

FDI in Norway's manufacturing sector.

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FDI in Norway's manufacturing sector.Torunn Kvinge and Rajneesh Narula¹**Abstract**

This report investigates the location advantages of the Norwegian manufacturing industry while focusing on economic as well as institutional factors. The economy relies highly on the exploitation of natural resources and only minor parts of its exports are technology based. Norway as a market for consumer goods is not only small in size but is also located at the periphery of Europe. Since the beginning of industrialisation, policies towards FDI have had two targets. The first has been to keep as much of the resource rent as possible within the country and the second, to develop a domestic manufacturing industry. A variety of political tools has been used to achieve these objectives. Although different international agreements aim to reduce preferences for domestic production, several sectors in the Norwegian manufacturing industry remain protected by governmental policy. Norwegian MNEs have internalised former and present L-advantages into firm-specific assets. Domestic interest groups or the state partly control several of these enterprises.

Compared to other small European countries, Norway has a relatively low share of FDI in the manufacturing industry. Nonetheless, over the last decades the country has experienced a substantial increase in FDI. This is partly due to investments of foreign affiliates of Norwegian multinational companies, reinvesting in Norway. In 1996, on an average, 18% of the employment in firms with at least 50 employees was located to foreign controlled firms while the corresponding figures in 1980 and 1991 were 8% and 13%. FDI mainly takes the form of mergers and acquisitions and is particularly significant in sectors with an above average R&D intensity and in other market segments with a relatively high producer concentration. The main industrial clusters as well as the production of consumer goods have experienced the major growth of FDI employment in the period 1991-1996. Often, these are also sectors with a high degree of governmental protection.

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Table of Contents

1. Introduction	4
2. Analytic framework	4
Competitive advantages	6
Globalisation and small economies	6
3. Norway compared to other European countries	7
Returning to foreign investment	9
4. The competitive advantage of Norway	12
5. Governmental policy and the history of FDI in Norway	17
6. FDI in the manufacturing sector	22
Outward and inward FDI	23
Aggregate changes in employment, 1980-1996	24
Effective rates of assistance (ERA) and FDI	35
Mergers and acquisitions	35
Concentration in different sectors	37
7. Summary and conclusions	39
References	42
Appendix	45

List of tables

Table 1	Some basic indicators 1997
Table 2	FDI activity from and by selected OECD countries
Table 3	Employment 1991 and 1996
Table 4	Effective rates of assistance (ERA) by sector
Table 5	Outward and inward FDI stock 1990-1997. Total and manufacturing industry
Table 6	Employment in firms with at least 50 employees 1980, 1991,1996. Number of employees and employees in different ownership groups as percentage of total employment each year
Table 7	Employment in firms with at least 50 employees 1980,1991, 1996. Percentages
Table 8	Employment 1996. Industrial clusters
Table 9	Employment 1996. Construction equipment and other consumer goods
Table 10	Employment 1996. Tele and IT industries, Machinery and equipment
Table 11	Employment 1996. Other chemicals and non-metallic mineral products
Table 12	Employment in foreign majority owned firms by mode of entry. 1996
Table 13	Employment 1996 in firms, existing both 1991 and 1996 by industries and change of ownership
Table 14	Herfindahl-indices and Pearson's correlation between Herfindahl-indices and ownership. All firms and foreign majority owned firms. 1996

1 Introduction

The aim of this report is to explore the location specific advantages influencing foreign direct investments (FDI) into the Norwegian manufacturing industry. We draw upon the OLI-framework (Dunning 1988, 2000) and its applications.

The report is organised as follows; chapter two presents a summary of the theory and possible applications for small economies. In the third chapter, we compare Norway with other European countries. The competitive advantages of the Norwegian manufacturing industry are the topic for chapter four while chapter five describes governmental policy and other structural indicators. Together these two chapters give a picture of the natural and created assets, which have constituted L-advantages in the manufacturing industry through the last century. Chapter six contains a description of the development of FDI as well as the development in employment in foreign majority owned firms compared to other firms, mergers and acquisitions and concentration in different markets while chapter seven concludes.

Data used here has been collected from several sources, including OECD, the World Bank, UNCTAD, Statistics Norway and the Central Bank of Norway. For the description and analysis of development in employment, we use a data-base constructed out of two different data-bases from Statistics Norway, the SIFON-register and the annual census of the Norwegian manufacturing sector, covering the period 1991-1996. We examine employment in foreign majority owned firms, i.e., firms in which one single foreign owner holds more than 50% of the equity.


2 Analytic framework

The OLI-framework developed by Dunning (1988, 2000) suggests that three conditions are necessary for FDI to take place. First, that the multinational company must have some owner-specific advantages (O-advantages) that make it capable of competing with host-country firms despite the drawbacks of being a foreigner. Second, internalisation of transactions within a firm i.e., I-advantages, should be more profitable than doing business through trading or licensing. Third, there need to be advantages of locating production to the relevant area, the so-called location-specific advantages or L- advantages.

According to Dunning and Narula (1994), location-specific advantages are determined by the nature and extent of the natural assets or created assets available. Included in the created assets are O-advantages of domestic firms, i.e., domestic firms may internalise

location-specific advantages and remain central actors in a certain domain even after the country has lost its specific advantages in this field.

Furthermore, inward FDI goes through different stages. In the first stage, the attraction of a location lies in the possession of natural assets. The country may have a deficiency in created assets such as a well functioning infrastructure, for instance, in the form of transportation and communication facilities, or an educated, trained and motivated labour force. In the second stage, markets have grown in either size or purchasing power and direct investments may substitute former imports. Location-specific advantages are connected to the characteristics of the market. Created as well as natural barriers to trade may stimulate market-seeking investments.

In the third stage, because of rising labour costs in the host country, inward FDI shifts towards efficiency seeking investments. In other words, structure-rationalisation takes place within companies across borders. By now, the host country too  developed its own companies, which are able to compete with foreign firms in the same sectors. In the fourth stage, domestic firms are able to compete effectively with foreign-owned firms in the domestic sectors in which the country has developed competitive advantages, as well as to penetrate foreign markets. L-advantages are mainly based on created assets and the main challenges for domestic as well as foreign firms are to capture positions in the global market. The fifth stage is characterised by a shifting balance between foreign and domestic firms. Independent of nationality of origin, the enterprises have developed similar O-advantages and compete through product differentiation. Intra-industry production has risen in significance and will generally follow prior growth in intra-industry trade. Intra-industry production as well as trade will, to a large extent, take place within transnational enterprises. In this stage, the O-advantages of firms may be less dependent on the assets of their country of origin and more on their ability to organise their advantages and exploit the gains of cross-border common governance (Dunning and Narula 1996).

We expect foreign firms to be found mainly in sectors with a relatively high concentration because factors creating O-specific advantages for the companies are often also the factors that create barriers to entry in markets. Caves (1996:83) differentiates between the following barriers to entry: capital-costs, scale economies in production, advertising outlays, research and development (R&D) and organisational complexity. Capital-cost barriers are associated with high sunk costs or capital-market imperfections. Empirical evidence from other countries supports the hypothesis that FDI and seller concentration are closely associated (for a review of the literature, see e.g., Caves 1996).

Competitive advantages

Competitive advantages are defined in relation to how well a country's industries perform on the world market. According to Porter (1990), the existence of *industrial clusters* is essential for a country to have a sustainable competitive advantage.

Competitive advantages of a region can be seen as a combination of L- advantages of that region and O-advantages of the region's enterprises. It is, however, not evident that foreign MNEs are investing mainly in the competitive sectors of the host country. Structural factors, for instance due to governmental policy might be the most important factor for the investing MNE. A host-country may, for instance, have competitive advantages in the manufacture of resource-intensive products, but still have MNEs producing in technology-intensive sectors. This is possible as long as there is governmental stimulation to foreign production in technology-intensive sectors, for example through tariffs or other trade barriers.

Porter's account tends to disregard the role of foreign firms. Dunning (1992) critiques this view and argues that transnational business activity along with governmental policy and chance should be seen as important factors influencing a country's "diamond" of competitive advantage. Transnational business activity may influence factor conditions, demand conditions, firm strategy as well as related and supporting industries and therefore will contribute to the development of the host country's competitive advantages.

Even where domestic firms constitute the heart of an industrial cluster, foreign firms may still play important roles. Furthermore, in later stages of the investment development path, foreign enterprises may acquire domestic enterprises as part of a strategic asset seeking policy. Hence, while in the initial stages of the investment development path, the main activities of an industrial cluster may be dominated by domestic enterprises; the opposite may well be the case in the later stages.

Globalisation and small economies


As highlighted by numerous studies, small, open economies share certain features (see for example Freeman and Lundvall [eds.] 1988, Dunning and Narula [eds.] 1996, Tulder 1999, Hoesel and Narula 1999, Bellak and Cantwell 1998). This body of literature has illustrated that small open economies tend to be more internationalised, with a relatively large share of the value-added activity being conducted with the explicit purpose of serving overseas markets. Furthermore, firms from these countries tend to be competitive in a few niche sectors, as small

countries tend to have limited resources and prefer to engage in activities in a few targeted sectors rather than spread these resources thinly across several industries.

Some of the characteristics of small economies are a function of size *per se*. The demand conditions restrain the sectors and kinds of ownership advantages that firms of a particular nationality develop. Small market size constitutes a disadvantage in the development of process technology as the economies of scale are not present, but may provide a competitive advantage in product innovation (Walsh 1988). This applies to the kind of created asset location advantages small countries can provide.² They have less resources³ and must either spread resources more thinly over the various disciplines or select areas as priorities, which often (but not always) are those in which they have a natural-asset advantage, leading to a specialisation of domestic firms in particular niche sectors (Soete 1987, Archibugi and Pianta 1992, Narula 1996). On the other hand, small country economies tend to be more open, because of the limited economies of scale the home market provides, and their firms tend to be more highly internationalised and often are involved in rationalised production due to the limited resources of their home economies.

The concentration on a few niche sectors as well as the limited size of the domestic market may have as consequence that FDI in small, open economies differs from the development of FDI in larger economies. First, small economies, which are rich in natural resources but in short supply of capital and specific know how, may need inward FDI to be able to develop their competitive advantages. Second, small countries may receive few or no market-seeking investments. Third, efficiency-seeking FDI may be crucial for several industries to obtain a rationalised structure because there are no domestic companies with the capacity to do this job.

3 Norway compared to other European countries

Table 1 gives some overall details of Norway compared to other small European countries. We also include some larger economies such as the UK, France and Germany for purposes of comparison. It is worth noting that even in comparison with the other Scandinavian economies, Norway is the smallest  terms of population and GDP, although on a per capita basis its GDP is higher than any of the countries in table 1.

² See Freeman and Lundvall [eds.] (1988).

³ On an absolute scale - although the expenditure on R&D as a percentage of GDP of, say, Sweden is higher than that of the U.S. (3% vs. 2.6%), in absolute terms its R&D expenditures are just 3.9% that of the U.S. (Freeman and Hagedoorn 1992).

Small economies (in population size and GDP) such as the Netherlands, Switzerland, Belgium and Sweden are much more internationalised on a relative basis (looking at the importance of trade in their economies) than their larger counterparts such as Germany, France, and the UK, as is well illustrated by this table.


Table 1: Some basic indicators 1997

	Norway	Denmark	Finland	Sweden	Switzer-land	Nether-Lands	UK	France	Germany
Population. Million.	4.393	5.84	5.40	8.846	7.089	15.611	59.009	58.608	82.052
GDP. Billion US dollars	153.4	170	119.8	227.8	256	363.3	1282.9	1394.1	2089.9
Per capita GDP, US dollars	34815	32179	23314	25746	36006	23280	21740	23789	25470
Value-added in the manufacturing sector as percentage of GDP	11.1	17.1*	22.5	19.6***	-	17.8**	18.5*	19.3	23.6
Employed persons in the manufacturing sector as a percentage of total employment	15.1	19.4	20.2	19.4	18.2	15.2	18.6	18.4	24.0
Export Billion US dollars	63.3	61.2	47.7	99.7	101.8	203.3	368.0	371.5	560.4
Export as percentage of GDP	41.3	36.0	39.8	43.8	39.7	56.0	28.7	26.6	26.8
Export of manufactures /total merchandise exports (1998)	30	65	86	82	93	70	85	80	86
Import. Billion US dollars	52.5	55.5	37.1	83.8	90.6	177.8	374.0	316.6	528.8
Import as percentage of GDP	34.2	32.6	31.0	36.8	35.4	48.9	29.2	22.7	25.3

Sources: OECD (1999), The World Bank (2000)

*1996 **1995 ***1994

Like other small countries, exports as a percentage of GDP were a much higher share than for large economies in 1997. Indeed, it would seem that, apart from certain idiosyncratic characteristics, Norway might appear to be broadly similar to the other countries listed here. Two issues need to be stressed here. Firstly, Norway's economy is highly dependent on natural assets, much more so than any of the other countries save the Netherlands. Secondly, Norway has a smaller manufacturing sector than the other countries.

From table 1, it is evident that Norway has a quite different industrial structure than Sweden, Denmark, Finland, UK, Germany, France, the Netherlands and Switzerland. While Norway mainly has comparative advantages in natural resources, the other countries' exports, to a much larger extent, consist of manufactured goods. In 1996, primary goods amounted to about three-quarters and manufacturing to one quarter of total merchandise exports from Norway. Comparatively, in Sweden 80%, in Finland 83% and in Denmark 69% (see Table 1) of the merchandise export consisted of manufacturing. In 1998, about 15% of the Norwegian merchandise exports were based  technology-intensive manufacturing. The equivalent figures for Sweden, Finland and Denmark were 50%, 42% and 28% respectively (Reve 2000).

Unlike the Netherlands, where manufacturing accounted for about 17.8% of GDP, Norwegian manufacturing sector accounted for 11.1% (see Table 1). This relatively low involvement in manufacturing and a concurrent high level of primary activities reflects two

things. First, that like other high-income countries, its location advantages vis-à-vis low value adding activity have been declining with rising unit labour costs. Second, unlike these other countries where there has gradually been a post-industrial society evolving with a growing dependence on high-value adding activity and services sector, Norway has traditionally had a very low significance of its secondary sector.

While the decline in manufacturing in most OECD countries occurred in response to the growth of the tertiary sector, in the case of Norway, much of the growth was associated with the primary sector. Between 1965 and 1999, the oil production and mining sector grew from less than 1% to 14.4% of GDP. The equivalent figures for the manufacturing industry were 21.3% in 1965 and 10.5% in 1999 (Statistic Norway 1994 and 2000). However, another characteristic that separates Norway from the UK and Netherlands (which also experienced rapid growth of their oil industry over roughly the same period) is that the agricultural sector has continued to grow. In terms of volume indices, agriculture, forestry and fishing have continued to show steady growth since 1970, increasing at roughly the same rate as manufacturing (Statistic Norway 1994).

Returning to foreign direct investment

Table 9.5 FDI activity from and by selected OECD countries

Country/ Area	1980						1992						1995					
	OFDI Stock	% share of total	IFDI Stock	% share of total	country share of world GDP	MNEs share of GDP	OFDI Stock	% share of total	IFDI Stock	% share of total	country share of world GDP	MNEs share of GDP	OFDI Stock	% share of total	IFDI Stock	% share of total	c of	
W-Europe	236579	45.6	200287	41.8	23.4	17.3	999852	51.7	838316	43.1	34.5	23.1	1395195	49.6	1192155	41.6		
Germany	43127	8.3	36630	7.6	7.3	10.1	178682	9.2	129606	6.7	7.8	17.2	259746	9.2	167137	5.8		
France	23604	4.5	22617	4.7	6.2	7.0	160897	8.3	119198	6.1	5.7	21.2	181255	6.4	147623	5.2		
UK	80434	15.5	63014	13.2	5.0	26.7	221197	11.4	173254	8.9	3.9	43.7	302847	10.8	314650	11.0		
Netherlands	42116	8.1	19167	4.0	1.6	35.7	131730	6.8	83733	4.3	1.4	67.3	164754	5.9	112336	3.9		
Italy	7319	1.4	8892	1.9	4.2	3.6	68718	3.6	62740	3.2	5.3	10.7	97042	3.5	63455	2.2		
Sweden	5611	1.1	3626	0.8	1.2	7.4	50547	2.6	14199	0.7	1.0	29.3	71491	2.5	36521	1.3		
Norway	1944	0.4	6699	1.4	0.6	13.7	12319	0.6	8484	0.4	0.5	18.4	22519	0.8	19652	0.7		
Total	204155	39.3	160645	33.5	26.0	13.0	824090	42.6	591214	30.4	25.5	24.0	1099654	39.1	861374	30.1		
Japan	18833	3.6	3270	0.7	9.8	2.1	250430	13.0	38720	2.0	15.9	7.9	306769	10.9	17814	0.6		
USA	220178	42.4	83046	17.3	25.1	11.2	488767	25.3	419526	21.6	25.7	15.3	709200	25.2	560088	19.5		
Other devel.	64314	12.4	125896	26.3	11.0	16.0	306329	15.9	470684	24.2	12.3	27.4	462022	16.4	602782	21.0		
Total devel.	507480	97.8	372857	77.8	72.0	11.3	1869616	96.8	1520144	78.2	79.4	18.5	2577645	91.7	2042058	71.3		
Developing	11310	2.2	106241	22.2	28.0	3.9	62418	3.2	420194	21.6	20.6	10.2	231405	8.2	789743	27.6		
Total	518869	100.0	479175	100.0	100.0	9.3	1932300	100.0	1945104	100.0	100.0	16.8	2811007	100.0	92865839	100.0		

Source: UN (1995, 1997), World Bank (1994, 1997)


Million US\$ 1980, 1992 & 1995


Country/ Area	1980				1992				1995									
	% OFDI Stock	% IFDI Stock	country share of world GDP	MNEs share of GDP	% OFDI Stock	% IFDI Stock	country share of world GDP	MNEs Share Of GDP	% OFDI Stock	% IFDI Stock	country share of world GDP	MNEs share of GDP						
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France	23604	4.5	22617	4.7	6.2	7.0	160897	8.3	119198	6.1	5.7	21.2	181255	6.4	147623	5.2	5.5	21.4
UK	80434	15.5	63014	13.2	5.0	26.7	221197	11.4	173254	8.9	3.9	43.7	302847	10.8	314650	11.0	4.0	55.8
Netherlands	42116	8.1	19167	4.0	1.6	35.7	131730	6.8	83733	4.3	1.4	67.3	164754	5.9	112336	3.9	1.4	70.0
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Total	518869	100.0	479175	100.0	100.0	9.3	1932300	100.0	1945104	100.0	100.0	16.8	2811007	100.0	2865839	100.0	100.0	20.4

Source: UN (1995, 1997), World Bank (1994, 1997)

Table 2 gives details of the foreign direct investment activity and GDP for several countries including Norway. The data on FDI stocks is based on estimates provided by UNCTAD, and these estimates are broadly comparable across countries. Inward FDI to Western Europe increased at an annual average rate of 26.3% between 1980 and 1992. This broadly reflected changes, related to the creation of a single European market and the resulting restructuring that it triggered (see Dunning 1997a, 1997b, Hagedoorn and Narula 2001). Indeed, it is significant to note that this also reflected a world-wide growth in the activities of multinationals, where the ratio of the volume of world inward plus outward FDI stock to world GDP has grown twice as fast as the ratio of world imports and exports to world GDP (UN 1998). In terms of share of worldwide FDI, Western Europe's share increased only marginally from 41.8% to 43.1% over this period, signifying that investment activity largely represented intra-European changes and responses to economic globalisation as European MNEs adjusted their spatial distribution to rationalise their European activities on a pan-European scale. This involved naturally enough, some level of disinvestment, as economies of

scale were exploited to a considerable extent. There was substantial inward investment from non-European countries, primarily by firms from Japan and the United States. However, some of this growth reflected a perceived need of MNEs to establish themselves within the European community before the end of 1992, as a reaction to the possible protectionism of the single European market, commonly referred to as 'fortress Europe'. Nonetheless, this was primarily FDI from relatively 'new' investors, in particular Japanese MNEs. Most US firms were already quite firmly established within Europe. However, US MNEs in general, reacted in much the same way as European firms by restructuring their European operations in preparation for the single market (Hughes 1992).

Examining the growth of Norwegian FDI between 1980 and 1992, Norway attracted 1.4% of the total worldwide inward FDI stock in 1980. By 1992, Norway's share of inward FDI stock had fallen to 0.4%. Indeed, this represented an annual average growth rate of just 2.2%, lower than the growth rate of nominal GDP over that period. This slow growth rate is further highlighted by the change in relative positions with Sweden. In 1980, Norway was home to almost twice the FDI stock of Sweden, which accounted for only 0.8% of total world FDI stock. By 1995, the situation had totally changed as Sweden accounted for almost twice the FDI stock of Norway. 

It should be stressed that a comparison with Sweden is not without pitfalls. First, fundamental differences exist in the industrial structure of the two countries. Unlike Norway, Sweden is highly dependent on its manufacturing sector. Much of the foreign investment in Norway has been directed to the primary sector, particularly to petroleum and other resource-intensive sectors. Even in 1990, FDI in the manufacturing sector of Norway was only 7.7% of the total FDI (see Table 5). In Sweden by contrast, 59.5% of the FDI was invested in the manufacturing sector the same year. ond, the growth of foreign direct investment to Sweden reflected a rapid relaxation of regulations regarding inward investment and the ownership of assets by foreign firms, beginning in the mid-1980s. Furthermore, by the early 1990s it had become apparent that Sweden was to join the European Union, and as a result, there was a considerable inflow of investment. As table 2 shows, between 1992 and 1995, when Sweden officially joined the EU, inward FDI stock grew at an astounding 52.4% annually, faster than any other country. The Swedish share of the total worldwide inward FDI stock increased from 0.7% in 1992 to 1.3% in 1995.⁴ Indeed, FDI in Norway also

⁴ The most important home-countries are USA (890 billion SKr), Finland (120 billion SKr), Norway and Netherlands (about 25 billion SKr each) (Invest in Sweden 1999:11).

demonstrated a rapid growth rate of 43.8% during this period, increasing its share of worldwide FDI from 0.4% in 1992 to 0.7% in 1995.

4 The competitive advantages of Norway

According to the 1992 Norwegian Porter study, the strongest and most dynamic industrial clusters in Norway were the maritime industrial cluster and the petro-industrial cluster. The seafood, metal products, paper and pulp industries were all part of medium strong clusters. The telecommunication and IT industries together with the pharmaceutical industry were categorised as part of the R&D cluster, which was characterised as a potential industrial cluster with large growth opportunities if correctly organised (Meyer and Reve 1993:47). A new Porter-study, undertaken in 1999-2000, showed that the highest growth after 1994 has been in the telecom/IT industries and in the seafood industrial cluster, although the maritime cluster as well as the petro-industrial cluster have experienced growth rates higher than the average of Norwegian industries (Reve and Jakobsen et al 2001).

However, in terms of industrial cluster development, the pharmaceutical industry has weakened and the telecommunication/IT industry is still not strong enough to be the basis for an industrial cluster (Reve 2000).⁵ The petro-industrial cluster and the maritime industrial cluster are the most important Norwegian clusters at the end of the nineties (Benito et al 2000, Jakobsen et al 2000).⁶ In the following paragraphs, we will take a closer look at the different industrial clusters.

The maritime industrial cluster

The maritime industrial cluster consists of the ship building industry, shipping and maritime services. Approximately 14% of the Norwegian exports in 1997 were related to the maritime sector. While the maritime sector is important for Norwegian exports, this is however mainly due to the exports of services, which constituted, on an average, over half of all the service exports from Norway in the period 1992-1997 (Benito et al 2000).

Norway is one of the world's largest shipping-nations and shipbuilding is the country's oldest competence industry. The importance of the Norwegian shipping and shipbuilding industry has been quite stable over the last decade. In 1997, the Norwegian OECD market share in the shipbuilding industry was 1.9% while the equivalent figure for the shipping

⁵ As is evident from Table 3, there has been a decline in the employment in the manufacturing sector of the Telecommunication/IT industries from 1991 to 1996.

industry was 9.3% (Benito et al 2000). In the manufacturing industry connected to the maritime industrial cluster, there was an employment growth of 3.6% from 1991 to 1996 (see Table 3).


Table 3: Employment 1991 and 1996

	Total employment			Employment in foreign majority owned firms			Employment growth 1991-1996
	1991	1996	Employment growth 1991-1996	1991	1996	Employment growth 1991-1996	
Petro-industrial cluster	16664(6.2%)	18787(6.7%)	12.5%	1673(6.0%)	3561(9.2%)	112.9%	10
Maritime industrial cluster	16357(6.1%)	16950(6.0%)	3.6%	540(2.0%)	1481(3.8%)	174.3%	3.3
Seafood industrial cluster	11280(4.2%)	13690(4.9%)	21.4%	309(1.1%)	491(1.3%)	58.9%	2.7
Metal industrial cluster	30964(11.5%)	31177(11.1%)	0.7%	2640(9.5%)	3428(8.8%)	29.9%	8.5
Forest industrial cluster	11112(4.1)	10794(3.8%)	-2.9%	616(2.2%)	952(2.5%)	54.6%	5.5
Tele/IT industries	4294(1.6%)	3867(1.4%)	-9.9%	2708(9.8%)	1543(4.0%)	-43.0%	63
Construction equipment	23133(8.6%)	23257(8.3%)	0.5%	1768(6.0%)	3174(8.2%)	79.5%	7.2
Consumer goods	101007(37.6%)	107504(38.1%)	6.4%	6336(22.8%)	11187(28.8%)	76.6%	6.3
Machinery and equipment	32354(12.0%)	34774(12.3%)	7.5%	6798(24.5%)	8099(20.8%)	19.1%	21
Other manufactures	21778(8.1%)	21147(7.5%)	-2.9%	4364(15.7%)	4944(12.7%)	13.3%	20
Sum	268985(100%)	281947(100%)	4.8%	27752(100%)	38860(100%)	40.0%	10

Source: Own calculations based on data from Statistics Norway

There are strong connections between the maritime industrial sector and other exporting sectors, like the fishing industry (fishing boats and equipment), offshore industry (oil-platforms) and transport of oil and petro-chemical products (Reve et al 1992, Meyer and Reve 1993, Benito et al 2000).

The petro-industrial cluster

In the last Porter-study, the petro-industrial cluster refers both to the firms that are engaged in the extraction and refinement of petroleum related products, as well as to firms engaged in the production and sale of equipment related to these firms. For instance, there are offshore yards⁷ that are specialised firms within areas such as seismic, drilling, supply activities, engineering and production of equipment particularly related to offshore technology. These have partly  developed as an extension of the shipbuilding industry (Reve et al 1992, Meyer and

⁶ The metal industrial cluster and the forest industrial cluster have not been investigated in the latest Norwegian Porter-study.

⁷ like Aker Stord and Kværner Rosenberg

Reve 1993). In 1999, crude oil and gas accounted for 35% of total Norwegian exports, while all products from the petro-industrial cluster approximately corresponded to 41% of total exports (Statistic Norway 2000:293).

In 1996, about 18,800 persons worked in the manufacturing industry connected with the petro-industrial cluster, which implies a growth in employment of about 12.5% since 1991 (see Table 3). Much of the petro-industrial cluster developed because of active government intervention. For instance, the Petroleum Law of 1985 provided a legal basis for the preferential treatment of the Norwegian manufacturing industry when it came to supplying the petroleum sector. Norway's acceptance of the European Economic Area (EEA) agreement in 1994 has meant that such preferential treatment for domestic Norwegian firms can no longer be practised. There is no doubt, however, that the Petroleum Law played a significant role in inducing the growth of firms in the building and repairing of offshore petroleum platforms and modules. For example, in 1989, only three out of seventeen contracts in this sector went to firms located outside Norway (Holmøy et al 1993).

In addition, Norwegian authorities established incentives for the MNEs to co-operate with domestic actors within R&D, training and education. It did so by requiring technology transfer to domestic firms from foreign-owned firms, often by insisting on joint ventures (Nygaard and Dahlstrom 1992).

When the extraction of oil from the North Sea started up, the authorities wanted to establish a Norwegian petro-chemical industry. Legislation therefore gave companies located in Norway, secure supplies of raw material at relatively stable prices (Meyer and Reve 1993).

Manufacture of basic chemicals has had relatively low energy prices due to long-term contracts with suppliers of electricity (Bye et al 1999). Raw materials are, however, more important than energy and account for about 60% of the costs in the production of the petro-chemical industry (Meyer and Reve 1993). Norsk Hydro and Statoil are the two important actors in the manufacture of petro-chemicals in Norway.

The seafood industrial cluster

The seafood industrial cluster consists of fishing, operation of fish hatcheries and fish farms, service activities incidental to fishing, processing and preserving of fish and fish products, manufacture of crude fish oils and fats, manufacture of cordage, rope, twine and netting, wholesale and retail sales of fish and wholesale of shipping equipment and fishing tackle.

In 1998, exports related to the seafood industrial cluster approximately corresponded to 6.4% of total Norwegian exports (Statistics Norway 2000). However, despite its

significance, there is little value-added in this industry. Although 90% of the catch is exported, about half of the export consists of unprocessed fish (Statistics Norway 2000). However, throughout the nineties, Norwegian firms in the processing of seafood have taken a larger piece of the world market, and in 1998, the Norwegian share of total sales of processed seafood in the OECD area was equal to 19% (Reve and Jakobsen 2001). In 1996, the manufacturing industry connected with the seafood industrial cluster had about 13,700 employees, a growth of 21.4% since 1991 (see Table 3).

The metal industrial cluster

The metal industrial cluster consists of the manufacture of basic metals and fabricated metal products (except machinery and equipment), manufacture of furnaces and furnace burners, machinery for metallurgy and recycling of metal waste and scrap.

In 1999, exports of metals corresponded to about 7% of total Norwegian exports (Statistics Norway 2000). The Norwegian metal industry mainly consists of the production of aluminium and ferroalloys. In 1992, Norway was the world's largest producer of ferro-silicon and silicon metals, the second largest producer of manganese alloys and the fifth largest producer of primary aluminium. Most of the production was exported, mainly to European countries (Meyer and Reve 1993). There has been almost no growth in domestic employment in the metal industrial cluster sector since 1991 and total employment in this sector was about 31,000 employees in 1996 (see Table 3).

Competitive advantages have been related *inter alia* to abundant and cheap hydro-electrical power, competence in metallurgy and good harbours. In these industries, access to cheap energy has been more important than closeness to raw materials or to customers (Svendsen et al 1992a and 1992b). Much of the production of ferro-alloys and aluminium was therefore located near energy-sources. The production of metals started with foreign capital in the beginning of the 20th century. In the 1950s and 1960s, the industries expanded parallel with the development of hydraulic power.

The main activity for the Norwegian aluminium production has traditionally been primary aluminium. From 1955 to 1970, there was an annual average growth of 14% in the production of primary aluminium. After 1970, the growth in the aluminium industry was about 3% each year, and it was strongly dominated by domestic capital (Reve et al 1992). The manufacture of aluminium lost 10% of the OECD market share from 1990 to 1997 (Jakobsen 1999).

The sector is dominated by Norsk Hydro, which acquired the Norwegian assets of their foreign partners in 1973, and by 1996 controlled about 75% of the production of basic aluminium in Norway.

Ferro-alloys are used in the manufacture of steel and aluminium and this is also an energy- and capital-intensive industry. The production of ferro-alloys expanded during the first decades after World War II due to a large need for steel for construction purposes. After 1974, Norwegian production stagnated (Reve et al 1992), as steel as well as ferro-alloys partly experienced increased competition from the newly industrialising countries. In 1965, 91% of the production of ferro-silicon and 77% of the production of ferro-manganese took place in the US and Western Europe, but by 1990 the figures were 62% and 43% respectively. In the 1990s, the Norwegian ferro-alloy industry also experienced harder competition from the eastern part of Europe. Transportation costs were large and the energy-prices to the Norwegian producers had grown more than the prices the competitors were confronted with. This was probably the reason why Norwegian companies expanded abroad, particularly in the US, Canada, Iceland and Brazil⁸ (Svendsen et al 1992b).

The forest industrial cluster

Another important exporting sector in the manufacturing industry has been the production of paper and pulp. This industry is also based on the use of natural resources and access to abundant waterpower. 80% of the production is exported, mainly to other European countries (NOU 1998:11). In 1999, exports from the forest industrial cluster approximately corresponded to 3% of total Norwegian exports (Statistics Norway 2000). The manufacturing industry connected with the forest industrial cluster employed about 10,800 persons in 1996, a reduction of 2.9% since 1991 (see Table 3).

In the beginning of the 20th century, foreign (and especially British) capital was important in developing this industry. In 1909, almost half of the capital in the manufacture of paper, leather and rubber was foreign owned (Stonehill 1965). However, by 1920, much of the paper and pulp production had been nationalised (Ulseth 1992)⁹.

By 1950, paper and paper products was the second largest export industry (Meyer and Reve 1993). Today it has relatively less importance for the Norwegian economy. More

⁸ The Norwegian industry also had problems with accusations of price dumping by EU producers.

⁹ The most significant transaction was the purchase of Kellner-Partington Paper Pulp Company Ltd. in 1917 by Borregaard A/S. Borregaard A/S was Norway's largest industrial concern in terms of total employment. It was also an instrument for repatriating other important British investments, including De-No-Fa og Lilleborg Fabrikker and Følldal Verk (Stonehill 1965:42).

recently, recycled paper has become increasingly significant for the manufacture of paper all over the world. For the pulp and paper industry, this means that the primary L-advantages, related to the large forests of spruce and pine have become less important. In the Nordic countries, there is less access to input for recycled paper, due to the smaller population in these countries. This is probably one of the main reasons why several Nordic companies have invested in factories in other European countries, like France, the UK and Germany (Ulseth 1992). The other main historical factor for the development of pulp and paper in the Nordic countries is abundant energy.

Norske Skog dominates the paper and pulp industry in Norway. It is a consolidation of some of the major Norwegian players, which took place in the 1980s, in an attempt to rationalise this sector. This consolidation in the Norwegian industry mirrors a similar restructuring that has taken place in these sectors throughout Europe, partly as firms have had to respond to falling profit margins. Such consolidation has allowed firms to reduce costs through economies of scope and scale in the production, marketing and distribution of paper and paper products. During the last decade Norske Skog has become one of the worlds leading producers of paper and pulp due to several acquisitions of competing enterprises.

5 Governmental policy and the history of FDI in Norway

Norway did not begin to industrialise until the early 20th century. In order to leverage and exploit its abundant natural resources, it needed to import technology to generate energy required for this purpose. At the beginning of the century, FDI in Norway was mainly in resource-based, export-oriented sectors that developed due to the access to cheap hydroelectric power. This served as a basis for broadly three types of new industries- the electro-metal (e.g., the production of aluminium), the production of paper and pulp and the electro-technical (e.g., the manufacture of generators).

From the beginning of the industrialisation of Norway, politics towards FDI had two aims. The first was to keep as much as possible of the rents from the exploitation of natural resources within Norway. The second was to develop a domestic manufacturing industry with the help of foreign capital. The objective of retaining as much as possible of the natural resource rent within Norway was achieved primarily using concession laws. In the period from 1883 to 1920, the Norwegian Parliament passed several laws, regulating the foreign ownership of natural resources. The most important law for industrial establishments, the so-called industrial concession law, was passed in 1917. According to this law, it was necessary

to apply for authorisation from the government if more than 20% of the capital stock was in foreign hands in companies with the ownership of mines, waterfall or real estate. The director of the board and a majority of its members had to be Norwegians. Despite the concession rules, foreign-owned affiliates owned or controlled more than a third of the equity in the Norwegian mining and manufacturing industry in 1909. The most important sectors were the manufacture of chemicals in which foreign capital accounted for 85% of the total.

A variety of policy tools was used with the objective of developing a domestic manufacturing sector. Among these were barriers to trade and “pressure” on domestic and foreign firms to buy domestic products. Often the concession conditions required that the foreign company undertook production in Norway.

In 1927, Parliament passed the so-called “10% Rule”, which required that 10% be added to foreign bids before choosing between foreign and domestic suppliers. The rule was especially meant to encourage the Norwegian production of electro-technical products and machinery. The Concession Act of 1917 also gave preferences to Norwegian production for deliveries to projects connected with waterfalls and mines. Some of the most important international companies in the electromechanical industry, such as ASEA, Brown Boveri, Siemens and Ericsson, established production in the country and this may be as a result of the governmental “infant-industry” policy.

Owing to imports of raw material and capital equipment for the industrialisation process, the Norwegian foreign debt grew rapidly during the first decade of the 20th century and the dominant role of foreign capital became of serious concern to the government. However, Norwegian interests were able to compulsorily acquire a number of the foreign owned companies¹⁰, partly due to the high liquidity of the economy immediately after World War I. Norway had a large merchant fleet, which in the period 1914-1918 gave the country a relatively high income in foreign currency.

During the inter war period, FDI mainly took the form of acquisitions in industries that were based on hydroelectric power. In 1927, the German company IG Farben exchanged shares with Norsk Hydro and so 25% of the shares of Norsk Hydro were in German hands. After this acquisition, foreign investments in Norsk Hydro represented approximately one third of all foreign-owned capital stock. In 1945, all German holdings in Norway were taken over by the Norwegian Government as war repatriations.

¹⁰ for instance, Hafslund, Arendal Smelteverk and parts of Norsk Hydro.

After World War II and until 1956, there were few new investments but existing foreign owned companies expanded.¹¹ Generally, liquidity was low throughout Europe and almost all FDI came from the US. Foreign capital inflow was very important for the Norwegian economy. Grants (mostly due to the Marshall program) and war repatriations were the main forms of inflow in the period 1948-1951. The Government realised that it would not be possible to maintain energy-intensive industries without foreign capital, and several concessions to foreign acquisitions of Norwegian companies were passed after 1955.

The lack of domestic capital in Norway in the 1950s and 1960s made the industry lobby for relaxed policies towards inward FDI. Although the majority of the capital was in the trade sector, Norway experienced a growth in FDI during the period 1957-1962 partly as a result of various incentives towards inward FDI.

After World War II, large efforts were undertaken to use waterfalls for electric power by the government. To ensure that the new electricity capacity would be used, the authorities made long-term contracts with firms in the power-intensive industries, namely aluminium, ferro-alloys and basic chemicals (plastic in primary forms, carbides, fertilisers) and with firms producing pulp, paper and paperboard. The prices were relatively low because the first electricity-projects had low costs and it was not possible then to export the energy over longer distances. The contracts between the power-producers and the manufacturing industry had duration of about 60 years and few of them contained clauses on price regulations. The energy-intensive sectors used about 30% of the produced electrical power in Norway in 1996. The most heavily subsidised industries through relatively low energy prices are the production of aluminium and the production of ferro-alloys (Bye et al 1999).¹²

After 1962, there were several, large foreign investments in the electrical energy-intensive industries, like the manufacture of aluminium, petro-chemicals, paper and pulp and ferro-alloys. This may be one of the reasons behind the growth in exports in the period 1955-1970. In addition, there were large foreign investments in the mechanical sector, in the manufacture of fish products and other consumer goods. Nonetheless, FDI in Norway has remained subdued. Foreign investment flows, measured in constant 1985-NOK, was about the same at the beginning of the 1980s as in the beginning of the century.¹³

¹¹ Only one new enterprise of a certain size was established before 1952 and this was Norsk Viftfabrikk.

¹² All such long-term contracts with prices lower than the market price for electricity are supposed to be terminated between 2005 and 2011.

¹³ Unless otherwise indicated, the previous paragraphs in this chapter are based, to a large extent, on Stonehill (1962), and Midttun et al (1987).

FDI continued to be regulated, and foreign firms were required to seek permission from the regulatory authorities before investing under the concession laws. Previous research shows that, in the 1970s and 1980s, there were few cases where the regulatory authorities did not give concession to perform a direct investment in the Norwegian manufacturing industry. However, the conditions for permission to produce may have prevented firms from applying (Kresl 1976, Kvinge 1994). Simpson (1994:9) remarks that the restrictions seem to have had little effect on the size of the equity the foreign owners wanted to hold.¹⁴

Lange (1977) brings forward two reasons why the concession laws during the first ten-year period did not have any "noteworthy inhibiting effect" on Norwegian industrial development: the laws were implemented in a liberal manner and the profit margins in the relevant sectors were high.

Furthermore, numerous exogenous factors affected structural market conditions, particularly Norway's obligations within international and supra-national agreements. Perhaps most important, was Norway's membership of the EFTA in 1960. The purpose was a gradual removal of tariff barriers for manufactured goods and the process was to be completed by 1 January 1967.¹⁵ Due to an agreement with EC in 1973, tariffs on most products were abolished by 1978 (Melchior 1994).

Developments associated with the European Economic Community, and the departure of several of the key EFTA members to the European community led to the establishment of the EEA-agreement in 1994. All trade between the remaining EFTA countries (Norway, Switzerland and Island) and EU is now regulated through the EEA-agreement. Because the EEA treaty forbids member countries from discriminating between foreign and domestic owners, the Norwegian Government was required to change the concession-rules, so that foreign and domestic acquisitions are treated uniformly by the authorities. However, acquisitions and mergers over a particular size need approval from the ministry of industry, independent of the nationality of the buyer.

In addition, the EEA agreement has required the reduction of subsidies to several industries. Furthermore, the conclusion of the Uruguay round of GATT and its implementation affected numerous governmental discriminatory practices, particularly in the

¹⁴ In 1996, although there were differences between sectors, on average the largest owner had at least 49% of the capital in foreign firms. In more than four out of ten firms, the largest owner on average stood behind 98% of the capital (see Table 1 in the appendix).

¹⁵ Different measures of openness indicate that there was no general trend towards more trade dependency in the period 1976-1991, despite the fact that the petroleum sector experienced a significant growth. One explanation is that sheltered sectors, i.e. sectors with relatively high trade barriers, have expanded so fast that trading sectors have lost on relative importance (Melchior 1994).

area of government procurement. The Government Procurement Agreement (GPA, as a part of GATT) forbids the authorities from discriminating between foreign and domestic offer when buying commodities or services of a certain size.

Although there are few formal tariff barriers left, several sectors are still protected by governmental policy. Statistics Norway calculated the amount of generalised government subsidies due to indirect taxes and subsidies, tariff and non-tariff barriers to trade and price discrimination in the market for electricity (Fæhn et al 1995, Fæhn et al 1996, Jørgensen et al 1999). These calculations show that there were barriers to trade in the production of food and beverages, textiles, cement, chemicals and production of machinery and equipment in the nineties. The regulations in the production of textiles, food (except fish products) and beverages mainly consisted of tariffs and quantitative barriers to trade. In the production of cement and in some of the chemical sectors (fertilisers and pharmaceuticals), the market concentration was relatively high, mainly due to large economies of scale in production and because import was prevented. Shipbuilding and the manufacture of fish products were subsidised through different forms of government grants. In the fabrication of paper products, chemicals and metals, the producers have taken advantage of favourable prices of hydroelectric power.

Table 4: Effective rates of assistance (ERA) by sector

	1991	1996
Food	-84.3	*
Beverages	-46.0	
Textiles and textile products	-2.3	-3.2
Wood and wooden products	0.8	1.0
Paper and paper products	-10.5	-1.7
Printing and publishing	0.9	-1.5
Chemical products, rubber and plastic, other non-metallic mineral products	-15.6	-0.5
Basic chemicals	-5.8	-5.5
Basic metals	-6.3	-14.1
Shipbuilding	-24.0	-23.4
Oil-platforms and modules	-8.8	-1.0
Other fabricated metal products, machinery and equipment	-4.8	-0.4

Source: Fæhn et al (1995), Jørgensen et al (1999)

* In 1996, fish-products had an ERA of -2.2. Production, processing and preserving of meat products and the manufacture of dairy products had an ERA of -71.1 and other consumer goods (including beverages) an ERA of -39.2.

Table 4 shows effective rates of assistance (ERA) calculated by Statistics Norway. ERA measures the effect of governmental industrial politics on factor prices. It is defined as the relative change in the factor reward to capital and labour if governmental politics would shift to be neutral. The higher the negative values of ERA, the more directly or indirectly subsidised is the industry (Jørgensen et al 1999).

In 1991, the average ERA was 30.5%, while in 1996 it was 18%. The most heavily supported sectors were agriculture, the manufacture of meat and dairy products and the manufacture of other consumer goods. Shipbuilding also had an ERA higher than average in 1996.¹⁶

Due to the EEA agreement as well as GATT, there were changes in the calculated generalised government subsidies from 1991 to 1996. The changes were mainly to do with the fact that the Norwegian government was no longer permitted to prefer Norwegian produced goods in the manufacture of machines and equipment nor to maintain specific Norwegian standards. Furthermore, firms have been prohibited from collaborating on prices or from sharing markets in the manufacture of chemical and mineral products (Jørgensen et al 1999).

6 FDI in the manufacturing industry

In chapters 3-5, we have described natural as well as created assets and structural conditions, influencing the L-advantages of Norway. In this chapter, we will take a closer look at the developments in Norwegian FDI in the nineties. Let us briefly summarise our prior findings. First, Norway is a small, open economy. Second, exports to a high degree are based on raw materials. Third, compared with other small economies in Europe, the manufacturing sector is relatively small. Fourth, about 70% of total exports can be traced back to the five main industrial clusters, which are the petro-industrial cluster, the maritime industrial cluster, the seafood industrial cluster, the metal industrial cluster and the forest industrial cluster.

Broadly speaking, the clusters exist around particular sectors. These are often also those sectors which benefit from governmental policy in the form of direct or indirect grants, import barriers etc.

After petroleum was discovered in the North Sea in the late 1960s, the GDP-growth of Norway has been relatively high. Increase in GDP per capita has resulted in increased demand for construction equipment, consumer goods and services. The Norwegian market is, however, relatively small with only 4.4 million inhabitants. Other structural components of

importance for the development of inward FDI might be the former concession laws (until 1995), the "10%-rule", international agreements like EFTA, GATT and EEA as well as non-tariff barriers to trade and direct governmental grants.

Outward and inward FDI

Table 5 shows Norway's inward and outward FDI in the period 1990-1997. The composition of inward FDI differs considerably from that of outward FDI. For instance, in the period 1990-1997, while on average about 11% of inward FDI was directed to the manufacturing industry, Norwegian manufacturing FDI accounted for about 26% of total outward FDI. From table 5, it is also apparent that Norway experienced a large growth in outward as well as inward FDI in the manufacturing sector during the nineties.

Several caveats concerning the data should, however, be made. First, the Central Bank of Norway only reports the investor's industry in Norway and not which industries the outward FDI goes to abroad. Second, growth in outward as well as inward investments may be due to Norwegian companies establishing affiliates abroad for reinvesting in Norway. Third, while the Central Bank of Norway measures inward FDI on the basis of information from the Norwegian Tax Inspectorate, outward FDI is measured on the basis of questionnaires to Norwegian enterprises in which foreigners own 10% or more. The result may be that inward investments are better documented than outward investments.

Table 5: Outward and inward FDI stock 1990-1997. Total and manufacturing industry

Billion Nkr and percentages	1990	1991	1992	1993	1994	1995	1996	1997
Total inward	73.2	94.8	94.5	102.4	113.7	123.3	139.1	168.1
Manufacturing	5.6	7.9	8.9	9.3	10.1	12.0	13.6	31.4
Inward FDI Manufacturing as percentage of total	7.7%	8.3%	9.4%	9.1%	8.9%	9.7%	9.8%	18.7%
Total outward	64.3	72.6	81.7	94.8	119.9	142.3	163.9	201.1
Manufacturing	26.2	19.1	21.8	24.2	33.3	37.6	41.1	41.6
Outward FDI Manufacturing as percentage of total	40.8%	26.3%	26.7%	25.5%	27.8%	26.4%	25.1%	20.7%

Source: The Central Bank of Norway

During the last decades, Norwegian industrial companies have expanded activities in other countries to a large degree. While 7% of the employment in the thirty largest Norwegian enterprises was to be found abroad in 1975, the equivalent figure was 35% in 1990

¹⁶ The shipbuilding sector has also been highly subsidised in other OECD countries. In Norway, as in the rest of

(Hammervoll and Heum 1993). In 1996, about 150,000 persons were employed in Norwegian companies abroad. This accounted for about 40% of the Norwegian employment in production exclusive agriculture and services the same year (Heum et al 1998). Outward FDI was dominated by a handful of Norwegian enterprises and a large part of the capital invested in other Nordic countries as well as the UK and the U.S. (Central Bank of Norway 1996).

It is evident that several of the largest domestic multinational companies have distinct O-advantages, which developed due to domestic natural and created assets, i.e., the companies internalised former and present L-advantages. These O-advantages extended to also include the ability to co-ordinate domestic and foreign assets across borders as these companies had relatively broad experience with FDI themselves. In the rest of the report, we concentrate on analysing the pattern and changes of inward FDI.

Aggregate changes in employment, 1980-1996

Table 6 reports changes in employment in firms with at least 50 employees for different ownership-groups by industrial sector. As Table 6 shows, employment in the Norwegian manufacturing industry decreased considerably between 1980 and 1996, from 254,454 to 185,222 persons.¹⁷ This represents a reduction of 27% over a 16-year period. It is important to note that most of this decline occurred between 1980 and 1991. Indeed, there has been a marginal increase of 6.1% in manufacturing employment between 1991 and 1996. This development is mainly conditioned by the state of the international market (economic cycles) and less by structural changes. Hence, while Norway experienced a recession after the decline in petroleum prices in 1985, the economy recovered in the beginning of the nineties.

Table 6: Employment in firms with at least 50 employees. 1980, 1991, 1996. Number of employees and employees in different ownership groups as percentage of total employment each year

the European Economic Area, subsidies are supposed to be phased out in 2001 (OECD, February 2000:5).

¹⁷ In this section, we focus on firms with at least 50 employees. In the next section, where we look closer at foreign investments in different industrial groups, we use data on all firms. For an overview on employment in all firms divided by sector, see Table 4 in the appendix.

FDI in Norway's manufacturing sector.

	1980			1991			1996		
	Foreign majority owned	Other ownership groups	Sum all ownership groups	Foreign majority owned	Other ownership groups	Sum all ownership groups	Foreign majority owned	Other ownership groups	Sum all ownership groups
Food, beverages and tobacco	1062 (3.3%)	30659 (96.7%)	31721 (100%)	1449 (5.2%)	26451 (94.8%)	27900 (100%)	5933 (18.5%)	26150 (81.5%)	32073 (100%)
Textiles	231 (1.8%)	12744 (98.2%)	12975 (100%)	521 (14.3%)	3115 (85.7%)	3636 (100%)	146 (4.0%)	3535 (96.0%)	3681 (100%)
Wood and wood products	196 (1.3%)	14835 (98.7%)	15031 (100%)	142 (2.3%)	5920 (97.7%)	6062 (100%)	99 (1.6%)	6009 (98.4%)	6108 (100%)
Paper and paper products Printing and publishing	1603 (4.1%)	38014 (95.9%)	39617 (100%)	2032 (6.5%)	28972 (93.5%)	31004 (100%)	2035 (6.3%)	30165 (93.7%)	32200 (100%)
Chemicals, chemical petroleum, coal, rubber, plastic products	2640 (11.3%)	20690 (88.7%)	23330 (100%)	3322 (20.2%)	13119 (79.8%)	16441 (100%)	4188 (25.4%)	12305 (74.6%)	16493 (100%)
Mineral products	582 (7.3%)	7372 (92.7%)	7954 (100%)	1486 (31.9%)	3167 (68.1%)	4653 (100%)	2620 (54.0%)	2234 (46.0%)	4854 (100%)
Basic metals	4003 (15.3%)	22116 (84.7%)	26119 (100%)	1851 (12.0%)	13627 (88.0%)	15478 (100%)	2107 (14.9%)	12032 (85.1%)	14139 (100%)
Fabricated metal products, machinery and equipment	9701 (10.1%)	86288 (89.9%)	95989 (100%)	11948 (18.7%)	51934 (81.3%)	63882 (100%)	15531 (22.4%)	53821 (77.6%)	69352 (100%)
Other manufacturing industries		1718 (100%)	1718 (100%)	510 (9.4%)	4935 (90.6%)	5445 (100%)	227 (3.6%)	6085 (96.4%)	6312 (100%)
Sum	20018 (7.9%)	234436 (92.1%)	254454 (100%)	23261 (13.3%)	151240 (86.7%)	174501 (100%)	32886 (17.8%)	152336 (82.2%)	185222 (100%)

Source: Own calculations, based on data from Statistic Norway and Kvinge (1994)

On an aggregate level, there were only minor changes in the structure of the manufacturing industry. The most important Norwegian manufacturing sectors continued to be machinery and equipment, the food sector, paper, printing and publishing. In 1996, about three-quarters of the persons working in firms with at least 50 employees in the manufacturing industry were engaged in these three sectors. Table 7 shows the percentage distribution of employment in different owner-categories on industrial sectors.

Table 7: Employment in firms with at least 50 employees 1980, 1991 and 1996. Percentages

	1980			1991			1996		
	Foreign majority owned	Other ownership groups	Sum all ownership groups	Foreign majority owned	Other ownership groups	Sum all ownership groups	Foreign majority owned	Other ownership groups	Sum all ownership groups
Food, beverages and tobacco	5%	13%	12%	6%	17%	16%	18%	17%	17%
Textiles	1%	5%	5%	2%	2%	2%	0.6%	2%	2%
Wood and wood products	1%	6%	6%	1%	4%	3%	0.4%	4%	3%
Paper and paper products Printing and publishing	8%	16%	16%	8%	19%	18%	6%	20%	17%
Chemicals, chemical petroleum, coal, rubber, plastic products	13%	8%	9%	14%	9%	9%	13%	8%	9%
Mineral products	3%	3%	3%	6%	2%	3%	8%	1%	3%
Basic metals	21%	9%	10%	8%	9%	9%	6%	8%	8%
Fabricated metal products, machinery and equipment	49%	36%	38%	51%	34%	37%	47%	35%	37%
Other manufacturing industries		1%	1%	2%	3%	3%	1%	3%	3%
Sum (The percentages do not always sum up to 100 due to abbreviations)	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: Own calculations, based on data from Statistic Norway and Kvinge (1994)

Employment in foreign majority owned firms

Tables 6 and 7 also give the distribution of employment in firms with foreign ownership in 1980, 1991 and 1996. Although data is highly aggregated on a sectoral level, some broad trends are observable. First, there was a growth in the employment of foreign majority owned affiliates both in absolute and relative terms. In absolute terms, employment of foreign majority owned firms increased by 16.2% between 1980 and 1991, and by 41.4% between 1991 and 1996. Given the decline in overall manufacturing employment, this implies a growth in the overall share of employment of foreign majority owned firms in the manufacturing sector from 7.9% in 1980 to 17.8% in 1996.

Second, the sectoral allocation of employment of foreign majority owned firms does not resemble that of domestic firms. In 1980 as well as in 1996, the fabrication of chemicals and fabricated metal products, machinery and equipment was relatively more important with foreign ownership (see Table 7). While the food sector was of less importance for foreign majority owned firms than for domestic firms in 1980, the importance was about the same in 1996. In the production of basic metals, the development was the other way around. In 1980, basic metals had a far larger relative significance for foreign majority owned firms than for domestic firms, while in 1996, the reverse was true. While employment in the fabrication of

mineral products had about the same importance independent of ownership groups in 1980, this sector became relatively more significant with foreign majority ownership in 1996.

Third, there were considerable variations in employment-growth between sectors with foreign majority ownership. In the food sector and the fabrication of mineral products, the employment with foreign majority ownership was between three and five times larger in 1996 than in 1980. Chemicals and fabricated metals, machinery and equipment had a total employment growth of about 60% over the relevant period. The employment in foreign majority owned firms in the manufacturing of paper products was 27% higher in 1996 than in 1980. All other sectors (textiles, wooden products, basic metals) with foreign ownership experienced a decline in employment from 1980 to 1996.

In 1980, fabricated metal products, machinery and equipment represented almost half of the employment in majority owned firms. This did not change very much over the relevant period (see Table 7). The second largest sector in 1980 was the manufacture of basic metals, with 21% of the total employment in majority owned firms. This sector had only 6% of the employment in 1996. While fabrication of basic metals lost considerably in relative importance, the food and beverage sector gained correspondingly. In 1996, this sector had increased (from 3% in 1980) to 18% of the total and was the second largest sector when it came to majority owned capital. In 1980 as well as in 1996, chemicals, in which 13% of the employees were engaged, was the third largest sector (see Table 7). Mineral products experienced a growth from 3% of the employment in 1980, to 8% in 1996. There was a small decline in the importance of sectors like textiles, wooden products, paper products, printing and publishing (see Table 7).

Due to statistical inconsistencies, caution should be exercised with the data used here. For instance, in several sectors in which FDI was important, Norwegians, in fact, owned some of the foreign investing firms. This was the case in the manufacture of beverages and basic chemicals.¹⁸ Moreover, in the offshore and shipbuilding industry, some of the yards with FDI were in fact, wholly or partly owned by Norwegian firms, which organised their economic activities in Norway through a holding company abroad.

¹⁸ Ringnes, which produces beverages, is a central player in the Norwegian market for soft drinks and beer. In 1995, Ringnes merged with the Swedish company Pripps. Pripps-Ringnes is registered as a Swedish company with its headquarter in Stockholm, although since 1997, it has been wholly owned by the Norwegian company Orkla. In 1998, Pripps-Ringnes had 59% of the Norwegian market for beer. The equivalent figures for soft drinks and mineral water were 20% and 70% respectively (Göran Orre, Head of information Pripps-Ringnes 28.12.99).

In the manufacture of basic plastic, Statoil and Norsk Hydro have been one of the leading producers in Norway. In 1994, Statoil started to co-operate with the Finnish Company Neste through Borealis. Statoil has the majority

The higher importance of the food and beverage sector came mainly between 1991 and 1996, with an average annual growth of 61.9% of employees working in firms with majority FDI. However, foreign ownership was almost absent in several branches (like meat products, fruit and vegetables, oils and fats, dairy products, grain mill products, starches and starch products). The most important branches in 1996 were beverages and “other food products”, which together accounted for 81.6% of the employment in majority owned firms in the food and beverage sector. The growth in employment from 1991 to 1996 also came mainly in these sectors. There was an annual average growth of 133% in beverages and of 54% in other food products.¹⁹

Employment in industrial clusters and other manufacturing

While table 3 gives a picture of the employment distribution in the Norwegian manufacturing industry on different industrial clusters and other sectors²⁰, tables 8-11 give more detailed information about the different industrial groups.

Generally, about 32% of total employment in 1991 as well as in 1996 was to be found in the five industrial clusters. There was an annual average growth in employment in the industrial clusters of about 1%, which is of the same magnitude as the growth rate in the whole manufacturing industry in the relevant period. In the case of foreign majority owned firms, around 21% of the employment was allocated to the five industrial clusters in 1991. In 1996, the equivalent figure was 26%.²¹ Hence, the employment-growth within the industrial clusters was stronger than within other industries with foreign ownership. In total, there was

of the shares in Borealis, but because the company is located abroad, Statoil’s production of plastic in Bamble in Norway in 1996 is registered in the statistics as foreign majority owned activity.

¹⁹ This is mainly due to a few mergers and acquisitions in the food and beverage sector, for instance the acquisition of Freia by Kraft General Foods in 1992 and the merger between Pripps and Ringnes in 1995. Other large foreign owners in the beverage sector are Coca-Cola company and the Danish company Carlsberg.

²⁰ The petro-industrial cluster, the maritime cluster and the seafood cluster are defined according to the Norwegian Porter-study (see Jakobsen et al 2000, Benito et al 2000 and Kopp et al 2000). In addition, we have defined several industrial groups, including a metal industrial cluster, forest industrial cluster, construction equipment, consumer goods, machinery and equipment and a group of other production, which mainly consists of chemicals and non-metallic mineral products not categorised within the other groups.

²¹ The production of electricity distribution and control apparatus, insulated wire and cable might be seen as part of the metal industrial cluster, the forest industrial cluster as well as the petro-industrial cluster. Hydroelectric power is closely connected with the production of aluminium, ferro-alloys, paper and pulp. Insulated wire and cable are also produced for the offshore sector. In addition, a large proportion of the chemical sector is petroleum-related and may therefore be categorised in the petroleum industrial cluster. While petrochemicals were included in the petro-industrial cluster in the 1992 study, this sector is not covered by the latest Norwegian Porter study.

In tables 3 and 8, however, we use the results from the latest Norwegian Porter-study when it comes to categorising which activities belong to different clusters. A rough reclassification (including the following sectors: NACE 24.16, NACE 25.22, NACE 25.24, NACE 31.1, NACE 31.2, NACE 31.3) would suggest that about 37% of the total employment and about 40% of the employment in majority owned foreign firms was associated with the five industrial clusters in 1996.

an annual average employment-growth of 8% in foreign majority owned firms in the period 1991-1996. In the industrial clusters, the average annual growth in the same period was 16%. In the next section, we shall focus on examining the development within each of the major industrial groups.

Development in the different industrial groups

The sectors that have experienced the largest *general* growth in employment from 1991 to 1996 are the seafood industrial cluster and the petro-industrial cluster. On the other hand, the telecom/IT industries as well as the forest industrial cluster experienced a decline in employment over the same period (see Table 3). The largest employment growth in *foreign majority owned firms* was in the maritime industrial cluster. This cluster had 174.3% more employees in foreign majority owned firms in 1996 than in 1991. In the petro-industrial cluster, the equivalent growth rate was 112.9%. In addition, the seafood industrial cluster and the forest industrial cluster experienced growth rates over 50% with foreign majority ownership. Furthermore, from 1991 to 1996, there was a growth in employment of nearly 80% in construction equipment and other consumer goods in foreign majority owned firms. Over the same period, the employment growth in machinery and other production was considerably smaller (between 10 and 20%). The higher growth rates with foreign majority ownership were mainly due to mergers and acquisitions. In the telecom/IT industries, the employment was 43% lower in 1996 than five years earlier (see Table 3).

Industry-distribution with foreign ownership

Using the preliminary new categories, let us take a closer look at the distribution of employees in foreign majority owned firms in the different industrial groups in 1996. The three most important industrial clusters, namely the petro-industrial cluster, the maritime industrial cluster and the seafood industrial cluster together engaged 14.2% of the employees in foreign controlled firms. The metal industrial cluster, the forest industrial cluster and the IT/telecom industries engaged another 15.3% of the employees in foreign controlled firms. 28.8% of the employees were engaged in firms producing consumer goods, 8.2% were producing articles for construction purposes and 20.8% were producing machines and equipment (see Table 3).

The relative importance of foreign ownership was largest in the telecom/IT industries, in chemicals and other products, in machines and equipment and in the petro-industrial cluster. In these four sectors, the employment in foreign majority owned firms accounted for

39.9%, 23.4%, 23.2%, and 19% of total employment respectively. In the rest of the groups, foreign majority ownership only counted for 3.6-13.7 % of total employment.

In 1996, foreign ownership was relatively important in R&D intensive sectors in which 23.7% of the employment was to be found in foreign controlled firms. R&D intensive sectors are industries with R&D expenses as a percentage of value added higher than average.²² There was however, a decline in the relative importance of these sectors with foreign majority ownership. While 45.6% of the employment in foreign controlled firms was allocated to the R&D intensive sectors in 1991, the share had fallen to 38.9% in 1996. The equivalent figures for all ownership groups were 19.5% in 1991 and 22.6% in 1996.

Table 8: Employment 1996. Industrial clusters

NACE		Total employment	Employees in foreign majority owned firms as a percentage of total employment in the sector
23.2	Refined petroleum products	1206	32.5
35.114	Building and repairing of oil-platforms and modules	12292	14.6
35.115	Installation and completing of work on platforms and modules	5121	26.7
35.116	Other floating equipment	168	0
Sum	Petro-industrial cluster	18787	19.0
29.111	Marine engines and parts	677	55.2
29.12	Pumps and compressors	2072	16.6
29.221	Lifting and handling equipment	1391	...
35.111	Building and repairing of ships and hulls more than 100 g-r.tons	9383	3.6
35.112	Installation- and completion work on ships and hulls more than 100 g-r.tons	1276	31.6
35.113	Building and repairing ships	1352	...
35.117	Ship breaking	...(22)	0
35.12	Building and repairing of pleasure and sporting boats	777	0
Sum	Maritime industrial cluster	16950	8.7
15.2	Processing and preserving of fish and fish products	12474	3.9
15.411	Crude fish oils and fat	22	0
17.52	Cordage, rope, twine and netting	1194	0
Sum	Seafood industrial cluster	13690	3.6
27.1	Basic iron, steel and ferro-alloys	1521	70.9
27.2	Tubes	462	...
27.3	Other first processing of iron and steel minus cold forming and folding (-27.33)	2277	...
27.41	Precious metal production	...	0
27.42	Aluminium production	6443	...
27.5	Casting of metals	1957	...
28.1	Structural metal products	7754	2.5
28.2	Tanks, reservoir and containers of metal	452	...
28.3	Steam generators	130	0
28.4	Forging, pressing and roll forming	204	0
28.5	Treatment and coating of metals	3172	19.5
28.61	Cutlery	361	0
28.62	Tools	422	20.4
28.63	Locks and hinges	674	57.6
28.7	Other fabricated metal products	4622	10.7
29.21	Furnace and furnace burners	278	27.3

²² These are NACE 19, NACE24, NACE29-NACE34 (Norges Forskningsråd 1999:246)

29.51	Machinery for metallurgy	112	0
37.1	Recycling of metal waste and scrape	253	23.7
Sum	Metal industrial cluster	31177	11.0
21.1	Pulp, paper and paper products	6715	0
21.2	Paper and paperboard	3838	23.2
29.55	Machinery for paper and paper production	241	...
Sum	Forest industrial cluster	10794	8.8

Source: Own calculations based on data from Statistics Norway

A closer look at the different industrial groups

In the *petro-industrial cluster*, the most important sub-sector was the manufacture of oil-platforms and modules (see Table 8). In this sector, 14.6% of the employment was in foreign majority owned firms. The equivalent figure for installation and completion of work was 26.7%. The third most important sub-sector was refined petroleum products, in which 32.5% of the employees were working in foreign majority owned firms.

In the *maritime industrial cluster*, about 76% of the employment was in shipbuilding and installation of ships and the rest in the manufacture of engines and other equipment. Foreign controlled firms accounted for a significant part of the employment in maritime engines and parts and in the installation and completion works on ships (see Table 8). Despite this fact, the average contribution from foreign controlled firms to the employment in the total maritime industrial cluster was only about 9%, the reason being that several sectors in the shipbuilding industry did not have FDI. In 1996, in the *seafood industrial cluster*, FDI was only to be found in the processing and preserving of fish products.

In the *metal industrial cluster*, about one half of the employment was allocated to basic iron, steel and ferro-alloys and other non-ferrous metal production, and the other half to fabricated metal products. Foreign capital was dominant in basic iron, steel and ferroalloys and in locks and hinges (see Table 8). In several sectors, there was very small or no production at all in foreign majority owned firms.

The main product manufactured by foreign firms in the *forest industrial cluster* was household and sanitary goods. In this sector, the entire employment was in foreign majority owned firms.²³ However, in the forest industrial cluster, the fraction of the employment that was to be found in foreign majority owned firms was relatively low on average and about 8.8% (see Table 8). This is because foreign firms were only active in the manufacture of articles of paper and paperboard and were not involved in the production of the “raw material”, i.e., they were not engaged in the energy-intensive component of the process.

Table 9: Employment 1996. Construction equipment and other consumer goods

NACE		Total employment	Employees in foreign majority owned firms as a percentage of total employment in the sector
20	Wood and wooden products	14491	1.5
25.21	Plastic plates, sheets, tubes and profiles	1763	26.5
25.23	Builders' ware of plastic	765	17.1
26.1	Glass and glass products	1954	51.0
26.4	Bricks, tiles and construction products	81	74.1
26.5	Cement, lime and plaster	557	92.8
26.6	Articles of concrete, cement and plaster	3646	21.6
Sum	Construction equipment	23257	13.7
15.71	Prepared feeds for farm animals	1798	25.7
15.84	Cocoa; chocolate and sugar confectionery	2279	56.2
15.96	Beer	3161	78.3
15.98	Production of mineral water and soft drinks	2208	63.3
15-16 ²⁴	Other food-products	30508	1.9
17-19 ²⁵	Textiles	7022	2.6
22.1	Publishing	25757	5.0
22.2-22.3 ²⁶	Printing and service activities related to printing	10354	6.3
24.4	Pharmaceuticals, med. chem. and botan. Products	2610	28.2
29.7	Domestic appliances	1240	36.4
31.4	Accumulators, primary cells and primary batteries	167	89.2
31.5	Lighting equipment and electric lamps	1378	10.0
31.6	Electrical equipment	1079	9.8
33.4	Optical instruments and photographic equipment	119	83.2
34.1	Motor vehicles	317	0
34.2	Bodies for motor vehicles	1217	...
34.3	Parts and accessories for motor vehicles	3298	...
35.4	Motorcycles and bicycles	572	...
36.1	Furniture	9126	2.2
36.2	Jewellery	938	0
36.3	Musical instruments	30	0
36.4	Sport goods	1036	11.5
36.5	Games and toys	33	0
36.6	Miscellaneous manufacturing	1257	...
Sum	Other consumer goods	107504	10.4

Source: Own calculations based on data from Statistics Norway

In *products for construction purposes*, the main sectors with FDI were glass, cement and concrete products (see Table 9). Flat glass has been imported from abroad, shaped, and processed in firms along the coast. As with cement, transportation costs have been relatively high, and there may have been advantages in locating near customers in the construction industry. The largest group of *consumer goods* was beverages, chocolate and sugar confectionery (see Table 9).

²³ For reasons of confidentiality, where there is only one, two or three firms in an industrial sub-sector, we have had to suppress the results. In such cases, we only provide aggregated figures.

²⁴ Except NACE 15.2 and 15.411 (seafood cluster)

²⁵ Except NACE 17.52 (seafood cluster)

²⁶ Except NACE 22.33 (Tele and IT industries)

FDI has been important in the production of machines and equipment. In 1996, almost half the employment in electric motors, generators and transformers was in foreign majority owned firms. The same year, in electrical distribution and control apparatus, the equivalent figure was 59.7%, in insulated wire and cable 94.4% and in industrial process control equipment 53.1% (see Table 10).²⁷

Table 10: Employment 1996. Tele and IT industries, Machinery and equipment

NACE		Total employment	Employees in foreign majority owned firms as a percentage of total employment in the sector
22.33	Reproduction of computer media	295	...
30.02	Computers and other information processing equipment	593	...
32.2	Television and radio transmitters and apparatus for line telephony and line telegraph	2979	50.9
Sum	Tele and IT industries	3867	39.9
29.119	Other engines and turbines and parts	1339	0
29.13	Taps and valves	558	50.0
29.14	Bearings, gears, gearing	735	...
29.2 ²⁸	Other general purpose machinery	5676	22.1
29.3	Other agricultural and forestry machinery	2107	...
29.4	Machine tools	517	25.9
29.52	Machinery for mining, quarrying and construction	1401	12.3
29.53	Machinery for food, beverages, tobacco	1175	...
29.54	Machinery for textile	115	...
29.56	Other special purpose machinery	1110	0
29.6	Weapons and ammunition	2123	0
30.01	Office machinery	153	...
31.1	Electrical motors, generators and transformers	3085	49.6
31.2	Electrical distribution and control apparatus	2477	59.7
31.3	Insulated wire and cable	1401	94.4
32.1	Electronic valves and tubes and other electronic comp.	1075	37.1
32.3	Television receivers, sound or video recording	417	0
33.1	Medical and surgical equipment and orthopaedic	1994	9.4
33.2	Instruments and appliances for measuring, testing, navigation	2670	18.5
33.3	Industrial process control equipment	614	53.1
35.2	Railway, tramway and rolling stock	1844	...
35.3	Aircraft and spacecraft	2150	0
35.5	Other transport equipment	38	...
Sum	Machinery and equipment	34886	23.2

Source: Own calculations based on data from Statistics Norway

In the telecommunication and IT industries, almost all employees in foreign majority owned firms were employed in the manufacture of television, radio transmitters, apparatus for

²⁷ As mentioned before, several of these sectors can also be seen as belonging to metal industrial or forest industrial cluster as electrical energy is important in these clusters. ABB Norsk Kabel is one of the leading producers of insulated wire and cable for the Norwegian domestic - as well as for the export markets. The company produces cable for the general electricity supply, ships, offshore activities, data and telecommunication.

²⁸ Except NACE 29.21 (Metal industrial cluster) and 29.221 (Maritime industrial cluster)

line telephony and line telegraph. In this sector, foreign ownership was quite important as, in 1996; over half of the employees were engaged in foreign majority owned firms (see Table 10). The production of machines and equipment was characterised by a few large and several, smaller foreign majority owned firms. This may indicate a combination of horizontal and vertical integration, i.e., machinery and equipment were imported from affiliates abroad and tailored to the requirements of the domestic customers, wherever they were located.

Table 11: Employment 1996. Other chemicals and non-metallic mineral products

NACE		Total employment	Employees in foreign majority owned firms as a percentage of total employment in the sector
23.1	Coke oven products	0	0
24.11	Industrial gases	535	49.3
24.12	Dyes and pigments	290	...
24.131	Carbides	847	87.8
24.139	Other inorganic basic chemicals	1142	...
24.14	Other organic basic chemicals	1402	...
24.15	Fertilisers and nitrogen compounds	1842	...
24.16	Plastic in primary form	2164	...
24.17	Synthetic rubber in primary form	...	0
24.2	Pesticides and other agro-chemical products	...	0
24.3	Paints, varnishes and similar coatings, printing ink and mastics	1625	16.1
24.5	Soap and detergents	589	...
24.6	Other chemical products	795	13.3
25.1	Rubber products	848	43.3
25.22	Plastic packing goods	1855	24.5
25.24	Other plastic products	1374	...
26.2	Non-refractory ceramic goods other than for construction purposes; refractory ceramic products	1026	20.5
26.7	Cutting, shaping and finishing of stone	696	...
26.8	Other non-metallic mineral products	1477	45.6
27.43	Lead, zinc and tin production	560	...
27.44	Copper production	493	0
27.45	Other non-ferrous metal production	1344	...
37.2	Recycling of non-metal waste and scrap	219	...
Sum	Other chemicals, rubber, plastic and non-metallic mineral products	21147	23.4

Source: Own calculations based on data from Statistics Norway

Closer inspection of the data in Table 11 suggests that foreign majority owned firms are active in three main areas. The first is plastics, the second carbides and the third other non-metallic mineral products. Foreign ownership is also quite dominant in industrial gases and in rubber products. To sum up, FDI is mostly prevalent in certain market niches within the different industrial groups.

Effective rates of assistance (ERA) and FDI

In 1996, a large part of foreign activities was allocated to sectors that had relatively high effective rates of assistance (ERA) like oil-platforms and modules, the shipbuilding industry, beverages and basic chemicals. Other sectors with relatively high ERA like paper and pulp and the metal sector had lost in importance when it came to majority FDI. Furthermore, foreign ownership played a very modest role in the seafood industrial cluster, which was also highly subsidised. Although the calculated ERA was considerably lower in 1996 than in 1991, in several sectors (like chemicals, rubber, plastic and other non-metallic mineral products, fabricated metal products, machinery and equipment, see Table 4), there was still a growth in FDI in these sectors.

However, this should not lead to the conclusion that inward FDI is independent of changes in structural factors. First, the calculated ERA is reported on a relatively highly aggregated level. Therefore, it may cover quite substantial differences between market segments within a sector. Second, the changes from 1991 to 1996 in the calculated ERA were mainly due to the *presumed* results of the GATT and EEA agreements. In practice, there may still exist structural market imperfections and positive ERA in several sectors. As we will see later, in 1996, concentration was relatively high in chemicals as well as in non-metallic mineral products. In addition, machines and equipment, which had lower calculated ERA in 1996 than in 1991 (due to the fact that the Norwegian government is no longer permitted to prefer domestic produced goods), had relatively high concentration indexes in 1996 (see Table 14). Hence, we do not have certain knowledge about the connection between the development in ERA and the development in FDI.

Mergers and acquisitions

The expansion in employment in foreign majority owned firms has mainly been due to mergers and acquisitions by multinational companies. Table 12 shows the employment in manufacturing firms in 1996, divided by mode of entry.

From table 12, it is evident that as much as 35.9% of the employment in 1996 was allocated to firms, which changed ownership and became foreign controlled according to mergers and acquisitions during the period 1991-1996. 9.7% of the employment in foreign controlled firms in 1996 was due to new establishments by foreign owners during the same period. Furthermore, only 54.4% of the employment was allocated to firms that were foreign majority owned in 1991 as well as in 1996.

Table 12: Employment in foreign majority owned by mode of entry. 1996

	Employment 1996	Percentage of total
New establishments by foreign owners 1991-1996	3801	9.7%
Foreign majority ownership both 1991 and 1996	21145	54.4%
Not foreign majority ownership 91/foreign majority ownership 96	11651	30.0%
Established 1991-1995 by domestic owners, but became foreign controlled 1992-1995	2297	5.9%
Total employment in foreign majority owned firms	38894	100%

Source: Own calculations based on data from Statistics Norway

Table 13 shows employment in firms, which existed in 1991 as well as in 1996 and changed ownership in the relevant period. There are quite large differences in the industry distribution. About 28% of the employment in firms, which changed from being not foreign majority owned in 1991 to being foreign majority owned in 1996 was in the food and beverage sector (see Table 13).

Table 13: Employment 1996 in firms, existing both 1991 and 1996 by industries and change of ownership

	Employment in firms without foreign majority ownership 1991 and with foreign majority ownership 1996	Employment in firms with foreign majority ownership 91 and without foreign majority ownership 96
15-16 Food, beverages and tobacco	3306 (28.4%)	...
22 Printing and publishing	161 (1.4%)	340 (15.6%)
24 Chemicals, chemical products	1221(10.5%)	...
25 Rubber, plastic products	528 (4.5%)	0
26 Other non-metallic mineral products	1548 (13.3%)	0
27 Basic metals	617 (5.3%)	...
28 Fabricated metal products	327 (2.8%)	...
29 Machinery and equipment	454 (3.9%)	0
30-33 Office machinery and apparatus	1210 (10.4%)	1363 (62.4%)
35 Other transport equipment	2056 (17.5.3%)	...
Other sectors	223 (1.9)	481 (22.0%)
Sum manufacturing	11651 (100%)	2184 (100%)

Source: Own calculations based on data from Statistics Norway

Change from foreign majority to foreign minority or domestic ownership for the most part was the case in the manufacturing of radio, television, communication equipment and apparatus and in printing and publishing (see Table 13).

Concentration in different sectors

We expect foreign firms to be found mainly in sectors with relatively high concentration because factors creating firm-specific advantages for the multinational companies (like economies of scale) are also the factors that create barriers to entry and seller concentration in markets.

Herfindahl-indexes²⁹ are a measurement of concentration of producers in an industry. When the Herfindahl-index is 1, there is only one producer. A high concentration in a sector might be defined as corresponding to a Herfindahl-index ≥ 0.1 (Veland and Sørgard 1990). If we use this criterion, we find that mostly all manufacturing industries on a three-digit level in Norway were highly concentrated (see Table 14). Exceptions were wood products, printing and publishing, rubber and plastic products, fabricated metal products and furniture. The concentration was, however, relatively high in several segments in these industries such as the impregnation of wood, the reproduction of sound recording, the manufacture of rubber tyres and tubes, builders' ware of plastic, steam generators and locks and hinges.

The Herfindahl-index does not tell us how competitive a market is. To investigate this question, we need data on imports relative to domestic production in different sectors.³⁰ Furthermore, there might also be several small firms in a sector, which give a relatively low index, although there are only one or a few owners. This is, for instance, the case in the production of food³¹ and in paper and pulp, in which co-operation of farmers and forest owners respectively dominate large parts of the production.

Table 14 shows Herfindahl-indices in different manufacturing sectors and the Pearson's correlation coefficients between the Herfindahl-indices and ownership, i.e. whether the firm is foreign majority owned or not.³²

Table 14: Herfindahl-indices and Pearson's correlation between Herfindahl-indices and ownership. All firms and foreign majority owned firms. 1996

²⁹ The Herfindahl-index is defined as the sum of the squared market shares of each firm in the sector and is calculated as $H = \sum_{(i=1 \text{ to } N)} (S_i)^2$ where N = the total number of firms in the sector, S_i is the market share of firm number i ($S_i \leq 1$)

³⁰ For the period 1976-1991, Melchior (1994) reports by means of an empirical analysis of Norwegian trade that non-tariff barriers have had a strong impact on domestic market shares.

³¹ In the manufacture of food, the Herfindahl-index varies from 0.0775 in production, processing and preserving of meat and meat products (NACE 15.1) to 0.7231 in manufacture of vegetable and animal oils and fats (NACE 15.4). Although there are several firms in sector 15.1, there are few owners. Earlier work shows that the farmers' co-operation is standing behind a large part of these firms (Veland and Sørgard 1990).

³² The Pearson correlation coefficient is calculated for industries on a two-digit level on the basis of the five-digit level Herfindahl-indices.

	Herfindahl-indices (std.dev)		Pearson's correlation coeff Herfindahl-index and ownership (1=foreign majority owned firms 0=else)
	All firms	Foreign majority owned firms	
15-16 Food, beverages and tobacco	0.1058134 (0.1499152)	0.2109809 (1453011)	0.1410***
17-19 Textiles, wearing apparel, leather	0.1319414 (0.1170463)	0.1907429 (0.1198229)	0.0438
20 Wood and wooden products	0.046882 (0.0339099)	0.0633522 (0.0604603)	0.0404
21 Paper and paper products	0.299988 (0.1605927)	0.3929889 (0.2543518)	0.1895
22 Printing and publishing	0.0402698 (0.0374238)	0.0548994 (0.0419279)	0.0716
23 Coke, refined petroleum	0.3353835 (0)	0.3353835 (0)	-
24 Chemicals, chemical products	0.392395 (0.2171035)	0.3672355 (0.1521374)	-0.0524
25 Rubber, plastic products	0.0934682 (0.0462152)	0.0951838 (0.0451998)	0.0107
26 Other non-metallic mineral products	0.2052948 (0.2440709)	0.496822 (0.3821911)	0.5191***
27 Basic metals	0.3635603 (0.1998671)	0.384945 (0.2538599)	0.0355
28 Fabricated metal products	0.0769879 (0.0932904)	0.1085431 (0.0911392)	0.0601
29 Machinery and equipment	0.1357927 (0.1178072)	0.112116 (0.0640373)	-0.0630
30 Office machinery and computers	0.6235678 (0.0577085)	0.6760069 (0.1090588)	0.273
31 Electrical machinery and apparatus	0.1909122 (0.1362851)	0.2811204 (0.2144163)	0.3063***
32 Radio, television, communication equipment and apparatus	0.1420681 (0.1309383)	0.2145297 (0.1377842)	0.2274
33 Medical precision and optical instruments, watches and clocks	0.1491266 (0.1615117)	0.2905697 (0.3147536)	0.2632***
34 Motor vehicles, trailers and semi- trailers	0.1198889 (0.1566031)	0.0944845 (0.046712)	-0.0335
35 Other transport equipment	0.1175826 (0.171889)	0.2276628 (0.261879)	0.1499**
36 Furniture, n.e.c.	0.0759955 (0.0879613)	0.1618429 (0.2334355)	0.1098**
Sum manufacturing	0.1102566 (0.1451633)	0.239993 (0.2592092)	0.2164***

*** Significant on 1%-level, ** Significant on 5%-level

Source: Own calculations based on data from Statistics Norway

The main impression is that the sectors based on natural resources as well as consumer goods, construction equipment and sectors with high levels of R&D-intensity all have relatively high concentration-levels, measured by the Herfindahl-index. The high concentration is probably due to economies of scale, either because of large sunk cost related to investments in machinery and other equipment, advertising outlays for the creation of brands or related to R&D.

Using data on a five-digit level gives Herfindahl-indexes that are significantly higher in sectors with majority owned FDI, i.e., foreign majority investments have been more prevalent in market-segments with few producers.³³ This was the case in the food and beverages sector, other non-metallic mineral products, electrical machinery and apparatus, medical, precision and optical instruments, watches and clocks, transport equipment and furniture. We realise that there were significant differences between ownership-groups in the production of machinery, as well as in resource-based sectors like the metal-industry and chemicals.

When controlling for size, the significant positive correlation between Herfindahl index and foreign majority ownership diminishes. In other words, foreign majority ownership is mainly to be found in market segments with high producer concentration, but so are larger domestic firms and firms with foreign minority ownership.³⁴

7 Summary and conclusions

This report explores country-specific characteristics influencing foreign direct investments into the Norwegian manufacturing industry while focusing on economic as well as institutional factors. Norway is a small, open economy with abundant natural resources, and highly concentrated in a few sectors. About two thirds of exports are connected with the five main industrial clusters, which during the nineties have been the petro-industrial cluster, the maritime industrial cluster, the seafood industrial cluster, the metal industrial cluster and the forest industrial cluster.

Compared to other open European economies, a relatively small part of Norwegian exports consists of manufactured goods and quite a minor share of merchandise exports is technology-based. Furthermore, GDP in the manufacturing industry is relatively low compared to the total GDP.

After the discovery of petroleum in the North Sea in the late 1960s, the GDP-growth of Norway has been relatively high. Increase in GDP per capita resulted in higher demand for construction equipment, consumer goods and services. The Norwegian market is, however,

³³ The hypothesis that there is no difference in the Herfindahl-index between firms with foreign majority ownership and other firm is tested and confirmed with a confidence-level of less than 5%. We therefore assume that majority owned foreign firms are more often to be found in niches with relatively high Herfindahl-indexes than are other firms.

³⁴ Generally, foreign owned firms are, on average, larger than domestic firms. However, when comparing firms with at least 50 employees, foreign majority firms are only significantly larger in the manufacturing of food and beverages, in the manufacturing of textiles and in the production of manufactured metal products. In firms with

small with only 4.4 million inhabitants and the population is dispersed over a larger area than in most other European countries. This makes transportation and transaction costs high within the Norwegian borders.

Since the beginning of the industrialisation of Norway in the early 20th century, policies towards FDI have had two targets. The first has been to keep as much as possible of the rent from the exploitation of natural resources within Norway. The second has been to develop a domestic manufacturing industry with the help of foreign capital. This has been undertaken through a combination of tariff and non-tariff barriers, as well as import-substituting policies, which have included concession laws, the petroleum law, the “10%-rule” and governmental grants.

Although various international agreements aim to reduce preferences for domestic production, in fact, several Norwegian sectors have continued to be protected by governmental policy. Data from Statistics Norway shows that generalised subsidies in the 1990s were due primarily to indirect taxes and grants, tariff and non-tariff barriers to trade as well as price discrimination in the market for electricity. These so-called effective rates of assistance (ERA) were relatively high in the food and beverages sector, in fertilisers, pharmaceuticals and cement as well as in different sectors of the industrial clusters.

Nonetheless, there was a significant decline in the level of government subsidies from 1991 to 1996. The changes were mainly to do with the fact that the government was no longer permitted within the EEA agreement to prefer Norwegian produced goods and to maintain specific Norwegian standards. Furthermore, firms were prohibited from collaborating on prices or from sharing markets. However, in 1996, producer concentration remained relatively high in several of the industries, which previously had high calculated ERA. This may indicate that structural market imperfections still existed in these sectors.

Compared to other small European countries, Norway has a relatively low share of FDI in the manufacturing industry. Nonetheless, there has been a growth in FDI located in this sector during the nineties. In 1996, employment in foreign owned firms with at least 50 employees accounted for 18% of total employment in the manufacturing sector. The equivalent figure in 1980 was 8%.

The petro-industrial cluster, the maritime industrial cluster as well as the production of consumer goods experienced the highest growth rates from 1991 to 1996. In 1996, approximately 26% of the employment in foreign majority owned firms in the manufacturing

at least 100 employees, foreign majority owned firms are only significantly larger than others in the manufacturing of food and beverages (see Table 2 in the appendix).

industry was within the five industrial clusters. If we extend the definition of the industrial clusters to also include the manufacturing of plastics, electric motors, generators and transformers, they incorporated 40% of the employment in foreign majority owned firms. The part of employment that is to be found in the industrial clusters does not differ particularly between ownership groups.

Several of the enterprises in basic metals, paper and pulp, which had been controlled by foreign interests at the beginning of the 20th century, are now controlled by domestic interests. Foreign MNEs were, however, still significant in several niche-markets. Furthermore, a considerably high share of the employment in sectors with relatively high R&D was within foreign controlled firms, although foreign companies reduced their significance in these sectors from 1991 to 1996.

Employment growth in foreign controlled firms in the manufacturing sector in the nineties was mainly the result of mergers and acquisitions. Furthermore, the increase in FDI was partly due to investments of foreign affiliates of Norwegian multinational companies, reinvesting in Norway and may have had the aim of reducing overall taxes.

The largest domestic companies developed within the main industrial clusters and at the end of the century and are mostly expanding their activities abroad. Norwegian MNEs have internalised former and present L-advantages into distinct O-advantages. These O-advantages also include the ability to co-ordinate domestic and foreign assets across borders as these companies have a relatively broad experience with FDI themselves.

In 1996, foreign majority ownership was mainly located in market segments with high producer concentration, but so were larger domestic firms and firms with foreign minority ownership. Together, these results indicate that there are minor but significant differences between foreign and domestic firms when controlling for sector and size of the firm.

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Appendix

Table 1 Share of capital, owned by the largest foreign owner

	Share of capital, owned by the largest foreign owner. Mean (St.dev) All firms with foreign ownership	Share of capital, owned by the largest foreign owner. Mean (St.dev). Firms in which the largest owner has at least 10% of the capital, i.e. firms with FDI	Share of capital, owned by the largest foreign owner. Mean (St.dev) Firms in which the largest owner has more than 50% of the capital, i.e. foreign majority owned firms
15-16 Food, beverages and tobacco	51.3 (42.7) N=165	61.9(40.2) N=135	98.7(5.6) N=72
17-19 Textiles, wearing apparel, leather	62.9(25.6) N=11	62.9(25.7) N=11	91.8(16.5) N=4
20 Wood and wooden products	22.6(30.0) N=51	30.0(32.0) N=38	92.9(15.0) N=7
21 Paper and paper products	27.1(34.5) N=60	33.1(36.2) N=48	93.9(14.5) N=12
22 Printing and publishing	31.5(37.3) N=288	36.8(38.2) N=244	98.3(5.9) N=67
23 Coke, refined petroleum	75.5(49.0) N=4	100 N=3	100 N=3
24 Chemicals, chemical products	35.0(42.8) N=118	71.6(40.0) N=54	98.4(6.7) N=36
25 Rubber, plastic products	55.1(47.0) N=54	91.1(22.1) N=32	98.8(6.4) N=28
26 Other non-metallic mineral products	60.5(46.9) N=184	94.0(19.0) N=117	98.9(3.6) N=109
27 Basic metals	34.7(38.8) N=51	63.5(35.4) N=26	95.9(11.4) N=13
28 Fabricated metal products	51.4(46.7) N=76	81.5(33.7) N=47	98.5(4.4) N=37
29 Machinery and equipment	73.3(40.0) N=155	87.1(27.9) N=129	98.9(6.5) N=108
30 Office machinery and computers	50.8(48.3) N=5	82.3(30.6) N=3	100 N=2
31 Electrical machinery and apparatus	80.5(34.9) N=75	89.5(24.0) N=67	97.1(8.7) N=60
32 Radio, television, communication equipment and apparatus	53.0(45.2) N=22	87.5(18.9)	94.8(8.9) N=11
33 Medical precision and optical instruments, watches and clocks	53.2(44.3) N=51	78.6(31.2) N=34	88.8(20.4) N=29
34 Motor vehicles, trailers and semi-trailers	32.3(40.0) N=16	55.2(40.6) N=9	97.3(5.5) N=4
35 Other transport equipment	52.0(40.0) N=77	69.1(32.6) N=56	96.2(7.3) N=32
36-37 Furniture, recycling n.e.c.	65.9(40.6) N=24	85.2(25.7) N=18	94.5(14.9) N=15
Sum manufacturing	49.0(44.0) N=1487	65.9(39.8) N=1084	97.6(8.4) N=649

Source: Own calculations based on data from Statistics Norway

Table 2 Pearson's correlation between size of the firm and ownership 1996
(1= foreign majority owned firms 0=else)

	All firms	At least 50 employees	At least 100 employees
15-16 Food, beverages and tobacco	0.1992*	0.2972*	0.3820*
17-19 Textiles, wearing apparel, leather	0.1350*	0.3032*	0.2351
20 Wood and wooden products	0.0473	-0.0085	-
21 Paper and paper products	-0.0239	-0.1271	-0.1735
22 Printing and publishing	0.0207	-0.0732	-0.0920
23 Coke, refined petroleum	-0.0651	-0.9878	-0.9878
24 Chemicals, chemical products	0.0875	0.1845	0.1772
25 Rubber, plastic products	0.3091*	0.1166	-0.0415
26 Other non-metallic mineral products	0.2313*	-0.0788	-0.2472
27 Basic metals	0.0921	0.0115	-0.0020
28 Fabricated metal products	0.2170*	0.2994*	0.3341
29 Machinery and equipment	0.0719	-0.0578	-0.1182
30-33 Electrical and optic products	0.2849*	0.0305	-0.0157
34-35 Transport equipment	0.1259*	-0.0374	-0.0980
36-37 Other manufacturing	0.0596		
Sum manufacturing	0.112*	0.0280	-0.0147

* The foreign owned firms have a significantly different size (on the 5% level) than other firms

Source: Own calculations based on data from Statistics Norway

Table 3 Structure of merchandise exports in Norway, the Netherlands Sweden and Switzerland 1996. Percentage of total

	Netherlands	Norway	Sweden	Switzerland
Food	19	8	2	3
Agricultural raw materials	4	1	5	1
Fuels	8	55	2	0
Ores and metals	2	7	3	2
Manufactures	63	23	80	94
Others	4	6	8	0
Sum	100	100	100	100
Total in \$ millions	177.228	48.922	82.704	80.756

Source: The World Bank 1998

FDI in Norway's manufacturing sector.

Table 4 Employment by sector and size in the manufacturing industry. 1996

	All firms		Firms with at least 50 employees		Firms with at least 100 employees	
	Total employment	Employment in foreign majority owned firms as percentage of total employment in the sector	Total employment	Employment in foreign majority owned firms as percentage of total employment in the sector	Total employment	Employment in foreign majority owned firms as percentage of total employment in the sector
15-16 Food, beverages and tobacco	52450 N=1855	12.7 N=15	32083 N=248	18.5 N=23	21822 N=101	23.8 N=13
17-19 Textiles	8216 N=532	2.6 N=4	3681 N=44	... N=1	1347 N=10	... N=1
20 Wood and wooden products	14491 N=1020	1.5 N=7	6108 N=59	... N=1	3631 N=22	0 N=0
21 Paper and paper products	10553 N=125	8.4 N=12	9606 N=50	8.3 N=6	8502 N=34	7.7 N=4
22 Printing and publishing	36406 N=2067	5.4 N=67	22594 N=105	5.5 N=10	19255 N=58	4.6 N=5
23 Coke, refined petroleum	1206 N=8	... N=3	... N=3	... N=2	... N=3	... N=2
24 Chemicals, chemical products	13865 N=213	22.8 N=36	12292 N=68	22.0 N=11	10420 N=42	23.6 N=8
25 Rubber, plastic products	6605 N=367	21.6 N=28	3069 N=30	36.0 N=10	1686 N=11	44.8 N=5
26 Other non-metallic mineral products	9437 N=687	35.2 N=109	4854 N=46	54.0 N=26	2870 N=16	51.5 N=9
27 Basic metals	15140 N=132	14.4 N=13	14139 N=55	14.9 N=8	13031 N=40	15.0 N=6
28 Fabricated metal products	17791 N=1211	10.3 N=37	7262 N=79	19.7 N=10	3416 N=21	31.9 N=5
29 Machinery and equipment	22867 N=1207	14.7 N=108	14344 N=106	17.6 N=21	9738 N=41	16.4 N=8
30-33 Electrical and optic products	20201 N=794	38.5 N=102	14319 N=86	47.8 N=40	11892 N=50	49.5 N=25
34-35 Transport equipment	39827 N=716	12.6 N=36	33427 N=140	14.1 N=22	30493 N=99	14.5 N=18
36-37 Other manufacturing	12892 N=785	3.7 N=15	6312 N=55	... N=2	3856 N=20	... N=2
Sum	281947 N=11719	13.8 N=649	185222 N=1174	17.5 N=193	143091 N=568	19.0 N=111

Source: Own calculations based on data from Statistics Norway