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**Conference Paper**

## Governed economic development in Europe's northernmost periphery. From company town to industrial diversity?

51st Congress of the European Regional Science Association: "New Challenges for European Regions and Urban Areas in a Globalised World", 30 August - 3 September 2011, Barcelona, Spain

**Provided in Cooperation with:**

European Regional Science Association (ERSA)

*Suggested Citation:* Bjørnsen, Marte; Johansen, Steinar (2011) : Governed economic development in Europe's northernmost periphery. From company town to industrial diversity?, 51st Congress of the European Regional Science Association: "New Challenges for European Regions and Urban Areas in a Globalised World", 30 August - 3 September 2011, Barcelona, Spain, European Regional Science Association (ERSA), Louvain-la-Neuve

This Version is available at:

<https://hdl.handle.net/10419/120067>

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# **Governed economic development in Europe's northernmost periphery. From company town to industrial diversity?**

By

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*Preliminary version: Please do not quote!*

## **Abstract:**

Svalbard is the northernmost settlement in Europe, situated halfway between northern Norway and the North Pole. The archipelago covers 61.000 square metres (the size of Latvia) and almost the entire area is under some kind of environmental protection. Half the area is constantly covered by glaciers. Settlement is restricted to Spitsbergen Island and there are two main settlements, the Norwegian town Longyearbyen and the Russian town Barentsburg. In addition, there are a few research stations about the island. Svalbard has been visited by hunters/whalers for centuries but settlement started with the mining industry around 1900. The size of the populations is in part politically determined and has historically varied with the mining activity. Total population is 2500 of which 80 per cent lives in the Norwegian settlement, which also is the administrative centre of Svalbard.

In this paper, we analyse the relationships between basic economic activities, other economic activities and population in Longyearbyen. The analysis is based on a yearly panel of establishment data dating from early 1990s. We construct a multiplier model to analyse historical trends as well as future prospects. The economic growth which has taken place in Longyearbyen the last twenty years is strongly linked to the activity in the mining company but also to growth in other and emerging industries. In the 1990s, the Norwegian government stimulated other economic activities to develop alongside mining to establish a more soundly founded settlement. In particular, higher education, research activities, tourism, and public government have evolved as subsidiary industries. In 2010, sixty per cent of all labour years were performed in these subsidiary industries. Population has grown along with economic activities and more workers bring their families. This again, leads to growth in services of general interest. Today, however, we may see a shift in this unbroken growth trend. The activity level in mining is falling and it remains to see how robust the subsidiary industries are to this changed situation. We have calculated that it takes a more than proportional increase in e.g. research or tourism activities to compensate for loss of employment in the mining industry. The last two years' experience does, however, show an even more markedly negative development in the private sector subsidiary industries.

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# 1 Introduction and History

Svalbard, of which Spitsbergen is the largest island, is a group of islands located between the north of Norway and the North Pole at around 80 degrees northern latitude. Up until the early 1900s, people stayed at Svalbard for periods of time whaling, sealing and fishing. In the 1850s, Svalbard became interesting also for explorers, researchers and tourists. Around 1900, large deposits of coal were found. Mining became an important industry and the grounds for a more stable settlement at Svalbard. Many of the nations participating in mining at Svalbard in the early days vanished during the Great War (1914-1918). Norway, on the other hand, invested in the mining industry at Svalbard during the Great War, and after the War was left the dominating nation.

## **1.1 The Svalbard Treaty**

In 1919, Norway applied for sovereignty over Svalbard. The Svalbard Treaty (ST) was signed in 1920, and in 1925 Svalbard became a part of the Kingdom of Norway. Although the ST grants Norway complete sovereignty over Svalbard, inhabitants of all nations that have signed the Treaty are awarded equal rights for living there and utilising the natural resources at Svalbard. This explains why there for instance have been Russian settlements, of which Barentsburg is the largest, at Svalbard in spite of Norwegian sovereignty.

Norwegian rules and regulations apply to the whole of Svalbard, including the non-Norwegian settlements. However, taxes paid at Svalbard have to be re-used there. Mainland Norway cannot, in other words, benefit from taxing economic activities, Norwegian or foreign, at Svalbard.

In this paper, we limit ourselves to discussing the activities in the Norwegian settlements, focusing on the activities in the main Norwegian settlement Longyearbyen, on mining (which takes place in Svea) and only briefly on the activities in Ny-Ålesund.

## **1.2 Briefly on Norwegian Mining at Svalbard and SNSK**

Svalbard has been, and is, very rich on natural resources, including coal. Mining has been the most important industrial activity at Svalbard since around the year 1900. There have been mining activities many places at Svalbard during the 20<sup>th</sup> century, mainly by Norwegian and Russian companies. Today, operating mines can be found at Barentsburg (Russia), Mine 7 in Adventsdalen (near Longyearbyen) and Svea.

The dominating Norwegian mining company has been, and is, Store Norske Spitsbergen Kulkompani (SNSK or SN for short), which is a company owned by the Norwegian Government. SN has mined coal in Longyearbyen since 1916, in Mine 1 to Mine 7. The activities in these mines were the economic basis for the settlement in Longyearbyen. Today, SN's mining activities in Longyearbyen are restricted to Mine 7, where they extract 70-80 thousand tons of coal a year. This production is used mainly for covering Longyearbyen's demand for energy. SN's main mining activities today take place at Svea, where they extract around 3 million tons of coal every year. This rate of extraction implies that the mines at

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Svea will be emptied in just a few years, and new fields of coal have to be opened after this if the coal mining activities are to be continued. The environmental protection regulations at Svalbard are extensive and are enforced by the Norwegian government.

The rate of extraction depends on a set of factors, of which the price of coal and the production costs are decisive. Costs depend on the productive capacity of the mine, including the labour's, the capital's and the shipping facilities' productivity. Previously, the rate of extraction (the yearly amount of coal extracted) was politically decided by the Government and relatively moderate. An important factor in setting the rate of extraction was to secure future activities, following the logic that the less we extract today, the longer a single coal mine will last. In this sense, SN's profitability was not an important factor, and production costs were covered by the Government when the price of coal was insufficient. This strategy changed in the 1990s, when SN was given a freer role. By investing in large coal extracting machines and infrastructure, the company increased its production capacity while, at the same time, the politically set rate of extraction was loosened. World market prices of coal started increasing parallel to this, and the profitability of SN increased substantially, especially after the turn of the century. In the last years prices have been historically high, which for the company means that the rate of extraction should be as high as capacity allows. The most important factor contributing to limit the company's rate of extraction of coal is now the shipping out capacity, which is in excess of three million tons a year. This rate of extraction is ten times higher than the previously political rate of extraction, which implies that today's mine at Svea will be emptied in a few years. Potential fields exist close to Svea and it is a political question, which among other factors involves a potential conflict between the industry, the environment and sovereignty, whether to continue mining at Svalbard after Svea or not. The opening of new field are presently under evaluation in the ministries for industry and environment.

### ***1.3 Longyearbyen: From Company Town to Modern Settlement***

Coal mining was the dominating industry at Svalbard until the 1990s. In addition to the actual mining activity, SN was responsible for running the local settlement at Longyearbyen. This means that the company was responsible for producing almost all types of local services including public services, it owned most houses, it owned the land and it was responsible for land use planning and other local policies. In this sense, Longyearbyen was a company town, based more or less solely on mining. This role grew from the early days of mining, and became more and more comprehensive as Longyearbyen as a settlement grew.

In many ways, the situation at the start of the 1990s was parallel to the situation today. The question was asked whether mining had a future at Svalbard, and if not, whether other economic activities could substitute mining. In order to secure the existence of the Norwegian settlements at Svalbard also with the potential loss of the mining activities, the national Svalbard policy changed in many ways during the 1990s. The Government gave SN a significantly freer role, which, as stated in the previous section, led to the restructuring of the company.

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This was of course not sufficient in order to secure continued economic activities and the future settlement in Longyearbyen. The Government therefore opened for increased tourism at Svalbard. In addition, a university centre (UNIS) was opened in Longyearbyen. These two activities today represent, together with the mining industry, the main economic base for Svalbard. Of course, the Government also administers the Svalbard Policy through the official representative at Svalbard, Sysselmannen, which also represents a major activity in Longyearbyen. This leaves the Longyearbyen community with three (four if we include Sysselmannen), rather than one (two), basic economic activities.

Parallel to this, significant changes have been made to the organisation and production of local services. First, SN was deprived of the obligation to supply services directed at the local population. Today, local democratic institutions have been instated, and the production of local public services is now the responsibility of these representative institutions. Non-public services are supplied by a number of small (and a couple of larger), privately owned, companies, not by SN. The private and public service level of Longyearbyen is now higher than the level of services in towns of similar sizes at the mainland.

Second, and as a part of the restructuring of Svalbard, the focus of the Svalbard Policy was changed. The overall issue of Norwegian sovereignty as stated in the Svalbard Treaty still exists and is an important background factor. However, developing Longyearbyen as a local community has become a significantly more important issue than before. Today therefore, a major focus of the Svalbard policy is to develop Longyearbyen as a community suited for families, rather than for single (male) inhabitants. The qualities of a family oriented society are thought to be very important for people wanting to stay and work at Svalbard. Although there still are many specifics to Svalbard regulations, Norwegian rules and regulations are gradually being more and more applied to people and businesses at Svalbard, so the differences to living at the mainland are becoming smaller. However, Svalbard and Longyearbyen are not meant to be the place to stay for the duration of life. It is mainly a place to stay for a limited period of time, primarily to work.

In this sense, Longyearbyen has changed significantly in the last twenty years. More activities have been developed as a part of the economic base. These activities are controlled by the Government in one sense or another, including financing. The production of private services is based primarily on demand from tourists, local inhabitants and local businesses. Local public services are produced by the local democratic institutions, which decide the quality as well as the quantity of production. The demand for these services comes primarily from the local population, which also finances part of the production. However, the central Government contributes to financing these services.

Today, Longyearbyen must be seen as a modern, local community with a relatively high private and public service level. It is still a place where people come mainly to work, and they can bring their families if they want to.

#### ***1.4 Outline for This Paper***

In this paper, we discuss Longyearbyen's transition during the 1990s, from a company town to a modern, small city or town. We focus on how the economic base of Longyearbyen has changed, from a one-sided to a multi-sector base. The

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development of markets for the derived (non-base) activities, with local entrepreneurs and service producers serving the local population and industries, has contributed largely to this development. Local democratic institutions have assumed the SNSK's responsibilities for producing local public services and for local land use planning, while the SNSK still is a major land holder in Longyearbyen. At the same time, the Norwegian Government aims at possessing sovereignty at Svalbard. The Svalbard Policy is an important tool for this.

We have developed an export base, economic model to analyse the relationships between the different sectors of the economy. Data is collected from each company at Svalbard and is used for updating the model on a yearly basis. In this sense, we get new information on the (changing) interdependencies between the sectors every year. The model is also used for predicting Svalbard's economic development and for analysing impacts of changing conditions on the Svalbard economy. We also use the model for analysing the relationship between employment and population growth.

## 2 A Brief Description of Svalbard's Economy and Economic Base

The development and future prospects of Svalbard's economy are significantly influenced by two important and exogenous factors. Svalbard's geography, remotely located with a harsh climate, is the first. The location on the one hand implies that the distances to other parts of the world, including the Norwegian Mainland, are quite substantial. This again implies that day-to-day commuting to work is impossible, and that there are no villages or settlements close by that can be used by the inhabitants when they want to shop or use other services. On the other hand, the remote location means that the number of people staying and visiting Svalbard is limited. Svalbard's nature then becomes relatively unaffected by humans and represents an arctic wilderness. Together with the climatic situation, this contributes to Svalbard being a very unique part of the world, quite attractive to certain types of scientific research, to tourists and to a limited number of other industries. Both the location and the climate are variables that are difficult to influence.

The other factor is the Norwegian Government's official Svalbard Policy. This includes the use of an array of short, medium and long term policy instruments aimed primarily at reaching the long term goals of upholding Norwegian sovereignty at Svalbard. The different policy instruments among other things contribute to regulating Norwegian economic activities at Svalbard. In this sense, they are exogenous to economic development at Svalbard. They influence economic activities directly through rules and regulations that state what types of activities that are accepted (or not), and through the Government's own economic activities. They also influence economic activities more indirectly, both via incentive structures for local economic activities and through Government ownership.

The geography and policy factors are both very important determinants in the economic development of Svalbard, and in many ways probably more important factors than in other parts of Norway. Although Svalbard's economy is heavily regulated and economic development is constrained both by the geography and the policy factors, the last couple of decades have brought significant changes in

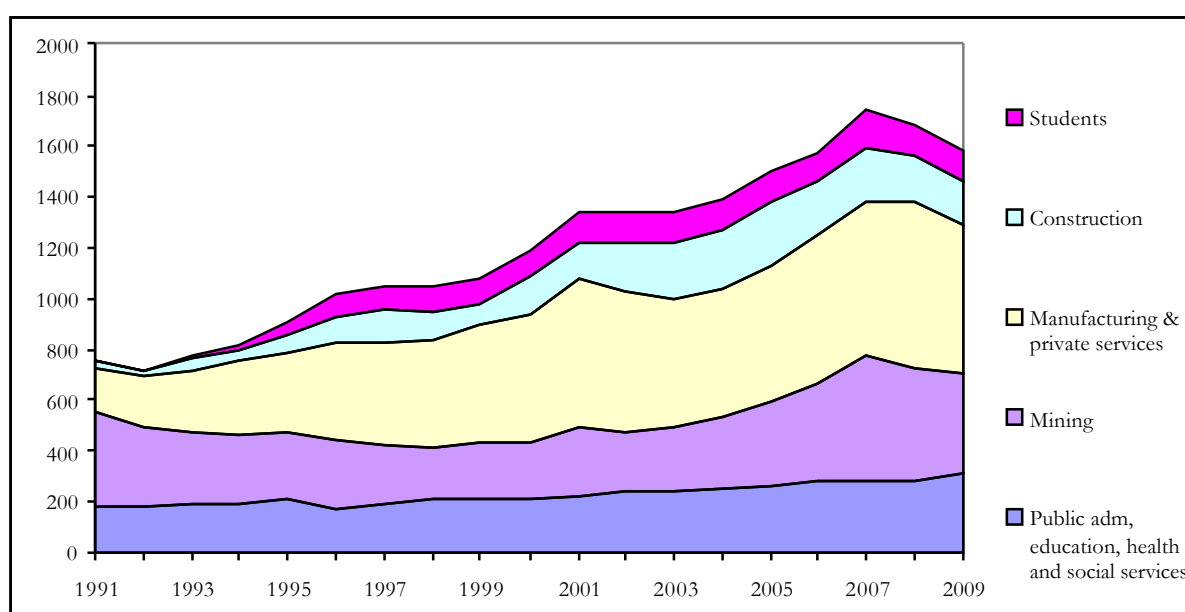
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the economic structure of Svalbard. We will discuss them here, focusing on how Longyearbyen has developed since around 1990 and pointing at some of the determinants behind the changes.

## 2.1 Economic structures of Svalbard 1990-2006

Above, we have discussed Longyearbyen's development as a company town run by the mining company SN. During the last twenty years, this situation changed significantly. Today, Longyearbyen has become a relatively modern, local community with a multi-sided economic structure and a well developed level of public and private services production. Families are encouraged to stay there, for shorter or longer periods of time.

Figure 1: Number of man years in Longyearbyen and Svea 1991-2009.



Source: Bjørnsen and Johansen (2010)

Figure 1 illustrates the growth of employment (number of man years) in Longyearbyen and Svea<sup>1</sup> since 1990. We find that the number of employees doubled during the period. The growth of employment can be categorised by three waves (or growth periods).

The first wave (1992-1996) can be explained by a substantial growth within the private sector while, at the same time, employment within mining continued its negative trend (which started before 1990). One of the important factors behind this growth is a substantial growth within tourism. Parallel to this, UNIS was established, which is illustrated by the growing number of students. This first period illustrates, in other words, the start of the restructuring of Svalbard's economy from mining to other basic activities.

<sup>1</sup> Svea is included mainly to illustrate how the level of activities within the Norwegian settlements has changed over time. The mining sector moved from Longyearbyen to Svea during the 1990s.

Between the first and the second wave, employment within mining continued to decline. This was counterbalanced by the continuing tourism-driven growth within the private sector. During the second wave (from 1998/1999 to 2001), employment in Longyearbyen and Svea grew by almost 25 per cent. This wave was characterised by two factors. Employment within the private sector continued to increase. At the same time, SNSK started developing the new mining site at Svea. This led to a temporary increase in employment within mining, which continued in the third wave.

The period between the second and the third waves can be explained by a fall of employment within the private sector. This was, in part, compensated by an increase in employment within construction. Both at the new mining site at Svea, and in Longyearbyen, construction activities were significant at the start of the century, compensating for the recession within the private sector. During the third wave, employment within mining increased with the extraction of coal at Svea. The rise in employment within mining can be explained mainly by the high coal prices and high rate of extraction of coal due to this, as we have discussed earlier in the paper. Year 2007 represent the peak of activity in Longyearbyen so far with 1750 man years.

Total employment at Svalbard fell by around 163 man years (10 per cent) from 2007 to 2009, of which more than 100 man years disappeared in the last year alone. We don't know for certain if the reduction represents a trend shift, or if it is merely an adjustment. However, representatives from the major companies and organisations at Svalbard seem to think that international economic trends, reduced reserves of coal, and national policy signals together imply reduced economic growth at Svalbard in the near future.

This period has, in other words, been characterised by major changes to employment numbers and structures in the two largest Norwegian settlements at Svalbard. Employment within mining is at the same level as at the start of the period. At the same time, new economic activities have developed. These activities are driven by a substantial increase of tourism. The number of employees within education has increased fourfold, to just in excess of 100, due to the new University Centre (UNIS). In addition, the number of students has grown. We will get back to this in chapter 3.

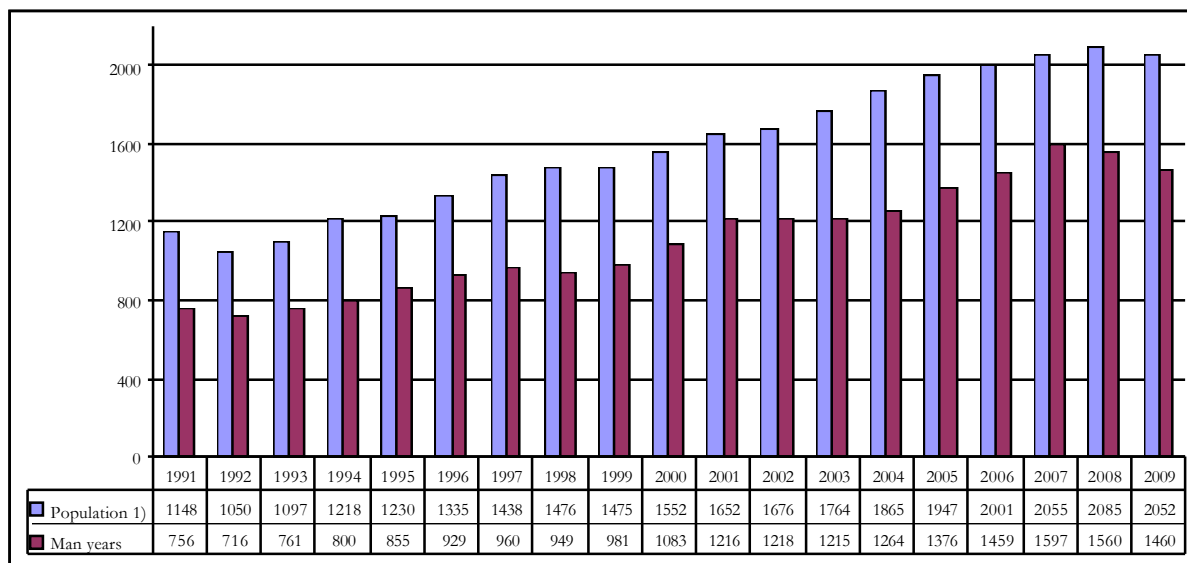
## **2.2 Population in the Norwegian settlements 1991-2006**

The doubling of number of employees at Longyearbyen and Svea during the period of course has to be compensated by a similar increase in the number of people living there. In figure 2, we show that the number of people in the Norwegian settlements has increased almost by the same number as the number of jobs. It has, however, not increased by the same *rate* (the number of people is not doubled). The population growth can partly be explained by an increase in the number of foreigners staying (and working) in the Norwegian settlements (Johansen and Bjørnsen 2009). The last two years' drop in employment has been accompanied by a reduced adult population and it is the Norwegian citizens who leave. Even so, the number of children is relatively stable which means that the population structure is not much changed.

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Figure 2: *Population in the Norwegian settlements and number of man years (including students) in Longyearbyen and Svea 1991-2009*



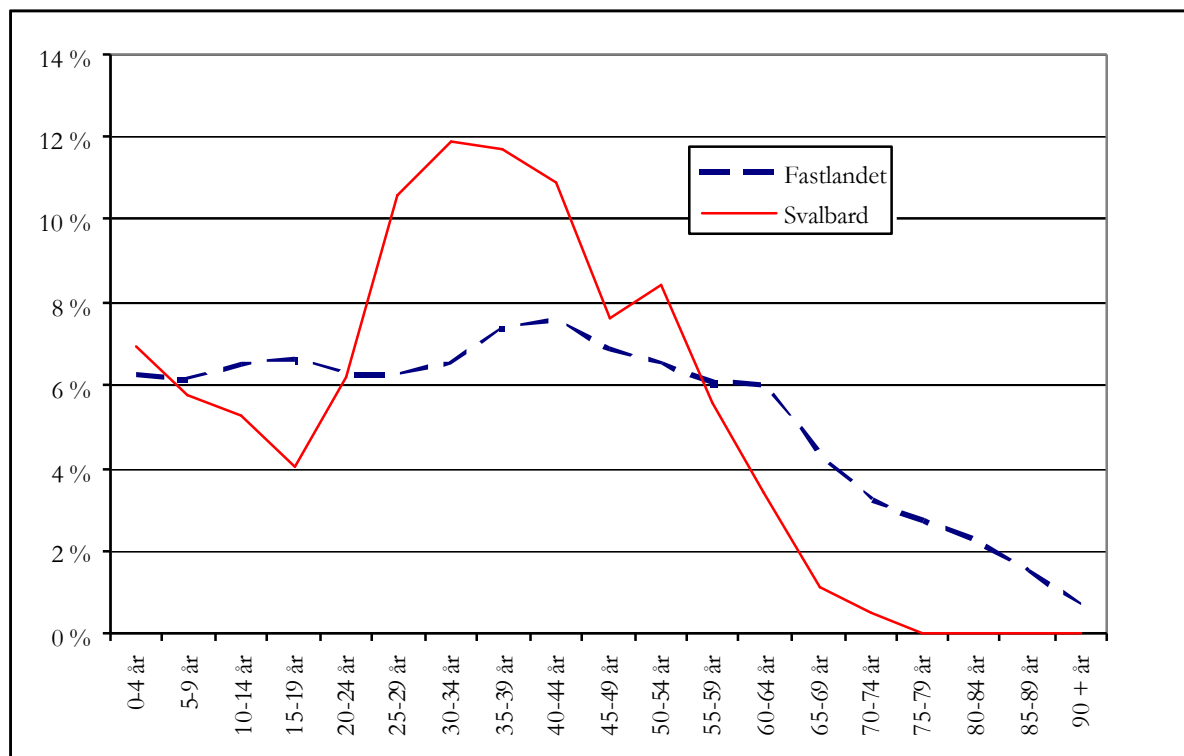
Source: Bjørnson and Johansen (2010)

The age structure of the population at Svalbard is quite different from the structure at the Mainland (figure 3). At Svalbard, the share of people in the age groups between 20 and 59 years is substantially higher than at the Mainland. This can be explained by the fact that Svalbard is a place where people go mainly to work, not to live. If we look at the younger age groups, there are relatively less children at Svalbard, except for the youngest group. This implies that people working at Svalbard would bring their children to the Mainland when they start school. In addition, there are almost no old persons staying at Svalbard. There is no care for older people there.

The extreme high rate of people within "working age groups" is also reflected in the employment rate. If we look at the number of grown ups (more than 20 years old), we find that there is only 1.05 person per man year. This is an extremely high rate of employment. Everybody works, both male and female. Of course, some might stay at home while others have two jobs, but the employment rate is still extremely high.

The final comment on population is that Svalbard is still dominated by men, compared to the Mainland (Johansen and Bjørnson 2007). Around 40 per cent of the population is female at Svalbard, while around 50 per cent is female at the Mainland. Svalbard is, in other words, a society dominated by economically active, male inhabitants in the prime of their working age.

Figure 3: National (Mainland) and Svalbard population distributed by age group (five year intervals) 2009



Source: Bjørnsen and Johansen (2010)

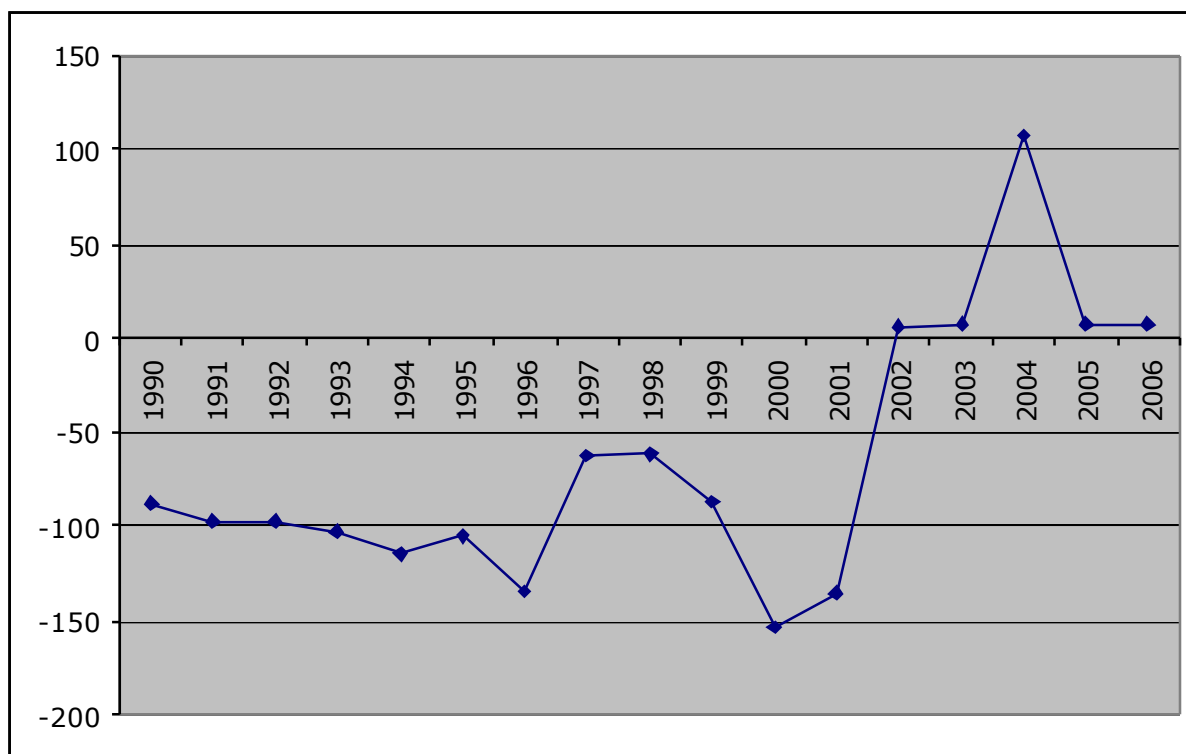
### 3 Model and Data for Analysing Svalbard's Economy

Svalbard's industrial structure can be divided into two main categories; the economic base and the derived activities. Basic economic activities have, by definition, their market outside the local economy. Thus, their development, or growth, is decided by conditions outside the local economy. In this sense, basic economic activities are *export oriented*. They generate incomes that are, at least to a certain extent, used inside the local economy. These incomes then become the economic base for derived activities, which are established in order to provide goods and services for the local economy and its population. The development, or growth, of the derived activities is determined by the growth in incomes in basic activities, and the derived activities are in this sense *locally oriented*. In this sense, there is a clear distinction between basic and derived economic activities. Growth in both sectors, however, depends on the conditions under which the economic base develops.

Theories of economic base are also called export base theories, since the basic economic activities by definition are externally oriented. Although the name "export base" implies that the basic activities of a region are directed towards a *market* outside the region, other sources of income generation are important for many basic activities. A typical source of income might be the Government (or the national public sector), which might finance a local economic activity for national reasons. This is a typical situation at Svalbard. The most important source of income for some of the basic activities is the Government. This makes

these activities under Government control, based on year-to-year funding by the Government. In a respect, these activities can also be defined as export activities, as they export services – including sovereignty – to the Nation as a whole. The Government’s willingness to pay for these services is reflected in the year-to-year budget. Examples of Government financed activities at Svalbard are UNIS, some research companies and Sysselmannen (and some others, but small).

Figure 4: The Government’s economic yield from SNSK. Millions NOK.



Source: SNSK

Earlier, but not today when coal prices are high and production has become substantially more efficient, the mining activities were subsidised and production of coal in this sense was a Government activity (illustrated in figure 4).

Production of tourism services is based on demand from tourists, and is a market based export oriented basic industry. Production of local public services is financed partly by the Government. In this sense, the production of these services should be categorised within the basic industries. On the other hand, both the level of production of each public service, and the quality and number of services provided, are functions of local demand. In this sense, the production of local public services is based on local markets and should be classified as derived activities. Until 2007, no distinction was made between production of national (Sysselmannen and others) and local public services. They have since been analysed separately as one governmental and one local sector. Both are kept as base activities although predicted development in the local sector is subjected to local demand.

This brings us to a more general problem in categorising different parts of the economy either within basic or derived activities. We have taken a pragmatic

view: The activities that generate most of their incomes from outside the local economy have been characterised as basic activities. This includes Sysselmannen, higher education and research (UNIS and research companies), the students at UNIS, mining and tourism. Local public activities are categorised as partly basic, partly derived (we will discuss these later). Tourism services are produced in many companies. We have distinguished between each company's production directed towards tourists, which is categorised as basic activities, and their production directed towards the local economy, which is categorised as derived activities. Given these definitions, the rest (the residual) of the economy is categorised within the derived sector.

Economic base theories are today regarded rather old-fashioned by many scientists. They focus on trade, on whether income generation takes place internationally (exports) or locally (derived), and on the connection between export oriented and derived activities. In this sense, local economic growth (defined as growth in all sectors of the economy) can be explained primarily by the growth of the basic activities, and similarly retraction in basic industries leads to retraction in derived activities. The theory is focused more on dependencies and interdependencies between two sectors of an economy, than on explaining economic behaviour, competition, innovation and so on.

On the other hand, when we look at Svalbard's economy, we find that there is a clear distinction between the basic and derived activities, and that Svalbard's economy can be defined as export driven. The Government finances some basic activities, while others are financed in the market for tourism and for coal. Income earned from these sources is spent in the local economy, and thus the basis for the derived activities. The derived activities, on the other hand, are market oriented and based on local demand, and depend on the incomes from the export oriented basic sectors to survive. At the same time, the derived activities are important factors for the local economy, both as job-opportunities and as suppliers of local services. Therefore, they are also important for developing Longyearbyen as an attractive place to live. Given the Government's political priorities and the aims of the Svalbard Policy, therefore, we think that the export base theory provides us with a sufficient analytical tool, which can be applied for analysing the linkages and dependencies between basic and derived activities. In this sense, it contributes to providing the national as well as the local authorities with information that is necessary for analysing Svalbard's economy and its industrial structure, as well as the impacts of policy changes and changes in the incomes from the basic activities into this structure. These are also the focuses of the analysis.

### **3.1 Data production**

The statistical information on Svalbard and Longyearbyen provided by Statistics Norway has been limited, compared to the information provided on local communities (municipalities) on the mainland. The legal framework, including the Statistics Act (on how to collect statistics, and on respondents' obligation to provide information), has not been in place until very recently. Therefore, information has had to be collected locally.

The local authorities have, since 1990, asked all businesses in Longyearbyen and elsewhere in the Norwegian settlements at Svalbard, to answer a relatively

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simple questionnaire. This questionnaire has enabled us to analyse Longyearbyen's economy. Today there are around 150 businesses at Svalbard. Each business is asked to answer questions on turnover, employment, wages, purchases and investments. In addition, they are asked to split their turnover into sub-categories (tourists and other exports, local companies and local population), as well as their purchases of investment goods and other goods (locally or imports from the mainland and abroad). The information has been collected according to the, more or less, same template since 1990. In 2008, the data collecting responsibility was transferred to Statistics Norway but the template stayed unchanged.

This gives us a good tool for analysing the trends of the Svalbard economy over time, including growth and recessions. By sorting the businesses into sub-categories using some sort of standard of industrial classification, we can analyse industrial development as well. One specific way of categorising the businesses is into four basic and one derived economic sectors, as we have done. The data is tailor-made for this purpose.

In addition to the information provided by this survey, other types of information are used in the analysis as well. Longyearbyen Lokalstyre (LL, the Local Government) provides information on housing, local public services and land use planning. From the Tax Office, via LL, we get information on the population. A small survey among the children in child care and at school is conducted (almost) yearly by LL, providing information on the number of children using these services and their parents' line of work. Spitsbergen Travel provides info on tourism. Finally, more qualitative information is collected by yearly visits to, and interviews with representatives of, the major companies at Svalbard.

All in all, we think that the amount of information at the disposal of the study is well sufficient for analysing Longyearbyen's development over time. There is a symbiosis between the data and the analysis; the data is, at least some of it, tailor-made for this analysis while, at the same time, the analytical tools developed are adapted to the data.

### **3.2 The Economic Base Model**

We have constructed an economic model where we have tried to isolate basic and export oriented from derived economic activities. Many companies can easily be classified within basic or derived sectors of the economy. As we have mentioned earlier, many companies on the other hand produce goods or services that are sold both locally and exported (exports in this sense include to the Government). These companies are classified according to what their main market is, either within basic or derived sectors. In addition, each company has been asked to estimate the share of their turnover that has been sold to tourists. This share is *always* defined as a part of the basic sector "tourism", irrespective of the classification of the "main" activities of the company. In this sense, we have the following classes of companies in Longyearbyen (and Svea):

- 100 per cent within one of five (including production of local public services) basic sectors.
  - 100 per cent within derived activities.
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- Less than 100 per cent of activities within a basic sector (not tourism), the rest within tourism.
- Less than 100 per cent of activities within the derived sector, the rest within tourism.

In addition, the Students are classified as a "basic" economic sector, since they represent an exogenous addition to Longyearbyen's economy, but their incomes only represent consumption demand, not turnover or value added (table 1).

The economy of Longyearbyen (and Svea) then includes six economic sectors, five basic (when all local and central public activities are aggregated to one sector) and one derived. Each company is classified according to whether their market is local or not, the historical classification of the company, and the data collected from the companies each year. After classifying each company, we aggregate the data to the six sectors. The data can be used for analysing flows of goods and services in and out of Svalbard, as well as local flows of goods and services, measured in NOK.

Figure 5 shows that the volume of all the basic activities together has increased during almost the whole period. From 1991 to 1994, however, there was a recession within these activities. This recession can be explained by decreased activity level within mining. Since 1993, there has been a transition of the basic sectors. New sectors grew, and today the basic activities are much more diversified than earlier. This also means that the economy is more robust to sudden exogenous change. However, the level of activity in most basic sectors at Svalbard is directly or indirectly controlled by the Government. Today, therefore, sudden exogenous changes to the Svalbard Policy will probably be the most important, potentially destabilising factor in the economy.

Another feature of figure 5 is that the level of derived activities has grown substantially during the period. There are two main factors that can explain this. First, many of the old "Company Town" activities have been reclassified, from the mining sector to the derived sector. This has been an important part of making Longyearbyen's structure and economy less dependent on SNSK (and more market oriented). Second, a number of new, mainly privately run, local services have emerged during the period. Together with the restructuring of the economic base, these services represent many of the factors that distinguish the old-fashioned and one-sided mining community of the future from the modern, local community of Longyearbyen of today. Johansen and Bjørnsen (2007) state that the level of services in Longyearbyen today is *higher* than in most local communities of comparable sizes in the Mainland. This is probably due to the remote location of Longyearbyen (there are no alternative cities), but many services depend both on the local market and on tourism. Therefore, the high quantity and quality of local services production could probably not exist without the symbiotic existence of tourism.

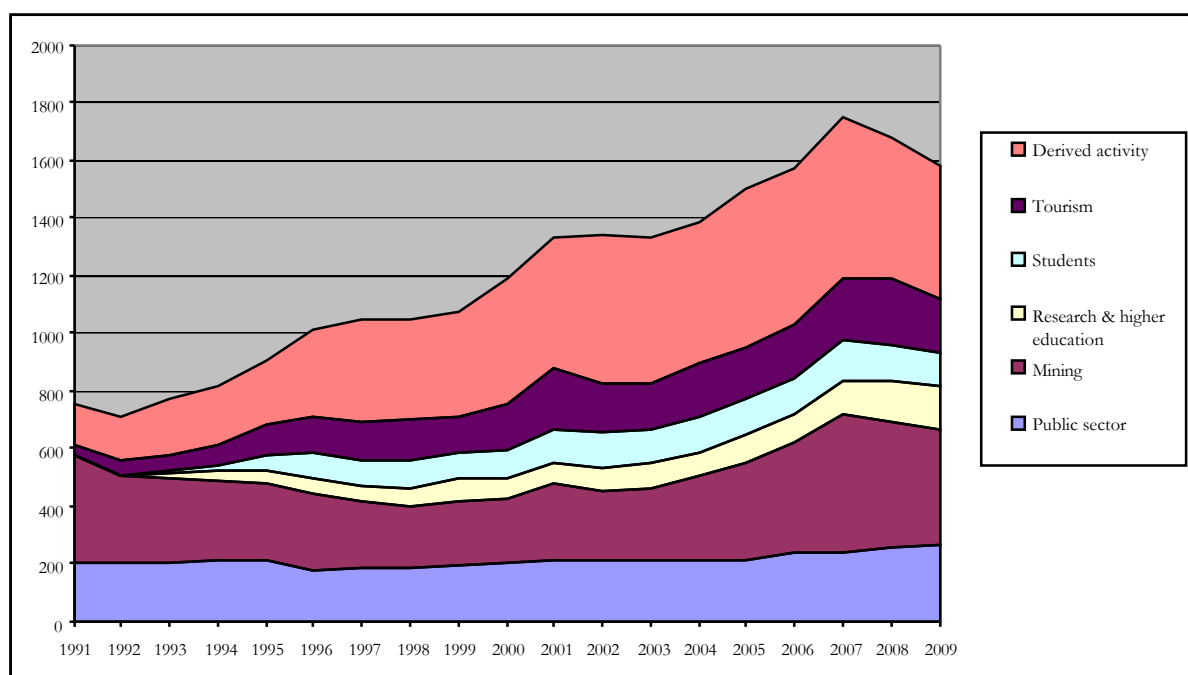
Since 2007, employment in the base sectors was reduced by 76 man years (6 per cent). Reduced employment within *Mining* (88 man years down since 2007) and fewer *Students* (26 man years down) was, to some degree, compensated by increased employment in the other base sectors. *Travel and tourism* was, however, badly hit in 2009 and employment was reduced by one third in hotels and restaurants. In 2009, the base sectors employed just below 70 per cent of

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total employment at Svalbard. This is an increase from around 60 per cent in 2000.

Within *Derived activities*, employment shares thus fell from 40 to 30 per cent during the same period. Investments are important for the year-to-year number of employed within these activities. During the last decade, and especially the last 3-4 years, the share of employment within *Construction* fell more rapidly than the share of employment within *Other derived activities*. From 2007 to 2009, the number of man years within derived activities fell by 87 (16 per cent), mostly within construction and business services.

Figure 5: *Number of Man Years worked in Longyearbyen and Svea 1991-2009*



Source: Bjørnsen and Johansen (2010)

The information collected and the classifications chosen have been used to produce table 1. Here, the key features of the economic base model as well as the main properties of the economy are summed up in a single table. In addition to the applied information and classifications, we have made a couple of assumptions to produce the table. First, we have assumed that the labour productivity of each company's tourism and non-tourism related activities are the same. This means that we have used the same share of tourism employment and tourism turnover for each company. All together, 179 man years produce 371 million NOK turnover within tourism, and in principle, tourism takes place in all companies. Second, we have related each basic industry's share of total local purchases and total wages (of which not all is spent), directly to employment within the derived sector of the economy. This assumption means that the local spending pattern is the same across Industries, which is not a big problem since we have only one derived sector. At the same time, this means that we can link employment within each basic industry to derived employment. Third, we have assumed that the model is demand driven without any thresholds or other ceilings. This means that changes in income earned in any basic industry will imply changed activity in the derived sector. This also means that the model can

be applied for projections for the whole economy, given projections for the basic sectors and assuming stable multipliers.

Table 1: *Some key figures for the basic industries in Longyearbyen and Svea 2008 and 2009 in mill NOK (turnover, value added, local purchases and wages), number of man years and labour multipliers.*

	Gov. Sector		Local Public		Research		Students		Mining		Tourism		Total Basic	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Turnover	104	109	123	121	160	149			3467	2079	398	371	4252	2829
Value Added	53	73	86	92	178	149			2047	1159	189	158	2554	1631
Companies' local purch.	27	37	75	97	30	177	12	12	438	194	124	104	706	621
Wages	47	65	77	82	58	62			495	448	92	82	769	739
Multipliers	0,34	0,30	0,40	0,43	0,25	0,22	0,07	0,06	0,55	0,57	0,46	0,41	0,42	0,42
Man Years: Basic	86	108	172	161	137	153	122	119	440	396	227	179	1185	1115
Derived Man Years	29	32	69	70	34	34	8	7	241	227	105	73	498	464
Total Man Years	115	141	240	230	171	186	130	126	681	622	333	252	1682	1579

Source: Bjørnsen and Johansen (2010)

Using this line of arguing, the table shows that mining directly and indirectly accounts for around 40 per cent of employment in Longyearbyen and Svea and is still the most important single basic industry in quantitative measures. The same line of arguing, on the other hand, shows that 60 per cent of employment in Longyearbyen and Svea can be directly and indirectly derived from other basic industries. Again, this illustrates the transformation of Longyearbyen during the 1990s and 2000s, in a quantitative way.

### 3.3 Population

Johansen and Bjørnsen (2010) have calculated the rate of turnover among the employees and among the population in Longyearbyen and Svea. The rates vary from year to year, from around 15 to close to 30 per cent. This means that 15 to 30 per cent of the employees (people) in Longyearbyen and Svea at the beginning of the year are replaced by new employees (people) during the year. This rate can be added to the growth rate of employment (population). In other words, a significant proportion of the employees (people) are new to Svalbard in a year. Sometimes, the turnover rate for the population is generally higher than the turnover in employment. In 2009, the turnover rates were estimated at 12 (employment) and 21 (population) per cent. These rates are relatively high, compared to the mainland, but for Svalbard, the turnover in employment is historically low and must be seen as a consequence of the reduced number of man years produced.

We also know that the employment rate in Longyearbyen and Svea is very high. In 2009, there were only 1.03 grown ups per man year worked. People go there to work. Therefore, there is a tight and direct link between the number of jobs and the working population, which can be used for projecting the number of grown-ups.



Whether the workers bring their families or not is a question of individual preferences, and the link between the working population and the number of children is not that clear. At the same time, we know that approximately a quarter of the people, and therefore families, migrate from (and to) Svalbard every year. For this reason, it is difficult to use standard population models to project ageing. This is particularly significant for projecting the number of children, which is used for deciding the supply of child care and schooling services.

An alternative model has consequently been developed. The model is used for projecting the number of children in two age groups (0 to 5 years and 6 to 18 years). We know where every child's father is working. Indicators, showing the number of children per man year in each sector of the economy, are constructed. These indicators vary significantly between sectors. The indicators are multiplied by the number of employees in the sector according to the projections. Then, the number of children is split into the two age groups according to the base year's age distribution, and we have projected the number of children. All in all, this model is found to be more stable than standard population models (Johansen and Bjørnsen 2007) and can be used to project the demand for child care and schooling.

This model is, of course, very different from standard population models. The choice of model is based on some important and empirical facts. The population in Svalbard is not stable, due to the high turnover rates. Therefore, standard models are not applicable. Ageing is not an important issue among the working population. Almost everybody works – that why they're there in the first place – age doesn't matter. It is more important to project the number of grown-ups as a group, which again is tightly connected to the number of jobs. It is, however, important to project the number of children in different age groups, due to the local public sector's need for planning child care and schooling. Due to the high turnover rates, ageing among children is difficult to project. Therefore, we have used the approach of father's place of work.

## 4 Applying the Model to the Data: Future Prospects

We have made projections both for the number of jobs (man years) and for the population in the period 2010 (observed values) to 2014, applying the model described in the previous section of the paper. The model's predictions, both for the number of jobs by sector and for the number of people by age group, are driven solely by the future prospects of the basic sectors. All indicators and coefficients of the model are given from the model's base year (2009).

### **4.1 Number of jobs by sector**

We have stated that the economic base model can be applied for analysing future economic development at Svalbard, if we know the prospects of the basic industries. It can also be applied for analysing the impacts changes in activity or income levels in basic sectors have for the rest of the Svalbard economy. However, the model only gives a picture of the economy at a given period of time, in our case in 2009 which was a time of stagnation. Even though we believe that the export base theory is an adequate description of the economy, a

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couple of essential additional assumptions have to be made if we want to consider it valid also in the future.

- We have to assume that the multipliers are relatively stable over time. This assumption is rather strict for at least a couple of reasons. First, the model's derived activities are represented by the residual of the economy at a given slot in time (2009). We have calculated the multipliers using this assumption. When we look at future prospects and apply these multipliers, we assume that there is a linear relationship between basic and derived activities over time. The derived activities then become non-residual and flexible, which is something quite different. Second, the relationship between basic and derived activities (the multipliers) can change over time because of structural change (new or vanishing basic or derived activities). Third, the multipliers would change over time if the relationship between basic and derived activities is non-linear (for instance if there are thresholds within production of certain derived activities).
- There is excess supply of labour, in the sense that the demand for labour in Longyearbyen (and Svea) is met by new labourers from the Mainland or abroad. This has been the case in all years (Johansen and Bjørnsen 2009). However, the supply of labour is affected by several factors, including the demand for labour outside Svalbard and the relative wage rate after taxes between Svalbard and alternative work. Many of the large companies at Svalbard state that the excess supply of labour has been smaller the last couple of years than earlier, particularly for high skilled labour (like mining engineers).

Commuting to the mainland, the housing market at Svalbard, and rules and regulations for people staying at Svalbard (including the level of taxes), are additional factors influencing the excess labour supply. We will look briefly into such factors in chapter 5.

If we accept the assumptions, there is still the matter of how to project development in the basic industries. In order to complete the prognoses, we have to make assumptions about how the base sectors will develop. We have already mentioned that representatives from the companies and organisations at Svalbard are not very optimistic about the future. Employment within *Mining* will go down due to already planned activity reductions. For the other base sectors, the future is more uncertain. Excluding some special consideration, *e.g.* for mining and the public services' dependence on population growth, we have assumed zero growth in the coming five years. More specifically:

- *Mining* will continue to reduce the activity as in 2009 for the next five years. The mining company will gradually decrease employment by 50 man years, pay around the same wages and demand around the same level of intermediates from other sectors at Svalbard. This implies a decrease over the five years from 396 to 344 man years (13 per cent).
  - *Higher education and research* reported pessimism for future growth because of insufficient funding from the government. In fact, UNIS were planning to reduce their activity both in number of employees and in the number of courses supplied. We assumed a slight decrease in the number
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of employees at UNIS and zero growth for the other institutions the next five years based on the interview information.

- *The number of students* was allowed to increase in step with national higher education policy goals but the growth is moderate from 119 student years in 2009 to 148 in 2014.
- *Public sector activities* are, because of the overall (negative) development, not assumed to increase employment and we apply zero growth because of threshold values in public sector services. We do however reduce local government employment by 3 per cent because we correct the activity level in population-demanded services (basically child care and schools) by expected development in population (children).
- *Tourism* had a set back in 2009 but have previously increased on a yearly basis since 1990. The growth within tourism activities will depend on the politically allowed number of tourists (conflicts with environmental protection) and tourism infrastructure (transportation and number of beds) but is also heavily dependent on business cycles, both locally and abroad. Svalbard is a rather expensive destination and in the wake of the financial crises and because of the low expectations for the local economy, we have applied zero growth also in this sector.

The bullet points represent the *main alternative*, which is based on the basic industries' own thoughts on their future prospects. These add up to a 4 per cent decrease in the activity the next five years. Derived sectors will experience a stronger decrease in employment than the base sectors.

Table 2: *Future prospects for number of man years within basic and derived activities at Longyearbyen and Svea. Main alternative.*

	2009	2010	2011	2012	2013	2014	Growth
Public sector	269	267	265	265	265	265	98,4
Research and high edu.	153	151	150	148	147	145	95,2
Students	119	124	130	136	142	148	124,6
Mining	396	370	344	344	344	344	87,1
Tourism	179	179	179	179	179	179	100,0
Derived	464	448	432	432	432	432	93,3
<b>Total</b>	<b>1579</b>	<b>1539</b>	<b>1500</b>	<b>1504</b>	<b>1509</b>	<b>1514</b>	<b>95,9</b>

Source: Bjørnsen and Johansen (2010)

We have made alternative predictions based on assumptions which better reflect the historical development and signals received from national policy documents. These will not be presented any further in this paper, but result in distinct activity increases in the projection period (see Johansen and Bjørnsen (2009) for more detail). Johansen and Bjørnsen (2007) discuss the impacts of other assumptions regarding uncertainty in general, the choice of model, the structure of the basic sectors, and the multipliers.

## 4.2 Population

Population projections are very simple to make, given the model described in section 3.3 and the employment projections of section 4.1. The projections are based on the same household structure as in 2009.

Table 3 *Population projections for the Norwegian settlements. Number of people by age group*

	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
Children 0-5 years	177	172	167	167	167	167
Children 6-18 years	244	237	231	231	230	230
Adults	1631	1589	1550	1554	1559	1564
<b>Total</b>	<b>2052</b>	<b>1999</b>	<b>1948</b>	<b>1952</b>	<b>1957</b>	<b>1961</b>

Source: Bjørnsen and Johansen (2010)

Population will be reduced by around 100 individuals, of which the major share is adults (67 people). The number of people will, however, go down in all age groups.

## 5 Some conclusions

In this paper, we have discussed the development of Svalbard's economy, and the links between the basic sectors and derived activities, and between employment and population. Given the specifics of the Svalbard economy, we think that the export base theory is a relatively good tool for analysing the relationships between different economic sectors. Therefore, an economic base model has been developed, and data to support this model have been collected. At the same time as it is simple and easy to update, the model provides us with relevant information as an analytical tool.

Svalbard's economy is highly regulated, in the sense that political priorities influence many parts of the economy directly (and other parts more indirectly). Compared to the Mainland economy, regulations at Svalbard are different. The Svalbard budget gives the policy priorities for the coming year. Every ten years or so, the Svalbard Policy strategies for the next period are drawn up in a Government White Paper. The last White Paper was published in 2008.

Securing Norwegian sovereignty at Svalbard is, and will be, the most important part of the Svalbard Policy. Economic activities are important. To what extent international and national policies on the environment and climatic threats will change Norwegian policies on mining at Svalbard, we do not know yet. There is an ongoing conflict between mining and environmental protection, and there is an ongoing conflict between fossil fuels and climatic change. Therefore, the future of mining at Svalbard will probably be discussed thoroughly in the White Paper.

One important part of the Svalbard Policy the past period has been the transition of, and development of a "modern" society, in Longyearbyen. The restructuring of the economy, including both the development of new basic economic sectors and the increase of derived activities is an important part of this policy. In

addition, Longyearbyen has become more family friendly, and thus a more attractive place for families to stay for shorter or longer periods of time. Longyearbyen is on the other hand not meant to be a place to stay for life. This part of the Svalbard Policy is also successful, as figure 3 suggests.

Although the Svalbard economy is highly regulated, the existing Svalbard Policy is open and welcoming in the sense that it allows people and business to establish in Longyearbyen. Ten years ago, the Government at the same time signalled that Longyearbyen was "large enough". Today, around 500 people more than this live in Longyearbyen. This has led to pressure on existing infrastructures, like electrical and water supply, housing, industrial estates, transportation and so on. A continued economic and population growth will probably induce capacity increasing investments in many types of infrastructure.

All these factors suggest that the coming years will be very important in deciding the future of Longyearbyen. Will Longyearbyen continue to grow and will there be a need for investments in new infrastructures? What about the other basic sectors? And derived activities? What about taxes? Many of the conditions for future development in Longyearbyen will depend on what the government decides regarding SNSK's application for the opening of new coal field. The export base model can be used for analysing the impact on employment and population of many of the potential changes to the Svalbard Policy.

## Literature

This paper is based mainly on one source:

Steinar Johansen og Hild-Marte Bjørnsen (2007): *Samfunns- og næringsanalyse for Svalbard 2007*. NIBR-rapport 2007:23.

Steinar Johansen og Hild-Marte Bjørnsen (2010): *Samfunns- og næringsanalyse for Svalbard 2009*. NIBR-rapport 2010:27.

These reports are, unfortunately, in Norwegian. However, the main contents of the report can be found in the summary, at

<http://www.nibr.no/content/download/5831/26446/file/2009-27.pdf>

The report also includes a list of further references.

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