# 4. Arctic economies within the Arctic nations

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This chapter updates information on the economic characteristics of the Arctic regions of the 8 Arctic countries. The economies of the Arctic are heavily dependent on natural resource extraction. The recent years have added experience of boom and bust to the economic development of these nature based economies. After 2002 there has been a strong increase in world market prices of most raw materials – in particular prices of metals and energy, both main sources of export revenues for most Arctic regions (figure 4.1). Prices peaked at a level 4-5 times above the 2002 level before collapsing with the financial crisis by medio 2008. Food prices also peaked in 2008, before they fell considerably although less than the prices of the more cyclically exposed minerals and fuels. High prices on fish rewards the fish exporting arctic economies, but on the other hand, the arctic regions import most of their food, and higher food prices add to already high costs of living.

In the following presentation of National Account data and other statistics on economic development in the Arctic regions, it is useful to keep in mind the recent raw material price development when interpreting the results. The main bulk of economic data in this chapter goes up to 2005, only covering the initial years of the price rise on energy and metals, but are far from reflecting the impact on the economy of the peaking raw material prices up to 2008.

For the most part, the information in this chapter is viewed from an intra-national rather than a comparative international perspective, although some comparisons among the regions are made in the concluding remarks to this chapter.

For each of the Arctic regions this chapter contains a core table showing gross regional product (GRP) (or GDP for nations) in current prices and the contribution to GRP by industry at a disaggregated level (for 18 industries). At this level of detail we hope to make all the main activities of the circumpolar Arctic regions visible. In addition, standardized figures present contribution to GRP by main industry and the role of nature based industries in the regional economy. These core tables generally refer to the years 2002 and 2005. The tables present value added or contribution to GRP in local currency in order to focus on the Arctic element of their respective national or federal economies. The data for the Arctic regions are based on national statistics. Data



# Figure 4.1. Price indices of food, metals and energy. 2000-2009 Price indices, 2005=100

# Box 4.1. Thule institute

The regional account data in this report have been harmonized by researchers at the Thule Institute at the University of Oulu, Finland. The Institute promotes cooperation across disciplines and carries out high quality research in the field of Northern and Environmental Issues, one of the University's focus areas. The Institute has four operational units, the Centre for Arctic Medicine, NorNet (Northern Environmental Research Network), NorTech Oulu and Oulanka Research Station.

The Thule Institute covers research programmes, graduate schools and Master's programmes. The Institute also participates in national and international networks in the field of northern and environmental issues.

The research programmes are titled Global Change in the North, Northern Land Use and Land Cover, and Circumpolar Health and Wellbeing. The Institute is also involved in research on Environmental and Resource Economics, Environmental Technology and in the programme Human-Environment Relations in the North – resource development, climate change and resilience. The research programmes include academic education and research training.

In 2008, the number of staff working at the Institute was 38 and the number of researchers, PhD students and graduate students working on research projects supported by the Institute was about 210.

sources by region are listed in box 4.3, page 67. Where available some more recent economic indicators are presented.



# Alaska

The economy of Alaska has a large contribution from resource-based industries such as petroleum, minerals, seafood and tourism. However, national defense and other government services also play an important role in the economy. In 2005 Alaska accounted for 0.3 per cent of the GDP of USA.

Alaska has a small and dispersed population of about 670 000 people. Natural resources, primarily oil, are extracted and generally shipped out of the state for processing. However, there is some manufacture of seafood, and to a modest extent, petroleum.

The Alaskan processing and manufacturing industries serve a limited number of international resource-based commodity markets that are cyclical in nature and price sensitive. Many goods and services are imported by the region and contribute to a high cost of living and relatively high labor costs. The limited infrastructure in the state as well as its distance from major American and foreign markets have restricted the development of diverse processing and manufacturing industries. As a high cost producer Alaska is highly exposed to price fluctuations, as those observed in recent years. Furthermore, the importance of US federal spending to Alaska makes the economy vulnerable to political decisions made at the national level concerning security and to federal budget constraints. The boom and bust nature of the Alaskan economy often results in an influx of workers during boom periods and an exodus when the boom ends.

Table 4.1 shows GDP of Alaska in current prices in 2002 and 2005, increasing by 6. 4 per cent per year on average. Adjusted for inflation the average annual growth rate was 3.6 per cent.

Oil and gas extraction took over as the largest single industry in 2005 – a position earlier held by public administration and defense. When transportation via pipeline is included, petroleum accounted for as much as 29 percent of GDP, even before the oil price really took off during 2007. Value added in transportation via pipeline decreased during the period, reflecting that the volume of oil production in Alaska continues falling

# Table 4.1. Value added<sup>1</sup> by industry. Alaska. 2002 and 2005

	2002		2005	
	Mill. USD	Per cent	Mill. USD	Per cent
Agriculture	26	0.1	20	0.1
Forestry	14	0.1	11	0.0
Fishing	258	0.9	219	0.6
Coal, lignite and peat extraction		0.0		0.0
Oil and gas extraction	5 343	18.0	8 550	23.9
Other mining and quarrying	503	1.7	1 416	4.0
Processing of fish	285	1.0	403	1.1
Other manufacture of food	32	0.1	45	0.1
Manufacture of wood and paper	20	0.1	34	0.1
Coal and oil manufacturing; chemicals	114	0.4	254	0.7
Manufacture of basic metals		0.0	2	0.0
Other manufacturing	145	0.5	211	0.6
Electricity, gas and water supply	346	1.2	366	1.0
Construction	1 442	4.9	1 932	5.4
Transport via pipelines	2 040	6.9	1 915	5.3
Public administration and defence	5 861	19.7	7 044	19.7
Education, health and social work	1 728	5.8	2 2 1 6	6.2
Other services	11 584	39.0	11 202	31.3
GDP	29 741	100.0	35 840	100.0

<sup>1</sup> At basic prices.

after the huge field of Prudhoe Bay peaked in the late 1980s.

Mining is the single industry that achieved the highest average growth rate at 41 per cent per year in current prices, mainly because of significant increase in mineral prices. However, the share of mining in GDP was still only 4 per cent in 2005. Public administration and defence represented 20 percent of GDP in 2005, private services 31 per cent.

It can roughly be said that the economy of Alaska stands on two pillars – petroleum and the public and private services necessary to sustain the society. Note, however, that private services includes tourism, an important sector that provides employment in the same scale as in the petroleum industry.<sup>2</sup> Agriculture and forestry played a minor role in 2002, and even declined over the period 2002-2005. Fishing and fish processing together contributed somewhat less than 2 per cent to GDP in 2005. This may seem modest in comparison with the dominating petroleum and mining industries. However, it is important to keep in mind that a considerable share of income from petroleum and other mineral extraction flows to investors outside the State of Alaska. Fisheries on the other hand are more important by other measurs, in terms of employment and residential income.

With 29 per cent of total GDP from petroleum extraction and pipeline transportation, the economy is naturally heavily exposed to fluctuations in the market price for oil and gas. Alaska has recently reformed the petroleum tax system, from gross taxation in terms of royalties to a net income-based system that stabilizes

Figure 4.2. Alaska permanent fund dividend. Current USD/capita. Nominal oil price. 1982-2008



the tax revenue during volatile price development. The revenue in petroleum production is usually higher than in other economic activities, as the oil and gas prices contain a resource rent. However, the cost of petroleum production is higher in the Arctic than in other petroleum producing areas<sup>3</sup>, hence the resource rent portion of revenue is lower than in more accessible petroleum regions. As a consequence, oil price variability tends to be more challenging in Alaska than in most petroleum producing areas world-wide. This is also the case for mining.

Resource rent is a wealth component rather than income generated by labour and capital. To turn petroleum rent into a sustained source of income the Alaska Permanent Fund has been established. The fund has received 25 per cent of royalties on oil production and had a value of about USD 32.6 billions by September 2009, down from 35.5 billions in June 2008. The fund has achieved a nominal rate of return of about 10 per cent per year over the last 20 years. A dividend program allocates a share of annual fund revenues to inhabitants of Alaska according to a scheme that smoothes the return over the last 5 years. Each person received a dividend of USD 2 069 in the fiscal year 2008 (figure 4.2). (In addition there was a one time extraordinary payment in 2008 of USD 1 200, so each person received a total dividend of USD 3 268.)

Royalties and taxes from oil production have historically generated large revenues for the state of Alaska to finance the public sector and build infrastructure. Although the growth in the economy has been significant during recent years it has not resulted in much economic diversification.

Historically, the U.S. federal government has contributed to the Alaska economy, through direct expenditures and transfers to the state government. Direct expenditures to federal activities are related to management of public lands, services to Alaska natives and military operations. The level of federal government spending in Alaska is quite high both on a per capita basis and





Figure 4.4. Mineral production of Alaska. 2005-2007



Source: See note 6.

as a percentage of federal spending. The military is an important part of the economy; in 2004, about 23 000 military personnel were on active duty in Alaska. Growth in federal spending in Alaska has been strong in recent years due to the political strenght of Alaska's congressional delegation and because of military buildup associated with the war in Iraq.

#### Petroleum

The value of petroleum production at wellhead was USD 18 billion in 2005. Crude oil including natural gas liquids accounted for the lion's share of petroleum revenues with 96 per cent of total output in value terms. The value of oil and gas production increased 70 per cent from 2003 to 2005. This increase in value was only a result of increased prices as annual crude oil production declined from 2003 to 2005. With the exception of refining of crude oil for local consumption, the bulk of crude oil is exported outside the state.

Alaska ranks as the third largest U.S. producer of crude oil after Texas and Federal offshore production. In spite

### Figure 4.5. Value of fish and seafood landings. Alaska. 2005



Source: Alaska Department of Fish and Game, http://www.cf.adfg.state.ak.us

of the decline in oil production, Alaska still accounted for close to 17 per cent of the total crude oil production in the US over the period 2000-2005, but production is clearly lower than in the 1990s. The Prudhoe Bay field on Alaska's North Slope has dominated the oil production and is the largest oil field ever discovered in North America. Production from Prudhoe Bay peaked in the late 1980s and went into decline. However, the Prudhoe Bay oil field alone still provides about 6 per cent of total US production<sup>4</sup>.

The value of natural gas production accounted for 4 per cent of total petroleum production in 2005. Some natural gas is processed into LNG (liquefied natural gas) and ammonia-urea for export, and some is consumed within the state. At 15 per cent of the U.S. total, Alaska natural gas production (gross withdrawals) is ranked third after Texas and the Gulf of Mexico. However, 87 per cent of total gas production was re-injected to increase oil field pressure and enhance oil recovery.

With petroleum production dominating the economy, the future reserve situation becomes of huge importance. Alaska has not been explored extensively compared to the rest of the U.S. In terms of proved reserves, Alaska's oil reserves accounted for 20.2 per cent of US reserves and Alaska's gas reserves for 4.4 per cent of US reserves in 2004<sup>5</sup>. A recent assessment carried out by the US Geological Surveys concluded that there are undiscovered resources of oil amounting to 46 billion barrels of oil equivalents (bboe) of oil and 47 bboe of gas in Alaska (see chapter 5).

# **Other minerals**

The value of mineral production, at market prices, rose from USD 1 401 million in 2005 to USD 3 367 million in 2007, an increase of 140 per cent (figure 4.4).<sup>6</sup> The major mineral product in terms of value was zinc, which accounted for over 60 per cent of the value of mineral production in 2007. After zinc came gold (at 15.2 per cent) and lead (at 11.6 per cent). In volume terms, zinc production amounted to 696 115 tons, gold





Figure 4.7. Value added in natural resource based industries. Alaska. 2002 and 2005. Per cent of GDP



production was 762 933 ounces, and lead production was 167 181 tons. Virtually all the output of the mining sector is exported.

The mining industry has been hit by falling world demand following the financial crisis, but is likely to benefit from a rebound in the world economy in the years to come. However, further development is economically viable only for the largest deposits. This is because of a lack of access to, and power at, remote sites, as well as the high construction and operating costs at these sites.

#### **Other industries**

The value of landed fish and other seafood amounted to USD 1 296 million in 2005, up from USD 942 million in 2000 (figure 4.5). However, the value of landings fluctuated during that period, as a result of significant variations in both prices and volume. Groundfish accounted for 52 per cent of the total value of landings in 2005 followed by salmon (23 per cent), halibut (13 per cent) and shellfish (11 per cent). The Alaska fishing industry is close to full exploitation of its resource base. Most of the fish is processed within the state. The value of exports of fish products declined from USD 1 335 million in 2002 to USD 1 296 million in 2005. In recent years Alaskan salmon fisheries have faced significant international competition from farmed salmon in Norway, Chile, U.K., Canada and elsewhere.

Alaska attracts tourists both from elsewhere in the U.S. and abroad and the number of tourists visiting Alaska increased steadily, from 1.15 million people in 2000 to 1.37 million people in 2004, an increase of 19.2 per cent. The 2004 level was already substantially above the level of 1990 when 716 000 tourists visited Alaska. This suggests that tourism in the Arctic is experiencing a long-term trend in growth, expected to recover from a decline during the recent economic recession. Reflecting the harshness of the climate, almost 90 per cent of tourists in 2004 visited Alaska during the summer. To show the natural resource based characteristic of the Alaskan economy, figure 4.7 presents value added in clusters of industries that relate to a specific resource extraction. Processing of fish and other food is thus included in their respective resource-based industries, as is value added generated by petroleum pipelines. Data for tourism are not available; otherwise this industry might well be included among the nature based industries. In total the resource-based industries in Alaska accounted for 37 per cent of GDP in 2005, and oil and gas production and pipeline transportation clearly dominates the resource economy. Hence, Alaska has a narrow economic base, which makes the economy vulnerable to shifts in global demand and business cycles.

International air cargo operations at the Anchorage International Airport and at Fairbanks have been expanding. Alaska is well positioned to serve not only the trade associated primarily with economic growth in China, but also trade due to the shift in manufacturing industry growth to countries such as Malaysia and Vietnam. Air transportation is included in the other services industry in table 4.1.

# **Economic structure**

Secondary industries, dominated by construction, contributed 9 per cent to GDP of Alaska in 2005, almost the same as in 2002 (Figure 4.6). The private service industry is larger than the public service industry and contributed as much as 37 per cent to GDP in 2005. Private services include pipeline transportation, air cargo and tourism among others. Pipeline transportation contributed 5.3 per cent to Alaska's GDP in 2005 (table 4.1); hence there is a large private service industry besides petroleum transportation. Pipeline transportation slightly reduced its role in the economy as the reduced volume transported was not made up for by higher transportation fees. Mining and petroleum combined made the share of primary industries increase from 21 per cent in 2002 to 28 per cent in 2005.



# **The Canadian North**



Canadian North is defined as the three Northern Territories. namely, Northwest Territories, Yukon and Nunavut. The Northern Territories combined accounted for 0.5 per cent of Canadian GDP in 2007. The population of Arctic Canada was 104 739 as of

July 1, 2007, and was fairly evenly distributed among the three territories with about 43 thousand inhabitants in the Northwest Territories and 31 thousand each in Yukon and Nunavut.

Table 4.2 shows gross regional product for the northern territories in 2002 and 2005 by industry. The mining and quarrying (excluding mineral fuels) rose to the position as largest industry accounting for close to 20 per cent of GRP in 2005. The growth of the diamond industry contributed substantially to this change. Second, at 16 per cent, came public administration and defense, followed closely by education, health and social work at 12 per cent.

Next were construction (8 per cent) and oil and gas extraction with slightly less than 8 per cent of GRP in 2005, about the same share as in 2002. It should be noted that the price of oil and diamonds in 2005/2006 was considerably higher than in 2002. More recent data suggest that the dominance of the government in the Territorial economy has declined primarily because of the boost given to the mining sector by the diamond industry. All of the diamonds currently mined in Canada are produced in the Northwest Territories.

As illustrated by figure 4.8 the extractive industries increased their relative position in the economy at the expense of both secondary industries and public and private services.

Other natural resource based industries than energy and minerals contributed less than one per cent to GRP in 2005. Energy based industries declined somewhat in relative terms due to the rapid growth in mining, in particular the diamond industry (figure 4.9).

When it comes to disposable income of households, Arctic Canada has 40 per cent higher disposable income per capita than in the non-Arctic regions (figure 4.10). The relatively high income in the Arctic mineral and energy sections together with a relatively low number of people might explain that disposable income per person is higher in the Arctic regions. In addition, there are relatively high transfers to the northern territories.

# Petroleum and mining

For the three Territories combined, the major pillar of economic activity has been mining and oil and gas extraction. In 2005, these industries accounted for 27

## Table 4.2. Value added<sup>1</sup> by industry. Arctic Canada. 2002 and 2005

	200	2	200	15
	Mill. CAD	Per cent	Mill. CAD	Per cent
Agriculture	6	0.1	7	0.1
Forestry	15	0.3	18	0.3
Fishing	2	0.0	2	0.0
Coal, lignite and peat extraction		0.0	0	0.0
Oil and gas extraction	398	7.9	512	7.7
Other mining and quarrying	676	13.4	1 302	19.5
Processing of fish		0.0		0.0
Other manufacture of food		0.0		0.0
Manufacture of wood and paper		0.0		0.0
Coal and oil manufacturing; chemicals		0.0		0.0
Manufacture of basic metals		0.0		0.0
Other manufacturing	33	0.6	32	0.5
Electricity, gas and water supply	94	1.9	99	1.5
Construction	508	10.1	533	8.0
Transport via pipelines	28	0.6	31	0.5
Public administration and defence	913	18.1	1 047	15.7
Education, health and social work	606	12.0	766	11.5
Other services	1 763	35.0	2 321	34.8
GRP	5 042	100.0	6 669	100.0

<sup>1</sup> At basic prices.

per cent of total value added in the Territories. Figures 4.11 and 4.12 illustrates how production values and volumes in petroleum developed during the period 2000-2008.

Oil and gas extraction has continued to decline as producing wells and fields come to the end of their lifespan. From 2001 to 2008, the volume of oil extraction declined 39 per cent. However, due to an increasing oil price, the value increased by 43 per cent in the same period. Most of the crude oil produced in the Territories is shipped to Ontario while most of the natural gas is shipped to British Columbia. The destination of these products depends on the proximity of pipelines.

Gas extraction has been in rapid decline from 2000 to 2008, falling by 77 per cent in volume. The price development has not compensated for this change and the value of natural gas sales declined as much as 59 per cent. The gas production in Northern Canada is connected to the North American gas market, where the price is currently determined in response to supply and demand, and not mainly based on long term contracts as in European gas market, where the gas price is llinked to the oil price.

After more than tripling between 2000 and 2004, the value of diamond production declined 24 per cent between 2004 and 2006 (figure 4.13). Sales are made in U.S. dollars and the appreciation of the Canadian dollar versus the U.S. dollar and lower diamond prices contributed to this decline in the value of diamond production.

# Table 4.3 Basic indicators. Arctic Canada. 2007

	Northwest Territories	Yukon	Nunavut
Population	42 637	30 989	31 113
Share of GRP in all three Northern Territories (per cent)	61.4	21.2	17.4
Transfers <sup>1</sup> as share of public revenues (per cent)	72.2	82.9	91 7

<sup>1</sup> From other than territorial government.

From 2006 to 2008 the value of diamond production rebounded, although the volume declined from 2007 to 2008.

In spite of recent turbulence in output and prices, diamonds continue to make a major contribution to the economy of the Northern Territories. In fact, the diamonds in Northern Territories have made Canada the world's third largest producer of diamonds, in value terms. Not only is Canada rich in diamonds as a result of the diamonds being mined in Northwest Territories, these diamonds are of high quality. There are a few companies which are processing diamonds in Northwest Territories. However, most of the diamonds from the Northwest Territories are exported outside Canada as rough or un-worked diamonds.

The diamond industry is having a positive impact on other sectors in the economy of Arctic Canada, including exploration, which have been carried out to some extent in Nunavut as well as in Northwest Territories. Economic activity related to the diamond industry has also stimulated non-residential construction, wholesale trade and transportation. It is expensive to construct and maintain a diamond mine in the Northwest Territories. A number of factors contribute to high construction and maintenance costs, including a harsh climate, transportation on ice-roads and environmental commitments.

#### **The Territories**

In all three Territories, the territorial government is larger than both the federal government sector and the local, regional and municipal sector. Transfers from the Canadian federal government are a substantial source of funding for the territorial governments (table 4.3). In fiscal year 2007/2008, transfers from other than the territorial government accounted for 81.5 per cent of total public revenues in the three Territories. For the individual Territories the share of revenues accounted for by other government transfers ranged from a low of 72.2 per cent in Northwest Territories to a high of 91.7 per cent in Nunavut with Yukon Territory in the middle at 82.9 per cent. While the Territorial governments are largely funded by federal government transfers, it should be noted that the federal government is benefiting from the economic activity related to diamonds through royalties and increased business and personal income taxes generated by the sector.





Figure 4.9. Value added in natural resource based industries. Arctic Canada. 2002 and 2005. Per cent of GRP





Figure 4.10. Gross regional product (GRP) per capita and Disposable Income for Households (DIH) per capita. Arctic Canada. 2005. 1 000 USD-PPP











The impact of climate change leads to enhanced activity throughout the region. Retreating ice cover has opened the way for increased shipping, tourism and resource exploration, and new Arctic shipping routes are being considered, including through the Northwest Passage.

Figures 4.14 illustrates the economic development in selected industries in Northern Canada and in each of the territories during 1997-2005.

For the Territories as a whole, the third largest industry is construction, which grew from CAD 532 million in 2004 to CAD 954 million in 2007 (both figures are in constant dollars). The growth in construction is primarily due to the stimulus provided by diamond mining and exploration.

The fourth largest sector in the Northern Territories is the financial industry, which includes finance and insurance, real estate and renting and leasing and management of companies and enterprises. The financial industry grew from CAD 736 million in 2004 to CAD 804 million in 2007.







# **Faroe Islands**

Faroe Islands has experienced variable, but on average solid economic growth during the last decade, as illustrated in figure 4.15. The average growth rate from 1998 to 2006 was 3.5 per cent per year in real terms. However, in 2003, GDP decreased by 4 per cent, largely a result of a decline in value of landed fish (figure 4.16), primarily of cod and to a lesser extent of saithe and haddock. Landings of cod and saithe decreased in tons, whereas landings of haddock declined in value due to a fall in prices.

Over the period 2002-2005, GDP in fixed prices was hardly increasing. Table 4.4 shows that value added in current prices increased about 4 per cent from 2002 to 2005 and fisheries' share in GDP fell from 18.1 per cent to 14.4 per cent. Processing of fish (including fish farming) decreased its share of GDP from 8.3 to 7.0 per cent.

More than 80 per cent of incomes from export are due to fish exports and the economy is critically dependent on fishing. Fisheries, fish farming and fish processing together account for more than 20 per cent of GDP. Moreover, other sectors also rely heavily on deliveries to the fishing industry. Initiatives have been taken to develop a supply industry for the petroleum sector, so far only involved in exploration in the waters of Faroe Islands, encouraged by oil discoveries west of the Shetland Islands, close to the sector of Faroe Islands. However, recent exploration has been discouraging.

The unemployment rate is among the lowest in Europe, down to 1.2 per cent in 2008. However, limited options for education at home lead many young students to go to Denmark or other countries after high-school. Hence labour supply is somewhat reduced and middle-aged/ elderly in composition.

Transfers from Denmark are reduced from 24 per cent of government expenditure in 1998 to 10 per cent in 2007.

# Table 4.4. Value added $^{\rm 1}$ by industry. Faroe Islands. 2002 and 2005

	2002 <sup>2</sup>		200	5
	Mill. DKK	Per cent	Mill. DKK	Per cent
Agriculture	51	0.6	42	0.5
Forestry		0.0	0	0.0
Fishing	1 566	18.1	1 287	14.4
Coal, lignite and peat extraction	6	0.1	0	0.0
Oil and gas extraction		0.0	0	0.0
Other mining and quarrying	0	0.0	0	0.0
Processing of fish	721	8.3	623	7.0
Other manufacture of food		0.0	0	0.0
Manufacture of wood and paper		0.0	0	0.0
Coal and oil manufacturing;		0.0	0	0.0
Manufacture of basic metals		0.0	0	0.0
Other manufacturing	401	4.6	368	4.1
Electricity, gas and water supply	152	1.8	150	1.7
Construction	576	6.7	610	6.8
Transport via pipelines		0.0	0	0.0
Public administration and defence	458	5.3	543	6.1
Education, health and social work	1 377	15.9	1 651	18.4
Other services	3 345	38.7	3 690	41.2
GDP	8 653	100.0	8 964	100.0

<sup>1</sup> At basic prices

<sup>2</sup> 2002 figures have been corrected since last report.



#### Figure 4.15. GDP index and growth rate. Faroe Islands. 1998-2006

Figure 4.16. Fish landings. Faroe Islands. 1 000 DKK





Figure 4.18. Value added in natural resource based industries. Faroe Islands. 2002 and 2005. Per cent of GDP



Figure 4.19. Gross regional product (GRP) per capita and Disposable Income for Households (DIH) per capita. Faroe Islands. 2005. 1 000 DKK-PPP





and 2005. Per cent of GDP



# **Arctic Finland**

Arctic Finland differs from other Arctic regions in that the manufacturing industry is highly developed and integrated in the global economy. Table 4.5 shows the industry structure of Northern Finland. In 2005, manufacturing generated 25 per cent of GRP, somewhat less in relative terms than in 2002 (28 per cent). Behind the label "Other manufacturing" we find the dominating electronics industry. In current prices, the other manufacture industry declined in relative important due to falling prices on electronic devices.

Figure 4.20 shows distribution of value added in fixed prices and employment by industry at a somewhat different disaggregation level with the electronics industry as a separate sector<sup>7</sup>.

The largest share of GRP is generated in the electronics industry with the city of Oulu as one of the main centres. The electronics industry creates about 17 per cent of the value added in fixed prices in Arctic Finland, but provides less than 5 per cent of the employment. The education, health and social services comprise 13 per cent of value added, but as much as one quarter of the regional employment.

# Table 4.5. Value added<sup>1</sup> by industry. Arctic Finland. 2002 and 2005

	2002		200	)5
	Mill.	Per	Mill.	Per
	euro	cent	euro	cent
Agriculture	242	1.9	212	1.5
Forestry	482	3.7	456	3.2
Fishing	13	0.1	10	0.1
Coal, lignite and peat extraction	42	0.3	32	0.2
Oil and gas extraction		0.0		0.0
Other mining and quarrying	35	0.3	92	0.6
Processing of fish		0.0		0.0
Other manufacture of food	110	0.8	136	1.0
Manufacture of wood and paper	840	6.5	963	6.8
Coal and oil manufacturing;				
chemicals		0.0	129	0.9
Manufacture of basic metals	698	5.4	660	4.6
Other manufacturing	1 925	14.8	1 686	11.8
Electricity, gas and water supply	317	2.4	325	2.3
Construction	766	5.9	966	6.8
Transport via pipelines		0.0		0.0
Public administration and defence	707	5.4	812	5.7
Education, health and social work	2 061	15.9	2 396	16.8
Other services	4 737	36.5	5 365	37.7
GRP	12 974	100.0	14 239	100.0

<sup>1</sup> At basic prices.

Figure 4.21 shows the average annual growth rates of value added in volume terms and employment by industry. The value added of the electronics has grown rapidly at almost 15 per cent per year. However, the employment of the electronics industry has declined about 4 per cent per year. Behind this extraordinarily high productivity growth is a structural change within the electronics industry: the low productivity assembly work has been moved to China, and highly productive technical development work has been expanded in Oulu. The success of the electronics industry in the Oulu region is based on the cooperation between the

industry, the University of Oulu and the city of Oulu in providing industrial infrastructure. The central area of the electronics industry has been mobile phone technology. However, after 2000 the electronic industry has been diversified. The reason why value added in current prices in other manufacturing in table 4.5 declined from 2002 to 2005 is lower prices in the electronic sector.

The value added of mining and forestry has increased rapidly, too. Their shares in the total value added are relatively small, however. The growth of the forest process-



Helsinki view. Photo: Crestock





<sup>1</sup> In 2000-prices.

Figure 4.21. Annual growth rates of value added<sup>1</sup> and employment by industry. Arctic Finland. 2000-2005



<sup>1</sup> In 2000-prices.

# Figure 4.22. Value added by main industry. Arctic Finland. 2002 and 2005. Per cent of GDP



Figure 4.23. Value added in natural resource based industries. Arctic Finland. 2002 and 2005. Per cent of GDP



Figure 4.24. Gross regional product (GRP) per capita and Disposable Income of Households (DIH) per capita. Arctic Finland. 2005. 1 000 EUR-PPP



ing industry, the most important manufacturing industry in the past, has been slow and metal industry has overtaken it both in terms of value added and employment.

# **Resource based industries**

The food production in Arctic Finland is minor. The share of agriculture, fishing and food manufacturing contributed less than 3 per cent to GRP and provided about 7 per cent of employment in 2005.

About 54 per cent of forested land of Finland is found in the Arctic regions. However, due to northern climatic conditions the share of Arctic Finland in national annual forest growth is less than 30 per cent and the share of round wood removals about 20 per cent. Still the yearly round wood removals in Arctic Finland amounts to about 20 000 m<sup>3</sup> per capita. The use of round wood by the forest industry in Arctic Finland is about the same magnitude as removals on annual basis<sup>8</sup>. The forestry and forest industry together had 10 per cent of GRP and less than 6 per cent of employment in 2005.

Finland has the largest extraction of peat for fuel in the world. About 25 per cent of the land area of Arctic Finland is peat-land. Although the land area used in peat energy production represents less than one percent of total land, the energy content of peat energy production is over 8 TWh per year – from about 13 m<sup>3</sup> peat per capita. The fuel is used mainly in eight large combined heat and power (CHP) plants producing district heat and electricity<sup>9</sup>.

Consumption of electricity in Arctic Finland was almost 14 TWh in 2007. The electricity consumption is relatively high because of the high share of processing industry in the economy. However, electricity generation from own natural resources is almost sufficient to balance the consumption. The share of hydro power in electricity supply is about 60 per cent, the share of forest industry CHP power generation about 15 per cent and the last 25 per cent is from the district heating CHP plants. The forest industry CHP plants mainly use wood waste as fuel.

Two relative large basic steel processing plants are located in Arctic Finland, one uses ferro-chrome from its own mine and the other uses ferrous concentrates imported from mines in Northern Sweden and North-West Russia. Besides there are gold and copper-nickel mines whose products are transported for processing outside the region. The share of the metal mining in GRP represents roughly half of the value added of the whole mining and quarrying industry in Arctic Finland.

The volume of mining in Arctic Finland has been relatively small, less than one tenth of the mining in Arctic Sweden in terms of the yearly mass of mined ore. However, two large mines have been opened in 2008 and three more have been decided to be started in near future. Together this growth in capacity would mean



that the ore extraction might grow tenfold in the next few years. The new mines include two copper nickel mines, two gold mines and an iron ore mine<sup>10</sup>. However, future development is dependent on metal prices (see figure 4.1)

Lapland and Kainuu are important winter tourism sites. According to the Regional Tourism Satellite Accounts of Finland the share of tourism in GRP of Arctic Finland was 9 per cent in the year 2002. Since then the number of visiting tourists has grown more rapidly than GRP and we may assume that the share of tourism on GRP has risen to about 10 per cent in 2006<sup>11</sup>.

Gross regional product per capita, as well as disposable income of households per capita, is somewhat lower in Arctic Finland compared with all of Finland (figure 4.24).



Nuuk, Greenland. Photo: Tom Nicolaysen

# Greenland

Greenland has a population of 57 000 people. A substantial share of the economy is owned and managed by the Greenland Home Rule Authorities. There is no private ownership of land in Greenland, and the Home Rule Authorities allocates user rights, including to animal herders.

Table 4.6 shows the economic structure of Greenland by 2005, based on improved statistical methods, making comparison with 2002-data of the previous ECONOR report less appropriate.

Education, health and social work is the largest industry in Greenland with a share of 20 per cent of total value added. The resource based industries taken together have a share of 25 per cent, and fishing is the largest resource based sector in Greenland. Within the fishing industry, shrimp is the most important species. The Royal Greenland company owned by the Home Rule Authorities is a dominant supplier of cold-water shrimps at the world market. In recent years the export value of shrimps has decreased as prices have lowered. Table 4.7 shows the development in export of shrimps 2002-2006. All in all, fish and other marine products make up about 85 per cent of total export. The cod fisheries are now of minor economic value due to decline of the resource base. The export of shrimps amounts to about 50 per cent of total export value. Regulations within the fisheries are mainly imposed as individual quotas in combination with other Home Rule regulations. In shrimp fisheries the quotas are transferable.

So far there is no petroleum production in Greenland, but according to US Geological Surveys 2008, Greenland has considerable expected (undiscovered) reserves of 46 billion barrels of oil equivalents (bboe). However, the location of these resources provides challenges in terms of ice and storms, and the neighbourhood of a pristine natural environment. Greenland is not expected to be developed in the very near future because the time lag between discoveries and production tend to be considerable in the Arctic.

#### Table 4.6. Value added<sup>1</sup> by industry. Greenland. 2005

	2005		
	Mill. DKK	Per cent	
Agriculture	411	4.0	
Forestry	0	0.0	
Fishing	726	7.1	
Coal, lignite and peat extraction	7	0.1	
Oil and gas extraction	0	0.0	
Other mining and quarrying	620	6.1	
Processing of fish	456	4.5	
Other manufacture of food	0	0.0	
Manufacture of wood and paper	30	0.3	
Coal and oil manufacturing; chemicals	0	0.0	
Manufacture of basic metals	0	0.0	
Other manufacturing	59	0.6	
Electricity, gas and water supply	283	2.8	
Construction	766	7.5	
Transport via pipelines	0	0.0	
Public administration and defence	1 052	10.3	
Education, health and social work	2 044	20.0	
Other services	3 755	36.8	
GDP	10 210	100.0	

<sup>1</sup> At basic prices.



Figure 4.25. GDP index and growth rate. Greenland. 1998-2006

Since 1992 several licensing rounds have opened for exploration off the west coast. New seismic data have been obtained, and the results are promising, according to the Ministry for Housing, Infrastructure and Minerals and Petroleum. In July 2006 Disko West was opened for exploration. The environmentally sensitive inner Disko Bay was not included in the licensing round. Environmental investigations have been carried out to assess the possible impact on the marine environment in the licensing area. However, environmental interest groups question the sustainability of petroleum activity in the area. According to the authorities, 13 international oil companies applied for prequalification, before the licensing round in Baffin Bay in 2010.

There has been increasing extraction of minerals in Greenland during the last years, particularly encour-

#### Table 4.7. Export from Greenland. Mill. DKK

	2002	2003	2004	2005	2006
Total export	2 388	2 286	2 282	2 427	2 418
Shrimps	1 360	1 279	1 155	1 333	1 197
Cod	87	82	70	84	129
Halibut	367	456	454	469	511
Other fish and sea products	369	316	305	231	201
Products of other animals	16	25	32	36	48
Gold and other precious metals			131	143	168
Other minerals				11	8
Other products	189	128	135	120	156

aged by the high world market prices on minerals up to 2008. The Home Rule Authorities and Denmark have reached an agreement concerning the sharing of income from future resource extraction. The income of mineral extraction will belong to the Home Rule Authorities, but the grant from Denmark will be reduced corresponding to 50 per cent of the resource revenues exceeding DKK 75 million.

The Home Rule Authorities have established Greenland Development, a new company that will support the commercial use of Greenland's rich hydropower potential. Like in Iceland, the vehicle for using the hydropower potential to generate revenues is to transform energy to metals for export. An agreement is made with the aluminum producer Alcoa on building an aluminum smelter near Maniitsoq.

There has been a marked increase in the exploration of minerals other than mineral fuels, primarily for gold, nickel and diamonds, and lately also molybdenum. A production license for gold was granted in 2003; in 2004 export of gold started up at mill. DKK 131 increasing to mill. DKK 168 in 2006, as shown in table 4.7, corresponding to about 14 per cent the level of total shrimp exports. By the end of 2008, however, the gold mine at Nalunaq was closed due to low economic performance. Olivine-mining started up in 2005, targeting the European market for olivine, which is used as an additive in blast furnace pellets in steel production.

In the years 1998-2006 Greenland experienced annual economic growth of GDP (in fixed prices) at about 2.7 per cent on average (figure 4.25). After 2001 the growth of GDP slowed and even turned into a 0.5 per cent decline in GDP from 2002 to 2003.

Fishing accounts for more than 80 per cent of all exports from the country. In 2006 total exports of goods amounted to mill. DKK 2 418. This compares with total imports of mill. DKK 3 454 for the same year. Notice that data for external trade do not include services. Most goods including food for household consumption are imported. In addition to marketed consumer goods, there is significant consumption of fish and meat harvested by the households themselves (see chapter 6 in this report).

# Figure 4.26. Value added by main industry. Greenland. 2005. Per cent of GDP







Figure 4.28. Export share of fish and seafood. Greenland. 2006. Per cent





Arctic catfish sold at local marketplace, Nuuk, Greenland. Photo: Tom Nicolaysen



# Iceland

After a long period of steady resource management and economic growth, Iceland plunged into financial turmoil and economic crisis in 2008. Over time, Iceland has refined its system of fishery management to avoid overfishing and surplus capacity. The financial sector has been less scrutinized for sustainability, and the private banks virtually collapsed in October 2008. The factors behind the recent dramatic turn in the economy of Iceland are discussed in Box 4.2 pages 56-57. Below we focus on the development of the economy during the years 2002-2005, for which there are comparable national account data at circumpolar level.

Traditionally, fishing and fish processing has been a major source of income in Iceland. In 2002, these activities accounted for 11.3 per cent of GDP (table 4.8). By 2005 their share of GDP fell to 6.7 per cent as a result of shrinking sector income, and strong growth in other sectors during the years 2002-2005, when the economy at large experienced rapid economic growth at an annual rate of 4.4 per cent on average. Figure 4.29 shows year by year growth in GDP 1998-2008 in volume terms.

A major driving force behind this development was the boost of the economy generated by a booming housing sector nurtured by offensive lending by public and private banks. Construction thrived on the escalation of the housing industry. Additional pressure was added to the economy by heavy investments in aluminum production. Construction of a new aluminum smelter was initiated in Reidarfjørdur in Eastern Iceland to increase export of energy intensive products and to alleviate unemployment in the region. The investment was the largest single project undertaken by Iceland since settlement. The construction industry increased its share of GDP from 8.1 per cent in 2002 to 9.6 of a considerably higher GDP in 2005. Concerns were raised that the project would crowd out other activities during the investment period, while providing few jobs in the long run.

Private services was stimulated by rapid growth in income and coincided with substantial tax reductions. Further, as the economic policy involved high interest

#### Table 4.8. Value added<sup>1</sup> by industry. Iceland. 2002 and 2005

	200	2	2005	
	Mill. ISK	Per cent	Mill. ISK	Per cent
Agriculture	10 666	1.6	12 537	1.4
Forestry	117	0.0	44	0.0
Fishing	54 401	8.3	40 454	4.7
Coal, lignite and peat extraction		0.0		0.0
Oil and gas extraction		0.0		0.0
Other mining and quarrying	823	0.1	869	0.1
Processing of fish	19 627	3.0	17 660	2.0
Other manufacture of food	13 699	2.1	12 590	1.5
Manufacture of wood and paper	3 200	0.5	2 446	0.3
Coal and oil manufacturing; chemicals		0.0	0	0.0
Manufacture of basic metals	10 153	1.6	9 056	1.0
Other manufacturing	39 941	6.1	46 735	5.4
Electricity, gas and water supply	26 262	4.0	28 115	3.2
Construction	52 482	8.1	83 414	9.6
Transport via pipelines		0.0		0.0
Public administration and defence	42 781	6.6	49 737	5.7
Education, health and social work	103 121	15.8	129 433	14.9
Other services	274 402	42.1	435 121	50.1
GDP	651 675	100.0	868 211	100.0

<sup>1</sup> At basic prices.

#### Figure 4.29. GDP index and growth rate. Iceland. 1998-2008



Figure 4.30. Investment activity by industries. Iceland. 1995-2007



rates to comply with a fixed inflation target, the Iceland króna attracted international investors and stimulated a large financial sector in Iceland.

Primary and secondary industries and public services all declined in relative importance, whereas private services increased from 42 per cent in 2002 to 50 per cent in 2005 (figure 4.31). The financial sector was central in expansion of private services, stimulated by the high interest rates and the large inflow of foreign capital, bringing Icelandic banks into international financial markets.

As illustrated in figure 4.32, the resource based industries generally lost ground to the rest of the economy. However, minerals have increased its share of GDP beyond 2005, due to an increase in both production and export of aluminium. About 70 per cent of total primary energy use is from geothermic or hydro power resources. The reduced contribution of energy to GDP from 2002 to 2005 reflects that Iceland's energy supply is barred from international markets thus preventing Iceland from taking full part in the global price rise on energy. The benefit to Iceland from investments in metal production from rising global energy prices is expected to come in terms of higher prices on e.g. aluminum. However, expansion of the aluminum sector has been met with considerable opposition from environmentalist groups.

Iceland has few proven mineral resources, but has access to vast marine resources and the fishing industry is still a main pillar of the economy.



Nesjavellir geothermal power plant in Iceland. Photo: Crestock

# Figure 4.31. Value added by main industry. Iceland. 2002 and 2005. Per cent of GDP



Figure 4.32. Value added in natural resource based industries. Iceland. 2002 and 2005. Per cent of GDP



Figure 4.33. Gross regional product (GRP) per capita and Disposable Income for Households (DIH) per capita. 2005. Iceland. 1 000 USD-PPP



# Box 4.2. Iceland in crisis

The Icelandic economy collapsed in early October 2008. Within a few days the three major banks had collapsed, as did the value of the currency. Bankruptcies of firms as well as unemployment skyrocketed. The inflation rate soared, and the finances of ordinary people were in shatters as the repayment of loans in foreign currency – as well as in indexed króna – increased rapidly.

Did the crisis hit out of the blue, or do Icelanders only have themselves to blame? Could the scope of the crisis have been restricted or could it have been avoided altogether with proper governmental actions?

These questions have been asked, and will continue to be asked in Parliament, in the media, in public and private meetings and in the court of Iceland. It will take time to come to a full understanding of the events that brought the country into crisis.

Below is a brief overview of the economic policy and major economic indicators of Iceland during the past 15-20 years leading up to the recent development.

After World War II Iceland has enjoyed rapid economic growth, bringing the living standards of the average citizen from being close to the bottom of the European scene up to the top of the rank world wide. But inflation has hovered around 20-40 per cent for long periods at a time until the early 1990s when it was brought under a sort of control by strict income policy orchestrated by associations of employers, employees and the government. In 2001 the Central Bank abandoned a hard-to-keep fixed exchange rate regime in favour of a floating rate regime supported by an inflation target. The retail banking-sector, previously mostly state-run, was privatized in the period 1998-2003.

The new monetary policy opened up for revitalization of private banking. During the inflationary period of the 1970's and the 1980's real interest rates were kept negative as usury laws kept the nominal rate below a fixed ceiling. Loans were gifts made possible by massive governmental intervention, and state owned banks totally dominated the bank sector.

Indexation of loans had been introduced as a part of broad-based economic reforms in 1979. Indexation slowly changed the landscape of the credit market, and encouraged savings. Thus, as capital was remunerated and recognized as a factor of production it became clear that state run banks were lacking the capacity to allocate capital efficiently. Several attempts were made to privatize the state-run banks. The foundation was finally laid with the establishment of Íslandsbanki, founded on the ruins of a collapsed state bank and later branded Glitnir. The remaining state-run banks were privatized during the period 1998 to 2003. However, housing loans continued to be managed by a governmental institution, the Icelandic Housing Financing Fund (HFF). A right to center coalition government kept their promise from the election campaign of 2003, to finance 90 per cent of the housing costs, up from 80 percent. The newly privatised banks saw their market shrink at the same time as they were trying to increase their market share and reacted

![](_page_19_Picture_11.jpeg)

increase their market Aluminium smelter at Reidarfjordur, Iceland. Photo: Gérard Duhaime

by entering the market for housing loans with full force by offering better terms than the HFF already in 2004. As expected the housing prices skyrocketed.

More favourable terms for housing loans was not the only promise given during the election campaign. Eastern Iceland had long suffered from de-population. As a remedy, the State Power Company, the government and municipal bodies came up with plans for an aluminium smelter in Reyðarfjörður. The smelter was the biggest investment project in Iceland since settlement. Economists pointed out that the short term effects of the project could be disruptive to other parts of the economy (crowding-out) during the investment period, while providing few jobs in the long run.

The senior party (Independence Party) of the coalition government in power from 1995 had long had lower taxes on its agenda, and an increased flow of revenue during the expansive period after 2001 pushed that goal higher on the agenda. A series of tax cuts followed, for corporate income, property tax and for personal income.

Each of the goals that the successive Icelandic governments tried to achieve, were clearly achievable if pursued in isolation, but hardly all at the same time. The investment project in Eastern Iceland was a large, governmental project representing a strong fiscal stimulus. Its implementation warranted the contraction of other governmentally induced investment projects and/or an increase in taxes. Lowering tax-rates was thus badly timed and contributed to further increasing the pressure in the economy. The same is true for the increase in the maximum amount for housing loans.

The policy mix offered by the politicians and the government left the Central Bank with few choices, given its newly established inflation goal. The bank had to increase the discount rate and did so repeatedly – paving the way for unintended consequences of the expansionary policies. The interest rate offered in Iceland was among the highest in the world, and foreign issue of bonds nominated in Icelandic krónas as well as demand for Icelandic krónas soared. The value of the króna increased dramatically.

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The Icelandic banks had been in bitter fight over domestic market shares and were well positioned to expand abroad. It was their "luck" that foreign loans were also cheap. The world was awash in capital.

Icelanders accumulated foreign assets at an accelerating rate during the last few years of the bubble years. Figure 1 shows that the accumulation of assets was not financed out of internal savings and the net position of the economy was (and is) negative.

Reports on the deteriorating international position began to appear in 2006. Some were worried that the Icelandic public would be responsible for the repayment of the loans. Economists pointed out that the debt was that of private firms, and if Icelandic private firms were overextending themselves, the loss would not be at the expense of the Icelandic public. These commentators could not know that Landsbanki was to open up IceSave accounts in the UK and other European countries backed by the Icelandic Depositors' and Investors' Guarantee Fund. As a result, the Icelandic taxpayers will probably end up footing a bill amounting to 4-10 per cent of GDP.

Households had increased their debt exposure dramatically after 1990 as there were few incentives to save. On the contrary, consecutive tax-reductions signalled to households that they were likely to control a bigger share of their income in the future. Thus, both the corporate sector and the household sector increased their exposure, in effect tying down an increasing share of their future income as interest payments.

Housing prices increased by almost 70 per cent in real terms from 2000 till 2007. The real jump came after the election in 2003 and the entrance of the newly privatized banks into the market for mortgage loans.

The government fully controlled public investments, investments in power production and in smelters. Furthermore, governmental decisions were instrumental in inducing the

![](_page_20_Figure_9.jpeg)

Figure 1. Foreign debt and assets as share of GDP. 1998-2008

Source: Central Bank of Iceland.

onset of the investment boom in housing.

The goal of stabilizing inflation between 1 and 4 per cent can hardly be seen as a success. That does not mean that the Central Bank did not try.

The Central Bank responded to the pressure created by sloppy fiscal policy by increasing the discount rate. It was questioned however, if the Central Bank was bold enough when increasing the discount rate and acted fast enough when signs of pressure were on the horizon. The other concern was that discount rate increases were ineffective as policy measures. The discount rate is not the only weapon in the bank's arsenal. It could have restricted credit by increasing the reserve requirement and countered demand in the foreign exchange market by increasing its own holding of foreign assets. It took many economists by surprise when the bank reduced the reserve requirement in 2003. The bank also abandoned the reserve requirement that had been mandated for deposits in foreign subsidiaries as late as spring 2008. It is therefore safe to say that the bank could have coordinated its actions with respect to restraining credit growth somewhat better.

In conclusion, it seems safe to suggest that the Central Bank narrowly considered the discount rate as the only weapon in its arsenal suitable to counteract pressure in the economy.

The so-called mini-crisis hit in 2006. Rating agencies voiced concerns that the Icelandic banks relied too heavily on the whole-sale market for loans for meeting their financial needs. Furthermore, many commentators pointed out that the Icelandic banks might be too big to fail and too big for the Icelandic government to come to their rescue. The banks opened up for retail banking (IceSave) in the UK and elsewhere and reduced their exposure to whole-sale bank-ing. Reports commissioned by the Chamber of Commerce concluded that the operation of Icelandic banks was more or less sound, as Icelandic banks did not have the toxic subprime loan bundles on their books. The market seemed to buy those explanations.

Not much later it was clear that well-intended policies aimed at making life easier for house-owners, people living in de-populating areas, and taxpayers turned into misfortune. The mixture of lax fiscal policy and narrowminded inflation targeting within the smallest floating currency in the world with inadequate foreign reserves proved to be dangerous.

<sup>&</sup>lt;sup>1</sup> Mishkin, F., & Herbertsson, T. T. (2006). *Financial Stability in Iceland*. Reykjavik: Iceland Chamber of Commerce.

<sup>&</sup>lt;sup>2</sup> Portes, R., & Baldursson, F. M. (2007). *The Internationalisation of Iceland's Financial Sector*. Reykjavik: Iceland Chamber of Commerce.

<sup>&</sup>lt;sup>3</sup> Thorolfur Matthiasson (2008): Paper presented at the Nordic Tax research Council, Stockholm 31 October 2008.

![](_page_21_Picture_2.jpeg)

# **Arctic Norway**

Except for some oil and gas extraction in the Norwegian sea, Arctic Norway has so far mostly hosted petroleum exploration whereas production has taken place in the North Sea further south. Now the tide might be turning, as fields in the North Sea are being emptied, and prospects for new reserves are found in more northern waters. The first steps into the Barents Sea have been taken and the first signs of petroleum activity can be seen in the regional economy by 2005.

To the purpose of this report, Arctic Norway includes Finmark, Troms, Nordland, the Svalbard Archipelago and Jan Mayen. There are no drastic changes in the economic structure from 2002 to 2005. Private services and education, health and social work were the dominant sectors in the economy of Arctic Norway in 2005 as well as in 2002. Together they contributed 62 per cent of GDP in 2005, slightly lower than in 2002 (65 per cent). The share of Public administration and defence in GRP stayed around 9 percent.

Fishing is still one of the largest industries in the region. The fishing industry generated 5 per cent of GRP in 2005, in 2002 slightly less (4 per cent). The coal mining activity is solely taking place in Svalbard.

Figure 4.34 shows the development in value added by major industry over the period 1997-2005. There has been a smooth growth in total production, however, the sector breakdown reveals considerable fluctuations. Primary productions or extraction of natural resources has buoyed around the trend, with a deep dip in 2003 before rapid growth took over from 2003 and the level was catching up with the trend by 2005. A major contributing factor to this development was a decline in fish catch and an even larger fall in fish prices. Secondary industries (manufacturing) developed closer to the trend until an abrupt decline took place in 2004, before turning into rapid growth by 2005. The surge in production was linked to heavy investments in the petroleum industry from medio 2002 in connection with the new gas field Snøhvit north of the town of Hammerfest. The associated land based LNG plant particularly stimulated the construction industry, as did the growth in hydropower capacity in the northern regions.

# Table 4.9. Value added<sup>1</sup> by industry. Arctic Norway. 2002 and 2005

	200	2	200	)5
	Mill.	Per	Mill.	Per
	NOK	cent	NOK	cent
Agriculture	756	0.9	709	0.7
Forestry	193	0.2	171	0.2
Fishing	3 264	3.7	5 164	5.0
Coal, lignite and peat extraction	258	0.3	409	0.4
Oil and gas extraction	1	0.0	127	0.1
Other mining and quarrying	422	0.5	493	0.5
Processing of fish	1 129	1.3	2 105	2.0
Other manufacture of food	1 2 4 1	1.4	1 439	1.4
Manufacture of wood and paper	325	0.4	420	0.4
Coal and oil manufacturing;				
chemicals		0.0	0	0.0
Manufacture of basic metals	469	0.5	1 432	1.4
Other manufacturing	3 281	3.7	3 348	3.2
Electricity, gas and water supply	4 795	5.4	6 574	6.3
Construction	4 647	5.2	7 106	6.9
Transport via pipelines		0.0	0	0.0
Public administration and defence	8 165	9.2	9 924	9.6
Education, health and social work	20 896	23.6	25 501	24.6
Other services	38 704	43.7	38 714	37.4
GRP	88 546	100.0	103 635	100.0

<sup>1</sup> At basic prices

Figure 4.34. Value added by main industy. Arctic Norway. 1997-2005

![](_page_21_Figure_13.jpeg)

Table 4.10.	Employment by	industry. I	Number o	of persons.	Arctic
Norway. 20	002 and 2005				

	2002	2002		5
	Employ- ment	Per cent	Employ- ment	Per cent
Agriculture, forestry	5 833	2.7	6 612	3.0
Fishing	7 666	3.6	6 214	2.8
Food processing	7 489	3.5	6 283	2.8
Mining	891	0.4	1 092	0.5
Petroleum	15	0.0	237	0.1
Hydroelectric power	1 781	0.8	1570	0.7
Tourism	18 117	8.4	17 357	7.8
Manufacturing	18 916	8.8	22 399	10.1
Services, non-government, excl.tourism	64 635	30.1	70 053	31.6
General government	89 627	41.7	89 665	40.5
Total	214 970	100.0	221 482	100.0

Figure 4.35. Value added by main industry. Arctic Norway. 2002 and 2005. Per cent of GDP

![](_page_22_Figure_3.jpeg)

Figure 4.36. Value added in natural resource based industries. Arctic Norway. 2002 and 2005. Per cent of GDP

![](_page_22_Figure_5.jpeg)

![](_page_22_Figure_6.jpeg)

![](_page_22_Figure_7.jpeg)

![](_page_22_Figure_8.jpeg)

![](_page_22_Figure_9.jpeg)

Table 4.10 shows that Agriculture and forestry has surpassed fisheries in numbers of persons employed. Both fisheries and food processing hired less people in 2005 than in 2002, whereas manufacturing employed 18 per cent more persons in 2005, and private services (except tourism) 8 percent more. The number of employed persons in tourism declined by 4 per cent from 2002 to 2005. The government sector is the dominant employer with 40 per cent of employed persons on its payroll.

Figures 4.35 and 4.36 provide snapshots of the industry structure in 2002 and 2005. Private services still dominates with respect to shares of GDP, but lost terrain compared with other main activities. Primary and in particular secondary industries increased their shares due to favourable market development for fish products, energy and construction.

Figure 4.36 illustrates the reliance on main natural resources. Fishing and fish processing increased from 5 to 7 per cent of GRP and generated a slightly higher share of GRP than activities based on energy resources in 2005.

Taking into account that the petroleum activity is mainly located in the North Sea, it is not surprising that GRP per capita is considerably higher outside Arctic Norway (figure 4.37). The level of disposable income of households per capita in northern Norway is about 10 per cent lower than in the rest of the country.

In nominal terms, households' disposable income in Artic Norway increased 47 per cent from 1997 to 2005 (figure 4.38). For Norway as a whole, the growth in households' disposable income in this period was considerably higher (66 per cent).

Figure 4.38 compares the growth in GRP and DIH. After 1997 for Arctic Norway, there has generally been a close race between GRP and DIH, with slightly higher growth in DIH. Factors that may explain this are that around 75 per cent of employment lies in the service sector, where wage levels are easily influenced by the national wage level. And secondly, employees in this region benefit from special tax deduction. In 2005, GRP overtakes DIH again, an expected change if resource rent plays an increasing role and is transferred to residents outside the region.

## The Sámi area

The areas in northern Norway defined as Sámi settlement areas are those areas that qualify for financial support from the Sámi development fund (Samisk utviklingsfond, SUF), in brief, the SUF area.

Table 4.11 shows the income account for the SUF area in 2005, compared to other areas of northern Norway (north of Saltfjellet). Average total income for the SUF area was 238 200 NOK, considerably lower than average total income for other northern areas with 280 900 NOK and the average for Norway with 316 300 NOK.

Note that table 4.11 shows average income for those income earners that have each of the following sources of income: Income from work, property income, taxable transfers, and tax-free transfers. It does not show average across all persons. Average total income thus appears as a weighted average of the income types, weighted by the number of persons receiving the income type.

Average income from work and property income was considerably lower in the SUF area than the average for other northern areas and the average for Norway. Taxable transfers were also lower in the SUF area although the share of population receiving those transfers was higher than in the other areas. Average unemployment benefit in the SUF area is slightly higher than in other northern areas and slightly lower than average for Norway. Child allowance is the only income type that is higher on average for recipients in the SUF area, compared to other areas.

# Table 4.11. Income account per capita above 17 years. All ofNorway and north of Saltfjellet. 2005. NOK

			Other
	All of	SUF-	areas in
	Norway	area1	the north <sup>2</sup>
Income from work	282 500	213 500	257 500
Employee income	267 600	202 600	244 300
Net income from self-employment	213 400	132 800	199 400
Property income	41 100	8 800	19 200
Taxable transfers	144 800	127 600	137 400
Social Security benefits	132 700	126 700	130 600
Unemployment benefit	56 500	53 100	50 500
Tax-free transfers	30 700	30 700	30 000
Child allowances	22 200	28 300	23 400
Dwelling support	16 900	13 000	14 200
Social assistance	37 800	20 400	26 600
Total income	316 300	238 200	280 900
Total assessed taxes and negative			
transfers	80 900	50 400	68 800
After-tax income	241 900	102 600	217 500

<sup>1</sup> SUF-area is defined as areas that qualify for financial support from the Sámi development fund north of Saltfjellet.

<sup>2</sup> Those areas north of Saltfjellet not defined as SUF-area

Source: Samisk statistikk 2008, table 36.

![](_page_24_Picture_2.jpeg)

Russian trawler in the Barents sea. © Helge Sunde / Samfoto

# **Arctic Russia**

Arctic Russia is by far the largest among the Arctic regions, both in terms of land area and population. In 2005 the population was 7.1 million, down from 7.9 million in 1995.

The National Accounts of Russia are now based on the European Industry classification (NACE Rev.1.1), facilitating comparison across borders. Comparison with sector data for Arctic Russia as presented in the previous report *The Economy of the North* is generally not possible. However, some sectors can be identified and compared over time.

In 2005 oil and gas extraction more or less dwarfed other industries by generating 50 per cent of GRP all alone, whereas mineral extraction accounted for 4 per cent. The share of education, health and social services was down to 4 per cent in 2005, clearly lower than the share in 2002, which was close to 9 per cent of GRP. In the years 2002-2005 Arctic Russia experienced a rapid annual economic growth at about 8.6 per cent (in fixed USD-prices).

#### Petroleum

Figure 4.39 shows the development of oil production during the period 1990-2006, distinguishing between

![](_page_24_Figure_10.jpeg)

Figure 4.39. Russian oil production. 1990-2006

Source: ArcticStat Circumpolar database, http://www.arcticstat.org

#### Table 4.12. Value added<sup>1</sup> by industry. Arctic Russia. 2005

	Mill. Rubles	Per
Agriculture and forestry	33 642	1 3
Fishing	15 319	0.6
Coal, lignite & peat extraction	60 355	2.3
Oil & gas extraction	1 337 617	50.2
Other mining & quarrying	117 854	4.4
Processing of fish	117	0.0
Other manufacture of food	11 590	0.4
Manufacture of wood & paper	26 321	1.0
Coal & oil manufacturing	52 814	2.0
Manufacture of basic metals	25 598	1.0
Other manufacturing	22 095	0.8
Electricity, gas & water supply	78 878	3.0
Construction	132 063	5.0
Public administration & defence	54 717	2.1
Education, health & social work	107 149	4.0
Other services	589 936	22.1
GRP	2 666 066	100.0

<sup>1</sup> At basic prices.

production in non-arctic Russia and the Arctic regions. The two largest oil producing arctic regions was above all Khanty-Mansii and to a lesser extent Yamal-Nenets. (See also figure 4.44)

The Yamal peninsula seems to be the focus for further investments in gas extraction as rich reserves are far more accessible there than the giant offshore Stockman gas field.

The total level of oil production in 2006 was approaching the level of 500 million tons in 1990 before the collapse following the break-up of the former Soviet Union. The highest level of production was reached in 1988 with about 530 million tons.

The two Arctic regions of Khanty-Mansii and Yamal-Nenets together produce almost 70 per cent of total Russian output. The production in Khanty-Mansii showed a larger increase than Yamal-Nenets during

![](_page_24_Figure_20.jpeg)

Figure 4.40. Russian gas production. 2000-2006

Figure 4.41. Value added by main industry. Arctic Russia. 2005. Per cent of GDP

![](_page_25_Figure_3.jpeg)

# Figure 4.42. Value added in natural resource based industries. Arctic Russia. 2002 and 2005. Per cent of GDP

![](_page_25_Figure_5.jpeg)

![](_page_25_Figure_6.jpeg)

![](_page_25_Figure_7.jpeg)

![](_page_25_Figure_8.jpeg)

the period 2004-2006. Yamal-Nenets totally dominates Russian gas production, which increased steadily from 2001 to 2006.

# **Economic structure**

Figure 4.41 illustrates how primary production looms in the economy, and that the levels of public services are unusually low even in an Arctic context. Figure 4.42 shows how energy productions have taken an even greater share of GRP since 2002.

When it comes to disposable income, Arctic Russia has almost 70 per cent higher disposable income per capita than in the non-arctic regions. The relatively low number of people in the Arctic together with the booming income of the petroleum sector might explain that disposable income per capita is higher in the Arctic regions, which is untypical, but also occur in Alaska and Arctic Canada, two other Arctic regions with important primary production sectors.

Figure 4.44 shows how different the various subregions are. While the minerals sector only contributes to around 2 per cent of the GRP in Evenk, the share in Yamal-Nenets and Khanty-Mansii is 61 and 73 per cent, respectively.

![](_page_26_Picture_2.jpeg)

# **Arctic Sweden**

The two northern counties, Västerbotten and Norbotten, constitute Arctic Sweden. The share of the total population living in the Arctic regions was around 5.6 per cent in 2005, a minor reduction from 2002. The two counties accounted for 5.3 per cent of national GDP in 2005, a small increase from 2002.

From table 4.13 we can see that there have been some significant changes in the economic structure between 2002 and 2005. The relative importance of other mining and quarrying and manufacture of basic metals more than doubled, while forestry and manufacture of wood and paper generated somewhat less of GRP in 2005 compared with 2002. Electricity, gas and water supply and the construction sector increased by 31 and 21 per cent, respectively. Private services and education, health and social services were the dominant sectors in the economy of Arctic Sweden in 2005 as well as in 2002. Together they contributed 56 per cent of GDP in 2005, somewhat lower than in 2002 (63 per cent).

Figure 4.45 shows the industry structure in 2002 and 2005. Even if the private services share of total GDP has declined over the period, it was still the dominant sector compared to other main activities at the end of the period. We also see that primary production had the largest relative increase over the period. In addition, secondary production generally is slightly larger than public services, which is not the case in other Arctic regions (except for Finland and Iceland). The main reason is the relatively huge manufacturing sector of wood and paper as well as basic metals in northern Sweden.

Figure 4.46 compares the importance of the different resource based industries in 2002 and 2005. The food and fish sectors remained small over the period. However, while timber production declined, the mineral sector expanded and became the dominant resource sector in 2005. The second largest sector in 2005 was energy resources, which is due to the relatively large electricity sector in northern Sweden.

# Table 4.13. Value added $^{\rm 1}$ by industry. Arctic Sweden. 2002 and 2005

	2002		2005	
	Mill. SEK	Per cent	Mill. SEK	Per cent
Agriculture	706	0,6	636	0,5
Forestry	3 371	2,9	3 038	2,5
Fishing		0,0		0,0
Coal, lignite and peat extraction		0,0		0,0
Oil and gas extraction		0,0		0,0
Other mining and quarrying	2 887	2,5	9 246	7,5
Processing of fish		0,0		0,0
Other manufacture of food	1 207	1,0	1 084	0,9
Manufacture of wood and paper	5569	4,8	4 119	3,3
Coal and oil manufacturing; chemicals		0,0		0,0
Manufacture of basic metals	1 497	1,3	3 666	3,0
Other manufacturing	8 961	7,7	9 676	7,8
Electricity, gas and water supply	6 497	5,6	8 522	6,9
Construction	5 490	4,7	6 671	5,4
Transport via pipelines		0,0		0,0
Public administration and defence	6 727	5,8	7 500	6,1
Education, health and social work	20 836	17,9	24 300	19,6
Other services	52 386	45,1	45 312	36,6
GRP	116 134	100,0	123 770	100,0

<sup>1</sup> At basic prices.

Gross regional product per capita as well as disposable income of households per capita are somewhat lower in Arctic Sweden as compared within all of Sweden (Figure 4.47).

Figure 4.48 shows the development in value-added by major industry over the period 1997-2006. There has been a more or less steady growth in total production from 1997 to 2006. However, secondary production grew faster than the trend up until 2002, before lower growth in the coming years lead it closer to the trend. The most divergent development from the trend is certainly seen in primary production or extraction of natural resources. The volume of primary production was lower in 2002 than in 1997. However, value added more than doubled in volume terms over the next four years. The surge in production is linked to increased mineral extraction.

Figure 4.49 presents growth in GRP and DIH after 1995 in Arctic Sweden, together with the population development. Firstly, we see that the Arctic population declined somewhat up to 2001, but has been more or less constant thereafter. There was a relatively similar growth in both GRP and DIH up to 2003. In the following three years there has been a much higher growth in GRP than DIH, probably as revenues rents in the primary production sector plays an increasing role and is transferred to residents outside the region.

Figure 4.45. Value added by main industry. Arctic Sweden. 2002 and 2005. Per cent of GDP

![](_page_27_Figure_1.jpeg)

Figure 4.46. Value added in natural resource based industries. Arctic Sweden. 2002 and 2005. Per cent of GDP

![](_page_27_Figure_3.jpeg)

Figure 4.47. Gross regional product (GRP) per capita and Disposable Income for Households (DIH) per capita. Arctic Sweden. 2005. 1 000 USD PPP

![](_page_27_Figure_5.jpeg)

Figure 4.48. Value added in volume terms by main industry. Arctic Sweden 1997-2006

![](_page_28_Figure_1.jpeg)

![](_page_28_Figure_2.jpeg)

# **Circumpolar overview**

Although this chapter has mainly focused on the individual Arctic regions, the format og data allows for an overview at circumpolar level.

When looking at the overall picture, the regions emerge as heterogeneous although as some, reckognizable clusters.

Arctic Russia, Alaska and Northern Canada are the main producers within petroleum and other mineral mining. In Arctic Russia, the primary production of mainly petroleum and minerals totally dominate the income generation (figure 4.50). Close to 60 percent of GRP originated in these activities in 2005. Although Arctic Russia clearly takes the lead, the three major petroleum regions have the highest shares of extractive industries in their economies. The same three regions have the lowest percentage contribution to GRP from secondary industries.

Among the other regions, Greenland and Faroe Islands are most dependent on natural resource extraction. In Arctic Sweden and in particular Arctic Finland, the secondary industries or manufacture of goods have the strongest position, to some extent supported by shorter distances to markets and less challenging natural surroundings.

Iceland and Arctic Norway have higher shares of value added from private and public services than all other regions. Iceland, Arctic Norway and Arctic Finland have the lowest contributions to GRP from extractive industries.

The degree of nature based activities is illustrated in figure 4.51. A comparison with figure 4.50 shows the extent to which the resources are processed within the regions. The petroleum and mineral rich cluster rely the most on natural resources. Alaska and Arctic Canada hardly process their extracted resources, Arctic Russia do to some extent, whereas all the other regions do process their resources, which thus have a more important position in their economies than the extraction activities indicate.

![](_page_29_Picture_9.jpeg)

Local marketplace, Nuuk, Greenland. Photo: Tom Nicolaysen

Figure 4.50 Value added by main industry in Arctic regions. 2005. Per cent of regional GDP

![](_page_29_Figure_12.jpeg)

Figure 4.51 Value added in natural resource based industries in Arctic regions. 2005. Per cent of regional GDP

![](_page_29_Figure_14.jpeg)

# Notes

- <sup>1</sup>IMF (2009): Primary commodity prices http://www.int.org
- <sup>2</sup>Institute of Social and Economic Research. MAP database.
- <sup>3</sup>IEA (2005): Resources to reserves, OECD.
- $^4$  EIA Energy Information Administration, http://www.eia.doe.gov $^5$  See note 4.
- <sup>6</sup> Szumigala, D. J., Hughes, R. A. and L. A. Harbo (2008): Alaska's mineral industry 2007, Special Report 62, Division of Geological & Geophysical Surveys.
- <sup>7</sup> Statistics Finland 2008. Regional accounts of production and employment. http://www.stat.fi/til/atutyo/tau\_en.html. Updated 19.3.2008
- <sup>8</sup> Finnish Forest Research Institute 2007. Finnish Statistical Yearbook of Forestry. Vammala
- <sup>9</sup> Statistics Finland 2008. Energy Statistics. Yearbook 2007. Helsinki
- <sup>10</sup> Geological Survey of Finland 2008. Metals and Minerals Production. http://en.gtk.fi/ExplorationFinland/MineralProduction/. Modified: 02.09.2008
- <sup>11</sup>Konttinen, J-P. 2006. Matkailun aluetaloudelliset vaikutukset matkailun alueellinen tilinpito [Regional Economic Effects of Tourism – Regional Tourism Satellite Account}. Ministry of Trade and Industry. Helsinki.

#### Box 4.3. Regional accounts data sources

#### Canada

Statistics Canada: Provincial and Territorial Economic Accounts: Data Tables http://www.statcan.gc.ca/pub/13-018x/2008002/6100256-eng.htm

# **Faroe Islands**

Statistics Faroe Islands: National accounts and balance of payments

http://www.hagstova.fo/portal/page/portal/HAGSTOVAN/Statistics\_%20Faroe\_Islands/Statistics/National\_accounts\_and\_ balance\_of\_payment

# Finland

Statistics Finland: Indicators of regional economy http://www.stat.fi/til/atind/index\_en.html

# Greenland

Statistics Greenland: Greenland in figures 2007 http://www.greenlandexpo.com/media(250,1033)/Greenland\_in\_Figures\_2007.pdf

# Iceland

Statistics Iceland: National accounts and public finance http://www.statice.is/Statistics/National-accounts-and-public-fin

# Norway

Statistics Norway: Regional accounts, 2006 http://www.ssb.no/fnr\_en/

## Russia

Goskomstat Russia: Gross Regional Product, 1995, 2000-2005. Available at ArcticStat: http://www.arcticstat.org/ Table.aspx/Region/Russian\_Federation/Indicator/Regional\_Accounts/Table\_2008-08-25-13/10911

Goskomstat Russia: Average Per Capita Money Income Of Population, 1990, 1995, 2000-2006. Available at ArcticStat: http://www.arcticstat.org/Statistics.aspx/Region/Russian\_Federation/Indicator/Personal!Household\_Income/

Goskomstat Russia: Average Annual Employment In The Economy, 1990, 1995, 2000-2006. Available at ArcticStat: http://www.arcticstat.org/Table.aspx/Region/Russian\_Federation/Indicator/Labor\_Force/Table\_2008-08-20-20/10854

Goskomstat Russia: Population Size, 1990, 1995, 2000-2006. Available at ArcticStat http://www.arcticstat.org/Table.aspx/Region/Russian\_Federa-

tion/Indicator/Population/Table\_2008-08-20-1/10835

# Sweden

Statistics Norway: Regional Accounts http://www.scb.se/Pages/ProductTables\_\_\_\_\_11100.aspx

# **United States**

Bureau of Economic Analysis: Regional Economic Accounts http://www.statcan.gc.ca/pub/13-018-x/ 2008002/6100256eng.htm

![](_page_30_Picture_26.jpeg)

Greenland. Photo:Photos.com

# Box III. The value of having the exclusive right to exploit a natural resource

The artic regions are rich in natural resources; Alaska, Khanty-Mansi and Yamalo-Nenets have vast oil and gas deposits, Greenland, Iceland and Northern Norway enjoy access to rich fishing grounds and Canada's Northwest Territories have found large diamond deposits. Furthermore, in other regions like Northern Norway, Murmansk and Arkhangelsk, there are great hopes for discovering oil and gas in the Barents Sea.

The natural resource sectors contribute by a large share to Arctic GDP. On the other hand, it does not follow that without the natural resources Arctic GDP would have been reduced by the same amount. GDP figures include the use of labour and capital to extract resources. Without the natural resources, both the labour and the capital employed could have been utilized in other sectors of the economy, and hence, they would have contributed to GDP anyhow.

In national accounting terms stocks of unexploited natural resources should be viewed as capital assets. The value of a capital asset is usually reckoned as the total discounted net income accruing from it. With respect to natural capital this is usually referred to as a stream of resource rents. The resource rents are thus the additional income a nation/region obtains from having the exclusive right to exploit a natural resource.

With point of departure in the national accounts, Eurostat (2001) and SEEA-2003 defines resource rent in the following way:

# Resource rent =

- i) + Basic value of output/productionii) Intermediate uses
- v) Compensation of employees
- vi) Return to fixed capital
- vii) Capital consumption

When calculating compensation of employees and return to fixed capital, the idea is to use wage rates and rates of return that reflect the alternative value of both the workers and the capital employed to extract the resource. For Norway the average wage rate and the average rate of return to capital for all non-natural resource based industries have been used as a measure of the alternative value. However, there is yet no consensus in the literature on the correct measure; for instance, The World Bank uses the average wage paid in the primary sectors as their measure for the alternative value of labour<sup>1</sup>. Below is an example from oil and gas extraction in Norway. All figures connected to oil and gas extraction accrue to a separate «off-shore» sector in the Norwegian national accounts.

The size of the resource rents is very dependent on world market prices of oil and gas. Output price movements can explain the large increase in resource rents from the period 1995-1999 to the period 2005-2008. Note also that the compensation to labour makes up a very small part of gross production, and that the compensation to capital makes up a relatively large, but declining part. To the extent that the figures from Norway are representative for the situation in the Arctic, it is of great interest from an Arctic sustainable development perspective to study further whether resource rents are reinvested in other capital assets located in the Arctic.

Not all natural resources have a positive resource rent. Studies from Norway show that even though Norway has access to rich fisheries, the resource rents are mostly negative. These figures indicate that in organizing the fisheries, the Norwegian authorities do not only maximize the surplus from the fisheries, but also focus on other targets such as providing jobs in remote areas. However, from a resource rent perspective jobs is a cost because labour has an alternative value. As already mentioned, one may of course discuss whether the average wage rate in the non-resource sectors is the correct measure of this value.

![](_page_31_Figure_14.jpeg)

# Figure 1. Average decomposition of gross production in the Norwegian oil and gas sector

# Figure 2. Five-year average resource rents from the renewable natural resources in Norway<sup>1</sup>

![](_page_31_Figure_17.jpeg)

<sup>1</sup> World Bank (1998): Estimating National Wealth: Methodology and Results, World Bank, Washington D.C.