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A list of Working Papers on the last pages

No. 401, 1993

FIRM DYNAMICS IN A NORDIC

**PERSPECTIVE: Large corporations and
industrial transformation**

by

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The study looks at the 30 largest industrial companies in each of the Nordic countries: their growth, internationalization, transformation and role in macroeconomic developments. These firms hold significant positions in their domestic economies. Furthermore, the largest companies at one point in time tend to keep their position as dominant firms over rather long time periods. Hence, a rather small number of large corporations is sufficient to produce effects of significance to the industrial and macroeconomic developments in their countries of origin.

The role of the largest industrial firms has increased over the last 10-15 years with respect to all variables studied: employment, output, foreign operations and R&D activities. The contribution of these companies has been particularly important when considering the growing internationalization and knowledge intensity of the Nordic industries.

KEY WORDS: Corporate growth, internationalization of business, Industrial transformation, Nordic economies.

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YHTEENVETO

Tutkimus on osa pohjoismaisen yhteistyöryhmän (Nordic Perspective Group, NPG) tutkimusohjelmaa. Yhteistyöryhmä, johon kuuluvat ETLA, IFF (Kööpenhamina), IUI (Tukholma) ja SNF (Bergen), on aiemmin julkaissut useita Pohjoismaiden taloudellista rakennetta ja tulevaisuuden näkymiä koskevia raportteja. Tämä tutkimus keskittyy talouden mikroperustaan, suuryrityksiin ja niiden rooliin kansantaloudessa. ETLAssa projekti liittyy yritystalouden ja teoknologian tutkimuksen ohjelmiin.

Tutkimuksessa tarkastellaan 30 suurimman teollisuusyrityksen kasvua, kansainvälistymistä ja kokonaistaloudellisia vaikutuksia kussakin Pohjoismaassa. Suuryritysten rooli on kaikissa vertailumaissa merkittävä: 30 suurimman teollisuusyrityksen kotimaisen työllisyyden osuus koko teollisuuden työvoimasta on Suomessa noin 50 %, Norjassa ja Ruotsissa runsas kolmannes ja Tanskassakin viidennes. Lisäksi suurimpien yritysten merkitys on kasvanut selvästi viimeisten 10-15 vuoden aikana.

Suuryritysten tuotannon ja työllisyyden kasvu on ollut tuntuvasti nopeampaa kuin teollisuuden kasvu keskimäärin. Suuret yritykset ovat kuitenkin kasvattaneet pääosin ulkomaisia toimintojaan. 30 suurimman teollisuusyrityksen kotimainen työllisyys on supistunut kaikissa Pohjoismaissa 1970-luvun lopulta alkaen. Työllisyyden supistuminen on kuitenkin ollut aina 1980-luvun lopulle saakka suuryritysten ryhmässä vähäisempää kuin teollisuudessa keskimäärin: yritysten voimakas kansainvälistyminen ei siten pääsääntöisesti ole syrjäyttänyt kotimaista työllisyyttä. Kuitenkin 1980-luvun lopussa tilanne näyttää muuttuneen varsinkin Ruotsissa. Suurimpien ruotsalaisten teollisuusyritysten kotimaisen työvoiman määrä väheni selvästi teollisuuden keskimäärää nopeammin ja vastaavasti ulkomaisen työllisyyden kasvu kiihtyi. Suomessa ja Norjassa muutokset olivat samansuuntaisia, mutta vähäisempiä.

Suomalaisten suurten teollisuusyritysten kansainvälistyminen oli 1980-luvulla nopeampaa kuin norjalaisten ja ruotsalaisten. Vuonna 1990 jo noin 50 % kymmenen suurimman ja noin 40 % kolmenkymmenen suurimman teollisuusyrityksen työntekijöistä työskenteli ulkomaisissa tytäryrityksissä. Nopeasta kasvusta huolimatta osuudet ovat tuntuvasti pienempiä kuin ruotsalaisten suuryritysten ryhmässä, jossa ulkomaisen työvoiman osuus koko henkilökunnasta on noin kaksi kolmannesta. Suomalaisten yritysten kansainvälistymisen taso on jokseenkin sama kuin ruotsalaisten 1970-luvun puolivälissä. Norjassa suurten yritysten kansainvälistyminen on ollut jonkin verran hitaampaa kuin Suomessa.

Suuryritysten ryhmä näyttää olleen hyvinkin pysyvä kaikissa Pohjoismaissa. Yritykset ovat viimeisten 10-15 vuoden aikana pitkälti säilyttäneet keskinäisen suurjärjestyksensä. Myös pitkällä aikavälillä suuryritysten joukko on pysynyt hyvin samankaltaisena: noin kaksi kolmannesta yrityksistä, jotka viisikymmentä vuotta sitten olivat 30 suurimman joukossa on tässä ryhmässä edelleen.

Suuryritysten rooli on erityisen merkittävä suurta riskinottoa vaativissa toiminnoissa, kuten tutkimus- ja kehitystoiminnassa sekä kansainvälisissä toiminnoissa. 30 suurinta teollisuusyritystä vastaa kussakin maassa lähes kokonaisuudessaan teollisuuden kansainvälisistä operaatioista. Myös T&K-toiminnassa suuryritysten merkitys on selvästi niiden tuotanto- ja työllisyysosuuksia suurempi.

FOREWORD

The Nordic Persepctive Group (NPG) is a cooperating venture of the research institutes ETLA (Finland), IFF (Denmark), IUI (Sweden) and SNF (Norway). In several publications this group has discussed the prospects of the Nordic economies by elaborating on the industrial base in the region. There has, however, been a lack of firm level data in these analyses, and the NPG has encouraged work to fill this gap. A project team was set up to focus attention specifically on the large industrial firms of the different Nordic countries.

Pontus Braunerhjelm (IUI), Per Heum (SNF), Steen Thomsen (IFF) and Pekka Ylä-Anttila (ETLA) have formed the team. Heum and Ylä-Anttila have been in charge of the work. Each researcher has been responsible for providing data on the largest firms for their respective countries. This work has been undertaken on the basis of national funding: in Denmark, Finland and Sweden mainly from the cooperating research institutes or from the researchers themselves, and in Norway additionally from the Norwegian Research Council for Applied Social Science (NORAS). The Nordic Economic Research Council (NEF) has funded part of the costs of bringing these data together for a comparative presentation at the Nordic level. This report responds to this task by presenting a descriptive analysis of the business development and the role of large industrial corporations in the Nordic economies.

Per Heum and Pekka Ylä-Anttila have been responsible for writing this report. Pontus Braunerhjelm and Steen Thomsen have commented on the approach and the manuscript at different stages of the work. We hope to continue this cooperation through more extensive studies on firm dynamics, industrial transformation and the role of large firms.

Maarit Säynevirta has done a tremendous job in keeping track of all the data and by preventing confusion from our repeated efforts to reexamine the comparability of the data. She has also compiled the tables and figures that are presented in this publication. We are grateful for her patience and her professional work. We also greatly appreciate the work undertaken by Trond Hammervoll and by Jyrki Ruutu. They have both contributed significantly to the progress of this project. We also want to acknowledge the contributions of Antti Ripatti, Klaus Walderhaug, Søren Jensen and Göran Johansson-Grahn, all of whom have been involved in different stages of the project work. Finally, the work has benefitted from discussions at several joint meetings of the Nordic Perspective Group.

Bergen/Helsinki, November 1993

Per Heum and Pekka Ylä-Anttila

1. INTRODUCTION

Industrial transformation should be considered essential for the prospects of economic growth in any country. This has been the base line for the current study, as it has been for previous publications from the Nordic Perspective Group comparing the structure and patterns of development in the Nordic economies mainly at the industry level (ETLA et.al. 1984; 1987; 1990). However, in these publications it is also advocated that to understand industrial transformation and economic growth, we need a micro-based approach applying firm level data. The present study complies to this task. Huge efforts have been taken to collect firm-level data, in this first stage by considering the sample of the 30 largest industrial firms in each of the four Nordic countries: Denmark, Finland, Norway and Sweden.

The general idea underlying this work has been that information on the largest industrial corporations may provide the necessary microeconomic foundation for analyzing industrial transformation and macroeconomic growth. There is undoubtedly a direct linkage between the development of the largest corporations and considerations at the micro level of the economy. At the same time we argue that the industrial magnitude of a rather small number of large corporations is sufficient to produce effects of significance to the industrial and macroeconomic development in their countries of origin.

This idea of linking information on large firms to macroeconomic considerations is by no means new. When, for instance, predictions of future investment levels are to be made, or when documenting the financial situation within the business sector, public authorities frequently collect information from the largest domestic firms. This approach is also significantly extended and formalized in the micro-to-macro model (MOSES) on the Swedish economy at IUI: Economic growth is modelled to build on

firm (microeconomic) behaviour, which in turn is restricted and influenced by ensuing macroeconomic feedbacks (see Eliasson, 1985).

There is, however, still a need to document the relevance of such an approach, and to improve its design. This report contributes to the former of these tasks. With information from only the 30 largest corporations of each country we argue that macroeconomic relevance is assured, and we apply it to illustrate current patterns of industrial development. At this stage we mainly present an extensive descriptive analysis, since we want to give a comprehensive picture of the large firm data base which never before has been used in a joint Nordic study.

The industry focus of this report is on manufacturing as the prime industrial source for long-term growth. This is clearly reflected in the economic development of Denmark, Finland and Sweden. Norway forms a slight exception as international transport services in shipping were an important factor in Norway's economic development until the early 1970s, while extraction of oil and natural gas has provided the most important growth impulses over the last two decades. Looking beyond 2000, however, manufacturing will undoubtedly be extremely decisive for the economic development of all these countries. This is the reason why we have included Chapter 2 which summarizes the industry level background of Nordic manufacturing.

Then, in Chapter 3 we discuss shortcomings of the industry level approach when addressing the issue of industrial transformation. The dynamic features of industrial transformation have to be addressed at the firm level. The firm concept is not, however, trivial in the field of economics. Thus, we briefly consider this theoretical issue before we elaborate on firm behaviour and current trends in the development of business.

These theoretical considerations do not represent any attempt to formulate hypotheses on which formal empirical testing may be conducted. Rather it works as a guide-line

for a storytelling type of report, where we apply data we have gathered on the largest industrial corporations of different Nordic countries to illustrate trends in Nordic business development and their macroeconomic impacts. Chapter 4 presents our data, the definitions we have applied, and the actual corporations that have been chosen according to our selection criteria.

Then, Chapter 5 addresses the stability in ranking among the largest firms, and the persistence of size of the large firms. More precisely our focus is on changes in the groups of the largest corporations, i.e. to what extent the large firms of one period have been surpassed by more rapid growth of other firms.

In Chapter 6 we discuss the growth and transformation of the large Nordic corporations. We focus on employment, on the internationalization of business, and on R&D activities.

Chapter 7 addresses the role of the largest corporations at the macroeconomic level of the Nordic economies. We focus on their growth pattern with respect to growth in domestic manufacturing. Then we consider their share of economic activities domestically and whether this has been increasing or decreasing over the last two decades. Furthermore, we briefly discuss the impacts of internationalization on domestic production, and the role of large corporations in domestic business communities. Chapter 8 summarizes the report and introduces the direction of our future research.

2. NORDIC MANUFACTURING - AN INDUSTRY LEVEL BACKGROUND

The composition of manufacturing production varies between the Nordic countries. Briefly, the main features of manufacturing in the different countries may be summarized as follows:

- In **Denmark** export oriented manufacturing is mainly made up of foodstuff industries and more sophisticated engineering. The Danish manufacturing sector has traditionally been small and dominated by small companies. It has, however, been argued that Danish firms are too small to enter the integrating European market (Thomsen, 1990).

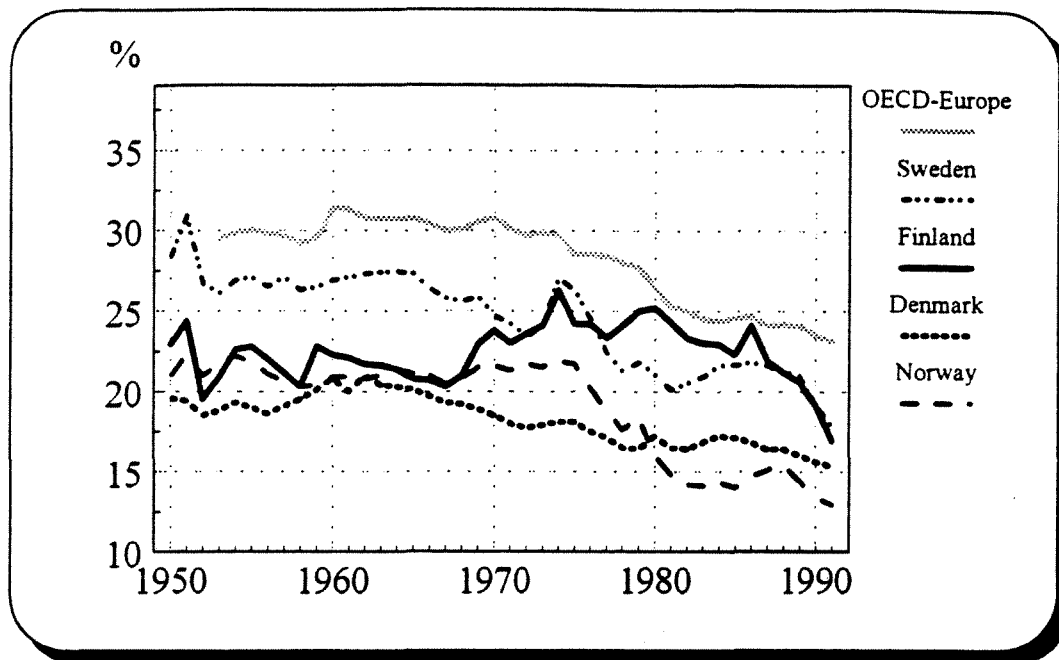
- In **Finland** manufacturing exports mainly stem from the pulp and paper industry, and from the engineering industry, which has shown significant growth. The large corporations have been internationalizing very rapidly during the past few years and domestic manufacturing investments have remained on a relatively low level. The dominance of large corporations in the industrial structure has probably increased, but it is evident that a greater contribution of these firms can be seen in foreign direct investment and other foreign operations (Kajaste, Parviainen and Ylä-Anttila, 1992).

- In **Norway** exports of crude oil and natural gas dominate the export picture followed by manufacturing exports from energy-intensive industries applying hydroelectric power. Large firms operate in these industries, while small business historically has dominated other parts of manufacturing. The traditionally strong contribution of small business to industrial production has, however, diminished and large corporations have been argued to be responsible for the bulk of economic growth in recent years (Berrefjord, Heum and Tvedt, 1990).

- In Sweden manufacturing has for long been dominated by 30-40 large companies, mainly based in the metal and engineering industry. Swedish industry is in relative terms probably the most internationalized in the world (Swedenborg et al., 1988). The largest Swedish corporations are giants compared to other Nordic companies (Oxelheim, 1984; ETLA et al., 1990). Contrary to the other Nordic countries, there is a host of Swedish studies on the role of large companies and their contribution to macroeconomic performance in Sweden (Swedenborg, 1973, 1979, 1982; Swedenborg et al., 1988; Eliasson, 1984). In general, the results of these studies show that the macroeconomic impacts of international operations on exports, and on domestic growth, productivity and employment have been positive. However, some recent studies have questioned the positive contributions to exports (Svensson, 1993), and whether the ongoing surge in cross-border mergers and acquisitions by the large industrial companies is leading to a too narrow and structurally unfavorable production capacity in Sweden (Braunerhjelm, 1990).

Turning to the development of manufacturing, it is a common feature of all Nordic economies that the manufacturing sector has been shrinking relatively. According to Figure 2.1, the share of manufacturing - as conventionally defined - in total output has shown a declining trend since the 1970s. The industrial countries in general exhibit the same trend, but the Nordic shares are clearly below the OECD Europe average.

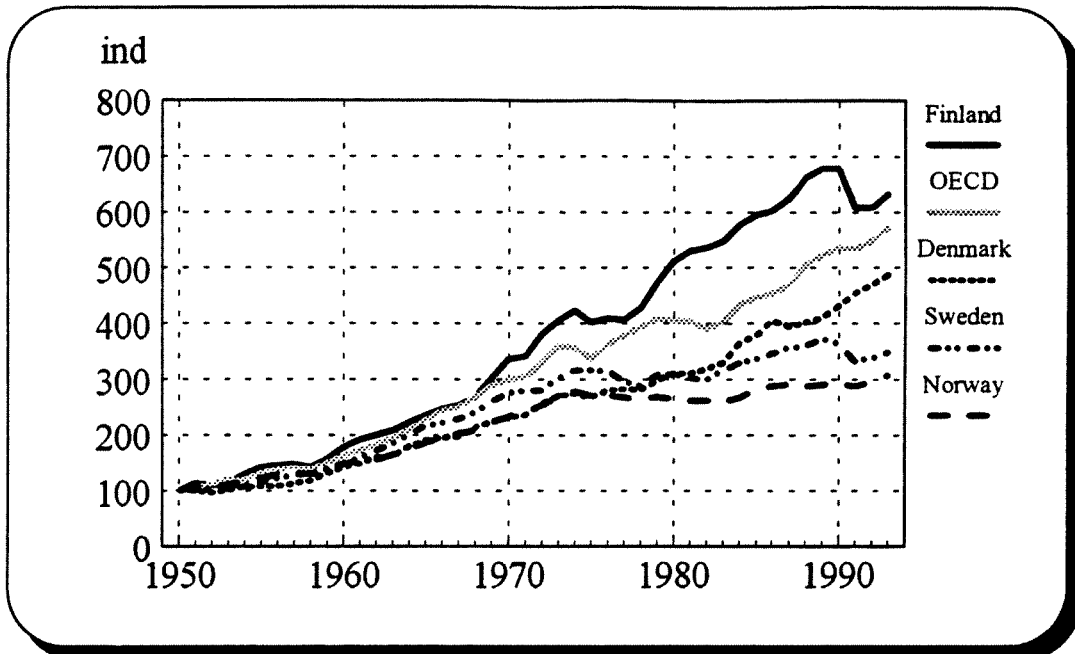
Figure 2.1 Share of manufacturing output in total GDP, 1950-1991. Per cent.



Source:OECD

Since 1950 the manufacturing growth have varied substantially across the Nordic economies and over time. Figure 2.2 illustrates this by showing the annual volume of manufacturing output in the Nordic countries and in the OECD.

Figure 2.2 Manufacturing output in the Nordic countries and OECD, 1950-1993. 1950=100.



Source: OECD

These differences in growth rates are more clearly read from table 2.1, where average annual growth rates are calculated for different periods.

Table 2.1 Manufacturing output in the Nordic countries and OECD, 1950-1993. Annual average change in volume. Per cent.

	OECD	Denmark	Finland	Norway	Sweden
1950-65	5,6	4,4	5,9	4,2	5,3
1965-74	5,1	4,1	6,7	4,6	4,4
1974-90	2,7	2,9	3,0	0,3	0,9
1990-93	2,8	4,1	-2,4	1,6	-1,4
1950-93	4,1	3,7	4,4	2,6	2,9

Source:OECD

Finland is the only of these Nordic countries where manufacturing growth since 1950 in general has exceeded the OECD average. Since 1990, however, the growth performance of Finnish manufacturing has been very poor. The pace of growth in Swedish and Danish manufacturing picked up somewhat in the early 1980s. Sweden has, however, slowed down again, while Danish manufacturing has exhibited fairly rapid growth compared to the Nordic average after a short downswing in the late 1980s. In Norway, manufacturing growth has generally been below the OECD average, and since the mid-1970s hardly any growth has been recorded at all.

There was a general trend throughout the 1980s for all these countries that domestic firms absolutely and relatively increased their foreign direct investments. This increase in foreign direct investments has to a large extent been directed towards the EC countries (Braunerhjelm, 1990; Karlsen, 1991). Foreign direct investments are mainly made up of investments conducted by domestic manufacturing, with the exception of Norway where the producers of international shipping services and of oil and natural gas also hold a significant share. It is uncertain how this investment pattern affects future growth of domestic manufacturing.

Another general trend in the investment pattern of Nordic manufacturing is the absolute and relative increase in the level of intangible investments. An indication is R&D expenditures in manufacturing, which have increased significantly compared to the level of fixed investments in all Nordic countries (ETLA et.al., 1990). Finnish manufacturing firms have in particular been expanding their R&D activities throughout the 1980s. The level of R&D is, however, clearly the highest in Sweden.

At the same time technical change - notably the new flexible technologies - have heavily impinged on industrial organizations and company structures of the Nordic economies (Ylä-Anttila and Lovio, 1990). The average size of establishments has been decreasing in several manufacturing industries, while the bulk of these industrial categories show that the share of value added to the sales value of production has

decreased (Hammervoll and Heum, 1992). Thus, in certain lines of production there seems to be a trend of scaling down production as further specialization is required to stay competitive in more flexible production arrangements within industrial networks.

These trends of internationalization, of more knowledge-intensive production, of de-scaling production and of flexible manufacturing are general phenomena affecting manufacturing all over the world. The weak average growth in manufacturing output, as recently experienced by most Nordic countries, is not, however, a world-wide trend. From a Nordic point of view this makes it increasingly important to examine how the industrial transformation that is going on will affect the future of these countries. Neither the processes leading to these changes nor their implications for future wealth can, however, be fully grasped at the industry level.

3. ANALYZING INDUSTRIAL TRANSFORMATION

3.1 Shortcomings in Industry Level Analysis

Data at the industry level originates from adding together information on domestic establishments whose production is classified as belonging to the same industry group. In addition to the problem that we frequently lack data on matters which are of importance to illustrate changes in the creation of value, there are certain obvious shortcomings in industry level data when we want to analyze industrial transformation.

Our problem concerns the fact that information on establishments is simply not aggregated to the firm as an organizational unit authorized to make major strategic moves. Furthermore, firms are not static entities but continuously subject to reorganization. Service production, for instance, is increasingly conducted in separate units within a firm. Operations which previously were conducted in one establishment, may now be undertaken in several establishments classified as belonging to different industries. This will cause changes in the recorded activity levels in these industries without reflecting real changes in the economy, only different ways of registering operations that always have been conducted. Thus, recorded changes at the industry level is becoming hard to interpret as firms move their operations across industries.

Another major problem is that industry level data is based on domestic production, whereas firms carry out production internationally. Thus, real firms will act according to how they consider their world-wide interests. Industry level data misses this as it is only shown how changes are taking place in industries in separate countries.

When applying industry level data to elaborate on firm behaviour, other problems arise. It is quite common to construct an artificial firm by calculating industry averages. However, the average firm is not a firm as we know it in the real world. This method of calculating average firms does not make any sense in analysis of industrial

transformation. It assumes all firms within one industry to be equal, while it is the differences in efficiency and competitiveness which cause industrial transformation.

This means that firm level data is needed to analyze the processes of industrial transformation, simply because it is hard to grasp the underlying driving forces of these processes at the industry level. Firm level data should also facilitate evaluation of growth prospects at the national level. For instance, national wealth is increasingly being affected by the internationalization of firms. Many assets, like management, technological skills and skilled labour, are becoming more mobile. Relocations of activities internationally within firms may lead to major changes in national economic structures. Thus, the interplay between the competitive advantages of countries and those of firms ought to be one of the key issues in industrial and economic policies.

3.2 Firms and Industrial Dynamics

In a dynamic economy there is a continuous restructuring of the business community. Old companies grow and change or they divest and close down. Simultaneously, new companies are established; they fail or succeed, either growing as independents or being acquired by other firms. This kind of firm dynamics is the very foundation for industrial transformation. Firms are subject to continuous change, and industrial operations change with them. This pertains to economic growth as well. The introduction of innovative and competitive entries are shown to be of vital importance for stable and strong economic growth in the long run (Eliasson, 1991).

The establishment of new firms is undoubtedly a major driving force in the growth process in the very long run. On the other hand, it is the group of existing firms that is responsible for the bulk of aggregate output and employment growth in the short and medium term, and which also contributes the most to the growth changes in the economy over such time horizons (Kristiansen, 1992). Thus, reorganisations within

existing firms, their internally generated growth, and external expansion of their business through mergers and acquisitions, should be regarded as essential parts of firm dynamics and industrial transformation, and also for long-term economic growth. The introduction of innovative and competitive entries is taken care of within existing firms, as well as through the establishment of new firms.

In essence this means that industrial transformation is the result of minor and major innovations and their diffusion. It takes primarily place through the competitive pressure put upon firms to exploit and develop business opportunities offered by changes in technology and markets, which also may lead to the entry and exit of firms. Then, the dynamics of industrial transformation simply means to understand the growth of firms and growth differentials between firms. This is, however, no trivial issue in the economic literature.

Even the firm as such is considered quite differently in economics. According to neoclassical models firms only react passively to external stimuli, i.e. to changes in price information. They have no internal organization nor external relations other than those related to price information. The firm's existence or organization simply has no role in this theory, since the purpose is not to explain the behaviour of firms, but to explain and predict changes in observed prices (Machlup, 1967). The firm described in neoclassical economic theory is something very different from the business organizations we observe and on which we can get information.

If we want to look at the growth of firms and changes in their market positions, we have to adopt another concept of the firm. The modern corporation has a multitude of goals which they try to reach by strategic manoeuvres. This active aspect of firm behaviour is needed if we want to raise questions about the boundaries, the size and the growth of firms. It is also needed when we want to look at the firms as parts of national economies. Evidently firms tend to grow differently and reach different limits to their size depending on their national economic environment or home base.

It is our point of departure that firms attempt to modify and remove constraints in order to generate profit, rather than being profit maximizers within given constraints. Research and development, product differentiation, mergers and acquisitions as well as strategic foreign direct investments are all different forms of active constraint-modifying behaviour.

When considering growth and growth differentials between firms, the standard assumption that scale economies in production determine the size, and that new technology may change the economies of scale, is not sufficient. It might be that there are scale economies at the level of plants (in production), but not at the level of a firm. As firm size increases, the economies of scale may turn into diseconomies due to higher control and monitoring costs. On the other hand the scale economies are often argued to relate more to other activities than production, namely to financing, marketing, and R&D (Eliasson, 1991, shows that only a small proportion of the resources in large manufacturing firms are devoted to the production of goods). Hence, size differences and growth differentials may also be attributed to unequal capabilities within firms to exploit such scale economies, and to identify and take advantage of these in their markets.

Besides the seminal work of Penrose (1959), most interesting perspectives on the growth of firms are found in theories on the internationalization of firms (see, for instance, Hymer, 1976; Caves, 1971, 1982; Dunning, 1981, 1988). They argue that firms grow internationally due to a lack of markets for firm-specific assets. Ownership advantage is the key concept. Since the exploitation of this firm-specific asset might be eroded in traditional trade arrangements, as exports and licencing, firms tend to internalize production by establishing foreign subsidiaries. The possession of firm-specific assets simultaneously provide an advantage which allows the firm to overcome problems associated with operations in foreign markets.

Firm-specific assets may occur when products are differentiated either by research and development or by advertising. That leads to horizontal foreign direct investment. Similarly, firms in concentrated markets may grow through foreign direct investments in order to utilize their management capabilities when the expansion of output in the home market is limited. Furthermore, high home market concentration will encourage foreign direct investments if the essential raw material is located abroad.

Hence, the growth of firms may in general be connected to the existence of some firm-specific, rent-yielding asset which provides the basis for a profitable expansion of production. Others have also more recently emphasized the feed backs of experience from production, markets and business operations on the upgrading and cultivation of this firm-specific asset. Thus, the process of technology accumulation from which a firm creates its competitive strength, may also explain why firms grow, or invest abroad (Cantwell, 1989), for instance to assure its presence in global technology centers of importance to the businesses in which it is engaged (Chesnais, 1992).

This active behaviour of firms is obviously the very precondition for the field of strategic management. In this perspective, firm behaviour is governed by the strategic concerns of a firm: What shall it produce, and in what lines of business should it be engaged? To what extent cooperation between different lines of businesses is to be promoted? What competitive strategies are the most forceful to pursue? How shall it design and organize its span of control, and to what extent shall the operations of different activities and business engagements be coordinated administratively?

In the literature on business strategy, it is often deemed worthwhile to make a conceptual distinction according to the aggregate level at which business is organized. The purpose of business is to create value. Value creation, however, is organized in entities at different levels of aggregation, which is illustrated by the different content of concepts like "the single-unit firm" and "the multi-unit firm".

Competition occurs at the disaggregate business unit level between strategic business units (SBU). The prime strategic concern of a SBU is its competitiveness. Thus, it is at this disaggregate level competitive strategies ought to be implemented (Porter, 1987).

A business unit may be independent (the single-unit firm) or be part of a constellation of several SBUs, forming a corporation or a multi-unit firm. The corporation represents another strategic level at which production and business is organized. The purpose of a corporate strategy is to strengthen the competitiveness of its SBUs, i.e. a SBU shall be more competitive within a corporation than it would have been as an independent firm (Salter and Weinhold, 1978). This may be achieved by organizing relations between the corporate level and the SBUs, and between the SBUs of the corporation. If these relations do not contribute to competitive advantages for the SBUs, there is no economic justification to keep them within the same corporation (Porter, 1987).

3.3 Current Trends in Industrial Transformation

When elaborating on current trends regarding industrial transformation, our discussion is very much based on how the firm is conceived in the strategic management literature. Then we have to bear in mind that strategic concerns vary between the corporate and the SBU level of a firm, as well as between firms depending on the businesses in which they are engaged and the business environments in which they operate. Changes in the business environment are crucial for understanding strategic reconsiderations and changes in firm behaviour. The implementation of strategies is then assumed to be decisive for the development of business and hence for industrial restructuring and economic performance at both the microeconomic and macroeconomic level of the economy (Rumelt et al., 1991).

Since the 1970s two major forces of change have produced significant effects on the competitive environment of almost any business. One is changes in **technology**; the other is changes made in **political regulations**.

The continuous **development of technology** means that production processes and products always are subject to impulses of change. One major impact of the current microelectronics paradigm is expected to be a change of scale economies in production in many industries. Technology has made it easier to adjust production processes to respond to different product standards. Thus, standardized mass production is challenged by more flexible production arrangements, which allow profitable production of goods and services that are increasingly adapted to the specific needs of different customers (Piore and Sable, 1984; Edquist and Jacobsson, 1988; Ylä-Anttila and Lovio, 1990).

However, even if we theoretically can argue that scale economies are becoming less predominant in production, there may still be untapped scale economies, for instance due to political regulations. And there may still be substantial scale economies regarding other economic activities, as in R&D and in finance.

As technology changes, so do **political regulations**. There is a rather unilateral trend among industrialized countries to promote competition. Almost globally steps are taken to liberalize flows of capital, goods, services and labour. This takes place within countries, and in the economic relations between countries and different economic regions of the world. Entry and exit barriers are being reduced. Business is increasingly becoming more exposed to international competition.

These technological and political changes provide firms with the option to exploit new opportunities regarding production processes, product development and market access, while being exposed to stronger competition. This obviously has to affect their

behaviour, and in turn show up in what we conceive as industrial transformation, e.g. regarding the size of firms and the content of business operations.

As the SBUs are most directly exposed to competitive forces, the effects of changes in the competitive environment on a corporation are channelled through the aggregate effects of such changes on its SBUs. This is the way of thinking which guides our discussion below on current trends regarding 1) division of labour, 2) factors of production, 3) internationalization and 4) firm size.

1. Division of labour: One option in new technology is that producers may increase their profits by exploiting the opportunities which technology creates to adapt products to the needs of specific customers. Another option is that activities which used to be conducted inside one firm, now may be decoupled and performed more competitively in separate SBUs. If both of these opportunities prove profitable, competition will force production to become more specialized. SBUs may maintain and strengthen their competitive edge by concentrating their efforts to the activities which they perform the best.

The recommendation for a competitive strategy is according to current management literature that any SBU ought to **cultivate its core competence** (Reve, 1990), and to purchase the inputs they need in performing their core activities from other SBUs which enjoy a competitive advantage in producing these inputs. The implication is a decoupling of activities which either are not based on, or do not support, the core competence of the SBU. The division of labour should be increasing at the SBU level of the economy. If there is such a trend, this should for instance show up as an increasing share of purchased goods and services relative to the sales value of production in SBUs. This seems to be the case in many lines of production when consulting industry level data (Carlsson, 1989; Hammervoll and Heum, 1992).

Even at the corporate level the literature suggests that corporate strategy ought to be designed so that the corporation may **expand, or diversify, on the basis of a common denominator of competence, or technology** (Porter, 1987). Then it may gain synergy from its different business engagements, which is crucial for justifying the existence of the corporation economically. This recommendation is in contrast to the corporate development which was observed through the 1960s and 1970s, when corporations in many instances expanded by moving into businesses which were rather remote to their core (Scherer, 1988).

Current trends in corporate development are expected to be more in consistence with the recommendations in the literature on corporate strategy. There is, no simple way of measuring to what extent the division of labour is increasing at the corporate level. The relative level of external sourcing would be increasing if the corporations did not change their portfolio of business engagements. But this is changing all the time, through mergers, acquisitions and divestitures.

2. Factors of production: If there is a general trend that SBUs cultivate the core competence of their business, firms will need to pay more attention to external sourcing. They will have to define their needs, investigate how these may be satisfied, be concious about how relations to suppliers are organized, and implement efficient supplies. Furthermore, the potential to tailor products to the specific needs of different customers, means that firms also increasingly have to interpret what the particular needs of their customers actually are, how these may be served through different product adjustments, and to make customers concious of these needs. In other words, it is becoming increasingly decisive to combine effective supplies and sales efforts with innovative capabilities in product development and production. Competitiveness is not determined solely by the efficiency in fabrication, but by the overall capacity within a firm to identify, create and exploit business opportunities (Carlsson and Stankiewicz, 1990). This capacity is discussed as economic or industrial competence (Pelikan, 1988).

Such **industrial competence** may be regarded as the decisive factor regarding the possibility of keeping and strengthening the competitive edge of firms (Eliasson et al., 1990). Brain-power and organization will increasingly decide the future of firms and corporations. Other production factors, such as natural resources, physical real assets and man-power, will be less important than earlier. Empirically this means that intangible investments should grow more rapidly than investments in physical real assets as buildings, machinery and equipment. This is shown to be the case at the industry level in the Nordic countries (ETLA et al., 1990). However, due to the continuous rearrangement of business engagements within corporations, this trend is not necessarily reflected when applying the same measure on only a group of corporations.

Another way of approaching this issue empirically would be to consider the share of value added spent on intangible investments. If competence is becoming more decisive for the competitiveness of firms, this share is likely to increase, which is documented to be the case at the industry level (Bjørklund and Heum, 1990). The relative level of intangible investments compared to value added varies substantially, however, between industries. Since corporations continually rearrange their portfolio of business engagements, this measure is not guaranteed to capture such a trend as long as only a group of corporations, and not all, is considered.

3. Internationalization: As political regulations are designed to liberalize the flows of goods, services, capital and labour internationally, competition is becoming globalized. This is reinforced by the development of technology which has eased long-distance communication considerably. These changes in the competitive environment of firms should, when taking the thesis that firms increasingly cultivate their core business into account, mean that firms have to expand foreign sales to grow and to reap profits. At the same time they will also increasingly have to consider foreign supplies to ensure that they will stay competitive. The business of a country will increasingly have to conduct sales abroad. Moreover, it probably means that competitive firms have to engage in production outside its country of origin. This may partly take place

through subsidiaries, partly through strategic alliances, or coalitions, with foreign firms (Porter and Fuller, 1986).

Foreign production has been considered as a means of getting around trade barriers, or to escape unfavourable conditions to business domestically. However other, and more important, factors should be regarded as the driving forces behind the expected internationalization of business.

As far as bulk production is concerned, costs of transportation and the efforts to re-structure mature industries internationally, stimulate corporate efforts to engage in production world-wide. Some will have to withdraw, but the most competitive will become more international. As far as knowledge-intensive production is concerned, the needs to stay close to customers, and the possible advantages of global sourcing, i.e. drawing on the dynamics of different global technology centers, imply that firms will establish production in several countries. If participating in just-in-time production arrangements, this may become even more evident.

The level of internationalization varies between different industries. The trends of becoming more international in business operations are, however, widespread and strong, in particular for the business of small economies. Thus, we expect it to show up as an increase in the shares of foreign sales within total sales and of foreign employment within total employment for almost any groups of business entities on which a study may focus.

4. Size of firms: International competition and new technology also affect the size of corporations and SBUs. Acquisition and mergers are frequently justified as a response to the increasing competition from abroad. Partly, it is the kind of argument that "one needs to be large to fight foreign giants" which is presented. More fundamental arguments may, however, also be introduced.

International integration of business, due to current efforts to liberalize and standardize trade and capital flows, probably reveals untapped economies of scale. Thus, the size of business entities should be expected to be increasing in industries where such barriers have been prevalent. Furthermore, there may exist scale economies in economic activities, as in R&D and in finance, which also may cause corporations to grow. Besides, current trends in business development require more and larger risky investments. This holds for investments in intangible assets, which are needed to respond to increasing knowledge requirements in production; and it is the case regarding investments to gain footholds abroad, which may be needed to operate in a more competitive environment internationally. In both of these areas, the failure ratio is significant. Firms need a solid financial base to engage in these. If the financial base is weak, such investments will expose the firm to huge risks, making its whole business vulnerable to a failure in every single investment project. One way of hedging against such risks, is to be part of a larger corporation, which can suffer losses in any single investment project without jeopardizing its long-term business engagements. This should also imply that corporations should be expected to grow in size.

On the other hand, the trend at the corporate level to consolidate and expand on the basis of related diversification, could imply the opposite. For the USA it is documented that the employment in the largest US industrial corporations has shrunk since 1979 (Carlsson, 1989). De Jong (1988) also finds that concentration is being reduced in the USA. However, in Europe he finds it still to be increasing. As the largest Nordic corporations are rather small by international standards (cf. chapter 4.5), we expect their size development to be in accordance with this general European pattern, i.e. **corporate growth.**

At the SBU level, however, theory suggests a different trend. New technology changes the rationale of economies of scale. In many areas of production, as in the engineering industry, large scale operations do not generate as great advantages as in the era of mass production (Carlsson, 1989). The more profitable opportunities to adapt products

to the specific needs of different customers, the greater the demands on SBUs to be flexible in production and organization: Flexible production systems are becoming more competitive (Ranta and Tchijov, 1990), favouring the competitiveness of small and mediumsized firms (Diwan, 1989). If demand patterns should be changing more rapidly than before, this advantage of small scale business could be favoured even more despite high fixed costs. All in all, this calls for a trend of "scaling down" among SBUs (Johnstone and Lawrence, 1988). This is confirmed empirically in the sense that according to Nordic industry level data, the average employment of business establishments, is decreasing in several industries (Carlsson, 1989; Hammervoll and Heum, 1992 and Ylä-Anttila and Lovio 1990).

Thus, we are confronted with patterns of development on the Nordic scene, which on the one hand should imply that corporations will grow, while on the other hand that SBUs are becoming smaller. There is no contradiction in this. A corporation encompasses several SBUs. Corporate growth can take place despite a trend of a declining size in SBUs, simply by including more and more SBUs within the corporate span of control. In this respect it is also important to recall that technology has improved the possibilities to distribute and interpret information considerably. Thus, the capacity to coordinate an increasing number of business engagements within one corporation should technically be present. The exploitation of this option will, however, depend on to what extent internal coordination actually serves the corporate purpose.

3.4 Questions to Be Addressed in the Report

Table 3.1 briefly sums up the previous discussion on current trends in business, and how they may be illustrated empirically employing firm level data.

We are not attempting to address all the issues regarding a firm level approach to analysis of industrial transformation which was raised above. Actually our ambition is quite limited in this respect. Besides presenting the content of our large firm data base, our main intention is to assess the macroeconomic importance of these large firms, and to use them as a micro sample to illustrate trends in Nordic business development.

The macro aspects of the largest Nordic firms are considered in two ways. First, in Chapter 5 we discuss how the growth of firms affects the rank stability and the persistence of large firms. At the end of the report (Chapter 7) we consider the contributions to economic activities which these large firms hold in their domestic economies.

Our discussion on Nordic business development is limited to this large firm data base. As these firm level data have been collected at the corporate level of firms, we are unable to consider changes in business at the SBU level. Our main focus is on corporate growth and on the internationalization of Nordic business. The data allows us to touch upon the issue of knowledge based production only to a minor extent.

Table 3.1 Summary of expected firm behaviour

	Current trends	Implications for SBUs	Aggregate expected effects of SBU changes on corporations
Division of labour	Increased specialization due to the cultivation of the core competence in firms.	Value added relative to sales is decreasing.	Related diversification, which due to continuous restructuring requires detailed studies to be documented.
Factors of production	Industrial competence is becoming relatively more important.	R&D-expenses relative to value added (or sales) is increasing.	R&D-expenses relative to value added (or sales) should be increasing.
Internationalization	Increasing.	Foreign production, employment and sales are increasing in relative terms.	Foreign production, employment and sales should be increasing in relative terms.
Size of firms	Descaling in production. Possible economies of scale in R&D, finance, marketing and international operations.	The size of SBUs is reduced	Potential untapped economies of scale in R&D, finance, and marketing mean that internationally small corporations will grow.

4. DEFINITIONS AND DATA ON LARGE NORDIC FIRMS

4.1 Problems in Defining Manufacturing and Firms

The prime concern of our research is to apply a firm level approach to analyze **manufacturing production**, which is considered the key to wealth for all the Nordic countries. However, if we only are to include manufacturing firms, our empirical base may easily prove too narrow. Manufacturing capabilities do not only evolve from current manufacturing production, but also from business in neighbouring industries. In particular, we assume the possibilities of spill-over effects to manufacturing from the extraction of non-renewable natural resources, as ore, oil and natural gas, to be of importance. Thus, in this study we pay attention to the **ISIC industries 2 and 3**.

Defining mining and manufacturing as the empirical base of our study poses another problem. The **conventional classification of industries** does not give a sufficient picture of manufacturing production. Manufacturing firms are increasingly becoming service producers (Eliasson et al., 1990), while they also decouple manufacturing services in separate units which officially are classified to belong to other industries. Hence, official statistics do not properly account for the role of internal and external service production related to manufacturing firms. There is, however, no easy way to avoid this problem.

A firm level approach poses another definitional problem, which may be labeled the boundaries of the firm (Tirole, 1988). The modern corporation is no easily definable entity. In many respects its boundaries are blurred because of several types of ownership arrangements and contract based inter-organizational relations (Ylä-Anttila and Lovio, 1990). Some consider the firm as a "nexus of treaties" (see Aoki et.al., 1990). Also here we have to make a choice, and we end up by applying the legal boundaries which define the firm as a financial entity.

These two main definitional problems arise because the traditional boundaries between firms and industries are fading away. National accounts and industrial statistics do not properly measure the industry level aggregates; and defining firms as financial entities neglects the contract-based inter-firm relations, which are of importance when the firm, is seen as a strategic decision making unit. This, however, has to be a shortage to our study, as it is to most others.

4.2 The Data Base on Large Nordic Firms

We focus on the **30 largest industrial corporations** of Denmark, Finland, Sweden and Norway. The number 30 is chosen at random. Our concern has been to select a number that is small enough to be handled efficiently while it secures a sufficient macroeconomic relevance. Our study will show whether the number of 30 large firms serve this purpose for the Nordic countries.

Further clarification is needed to operationalize what we mean by the largest Nordic industrial corporations. We define a **corporation** as a financial entity encompassing several business engagements which legally are within the control span of one ownership group. An **industrial corporation** is defined as a corporation which has more than 50% of its total employment in conventional mining and manufacturing. This means that industrial corporations may have SBUs operating in other industries, but that the majority of employment in the corporation as a whole is in industries classified as ISIC 2 or 3.

Defining **Nordic industrial corporations**, we include all firms operating in one of the Nordic countries, even though they may be owned from abroad and be part of a larger foreign corporation. In such cases, however, we only include the legal parts of the firm registered in the host country, i.e. also foreign subsidiaries which are directly subordinated to their control.

When selecting the **largest industrial corporations** Nordic country, several size measures are available. As value creation is our main concern when studying industrial and economic development, information on value added would be a quite natural ranking criterion. Value added data is, however, hard to come by at the firm level. The most frequently reported size measures are sales and employment. As we expect employment figures to be the ones that correlate most strongly with value added, we have chosen it to be our ranking criterion. We have then considered world-wide employment of the corporations rather than employment which they have in their countries of origin. Either way, the sample of corporations would have been more or less the same. Only the rank order is to some extent affected.

The number of variables on which we have sought corporate data, is quite limited. We have sought information on sales, employment, R&D, profits and foreign operations (sales and employment) as well as on value added and on the founding year of the firm. At this stage, the priority has been given to foreign operations, in particular regarding sales and employment, and our data coverage is fairly good in this respect. However, also for these variables as for the others, there are variations in the coverage over time and between countries. Appendix 1 presents the list of variables and information on the number of corporations from which we have data.

4.3 Problems Regarding the Data Base

It is a fact that corporations continuously are subject to change. When constructing a data base on specific firms, the extent of mergers and acquisitions may cause some trouble. Our basic idea has been that we keep the acquiring corporation in our data base, and regard it as expanding through external growth. The acquired corporation or SBU becomes part of the acquiring financial entity. If the acquired unit is a corporation, it stops to exist as a separate entity at the corporate level. In some cases, however, it is difficult to say which of the two merging corporations that actually should

be considered as staying on as a financial entity. Then we have had to rely on our own discretion. There is no reason to believe that this causes major problems in analyzing our data.

There are, however, three matters to be aware of when interpreting the data which is used in this report. The first concerns consistency within the data. As there are no systematically collected public data on corporations in any of the Nordic countries, we have had to collect them from different sources: mainly from annual reports and directly from the management of the corporations. This means that we base our information on the consolidation principles which the corporations apply. These may vary between corporations, and they have to some extent been changed for the same firm during the period covered by this study. Thus, accepting the consolidation principles of the corporations, we are aware of problems that may arise when interpreting development patterns which the data reveal. We think, however, that these problems are of minor importance in our study.

The second matter concerns the industry aggregates which are used to compare growth patterns at the corporate and national level for the different countries, and to calculate the share of the largest corporations in domestic mining and manufacturing. We make use of National Accounts, which causes a problem as service production is included in the corporate figures, while excluded for those at the aggregate level. We take account of that in our discussion.

Finally, the sampling of corporations may cause some problems when the data is used to analyze changes in the ways business is conducted. The 30 largest corporations in the data base are selected for every year between 1974 and 1990. Thus, our sample varies from one year to another, while panel data would be preferable when analyzing industrial transformation.

As the largest corporations one year tend to be among the largest also in later years, we do to some extent have panel data. The number of corporations which can serve as a panel for all of this period is on the other hand fairly low, i.e. less than 20 in each country.

Establishing panel data is, however, more complicated than to just include the apparently same corporations over the period considered. A corporation changes over time as it invests to take the advantage of changing business opportunities, through mergers and acquisitions, and by divestitures. Only the corporation's name may remain a constant. Thus, to establish true panel data we not only need to collect information for the years a corporation does not qualify to be among the 30 largest; in some sense we also have to consolidate its business engagements over time.

However, for practical purposes we do not expect it makes much difference to illustrate current trends in business development on the basis of the then largest industrial corporations in a country, rather than to examine these trends on the basis of a panel sample selected among the largest corporations. At least this is what we can expect because of the persistence of large firms, which is documented in Chapter 5. This is also confirmed when comparing the trends envisaged by our samples with results from our preliminary attempts to construct panel data from our data base.

4.4 The Largest Corporations of the Nordic Countries

Applying the selection criteria as previously discussed, the 30 largest industrial corporations of each of the Nordic countries are those listed in Table 4.1. Just glimpsing at the figures, it is evident that the largest of the Swedish corporations are rather huge compared to the largest of the other Nordic countries. None of the Danish corporations in 1990 is as large as any of the 10 largest of Sweden, and only 1 of the largest in

Finland (NOKIA) and in Norway (NORSK HYDRO) would have made the Top-10 in Sweden according to employment.

However, by Nordic standards also the largest Finnish corporations are rather huge. Actually, the smallest of the 30 Finnish corporations making this list, is larger than the similar Swedish corporation according to employment. Further, both No. 30 in Finland and in Sweden, would have ranked quite high both in Denmark and Norway.

Table 4.1 The largest Nordic industrial corporations by country, 1990.

Corporation	Employees	Corporation	Employees
<u>Denmark</u>		<u>Finland</u>	
SOPHUS BERENDSEN	14600	NOKIA	37336
DANFOSS	13910	RAUMA-REPOLA	20724
DANISCO	12744	KONE	20120
CARLSERG	12192	VALMET	17955
F.L.SMIDTH	10937	KYMMENE	17943
NOVO	8742	OUTOKUMPU	17494
GRUNDFOS	7179	METRA	16901
NKT	6979	ENSO	15974
ROCKWOOL	5566	KEMIRA	15256
MD FOODS	5501	PARTEK	14762
SKANDINAVISK HOLD.	5289	YHTYNEET PAPER.	13434
TULIP	4588	AHLSTRÖM	13324
LEGO	4221	ASKO	13218
ABB DENMARK	4220	FAZER	13204
SUPERFOS	4115	METSÄ-SERLA	13049
J. VILLADSENS FABR.	3820	TAMPELLA	12265
SADOLIN & HOLMBLAD	3298	NESTE	11707
BANG & OLUFSEN	3200	HUHTAMÄKI	10431
INCENTIVE	3068	RAUTARUUKKI	10124
AARHUS OLIEFABRIK	2729	WÄRTSILÄ	9740
GUTENBERGHUS	2616	STRÖMBERG	8339
AALBORG PORTLAND	2585	AMER	8218
V KANN RASMUSSEN	2516	ORION	6124
STEFF HOULBERG	2399	SANOMA	5545
LÖVENS KEMISKE	2394	SUOMEN SOKERI	5317
ELECTROLUX DK	2334	LASSILA-TIKANOJA	5016
B W DIESEL	2279	VEITSILUOTO	4886
ODENSE STAALVALSE	2238	TAMPEREEN KIRJAP.	4556
BERLINGSKE	2170	HACKMAN	4406
DANYARD	2046	MASA YARDS	3934

<u>Norway</u>		<u>Sweden</u>	
NORSK HYDRO	33042	ASEA	215154
STATOIL	13222	ELECTROLUX	150892
ELEKTRISK BUREAU	12979	VOLVO	72213
KVÆRNER	12774	ERICSSON	66138
AKER	12461	SKF	49305
NORA	7727	PROCORDIA	45193
ELKEM	7454	STORA KOPPARBERG	36416
DYNO	7273	SKANSKA	31746
NORSKE SKOG	6465	SCA	30139
ORKLA-BORREGAARD	6317	SAAB SCANIA	29388
FREIA-MARABOU	5476	NOBEL INDUSTRIER	26654
SIEMENS	3085	SANDVIK	26373
ALCATEL STK	3085	NORDSTJERNAN	23178
RIEBER & SØN	2883	TRELLEBORGS	21939
NORSK JERNHOLDING	2810	ATLAS COPCO	21507
RAUFOSS	2777	ALFA LAVAL	20809
ULSTEIN	2758	ESSELTE	19545
HAFSLUND NYCOMED	2735	INCENTIVE	16525
PHILLIPS PETROLEUM	2712	AGA	14559
NORSK DATA	2579	MODO	12961
MOELVEN INDUSTRIER	2550	EUROC	9207
JOTUNGRUPPEN	2375	ASTRA	8846
APOTEKERNES LAB.	2340	ESAB	8279
TIEDEMANN'S	2323	BAHCO	7806
M.PETTERSON & SØN	2288	ASSI	7633
NORSK FORSVARST.	1845	PERSTORP	7374
MUSTAD INDUSTRIER	1610	PLM	6342
ESSO NORGE	1272	SKÅNE GRIPEN	4810
KVERNELAND	1228	NCB	4727
NORSKE SHELL	1121	SÖDRA SKOGSÄGARNA	3285

Source: The large firm data base of the Nordic Perspective Group

The large Swedish corporations are dominated by ASEA, which we have regarded as Swedish while it actually is Swedish-Swiss, and ELECTROLUX. Similarly NORSK HYDRO stands out in Norway and NOKIA in Finland. However, if size had been measured by value added or sales rather than employment, the Norwegian picture would, due to the high value of oil, have been dominated by 2 corporations: Statoil and Norsk Hydro. In Denmark no corporation stands out in a similar way relative to the others in the group of the 30 largest in 1990.

The largest corporations also differ between the Nordic countries as to industries in which they operate. In Table 4.2 the large firms are classified according to industry. However, most of the firms are operating in several industries which the table does not reveal. Nevertheless, the differences between the firms resemble the differences in the industrial base between the Nordic countries as described in Chapter 2.

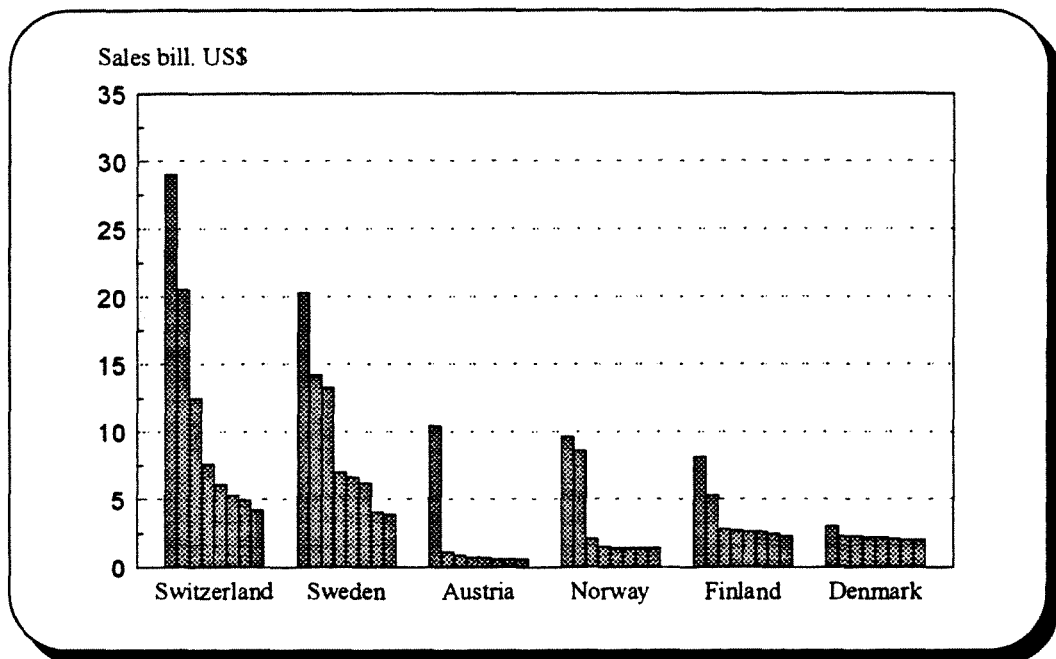
Table 4.2 The 30 largest corporations by industries, 1990

Industry	Denmark	Finland	Norway	Sweden
Oil and mining	-	-	4	-
Food stuff	5	2	3	1
Textile and clothing	-	1	-	-
Wood and paper	1	5	3	6
Chemicals	8	2	4	4
Non-metallic mineral products	2	2	-	2
Basic metals	-	2		1
Engineering and metal products	9	11	11	12
Other industries and multibranch companies	5	5	3	4
Total	30	30	30	30

4.5 Large Nordic Corporations in an International Perspective

The largest of the large Swedish corporations are obviously giants compared to their Nordic counterparts. However, when compared to the largest corporations of other small countries, this relative hugeness is not so remarkable. Figure 4.1 shows the distribution of the 8 largest corporations according to sales for Switzerland and Austria in addition to the 4 Nordic countries of this study. Then the largest of the Swedish do not stand out so much as in the strictly Nordic comparisons.

Figure 4.1 The 8 largest firms in selected small countries, 1989.
Corporate sales in billion USD.



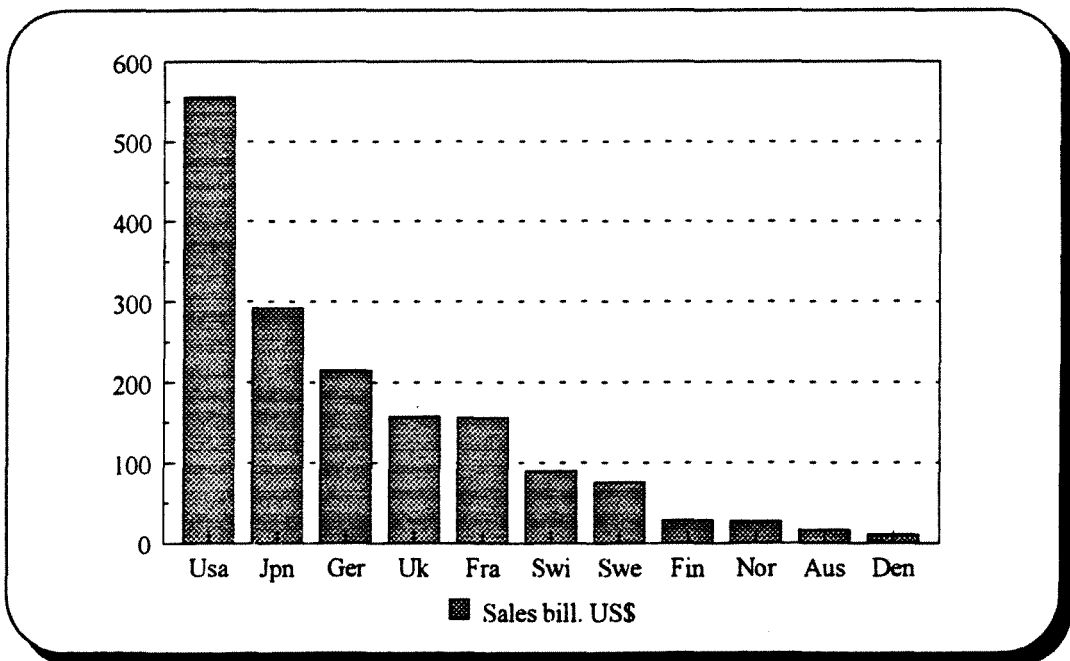
Source: Nordic Perspective Group.

The largest Swiss corporations are of the same magnitude or even somewhat larger than the largest Swedish. The interpretation depends to some extent on how ASEA (ABB) is classified. In Figure 4.1 it is included both as a Swedish and a Swiss corporation, due to the 50/50 ownership structure between these countries. However, the

Swedish and the Swiss corporations in this figure are in general much larger than the largest of the other countries. Actually, with the exception of the state-owned holding company AUSTRIAN INDUSTRIES, the largest Austrian corporations are smaller than the similar ones in Denmark, Finland and Norway (cfr. Siegel, 1991).

When comparing the largest Nordic corporations with those of large countries, the picture is different. Then the magnitude of even the largest Swedish corporations turns out as rather modest, while the other Nordic corporations appear quite dwarfish. This is evident from Figure 4.2. Here figures on corporate sales are added together for the 8 largest industrial corporations of different countries. Accumulated sales of the 8 largest Swedish corporations were about 80 billion USD in 1989, while for the corporations of the other Nordic countries 30 billion USD or less. The similar figure for the 8 largest US corporations was 540 billion USD, and 300 and 220 billion USD for the eight largest Japanese and Germany respectively.

Figure 4.2: Accumulated sales of the 8 largest corporations in selected countries, 1989. Billion USD.



Source: Nordic Perspective Group

We shall not go deeper into the question of international size differences among firms from different countries. Of course, the relevance of applying sales figures to rank and compare corporations may be questioned, and differences in lines of production ought to be brought into considerations. Nevertheless, our point is simply that despite the hugeness of the largest domestic corporations on the Nordic scene, and of the Swedish in particular, these firms do not in general stand out as giants by international standards. With one or two exceptions, this even holds for the largest Swedish firms.

5. INDUSTRIAL TRANSFORMATION AND LARGE FIRM PERSISTENCE

5.1 Stability in Rankings, 1974-1990

A crucial question when considering only a sample of the largest firms is to what extent the composition of the group of the largest firms is subject to change by the industrial transformation that definitely has been going on in the Nordic area. Significant changes in the composition should indicate that industrial transformation is driven by rapid growth of new, or previously small firms, and in turn by the subsequent decline of the previous large. On the other hand, significant persistence should indicate that the large firms prove rather efficient in adopting to changes in their business environment, and that they consequently represent a major force in the continuously ongoing transformation.

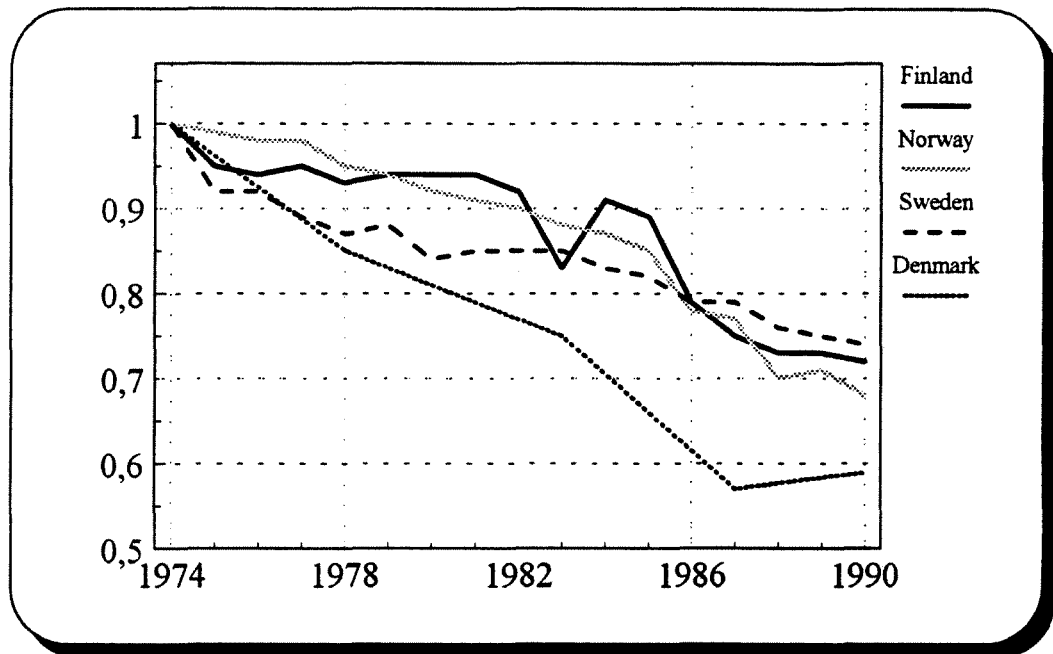
We employ basically two methods in answering the questions above: changes in rank correlations within the group of top 30 companies and the number of exits and entries in the group. It has to be noted that when making the stability analysis on the basis of Spearman rank correlation coefficients, we employ information on all the firms which appear among the 30 largest in any of the years 1974-1990. Altogether this is about 50 companies from each country. The companies in this sample which do not qualify for the top 30 in a certain year, are that year ranked as 31 (for the required adjustments to correlation analysis, see Ruefli and Wilson, 1984 and 1987, Thomsen, 1992).

The stability figures display the rank correlations between the starting year (1974) and the subsequent years. They have been calculated on the ranking of firms according to employment, and on their ranking according to sales. For Finland, Norway and Sweden we have annual observations; for Denmark we have observations for 1974, 1978, 1983, 1987 and 1990.

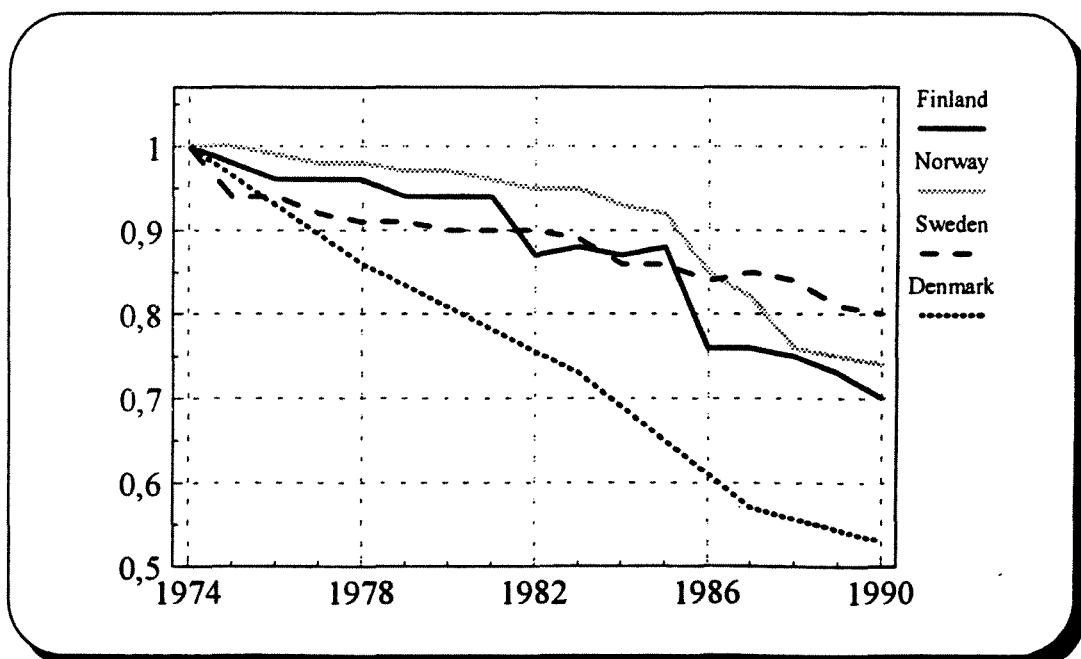
The persistence analysis based on Spearman rank correlation coefficients is summarised in Figure 5.1 according to employment and sales respectively, and for each country in Figure 5.2.

Figure 5.1 Rank stability for the largest industrial corporations in the Nordic countries, 1974 - 1990. Spearman rank correlation coefficients.

Employment

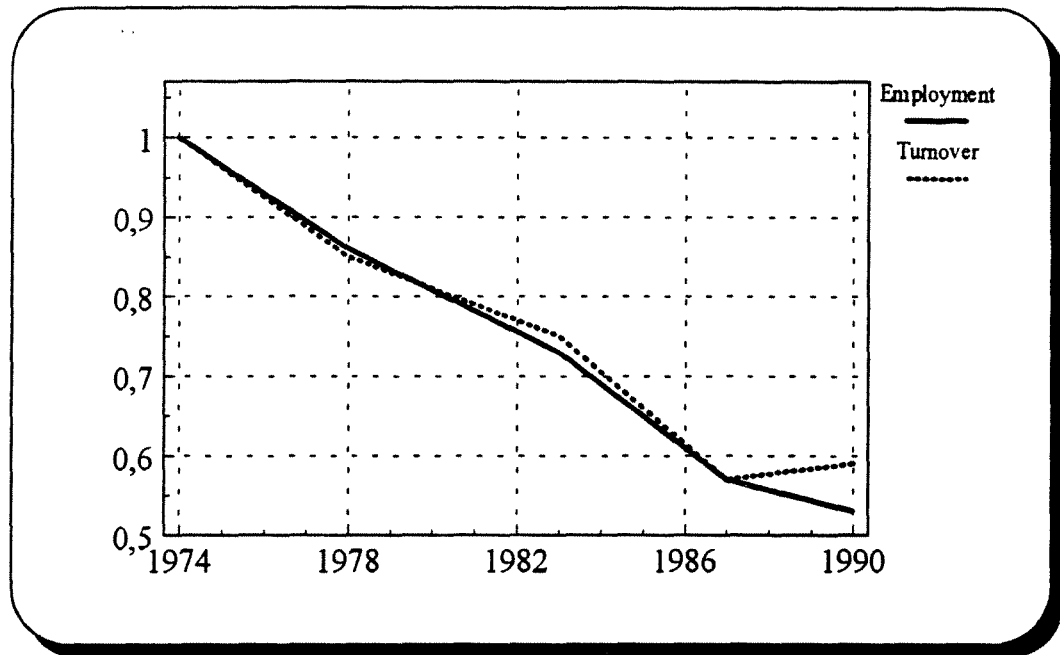


Sales



5.2 Rank stability for the largest industrial corporations by country, 1974-90.
Spearman rank correlation coefficients.

Denmark



Finland

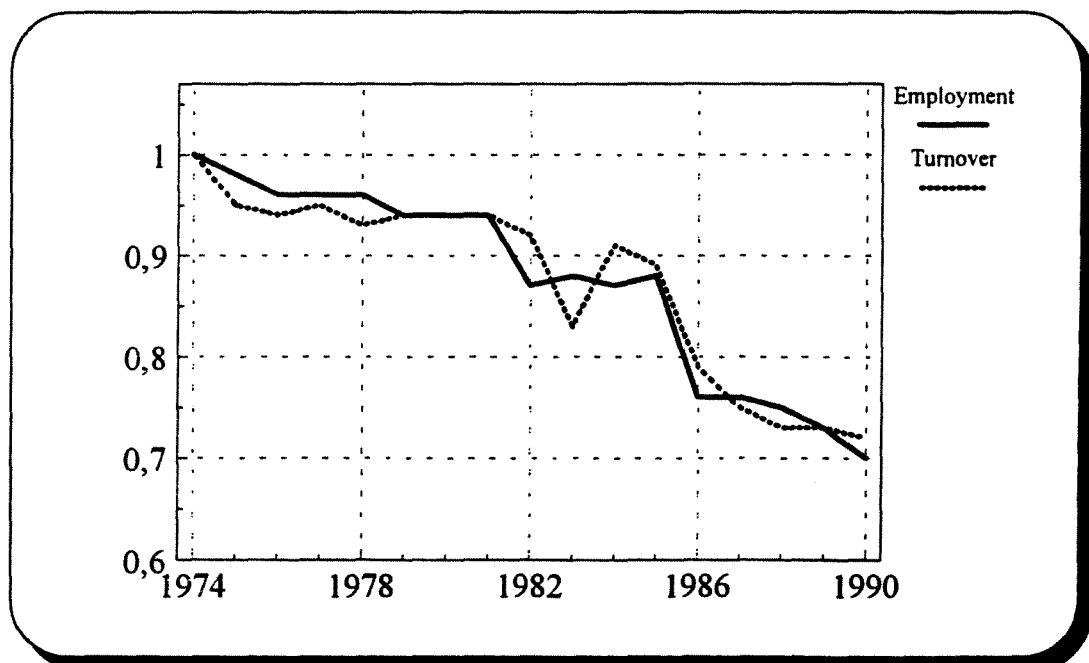
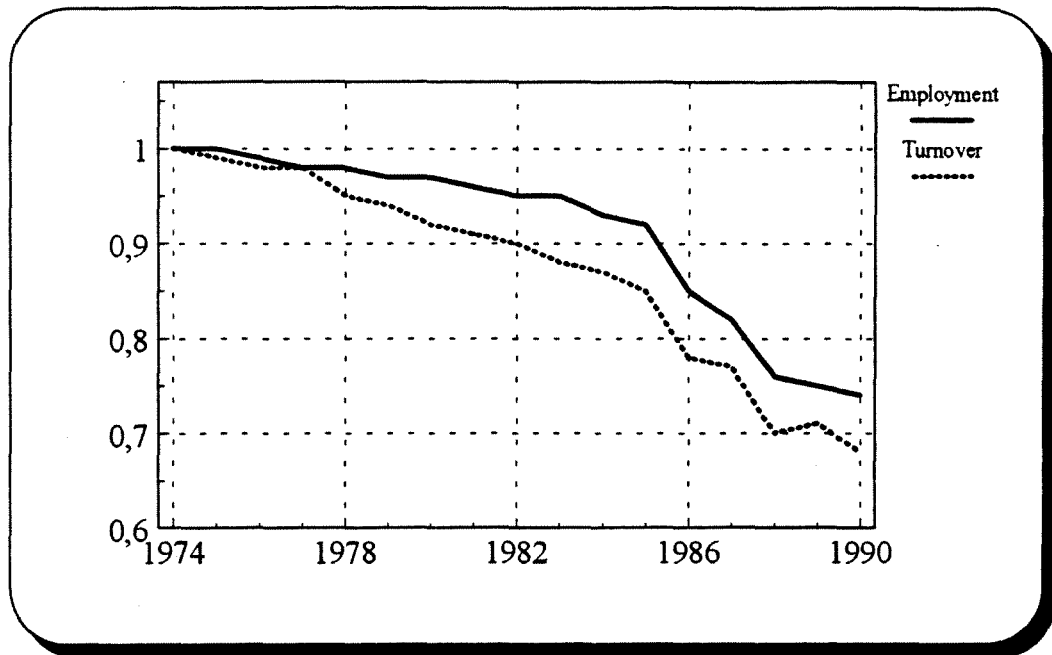
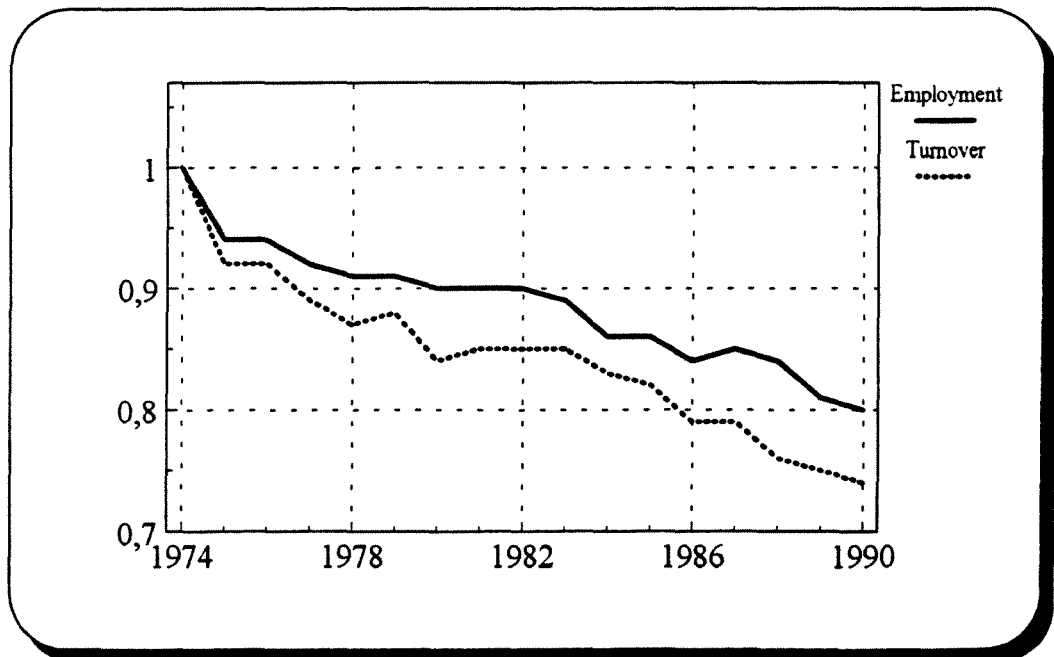


Figure 5.2 continues

Norway



Sweden



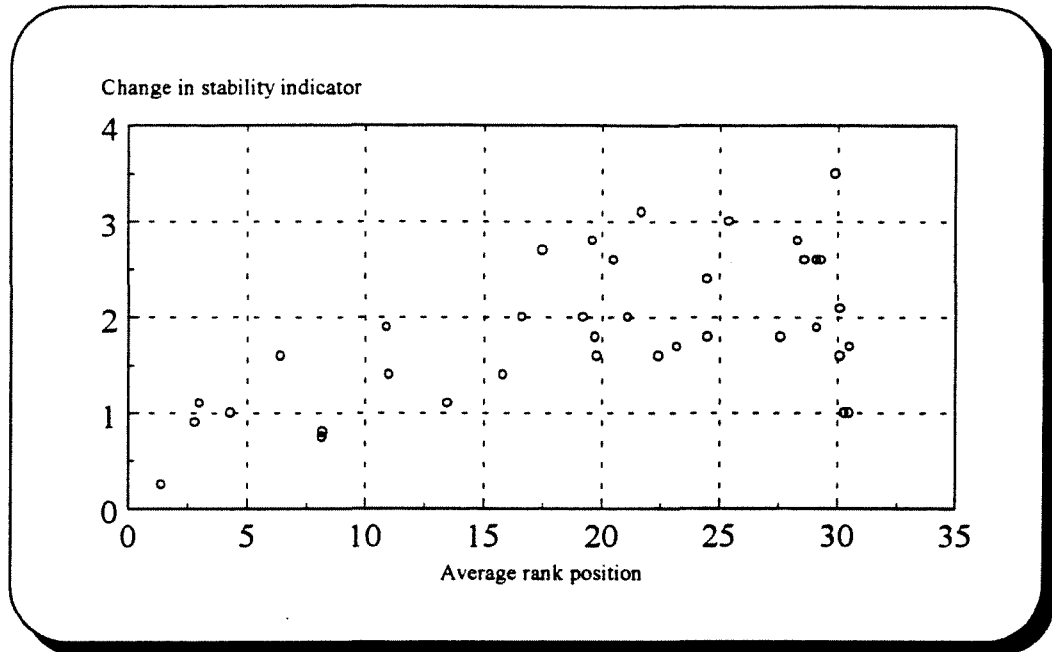
Source: The large firm data base of the Nordic Perspective Group

The first conclusion is that the size structures are rather stable in all countries, in particular over the first ten years under consideration. There are, however, some interesting differences between the countries. The group of Swedish companies is showing the highest stability and the Danish group the lowest among the four. The ranking of the Swedish and Norwegian firms is more stable according to employment than sales, whereas in Denmark it seems to have been the other way round. The group of Finnish firms, in turn, is showing more or less similar changes in rankings based either on employment or sales.

Without further information it is impossible to conclude on the reasons for these differences. We may, however, look into the question of whether the largest firms in this sample - i.e. those ranking highest in the group of leading companies - tend to be more stable in their rank positions than the smaller ones. This issue is considered for the large firms of Finland, Norway and Sweden in Figure 5.3. We do not have a sufficient number of observations to do this properly for the large Danish firms. The indicator of firm-specific stability is calculated simply as an average of changes in rank positions over the period 1974 to 1990. The higher it measures, the more unstable has the rank position been. This is plotted along the vertical axis, while the average rank position of the firm over this period is plotted along the horizontal axis.

**Figure 5.3 Stability in rank position vs. company size among large firms.
Ranking according to employment.**

Finland



Norway

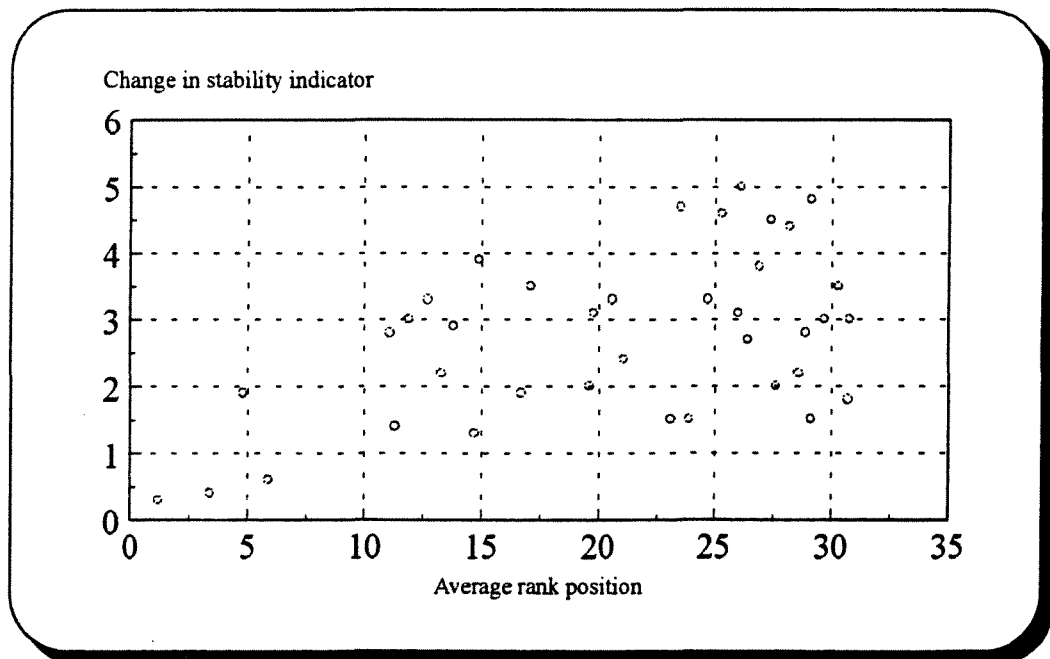
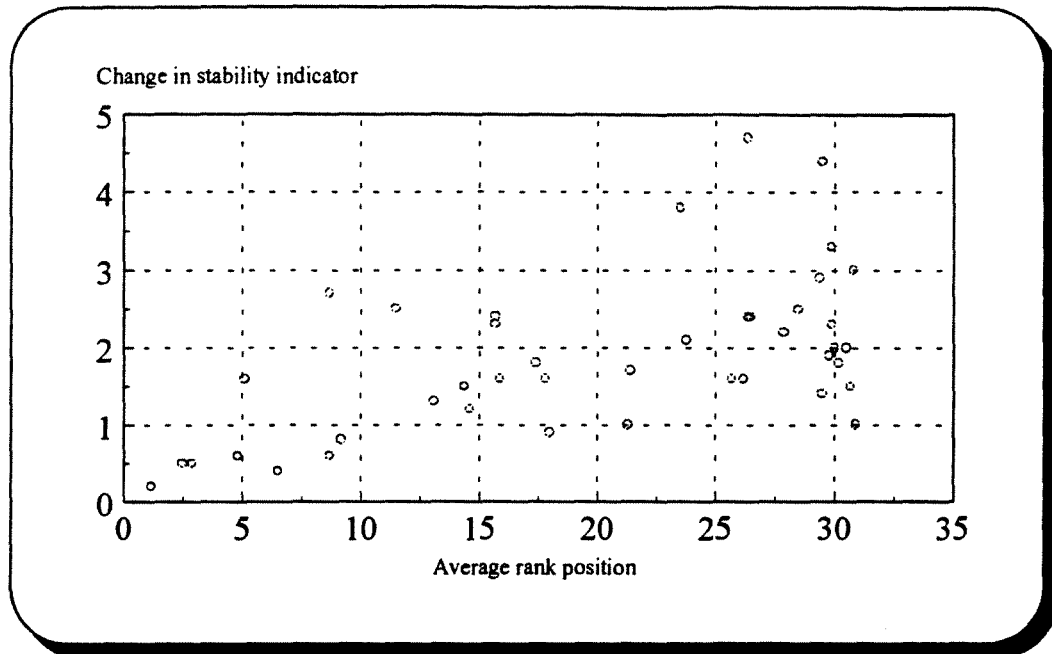


Figure 5.3 continues

Sweden



Source: The large firm data base of the Nordic Perspective Group

The message from the figure is quite clear: The bigger the firm, the more likely it is to keep its (high) rank position. This holds for all the countries. The correlation is very clear and statistically significant. It should, however, be noted that the size differences between firms are the larger the larger the firms are. Thus, a certain percentage change in the employment of firms causes greater rank variation among the smaller firms in the sample than among the largest. The observed relation between size and rank stability is in other words rather self evident.

Another way of considering the persistence of large firms, is to examine the frequency of exits, or new entries, regarding the group of the 30 largest. This is done in Table 5.1, showing that on the average there are about two exits per year in each country in the period under consideration. This shows, again, a high stability among firms holding the leading positions.

Exits/entries have, however, increased during the latter half of the 1980s. That concerns in particular Norway, where the number of exiting firms per year in the latter

half of the 1980s is twice as high as in preceding decade. Also in Sweden the number of exits has increased significantly. As there are hardly any corporation disappearing from the groups of the largest due to bankruptcy, these differences between subperiods can mainly be explained by the rise in mergers and acquisitions among the largest firms which took place throughout the 1980s. If exits due to mergers and take-overs are excluded, there are no major differences, neither between subperiods nor across countries. The average number of exits due to relatively slower growth of previously large firms is approximately one per year for each country over the whole period from 1974 to 1990.

These findings regarding large firms are in line with some previous studies. Data from the US industry shows that the average number of exits from the group of 100 largest companies has been about 3 during the same period from the mid-1970s to late 1980s (see Scherer and Ross, 1990).

In the standard industrial organization literature the high stability of leading firms' positions is usually interpreted to indicate lack of dynamic competition. In the case of the open Nordic economies, however, we are cautious to draw this conclusion. Most of the leading companies are competing outside the national borders in very different types of markets. If anything, one can conclude that no major changes have taken place in terms of dynamic competition in the groups of leading Nordic companies over the period from the mid-1970s to 1990.

Table 5.1 Exits from the groups of the 30 largest corporations by country, 1974 - 1990. Firms ranked according employment.

Year	Denmark		Finland		Norway		Sweden	
	A	B	A	B	A	B	A	B
1975	-	-	1	0	2	0	2	0
1976	-	-	0	0	2	0	1	0
1977	-	-	1	0	1	0	2	0
1978	6	0	2	0	4	1	3	0
1979	-	-	1	0	2	0	1	1
1980	-	-	0	0	1	0	1	1
1981	-	-	1	0	2	2	2	0
1982	-	-	4	0	1	1	1	1
1983	5	0	3	0	2	0	0	0
1984	-	-	1	0	1	1	3	2
1985	-	-	1	0	4	1	1	1
1986	-	-	2	0	5	3	5	1
1987	7	1	3	0	4	4	5	4
1988	-	-	1	0	5	4	2	0
1989	-	-	1	0	4	3	2	2
1990	6	2	2	0	2	2	1	1
AVERAGE								
75-90	1,5	0,2	1,5	0	2,6	1,4	2	0,9
75-84	-	-	1,4	0	1,8	0,5	1,6	0,5
85-90	-	-	1,6	0	4	2,8	2,7	1,5

A = All firms

B = Firms leaving the group due to bankruptcy or merger

Source : The large firm data base of the Nordic Perspective Group

5.2 Persistence of Large Firms in a 50-Year Perspective

The 15-years perspective certainly reveals changes in all the Nordic countries regarding the composition of firms that qualify for the group of the 30 largest. However, the group of the largest in 1990 is by no means completely different from the similar group in the mid-1970s. A significant number of the largest in the beginning of this period is also among the largest of today.

A period of 15 years is, however, rather short when considering how the basis for deeply rooted organizations, like large corporations, usually change. The existence of firms are based on organizing human capital, industrial competence, real assets and financial resources, which all may be applied for different business opportunities. This means that a firm may continue to exist while the businesses in which it is engaged, may change. Or, at least, the ways it operates its businesses are changed in order for the firm to stay competitive.

Large firms can usually refer to a long industrial history. This may be illustrated by considering the age of the largest industrial corporations in 1990, or what we have called their founding year. In our interpretation, however, the founding year does not refer to the year in which a corporation was legally established in its present form. A merger, for instance, means in some sense the legal establishment of a new corporation without necessarily liquidating the businesses in which the merging partners were involved. Thus, we consider the founding year to be the year of establishment for the oldest business unit from which the business engagements of the present corporation directly have evolved.

As we have left the problems of operationalizing this rather unclear definition to the discretion of the project participants from each country, our information on this matter ought to be interpreted with some caution. Nevertheless, it is rather obvious from Table 5.3 that the operations of the largest Nordic corporations generally can be traced long back in time. Only in rare cases are they based on a business that first was established over the previous 25 years. This is the case for all Nordic countries. It is further

a common feature for the 30 largest corporations of all the countries that only some 20-30% has evolved from a business unit which was not well established at least 50 years ago. Actually, in all countries a significant number of the 30 largest corporations of today seems to have a history of at least 100 years.

Table 5.3 Founding year for the oldest business within the largest Nordic industrial corporations of 1990. Number of corporations

Founding Year	Denmark	Finland	Norway	Sweden
1965-1990	5	2	3	2
1940-1964	4	4	3	5
1915-1939	7	10	3	7
1890-1914	4	4	11	11
-1889	10	10	11	5

Source: The large firm data base of the Nordic Perspective Group

The history of the largest corporations illustrates the long-term character of business development. Furthermore, it underlines the prerequisite of continuity in industrial transformation: New businesses evolve from the current industrial base. Only rarely does something distinctly new emerge. Except for the discovery of unknown natural resources, as happened in Norway with oil and gas in the early 1970s, nothing comes out of the blue.

The continuity which characterizes industrial transformation, does not imply that the largest corporations of today were the largest in previous periods. Smaller firms may have grown and surpassed those which were the largest in the earlier days. Despite relatively high rank stability discussed in the previous section, the introduction of new firms into this sample of large is also part of the story. It ought to be even more so if a longer time perspective is applied.

This we will consider by comparing the largest corporations of the period prior to World War II, as they are presented in Table 5.4, with the largest of today (cf. Table 4.1). The ranking of the largest more than half a century ago is for Denmark from 1938, and it is based on Thomsen (1992); also for Finland it is from 1938, based on Ripatti, Vartia and Ylä-Anttila (1989); for Norway it is for 1936, based on Walderhaug (1992); and for Sweden it is from a decade earlier, for 1925, based on Jagrén (1988).

Table 5.4: Largest industrial corporations of the Nordic countries, pre-WWII.

Denmark, 1938.

STORE NORDISKE TELEGRAFSKAP
 DE DANSKE SUKKERFABRIKKER
 DE FORENEDE BRYGGERIER
 NORDISK KABEL OG TRAAD
 BURMEISTER & WAIN

ÅLBORG PORTLAND
 DE FORENEDE PAPIRFABRIKKER
 AARHUS OLIEFABRIK
 SUPERFOS
 F.L. SMIDTH & Co

CARL ALLER
 DE DANSKE SPRITFABRIKKER
 DANSK CICORIE
 NORDISK FJER
 HELSINGØR SKIBS- OG MASKINBYGGERI
 KRYOLITH MINE OG HANDEL
 FISKER & NIELSEN
 GYLDENDAL
 GLUD & MARSTRANDS FABRIKER
 BALLIN & HERTZ

STJERNEN
 TITAN
 KASTRUP GLASVÆRK
 HENRIQUES & LØVGREN TRIKOTAGE
 DANSK MEDICINAL- OG KEMI
 KØBENHAVNS BRØDFABRIK
 KONGELIG PORCELLAIN
 VØLUND
 LAURIDS KNUDSEN
 BRANDTS KLÆDEFABRIK

Finland, 1938.

ENSO-GUTZEIT
 WÄRTSILÄ
 A. AHLSTRÖM
 FINLAYSON-FORSSA
 TAMPEREEN PELLAVA- ja
 RAUTATEOLLISUUS
 KYMIN
 VALTIONRAUTATEIDEN KONEP.
 W. ROSENLEW & Co.
 WILH. SCHAUMAN
 SUOMEN GUMMITEHDAS

PORIN PUUVILLA
 SUOMEN TRIKOOTTEHDAS
 YHDISTYNEET VILLATEHTAAT
 YHTYNEET PAPERITEHTAAT
 KAUKAS
 ARABIA
 SOK:n TEOLLISUUSLAITOKSET
 PARAISTEN KALKKIVUORI
 VAASAN PUUVILLA
 KEMI

HACKMAN & Co.
 RAUMA
 SUOMEN SOKERI
 OTK:n TEOLLISUUSLAITOKSET
 STRÖMBERG
 JOHN BARKER
 OULU
 VUOKSENNISKA
 VEITSILUOTO
 H:gin KAUPUNGIN TEOLLISUUS-
 LAITOKSET

Norway, 1936

BORREGAARD
 O. MUSTAD & SØN
 NORSK HYDRO
 UNION
 FREIA CHOCOLADEFABRIKK
 ASKIM GUMMIVAREFABRIKK
 CHR. BJELLAND & Co.
 AKERS MEK. VERKSTED
 ORKLA GRUBE
 SAUGBRUKSFORENINGEN

SYDVARANGER
 CHRISTIANIA SPIGERVERK
 CHRISTIANIA GLASMAGASIN
 FREDRIKSTAD MEK. VERKSTED
 SULITJELMA GRUBE
 ELEKTRISK BUREAU
 DE FORENEDE ULDVAREFABRIKKER
 NORSK ALUMINIUM COMPANY
 NYLANDS VERKSTED
 NYDALENS COMPAGNIE

ELECTRIC FURNACE PRODUCTS Co.
 NORSK ELEKTRISK & BROWN BOVERI
 STRØMMENS VERKSTED
 DET NORSKE ZINKKOMPANI
 RAUFOSS AMMUNISJONSFABRIKKER
 DALE FABRIKKER
 THUNES MEK. VERKSTED
 TOFTE CELLULOSEFABRIKK
 ARNE FABRIKKER
 KONGSBERG VÅPENFABRIKK

Sweden, 1925

ASEA
 STORA KOPPARBERG
 SWEDISH MATCH
 GRÄNGES/LKAB
 SKF
 SOCKERBOLAGET
 UDDEHOLM
 HÖGANÄS-BILLESOLM
 TOBAKSMONOPOLET
 ERICSSON

YTTERSTFORS-MUNKSUND
 HOLMENS BRUK
 HUSQVARNA VAPENFABRIK
 GIMO-ÖSTERBY BRUK
 SANDVIK

Sources: Thomsen (1992), Ripatti, Vartia and Ylä-Anttila (1989) and Hjerpe (1979), Walderhaug (1992), Jagrén (1988).

Several of the names on this pre-WWII list are easily recognized when considering the names of the largest corporations in 1990. Thus, it is by no means so that the corporations in the group of largest in a country, is completely replaced by other corporations over a period of more than 50 years.

Actually, when we examine the current situation of the largest firms from the pre-WWII period, a great number can be traced to the largest firms of today. This is summarized for the 30 largest of Denmark, Finland and Norway in the latter half of the 1930s in Table 5.5.

Table 5.5 Current situation of industrial corporations that were largest in the late 1930s. Denmark, Finland and Norway.

	Denmark	Finland	Norway
Among the 30 largest of 1990 as an independent corporation	9	14	8
Merged to be part of one of the 30 largest corporations of 1990	5	6	11
Still in business	9	4	10
Closed down	7	6	1

Source: The large firm data base of the Nordic Perspective Group

Obviously large firms seem to be rather persistent. In Finland and Norway roughly two thirds of the 30 largest corporations in the late 1930s are represented within the group of the 30 largest in 1990. In Denmark this is the case for almost half. Less than one fourth of the 30 largest firms from the late 1930s are completely closed down. In Norway this concerns only one of the whole group of 30.

The persistence among large firms from the late 1930s is even more evident when considering the largest of the large: 8 of the 10 largest in Denmark are found among the 30 largest also in 1990, of which 4 still are independent corporations; in Finland it is 9 of the 10, and 6 as independent; and in Norway it is 7 of the 10, and 5 as independent. Of the 10 largest from Sweden in the mid-1920s, 7 are among the 30 largest in 1990, and of these 4 are still independent.

Thus, it seems fair to summarize that there is a noteworthy persistence within the group of the largest industrial corporations in all Nordic countries. Of the largest in 1990, some are almost a one-to-one extension of one of the largest more than 50 years ago; some represent restructured constellations involving one or more of the largest at that time; others are new to the scene of the largest. However, only rarely these are "newcomers" directly based on business units that were not in operation 50 years ago. Similarly, only a few of the largest half a century ago can be classified as completely out of business today, even though their lines of production may have changed.

These findings clearly indicate that the largest industrial corporations at any point in time must be playing an important role in the renewal and restructuring of industrial activities on the Nordic scene. This does not mean that they are the innovators, nor that the operations of small and mediumsized firms are of no significance. What it means is that a significant share of the largest, at one time or another, seems to engage successfully in the process of industrial transformation. This involvement, however, may either be based on innovations and creativity originating in each of the large corporations, or it may be based on what others actually have initiated.

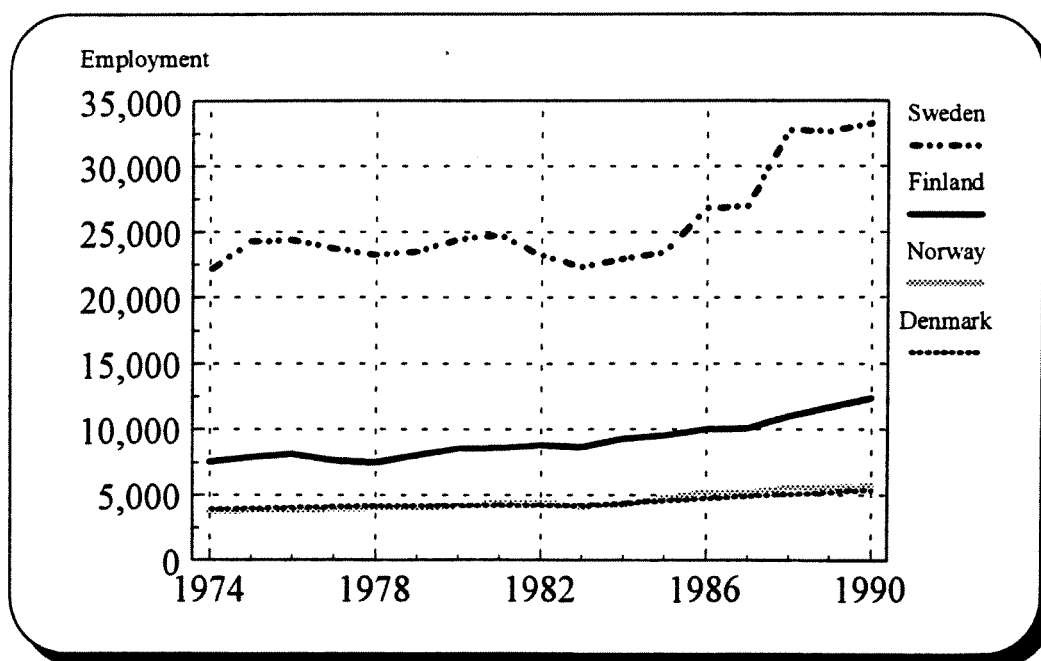
6. THE GROWTH AND TRANSFORMATION OF LARGE NORDIC FIRMS

6.1 Corporate Growth

The fact that the largest Nordic industrial corporations are rather small by international standards has led us to expect an overall growth in the operations of Nordic firms at the corporate level. The argument is untapped economies of scale, and that such growth will make the single businesses of the corporations less vulnerable to the demands put on them regarding internationalization and intangible investments.

The simplest data to use to measure corporate growth is to consider changes in corporate employment. Figure 6.1 shows the average world-wide employment of the 30 largest corporations of each of the four Nordic countries in the 1974-1990 period. For Finland, Norway and Sweden we have annual observations; for Denmark the observations concern 1974, 1978, 1983 and 1990.

Figure 6.1 Average employment in the group of 30 largest industrial corporations of Denmark, Finland, Norway and Sweden, 1974-1990



Source: The large firm data base of the Nordic Perspective Group.

The figure reveals the size differences among large corporations from different Nordic countries as discussed in Chapter 4, with the Swedish firms as the definitely largest and also the Finnish firms as much larger than the largest of Denmark and Norway. From table 6.1 we see that the 30 largest Swedish corporations in 1990 taken together have almost one million employees. Comparing this to the 370.000 employees in the 30 Finnish, the 170.000 in the 30 Norwegian and the 160.000 in the 30 Danish, the 30 largest Swedish corporations on the average are 2.7 times as large as the largest Finnish, and approximately 6 times the largest of Norway and Denmark. Even if only the Swedish-based parts of ASEA were included in the sample, these differences would hold true but not to the same extent. Total employment of the 30 largest Swedish corporations would then have been approximately one-sixth lower.

However, despite these size differences there are certain similarities in the pattern of corporate growth between the largest firms of the four countries. During the 1970s and early 1980s employment growth was rather modest among these largest corporations. Then, on the average, the group of the largest firms from all these countries grew rapidly throughout the latter half of the 1980s.

The relative magnitude of this corporate growth is more clearly seen when consulting Table 6.1, which presents employment figures for these groups of corporations in 1990 and in the mid-1970s. For the 30 largest firms from all the countries, it is obvious that employment growth has been significant. However, some differences occur regarding the relative growth of employment of these corporations. It has been of the same magnitude as far as the Danish and Swedish corporations are concerned. In Norway this growth rate has been somewhat higher on the average, while it in Finland has been the strongest. To be more specific, the employment of the 30 largest Finnish corporations in 1990 is almost 60% higher than in 1974, in Norway it is almost 50% above, while in Denmark and Sweden somewhat less than 40% higher.

Considering different groups among the 30 largest firms, it is evident that employment in the group of the 10 largest has increased significantly over the period in all

countries. In Norway employment among these largest of the large corporations has grown more than 70% since 1974, or equivalent to an annual average growth rate of 3.5%. In the other 3 countries the 1990 employment in the group of the 10 largest is some 50% higher compared to the mid-1970s. However, if only the Swedish-based operations of ASEA in 1990 were included, employment growth among the 10 largest Swedish corporations would have been less than 20%.

Table 6.2 World-wide employment of the 10 and the 30 largest Nordic industrial corporations by country of origin, 1974/75 and 1990. 1000 persons.

	Denmark		Finland		Norway		Sweden	
	1974	1990	1975	1990	1975	1990	1975	1990
10 largest	65	98	131	195	69	120	491	727
11-30 largest	52	63	105	176	45	50	236	272
30 largest	117	161	236	371	114	170	727	999

Source: The large firm data base of the Nordic Perspective Group.

With the exception of Finland, the growth in employment has been much weaker among the 20 next largest corporations on the list for all countries. Employment in this latter group of Finnish corporations has increased with almost 70% since 1974. This group of corporations from the other 3 countries reveals employment growth at the level of 10-20% over this period, with the Norwegian at the lower end of this interval. Altogether, this indicates that the largest of the large corporations has become relatively larger within the domestic business community particularly in Norway, but also in Denmark and in Sweden. This is not the case in Finland. The concentration ratio within the group of the 30 largest is the highest in Norway and Sweden.

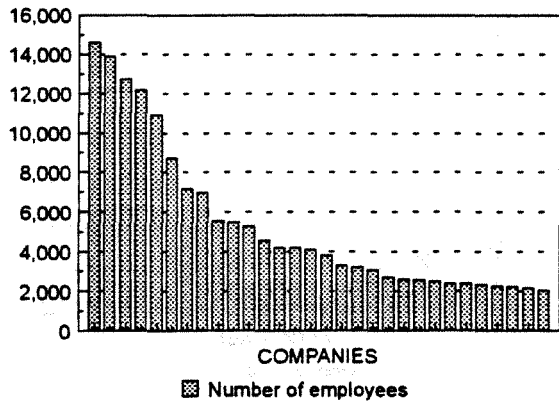
A more detailed picture on how corporate growth has affected the size distribution among the 30 largest corporations of different Nordic countries, is presented in Figure 6.2. It is evident that employment in the No.1 corporation of Norway and Finland, and in the No.1 and 2 of Sweden, has increased significantly from 1974 to 1990, whereas there is no similar growth for the highest ranked Danish corporation. Nevertheless, the size distribution within the whole group of 30 corporations is with this exception rather even in Finland, and has become increasingly so since 1974. A rather even size distribution also characterizes the 30 largest corporations of Denmark, as was the case even 15 years ago.

The country-internal size differences were most prominent among the largest corporations of Sweden in 1974, and they have been strengthened since then. Even greater size differences have formed among the largest Norwegian corporations, which now resemble the Swedish distribution. Thus, the corporate growth that has taken place since the mid-1970s, has been more broadly based among the 30 largest corporations of particularly Finland, but also of Denmark, compared to the development among the largest corporations from Norway and Sweden.

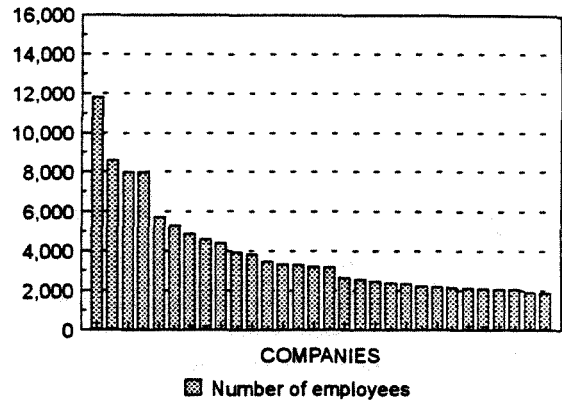
Figure 6.2: Employment in each of the 30 largest industrial corporations of Denmark, Finland, Norway and Sweden, 1990 and 1974.

Denmark

1990

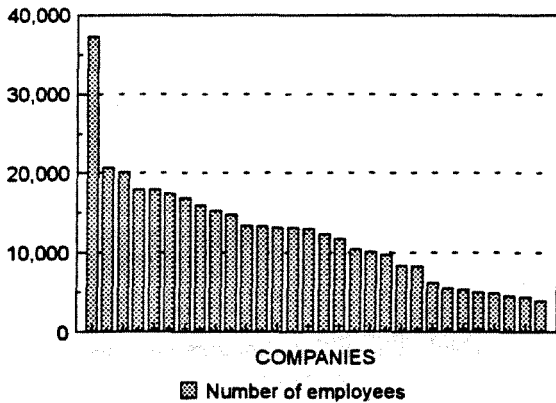


1974



Finland

1990



1974

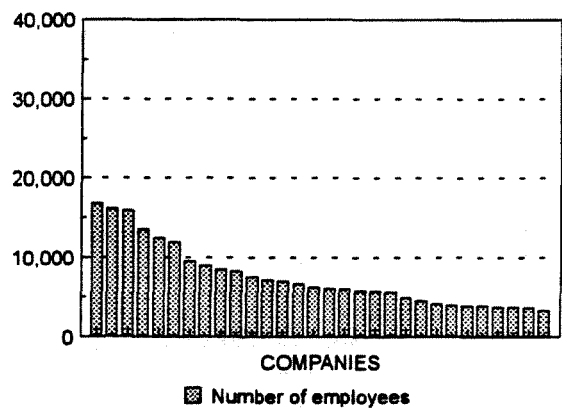
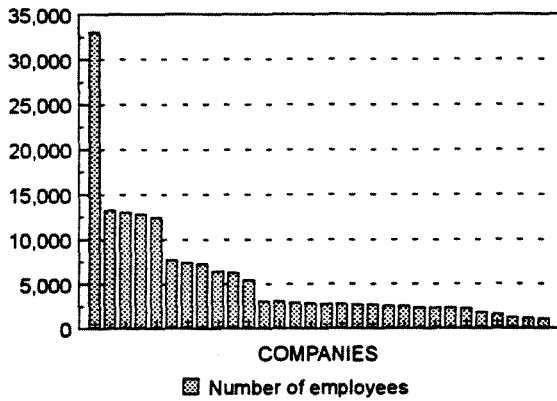


Figure 6.2 continues

Norway

1990

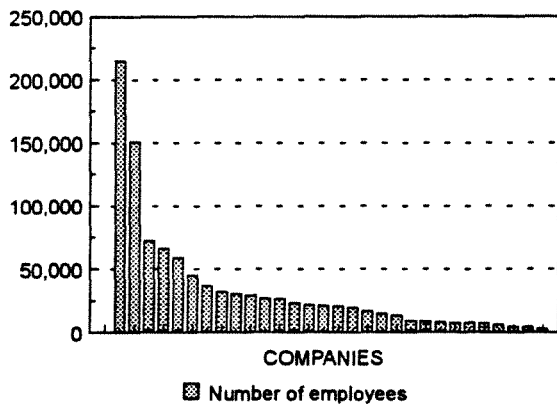


1974

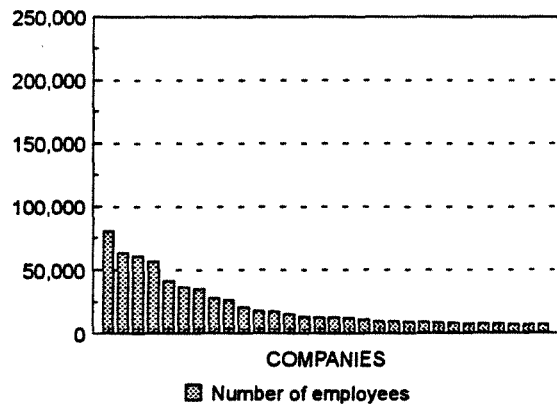


Sweden

1990



1974



Source: The large firm data base of the Nordic Perspective Group

6.2 Internationalization of Business

6.2.1 The Internationalization of the Largest Firms

The largest Swedish corporations are well-known for their world-wide activities. This is confirmed in Table 6.2, which shows that business activities abroad play a substantial role in the operations of the largest Swedish corporations: 78% of their sales are with foreign customers, and 62% of their corporate employment are outside Sweden. This is not caused by any single corporation: Even if only the Swedish originated parts of ASEA were included, foreign sales in the Swedish sample would have been at the level of 75% of corporate turn-over, and the share of corporate employment abroad would have been above 55%.

Table 6.2 The international base of the 30 largest industrial corporations by country, 1990. Foreign billing in per cent of corporate sales; employment in foreign subsidiaries in per cent of corporate employment.

	Denmark	Finland	Norway	Sweden
Foreign billing; % of corporate sales	62	69	66	78
Foreign employ- ment; % of corporate empl.	34	39	33	62

Source: The large firm data base of the Nordic Perspective Group

It is also evident that foreign operations play a more substantial role for the largest Swedish corporations than for the largest industrial corporations of the other Nordic countries. However, the international base is also quite significant when considering

the largest industrial corporations of the other Nordic countries. The 30 largest Danish, Finnish and Norwegian corporations all have on the average 60-70% of their corporate turnover abroad, and one third or more of their employment in foreign subsidiaries.

Extending the issue of international footholds among the largest Nordic industrial corporations, we may examine how widely such foreign operations are distributed within the group of the 30 largest of the different countries. Table 6.3 sheds light on this by listing to what extent the turnover of the different corporations is based on foreign sales.

Table 6.3 Foreign sales in per cent of corporate sales for the 30 largest industrial corporations by country, 1990. Number of corporations.

Country	Foreign sales in per cent of corporates sales			
	0-29%	30-49%	50-69%	70-100%
Denmark	3	4	8	15
Finland	4	4	7	15
Norway	5	6	9	10
Sweden	2	2	7	19

Source: The large firm data base of the Nordic Perspective Group

It is evident that Swedish corporations in general are more oriented towards international markets. As many as 26 of the 30 corporations have more than half of their sales revenues from abroad. However, the serving of foreign markets is also broadly

represented among the largest corporations of the other Nordic countries as well. Some 23 of the 30 largest Danish corporations have more than 50 % of their corporate turnover abroad, while this is the case in 22 of the largest Finnish firms, and in 19 of the Norwegian.

Another aspect of international footholds is foreign production. Table 6.4 classifies the corporations on the basis of the extent to which they have employees in subsidiaries abroad. Actually, as many as 26 of the 30 largest Swedish corporations have more than 30 % of their employment outside Sweden; 17 have more than half of their corporate employment abroad. The largest corporations of the other Nordic countries are more extensively based on production in their home country: The number of corporations with 70 % or more of their employment domestically is quite high in Norway, Finland and in Denmark. However, even among the 30 largest corporations of these countries there is a group of 6 to 9 firms which has more than half of their employment abroad.

Table 6.4 Employment in foreign subsidiaries in per cent of corporate employment for the 30 largest industrial corporations by country, 1990.
Number of corporations.

Country	Foreign employment in per cent of corporate employment			
	0-29%	30-49%	50-69%	70-100%
Denmark	17	7	2	4
Finland	13	8	7	2
Norway	16	8	5	1
Sweden	4	9	8	9

Source: The large firm data base of the Nordic Perspective Group

Comparing the information of the two tables, 6.3 and 6.4, it seems rather clear that the largest corporations of Denmark, Norway and Finland to a greater degree than those of Sweden, have based their international footholds on traditional exports. As far as the largest Swedish firms are concerned, foreign sales are more closely linked to foreign production than is the case of the largest firms of the other countries.

However, according to the changes in the distribution of employment between domestic and foreign establishments of these firms, foreign production is definitely becoming more important for foreign sales also with respect to the largest corporations of Finland and Norway compared to the 1970s. Table 6.5 provides data which clearly shows that the share of foreign employment is increasing relatively more than the share of foreign sales.

Table 6.5 Foreign sales and foreign employment among the 30 largest industrial corporations by country, 1974/75 and 1990.

	Denmark		Finland		Norway		Sweden	
	1974	1990	1974	1990	1975	1990	1975	1990
Foreign sales, % of corporate turnover	-	62	41	69	49	66	66	78
Employment abroad, % of corporate employment	-	34	< 10	39	6	33	37	62

Source: The large firm data base of the Nordic Perspective Group

These changes regarding traditional exports vs. foreign production when operating internationally is probably also going on among the largest firms of Denmark, even

though we lack data to document it firmly. The table further shows that the largest Danish, Finnish and Norwegian corporations in 1990, on the average, now resemble the largest Swedish corporations of the mid-1970s as far as foreign operations are concerned. This does not mean, however, that they necessarily are lagging 10 years or so behind the development of large Swedish firms. The direction of change is the same, while the differences in levels to a great extent may be explained by differences in production and lines of business, as well as by differences in the composition and tradition of domestic private investors.

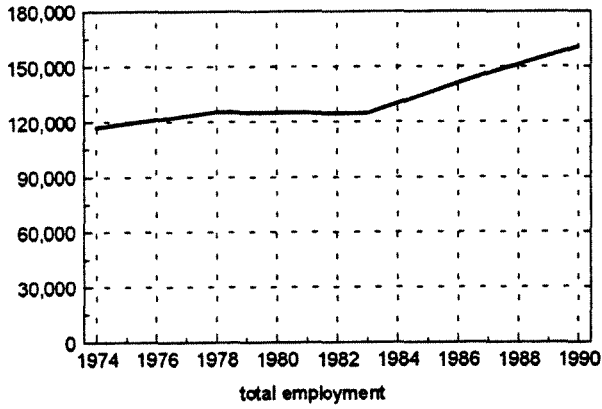
6.2.2 The Largest Firms Have Primarily Grown Abroad

Figure 6.3 pictures employment in the 30 largest corporations of Denmark, Finland, Norway and Sweden over the period 1974-1990. These employment figures are, with the exception for Denmark, split up between entities located in the corporations' country of origin and abroad.

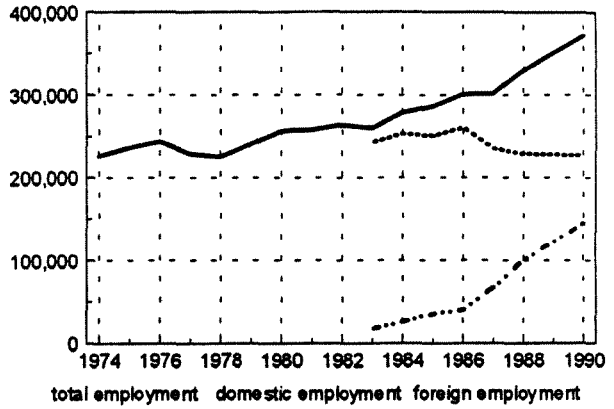
When considering the distribution of employment between domestic and foreign-located entities of these firms, an interesting feature regarding the operations of the largest Nordic corporations appears. Over the whole period studied, the 30 largest firms have not increased their employment in their countries of origin. The level of their domestic employment has been stable, or in Sweden it has even been decreasing slightly since 1975. The reduction of the large firms' employment in Sweden has particularly occurred in the late 1980s. Lower absolute levels of domestic employment in the late 1980s is also the case for the largest Finnish firms. In 1990 this also occurred in Norway. Thus, despite the rapid growth of the largest firms as discussed in Chapter 6.1, this means that corporate growth when measured by employment has taken place abroad.

Figure 6.3 Employment in the 30 largest industrial corporations by country, 1974-1990. World-wide, domestic and foreign employment.

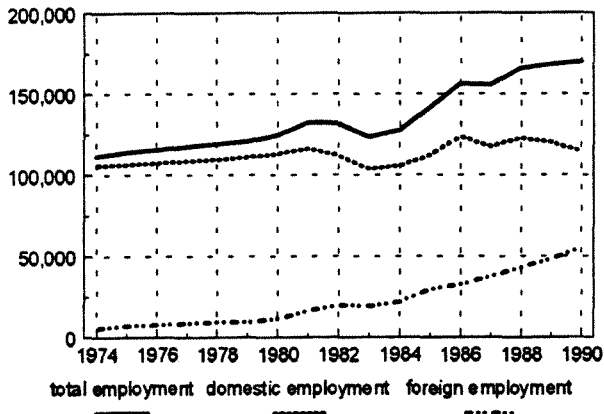
Denmark



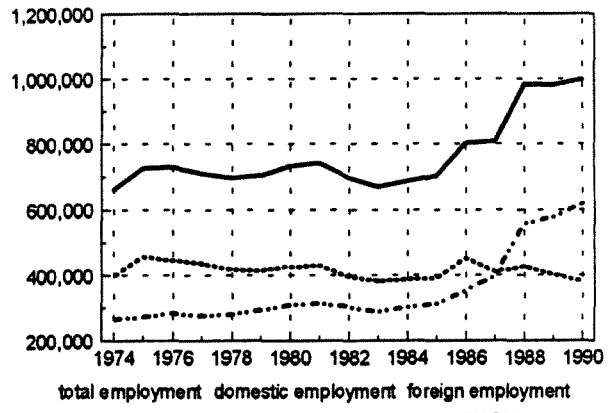
Finland



Norway



Sweden



Source: The large firm data base of the Nordic Perspective Group

This pattern of corporate growth abroad is also envisaged when the group of the 30 largest is split up to show the development for the 10 and the 11-30 largest corporations. Employment figures for 1975 and 1990 are presented for these groupings of the corporations in Table 6.6 except for the largest Danish firms, where data from the mid-1970s is lacking.

Table 6.6 Employment in the 10 and the 11-30 largest industrial corporations by country, 1974 and 1990. World-wide, domestic and foreign employment. 1000 persons.

Employment	Denmark		Finland		Norway		Sweden	
	1974	1990	1974	1990	1974	1990	1974	1990
Domestic:								
10 largest	-	ca.58	ca.126	100	64	78	273	254
11-30 largest	-	ca.49	ca.100	127	43	36	183	126
30 largest	-	ca.107	ca.226	227	107	114	456	380
Abroad:								
10 largest	-	ca.40	ca.5	95	5	42	218	473
11-30 largest	-	ca.14	ca.5	49	2	14	53	146
30 largest	-	54	ca.10	144	7	56	271	619
World-wide:								
10 largest	65	98	131	195	69	120	491	727
11-30 largest	52	63	105	176	45	50	236	272
30 largest	117	161	236	371	114	170	727	999

Source: The large firm data base of the Nordic Perspective Group

As discussed in Chapter 6.1, the data on world-wide employment clearly envisages corporate growth for the 10 and the 11-30 largest corporations in all Nordic countries. Even though the extensiveness of growth varies between the two groups of corporations and between their countries of origin, it is also evident from Table 6.6 that foreign employment has grown within both groups in all the countries.

There are, however, huge differences regarding the domestic effects of this growth. Both the 10 and the 11-30 largest Swedish corporations have reduced their employment in Sweden. The 10 largest Norwegian corporations have increased their employment in Norway, whereas it has been reduced for the 11-30 largest. In Finland it is the other way around: The 11-30 largest corporations have increased their Finnish employment, while the 10 largest have reduced theirs. Nevertheless, it is evident that the overall picture of the largest Nordic industrial corporations is that corporate growth has taken place abroad throughout the 1980s in particular.

These data on the pattern of corporate growth, or internationalization, are in no way sufficient to conclude anything on whether the largest Nordic corporations are "leaving" their home country, or whether it just means that they are adapting to a new competitive environment in order to maintain and improve their competitive edge. A brief discussion of possible effects of this internationalization on the national economic development is brought up in Chapter 8.

6.2.3 Foreign Ownership Control of Large Nordic Firms

Internationalization is not only expressed through exports and outward foreign direct investments. The other side of the coin is imports and inward direct investments of foreigners. Data is scarce to elaborate on this at the corporate level. We do, however, know whether the corporations in our sample of large firms are majority owned from abroad or not.

Table 6.7 gives the information as to how many of the 30 largest corporations for the different Nordic countries which were majority owned from abroad. Abroad in this sense also means other Nordic countries. For instance, ASEA of Sweden is the majority owner of one of the 30 largest corporations in all the other Nordic countries; ABB Denmark, Strömberg in Finland and Elektrisk Bureau in Norway.

Table 6.7 Foreign ownership of the largest Nordic industrial corporations, 1975, 1983 and 1990. Number of corporations among the 30 largest of Denmark, Finland, Norway and Sweden which are majority-owned from abroad.

Year	Denmark	Finland	Norway	Sweden
1974	0	1	3	0
1983	1	0	5	0
1990	4	2	6	0

Source: The large firm data base of the Nordic Perspective Group

It is evident that more of the largest Danish and Norwegian corporations are majority owned from abroad than is the case with the largest of Sweden and Finland. This probably reflects differences in political regulations and the political practice regarding inward investments between these countries, and for Sweden compared to the others also differences in the strength of domestic capital owners. It should, however, be mentioned that the largest Swedish corporation, ASEA (ABB), is 50 % foreign owned. Thus, it could have been classified differently without changing the pattern that large Swedish corporations are hardly ever majority owned from abroad.

If the Nordic economies are to be dynamic parts of the integrating European economy, inward investments should be expected and appreciated. However, this does not mean that all corporations, or all of the largest, will benefit from being part of a larger foreign constellation of businesses. This raises the complex issue regarding the role of ownership control in firm dynamics (Eliasson et al., 1988).

6.3 Industrial Competence and Competitiveness

6.3.1 Investments in R&D of the Largest Firms

The creation of value is in general based on abilities to combine labour and capital for the purpose of satisfying needs in society. Competitiveness is then frequently explained by the access to valuable natural resources, or to huge volumes of relatively cheap labour or capital. In the modern firm, however, the capabilities to innovate; to adopt and apply technological and organizational opportunities; to collect, systemize and interpret information; to develop competitive relations with suppliers; for product development; and for marketing and after-sale service, are considered the key factors to success. Human and organizational capabilities, rather than manpower and money, are increasingly becoming decisive to create value profitably. The industrial competence of organizations and individuals are put to test when the supplies of labour, capital and natural resources are scarce.

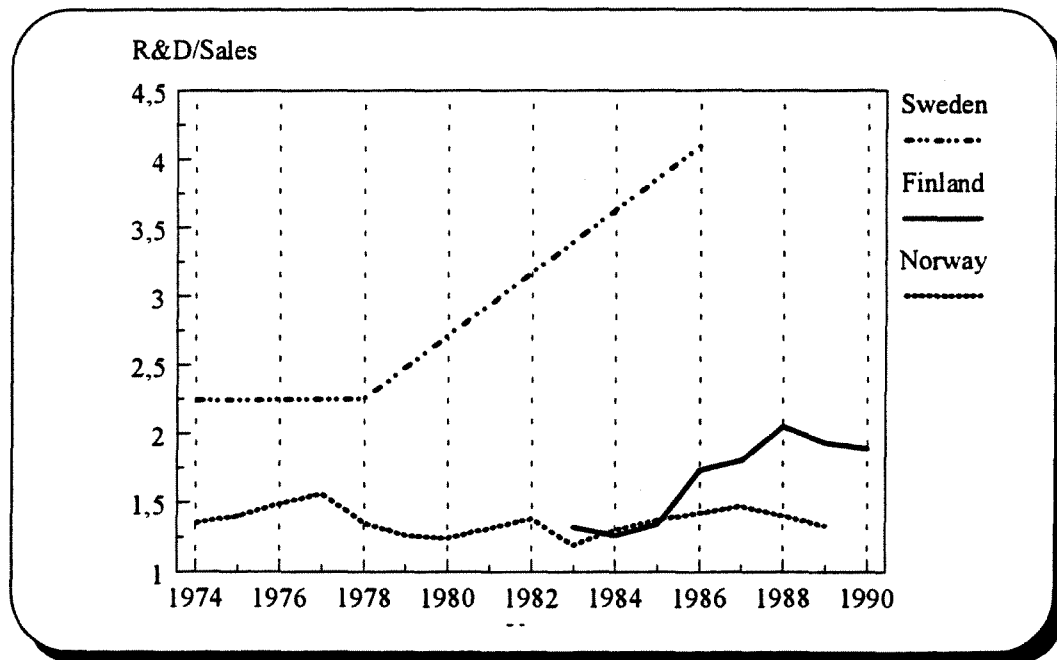
Industrial competence is an intangible asset in which firms invest in different ways. It concerns marketing, product development, software systems, education and team-building, to mention some. Despite the fact that such intangible assets are expected to be of importance, and increasingly so, for the competitiveness of firms, data is still scarce in this area. What we have at the firm level is usually limited to information on R&D-expenses. R&D is, however, only a fraction of the multitude of investment objects regarding industrial competence (Eliasson et al., 1990). Nevertheless, we will make use of this information to illustrate the changing importance of such assets for modern business.

Figure 6.4 shows the R&D intensity of the largest industrial corporations of Finland, Norway and Sweden. The intensity is calculated by measuring R&D in per cent of corporate sales. It would have been preferable to relate these investments to the value

added of the corporations. Corporate sales are, however, chosen simply because the data coverage is better.

Due to missing observations, we have calculated the arithmetic mean of the R&D-to-sales ratio for those years when data is available. In addition we have demanded a minimum data coverage, which means that only some years are plotted for the largest Swedish corporations, and that the latter half of the 1980s is left out. It should also be noted that for Norway we only have R&D spent by domestic establishments of the largest corporations, while for Sweden and Finland we cover the R&D activities of these corporations world-wide. This means that we to some extent underestimate the R&D intensity of the Norwegian corporations. However, R&D in their foreign establishments is definitely not extensive. Only for a couple of corporations does it play a noteworthy role. Thus, our underestimation should be of minor importance.

Figure 6.4 R&D in the 30 largest industrial corporations by country, 1975-1990.
Per cent of corporate turnover. Unweighted average.



Source: The large firm data base of the Nordic Perspective Group

Despite these warnings, the figure should give a fairly good indication of differences in the R&D intensity and its development for the largest corporations of these countries. It is evident that R&D is relatively more prevalent within the largest Swedish corporations, than in the largest of Norway and Finland. It also shows that the R&D intensity throughout the 1980s has been increasing among the largest corporations of Sweden and of Finland. In Norway, the R&D intensity seems to have been rather stable. However, this is due to the fact that oil companies with low R&D intensities have become more important within the group of 30 throughout the 1980s, counteracting the clear trend of a higher R&D intensity which has been documented for Norwegian manufacturing firms when relating it to value added (Björklund and Heum, 1990; Hammervoll and Heum, 1992).

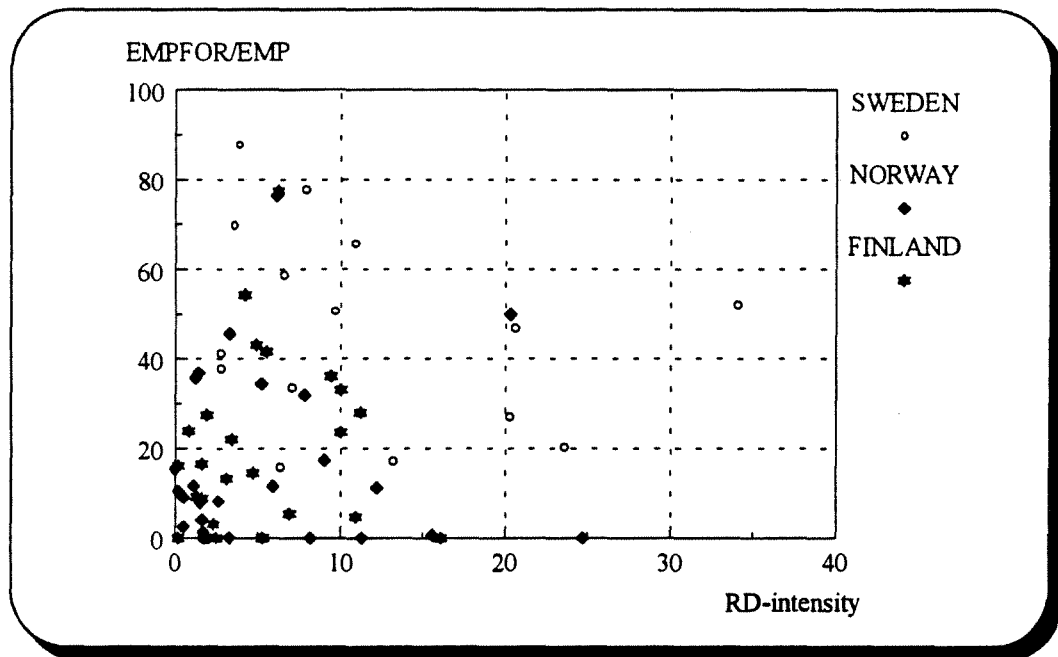
Differences in the average R&D intensity between the corporations of different Nordic countries may to some extent be explained by differences in the kinds of businesses in which these firms are engaged (cf. Table 4.2). The more rapid growth in R&D-intensity among Swedish firms from the late 1970s to the mid-1980s, may be related to an earlier internationalization of Swedish firms allowing them to reap profits on ownership advantages, fueling R&D in these firms (Swedenborg et. al., 1988).

6.3.2 R&D and the Internationalization of Firms

R&D is one way of investing in industrial competence. As expenditures on internal education, marketing work and information networks, it represents the more systematic, or organized way to upgrade industrial competence. Such conscious investments may, however, not be the most important in this respect, and on its own such efforts are hardly likely to contribute to the competitive edge of firms. Industrial competence necessarily has to be based on the learning of firms and individuals in general, i.e. on gaining from experience, and successes and failures in many areas, as well as combining ideas collected from many different ongoing business operations.

Internationalization is a way to apply the industrial competence of a firm in new environments. Doing so, experience may feed back on innovative activities, and thus the industrial competence of firms. This is the technology accumulation approach applied on multinational corporations (Cantwell, 1989). Internationalization is also thought of as one way for firms with a small home base to capture scale economies in activities as R&D (Swedenborg, 1979; 1991). Thus, for different reasons a positive correlation is to be expected between the levels of R&D and internationalization within firms.

Figure 6.5 Rate of internationalization and R&D intensity in large Nordic manufacturing companies in 1987. Foreign employment in per cent of total employment (EMPFOR/EMP) and R&D in per cent of sales.



Source: The large firm data base of the Nordic Perspective Group and National Accounts.

This is briefly considered in figure 6.5 where firms are plotted according to R&D intensity and their engagement in production abroad (share of employees in foreign subsidiaries). Foreign owned firms are excluded as their participation in international production is not taken fully care of by our data. However, the predicted relationship

between R&D and internationalization does not gain convincing support in our data. Future research ought to consider how foreign and state ownership as well as political regulation affect these aspects of firm behaviour. It may also be advisable to distinguish between different lines of production in which firms operate.

7. LARGE NORDIC FIRMS IN DOMESTIC MANUFACTURING

7.1 Output and Growth

An interesting task is to compare the largest firms and their development, in particular their growth, with total manufacturing, meaning mining and manufacturing (ISIC 2 and 3), in their country of origin. This also provides information on the relevance of focusing on such small group of firms when considering industrial transformation at the macro level of the economy.

At the firm level there are certain common features regarding the growth pattern of the largest Nordic corporations, at least since the mid-1970s. The growth in total number of employees has been 50-60 % over the 1974-1990 period, or equivalent to 2-3 % as an annual average. In the same period total manufacturing employment in all Nordic countries has been decreasing. Thus, corporate growth has been clearly faster than that in total domestic manufacturing. There are, however, slight differences across the countries and subperiods as indicated by Table 7.1.

Table 7.1 Growth of employment in the 30 largest firms and in total domestic manufacturing, 1974 - 1990. Average annual change, %.

	Denmark	Finland	Norway	Sweden
30 largest				
1974-1980	1.7*	2.1	1.8	1.7
1981-1990	3,6**	3,7	3,2	3,1
1974-1990	2.0	3.1	2.6	2.6
Total manufac- turing 1974-1990	-0.2	-1.2	-1.2	-4.0

* 1974-1978

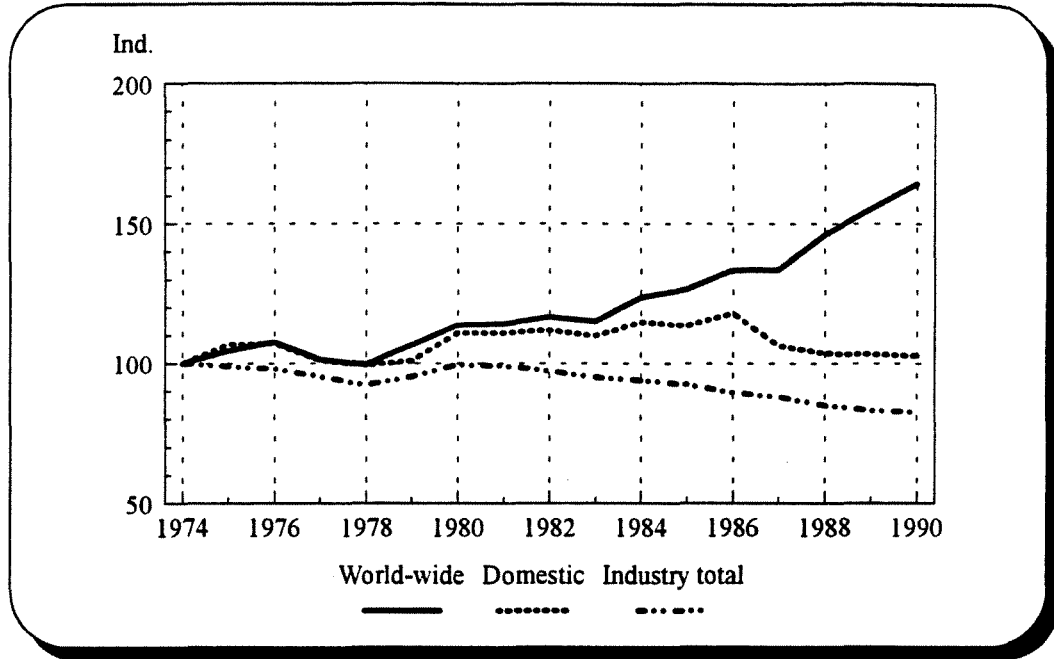
** 1983-1990

Source: The large firm data base of the Nordic Perspective Group and National Accounts

As already discussed, the growth of the large firms has mainly taken place abroad: Over the 1974-1990 period domestic employment in the top 30 group has been rather stable in Finland and Sweden and only slightly increasing in Norway, while we lack Danish data (cfr. Chapter 6.). In the latter part of the 1980s the domestic employment of the largest firms is showing a declining trend in Finland and Sweden, and to some extent in Norway. Contrary to that, the growth of foreign employment of these firms was accelerating throughout the 1980s, the Finnish firms showing the highest growth rates. This raises the question as to how the rapid internationalization has affected the growth performance of the domestic business units in these large firms relative to other domestic firms. Have the domestic growth of the large firms been slower or faster than domestic manufacturing on the average? Figure 7.1 provides some answers.

Figure 7.1 Employment in the 30 largest firms (world-wide and domestic) and in total domestic manufacturing and mining, 1975-1990. 1974 = 100.

Finland



Norway

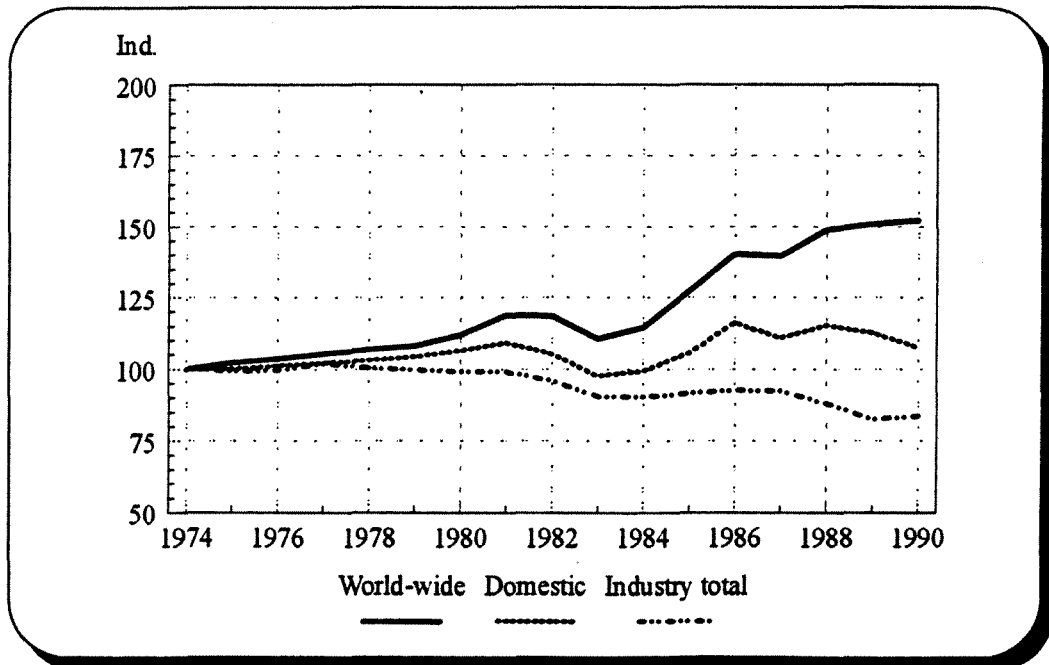
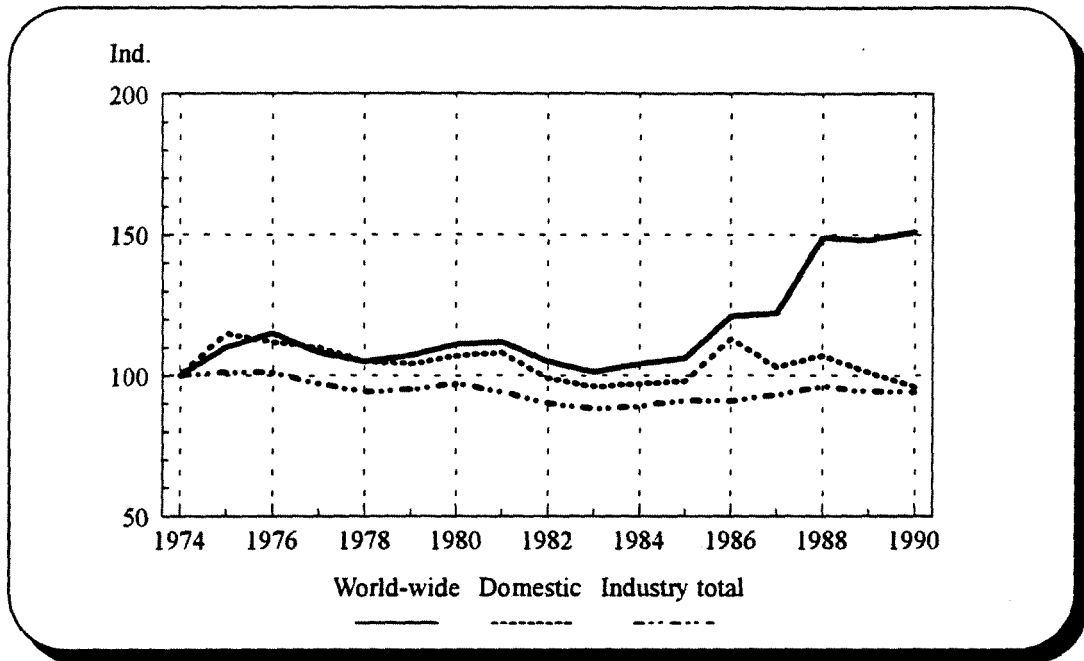


Figure 7.1 continues

Sweden



Source: The large firm data base of the Nordic Perspective Group and National Accounts

The domestic operations of the top 30 group seems to have grown somewhat faster than the average manufacturing growth measured in terms of employment. So, in spite of the fact that most of their corporate growth has been abroad, the contribution of these firms to total domestic manufacturing has been increasing.

Table 7.2 presents this in some other way, by calculating the employment in the largest firms in per cent of total manufacturing employment in their Nordic home country. The calculations have been done on the firms world-wide employment, on on their employment in domestic business units, and they are presented for the 10, the 20 and the 30 largest firms of each country respectively.

If the foreign employment of the large firms are included, the relative size of the large firms has grown tremendously: the ratios have doubled, or almost so, in all countries except for Denmark. Nevertheless, this relatively rapid growth of the largest firms is clear in Denmark, too.

When we focus on domestic manufacturing activities alone, this trend of more rapid large firm growth is not so evident, but nevertheless clear. In each of the Nordic countries where data is available, the concentration ratio based on domestic employment has been growing when comparing 1990 and 1974. This growth has been strongest as far as the largest Finnish firms are concerned, and clearly weakest in Sweden.

With an employment share of 35-50% through their domestic business units, the 30 largest industrial corporations are clearly dominating Finnish, Swedish and Norwegian manufacturing industries. Denmark differs clearly in this respect. In Sweden and in Norway the group of the 10 largest firms holds a more significant position than in Finland, whereas the 20- and 30-firm ratios are much higher in Finland than in the other two countries. This reflects the more equal size distribution of the largest Finnish firms which was discussed in Chapter 6.

Table 7.2 Employment (total and domestic) in the largest manufacturing companies as a per cent of domestic industry total*, 1974 and 1990.

	Denmark		Finland		Norway		Sweden	
	1974	1990	1974	1990	1974	1990	1974	1990
10 largest								
- total	12,7	19,5	21,8	42,2	17,2	37,4	44,4	76,4
- domestic	-	11,5	19,0	22,0	16,2	24,2	23,9	26,7
20 largest								
- total	18,6	27,2	33,2	68,3	24,2	47,0	57,4	97,9
- domestic	-	17,1	30,0	40,0	23,0	32,0	32,7	36,8
30 largest								
- total	22,8	31,8	40,3	80,5	28,8	52,7	65,3	105,0
- domestic	-	21,1	37,0	49,2	27,4	35,8	39,2	39,6

* Mining and manufacturing

Source: The large firm data base of the Nordic Perspective Group

Previous studies on the performance of Swedish multinationals have shown that they have been performing better than domestic firms in terms of overall and domestic growth, productivity and profitability (see Swedenborg et.al., 1988 and Swedenborg, 1992). However, when conferring Figure 7.2, which shows the largest firms' share of domestic manufacturing employment since the mid-70s, our data suggests that at least in terms of domestic employment the growth performance of Swedish multinationals has been worse than the Swedish industry average during the late 1980s. The employment of the domestic units of these highly internationalized companies has been reduced

more rapidly than the total of Swedish manufacturing. On the other hand, Figure 7.2 also clearly shows the relatively increasing contributions of the largest firms to the economies of Finland and Norway.

Figure 7.2 Employment in the domestic business units of the 30 largest firms relative to total employment in domestic manufacturing and mining, 1974-90, %.

Finland

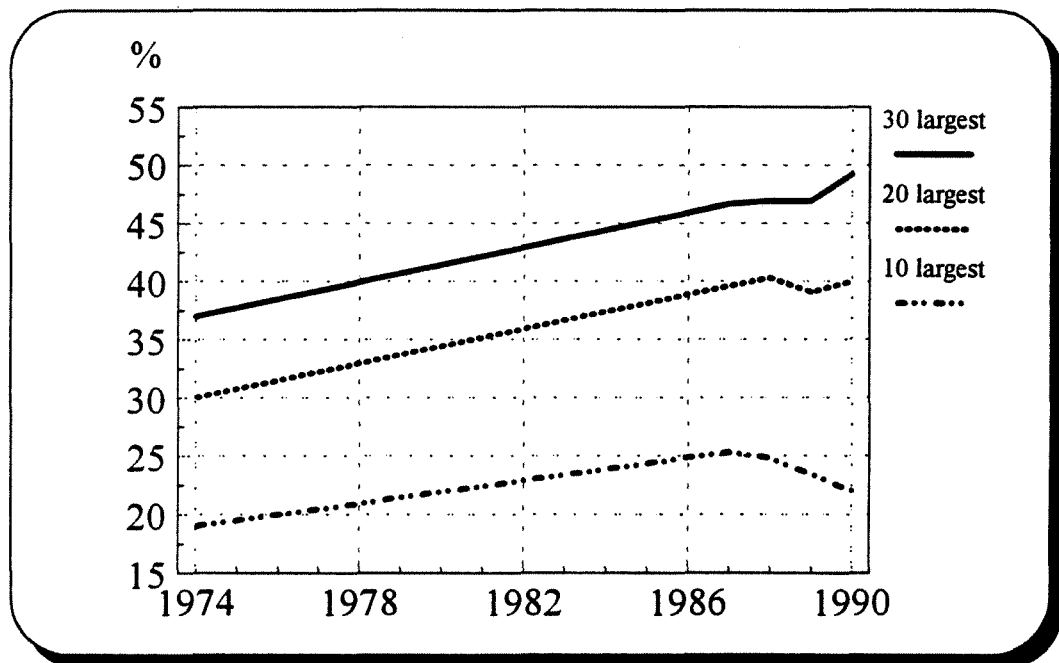
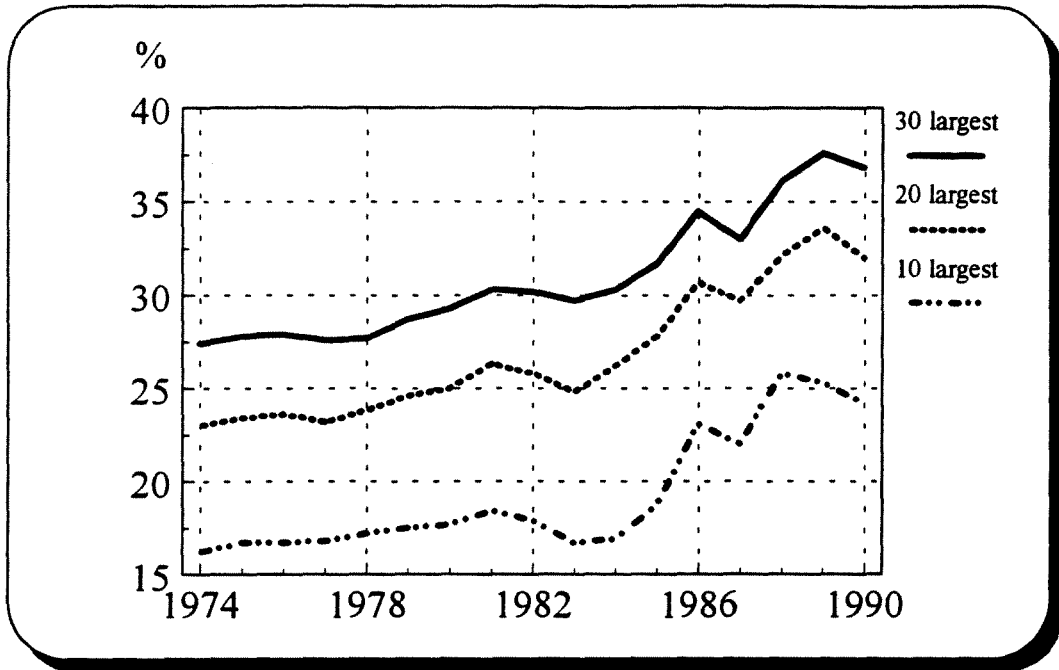
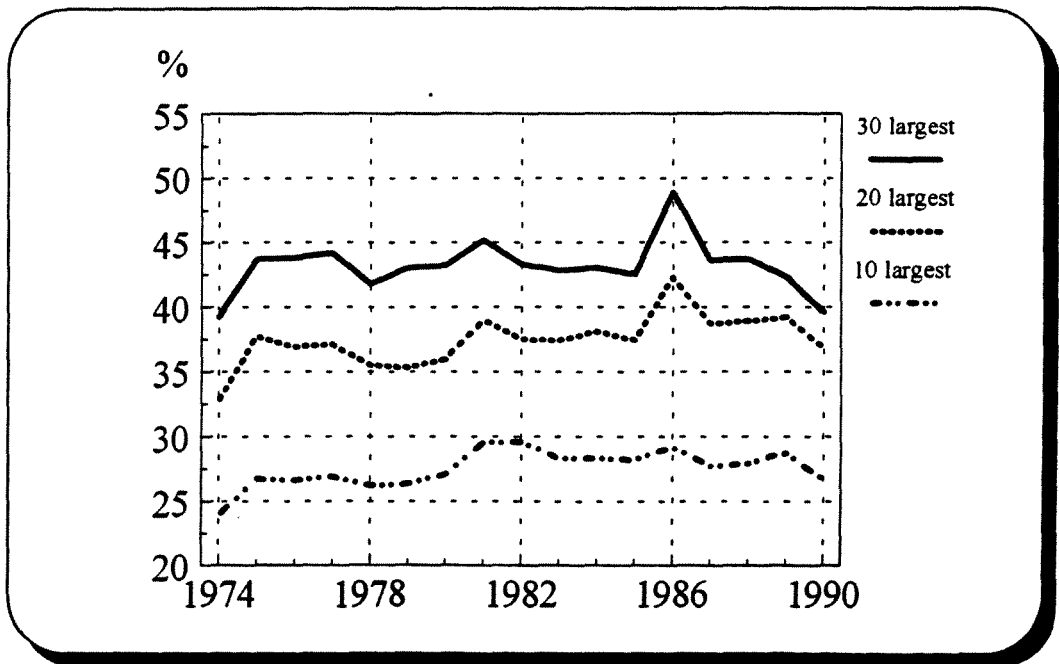


Figure 7.2 continues

Norway



Sweden



Source: The large firm data base of the Nordic Perspective Group and National Accounts

When interpreting the growth figures presented in this section, one should keep in mind the caveats given in Chapter 4. There might be some spurious growth in our data due to the changes in the accounting and reporting practices of the companies. Some of the firms in our sample did not report consolidated, corporate level information in the 1970s and early 1980s. Thus, some recorded growth from this period may simply be due to changes in consolidation practices of some firms in our sample. It has only partly been possible to control this problem. Hence, both the absolute and relative growth rates of the large firms may be somewhat exaggerated. This problem does not, however, concern our data from the early 1980s onwards, and we do not consider it to be severe even when we are considering the whole period since the mid-1970s.

7.2 Internationalization and R&D Activities

Besides the generally increasing share of production in large firms, the contribution of large corporations to total manufacturing has been growing particularly in the fields where major risk taking is needed. International operations and R&D activity are the most obvious examples.

The foreign operations of the large Nordic companies have been growing faster than their domestic output or employment as shown in the previous chapters. Table 7.3 shows the share of foreign employment in per cent of total corporate employment for the 10, 20 and 30 largest firms of Finland, Norway and Sweden. The share has increased for all groups over the period considered.

When considering this share for the different subgroups of the 30 largest, it is evident that there is a clear correlation between firm size and the rate of internationalization, also within this small sample of the largest firms. For the 10 largest Swedish firms the share of foreign employment is already about two thirds, for the Finnish about a half, and for the Norwegian more than one third. These shares are generally reduced as the firm size decreases

Table 7.3 Employment in foreign subsidiaries in per cent of total corporate employment for the largest firms of the Nordic countries, 1974 and 1990.

	Finland		Norway		Sweden	
	1974	1990	1974	1990	1974	1990
10 largest	13	49	5	35	46	65
20 largest	10	42	5	32	43	63
30 largest	15	40	5	33	40	62

Source: The large firm data base of the Nordic Perspective Group

The role of large firms as the leaders of internationalization business becomes evident when we compare the foreign employment of these firms to that which is registered as total foreign employment for all domestic manufacturing firms. The information on the entire population of manufacturing firms is quite hard to come by, but some data on Finland and Sweden exist. The foreign employment in our sample of the 30 largest Finnish companies - about 150 000 - is larger than the total number of employees in all Finnish owned subsidiaries as reported by the Bank of Finland (140 000). In Sweden the 30 largest industrial corporations are responsible for 90-95% of total foreign employment of the Swedish owned companies (cf. Braunerhjelm, 1990). Hence, it seems fair to conclude that the internationalization of the Nordic industries translates more or less to the international operations of large firms.

The same conclusion about the leading role of the large firms applies to R&D activities. Here our data is quite limited. Table 7.4 only provides information on the research spendings of the five largest industrial corporations (according to employment)

in Finland and Norway relative to the industry total of these countries. For comparison the figure on the employment of these five firms in per cent of total domestic manufacturing employment is included in the table.

Table 7.4 Employment and R&D in the 5 largest firms of Finland and Norway, 1983 and 1987. Per cent of total employment and R&D in domestic manufacturing.

Country	Employment		R&D expenditure	
	1983	1987	1983	1987
Finland	17,1	19,7	32,3	33,7
Norway	14,4	22,5	31,3	50,1

Source: The large firm data base of the Nordic Perspective Group

The relative size of large firms' R&D spending clearly exceeds their contribution to total employment and output in each country. Moreover, the dominance of these companies seems to have increased in recent years. This is in line with findings of many other studies (see, e.g., Vuori and Ylä-Anttila, 1987 and references therein). The literature gives two main explanations for the concentration of R&D investment. First, there are obvious scale economies in R&D to be reaped. Secondly, the failure of capital markets to diversify the risks associated with R&D leads to expansion of research activities in the large companies, since the risk diversification can, to some extent, be done if the firm is simultaneously engaged in several uncorrelated projects. There is no doubt that both of these mechanisms have been at work in the Nordic countries.

7.3 Is Large Firm Dominance a Small Country Phenomenon?

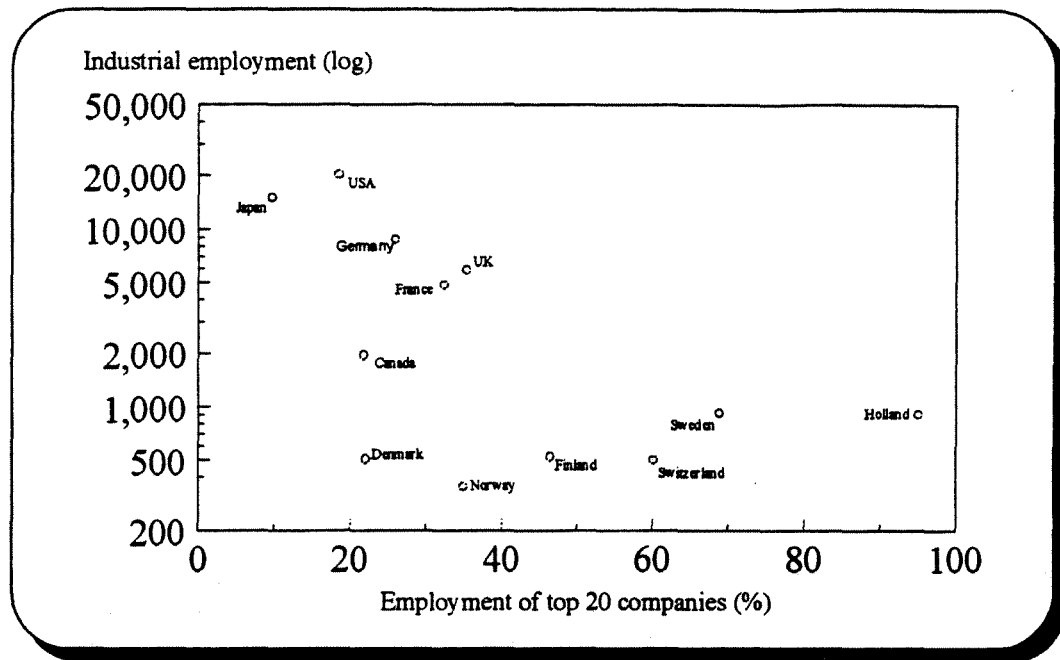
The previous sections clearly indicate that a rather small number of large firms holds a dominant position in the manufacturing of Finland, Norway and Sweden, while this to a much smaller extent seems to be the case in Denmark. Nevertheless, one may ask whether the dominance of large firms is a small country, or a Nordic, phenomenon? This issue is looked at in Table 7.5 and in Figure 7.3 with data from the mid-1980s.

Table 7.5 Industrial concentration ratios of selected countries, 1985.

Country	Average size of top 20 firms (number of employees)	Employment of top 20 firms as a per cent of total industrial employment
USA	219 748	19
Japan	72 240	10
Germany	114 542	26
UK	108 010	35
France	81 381	33
Canada	26 414	22
Switzerland	36 602	60
Holland	47 783	95
Denmark	6 049	22
Finland	12 095	47
Norway	6 194	35
Sweden	31 690	69

Sources: Scherer - Ross (1990) and the large firm data base of the Nordic Perspective Group

Figure 7.3 Aggregate concentration ratios and country size, 1985*



*Aggregate concentration ratio = the share of the 20 largest firms in total manufacturing employment.

Country size = Total employment in domestic mining and manufacturing.

The pattern envisaged in Table 7.5 and Figure 7.3 is rather clear: The average size of the largest companies is positively correlated with country size (measured by total industrial employment), whereas the aggregate concentration ratio is negatively correlated with country size. This makes it reasonable to interpret the large firm dominance as a small country phenomenon, but not something which necessarily has to emerge in small countries. The small countries like Switzerland, Holland, Sweden and Finland all clearly show above average shares of leading companies in total industrial employment. This is not the case for Denmark, while for Norway the share is at the level of that in France and Great Britain.

There are, however, a lot of definitional problems involved, as indicated in Chapter 4. The definition of a corporation might vary considerably across the countries. Japan,

showing surprisingly low concentration in the table, is a good example. There are family groupings and holding companies having ownership interests in several firms which are, however, reported as separate companies. In fact these companies might form a large, centrally controlled corporation whose boundaries are not easy to define from outside. Nevertheless, the data suggests that economies of scale (or other factors related to size) may be pushing large firms toward being larger relative to their national industries in small countries than in large (cf. Scherer and Ross, 1990).

8. CONCLUDING REMARKS: INDUSTRIAL TRANSFORMATION AND THE ROLE OF LARGE FIRMS

The largest firms of the Nordic countries hold a significant position in their domestic economies. Furthermore, the largest at one point in time tend to keep their position as a dominant firms over rather long time periods. Thus, we think a rather small number of firms may serve as the microeconomic foundation in studies of industrial transformation and macroeconomic growth, also in a long-term perspective.

This has been the approach applied in this study, where the main focus has been on the growth, and internationalization of large firms, and the knowledge requirements to modern competitive business. The largest manufacturing corporations seem to have increased their role with respect to all the variables studied above: employment, output, foreign operations and R&D activities. The contribution of these companies has been particularly important when considering the growing internationalization and knowledge intensity of the Nordic industries. These are the features that industry level studies have indicated as most important factors behind the structural changes of manufacturing industries in these countries (cf. Chapter 2 and the references therein). The large firms are obviously particularly important in this respect.

This role of the largest firms in the current industrial transformation has obviously led to a concentration of economic activities on the Nordic scene. It is uncertain how the macroeconomic effects of this concentration ought to be interpreted. Usually an increase in concentration is expected to hamper aggregate economic growth through efficiency losses. However, for open economies the existence of international competition may assure the necessary competitive forces even if domestic production is becoming more concentrated. Actually, larger corporations, meaning concentration in a small economy, may be needed if domestic businesses are to stay competitive internationally. If so, efficiency gains may be expected.

The trend of internationalization raises the issue as to how foreign production affects value generation domestically (Swedenborg, 1973, 1979, 1982; Blomström, 1991; Bellak, 1993). The concept of internationalization means in some sense that corporations grow more rapidly abroad than at home. But, how does this growth pattern affect domestic production? Foreign production may be considered a prerequisite for maintaining and strengthening competitiveness and value creation at home. On the other hand, foreign production may also be regarded as a means for firms to escape production requirements that are set on the domestic scene. Thus, the macroeconomic impacts of internationalization on the Nordic economies are uncertain, revealing an issue that is well advised to examine.

Internationalization of business firms has not received proper attention in analyzing the competitiveness of firms, industries or countries. A growing proportion of international trade is controlled by large multinational corporations. The standard analysis of competitiveness, based on trade theory, neglects the role of multinationals. The mobility of capital, technology and other factors within multinational companies has major implications for policy considerations as indicated, e.g., by Blomström (1991). Blomström (1991) shows that Sweden's share in world exports of manufactures declined from the mid-1960s (by more than 20 %), while - at the same time - the share of the Swedish multinationals increased significantly (by more than 15 %). The large companies seem to have restored their competitive position by expanding their production outside the national borders. The comparative advantages of (internationally operating) firms and those of countries do not necessarily coincide.

The rapid internationalization of Nordic firms throughout the 1980s draws attention to how the foreign production by domestic firms affects the economy of their home country. Most of the studies carried out so far have indicated that the domestic macroeconomic impacts of the internationalization of business are mainly positive (see Swedenborg et al., 1988; Swedenborg, 1992; Kinnunen, 1991).

It is, however, hard to generalize the effects of foreign direct investments on the home country's economy, as theory is far from providing a priori answers to the many effects that may occur (Bellak, 1993). Recent studies with the Swedish data also question the conclusions of the earlier studies, for instance when it comes to the positive effects on home country exports. Svensson (1993) finds a clear substitution effect of Swedish firms' foreign production on domestic exports. At the margin this substitution is estimated to be quite substantial, and it is mainly caused by third country exports of the foreign affiliates.

On the Nordic scene, at least Finland, Sweden and Norway have experienced the rapid internationalization of domestic business firms. In all these countries, the stock of outward investments also outnumber the stock of inward FDI as far as manufacturing is concerned (Heum and Ylä-Anttila, 1993). Thus, the issue of how the operations of domestic multinationals affect the home country's economy, is one important area for future research.

The macroeconomic impacts of the trend in business development, which imply that industrial competence is becoming more important to the competitiveness of firms, may be traced by consulting perspectives on how competitiveness evolves. It is well established that the competitiveness of firms cannot be ascribed to the inhouse resources of individual firms alone. Competitiveness is created in complex processes involving a broader industrial base (ETLA et al., 1984 and 1987). This is in tradition with Schumpeterian research, with research on innovation (Rosenberg, 1976; Freeman, 1974; Mansfield, 1968) and with evolutionary economics (Nelson and Winter, 1982). Perroux (1955) makes use of a similar perspective when elaborating on "growth poles", as Dahmén (1950; 1989) did when studying Swedish business in the context of "development blocks". Currently, Porter's (1990) perspective on dynamic business in industrial clusters is gaining the most attention on the Nordic scene. As the others, Porter's perspective is based on the assumption that under certain conditions there is a reciprocal promotion of competitiveness among firms. The behaviour of a firm may

generate externalities in innovation and in knowledge accumulation which also benefit other firms, and this is all the more so the more human capabilities and competence are the source of growth.

As Porter considers domestic industrial clusters to be of vital importance in this respect, he also draws the macroeconomic implication that dynamic clusters benefit the competitiveness, or economic development, of nations, even though this connection on an aggregate level is not well developed by Porter. This is, however, the topic of economic theories on endogenous growth (Romer, 1986; Grossman and Helpman, 1991). The economic models of endogenous growth document that long-term macroeconomic growth is possible if there are positive economic externalities within the business community, or if there is shortage in the supply of one essential production factor (Rebelo, 1990). Such a factor may be industrial competence.

Industrial clusters, development blocks, or whatever they may be labelled, provide in theory the industrial base for such processes of innovation and diffusion of knowledge, i.e. what the general term "externalities" must consist of. If economic competence is becoming more important as a factor of production for firms to stay competitive, externalities, or the ability to exploit synergy among firms in the domestic economy, should also become more decisive for the economic development of a nation. This is, however, hard to show as there is no well established way to document the existence or to measure the magnitude of externalities quantitatively.

Nevertheless, accepting this perspective, it might well be that some firms mean more to the development of the national economy than others. Industrial competence has to stem from systematic efforts and practical experience from factors that really matter for the effectiveness in business operations. Investments in R&D is of the systematic kind, while participating in international business represents a kind of on-the-job-training which ought to be of general importance. As it is particularly in R&D and internationalization that the large firms have been documented to have a dominant

role, these firms may be classified as potentially important sources for externalities in the domestic business communities they are part of.

However, holding a position of a possible source for important externalities within domestic business communities, does not guarantee that firms actually nurture each other. Beside individual firm capabilities, this depends on labour market mobility, efficiency in the market for corporate control, and the kinds of business relations between firms. Rather than nurturing each other, allowing the rate of growth to vary between different firms and businesses, large firms may constrain the evolution of domestic challengers. The persistence and rank stability of large firms clearly reveals that this is a risk that deserves attention. Thus, future studies ought to pay more attention to the innovative conditions inherent in the complex interplay between large firms on the one hand and small and medium-sized firms as well as new entries on the other (Braunerhjelm, 1993). This is what constitutes the dynamics of industrial transformation and macroeconomic growth.

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APPENDIX 1: The Large Firm Data Base: Variables and Data Coverage

List of variables

OBS	Year, (Y:19xx)
COUNTRY	Name of the country (DENMARK, FINLAND, NORWAY, SWEDEN)
COMPANY	Name of the company
EMP	Number of employees
EMPFOR	Number of employees in the foreign operations
VA	Value added, million local currency units
VAFOR	Value added in foreign operations , million unit
SALES	Sales, million unit
SALESFOR	Sales in foreign operations, million unit
EXPORT	Value of export, million unit
RD	Research and development expenditures, million unit
INDUSTRY	Industry code 3-digit level
FOUNDIR	Founding year
INDEP	Corporation legally independent entity
SUBS	Subsidiary of foreign multinational , binary variable
RDFOR	Research and development in foreign subsidiaries, million unit
RDDOM	Research and development in home country, million unit
PROFIT	Corporate profits, gross profits before extraordinary items and taxes, million
ASSETS	Total assets according to the balance sheet, million unit

Number of observations

DENMARK

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
EMP	30	-	-	-	30	-	-	-	-	30	-	-	-	30	-	-	30
EMPFOR	3	-	-	-	6	-	-	-	-	5	-	-	-	14	-	-	30
VA	6	-	-	-	8	-	-	-	-	18	-	-	-	17	-	-	-
VAFOR	1	-	-	-	1	-	-	-	-	2	-	-	-	2	-	-	-
SALES	28	-	-	-	29	-	-	-	-	30	-	-	-	28	-	-	30
SALESFOR	3	-	-	-	5	-	-	-	-	8	-	-	-	17	-	-	-
RD	2	-	-	-	3	-	-	-	-	12	-	-	-	8	-	-	-
INDUSTRY	29	-	-	-	29	-	-	-	-	30	-	-	-	30	-	-	30
FOUNDIR	28	-	-	-	28	-	-	-	-	22	-	-	-	25	-	-	23
INDEP	13	-	-	-	13	-	-	-	-	16	-	-	-	7	-	-	-
SUBS	13	-	-	-	13	-	-	-	-	16	-	-	-	7	-	-	-
RDFOR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RDDOM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PROFIT	23	-	-	-	28	-	-	-	-	28	-	-	-	26	-	-	-
ASSETS	27	-	-	-	29	-	-	-	-	28	-	-	-	26	-	-	-

APPENDIX 2: World-wide Employment of the Largest firm

DENMARK

YEAR	Total mining and manufacturing	SHARE OF THE INDUSTRY TOTAL %		
		10	20	30
1974	514 000	12,7	18,6	22,8
1975	471 000	-	-	-
1976	474 000	-	-	-
1977	471 000	-	-	-
1978	468 000	-	-	-
1979	472 000	14,9	21,8	26,7
1980	464 000	-	-	-
1981	448 000	-	-	-
1982	447 000	-	-	-
1983	449 000	16,1	23,0	27,7
1984	473 000	-	-	-
1985	502 000	-	-	-
1986	521 000	-	-	-
1987	515 000	16,1	23,5	28,4
1988	505 000	-	-	-
1989	504 000	-	-	-
1990	504 000	19,5	27,1	31,8

APPENDIX 2 continues

FINLAND

YEAR	Total mining and manufacturing	SHARE OF THE INDUSTRY TOTAL %		
		10	20	30
1974	561 000	21,8	33,2	40,3
1975	555 000	23,7	35,6	42,5
1976	550 000	24,9	37,1	44,2
1977	534 000	24,1	35,8	42,8
1978	517 000	24,3	36,1	43,5
1979	534 000	25,0	37,0	45,1
1980	558 000	26,0	38,0	46,0
1981	556 000	26,2	38,4	46,3
1982	545 000	28,3	41,0	48,3
1983	533 000	28,3	41,1	48,7
1984	527 000	29,8	44,8	53,0
1985	519 000	30,7	46,6	55,1
1986	502 000	33,6	51,7	60,0
1987	493 000	34,2	52,7	61,2
1988	477 000	39,3	60,2	69,1
1989	466 000	40,8	64,0	75,1
1990	463 000	42,0	68,0	80,2

APPENDIX 2 continues

NORWAY

YEAR	Total mining and manufacturing	SHARE OF THE INDUSTRY TOTAL %		
		10	20	30
1974	387 000	17,2	24,2	28,8
1975	384 000	17,9	25,1	29,6
1976	385 000	18,0	25,4	30,0
1977	394 000	18,3	25,3	29,8
1978	389 000	18,9	26,1	30,6
1979	386 000	19,1	26,7	31,3
1980	386 000	19,7	27,5	32,3
1981	383 000	21,4	29,7	34,6
1982	371 000	22,0	30,5	35,6
1983	350 000	20,9	29,7	35,2
1984	349 000	21,6	31,3	36,6
1985	354 000	25,1	35,0	40,1
1986	358 000	30,0	38,6	43,7
1987	357 000	30,4	38,7	43,5
1988	340 000	35,6	43,7	48,8
1989	319 000	37,4	47,0	52,7
1990	323 000	37,1	46,6	52,5

APPENDIX 2 continues

SWEDEN

YEAR	Total mining and manufacturing	SHARE OF THE INDUSTRY TOTAL %		
		10	20	30
1974	1013 000	44,4	57,4	65,3
1975	1023 000	48,0	63,0	71,1
1976	1021 000	47,8	63,0	71,6
1977	985 000	46,6	62,8	72,2
1978	957 000	47,4	63,5	72,8
1979	961 000	48,2	63,8	73,4
1980	982 000	50,2	65,5	74,5
1981	951 000	54,3	69,9	78,0
1982	912 000	53,1	68,5	76,4
1983	893 000	52,3	67,1	75,0
1984	899 000	53,2	69,2	76,5
1985	920 000	52,8	68,9	76,4
1986	923 000	57,9	76,9	87,0
1987	942 000	59,4	78,2	85,8
1988	975 000	71,4	92,7	100,8
1989	951 000	75,0	95,6	103,1
1990	951 000	76,4	97,9	105,4

APPENDIX 3: Domestic Employment of the Largest Firm

DENMARK

YEAR	Total mining and manufacturing	SHARE OF THE INDUSTRY TOTAL %		
		10	20	30
1974	514 000	-	-	-
1975	471 000	-	-	-
1976	474 000	-	-	-
1977	471 000	-	-	-
1978	468 000	-	-	-
1979	472 000	-	-	-
1980	464 000	-	-	-
1981	448 000	-	-	-
1982	447 000	-	-	-
1983	449 000	-	-	-
1984	473 000	-	-	-
1985	502 000	-	-	-
1986	521 000	-	-	-
1987	515 000	-	-	-
1988	505 000	-	-	-
1989	504 000	-	-	-
1990	504 000	11,5	17,1	21,1

APPENDIX 3 continues**FINLAND**

YEAR	Total mining and manufacturing	SHARE OF THE INDUSTRY TOTAL %		
		10	20	30
1974	561 000	-	-	-
1975	555 000	-	-	-
1976	550 000	-	-	-
1977	534 000	-	-	-
1978	517 000	-	-	-
1979	534 000	-	-	-
1980	558 000	-	-	-
1981	556 000	-	-	-
1982	545 000	-	-	-
1983	533 000	-	-	-
1984	527 000	-	-	-
1985	519 000	-	-	-
1986	502 000	-	-	-
1987	493 000	25,3	39,6	46,6
1988	477 000	24,8	40,3	46,9
1989	466 000	23,4	39,1	46,9
1990	463 000	21,4	39,0	49,0

APPENDIX 3 continues

NORWAY

YEAR	Total mining and manufacturing	SHARE OF THE INDUSTRY TOTAL %		
		10	20	30
1974	387 000	16,2	23,0	27,4
1975	384 000	16,7	23,4	27,8
1976	385 000	16,7	23,6	27,9
1977	394 000	16,8	23,2	27,6
1978	389 000	17,2	23,8	27,7
1979	386 000	17,5	24,6	28,7
1980	386 000	17,7	25,0	29,3
1981	383 000	18,4	26,3	30,3
1982	371 000	17,9	25,8	30,2
1983	350 000	16,9	24,8	29,7
1984	349 000	16,9	26,2	30,3
1985	354 000	18,7	27,8	31,7
1986	358 000	23,1	30,7	34,5
1987	357 000	22,0	29,7	33,0
1988	340 000	25,8	32,1	36,1
1989	319 000	25,3	33,6	37,6
1990	323 000	23,9	31,6	35,4

APPENDIX 3 continues

SWEDEN

YEAR	Total mining and manufacturing	SHARE OF THE INDUSTRY TOTAL %		
		10	20	30
1974	1013 000	23,9	32,7	39,2
1975	1023 000	26,7	37,7	43,7
1976	1021 000	26,6	36,9	43,8
1977	985 000	26,9	37,1	44,2
1978	957 000	26,2	35,5	41,8
1979	961 000	26,3	35,3	43,0
1980	982 000	27,1	36,0	43,2
1981	951 000	29,5	39,0	45,2
1982	912 000	29,6	37,5	43,3
1983	893 000	28,3	37,4	42,8
1984	899 000	28,3	38,1	43,0
1985	920 000	28,2	37,4	42,5
1986	923 000	29,2	42,3	48,9
1987	942 000	27,7	38,7	43,6
1988	975 000	27,9	38,9	43,7
1989	951 000	28,7	39,2	42,3
1990	951 000	26,7	36,8	39,6

APPENDIX 4: Mean Employment of the Largest Firms. Number of employees

DENMARK

YEAR	MEAN EMPLOYMENT		
	10	20	30
1974	6529	4787	3898
1975	-	-	-
1976	-	-	-
1977	-	-	-
1978	6991	5090	4170
1979	-	-	-
1980	-	-	-
1981	-	-	-
1982	-	-	-
1983	7241	5162	4150
1984	-	-	-
1985	-	-	-
1986	-	-	-
1987	8291	6049	4881
1988	-	-	-
1989	-	-	-
1990	9835	6845	5349

APPENDIX 4 continues**FINLAND**

YEAR	MEAN EMPLOYMENT		
	10	20	30
1974	12205	9299	7530
1975	13145	9873	7857
1976	13716	10197	8109
1977	12841	9562	7623
1978	12573	9340	7499
1979	13342	9873	8018
1980	14510	10610	8555
1981	14544	10669	8581
1982	15414	11181	8779
1983	15069	10955	8653
1984	15721	11810	9304
1985	15911	12095	9524
1986	16865	12973	10033
1987	16856	13000	10059
1988	18767	14365	10987
1989	19022	14922	11687
1990	19447	15748	12377

APPENDIX 4 continues**NORWAY**

YEAR	MEAN EMPLOYMENT		
	10	20	30
1974	6641	4686	3715
1975	6883	4809	3794
1976	6943	4883	3849
1977	7197	4984	3915
1978	7348	5072	3968
1979	7368	5143	4013
1980	7610	5305	4151
1981	8213	5677	4413
1982	8172	5654	4401
1983	7318	5205	4104
1984	7554	5453	4225
1985	8872	6194	4730
1986	10752	6907	5209
1987	10847	6905	5180
1988	12098	7422	5526
1989	11926	7488	5605
1990	11971	7531	5652

APPENDIX 4 continues**SWEDEN**

YEAR	MEAN EMPLOYMENT		
	10	20	30
1974	44963	29064	22038
1975	49134	32217	24240
1976	48774	32146	24350
1977	45908	30936	23704
1978	45402	30384	23226
1979	46279	30662	23502
1980	49294	32160	24398
1981	51622	33219	24740
1982	48436	31215	23211
1983	46663	29961	22310
1984	47830	31094	22931
1985	48540	31690	23443
1986	53455	35484	26769
1987	55991	36824	26924
1988	69635	45182	32761
1989	71315	45470	32674
1990	72658	46532	33298