be unfit for the purposes of this paper. Since no such typologies are yet available for internationalization strategies as a whole, we develop our own typology in the empirical sections below.

3. MEASURING INTERNATIONALIZATION

The analysis of firms' internationalization strategies requires the appropriate measurement of the internationalization concept. A wide range of variables have been suggested to measure internationalization, including the Network Spread index (Ietto Gillies, 1998; Muller, 2004), or entropy indices of diversification (Kim et al., 1989, Hitt et al., 1997). Empirically, the use of the degree of internationalization – the ratio of foreign to total assets, sales or – less often used – employment or subsidiaries – is most common (see the review of the internationalization literature by Hitt et al., 2006). Sullivan (1994, 1996) has argued that several of these measures could and should be combined into a multi-item construct, consisting of the degree of internationalization of sales, assets, and several other variables. However, Ramaswamy et al. (1996) found little evidence that these variables indeed comprised items of a single construct, and also Hassel et al. (2003) stressed that internationalization is a multidimensional concept, pointing out that also theoretically (e.g. Vernon's product cycle, and the Uppsala stages model), foreign sales and foreign assets should be treated as dissimilar dimensions of internationalization.

To deal with these considerations, we measure the degree of internationalization in three ways: as the foreign-to-total ratio of Assets, Sales, and Employment. These are similar to the components of UNCTAD's Transnationality Index, although we will not combine them in this paper). We collected data for each of these three variables for the 1990-2004 period for a sample of 233 of the world's largest firms (as explained in more detail below), making use of annual reports and SEC filings. The use of manually collected annual report data allowed us to pay particular attention to documenting the exact methodologies used in those reports. As explained in more detail below, this was vital to ensure reliable and longitudinally comparable data on internationalization.

While debate continues on whether the DOI variables capture the concept of internationalization appropriately, little to no debate exists on how exactly these ratios should be measured. But even such apparently simple and often-used indicators as the ratio of foreign-to-total sales (FSTS), foreign-to-total assets (FATA) and foreign-to-total employment (FETE) are much more complex than the easy downloads from archival electronic data sources such as Thomson Financial (included in Datastream and comprising the WorldScope database) or CompuStat seem to suggest. One only has to open an annual report of a random MNE, to see that classifying assets, sales or

employment as 'foreign' or 'domestic' is slightly more complex. See for example the illustration of the geographical segment reporting by Sharp in figure 1. In this table, Sharp breaks down its total sales from various regions including intersegment (i.e., intrafirm) sales, which are subsequently eliminated from the total sales. It is not immediately clear which elements should be included in the 'foreign' and which in the 'total' component to calculate the foreign-to-total ratio of sales.

[Figure 1 approximately here]

Many important methodological issues need to be addressed, that are different for all three variables. As explained in more detail below, for sales data, these methodological issues include a) the difference between sales by destination and by origin; and b) the importance of intra-firm sales. For asset internationalization, they involve a) the definition of assets used, and b) the role of corporate or non-geographically specified assets. For employment data, the problems are caused by differences in a) whether the number of employees or the number of full-time equivalent jobs are reported, and b) if the numbers are based on the staff numbers at the end of a fiscal year, or on the average number of employees in a particular year. For all firms, the exact definition of the home country is important (as firms sometimes report data using their home region – e.g. Europe – as base), as well as the designation of the year of observation and the use of exchange rates for conversions to US dollars, as fiscal year-ends may not always be similar to the calendar year end. Finally, the comparison of internationalization over time is additionally hampered by mergers and acquisitions among firms.

Not appropriately dealing with these methodological problems creates severe problems in drawing conclusions from internationalization data. Both in time-series as in cross-sectional data, different definitions lead to biases that – as the examples below show - are often not unsubstantial. This results in faulty comparisons among firms, and in the recordings of growth or decline in internationalization over time that are due to methodological instead of firm strategic changes. In the data we gathered for this paper, we aimed to avoid and control for these problems as much as possible, focusing particularly on the time dimension. We will detail each of the problems and our solutions for sales data, assets data, employment data, regional homes, and M&As, in turn. We will also address how our rather 'labour-intensive' data compare to the more readily available information from electronic datasources, in particular the Thomson Financial and WorldScope databases.

Sales data

For sales data, the key problem in measuring internationalization relates to using data on 'sales by destination' (i.e., export sales, by destination of the final customer of a product, which may very well come from the home country) or 'sales by origin', sales that are recorded as foreign only if they are indeed sold by a foreign subsidiary. The difference between these two is substantial. Although very few firms record both, the example of Siemens provides a good illustration: in 2004, their FSTS ratio for sales by destination was nearly 90%, whereas for sales by origin, this was 56%, representing a difference of more than 30 percent points. For Volkswagen, similar differences were recorded in the mid-1990s: 70% of foreign sales by destination, 35% by origin. Also the comparison over time within the same firm show substantial changes in internationalization if firms start to use different ways of reporting. We choose to use sales by origin as often as possible, as this best captures the international expansion through investment of MNE activity. In the case of methodological changes within the time series, an adjustment was made for part of the series to remove biases due to methodology. This adjustment was always made so as to affect as few observations as possible. In order to distinguish between what share of a year-on-year change was due to methodological changes, and what part due to 'normal' changes in strategy, we calculated the average of four observations before and after the change in both the partial series, and correct one of the partial series by adding or subtracting the average difference between these two means. These corrections were made for a total of 28 out of the 231 firms that had a time-series of FSTS data available. The corrections involved an average of 4.2 changes per time-series, with an average absolute mean difference of 20%.

A second problem is that the total of geographically specified sales may not always equal the total sales of a firm. This is almost always due to eliminations of intra-firm sales: the sales of one affiliate to another. Not considering eliminations may result in over or underestimation of the real value of FSTS, as the numerator and denominator are not reflecting the same concept. As a general rule, we calculate the FSTS based solely on the geographically specified sales to external customers. In the example of Sharp above, only the sales to customers (hence excluding intersegment sales) are used to calculate the share of sales outside Japan (the total adds up to the consolidated total as the intersegment sales are eliminated).

Asset data

For asset data, one of the key problems in collecting comparable data relates to the type of assets that is geographically specified in the annual report. We found a total of 10 different definitions that have been used in addition to total assets: fixed assets; identifiable assets; long-lived assets; net assets; operating assets; property, plant and equipment; segment assets; tangible and intangible assets; tangible fixed assets; and capital investment. The amount of assets that is specified may be much less than a firm's total amount of assets. In such cases, directly linking the 'foreign' component to the total amount of assets on the balance sheet creates important measurement deficiencies. In addition, among the type of assets that is specified, a common component includes 'corporate', i.e., non-geographically specified assets. As with sales, we only use the amount of clearly geographically specified data to calculate the FATA variable. This means that assets that are not geographically specified either due to the definition or due to the 'corporate' component are not considered in calculating either the nominator or denominator of the foreign-to-total asset ratio.

Differences in methodology and definition create similar problems in the data over time for assets, as the difference between sales by destination or origin did for sales. For example, the degree of internationalization of Apple decreased from 39% in 1998 to 17% in 1999, as the definition changed from total assets into long-lived assets. For British American Tobacco, the FATA ratio increased from 27% in 1997 to nearly 80% in 1998 when instead of total assets, the operating assets were specified, and then dropped in 1999 to 62% as from that year onwards the dispersion of operating assets including unamortized goodwill was reported. Finally, Johnson & Johnson recorded a drop from 49% to 37% in 1998 in the share of foreign assets, as instead of identifiable, long-lived assets were reported. To correct for the effect of changes over time in asset measurement methodology on the total FATA ratio, we used the same approach as for sales data (i.e., by taking the mean difference between 4 observations before and after the break and correcting the shortest time series with this difference). These corrections were made for a total of 45 out of the 148 firms that had a time-series of FATA data available. The corrections involved an average of 4.8 changes per time-series, with an average mean difference of 14 percent points.

Employment data

Employment data are slightly less problematic than the geographical segmentation of sales and assets. The geographical location of a particular employee is generally easily established, as even the most mobile managers or expatriates tend to have a home base (even if that may change during the years), so problems related to part of the workforce not being geographically specified are virtually absent. Firms do differ, however, in whether they report the total number of employees (people) or number of jobs (full time equivalent, or FTE), and whether year-end or year-average numbers of employment are reported. This may affect the degree of internationalization of employment of a firm. For example, part-time work is quite common for women in the Netherlands, meaning that Dutch firms that would change from reporting on the number of individual employees to reporting on FTE, may see a drop in internationalization. Similarly, a high use of seasonal work in foreign countries by for example agricultural firms (and in the food, beverages and tobacco sectors) may create differences in the FETE ratio at the year-end, and on average.

For the 20 changes in reporting on employees however (out of the total of 114 series), the average absolute difference between before and after a methodological change was only 2.2 percent point. This is well within the normal annual fluctuations in the data. The highest difference (5 percent point) was recorded by Alcoa between 1994 and 1995, changing from year average to year-end reporting. This difference was not exceptional given the quite substantive increase in internationalization of the firm: an increase of 4% was recorded between 1992 and 1993, and an increase of 7% between 1995 and 1996. Hence, it appears that in the case of the FETE ratio, the method of reporting has no substantial effect on the degree of internationalization. Therefore, no corrections were made in the employment time series.

Control for regions

In addition to controlling for changes in the accounting methodology that was used to report the distribution of assets and sales by geographical segments, we also controlled for changes in definitions of the home country (or region) for all three variables (as in this case, differences for the FETE were

substantial). Quite a number of firms – in particular European firms – reported at some point in time on their extent of internationalization without mentioning the share of their home country in their total sales, assets, and employees, but use the entire EU (or even broader, 'Europe, Middle East and Africa') instead. For example, Valeo started to report for the European region since 2002, causing a drop in the internationalization of employees from 67% to 23%. Michelin made a similar change in 2002, explaining a decrease in the FSTS ratio from 86% to 53%, and a change in FATA from 77% to 51%. A US example is Ford, which started to report its employees 'outside North America' as foreign in 2003, causing a decline of 54% to 45% in the FETE ratio. We corrected for this problem in the same way as we did for assets and sales. This resulted in corrections for 22 time-series of FSTS, 6 time series of FATA, and 10 time-series of FETE.

Exchange rates and fiscal year-ends

All sales and asset data used were converted into US $ using year average exchange rates for sales, and year end exchange rates for US $. These exchange rates were taken as for the same date as the fiscal year end of the firm (for example, for many Japanese firms this is at the end of March). Fiscal years were assigned to the years in the dataset based on the maximum overlap of months. Hence, fiscal years ending between the 1st of January and 30 June were seen as giving the data for the preceding year, and fiscal years ending between the 1st of July and the 31st of December, as the data for that same year.

Mergers and acquisitions

Mergers and Acquisitions (M&As) have been a dominant mode of internationalization in the 1990s and (again) since 2003/2004. This creates problems in longitudinal analysis, as a merger (or takeover) of two independent firms into one new firm creates a discontinued time series. For example, if two firms in the sample merge in 1998, there will be data for the two independent firms up until 1997, and data for the single merged firm from 1998 onwards. If these series are treated as independent (i.e., as three separate entities in the dataset), the analysis denies that M&As are a key part of the expansion strategy of certain firms, and it creates a relatively artificial distinction between takeovers within the

sample, and takeovers outside the sample: why should a takeover by a large MNE of one of the smallest firms in the sample result in a separate time series and an acquisition of a large firm outside the sample, not? However, simply adding the data on the combined firm to one of the two preceding firms may also not be appropriate, if the two firms combine their activities on a relatively equal footing (i.e., the merger is a strategy of both firms).

[Figure 2 approximately here]

In order to deal with this problem, we use a hierarchical set of decisions following the diagram in figure 2. First, we distinguish between acquisitions and mergers. In their simplest form, acquisitions occur if one firm buys another firm, and announces this acquisition as such. In this case, we treat the acquiring firm as the surviving entity; the acquired firm – if it is in the sample – is covered until the acquisition. The treatment of mergers is more difficult. Often, firms prefer to present the combination of their businesses as a 'mergers of equals', whereas in fact an acquisition has occurred or the merger is dominated by one partner. An example is here the combination of Hoogovens and the twice as large British Steel into Corus, which was presented as a merger but has primarily been dictated by the interests of British Steel (Hendriks, 2006). We therefore choose to distinguish between mergers 'of equals', and 'of unequals', dependent upon the size of the involved firms. We define size on the basis of sales in the year preceding the merger. Mergers where the difference between the partners is larger than 10% of the sum of the combined sales[1] are considered as unequal, the others as equal. The data for firms involved in mergers of unequals are treated similarly as acquisitions.

For mergers between partners of equal size, a further study is made of whether there is a dominant partner. This is based on the developments after the merger, new headquarter location, and board membership. For example, the merger of Chevron and Texaco to ChevronTexaco in 2001 involved two partners of almost exactly equal size, but the name change to Chevron in 2004, the location of headquarters, and the domination of former Chevron employees in the Board of Directors

[1] While this is a rather arbitrary figure, we do believe that firms that are below this threshold, are clearly not equally sized: a difference of 10% or more of the combined sales is similar to the largest firm having at least one quarter more sales than the smaller firm of the two. But it may be that also firms above this threshold could still not be considered equally sized (e.g., in the case of a 9% difference). However, given that they are relatively few in number, and are furthermore submitted to an additional test (of dominance), a potential mis-classification at this stage should not affect the results of our analysis substantially.

and Executive Committee indicate that Chevron has been the dominant partner in this deal. Data for firms involved in mergers of partners that are equal in size, but that are still dominated by one firm, are also treated in the same way as acquisitions data.

[Figure 3 approximately here]

Following this line of reasoning, very few true mergers exist in the group of the world's largest corporations. Most of the high-profile mergers of the past 15 years, such as the merger between Chevron and Texaco, but also the combination of VIAG and VEBA into E.on, Thyssen and Fried.Krupp into ThyssenKrupp, and Chrysler and DaimlerBenz to DaimlerChrysler, can be characterized as 'dominated mergers' (in these examples, by VEBA, Thyssen and DaimlerBenz, respectively), and have been included in the sample accordingly. One example of a true merger is displayed in figure 3, which shows the combination of Rhône-Poulenc and Hoechst to Aventis (which later on merged with Sanofi-Synthélabo). Next to Aventis, only two additional firms in our sample of firms with (combined) more than 10 years of data could be identified as 'true' mergers (GlaxoSmithKline, and ConocoPhillips). These have been excluded from the sample, as they represent such a very small set of firms.

Comparison with other datasets

An important question that comes to mind after all these changes and adjustments, is to what extent this manual collection and adjustment of the data is worthwhile, particularly in the light of the availability of similar DOI data from electronic archival databases. To a large extent, the added value of making the methodological adjustments becomes already apparent in the overview above, where the size and number of changes are reported, and individual examples show that many of the adjustments are far from unsubstantial, and also indicate that *not* making a correction (for e.g. a change from reporting by home country to home region) would lead to knowingly including errors in the data.

But there are also other reasons why we believe the dataset we compile here is superior over the data that stems from electronic archival data sources (such as Thomson Financial (which includes Amadeus and WorldScope, or Compustat). One of these was that the internationalization of employment is not available in these databases, and hence would require manual data collection

anyhow. But perhaps the most important reason to embark on this effort was a lack of transparency with respect to the exact source and potential treatment or adjustments of the data in existing electronic databases (we focus our comparison primarily on Thomson Financial/Thomson Banker). As elaborated in more detail below, there often appeared to be substantial but inexplicable differences between what Thomson Financial reported and what firms' annual reports or SEC filings indicated, or there were data missing for well-renowned firms (Shell, Ford, General Motors, Siemens, to name just a few) although these firms published extensive geographically specified data in their annual reports.

To illustrate these points, we compared the internationalization data for sales and assets for a subset of our sample (120 firms for the 1998-2002 period) with the data from Thomson Financial database. We choose to compare this sub-sample because these include the firms that were not affected by major mergers or acquisitions (or liquidations) that could affect data coverage, included only publicly listed firms, and were covered a substantial number of data points in Thomson for at least one of the two variables. The time period was limited to the selected five years to reflect the fact that internationalization data are only relatively recently becoming available (hence the start in 1998), and to take into account that there may be delays in electronically recording the data published in annual reports (hence the final date of 2002). This subset hence should represent those firm-years for which data are most readily available and that are actively covered by Thomson. Yet, the number of missing values in the Thomson databse is substantially higher: 18% of the Thomson data versus 4% for our data are missing for sales, and 37% versus 12% respectively for assets. In addition, the Thomson data contained a considerable number of obvious mistakes in the form of one-year 'spikes' in the data that could not be explained by a merger or acquisition and could also not be found in the annual reports. This resulted in an average absolute difference between Thomson and our data of 4.1% for sales (st.dev 7.8%), and 10.8% for assets (st.dev 11.8%). The correlation coefficientsbetween the two datasets was .93 for sales, and .73 for assets. In a simple regression analysis, this translated into an explained variance (R-square) of .87 and .54 respectively. This means that for assets, our data could only explain for 54% of the variance in the Thomson indicator. This seems particularly low for an indicator that should measure the exact same value. As a conclusion, the data problem seems particularly important in the case of assets (though also for sales, 1 in 7 cases had a difference of more

than 10%). Table 1 illustrates a few examples that compare the FATA ratio that is used in this paper and the one reported by Thomson Financial.

[Table 1 approximately here]

It is important to note that this does not necessarily mean that all previous research on the determinants and performance effects of the DOI has come to wrong conclusions. The great majority of these studies is based on cross-sectional data, or analyzed panel data with a strong emphasis on the cross-sectional dimension. I.e., they compare differences between more and less internationalized firms. As we have seen, there is a positive correlation between the Thomson dataset and our dataset, which means that on average, firms that are highly internationalized according to Thomson, are also more internationalized according to our measures. Although future research should further investigate this issue of potentially biased results in substantive research settings, for now we can only conclude that in a cross-sectional research design, the use of Thomson data means that measurement error is (substantively) increased (as witnessed from the relatively low R-square value of the regression equation), meaning that in studies with DOI as dependent variable, the results are simply just less efficient (though some researchers (Cheng and Van Ness, 1999) point out that more severe problems (biases) created by measurement error in the independent variables, which is the case for example in studies on the performance effects of DOI).

In contrast with studies with a cross-sectional focus, research with a distinct longitudinal design that aim to compare and analyze internationalization data over time, however, extreme care must be taken to use a unified methodology. Since this is exactly the purpose of this paper, we believe that our efforts in compiling this dataset are further justified.

4. METHODOLOGY

Sample selection

The basis of our selection of firms has been a combination of the 300 largest non-financial firms worldwide in 1995 (based on sales, from the Fortune Global 500 list of 1995), plus the top 50 largest firms from a selection of the most important investor countries worldwide: the US and Japan (both Top 50s already included in the 300 from Fortune), and the UK, France, Germany, and the

Netherlands. These Top50s ensured a wider coverage of in particular European firms that would otherwise have been underrepresented in the sample. This resulted in a sample that in 1995 consisted of 444 firms (or entities). These firms were followed over time: backwards until 1990, and forwards until 2004 (the latest data available). In case of intra-sample mergers or acquisitions, data were attributed to the 'dominant' party as explained above, and the old series discontinued. In gathering data on the internationalization of sales, assets and employment, we were able to find such data for 233 firms for which at least one of the three variables (FATA, FETE, FSTS) was available for 10 or more years in the 1990-2004 period. These long periods are necessary in order to be able to study patterns over time.

This 10-year criterion meant that for 85 firms (in addition to the 233, our total set consisted of 318 firms), data were found but were not used. For 35 out of the 85 firms, this lack of data was because geographically broken down data were not reported until the late 1990s. This category included quite a number of utilities and formerly state-owned companies, such as Telefónica, Electricité de France and Deutsche Post. For the other firms, mergers or takeovers were an important reason for the lack of sufficient time series. For 26 firms, data collection ceased as they became part of another firm (either as takeovers, or in mergers of unequals or with a dominant partner), such as Comptoirs Modernes (part of Carrefour). A total of 13 firms was not used as they resulted from a merger but without sufficient data on their predecessors to create a 10-year time series. This included sometimes painful exclusions (as firms are both quite large in their industry, and nearly hit the 10-year mark), for example Novartis and Suez (Suez Lyonnaise), both with nine years of data available for all three variables until 2004. The exclusion of the 'true' mergers accounted for the removal of 9 entities, while two firms were liquidated in the course of the 1990s (Agiv and Deutsche Babcock). In sum, the exclusion of these 85 entities meant that 85 series of FSTS, 59 series of FATA, and 47 series of FETE data were not analyzed. These series had an average number of observations of 5 (6 for sales).

The data that were used in the analysis are summarized in the Annex. This table shows for each firm in the sample, whether or not a series of FSTS, FATA, or FETE data is available, how many observations are in the series, according to what method the data are measured, and if the series have been adjusted for either methodological changes, or differences in the definition of the home country

(region). Finally, the country of origin is reported, and if applicable, information on M&As in which the firm has been involved and that affected the coverage of the data. In sum, our dataset consists of 3495 (15*233) firm-year observations as a maximum, of which 3252 (93%) are available for FSTS, 2023 (58%) are available for FATA, and 1593 (46%) for FETE. These data are summarized within time-series per firm, leading to a total of 231 (out of 233) time series for FSTS, 148 for FATA, and 114 for FETE. The average number of observations per time-series is 14.1; 13.7; and 14.0, respectively, out of a maximum of 15.

Variable measurement

Based on these time-series data, we defined a range of variables in order to measure the level and process of internationalization for the 1990-2004 period for each firm. These variables cover a total of five dimensions of internationalization. In addition to measuring the level of internationalization (1), we follow Vermeulen and Barkema's (2002) suggestions and include pace, or average growth rates (2) and rhythm or variation in growth (3). We also include the measure proposed by Maitland et al (2005) of clustering of investment over time (4).

As a final dimension, we also address not just the relative importance of international activity (as in the various DOI measures), but also the absolute level of international expansion (5). This acknowledges that the DOI is not only influenced by the extension or retreat of foreign operations, but also of domestic operations. A decrease in the TNI is usually interpreted as a sign of failure by those expecting a positive relationship between internationalization and performance. But it may equally reflect home country growth – that potentially has even been made possible because of profitable international activities – rather than a decline of foreign competitiveness. Similarly, the selling of domestic activities increases the TNI, without the firm investing in new foreign activities at all. In analyzing the internationalization strategies of firms, hence both the degree and absolute level should be considered for a comprehensive overview of international expansion. Although comparisons for levels of size are inherently influenced by overall company size, it is interesting to compare the growth of domestic operations with the growth in DOI. That this is not just a merely academic question is illustrated by figure 4 that shows the growth in domestic sales related to changes in the FSTS ratio.

For all firms in the upper-left quadrant, an increase in internationalization is paired with a decrease in domestic sales, meaning that at least a part of the increase in DOI is explained by domestic decline rather than foreign expansion. Similarly, the firms in the bottom-right quadrant have seen decreases in their FSTS ratio, but this change is at least partially explained by the increase in domestic sales. For roughly a third of the sample, an increase or a decrease in the FSTS ratio is not necessarily equal to an increase or decrease in foreign activities as a whole.

[Figure 4 approximately here]

Based on these five dimensions, we calculated for sales, assets and employment 1) the average DOI between 1990 and 2004 (MEAN); 2) the maximum value (MAX) and 3) the minimum value (MIN) of DOI in that period in order to measure the level of internationalization. The pace or change in internationalization was measured by 4) the average change in DOI (GROWTH), whereas the rhythm or variability of internationalization was measured by 5) the average absolute change in DOI (ABS GROWTH) and 6) the standard deviation of growth (GROWTH SD). The temporal clustering was assessed using 7) the clustering index by Maitland et al., (2005) (CLUSTER, explained below); and the absolute importance of international activities by 8) the growth in domestic sales, assets, and employment, respectively (D GROWTH).

Of these variables in particular the variable CLUSTER requires some further explanation. In our paper, we use the Clustering Index proposed by Maitland et al. (2005), but apply it to the DOI of firms, instead of to the number of international investments. The Clustering Index is based on the number of 'clustering points' divided by the number of observations in the time-series (in our sample, max 15). Clustering points are annually attributed to a firm for above or below average (within the time-series) changes in internationalization. Standardizing the FATA, FSTS, and FETE variables per firm, absolute z-values below 1 are awarded no points, z-values between 1 and 2 are worth 2 points, those between 2 and 3, 4 points, if an increase or decrease in internationalization is more than 3 standard deviations away from the mean growth of internationalization of a particular firm, 8 points are assigned. Additional points are awarded for serial exceptional internationalization: if in the preceding year internationalization occurred in the same direction (i.e., increase or decrease), the points of the previous year are also added to the present year in an accumulative way. The resulting

measure indicates for each firm, whether its internationalization in the 1990s has occurred relatively clustered in time, or dispersed over the entire period. Higher values indicate stronger clustering.

Analytical approach

The empirical analysis consists of several steps. First, a factor analysis is performed on the 8 variables of internationalization to reduce the number of variables and explore if the five dimensions of internationalization that we identified are indeed present in the data. Subsequently, the thus-derived factors are used to cluster MNEs into distinct groups of firms that are relatively similar in their internationalization strategies, using hierarchical and non-hierarchical clustering techniques. These clusters represent what we dubbed 'trajectories': a distinct pattern over time with respect to the level, pace, variability and temporal concentration of international expansion. As a final step in the analyses, we compare the various sales, assets, and employment trajectories of firms, and asses to what extent such trajectories may be dependent upon country and sector classifications. Given the nature of the variables, these analyses are based on simple cross-tabulations and Chi-square tests.

5. RESULTS: INTERNATIONALIZATION TRAJECTORIES 1990-2004

The descriptive statistics and correlations of each of the internationalization variables are displayed in tables 2 to 4. These tables show that many of the variables that were expected to be highly correlated – such as the three variables for the level of DOI, and the two variables measuring variability of international expansion (abs_growth and growth_sd) – are indeed associated with each other. In addition, the structure of correlations is relatively similar across tables, indicating that the dimensions we are looking for are present in all three measures of the degree of internationalization: FSTS, FATA, and FETE. Table 5 explores this issue further and reports the correlation coefficients among the sales, assets and employment variables that seek to measure the same concept. The table shows very high correlations for the level of internationalization: firms that have a relatively large share of their assets abroad, also have a relatively (to other firms) large share of their sales and employment outside their home country. There are no significant correlations for the extent of clustering over time among sales, assets and employment growth. Especially the dynamic link between international assets and

employment is weak: an increase in the internationalization of assets does not necessarily lead to more internationalization of employment (nor does that happen in the domestic market). It appears that whereas for some firms assets and employment go hand in hand, for others, there may be tradeoffs between the internationalization of assets and employment.

[Tables 2 to 5 approximately here]

Factor analysis

For each of the different variables, we performed a factor analysis (varimax rotation) to reduce the number of variables and to see if the five dimensions we identified were indeed present in our data. The results indicated that for each set of variables (assets, sales, and employment) 4 factors could be identified. These factors were very similar in nature, as could be concluded from the factor loadings. The results of the factor analyses are presented in table 6. The four factors extracted explain for a total of 91% of the variance in the sales variables, and for 89% and 92% respectively, of the variance in the assets and employment variables. Factor 1 represents the level of internationalization, and is named "LEVEL". Factor 2 represents the variability in expansion, and is called "VOLATILITY". Factor 3 represents a combination of DOI growth and domestic decline, and is called "INTERNATIONAL EXPANSION". The factor loadings for this factor for employment have opposite signs compared to the loadings on the same factor in the sales and assets analyses; we therefore reversed the resulting factor-scores in the subsequent analyses. Finally, factor 4 solely represents the temporal clustering of internationalization, and is called "CLUSTER".

[Table 6 approximately here]

Cluster analysis

Using the factor scores generated in the factor analysis as input variables, we aimed to establish clusters of firms that scored in similar ways on the four factor scores. We first applied a hierarchical clustering procedure in order to determine the number of clusters in the dataset, using the squared Euclidean distance as a distance measure. Based on a scree-plot of the agglomeration coefficients, 6 clusters were found for sales, assets, and for employment. The cluster centers of the hierarchical clustering procedure were used as seeds in the k-means cluster analysis. Such a non-hierarchical

cluster analysis avoids that individual cases continue to be part of a cluster due to early combinations with other cases, whereas they would fit better with other groups of firms.

The results of the cluster analysis are displayed in tables 7 to 9. Each of the tables shows the averages for each cluster of the variables (the factor scores) on which the cluster analysis is based. These values have been used to develop names for the various clusters.

[Table 7 approximately here]

For sales, six different strategies or trajectories could be distinguished, as displayed in table 7. First of all, 60 firms were characterized as 'home oriented'. These firms scored very low in terms of the overall level of internationalization of sales, and also over time, only expanded their international sales very gradually (hence low volatility and cluster scores), and only to a very limited extent (as indicated by the relatively low value for international expansion). A typical example of a firm in this cluster is the American retail chain Safeway. With an average 17% of their sales outside the USA, Safeway's international turnover actually decreased over the 1990s, in a very gradual way with on average 1% per year.

The second category involves firms that have seen a 'strong expansion' of their foreign sales in the 1990-2004 period. Although their average level of internationalization is relatively low, these 32 firms have greatly expanded their international activities, as shown by the high score on that factor. This expansion occurred relatively gradually and not clustered in time, although the speedy changes did increase overall volatility. A key example of a firm that has rapidly expanded its international sales is France Télécom. From having no international sales in the early 1990s, the firm strongly expanded the share of its international revenues to a total of 40% in the early 2000s. With the exception of a relatively large increase in 1999, this increase was quite gradual.

A total of 18 firms in our sample showed clear 'home reorientation' strategies away from international markets, as indicated by the very low value on the international expansion factor. These firms had quite substantial degrees of international sales, but reduced the foreign component of their sales in one or more relatively large steps (see the high value for 'cluster'). British American Tobacco is one of these firms. After a period in the 1990s where between 70% and 80% of BAT's sales came

from non-British countries, the FSTS ratio was reduced in only a few years to 55% in 2004. This decline was associated with an increase in domestic sales, not a reduction in foreign sales, however.

The 45 firms that were named 'clustered' are primarily characterized by the high values for the associated factor. Scoring more or less on average with respect to the overall level of internationalization; slightly higher for expansion and lower for volatility, many of these firms increased their international presence with a 'bang'. An example of this category of firms is Otto Versand, which increased its foreign share of sales from around a stable 30% in the early 1990s, to 50% in the four-year period between 1997 and 2001, after which the FSTS ratio remained stable again.

A slightly paradoxical name is proposed for the 15 'Stable-volatile' firms. These firms are characterized by their high volatility in growth rates of international sales, although these changes occur around a relatively stable mean, as shown by the relatively low scores on expansion and cluster. These firms have average degrees of internationalization. ThyssenKrupp provides a good illustration of these firms: comparing the FSTS ratio at the beginning and end of the 1990-2004 period, the difference is minimal: 47% versus 44%. But the time in between is characterized by rapid sequence of highs and lows, as the FSTS ratio oscillated from 47% in 1990 to a peak of 52% 1997, then declined to 38% in 1999, jumped back again to 60% in 2001, to end at 44% in 2004.

The final set of firms has 'comprehensive' international sales. This group of 61 firms has the highest levels of international sales among all firms, and has seen a slow but steady increase in the FSTS ratio in the 15 years under investigation, as indicated by the relatively low values for volatility and cluster for these firms, and the slightly above average score on international expansion. Dow Chemical is a typical example of this category of firms: it gradually increased its (already above average) 52% of foreign sales in 1990 to 62% in 2004. Figure 5 graphically displays the archetypical examples of the six internationalization trajectories throughout the 1990s.

[Figure 5 approximately here]

Similar to the six different internationalization trajectories for sales, six trajectories can be identified that characterize the expansion and retreat of firms with respect to their international assets, see table 8. Where the sales dimensions is primarily market related, the asset dimension reflects the internationalization of production. Some of the trajectories that have been identified for the

internationalization of sales, have parallels with the trajectories of asset internationalization (although this by no means implies that these involve also the same firms), others are slightly different.

As with the sales trajectories, a first set of 35 firms has been dubbed as having followed a 'home-based' trajectory between 1990 and 2004. These firms are characterized by very low levels of asset internationalization, and score also low on volatility, expansion, and cluster. The Japanese construction and engineering firm Kajima exemplifies this trajectory, with the FATA ratio hovering around 10% throughout the period under investigation.

[Table 8 approximately here]

The second cluster of firms has followed a trajectory of asset internationalization that can be called 'strong expansion'. These 32 firms pair substantial levels of internationalization with a large increase in the share of foreign assets throughout the 1990s, as witnessed by the high value on international expansion for these firms. This expansion occurs relatively gradually, without major clusters over time. An example is Asahi Glass, the Japanese glass manufacturer, which expanded its international production from 36 to 56% between 1995 and 2004 in large but relatively equally sized steps.

The 36 firms that followed a 'clustered' internationalization trajectory with respect to assets have expanded their international production in either one or several large steps, with periods of relative stability in between. An illustration of this trajectory is Associated British Foods, which increased its FATA ratio from just over 10% in the early 1990s, to 44% in 2004, with a particular strong increase in the late 1990s.

Similar to the sales trajectories, there is also a cluster of firms that follows a comprehensive asset internationalization trajectory. A total of 31 firms can be characterized as being already very international, with relatively few changes throughout the period under investigation (as indicated by the relative low scores for the volatility, expansion, and cluster factors). A good example of this fourth group of firms is Akzo Nobel, the Dutch chemicals company, which had an average of around 70% of its assets outside the Netherlands, growing only slightly throughout the 1990s and 2000s.

In comparison with the previous clusters, a slightly smaller set of firms can be characterized as 'dynamic-volatile'. These 12 firms are very volatile, but also characterized by strong expansion, hence they are dynamic rather than static as was the case for the sales trajectory. The internationalization of

Rolls-Roys is illustrative for this trajectory. Increasing its share of foreign assets from 11 to 33% between 1990 and 2004, it did so in a very changeable path. Its FATA ratio moved from 11% to `16% in 1993, was reduced to 4% in 1997 to increase in two years time to 40%, and in 2002, to 55%, to rapidly decline again in the two years to 2004 (33%).

The final set of firms, which we called 'contraction' includes only 2 MNEs; Bull, the French electronics firm, and Booker, the British retailer. Bull's is a story of restructuring, debt, government support, little if any profit, and a strong retreat from international markets since the year 2000. Booker, prior to its acquisition by the Big Food Group in 2002, also experienced several major restructuring operations in the late 1990s, and was characterized by large debt and sluggish sales. These troubles are reflected in an extremely volatile international presence – Bull's ranged between 0% and 56% in the period under investigation, Booker's between 0% and 42%. Both firms also stand out from the other firms because of their low scores on average levels of internationalization and for international expansion. Indeed, both firms have (nearly) completely retreated from foreign production, Booker between 1997 and 1999; and Bull between 2001 and 2004.

The final set of clusters we created is based on the internationalization of employment, and is displayed in table 9. Given the smaller number of observations that was available for the internationalization of employment, some groups are slightly smaller. Three main strategies can be distinguished: comprehensive, clustered, and home-centred. Fewer firms follow strong expansion or dynamic-volatile strategies.

[Table 9 approximately here]

The largest group of firms is characterized by a 'comprehensive' international employment trajectory: high levels of foreign employment, with relatively few changes in the FETE ratio over time, as shown by the low values for volatility, expansion and cluster. Heineken is a prime example here. Already very international with 78% of its employees outside the Netherlands in 1990, the firm gradually increased is international presence to a FETE ratio of 92% by 2004.

Again, as with sales and assets, we find a set of firms of which the strategy can be characterized as 'strong expansion', although it is a relatively small group consisting of only 10 firms. Already with a large share of foreign employees (see the high score on the level factor), these firms

strongly increased their FETE ratio in the course of the 1990s. It should be noted that this is 'real' expansion, and not a displacement of domestic with foreign employees. Delhaize Le Lion for example increased its FETE ratio from 80 to 88% between 1990 and 2004, while more than doubling its total number of employees.

A set of 27 firms is characterized by a clustered trajectory, where expansion and reduction of the FETE ratio occur in relatively short time-periods, after which the share of foreign employment remained stable again. These firms do not have high FETE ratios, and expand their international employment only at an average pace. General Electric for example increased its share of foreign employees in its total workforce from 21% to 46% between 1990 and 2004, but the majority of this increase took place between 1993 and 1997.

Similar to the previous clusters for sales and assets, a relatively small set of 10 firms can be characterized as 'dynamic-volatile'. These firms show very volatile trajectories, but are also characterized by above-average international expansion, hence the dynamic instead of the static characterization. Franz Haniel for example expanded its foreign employment from 57% to 77% in the period under investigation, but did so in several 'waves' after each of which, a period of reduction followed (temporary highs could be recorded in 1993; 1997; and 2001).

As with the sales and assets trajectories, a substantial number of firms have used home-centered internationalization trajectories in the course of the 1990s and early 2000s. These firms are characterized by very low levels of employment internationalization, and score also low on volatility, expansion, and cluster. The American retail chains are key examples of such firms, but also German-based KarstadtQuelle has very few international employees, with an average of 5% FETE.

The final group consists of 3 firms that have been characterized as having followed 'retreat' trajectories. The firms in this category include of Getronics, Canon and BOC: all relatively international firms (at some point), but very volatile: the FETE ratio of Getronics ranged between 17% to 75%; for Canon, between 13% and 88%; and for BOC, between 8% and 94%. Also each of these three firms is characterized by a serious reduction of the share of international employment and by a reorientation to the domestic market, with strong domestic employment growth over the 1990s and early 2000s.

A key question after reviewing the various different sales, asset and employees trajectories is to what extent an in what way, firms combine various trajectories. Cross-tabulating the sales trajectories with those for assets and employment (assets and employment could not be linked due to the few firms that reported both for a sufficient period of time), table 10 points at some interesting results. The upper half of the table links sales and assets trajectories. It shows that firms with a home oriented sales trajectory are also often characterized by home-oriented asset trajectories. Still, there is also a substantial set of home-market oriented firms that takes a clustered approach to the internationalization of assets, expanding international production while maintaining a focus on domestic clients. A similar overlap can be found for firms that show a strong expansion for sales, and for assets. Clustered sales trajectories, in which international sales are strongly increased in relatively short periods of time are often combined with comprehensive asset trajectories. Such firms appear to use their international production base as a means to target and enter new markets. However, the majority of firms that followed a comprehensive asset trajectory also followed a comprehensive sales trajectory. The lower half of table 10 links sales with employment trajectories. Here too we see groups of firms that are distinct in their home orientation for sales and employees (a total of 13) and that combine comprehensive strategies for both dimensions (a total of 21 firms). But also other types of sales trajectories are associated with a domestic employment trajectory; in particular the clustered and home-reorienting firms.

[Table 10 approximately here]

A main conclusion from this table is not so much that firms display similar strategies with respect to the internationalization of sales, assets, and employment, but that those strategies are quite different for many firms. Firms choose to focus on the domestic market while greatly expanding foreign production, or couple comprehensive sales trajectories with a clustered trajectory of international employment. This begs the question what determines the trajectories that firms follow.

Internationalization trajectories by sector of activity and country of origin

Using Chi-square tests, we established that there is a relationship between the country of origin of a firm and its internationalization trajectory with respect to sales (Chi-square(30) = 83.2; $p<0.01$) and

assets (Chi-square(30) = 65.4; p<0.01). Table 11 below reports the results of these tests, displaying the different sales and asset internationalization trajectories for the various countries in the sample.

[Table 11 approximately here]

A first rather technical element that becomes apparent from table 11 is that in particular German and Dutch firms fail to report on the geographical segmentation of their assets, given the small number of observations for assets for these countries compared to e.g. the availability of sales data. Hence, we will not draw conclusions regarding the asset internationalization trajectories of firms from these countries. Starting from the sales strategy of German firms, these are clearly dominated by a clustered approach. French firms are similarly characterized by a focus on clustered internationalization of sales. With respect to the internationalization trajectories of assets, the majority of French firms followed either a clustered or comprehensive trajectory in the 1990s. British firms are characterized by either their comprehensive and strong expansion trajectory with respect to sales, and comprehensive and dynamic volatile for assets. The internationalization trajectories of sales by Dutch firms are dominated by comprehensive trajectories. Japanese and American firms are both strongly typified by their home market orientation. But while Japanese firms are similarly homogeneously home-based in their production, US firms are much more dispersed in their approaches of the internationalization of assets, taking not only a home based but also often a strong expansion or clustered trajectory.

Similarly to the relationship between internationalization trajectories and country of origin, we used Chi-square tests to establish whether there is a relationship between the sector of activity and a firm's internationalization strategy with respect to sales. The tests confirmed that this was the case (sales Chi-square(70) = 94,4; p<0.05; assets Chi-square(70) = 95,0; p<0.05). Both these tests should however be interpreted with caution in light of the relatively small number of observations in our sample in relation to the quite extensive 6x15 cluster-sector matrix. Table 12 below reports the different sales and asset internationalization trajectories for a selected number of sectors (those with most observations). These results for the sales and assets internationalization trajectories across sectors and countries should however be interpreted with caution, especially as the number of firms that has been characterized with respect to their asset strategy is smaller than that of sales, meaning that

differences in number of observations could partly account for the emphasis on various strategies within a sector or country.

[Table 12 approximately here]

Table 12 shows that in the chemicals and pharmaceuticals sectors, most firms can be characterized as following a comprehensive trajectory, both with respect to sales and assets. Computer and electronics firms are however more inclined to follow a home oriented sales and asset trajectory, although a substantial number of firms also can be characterized as stable-volatile with respect to sales and clustered with respect to assets. The food, beverages and tobacco industry more or less mirrors the overall distribution of internationalization strategies, although firms in this sector seem to have a slight preference for comprehensive trajectories as regards assets. Automotive firms have shown a distinct comprehensive international sales trajectory, and a similar comprehensive, or else strongly expanding, trajectory of international production. Telecom and utilities can be characterized as home market oriented, while assets are also often home-based, or else follow a dynamic volatile international trajectory. Wholesale and retail have are also been strongly home-based in the 1990s.

6. CONCLUSIONS

The debate on why and how firms invest abroad is central to international business studies, and has generated a wide range of theoretical and empirical contributions. The literature review in this chapter showed that the theoretical paradigms are often broad and encompassing, while the empirical analysis of internationalization predominantly focuses on either one-off investment decisions (as in mode of entry research), on national aggregates (e.g. in analysing the determinants of FDI), or on the static levels of internationalization only (as in most estimations of the internationalization-performance relationship). While each of these strands of research has yielded important insights, it remains remarkably unclear how, at the corporate level, firms expand and withdraw their international activities over time, and to what extent different patterns or clusters of strategies can be distinguished among such processes. An important reason for this deficiency has been the difficulty in obtaining reliable and comparable time series of internationalization strategies at the corporate level. To the best

of our knowledge, since the Harvard Multinational Enterprise project in the 1960s and 1970s (Vernon, 1971), no major research has been done with the aim to follow the internationalisation strategies of a substantial of firms over a longer period of time. In 1999, Vernon (1999: 48) still observed that the kind of data needed for longitudinal studies at the firm level are difficult to obtain. In this paper, we aimed to address this issue by exploring to what extent the internationalization of sales, assets and employment between 1990 and 2004 of a sample of 233 of the largest firms worldwide could be classified into distinct trajectories - patterns over time with respect to the level, pace, variability, and temporal concentration of international expansion. The prime ambition of the paper, therefore, has been descriptive - getting the data right in order to facilitate further research.

In order to measure internationalization, we used one of the most commonly used indicators, the degree of internationalization or the ratio of foreign-to-total activities, for sales, assets, and employment. However, despite its widespread use in empirical studies, and its availability in electronic databases such as Thomson Financial, WorldScope or CompuStat, we find that the degree of internationalization is a far more difficult indicator to measure. It is ridden with methodological problems that need to be addressed in order to avoid what was shown to be large biases or discontinued time-series. We aimed to deal very carefully with methodological issues including for example the exact definition of sales, assets and employment that are geographically specified, the role of eliminations and non-geographically specified parts of sales and assets, changes in the methodology of reporting by firms over time, the use of home country or home region as a base to calculate the foreign share, and the occurrence of mergers and acquisitions. In order to be able to do so, we manually collected the data from corporate annual reports, so that the exact methodology could be recorded. An additional benefit was that in comparison with electronically available data, the number of missing values and mistakes was significantly decreased in our dataset, and that the internationalization of employment could be monitored as well (this indicator is often not available in archival sources).

In the end, we were able to collect - and if necessary methodologically correct and adjust - internationalization data for a set of 318 of the largest non-financial firms worldwide. As we aimed to characterize the internationalization process over time from 1990 onwards, we only included those

time-series for foreign sales, assets and employment (FSTS, FATA and FETE) for which at least 10 years of consecutive data were available. This resulted in a dataset of 233 firms. For 231 of these firms, FSTS data was available for 10 years or more (a total of 3252 firm-year observations) , the same was the case for FATA data for 148 firms (2023 firm-year observations), and FETE data for 114 firms (1593 firm-year observations). These data were used to calculate eight variables describing the internationalization of firms over time, such as the mean, growth, and Maitland et al.'s (2005) cluster variable. These variables were subsequently factor analyzed to result in four key factors that describe international expansion of firms over time, including the level, growth, volatility, and temporal clustering, of international activities. Hierarchical and non-hierarchical clustering techniques then resulted in 6 trajectories each for the internationalization of sales, assets, and employment.

With respect to sales, we could identify firms that were characterized by 1) a home market oriented trajectory; 2) a strong expansion international expansion trajectory; 3) a home re-orientation trajectory; 4) a clustered trajectory (in which international expansion and retreat was strongly clustered over time); 5) a stable-volatile trajectory (in which the share of international sales varied strongly, but around a certain constant value), and 6) a comprehensive trajectory (large and slowly growing international sales).

With respect to assets, we identified relatively similar firm trajectories that could be typified as 1) home-based, 2) strong expansion; 3) (temporally) clustered; 4) comprehensive; 5) dynamic-volatile (in which the share of international assets varied strongly, but did increase or decrease as over time), and 6) contraction. For the internationalization of employment, the trajectories 1) comprehensive; 2) strong expansion; 3) clustered; 4) dynamic volatile; 5) home-centred and 6) retreat were obtained from the cluster analysis.

Although these 6 strategies for sales, assets and employment overlap in terminology and main characteristics, this does not necessarily mean that they also overlap within a single firm. Linking the sales trajectories to those of assets and employment, some firms indeed showed similar strategies (notably the home oriented, and comprehensive strategies were often combined within a single firm), but in many more cases, one firm combines two or three different strategies for sales, assets and employment internationalization. Firms choose for example to focus on the domestic market while

greatly expanding foreign production, or couple comprehensive sales trajectories with a clustered trajectory of international employment.

These results show that the average global trends that point in the direction of more foreign activities, more internationalization, and hence in the end, more globalization, obscure the fact that the exact form and pace of insertion in the world economy differs strongly across firms. Globalization, often presented as a homogeneous or at least homogenizing process, has in fact many faces, and follows many different paths. This finding alone is already an important result, as it calls for substantial nuances to the sometimes wide-sweeping statements and conclusions that are often made regarding 'globalization'. Other authors in International Business have made similar arguments for further disentangling the globalization concept, for example with respect to the strong regional dimension of globalization (Rugman, 2000), or regarding the historical predecessors of the current phase of international connectivity (Jones, 2005). Such distinctions contribute to an increased comprehension of what is as of yet 'a poorly understood phenomenon' (Rugman and Verbeke, 2004:3), and are vital if we want to come to policy recommendations on how to deal with globalization, on predicting how the future of globalization looks like, and on the exact role of MNEs in that process. However, such recommendations can be only further specified if more research has been done into the exact determinants of the various trajectories, and into their performance implications – for both the firms themselves, and for the countries from which these firms originate and in which they invest. While an in-depth analysis of such determinants and performance implications is beyond the scope of this paper, we did explore to what extent internationalization trajectories differed across sectors and countries. We found that even though there appear to be 'dominant' strategies of internationalization in most countries and sectors, examples of nearly each approach could be found in each country or sector. This means that although country and sector influence a firm's internationalization strategy and trajectory, they do not determine to what extent and in what way firms expand (or retreat from) their activities abroad. Important firm-specific variation exists; any sign of global sectoral or geographical convergence in internationalization strategies is absent.

The findings of this study – a typology of the internationalization trajectories of firms since the early 1990s – form a basis for further research on the determinants and effects of firm specific trajectories that may have important managerial and policy implications. For example, exploring differences in internationalization trajectories between firms with different characteristics (for example R&D intensity, size, but perhaps also top management team composition and international orientation) can yield information on the role of ownership or firm-specific advantages that influence firm strategy. Such an understanding (of for example the factors that determine asset-intensive versus employment-intensive internationalization) is of particular relevance for policy makers, for example in developing countries, that want to attract a particular kind of FDI. Furthermore, by analysing profitability differences – or any other type of performance measure – among firms that started internationalization relatively early, we can derive recommendations for managers that find themselves in a similar situation at present. Another line of research could be to consider a number of important institutional changes that appeared over the 1990s and consider to what extent they impacted upon the internationalization trajectories of (certain groups of) firms. The creation of the World Trade Organization in 1995 is an example of such a change, or the steps in the regional integration process in the EU. For a selection of firms and sectors, privatization and deregulation will also very likely have influenced the internationalization trajectories. As a final example, an in-depth understanding of internationalization trajectories and past path dependencies could also help predict the direction of future internationalization. All such studies would help our understanding of the international strategies of the largest firms worldwide, and hence of the nature and direction of globalization in general.

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FIGURES

Figure 1 Illustration of geographical segment reporting: Sharp

	Yen (millions)		U.S. Dollars (thousands)
	2005	2006	2006
Net Sales:			
Japan:			
Customers	¥ 1,626,944	¥ 1,742,349	$ 15,020,250
Intersegment	629,484	708,691	6,109,405
Total	2,256,428	2,451,040	21,129,655
The Americas:			
Customers	338,342	409,105	3,526,767
Intersegment	7,858	7,715	66,509
Total	346,200	416,820	3,593,276
Asia:			
Customers	110,658	116,690	1,005,948
Intersegment	158,828	178,556	1,539,276
Total	269,486	295,246	2,545,224
Europe:			
Customers	353,198	425,371	3,666,992
Intersegment	2,975	3,662	31,569
Total	356,173	429,033	3,698,561
Other:			
Customers	110,717	103,594	893,052
Intersegment	167,929	290,868	2,507,482
Total	278,646	394,462	3,400,534
Elimination	(967,074)	(1,189,492)	(10,254,241)
Consolidated	¥ 2,539,859	¥ 2,797,109	$ 24,113,009

Source: Sharp Annual Report 2006, p.52

Figure 2 Treatment of M&As in the time series analysis

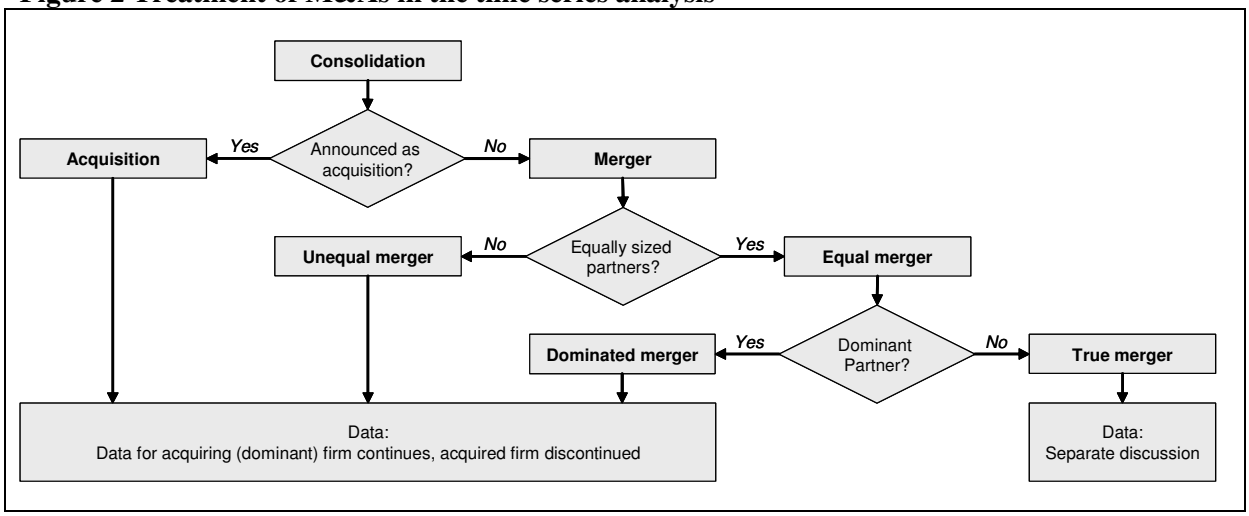


Figure 3 Internationalization of Sales (FSTS) of Sanofi-Aventis and predecessors

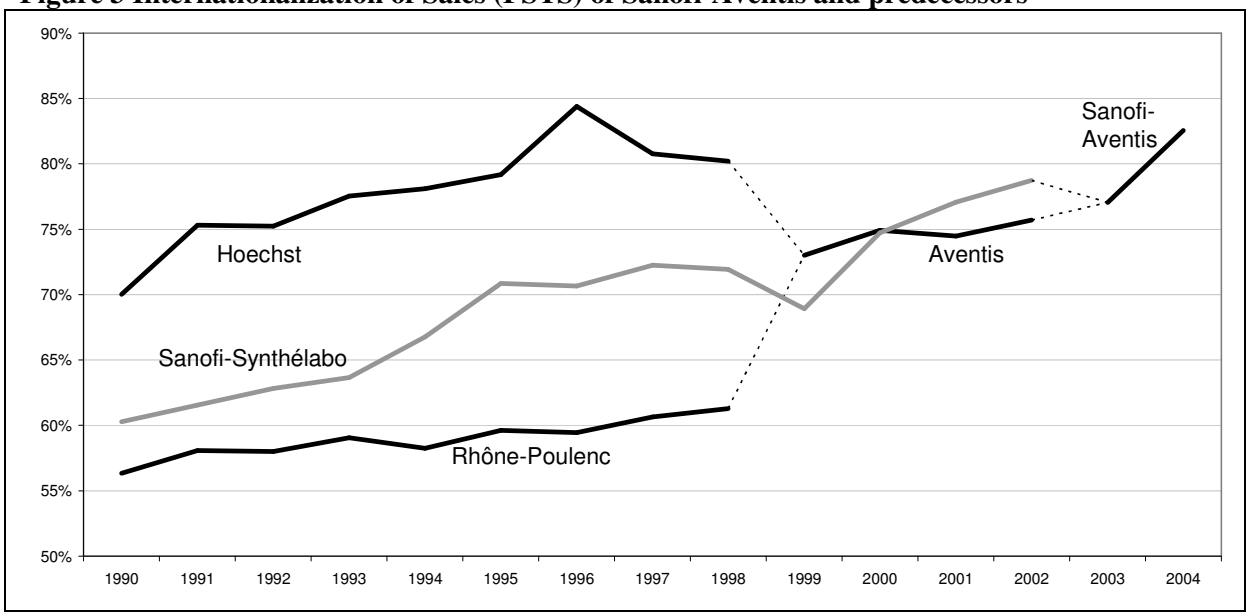


Figure 4 Domestic sales growth and FSTS (n=233)

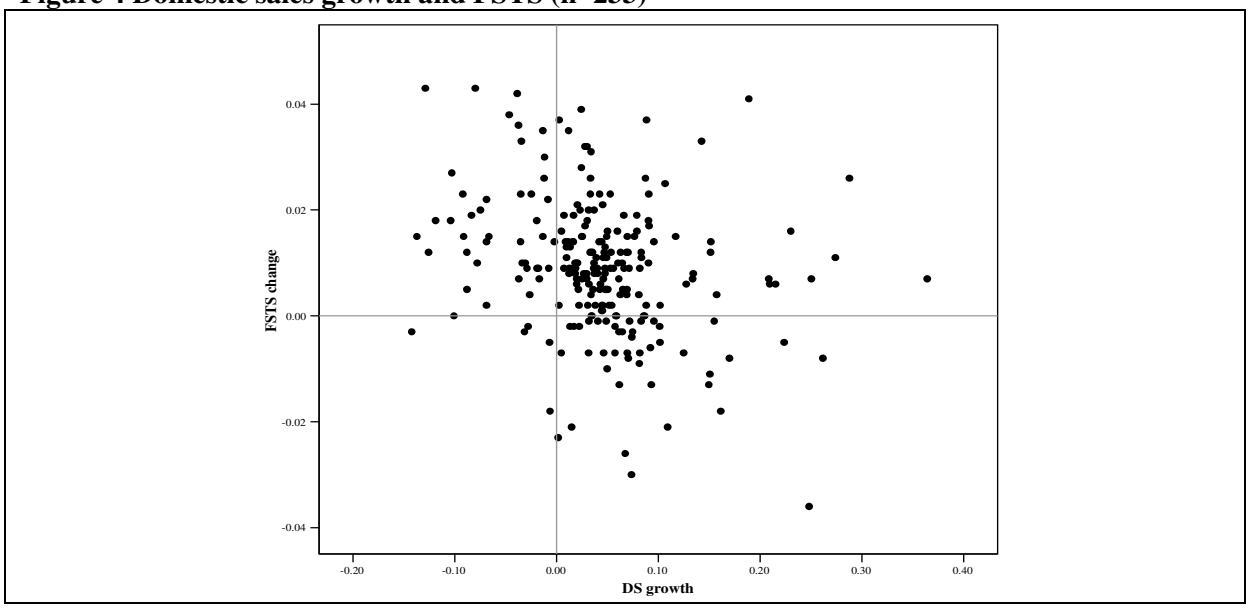
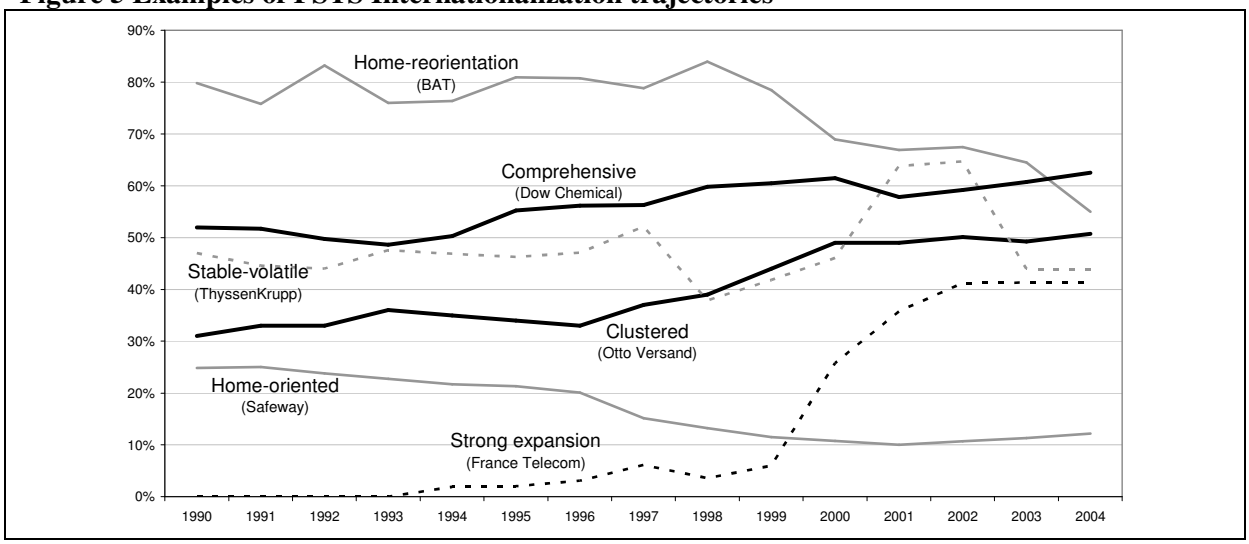


Figure 5 Examples of FSTS Internationalization trajectories



TABLES

Table 1 Internationalization of Assets: a comparison with Thomson Data for selected firms

	Data in present paper					Thomson Financial Data				
	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002
Coca-Cola	57%	64%	56%	60%	64%	76%	62%	50%	30%	60%
Dow Chemical	59%	55%	55%	50%	52%	18%	16%	16%	17%	17%
Ford Motor	42%	44%	43%	53%	56%	..	8%	7%	7%	7%
General Motors	39%	38%	36%	31%	29%	7%	5%	4%	4%	6%
ICI	75%	77%	79%	80%	78%	48%	45%	44%	47%	47%
Johnson & Johnson	52%	48%	48%	43%	46%	..	68%	15%	12%	15%
Nestlé	53%	55%	57%	59%	57%	30%	43%	40%	19%	28%
United Technologies	39%	29%	26%	27%	29%	..	13%	12%	12%	..
Xerox	52%	52%	54%	58%	56%	4%	5%	5%	5%	5%

Table 2 Correlations among FSTS variables (n=231)

		m	sd	S1	S2	S3	S4	S5	S6	S7
S1	FSTS mean	0.450	0.246	1.000						
S2	FSTS min	0.341	0.241	0.962***	1.000					
S3	FSTS max	0.560	0.254	0.955***	0.865***	1.000				
S4	FSTS growth	0.009	0.013	0.051	-0.043	0.207***	1.000			
S5	FSTS abs growth	0.027	0.015	0.114*	-0.090	0.341***	0.224***	1.000		
S6	FSTS growth sd	0.041	0.028	0.065	-0.108	0.276***	0.140**	0.929***	1.000	
S7	FSTS cluster	1.082	0.495	-0.047	-0.050	-0.055	0.062	-0.126*	-0.199***	1
S8	DS growth	0.043	0.075	-0.013	-0.006	-0.018	-0.274***	0.147**	0.122*	0.069

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

Table 3 Correlations among FATA variables (n=148)

		m	sd	A1	A2	A3	A4	A5	A6	A7
A1	FATA mean	0.385	0.217	1.000						
A2	FATA min	0.286	0.211	0.959***	1.000					
A3	FATA max	0.489	0.231	0.955***	0.850***	1.000				
A4	FATA growth	0.007	0.011	0.052	-0.019	0.167**	1.000			
A5	FATA abs growth	0.028	0.016	0.197**	-0.020	0.419***	0.014	1.000		
A6	FATA growth sd	0.042	0.025	0.138*	-0.065	0.350***	-0.050	0.950***	1.000	
A7	FATA cluster	1.083	0.471	-0.029	-0.030	-0.041	0.068	-0.144*	-0.213***	1
A8	DA growth	0.075	0.213	0.153*	0.174**	0.125	-0.166**	0.012	0.005	-0.066

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

Table 4 Correlations among FETE variables (n=114)

		m	sd	E1	E2	E3	E4	E5	E6	E7
E1	FETE mean	0.479	0.237	1.000						
E2	FETE min	0.368	0.249	0.957***	1.000					
E3	FETE max	0.596	0.238	0.936***	0.830***	1.000				
E4	FETE growth	0.013	0.013	-0.061	-0.281***	0.199**	1.000			
E5	FETE abs growth	0.026	0.017	-0.102	-0.299***	0.169*	0.499***	1.000		
E6	FETE growth sd	0.041	0.034	-0.149	-0.286***	0.113	0.425***	0.889***	1.000	
E7	FETE cluster	0.987	0.479	-0.103	-0.100	-0.113	-0.034	-0.086	-0.201**	1
E8	DE growth	-0.028	0.076	-0.005	0.038	0.012	-0.237**	0.105	0.011	0.027

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

Table 5 Correlations among FSTS, FATA and FETE variables

	Sales-Assets	Sales-Employ	Asset-Employ
Mean	0.894***	0.789***	0.838***
Min	0.866***	0.776***	0.793***
Max	0.855***	0.799***	0.795***
Growth	0.386***	0.512***	0.569***
Abs growth	0.470***	0.416***	0.204*
Growth sd	0.402***	0.285***	0.026
Cluster	0.121	0.170*	0.094
Domestic growth	0.221***	0.593***	0.115
n	148	112	67

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

Table 6 Factor analysis results (rotated)

	Sales				Assets				Employment			
	F1	F2	F3	F4	F1	F2	F3	F4	F1	F2	F3	F4
mean	0.996				0.990				0.992			
min	0.977				0.970				0.940			
max	0.948				0.939				0.967			
growth			0.783				0.807				-0.485	
abs growth		0.975				0.981				0.955		
growth sd		0.958				0.980				0.909		
cluster				0.949				0.992				0.981
D growth			-0.812				-0.716				0.942	
% expl.var	35.67	26.51	16.08	13.06	35.88	25.79	14.78	12.50	35.2	29.6	14.35	12.8
Eigenvalue	2.85	2.12	1.29	1.05	2.87	2.06	1.18	1.00	2.82	2.37	1.148	1.02

Table 7 Cluster analysis results: the internationalization of sales

	Home-oriented	Strong expansion	Home-reorientation	Clustered	Stable-volatile	Compre-hensive
LEVEL	-1.000	-.258	.469	-.006	.008	.983
VOLATILITY	-.478	.727	.268	-.311	2.560	-.391
INT'L EXPANSION	-.227	1.459	-1.958	.116	-.583	.093
CLUSTER	-.464	-.085	.479	1.359	-.295	-.571
n	60	32	18	45	15	61

Table 8 Cluster analysis results: the internationalization of assets

	Home-based	Strong Expansion	Clustered	Compre-hensive	Dynamic Volatile	Contraction
LEVEL	-.941	.360	-.236	1.139	-.248	-1.213
VOLATILITY	-.481	-.007	-.329	-.149	2.217	3.059
INT'L EXPANSION	-.228	.724	-.018	-.307	.576	-1.913
CLUSTER	-.616	-.716	1.330	-.144	.125	-.229
n	35	32	36	31	12	2

Table 9 Cluster analysis results: the internationalization of employment

	Compre-hensive	Strong Expansion	Clustered	Dynamic Volatile	Home-centred	Retreat
LEVEL	0.795	0.613	-0.451	-0.460	-1.197	0.534
VOLATILITY	-0.396	0.956	-0.170	1.691	-0.538	2.145
INT'L EXPANSION	-0.135	1.751	0.005	0.125	-0.193	-3.020
CLUSTER	-0.304	0.096	1.344	-0.560	-0.820	-0.443
n	43	10	27	10	21	3

Table 10 Linking sales with asset and employment trajectories

	Asset trajectory; # of firms[1]						Total	Asset trajectory[1]; % within Sales trajectory					
Sales trajectory	1	2	3	4	5	6		1	2	3	4	5	6
Home-oriented	23	6	16	1	1	1	48	47.9%	12.5%	33.3%	2.1%	2.1%	2.1%
Strong expansion	3	7	4	1	5	1	21	14.3%	33.3%	19.0%	4.8%	23.8%	4.8%
Home-reorient.	2	4	3	4	0	0	13	15.4%	30.8%	23.1%	30.8%	0.0%	0.0%
Clustered	4	3	6	9	2	0	24	16.7%	12.5%	25.0%	37.5%	8.3%	0.0%
Stable-volatile	1	3	3	0	2	0	9	11.1%	33.3%	33.3%	0.0%	22.2%	0.0%
Comprehensive	2	9	4	16	2	0	33	6.1%	27.3%	12.1%	48.5%	6.1%	0.0%
TOTAL	35	32	36	31	12	2	148	23.6%	21.6%	24.3%	20.9%	8.1%	1.4%

	Employ trajectory; # of firms[2]						Total	Employ trajectory[2], % within Sales trajectory					
Sales trajectory	1	2	3	4	5	6		1	2	3	4	5	6
Home-oriented	2		6	2	13		23	8.7%		26.1%	8.7%	56.5%	
Strong expansion	2	5	5	1	1	1	15	13.3%	33.3%	33.3%	6.7%	6.7%	6.7%
Home-reorient.	6			1	1		8	75.0%			12.5%	12.5%	
Clustered	9		4	2	2		17	52.9%		23.5%	11.8%	11.8%	
Stable-volatile	3		3		2		8	37.5%		37.5%		25.0%	
Comprehensive	21	5	7	4	2	2	41	51.2%	12.2%	17.1%	9.8%	4.9%	4.9%
TOTAL	43	10	25	10	21	3	112	38.4%	8.9%	22.3%	8.9%	18.8%	2.7%

Interpretation of the table: the upper left number in the table indicates that 23 out of the total of 48 firms that followed a home-oriented sales trajectory, followed a home-oriented asset trajectory. This is equal to 47.9% of those 48 firms.
[1] Asset trajectory: 1=home-based; 2=strong expansion; 3=clustered; 4=comprehensive; 5=dyn.volatile; 6=contraction.
[2] Employ trajectory: 1=comprehensive; 2=strong expansion; 3=clustered; 4=dyn.volatile; 5=home-centered; 6=retreat.

Table 11 Sales and asset internationalization trajectories by country

	Number of firms						Total	% within country					
Sales trajectory[1]	1	2	3	4	5	6		1	2	3	4	5	6
Germany	2	4	2	9	2	10	29	6.9%	13.8%	6.9%	31.0%	6.9%	34.5%
France	1	5	1	9	5	8	29	3.4%	17.2%	3.4%	31.0%	17.2%	27.6%
UK	6	10	5	2	1	11	35	17.1%	28.6%	14.3%	5.7%	2.9%	31.4%
Netherlands	2	3	3	5	1	9	23	8.7%	13.0%	13.0%	21.7%	4.3%	39.1%
Japan	16	5	0	5	2	4	32	50.0%	15.6%	0.0%	15.6%	6.3%	12.5%
USA	30	3	6	13	1	8	61	49.2%	4.9%	9.8%	21.3%	1.6%	13.1%
Other	3	2	1	2	3	11	22	13.6%	9.1%	4.5%	9.1%	13.6%	50.0%
TOTAL	60	32	18	45	15	61	231	26.0%	13.9%	7.8%	19.5%	6.5%	26.4%

	Number of firms						Total	% within country					
Asset trajectory[2]	1	2	3	4	5	6		1	2	3	4	5	6
Germany	0	1	0	3	0	0	4	0.0%	25.0%	0.0%	75.0%	0.0%	0.0%
France	0	4	5	5	3	1	18	0.0%	22.2%	27.8%	27.8%	16.7%	5.6%
UK	5	5	4	7	6	1	28	17.9%	17.9%	14.3%	25.0%	21.4%	3.6%
Netherlands	0	1	0	4	0	0	5	0.0%	20.0%	0.0%	80.0%	0.0%	0.0%
Japan	15	5	6	1	0	0	27	55.6%	18.5%	22.2%	3.7%	0.0%	0.0%
USA	13	13	19	7	1	0	53	24.5%	24.5%	35.8%	13.2%	1.9%	0.0%
Other	2	3	2	4	2	0	13	15.4%	23.1%	15.4%	30.8%	15.4%	0.0%
TOTAL	35	32	36	31	12	2	148	23.6%	21.6%	24.3%	20.9%	8.1%	1.4%

Interpretation of the table: the upper left number in the table indicates that 2 out of the total of 29 firms from Germany followed a home-oriented sales trajectory. This is equal to 6.9% of all 29 German firms.
[1] Sales trajectory: 1=home-oriented; 2=strong expansion; 3=home-reorient; 4=clustered; 5=stab.volatile; 6=comprehensive.
[2] Asset trajectory: 1=home-based; 2=strong expansion; 3=clustered; 4=comprehensive; 5=dyn.volatile; 6=contraction.

Table 12 Sales and asset internationalization trajectories by selected sectors

	Number of firms						Total	% within sector					
Sales trajectory [1]	1	2	3	4	5	6		1	2	3	4	5	6
Chemicals, pharmaceuticals	3	3	1	3	1	11	22	13.6%	13.6%	4.5%	13.6%	4.5%	50.0%
Computers & electronics	4	3	1	4	1	10	23	33.3%	0.0%	8.3%	16.7%	25.0%	16.7%
Food, beverages & tobacco	5	4	2	6	0	7	24	20.8%	16.7%	8.3%	25.0%	0.0%	29.2%
Motor vehicles and parts	4	2	1	2	1	7	17	23.5%	11.8%	5.9%	11.8%	5.9%	41.2%
Telecom & utilities	7	2	1	4	1	0	15	46.7%	13.3%	6.7%	26.7%	6.7%	0.0%
Wholesale and retail	14	1	1	8	1	1	26	53.8%	3.8%	3.8%	30.8%	3.8%	3.8%
TOTAL	60	32	18	45	15	61	231	26.0%	13.9%	7.8%	19.5%	6.5%	26.4%

	Number of firms						Total	% within sector					
Asset trajectory[2]	1	2	3	4	5	6		1	2	3	4	5	6
Chemicals, pharmaceuticals	2	4	0	9	1	0	16	12.5%	25.0%	0.0%	56.3%	6.3%	0.0%
Computers & electronics	6	3	5	4	0	1	19	31.6%	15.8%	26.3%	21.1%	0.0%	5.3%
Food, beverages & tobacco	3	2	3	4	1	0	13	23.1%	15.4%	23.1%	30.8%	7.7%	0.0%
Motor vehicles and parts	2	5	2	4	0	0	13	15.4%	38.5%	15.4%	30.8%	0.0%	0.0%
Telecom & utilities	3	0	2	2	3	0	10	30.0%	0.0%	20.0%	20.0%	30.0%	0.0%
Wholesale and retail	10	1	3	1	2	1	18	55.6%	5.6%	16.7%	5.6%	11.1%	5.6%
TOTAL	35	32	36	31	12	2	148	23.6%	21.6%	24.3%	20.9%	8.1%	1.4%

Interpretation of the table: the upper left number in the table indicates that 3 out of the total of 22 firms in the chemicals and pharmaceuticals sector followed a home-oriented sales trajectory. This is equal to 13.9% of all firms in that sector.

[1] Sales trajectory: 1=home-oriented; 2=strong expansion; 3=home-reorient; 4=clustered; 5=stab.volatile; 6=comprehensive.

[2] Asset trajectory: 1=home-based; 2=strong expansion; 3=clustered; 4=comprehensive; 5=dyn.volatile; 6=contraction.

ANNEX. DESCRIPTION OF FIRMS IN THE SAMPLE[1]

		Years			n			Method			Method corrections			Home is region?			Home corrections			
Name	**Ctry**	**S**	**A**	**E**	**S**	**A**	**E**	**S***	**A***	**E***	**S**	**A**	**E**	**S**	**A**	**E**	**S**	**A**	**E**	**Merger info**
Electrolux	SWE	[90-04]	-	[90-04]	15	-	15	o	-	AP	-	-	-	-	-	-	-	-	-	
Volvo	SWE	[90-04]	[90-04]	[90-04]	15	15	15	o	11	EP	Y	Y	-	-	-	-	-	-	-	
ABB	CHE	[90-04]	-	[90-04]	15	-	15	d	-	EP	-	-	-	-	-	Y	Y	-	Y	
Accor	FRA	[90-04]	-	[93-04]	15	-	12	o	-	AF	-	-	-	-	-	-	-	-	-	
ÆON (Jusco)	JAP	[95-04]	[95-04]	-	10	10	-	o	3	-	-	Y	-	-	-	-	-	-	-	
Akzo Nobel	NLD	[90-04]	[90-04]	[90-04]	15	15	15	o	2	AF	-	-	-	-	-	-	-	-	-	
Alcan	CAN	[92-04]	[92-04]	[92-04]	13	13	13	o	11	AP	-	Y	-	-	-	-	-	-	-	
Alcatel	FRA	[90-04]	[90-04]	[90-04]	15	15	15	o	11	AF	-	-	-	-	-	-	-	-	-	
Alcoa	USA	[90-04]	[90-04]	[90-04]	15	15	15	o	2	EP	-	Y	-	-	-	-	-	-	-	
Allied Domecq	GBR	[90-02]	[90-02]	[90-02]	13	13	13	o	11	EP	-	Y	-	-	-	-	-	-	-	
Altria (Philip Morris)	USA	[90-04]	[90-04]	-	15	15	-	d	2	-	Y	Y	-	-	-	-	-	-	-	
American Home Products	USA	[90-04]	[90-04]	[93-04]	15	15	12	d	3	EP	-	-	-	-	-	-	-	-	-	
AMR Corporation	USA	[90-04]	-	-	15	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
Anheuser Busch	USA	[95-04]	[95-04]	-	10	10	-	d	11	-	-	-	-	-	-	-	-	-	-	
OPG	NLD	[95-04]	-	-	10	-	-	d	-	-	-	-	-	-	-	-	-	-	-	
Apple	USA	[90-04]	[90-04]	-	15	15	-	d	11	-	-	Y	-	-	-	-	-	-	-	
Arcelor (Usinor)	FRA	[90-04]	[90-04]	[90-04]	15	15	15	o	11	AP	Y	Y	-	-	-	-	Y	Y	Y	
Archer Daniels Midland	USA	[90-04]	[90-04]	-	15	15	-	o	3	-	-	-	-	-	-	-	-	-	-	
Areva (CEA Industrie)	FRA	[95-04]	-	-	10	-	-	d	-	-	Y	-	-	-	-	-	-	-	-	
Asahi Chemical	JAP	[91-04]	[91-04]	-	14	14	-	d	11	-	-	-	-	-	-	-	-	-	-	
Asahi Glass	JAP	[91-04]	[95-04]	-	14	10	-	o	11	-	-	-	-	-	-	-	-	-	-	
Ashland	USA	[95-04]	[95-04]	-	10	10	-	o	6	-	-	-	-	-	-	-	-	-	-	
Associated British Foods	GBR	[90-04]	[90-04]	[90-04]	15	15	15	o	4	AP	Y	Y	-	-	-	-	-	-	-	
AstraZeneca	GBR	[90-04]	[90-04]	[90-04]	15	15	15	o	6	AP	-	Y	-	-	-	-	-	-	-	
AT&T	USA	[90-03]	[90-03]	[93-03]	14	14	11	o	11	EP	-	-	-	-	-	-	-	-	-	Acquired by SBC
ARCO	USA	[90-99]	[90-99]	-	10	10	-	o	11	-	-	Y	-	-	-	-	-	-	-	Acquired by BP
BAE Systems	GBR	[90-04]	-	-	15	-	-	o	-	-	Y	-	-	-	-	-	-	-	-	
Balfour Beatty (BICC)	GBR	[90-04]	-	-	15	-	-	o	-	-	Y	-	-	-	-	-	Y	-	-	
Ballast Nedam	NLD	[90-04]	-	-	15	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
BAM	NLD	[92-04]	-	-	13	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
BASF	DEU	[90-04]	-	[90-04]	15	-	15	o	-	EP	-	-	-	-	-	-	Y	-	-	
Bayer	DEU	[90-04]	[94-04]	[90-04]	15	11	15	o	11	EP	-	-	-	Y	Y	Y	-	-	-	
BMW	DEU	[90-04]	[95-04]	[90-04]	15	10	15	o	11	EP	Y	-	-	-	-	-	-	-	-	
BCE Inc.	CAN	[90-04]	[90-04]	-	15	15	-	o	2	-	-	Y	-	-	-	-	-	-	-	
Beiersdorf	DEU	[90-04]	-	-	15	-	-	o	-	-	Y	-	-	-	-	-	-	-	-	
BellSouth	USA	[94-04]	[94-04]	-	11	11	-	o	3	-	-	-	-	-	-	-	-	-	-	
Bertelsmann	DEU	[94-04]	-	[90-04]	11	-	15	o	-	EP	-	-	-	-	-	-	-	-	-	

		Years			n			Method			Method corrections			Home is region?			Home corrections			
Name	**Ctry**	**S**	**A**	**E**	**S**	**A**	**E**	**S***	**A***	**E***	**S**	**A**	**E**	**S**	**A**	**E**	**S**	**A**	**E**	**Merger info**
BOC	GBR	[90-04]	[90-04]	[90-04]	15	15	15	o	6	EP	-	-	-	Y	Y	-	Y	-	-	
Boeing Company	USA	[90-04]	-	-	15	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
Booker	GBR	[90-99]	[90-99]	-	10	10	-	o	5	-	-	-	-	-	-	-	-	-	-	Acquired by Iceland; delisted.
Boots	GBR	[90-04]	[90-04]	-	15	15	-	o	5	-	-	-	-	-	-	-	-	-	-	
Bouygues	FRA	[90-04]	-	[90-04]	15	-	15	o	-	EP	-	-	-	-	-	-	-	-	-	
BP	GBR	[90-04]	[90-04]	[90-04]	15	15	15	o	10	AP	-	Y	-	-	-	-	-	-	-	
Bridgestone	JAP	[90-04]	-	-	15	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
Bristol-Myers Squibb	USA	[90-04]	[90-04]	-	15	15	-	o	2	-	-	Y	-	-	-	-	-	-	-	
British Airways	GBR	[90-04]	-	[90-04]	15	-	15	d	-	AP	Y	-	-	-	-	-	-	-	-	
British American Tobacco	GBR	[90-04]	[90-04]	[90-04]	15	15	15	o	11	AP	-	Y	-	-	-	-	-	-	Y	
British Telecom	GBR	-	-	[90-04]	-	-	15	-	-	AP	-	-	-	-	-	-	-	-	-	
Buhrmann (KNP BT)	NLD	[94-04]	-	[94-04]	11	-	11	d	-	EP	-	-	-	-	-	-	-	-	-	
Burmah Castrol	GBR	[90-99]	[90-99]	-	10	10	-	o	4	-	-	-	-	-	-	-	-	-	-	Acquired by BP
Cable & Wireless	GBR	[90-04]	[90-00]	[90-04]	15	11	15	o	5	AP	-	-	-	-	-	-	Y	-	-	
Cadbury-Schweppes	GBR	[90-04]	[90-04]	[90-04]	15	15	15	o	5	AP	-	Y	-	-	-	-	-	-	-	
Campina Melkunie	NLD	[90-04]	-	[90-04]	15	-	15	o	-	AF	-	-	-	-	-	-	-	-	-	
Canon Inc.	JAP	[90-04]	[90-04]	[90-04]	15	15	15	o	11	EP	Y	-	-	-	-	-	-	-	-	
Carrefour	FRA	[90-04]	[90-04]	[90-04]	15	15	15	o	11	AP	-	Y	-	-	-	-	-	-	-	
Caterpillar	USA	[90-04]	[90-04]	[90-04]	15	15	15	o	11	EP	Y	Y	-	-	-	-	-	-	-	
Cebeco-Handelsraad	NLD	[90-04]	-	-	15	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
ChevronTexaco	USA	[90-04]	[90-04]	-	15	15	-	o	11	-	-	-	-	-	-	-	-	-	-	Includes Chevron
Christian Dior	FRA	[90-04]	[90-04]	-	15	15	-	o	11	-	-	-	-	-	-	-	-	-	-	
Coca-Cola Company	USA	[90-04]	[90-04]	-	15	15	-	o	2	-	-	-	-	-	-	-	-	-	-	
Coles Myer	USA	[93-04]	[93-04]	-	12	12	-	o	11	-	-	-	-	-	-	-	-	-	-	
Saint Gobain	FRA	[90-04]	[90-04]	[90-04]	15	15	15	o	11	EP	-	Y	-	-	-	-	-	-	-	
Compaq	USA	[90-01]	[90-01]	-	12	12	-	o	11	-	-	Y	-	-	-	-	-	-	-	Acquired by HP
Continental	DEU	[90-04]	-	[90-04]	15	-	15	o	-	EP	-	-	-	-	-	-	-	-	-	
Cosun	NLD	[90-04]	-	-	15	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
Corus	GBR	[90-04]	[90-04]	[90-04]	15	15	15	d	11	AP	Y	-	-	-	-	-	-	-	-	Includes British Steel
CostCo	USA	[90-04]	[90-04]	-	15	15	-	o	11	-	-	-	-	-	-	-	-	-	-	
CSM	NLD	[90-04]	-	[90-04]	15	-	15	o	-	AP	-	-	-	-	-	-	-	-	-	
DaimlerChrysler	DEU	[90-04]	[92-04]	[90-04]	15	13	15	d	3	EP	Y	Y	-	-	-	-	-	-	-	Includes DaimlerBenz
Dalgety	GBR	[90-02]	-	[90-02]	13	-	13	o	-	AP	-	-	-	Y	-	-	Y	-	-	
Degussa	DEU	[90-04]	-	[90-04]	15	-	15	o	-	EP	Y	-	-	-	-	-	-	-	-	
Delhaize Le Lion	BEL	-	-	[90-04]	-	-	15	-	-	AP	-	-	-	-	-	-	-	-	-	
Delta Airlines	USA	[90-04]	-	-	15	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
Denso	JAP	[90-04]	[95-04]	-	15	10	-	o	11	-	-	-	-	-	-	-	-	-	-	
Lufthansa	DEU	[90-04]	-	[90-04]	15	-	15	o	-	AP	-	-	-	-	-	-	-	-	-	

		Years			n			Method			Method corrections			Home is region?			Home corrections			
Name	**Ctry**	**S**	**A**	**E**	**S**	**A**	**E**	**S***	**A***	**E***	**S**	**A**	**E**	**S**	**A**	**E**	**S**	**A**	**E**	**Merger info**
Deutsche Telekom	DEU	[93-04]	-	-	12	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
Dow Chemical	USA	[90-04]	[90-04]	-	15	15	-	o	3	-	-	Y	-	-	-	-	-	-	-	
Du Pont	USA	[90-04]	[90-04]	-	15	15	-	o	6	-	-	Y	-	-	-	-	-	-	-	
E.On	DEU	[90-04]	[94-04]	[95-04]	15	11	10	o	3	EP	Y	-	-	-	-	-	-	-	-	Includes VEBA
Eastman Kodak	USA	[90-04]	[90-04]	[90-04]	15	15	15	o	6	EP	-	Y	-	-	-	-	-	-	-	
Eiffage	FRA	[93-04]	-	-	12	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
Elf Aquitaine	FRA	[90-99]	[90-99]	[90-99]	10	10	10	o	3	EP	-	-	-	-	-	-	-	-	-	Acquired by Total
ENI	ITA	[90-04]	[90-04]	[90-04]	15	15	15	d	2	EP	Y	-	-	-	-	-	-	-	-	
Ericsson	SWE	[90-04]	-	-	15	-	-	d	-	-	-	-	-	-	-	-	-	-	-	
ExxonMobil	USA	[90-04]	[90-04]	-	15	15	-	o	3	-	-	-	-	-	-	-	-	-	-	Includes Exxon
Fiat	ITA	[90-04]	[90-04]	[90-04]	15	15	15	o	11	EP	-	-	-	-	-	-	-	-	-	
Ford Motor	USA	[90-04]	[90-04]	[90-04]	15	15	15	o	6	AP	-	-	-	-	-	-	-	-	Y	
Fortum	FIN	[90-04]	-	[90-04]	15	-	15	o	-	EP	Y	-	-	-	-	-	-	-	-	
France Télécom	FRA	[94-04]	-	[94-04]	11	-	11	o	-	AF	-	-	-	-	-	-	-	-	-	
Franz Haniel	DEU	[90-04]	-	[90-04]	15	-	15	o	-	EP	-	-	-	-	-	-	Y	-	-	
Fuji Heavy Industries	JAP	[95-04]	[95-04]	-	10	10	-	o	11	-	-	-	-	-	-	-	-	-	-	
Fuji Photo Film	JAP	[90-04]	-	-	15	-	-	d	-	-	Y	-	-	-	-	-	-	-	-	
Fujitsu	JAP	[90-04]	[95-04]	-	15	10	-	o	11	-	-	-	-	-	-	-	-	-	-	
Gaz De France	FRA	[90-04]	-	-	15	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
General Electric	USA	[90-04]	[90-04]	[90-04]	15	15	15	o	11	EP	-	-	-	-	-	-	-	-	-	
GEC (Marconi)	GBR	[90-02]	[90-02]	[90-02]	13	13	13	o	6	EP	-	-	-	-	-	-	-	-	-	
General Motors	USA	[90-04]	[90-04]	[90-04]	15	15	15	o	6	EP	-	Y	-	-	-	-	-	-	-	
George Weston	CAN	[90-04]	[90-04]	-	15	15	-	o	1	-	-	Y	-	-	-	-	-	-	-	
Georgia-Pacific	USA	[90-04]	-	-	15	-	-	d	-	-	-	-	-	-	-	-	-	-	-	
Getronics	NLD	[90-04]	-	[90-04]	15	-	15	o	-	EF	-	-	-	-	-	-	Y	-	-	
GIB	BEL	[90-99]	-	[90-99]	10	-	10	o	-	EP	-	-	-	-	-	-	-	-	-	Liquidated
Goodyear Tire & Rubber	USA	[91-04]	[91-04]	[93-04]	14	14	12	o	3	EP	-	-	-	-	-	-	-	-	-	
Bull	FRA	[94-04]	[94-04]	-	11	11	-	o	3	-	-	-	-	Y	-	-	-	-	-	
Casino	FRA	[90-04]	-	[90-04]	15	-	15	o	-	AP	-	-	-	-	-	-	-	-	-	
Danone	FRA	[90-04]	[90-04]	[90-04]	15	15	15	o	11	EP	-	-	-	-	-	-	Y	-	-	
GTE	USA	[90-99]	[90-99]	[90-99]	10	10	10	o	11	EP	-	-	-	-	-	-	-	-	-	Merged with Bell Atlantic; Verizon
Hagemeyer	NLD	[90-04]	-	-	15	-	-	o	-	-	Y	-	-	Y	-	-	Y	-	-	
Hanson	GBR	[95-04]	[95-04]	[95-04]	10	10	10	o	11	AP	-	-	-	-	-	-	-	-	-	
Heineken	NLD	[90-04]	-	[90-04]	15	-	15	o	-	AP	-	-	-	-	-	-	Y	-	-	
Henkel	DEU	[90-04]	-	[90-04]	15	-	15	o	-	EP	-	-	-	-	-	-	Y	-	-	
Hewlett-Packard	USA	[90-04]	[90-04]	-	15	15	-	o	6	-	-	-	-	-	-	-	-	-	-	
Hitachi	JAP	[90-04]	[95-04]	-	15	10	-	o	11	-	-	-	-	-	-	-	-	-	-	
Hochtief	DEU	[90-04]	-	[90-04]	15	-	15	o	-	AF	-	-	-	-	-	-	-	-	-	

		Years			n			Method			Method corrections			Home is region?			Home corrections			
Name	**Ctry**	**S**	**A**	**E**	**S**	**A**	**E**	**S***	**A***	**E***	**S**	**A**	**E**	**S**	**A**	**E**	**S**	**A**	**E**	**Merger info**
HBG	NLD	[90-01]	-	[90-01]	12	-	12	o	-	AP	-	-	-	-	-	-	-	-	-	Acquired by BAM
Honda Motor	JAP	[90-04]	[90-04]	-	15	15	-	o	11	-	-	-	-	-	-	-	-	-	-	
Honeywell	USA	[90-04]	[90-04]	-	15	15	-	o	3	-	-	-	-	-	-	-	-	-	-	Includes AlliedSignal
Hunter Douglas	NLD	[90-04]	-	-	15	-	-	o	-	-	-	-	-	Y	-	-	-	-	-	
ICI	GBR	[90-04]	[90-04]	[90-04]	15	15	15	o	11	AP	-	Y	-	-	-	-	-	-	-	
Inchcape	GBR	[90-04]	[90-04]	-	15	15	-	o	4	-	-	-	-	-	-	-	-	-	-	
Intel	USA	[90-04]	[90-04]	-	15	15	-	o	6	-	-	-	-	-	-	-	-	-	-	
IBM	USA	[90-04]	[90-04]	-	15	15	-	o	3	-	-	-	-	-	-	-	-	-	-	
International Paper	USA	[90-04]	[90-04]	[93-04]	15	15	12	o	3	EP	-	-	-	-	-	-	-	-	-	
International Power	GBR	[90-04]	[90-04]	[90-04]	15	15	15	o	5	AP	-	-	-	-	-	-	-	Y	Y	Includes National Power
Invensys	GBR	[90-04]	[90-04]	-	15	15	-	o	5	-	-	-	-	-	-	-	-	-	-	Includes BTR
Itochu	JAP	[90-04]	[90-04]	-	15	15	-	o	11	-	-	-	-	-	-	-	-	-	-	
Ito-Yokado	JAP	[90-04]	[90-04]	-	15	15	-	o	11	-	-	-	-	-	-	-	-	-	-	
J. Sainsbury	GBR	[90-04]	[90-04]	[90-04]	15	15	15	o	4	AF	-	-	-	-	-	-	-	-	-	
Japan Airlines	JAP	[90-04]	-	-	15	-	-	d	-	-	Y	-	-	-	-	-	-	-	-	
Johnson & Johnson	USA	[90-04]	[90-04]	-	15	15	-	d	2	-	-	Y	-	-	-	-	-	-	-	
Kajima	JAP	[95-04]	[95-04]	-	10	10	-	o	11	-	-	-	-	-	-	-	-	-	-	
Kanematsu	JAP	[92-04]	[95-04]	-	13	10	-	o	11	-	-	-	-	-	-	-	-	-	-	
KarstadtQuelle	DEU	[90-04]	-	[90-04]	15	-	15	o	-	AF	-	-	-	-	-	-	-	-	-	Includes Karstadt
Kimberly Clark	USA	[90-04]	[90-04]	-	15	15	-	o	11	-	-	-	-	-	-	-	-	-	-	
Kingfisher	GBR	[90-04]	[90-04]	-	15	15	-	o	4	-	-	-	-	-	-	-	-	-	-	
Kmart Corporation	USA	[90-03]	-	-	14	-	-	d	-	-	-	-	-	-	-	-	-	-	-	Chapter 11 Restructuring
Kobe Steel (Kobelco)	JAP	[92-04]	-	-	13	-	-	o	-	-	Y	-	-	-	-	-	-	-	-	
Royal Ahold	NLD	[90-04]	[90-04]	[90-04]	15	15	15	o	11	EP	-	-	-	-	-	-	-	-	Y	
Kyushu Electric Power	JAP	[90-04]	[90-04]	[90-04]	15	15	15	o	11	EP	-	-	-	-	-	-	-	-	-	
Ladbroke (Hilton Group)	GBR	[90-04]	[90-04]	-	15	15	-	o	4	-	-	-	-	-	-	-	-	-	-	
Lafarge	FRA	[93-04]	[93-04]	-	12	12	-	o	6	-	-	-	-	-	-	-	-	-	-	
Lagardere	FRA	[91-04]	-	-	14	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
L'Air Liquide	FRA	[90-04]	[90-04]	-	15	15	-	o	3	-	-	Y	-	-	-	-	Y	-	-	
Linde	DEU	[90-04]	-	[90-04]	15	-	15	o	-	EP	-	-	-	-	-	-	-	-	-	
L'Oreal	FRA	[90-04]	-	[90-04]	15	-	15	o	-	EP	-	-	-	-	-	-	-	-	-	
LVMH	FRA	[90-04]	[90-04]	-	15	15	-	o	11	-	-	-	-	-	-	-	-	-	-	
Man	DEU	[90-04]	-	[90-04]	15	-	15	o	-	EP	-	-	-	-	-	-	-	-	-	
Mannesmann	DEU	[90-99]	-	[90-99]	10	-	10	o	-	EP	-	-	-	-	-	-	-	-	-	Acquired by Vodafone
Marathon Oil (USX)	USA	[90-04]	[90-04]	-	15	15	-	o	6	-	-	-	-	-	-	-	-	-	-	
Marks & Spencer	GBR	[94-04]	[94-04]	[94-04]	11	11	11	d	5	AP	Y	-	-	-	-	-	-	-	-	
Matsushita Electric Ind.	JAP	[90-04]	[95-04]	[90-04]	15	10	15	o	11	EP	-	-	-	-	-	-	-	-	-	
MCI / WorldCom	USA	[90-04]	[90-04]	[90-04]	15	15	15	o	3	EP	-	Y	-	-	-	-	-	-	-	

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Name	**Ctry**	**S**	**A**	**E**	**S**	**A**	**E**	**S***	**A***	**E***	**S**	**A**	**E**	**S**	**A**	**E**	**S**	**A**	**E**	**Merger info**
McKesson	USA	[94-04]	[94-04]	-	11	11	-	o	3	-	-	-	-	-	-	-	-	-	-	
Michelin	FRA	[90-04]	[90-04]	-	15	15	-	o	9	-	-	Y	-	-	-	-	Y	Y	-	
3M	USA	[90-04]	[90-04]	-	15	15	-	o	6	-	-	-	-	-	-	-	-	-	-	
Mitsubishi Corporation	JAP	[90-04]	[90-04]	[90-00]	15	15	11	o	2	EP	-	Y	-	-	-	-	-	-	-	
Mitsubishi Materials	JAP	[93-04]	[95-04]	-	12	10	-	o	11	-	-	-	-	-	-	-	-	-	-	
Mitsui & Co.	JAP	[90-04]	[90-04]	-	15	15	-	o	2	-	-	Y	-	-	-	-	-	-	-	
Motorola	USA	[90-04]	[90-04]	-	15	15	-	o	11	-	-	-	-	-	-	-	-	-	-	
Nederlandse Gasunie	NLD	[91-04]	-	-	14	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
Nestlé	CHE	[90-04]	-	[90-04]	15	-	15	o	-	EP	-	-	-	Y	-	-	-	-	-	
Nokia	FIN	[90-04]	-	[90-04]	15	-	15	o	-	AP	-	-	-	-	-	-	-	-	-	
Noranda	CAN	[90-04]	[90-04]	-	15	15	-	o	10	-	-	-	-	-	-	-	-	-	-	
Norsk Hydro	NOR	[91-04]	[91-04]	-	14	14	-	o	3	-	Y	Y	-	Y	-	-	Y	-	-	
Nortel Networks	CAN	[91-04]	[91-04]	-	14	14	-	o	3	-	-	Y	-	-	-	-	-	-	-	
Nutreco	NLD	[94-04]	-	[94-04]	11	-	11	o	-	AF	-	-	-	-	-	-	-	-	-	
Otto Versand	DEU	[90-04]	-	-	15	-	-	d	-	-	-	-	-	-	-	-	-	-	-	
Pechiney	FRA	[90-02]	[90-02]	[90-02]	13	13	13	o	3	EP	-	-	-	-	-	-	-	-	-	Acquired by Alcan
P&O Steam Navigation	GBR	[90-02]	[90-02]	[90-02]	13	13	13	o	5	AP	-	Y	-	-	-	-	-	-	-	Acquired by DP World
PepsiCo	USA	[90-04]	[90-04]	[93-04]	15	15	12	o	3	EP	-	-	-	-	-	-	-	-	-	
Philipp Holzmann	DEU	[90-00]	-	[90-00]	11	-	11	o	-	AP	-	-	-	-	-	-	-	-	-	Insolvent
PPR	FRA	[92-04]	[92-04]	[92-04]	13	13	13	o	1	AP	-	-	-	-	-	-	-	-	-	
Procter & Gamble	USA	[90-04]	[90-04]	-	15	15	-	o	11	-	-	-	-	-	-	-	-	-	-	
Raab Karcher	DEU	[90-99]	-	-	10	-	-	o	-	-	-	-	-	-	-	-	-	-	-	Acquired by Saint Gobain
RAG	DEU	[94-04]	-	-	11	-	-	d	-	-	-	-	-	-	-	-	-	-	-	
Randstad	NLD	[90-04]	-	-	15	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
Raytheon	USA	[90-04]	[90-04]	-	15	15	-	d	3	-	-	-	-	-	-	-	-	-	-	
Reed Elsevier	GBR	[92-04]	-	[92-04]	13	-	13	o	-	EP	-	-	-	-	-	-	-	-	-	
Renault	FRA	[90-04]	[90-04]	[90-04]	15	15	15	o	6	EP	-	-	-	-	-	-	-	-	-	
Ricoh	JAP	[90-04]	[90-04]	-	15	15	-	o	3	-	-	-	-	-	-	-	-	-	-	
Rio Tinto (RTZ CRA)	AUS	[90-04]	[90-04]	[90-04]	15	15	15	o	5	AF	-	-	-	Y	Y	Y	Y	Y	Y	
RMC	GBR	[90-04]	[90-04]	[90-04]	15	15	15	o	5	AP	-	-	-	-	-	-	-	-	-	
Robert Bosch	DEU	[90-04]	-	[90-04]	15	-	15	o	-	AP	-	-	-	Y	-	Y	-	-	-	
Roche	CHE	[90-04]	[90-04]	[90-04]	15	15	15	o	7	EP	-	-	-	-	-	-	-	-	-	
Rockwell International	USA	[91-04]	[91-04]	[94-04]	14	14	11	o	2	EP	-	Y	-	-	-	-	-	-	-	
Rolls-Royce	GBR	[90-04]	[90-04]	[90-04]	15	15	15	o	4	AP	-	-	-	-	-	-	-	-	-	
Royal Dutch/Shell Group	NLD	[90-04]	[90-04]	[90-04]	15	15	15	o	1	AP	-	-	-	Y	Y	Y	-	-	-	
RWE	DEU	[90-04]	-	[90-04]	15	-	15	o	-	EF	-	-	-	-	-	-	-	-	-	
Safeway	USA	[90-04]	[90-04]	-	15	15	-	o	11	-	-	-	-	-	-	-	-	-	-	
Sanyo Electric	JAP	[92-04]	[92-04]	-	13	13	-	o	11	-	-	-	-	-	-	-	-	-	-	

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Name	**Ctry**	**S**	**A**	**E**	**S**	**A**	**E**	**S***	**A***	**E***	**S**	**A**	**E**	**S**	**A**	**E**	**S**	**A**	**E**	**Merger info**
Sara Lee	USA	[90-04]	[90-04]	-	15	15	-	o	3	-	-	-	-	-	-	-	-	-	-	
SCA	SWE	[90-04]	-	[90-04]	15	-	15	o	-	AP	-	-	-	-	-	-	-	-	-	
Philips Electronics	NLD	[90-04]	[94-04]	[93-04]	15	11	12	o	11	EP	-	-	-	-	-	-	-	-	-	
Schneider Electric	FRA	[95-04]	-	[95-04]	10	-	10	o	-	AP	-	-	-	-	-	-	Y	-	Y	
Sears Roebuck & Co.	USA	[90-04]	[90-04]	[94-04]	15	15	11	o	11	EP	-	-	-	-	-	-	-	-	-	
Sharp	JAP	[92-04]	[92-04]	-	13	13	-	o	11	-	-	-	-	-	-	-	-	-	-	
Siemens	DEU	[90-04]	-	[90-04]	15	-	15	o	-	EP	-	-	-	-	-	-	-	-	-	
Six Continents (Bass)	GBR	[90-04]	[90-04]	-	15	15	-	o	11	-	-	-	-	-	-	-	-	-	-	
Solvay	BEL	[90-04]	-	[90-99]	15	-	10	d	-	EP	Y	-	-	-	-	-	Y	-	-	
Sony	JAP	[90-04]	[90-04]	[90-04]	15	15	15	o	3	EP	-	-	-	-	-	-	-	-	-	
Statoil	NOR	[94-04]	[94-04]	-	11	11	-	o	1	-	-	-	-	-	-	-	-	-	-	
Suedzucker	DEU	[90-04]	-	-	15	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
Sumitomo	JAP	[90-04]	[95-04]	-	15	10	-	o	3	-	-	-	-	-	-	-	-	-	-	
Sumitomo Metal Industries	JAP	[91-04]	-	-	14	-	-	d	-	-	-	-	-	-	-	-	-	-	-	
Suzuki Motor	JAP	[93-04]	[94-04]	-	12	11	-	o	2	-	-	-	-	-	-	-	-	-	-	
Tate & Lyle	GBR	[90-04]	-	[90-04]	15	-	15	d	-	AP	Y	-	-	-	-	-	-	-	-	
Telstra	AUS	[90-04]	[90-04]	[90-04]	15	15	15	d	11	EP	-	-	-	-	-	-	-	-	-	
Tesco	GBR	[90-04]	[90-04]	[90-04]	15	15	15	o	11	AF	-	-	-	-	-	-	-	-	-	
Texaco	USA	[90-00]	[90-00]	-	11	11	-	o	11	-	-	Y	-	-	-	-	-	-	-	Acquired by Chevron
Texas Instruments	USA	[90-04]	[90-04]	-	15	15	-	o	6	-	-	Y	-	-	-	-	-	-	-	
Thales (Thomson CSF)	FRA	[94-04]	-	[94-04]	11	-	11	o	-	EP	-	-	-	-	-	-	-	-	-	
ThyssenKrupp	DEU	[90-04]	-	[90-04]	15	-	15	o	-	EP	-	-	-	-	-	-	-	-	-	Includes Thyssen AG
Tomen	JAP	[90-04]	[95-04]	-	15	10	-	o	11	-	-	-	-	-	-	-	-	-	-	
Tomkins	GBR	[90-04]	[90-04]	-	15	15	-	o	2	-	-	Y	-	-	-	-	-	-	-	
Toshiba	JAP	[90-04]	[95-04]	-	15	10	-	o	11	-	Y	-	-	-	-	-	-	-	-	
Total	FRA	[90-04]	[90-04]	[90-04]	15	15	15	o	8	AP	-	-	-	-	-	-	-	-	-	
Toyota Motor	JAP	[90-04]	95-04]	-	15	10	-	o	3	-	-	-	-	-	-	-	-	-	-	
United Airlines	USA	[95-04]	-	-	10	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
Unilever	NLD	[90-04]	[90-04]	[90-04]	15	15	15	o	5	AP	-	Y	-	Y	Y	Y	Y	-	-	
UPS of America	USA	[95-04]	-	-	10	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
United Technologies Corp.	USA	[90-04]	[90-04]	-	15	15	-	o	3	-	-	-	-	-	-	-	-	-	-	
Valeo	FRA	[90-04]	[90-04]	[90-04]	15	15	15	o	6	EP	-	Y	-	-	Y	-	Y	Y	Y	
Viacom	USA	[90-04]	[90-04]	-	15	15	-	o	11	-	-	Y	-	-	-	-	-	-	-	
VIAG	DEU	[90-99]	-	-	10	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
Volker Wessels	NLD	[90-04]	-	[90-04]	15	-	15	o	-	AP	-	-	-	-	-	-	-	-	-	Includes Volker Wessels Stevin
Volkswagen	DEU	[90-04]	-	-	15	-	-	d	-	-	Y	-	-	-	-	-	-	-	-	
Wal-Mart Stores	USA	[90-04]	[90-04]	[90-04]	15	15	15	o	11	EP	-	-	-	-	-	-	-	-	-	
Walt Disney	USA	[90-04]	[90-04]	-	15	15	-	o	11	-	-	-	-	-	-	-	-	-	-	

		Years			n			Method			Method corrections			Home is region?			Home corrections			
Name	**Ctry**	**S**	**A**	**E**	**S**	**A**	**E**	**S***	**A***	**E***	**S**	**A**	**E**	**S**	**A**	**E**	**S**	**A**	**E**	**Merger info**
Waste Management	USA	[90-04]	[90-04]	-	15	15	-	o	11	-	-	Y	-	-	-	-	-	-	-	
Weyerhauser	USA	[90-04]	-	-	15	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
Wolseley	GBR	[90-04]	-	-	15	-	-	o	-	-	-	-	-	-	-	-	-	-	-	
Wolters Kluwer	NLD	[90-04]	-	[90-04]	15	-	15	o	-	AF	-	-	-	-	-	-	Y	-	Y	
Worms & Cie	FRA	[90-04]	[90-99]	-	15	10	-	o	5	-	-	-	-	-	-	-	-	-	-	Includes Arjo Wiggins Appleton
Xerox	USA	[90-04]	[90-04]	-	15	15	-	o	11	-	-	Y	-	-	-	-	-	-	-	
Wal-Mart Stores	USA	[90-04]	[90-04]	[90-04]	15	15	15	o	11	EP	-	-	-	-	-	-	-	-	-	

[1] *Explanatory notes*:
S, A, and E denote FSTS, FATA, and FETE variables, respectively.

The columns 'years' identify the period for which data are available for that firm and variable.
The columns 'n' indicate how many observations are in a single series.
The columns 'method' denote the measurement methodology of the various variables with codes as specified below.
The columns 'Method corrections' indicate if methodological changes had occurred in the time series that required data adjustment as specified in the text.
The columns 'home is region' indicate if for a particular firm, the foreign-to-total ratios are based on extra-home regional (e.g., EU), instead of extra-home country data.
The columns 'home corrections' indicate if the data have been adjusted to control for changes in the home country (region) definition in the time series.
The column 'merger info' gives specifics for time-series that are incomplete due to mergers or takeovers.

S* Sales methodology defined as follows: o - Sales by origin (default); d – Sales by destination

A* Asset methodology defined as follows: 1 - Fixed assets; 2 - Identifiable Assets; 3 - Long Lived Assets; 4 - Net Assets; 5 - Operating Assets; 6 - Property, Plant and Equipment; 7 - Segment Assets; 8 - Tangible and Intangible Assets; 9 - Tangible Fixed Assets; 10 - Capital Investment; 11 - Total Assets

E* Employment methodology defined as follows: AF - Year average, full-time equivalent; AP - Year average, number of people; EF - Year end, full-time equivalent; EP - Year end, number of people