



Growth in the Nordic business sector

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TemaNord 2008:503

© Nordic Council of Ministers, Copenhagen 2007

ISBN 978-92-893-1662-0

Print: Ekspresen Tryk & Kopicenter

Printed on environmentally friendly paper

This publication can be ordered on www.norden.org/order. Other Nordic publications are available at www.norden.org/publications

Printed in Denmark

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Nordic co-operation

Nordic cooperation is one of the world's most extensive forms of regional collaboration, involving Denmark, Finland, Iceland, Norway, Sweden, and three autonomous areas: the Faroe Islands, Greenland, and Åland.

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Nordic cooperation seeks to safeguard Nordic and regional interests and principles in the global community. Common Nordic values help the region solidify its position as one of the world's most innovative and competitive.

Foreword

Growth is important. Today's growth is what we have to live on tomorrow. This is why we have focused on productivity and growth in this project. During the last decade the US economy accelerated substantially and left most European economies behind. However, it seems that the Nordic economies have performed distinctly better than the central European ones during this period. This makes it very interesting to study the growth pattern and the relationships between these economies in more detail. In this study we have used the growth accounting technique which is a very useful instrument to study the growth performance of nations and industries. Focus has been on the growth pattern and on industrial similarities and differences. We have also studied price development and the impact of technological change and competition, and also the distribution industries. It is of course very difficult to draw any direct relevant conclusions from these analyses, but we have tried to make some brief concluding remarks. The project group has consisted of Antti Pasanen, Finland, Steinar Todsén, Norway, Henrik Sejerbo Sørensen and Ioanna W Hørup Petersen, Denmark, Vera Norrman, Tomas Skyttesvall and Hans-Olof Hagén, Sweden, Tomas Skyttesvall and Hans-Olof Hagén have written the report and the latter has been the project manager.

Hans-Olof Hagén
Project Manager

Content

Foreword	5
Main results	9
Summary	11
Conclusions	12
1 Growth in the Nordic countries	15
Average growth decomposed	15
Average growth in the total business sector	15
Average growth in the goods sectors.....	19
Average growth in the service sectors	22
Growth in MFP over time	25
The total business sectors.....	25
The goods sectors.....	26
The service sectors	27
Conclusions	28
2. Integration and distribution, the industry development	29
How well are the Nordic economies integrated?	29
Hypotheses.....	29
Technical change and price movements.....	30
Multifactor growth and prices	31
The international technology transfer in the Nordic economies	34
Does the openness of the Nordic economies lead to a common price movement?	37
The impact of trade on price movements	38
The knowledge economy and the price changes	40
Conclusions of the hypotheses testing.....	42
The distribution industries in the Nordic countries	43
The volume growth in gross production.....	43
The Gross production multifactor productivity growth pattern	45

Main results

- The growth in gross production was highest in Finland, followed by Sweden, Norway and Denmark.
- Most of these differences could be explained by the differences in intermediate inputs.
- The differences in the input of quality-adjusted labour did not explain much even if the Swedish and Norwegian input did only grow half as fast as that of the other countries.
- The Danish input of ICT capital service contributed to more than twice as much as the others but this was partly compensated by the input of non-ICT capital service for Norway and Sweden.
- The multifactor productivity growth rates were marked higher especially in Finland but also in Sweden compared to Norway and Denmark.
- The differences in multifactor productivity growth rates could explain part of the differences in price changes in all the Nordic countries.
- There seems to be rather strong technology transfer among the Nordic countries and between them and the rest of the world since the multifactor growth rates for different countries are strongly correlated to the average Nordic one.
- There has also been a rather strong economic relationship between the Nordic countries and the rest of the world since the price changes in different countries are strongly correlated to the average Nordic one.
- The openness of the Nordic countries measured as import penetration and export share explains some of the differences in price movements that could not be explained by the multifactor productivity growth rates.
- The ICT intensity further dampened the price increases for all countries, and for Finland and Sweden so did the R&D intensity but not quite the concentration rate.
- It is of course very difficult to draw any conclusion that could be of some policy relevance from this analysis. Still we will hint at some insights, even if they are of a very tentative nature;
 - o The Danish multifactor productivity growth rate is lagging behind the other Nordic countries, which could be a momentum for their growth policy.
 - o Sweden has not been able to increase its employment as much as Denmark and Finland, nor has the labour quality increased that much.

- o The information of details is less in the Norwegian case, but still appears as some of its growth opportunities lie in the labour force as in Sweden.
- o There is much room for further labour force mobilisation in Finland also.
- o Openness to foreign competition looks like it is of much greater importance than the concentration in the national markets. The Nordic countries have thus very much to gain from further liberalisation of international trade with countries both within and outside the EU.
- o There still seems to be some room for ICT policy in Denmark and Norway, as well as for innovation policy.
- o Norway's impressive productivity development in the trade industry and Finland's in the communication industry could be partly policy-driven and thus of interest for other countries.

Summary

After the economic crises that hit Sweden and Finland so bad in the beginning of the 1990s, all the Nordic countries have experienced a long period of healthy growth from 1993 to 2005. The growth in gross production in the business sector has been highest in Finland, followed by Sweden, Norway and Denmark. Even if Finland has had an average growth rate of 5 percent compared to Denmark's 3 percent per year, the growth has lost some of its momentum from the 1990s. The goods industries did quite well in Finland and Sweden, but both Norway and Denmark beat the Swedish growth of service industries. In those countries the growth rates were higher in the service industries than in the goods industries, in contrast to Finland and to Sweden.

Most of these differences in growth rates could be explained by the differences in intermediate inputs of energy, materials and services. The intermediate input accounted for between 53 and 63 percent of the growth in gross production in the whole business sector as well as in the service and good producing parts of the business industries, with the exception of the Swedish service industries where it only accounted for 47 percent.

The labour inputs accounted for almost half a percent per year in the gross production growth for Denmark and Finland but for Sweden and Norway it was just half that size. The labour input increase is in all countries concentrated to the service industries. In Denmark and Finland its growth impact is around two thirds of a percent but in Sweden it was just a little more than half that size.

When it comes to ICT capital Denmark really stands out. For this country it was even more important than the quality-adjusted labour input, while ICT capital in the rest of the countries was less than half of the Danish impact in all the other countries. On the other hand the importance of non-ICT capital was between 50 and 100 percent as high in Sweden and Norway as it was in the other two countries. But still in total the Danish capital service input had the highest growth impact by far. In all countries it is in the service industries the major growth effects of the ICT capital service is found. In Denmark the effect is of the same magnitude as the labour impact. The highest impact of the non ICT capital service is found in the Swedish service industries even if it is of a lesser magnitude.

Finally the multifactor productivity growth rate was the highest in Finland at 1.2 percent per year and then comes Sweden with 1.1 while Norway had just three fifths of that level and Denmark's was a meagre 0.2 percent. In all countries the growth rates were much higher in the goods industries than the service industries, with the exception of Norway whe-

re the service industries actually had a 0.1 higher multifactor growth rate. The differences for the other countries varied from 0.9 in Finland to one third of that in Denmark. But still the Finnish service industries had a higher growth rate than all others except for the Finnish and Swedish goods industries.

The differences in multifactor productivity growth rates could explain part of the differences in price changes in all the Nordic countries. Both when other factors such as the competition, knowledge economy indicators and the country effects were taken into account and not the customers seem to get two thirds of the benefits of technological development.

There appears to be a rather strong technology transfer between the Nordic countries since the multifactor growth rates for different countries are strongly correlated to the average Nordic one.

There is also a strong economic relationship between the Nordic countries since the price changes in different countries are strongly correlated to the average Nordic one.

The openness of the Nordic countries measured as import penetration and export share seems to explain some of the differences in price movements that could not be explained by the multifactor productivity growth rates. The ICT intensity further dampened the price increases, and at least for Finland and Sweden the R&D intensity also did, but not to the same degree.

Conclusions

It is of course very difficult to draw any conclusion that could be of some policy relevance from this analysis. Still we will try to hint at some insights, even if they are of a very tentative nature.

The Danish multifactor productivity growth rate seems to be lagging behind the other Nordic countries, which could be a momentum for their growth policy. The Danish business sector has increased its employment as well as the labour quality and its investments in ICT, but it does not seem to have performed that well when it comes to MFP growth. The innovative climate could perhaps be more focused in its growth policy.

The overall growth rate and the MFP growth rate have been rather high in the Swedish business sector. However, Sweden has not been able to increase its employment as Denmark and Finland, nor has the labour quality increased that much. And the ICT investments are not in line with the Danish expansion. It seems that the Swedish policy lessons lie mostly in the human capital area. Mobilisation of the labour force as well as more investment in education could possibly improve this situation.

Considering the fact that the Norwegian specialisation lies in the capital intensive industries, primarily oil, the overall growth rate and even the MFP growth is not that bad. The information of details is less in the Nor-

wegian case, but still it seems as some of its growth opportunities lie in the labour force as in Sweden.

The Finnish performance is impressive, but still there is something lacking in the ICT-investment field. And the large increase in the hours worked is a reflection of the equally large reserves it started with, so there is much room for further labour force mobilisation also in Finland.

1 Growth in the Nordic countries

Average growth decomposed

Average growth in production in the Nordic business sectors (*Iceland is not included in this study*) has been fairly high during the period 1993 to 2005. Of the four countries included in this study, Finland has experienced the highest average growth at 5.0 percent per year. In Sweden and Norway, growth in production has been almost equal at 3.9 percent and 3.7 percent respectively. In Denmark, average growth has been the lowest in comparison at still a good 3.1 percent.

The two main explanations behind growth in production are either an increase in the inputs of production factors e.g. capital, labour and intermediate goods and services, or a raise in the level of productivity in the economy. In this chapter we will take a closer look at the drivers behind the growth in the Nordic countries included in this study, comparing the factors and looking for differences and similarities between the countries. We will try to observe differences in the structure of capital, i.e. ICT capital versus non-ICT capital, the effects of labour input and labour composition and to what extent growth in productivity has played on the economic growth. We will analyse this decomposition of growth in production for the total business sector, the goods and the service sector in each of all four countries.

Average growth in the total business sector

The average growth in production regarding the total business sector, for all four countries, is depicted in figure 1.1. The growth in production is decomposed into average growth in input of ICT capital, non-ICT capital, labour, intermediates and multifactor productivity, MFP.

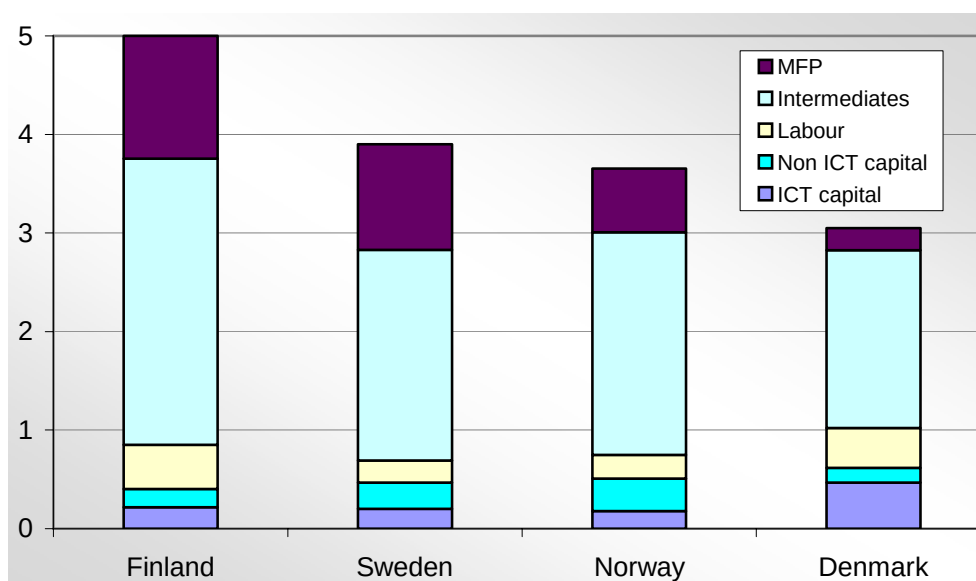


Figure 1.1 Average growth in production 1994–2005 decomposed.

The Nordic business sectors

Regarding total capital input, the Danish business sector accounted for the highest share-weighted average growth at 0.6 percent. In Sweden and Norway the corresponding growth rate equalled 0.5 percent each. Finland experienced the lowest growth rate at 0.4 percent. With growth in capital input explaining 20 percent of growth in production, growth in capital was of more significance in Denmark in comparison to the other countries. In Norway and Sweden, the corresponding share was 14 percent and 12 percent respectively. The lowest share was noted in Finland at a mere 8 percent.

Digging deeper into the composition of the capital stock, comparing the growth in input of ICT capital and non-ICT capital, Denmark and Finland were experiencing higher growth rates in ICT capital input than in non-ICT capital input. This is especially true in Denmark where the ICT growth rate was 3 times higher than the non-ICT growth rate. In the other countries this difference between the two types of capital input was much smaller.

With an average growth at nearly 0.5 percent, Denmark also had the strongest yearly growth of all Nordic countries in ICT capital input during the period. In comparison, Finland and Sweden followed at 0.2 percent and Norway at a little less than 0.2 percent.

Regarding the input of labour, including the effects of changes in labour composition, Finland experienced the highest average growth rate at more than 0.4 percent per year. In Denmark labour input grew on average by 0.4 percent per year. In Norway and Sweden, growth in labour input averaged only 0.2 percent.

The share of growth in production explained by growth in labour input is more evenly distributed among the countries in comparison with capi-

tal input. Once again, Denmark accounts for the largest share at 13 percent followed by Finland at 9 percent. In Norway and Sweden, labour input growth explained 7 percent and 6 percent of the growth in production respectively.

Comparing the effects of inputs of capital and labour, Finland was the only country in which input of labour played a more significant role on production than input of capital. The difference between labour and capital input was quite small though. In the other countries capital input accounted for about twice the effect of labour input.

In this analysis, labour input was decomposed into growth in hours worked and in labour composition. Regarding the labour composition in Sweden it is accounted for: age, level and type of education and ethnicity in the labour force. In Denmark and Finland the decomposition is less detailed. Lacking necessary data about the Norwegian labour force we used statistics from OECD regarding the share of education at different levels over time. Comparing the four countries according to these statistics we assumed zero growth in labour composition in Norway. The result of the decomposition is depicted in fig 1.2.

As is seen in fig. 1.2, growth in hours worked was the most significant factor in labour input in all four countries. Regarding the average growth in hours worked, there are no major differences between the countries. The average growth was about equal, between 0.2 to 0.3 percent, per year. The main difference lies in the growth in labour composition. On average, growth in labour composition was highest in Finland at almost 0.2 percent, corresponding to a share of 40 percent of average total labour input. In Denmark corresponding growth rate was just below 0.1 percent and in Sweden almost zero. Also, the share of growth in labour composition in the latter two countries was not at all as significant as in Finland.

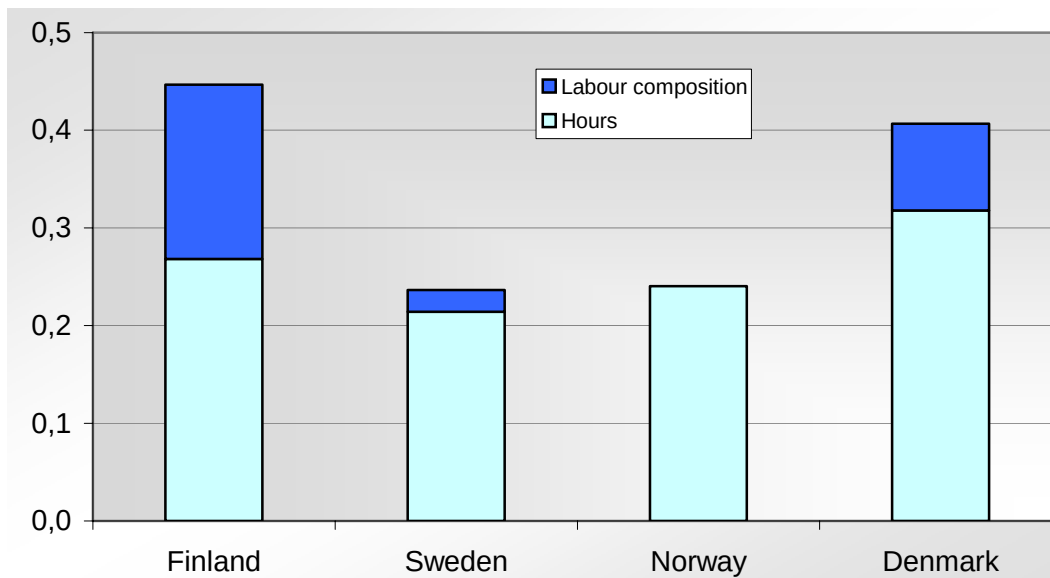


Figure 1.2 Average labour input 1994–2006 decomposed

The Nordic business sectors

In all four countries, growth in input of intermediate goods and services was by far the single most important factor explaining growth in production. Increasing intermediate consumption explained around 60 percent of the growth in production in each of the countries, as can be seen in fig 1.1, which is also more than double the effect of any other factor.

In Finland, share-weighted average growth in intermediate input at 2.9 percent was significantly higher than in the other countries. The share-weighted growth in intermediate input in Norway and Sweden followed at 2.3 percent and 2.1 percent respectively. In the Danish business sector, average growth in intermediate input equalled 1.8 percent.

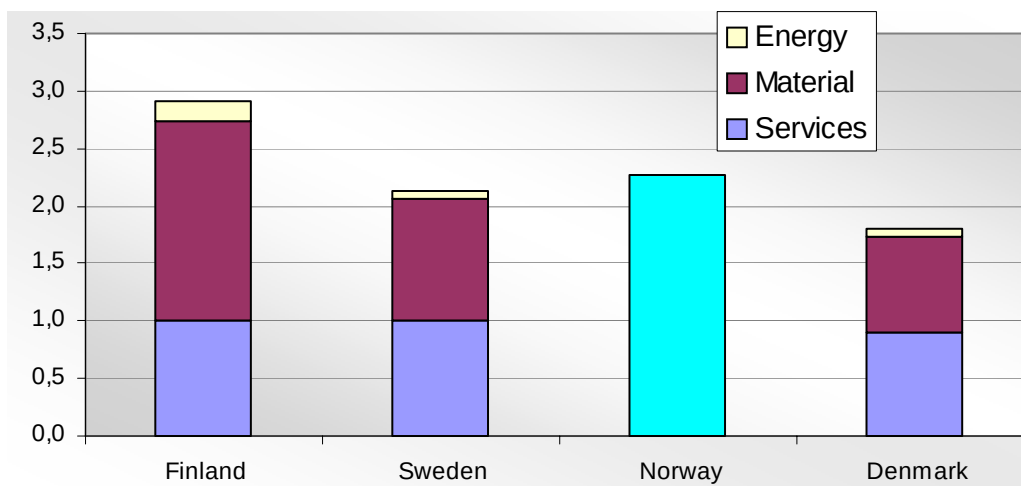


Figure 1.3 Average growth in intermediate input 1994–2006 decomposed

The Nordic business sectors

In fig. 1.3 the growth in input of intermediate consumption is decomposed into the growth of energy products, material products and services. In the case of Norway we lacked the necessary data to perform this decomposition.

As is seen in the fig. 1.3, growth in input of materials was highest, at 1.7 percent, and most significant in Finland. In Sweden and Denmark growth in materials and in services was almost equal, at around 1 percent. The growth rate in energy input was significantly lower in all three countries and only accounted for a minor part of the average growth in intermediate consumption.

In terms of raising production by increasing the level of productivity, Finland was the most successful of the Nordic countries with an average growth in MFP at 1.2 percent (see fig.1.1). Sweden followed second at 1.1 percent. These two countries' productivity growth rates are competitive in an international perspective. In Norway the MFP growth was over 0.6 percent and in Denmark 0.2 percent.

In Sweden and Finland, growth in MFP is a main driver of growth in production, next to intermediate consumption. MFP growth is explaining respectively 27 percent and 25 percent of the growth in production. In Norway the corresponding share is 18 percent and in Denmark only 7 percent.

To conclude, growth in productivity is the second most important factor explaining growth in production in Sweden and Finland especially, but also in Norway. In the case of Denmark, growth in productivity showed to be the least significant factor.

Average growth in the goods sectors

Average growth in production in the Nordic goods sectors was higher than in the total business sectors in Finland and Sweden, at 5.6 percent and 4.4 percent respectively. The growth in production in the Norwegian goods sector was slightly lower than in the total business sector at 3.1 percent. And in the Danish goods sector, growth in production was significantly lower than in the total business sector at 2.3 percent.

Regarding total capital input in the Nordic goods sectors, we found almost the same structure as in the total business sector. The Norwegian and the Danish goods sectors accounted for the highest share-weighted average growth at 0.4 percent each. In the Swedish goods sector, average growth in capital input exceeded 0.2 percent. And again, Finland experienced the lowest growth at just under 0.2 percent.

The growth rates in ICT capital input were somewhat lower in the goods sectors than in the business sectors. And in Denmark the growth rate was significantly higher than in the other countries at over 0.3 percent. The ICT growth rates in the other countries equalled 0.1 percent. As

in the total business sector, growth in input of ICT capital played a more important role in the case of Denmark and Finland than growth in input of non-ICT capital. For Sweden and Norway it was the other way around.

Regarding total input of labour, the average growth rates were significantly lower in the goods sector than in the total business sector. Sweden and Finland experienced the highest growth rates at 0.1 percent and in Norway and Denmark the growth rates was close to zero. In comparison with the total business sectors, the impact of labour input on production growth was of significantly less importance in the goods sectors in all four countries.

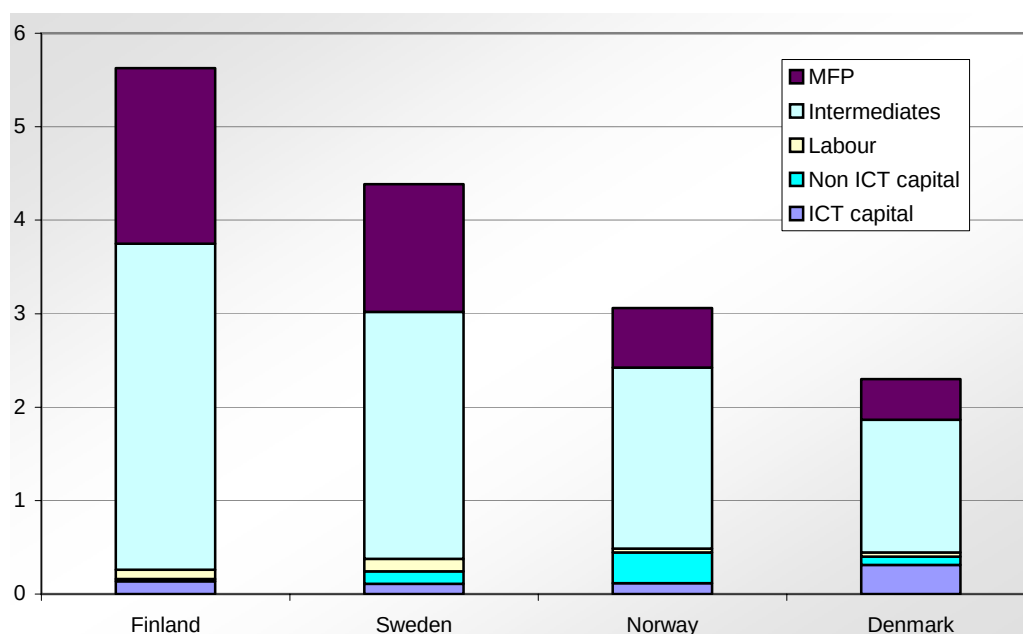


Figure 1.4 Average growth in production 1994–2005 decomposed

The Nordic goods sectors

That part of growth in production explained by growth in capital and labour input was lower in the goods sectors in all four countries. Comparing input of capital and labour, all four countries accounted for higher growth rates in capital input than in labour input in the goods sector. This also means that growth in capital input explained a larger part of growth in production than growth in labour input, in all four countries.

The decomposition of labour input regarding the goods sector is depicted in figure 1.5.

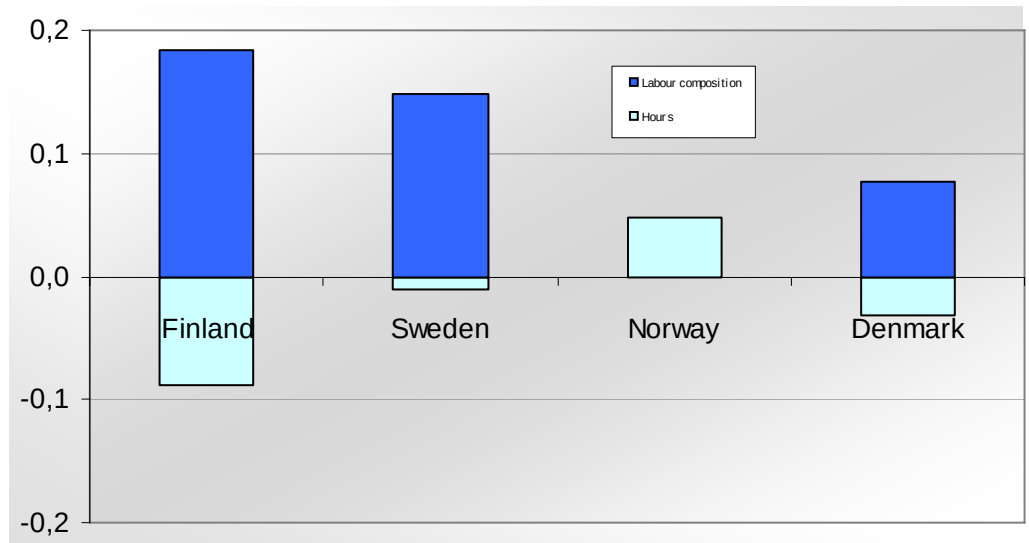


Figure 1.5 Average labour input 1994–2006 decomposed

The Nordic goods sectors

Figure 1.5 tells a whole different story about labour input in the goods sectors in comparison with the Nordic business sectors. Except in Norway, growth in hours worked is negative in all countries. Also, the growth in labour composition is of much greater significance in labour input growth in the goods sector.

As was the case in the total business sector, the major part of growth in production in the goods sectors could be attributed to growth in input of intermediate goods and services. Comparing the goods sector with the total business sector for each of the four countries, the share of growth in production explained by the growth in intermediates exceeded 60 percent, and was slightly larger in the goods sectors in all cases.

In fig. 1.6 growth in intermediate input in the goods sectors is decomposed into average growth in energy products, material products and services.

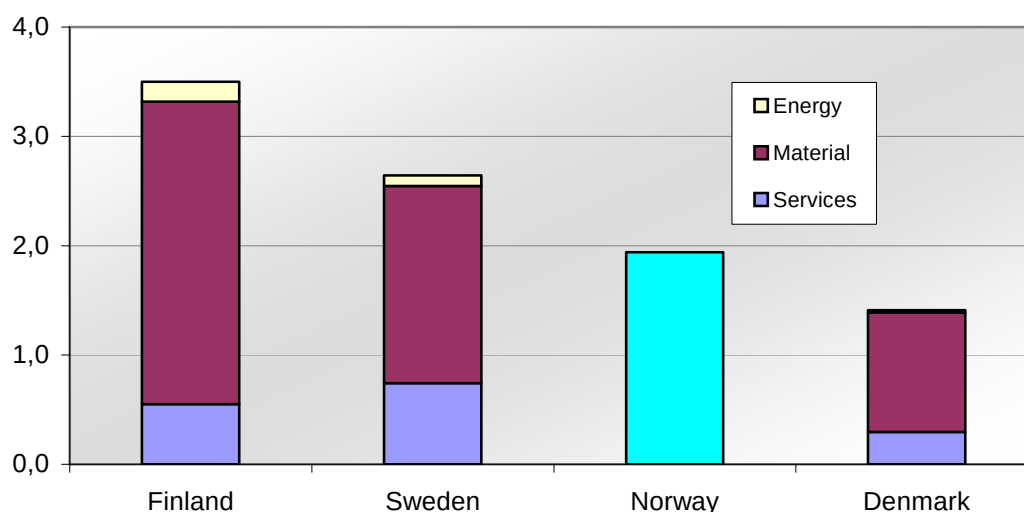


Figure 1.6 Average growth in intermediate input 1994–2006 decomposed

The Nordic goods sectors

In addition, growth in materials in the goods sectors seemed to be the most important factor of the growth in intermediates. The average growth in materials was significantly higher than corresponding figures for the input of services in Finland, Sweden and Denmark. The growth rates in energy input were again very low and almost the same as in the total business sectors.

In comparison with the business sectors, average growth in MFP in the goods sectors was higher in all countries except in Norway, where it was equal. Finland and Sweden experienced the highest MFP growth at 1.9 percent and 1.4 percent respectively. In Norway and Denmark the corresponding rates was 0.6 and 0.4 percent. Growth in productivity in the goods sector was by far the second most important factor in Finland and Sweden. In the case of Norway and Denmark, it was slightly more important than growth in capital input. In conclusion, growth in MFP in the goods sectors played a significantly more important role explaining growth in production, especially in Denmark, and growth in labour input a significantly less important role, compared to the total business sectors.

Average growth in the service sectors

Consequently, average growth in production in the service sectors was higher than in the total business sector in Norway and Denmark at 4.3 percent and 3.6 percent respectively. Still, Finland accounted for the highest average growth in the service sector at 4.4 percent. In Sweden average growth in production was 3.4 percent.

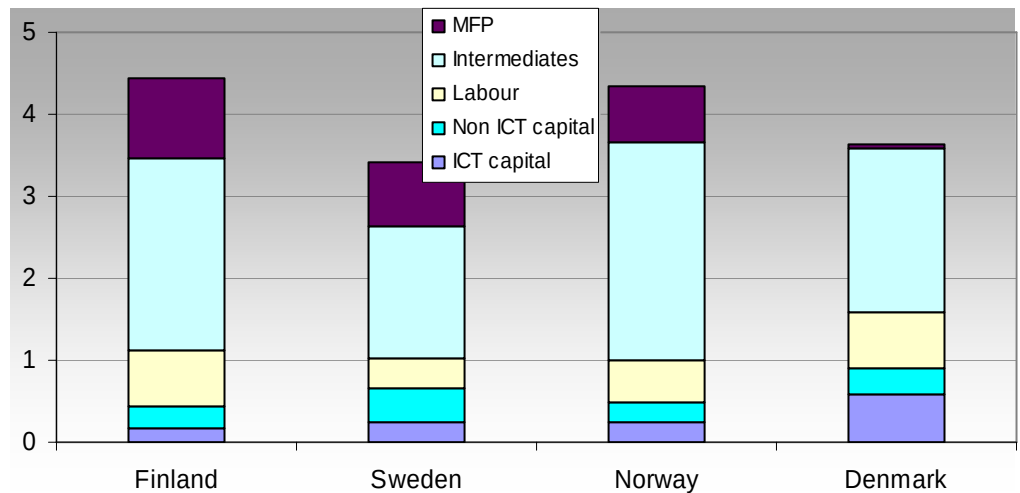


Figure 1.7 Average growth in production 1994–2005 decomposed.

The Nordic service sectors

Regarding total capital input in the service sectors, Denmark accounted for the highest share-weighted average growth rate at 0.9 percent. In Sweden, Norway and Finland the corresponding growth rates were 0.6, 0.5 and 0.4 percent respectively. With growth in capital input explaining 25 percent of the growth in production, growth in capital was of more significance in Denmark in comparison to the other countries. In Sweden, Norway and Finland the corresponding share was 19, 12 and 10 percent respectively.

As is seen in the figures, the growth rates in capital were higher, and the share of capital input in production growth was larger in the service sectors in comparison to the goods sectors, except in Norway. In Norway, the effect of capital on production was slightly larger in the goods sector.

Furthermore, growth rates in input of ICT capital in all four countries are higher in this sector compared to the goods sector. The same also holds for the input of non-ICT capital, again with the exception of Norway.

Another significant difference between the goods and the service sectors is the growth rate in labour input. The growth rate in labour input was much higher in the service sectors and played a significantly more important role on production growth than in the goods sector in all four countries.

In fig. 1.8 the growth in labour input is decomposed into growth in hours and labour composition.

As is seen in fig. 1.8, growth in hours worked was the most significant factor in labour input in all four countries. The average growth rate ranged from 0.6 percent in Denmark and Finland to 0.4 percent in Sweden.

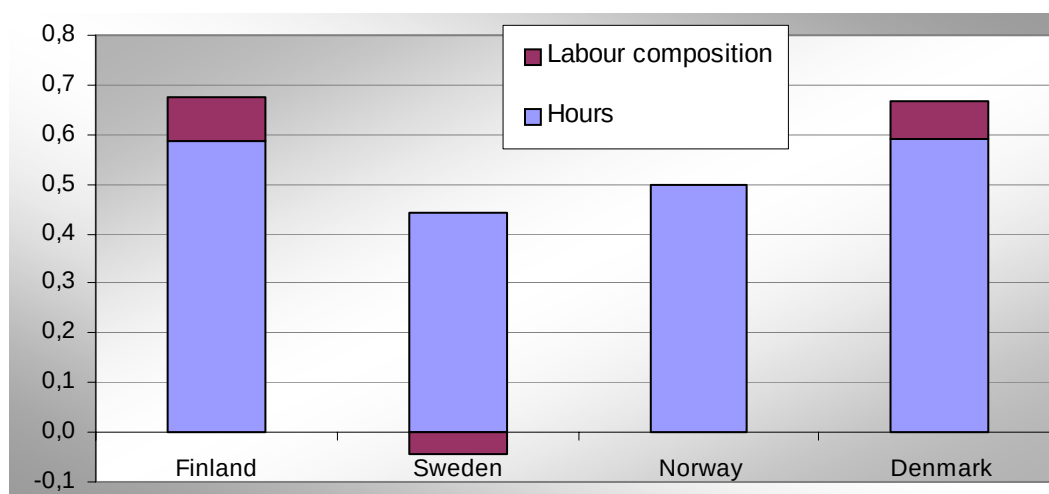


Figure 1.8. Average labour input 1994–2006 decomposed

The Nordic service sectors

Regarding labour composition, Denmark and Finland again experienced the highest growth rates at just under 0.1 percent. In Sweden the corresponding growth rates was even negative but close to zero.

Once again, growth in intermediate inputs, explained the largest part of the growth in production in all four countries, as can be seen in fig. 1.9. Nevertheless, growth in intermediates is of little less importance in this sector in comparison with the goods sector.

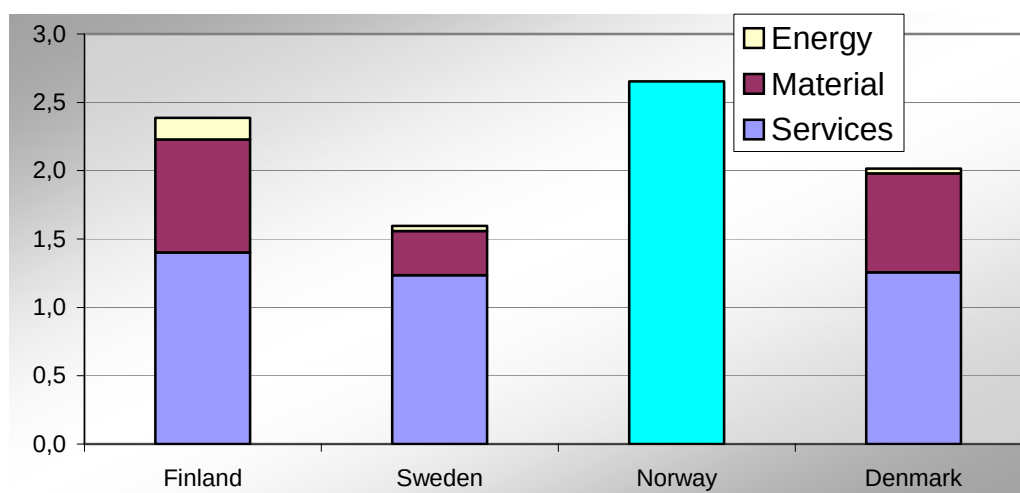


Figure 1.9. Average growth in intermediate input 1994–2006 decomposed

The Nordic service sectors

In the service sectors, contrary the goods and the business sectors, growth in services seemed to be the most important factor of the growth in intermediates. The average growth in input of services was significantly higher than the average growth in materials in Finland, Denmark and Sweden at 1.4, 1.3 and 1.2 percent respectively. Growth in services in the

service sectors is also significantly higher than corresponding figures in the goods sectors. Regarding the growth in energy, Finland experienced the highest growth rate at almost 0.2 percent. In Sweden and Denmark the corresponding growth rates were close to zero.

Yet another significant difference between the goods and the service sectors was the much lower growth in productivity in the service sectors. Finland again accounted for the highest productivity growth rate at 1.0 percent, followed by Sweden at 0.8 percent.

In Norway, growth in productivity was 0.7 percent on average and in Denmark there was almost no productivity growth at all. In Sweden and Finland, growth in MFP explained 23 percent and 22 percent of the growth in production respectively. In Norway the corresponding share was 15 percent, and in Denmark it was only 1 percent.

Growth in MFP over time

The total business sectors

In Finland, average growth in MFP was the highest among the Nordic countries during the time period 1994 to 2006 at 1.2 percent. Growth in MFP in Finland remained high and fairly stable around 1.5 percent from the beginning of the period until the year 2000. In 2001, growth in MFP slumped gradually until the year 2003 when the growth rate was at its lowest and even negative. In 2004 MFP growth began to recover and in 2006 the growth rate was back at a high 1.7 percent.

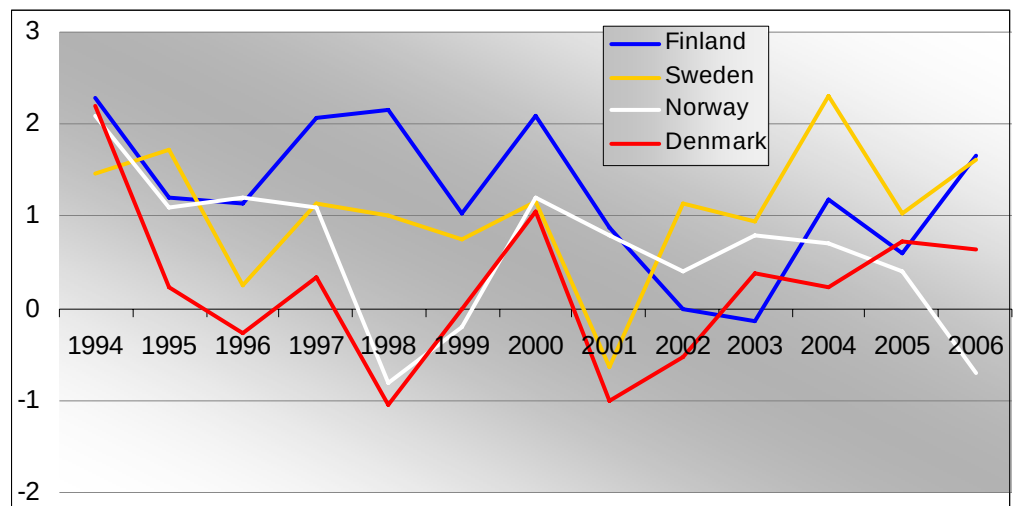


Fig 1.10 Yearly MFP growth rates in the Nordic countries 1994–2006

The Nordic business sectors

Sweden, which had the second highest average MFP growth at 1.1 percent, was also quite stable over the period at a level around 1 percent,

with the exception of the years 2001 and 2004. The year 2001 was marked by the crisis in the telecom sector and in the ICT producing sectors. After the dip in 2001 productivity began to recover earlier in Sweden than in the other Nordic countries. From 2002 onwards productivity has grown at high rates and especially in 2004 when the growth in production was booming.

Average MFP growth in Finland and Sweden was about twice as high as in Norway in third place. As all four countries recovered from a period of weak economic activity, Norway also had very strong productivity growth in the beginning of the period. Looking at the whole period, the trend in the growth rate is diminishing with three major setbacks in 1998, 1999 and 2006 when the level of productivity was even lowered.

Denmark also accounted for very high productivity growth during the first year of the period at 2.2 percent. After that MFP growth is much lower during the period and even negative during several years. As a consequence, average MFP growth rate in the Danish business sector is by far the lowest of the Nordic business sectors at 0.2 percent. However, at the end of the period the productivity rate seems to have recovered and has become more stable at around 0.5 percent.

The goods sectors

The Nordic goods sectors show a similar trend as in the total business sectors in the beginning of the period, with high but diminishing productivity growth rates. The highest average growth in MFP in the goods sector was seen in Finland and Sweden at 1.9 percent and 1.4 percent respectively.

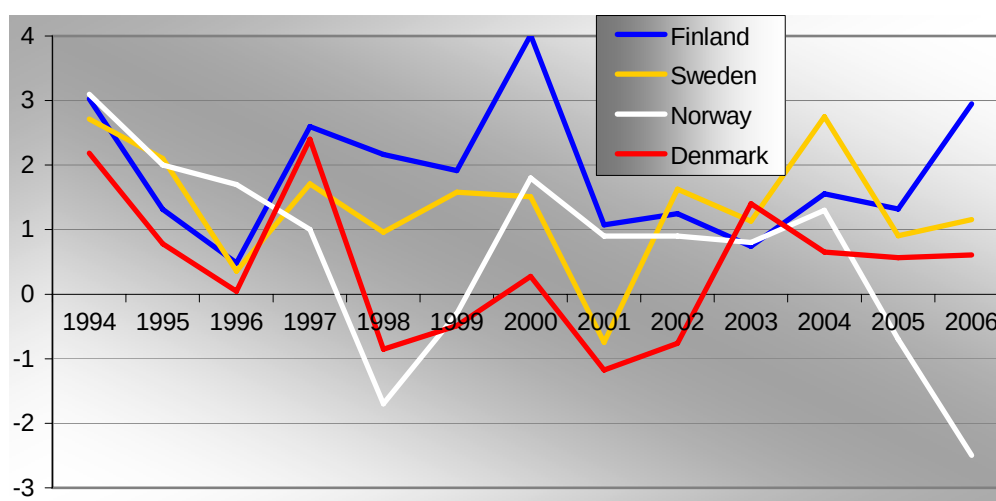


Figure 1.11. Yearly MFP growth in the Nordic goods sectors 1994–2006

The Nordic goods sectors

In Norway, average MFP growth was slightly lower in the goods sector than in the total business sector at 0.6 percent and in Denmark it was slightly higher at 0.4 percent. Both countries were facing a negative growth trend during the period. In Norway the productivity growth was negative in 1998 and in 1999 and especially in 2005 and 2006 which really distinguishes them from the other Nordic countries. In Denmark the level of productivity is falling in almost every year in the middle of the period. But from 2003 onwards the growth in productivity has been positive at a level at over 0.5 percent.

In both these countries MFP growth is significantly higher than in the total business sector. After a low point in 1996, productivity growth rates rise in these two countries and remain on a high level with the exception of Sweden in 2001.

The service sectors

The growth rates in productivity were on the whole lower in the service sectors than in the goods sectors except in Norway.

The Finnish service sector experienced the highest average productivity growth rate among the Nordic countries during this period at 1.0 percent. The growth rates were especially high in the first half of the period. In 1999 the growth rate started to diminish and was even negative during 2002 and 2003.

In Sweden the growth rate in MFP was slightly volatile at around 0.5 percent until it became negative in 2001. Thereafter growth picked up speed and showed a strong positive trend. In Norway growth rates were volatile at around 0.3 percent until 2004. Thereafter the growth rate gained momentum.

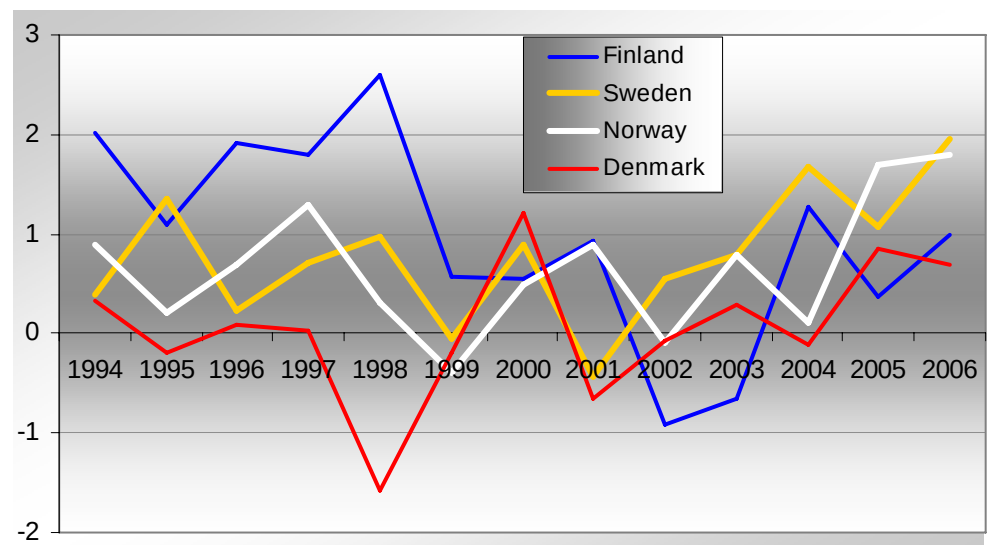


Fig 1.12. Yearly MFP growth in the Nordic service sectors 1994–2006

The Nordic service sectors

Growth rates in the Danish service sector were almost zero in the first years of the period, hitting a low point in 1998 when growth became negative. The high productivity rate in 2000 was probably a reaction to the conditions during 1998. At the end of the period the growth rates again were very low and sometimes negative before they seemed to gain momentum in 2005.

Overall, from the year 2002 it seems that productivity rates have been gaining momentum and all four countries are experiencing a strong positive trend ending at fairly high growth rates.

Conclusions

It is of course very difficult to draw any conclusion that could be of some policy relevance from this analysis. Still we will try to hint at some insights, even if they are of a very tentative nature.

The Danish growth rate seems to be lagging behind the other Nordic countries, which could be a momentum for their growth policy. The Danish business sector has increased its employment as well as the labour quality and its investments in ICT, but it does not seem to have performed that well when it comes to MFP growth. The innovative climate could perhaps be more focused in its growth policy.

The overall growth rate and the MFP growth rate have been rather high in the Swedish business sector. However, Sweden has not been able to increase its employment as Denmark and Finland, nor has the labour quality increased that much. And the ICT investments are not in line with the Danish expansion. It seems that the Swedish policy lessons lie mostly in the human capital area. Mobilisation of the labour force as well as more investment in education could possibly alleviate this situation.

Considering the fact that the Norwegian specialisation lies in the capital intensive industries, primarily oil, the overall growth rate and even the MFP growth is not that bad. The information of details is less in the Norwegian case, but still it seems as some of its growth opportunities lie in the labour force as in Sweden.

The Finnish performance is impressive, but still there is something lacking in the ICT-investment field. And the large increase in the hours worked is a reflection of the equally large reserves it started with, so there is much room for further labour force mobilisation also in Finland.

2. Integration and distribution, the industry development

In this section the data on the individual industries will be used in order to study the similarities and differences between the four Nordic economies. First the study will be done mostly in form of testing some hypotheses for all industries. Secondly the development in the distribution industries will be looked into and compared with the US development.

How well are the Nordic economies integrated?

Hypotheses

Three main hypotheses will be tested. The first one is indirectly related to the issue in the heading: there is a negative relationship between the multifactor productivity growth and the price developments at the industry level

This means that a faster technical change in an industry is expected to lead to a less rapid price increase, or even decrease in some extreme cases. This should be the case for all the Nordic countries taken separately, and also for the whole area.

The second hypothesis is: the streams of international technological transfers between nations are large enough to make the technological development in the different industries rather similar. That means that there is a significant relationship between the multifactor growth rates of the industries in one Nordic country with those in other Nordic countries. However, since the composition of the industry aggregates used in this study varies considerably between the Nordic countries this relationship can be quite blurred. Still it is believed that the hypothesis will be confirmed so at least the relationship between each country and the average Nordic one will be significant.

The third hypothesis is: International trade is so intense within the Nordic countries and between them and the rest of the world that the patterns of price developments of the different industries are rather similar. That means that a positive and significant relationship between the price movements in each country and the average Nordic one is expected.

Technical change and price movements

Multifactor productivity (MFP) is often called technical change; this implies that innovation is the main force behind the MFP growth. Important factors that are involved in the creation of an innovative environment are research, ICT use and human capital. This can be studied on an industry level. For a single firm operating in a perfect market all the benefits of an MFP increase would go to the customers. However, if the products are not homogenous and differ among firms which is the normal situation in most high tech industries, this is the case. And if a firm is really innovative and does not just spend a lot of money on R&D, it will increase the value of its products and services. If its innovation has more of a product orientation or process orientation it will instead improve its production and distribution. If the firm is a true monopolist or even if it has a more limited monopoly power, in scope or time, based on patents or on the advantage of being a major player, the firm can expect to benefit a lot from its innovation. With a weaker market position due to strong competition from other innovative firms, the rewards to the innovating firm will be just a fraction of the total benefits of this innovation to the whole society. Markets where there are many examples of both these alternatives are the markets for ICT goods and services.

Most of the submarkets within the ICT sector market are characterized by fierce competition, where a firm's innovative ability does not guarantee large profit margins. Those who have gained most from the rapid technological developments are the customers who have continuously received better products and services for the same or lower prices.

In an industry that is less innovative, dynamics are not as good and customers cannot expect falling prices even if competition is intense. But if such a market is opened for international competition, the relative prices can fall even if the market is more or less lacking innovations. An example of this is the Swedish food market, where everything from the farmers to the grocery shops is included. In the beginning of the 1990s the planning power of the local community over the grocery market was reduced. This led to sharper competition among the food retailers. When Sweden joined the EU the Swedish farmers and the food processing industry suddenly had to compete with other European firms. And in recent years new players have entered in the national distribution market in the form of foreign grocery chains that have established themselves in Sweden. This has led to a more intense competition among the dominant grocery chains. These major changes in the competitive environment led to falling prices for the Swedish consumers. During the 1980s the CPI for food increased by 0.7 percent more per year than the total CPI, but since 1990 it has increased by 1.7 percent less than the total CPI. So there are two major forces that influence price development: technical changes and competition on the market.

It is not only a continuous fight between producers and consumers about how much each should benefit from technological development. It is also in fact a competition among nations. If, for example, a country produces a lot of IT hardware for a market with imperfect competition it can be expected to benefit from the rapid productivity growth, which also gives a boost to the gross national income, GNI. This is, of course, only true in volume terms with fixed prices, but is not as self-evident when it is measured in current prices. And the transactions between countries are done in current prices. If a country's trade balances, it does so in current prices and not in fixed prices. The country has to buy its imports with the euros, kronor, dollars and pounds it receives from its export. So the exchange rate and prices really matter. If international competition is fierce, the national firms have to charge lower prices than they could last year in order to sell their products to other countries this year also. This means that they cannot distribute as large sums to their employees and their owners as they otherwise could have done. In turn their employees and owners cannot buy as many foreign consumer goods as they could have if their employer was able to keep the price level from last year.

In the trade battle between nations it is of utmost importance for a country to sell its products as expensively as possible and buy as cheaply as possible. If a country's export is dominated by products and services that are produced by industries with high MFP growth sold on very competitive markets, it will probably have to sell them at decreasing prices and thus give away a large part of the rapid MFP increase to customers in other countries. On the other hand it is of course an advantage to specialise in high tech industries with a high MFP growth since this increases the growth rate of the country. The trick is to produce products with high MFP growth rates with rather weak competition or use a lot of those products in your own country. But it is definitely an advantage to import a lot of products and services with high MFP growth which are sold on very competitive markets.

Multifactor growth and prices

Now let us go back to the industry level. As mentioned above with our aggregation level, the two-digit NACE with some further restrictions gives us roughly 40 industries per country. Some industries are missing in one country and others in another. Due to confidentiality restrictions or lack of some data the industries are represented by the average of several industries in one country and so on. All this blurs our picture but still we believe that the economic forces and the openness of the Nordic economies will confirm the hypothesis. However, probably a more important problem is the fact that the prices of goods and services are not only dependent on the changes in the internal process of the firm that sells them,

that is, the development of its value added. The income from sales, or gross production, depends thus on the value added, or the contribution that a firm itself makes to all the inputs that it buys from other firms, as well as inputs such as: raw materials, intermediate goods, energy and services. For companies that produce goods, their value added are in general worth considerably less than half of the value of the finished good. Value added is more important for many service firms, but for all firms the inputs bought from other firms are of great importance.

The change of the prices of the goods or services that a certain industry sells therefore depends not only on the MFP growth of its own industry but also on the MFP growth of all the industries that it uses as inputs. For example if the price of crude oil increases, some industries like the petroleum refineries that use crude oil as an input are faced with increasing costs. Since they do not add much to the value of their inputs and thus cannot absorb any of these cost increases, they pass them on to their customers. But let us make a try anyhow.

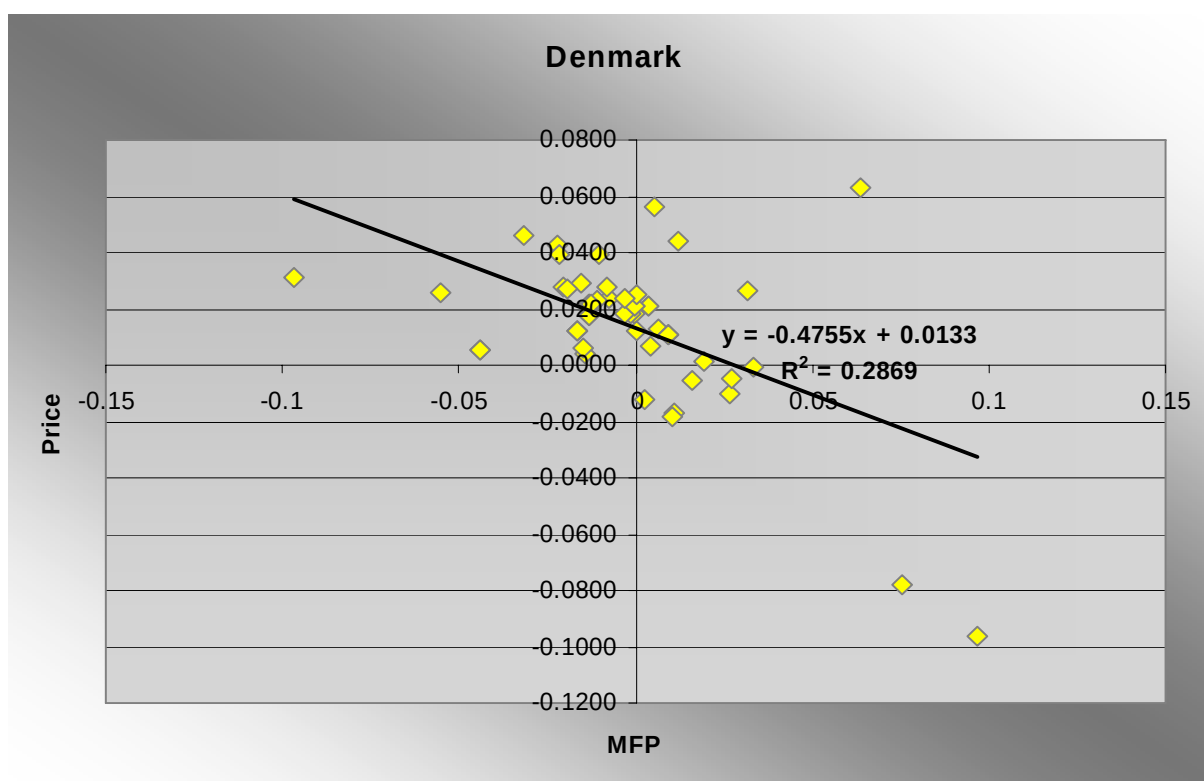
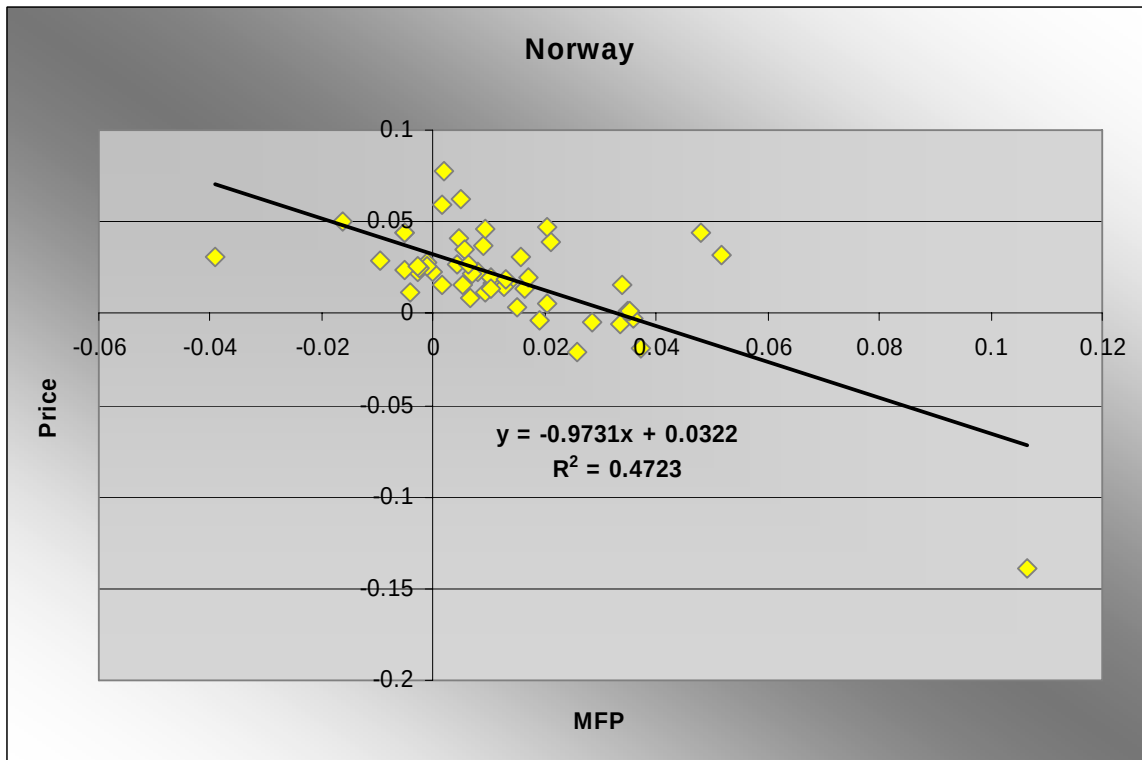
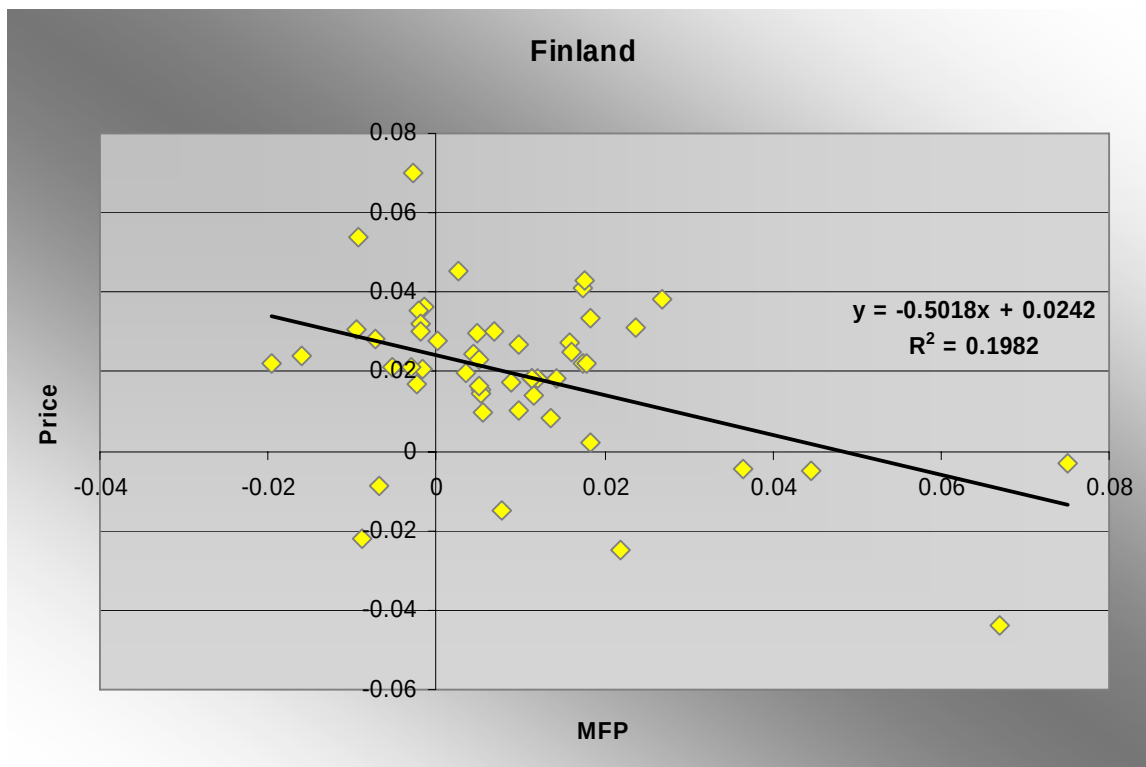
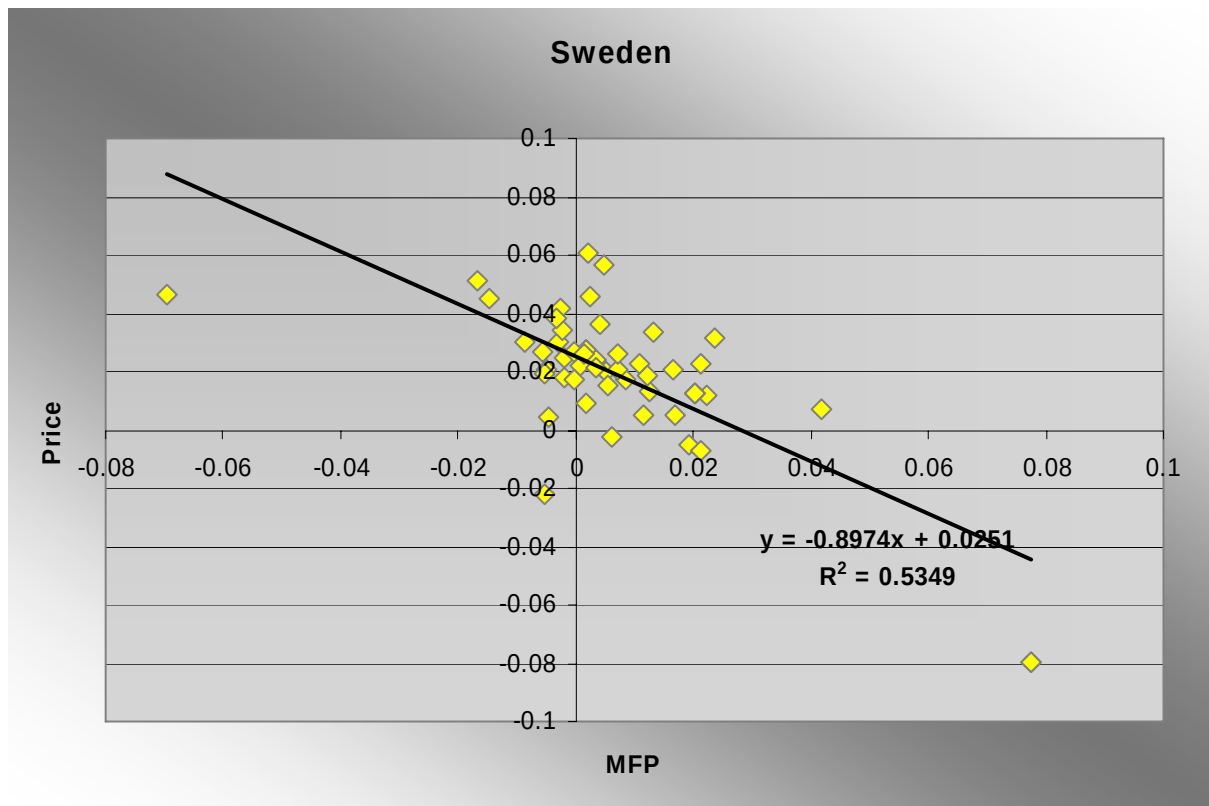


Figure 2.1. The relationship between the growth rates of MFP and prices for the period 1993–2003/2004
a. Denmark

*b. Norway**c. Finland*



d. Sweden

We begin by studying the relationship between prices and multifactor productivity in the Nordic countries. The hypothesis is that the openness of the Nordic economies, even if they are quite small, is enough to create as competitive environment as is necessary to give a significant negative relationship between these variables. From figure 2.1 it can be seen that our hypothesis is confirmed. However, the relationship is strongest in Norway and Sweden, but weaker in Denmark and weakest in Finland. This is partly due to some extreme observations that strengthened the relationship in two first mentioned countries. There are also similar examples in Denmark and Finland, but they do not work in just one direction and do not influence results that much.

The international technology transfer in the Nordic economies

The crucial test of our hypothesis if the Nordic markets are really international is if the prices and multifactor productivity moves in accordance with each other.

In order to test the hypothesis of technology transfer between countries, here measured as the relation between the multifactor growth rates

for different countries, a correlation table has been constructed. The hypothesis is confirmed since the correlation between the national growth rates and the Nordic average, which is a simple arithmetic mean, is strongly significant for all the four Nordic countries.

The correlation coefficients were also quite high; they were between 0.6 and 0.8. The highest level was reached by Denmark, then Sweden while Finland was last. The individual correlations are also significant on a high level with just two exceptions. Neither the Norwegian and Swedish industries, nor the Finnish and Danish were correlated if you do not accept 18 or 22 percent as an acceptable significant level, which means that the risk of drawing the wrong conclusion is as high as one of five. Sweden fitted equally well to Norway and Finland since both these pairs had a correlation coefficient over 0.4, and second came Denmark and Norway with a coefficient of 0.35. This was mostly according to structural differences in the economies, or alternatively put, the relative weight the respective industries have in each country. However, there is one exception: Denmark fitted quite well with two countries with quite a different industry structure. Still it represents some important characteristics of the Nordic economies.

Table 2.1 Correlations between MFP growth rates

Pearson Correlation Coefficients					
Prob > r under H0: Rho=0					
Number of Observations					
	MFP Nordic	MFP Denmark	MFP Norway	MFP Finland	MFP Sweden
MFP Nordic	1.00	0.79 <.0001	0.64 <.0001	0.60 <.0001	0.72 <.0001
MFP Denmark	0.79 <.0001	1.00	0.35 0.01	0.17 0.22	0.42 0.00
MFP Norway	0.64 <.0001	0.35 0.01	1.00	0.27 0.05	0.19 0.18
MFP Finland	0.60 <.0001	0.17 0.22	0.27 0.05	1.00	0.44 0.00
MFP Sweden	0.72 <.0001	0.42 0.00	0.19 0.18	0.44 0.00	1.00

The gross production multifactor productivity growth as mentioned above does not include the growth in countries' input, but it includes the cost of both ICT capital service and the different cost of the R&D. Still it is worth testing if there is some additional advantage in growth terms for the industries that are more knowledge-intensive in these respects. The mechanism that could create such an effect is if the technological frontier was moving so fast that those industries that invest heavily in knowledge benefit in the form of some extra growth beyond what investment in other forms of capital gave.

This seems to be the case since the correlations coefficient between the multifactor growth and the ICT capital stock in relation the value added and R&D investments also in relation to the value added in 2003/2004 were both significant at the one percent level. In a regression over all the observations and controlled for the country effects, the ICT comes out significant for R&D. The significant level was well over 10 percent, which can be called more of a tendency than a fact, and the adjusted r-square is a meagre 0.06. Still there is some advantage in MFP growth terms if a nation has a higher proportion of ICT-intensive industries and probably also more R&D industries since they definitely do have a higher growth rate.

The country dummy for Denmark is not in the regression so the other country dummies measure the difference between this country and the others. The result tells us that the Norwegian industries tend to be those that have the highest MFP, but this is due to the already-mentioned effect of the lack of measurement for the labour quality increase in Norway. But both the two other countries also seem to also have around one percent higher growth rates unweighted with the industry size than the ICT and R&D differences that are taken into account. If we make a very rough adjustment for a possible labour quality increase of 0.2 percent the Norwegian result seems to be in line with Finland.

Table 2.2. The relation between MFP growth and the relative R&D intensity and ICT intensity

Dependent Variable: MFP				
R-Square	0.087			
Adj R-Sq	0.064			
Parameter Estimates				
Variable	Parameter	Standard	t Value	Pr > t
	Estimate	Error		
Intercept	-0.004	0.003	-1.29	0.20
ICT	0.013	0.006	2.22	0.03
R&D	0.003	0.002	1.44	0.15
Finland	0.012	0.004	2.72	0.01
Sweden	0.009	0.004	2.14	0.03
Norway	0.015	0.004	3.45	0.00

Does the openness of the Nordic economies lead to a common price movement?

The last of these three main hypotheses is the one that relates the development of the price levels in the different countries.

Table 2.3 The correlation between price developments in the Nordic countries 1993–2003/4

Pearson Correlation Coefficients, N = 53					
Prob > r under H0: Rho=0					
	Price Nordic	Price Denmark	Price Norway	Price Finland	Price Sweden
Price Nordic	1.00	0.72 <.0001	0.81 <.0001	0.66 <.0001	0.72 <.0001
Price Denmark	0.72 <.0001	1.00	0.56 <.0001	0.24 0.08	0.20 0.16
Price Norway	0.81 <.0001	0.56 <.0001	1.00	0.28 0.04	0.38 0.00
Price Finland	0.66 <.0001	0.24 0.08	0.28 0.04	1.00	0.57 <.0001
Price Sweden	0.72 <.0001	0.20 0.16	0.38 0.00	0.57 <.0001	1.00

This is based on the assumption that the openness to export and import in the Nordic countries should lead to a relatively common pattern in the price changes. From table 2.3 it is clear that this hypothesis is also confirmed.

The relations between the price developments are at least as strong as those of the multifactor productivity growth rates. For one country the correlation coefficient between the national and the common Nordic variant, which is a simple arithmetic mean, namely Norway, is above 0.8 and for two, Sweden and Denmark, it is above 0.7. Even for Finland the correlation coefficient is as high as 0.66.

The changes are rather similar in Denmark and Norway with an internal correlation coefficient of almost 0.6; the same is true for the other pair Sweden and Finland. The relations between all countries are highly significant but the correlation for Denmark and Sweden is insignificant and the one between Denmark and Finland is almost on the 10 percent level. This means that the Danish price movements are only related to the Norwegians and the Nordic ones.

Finally a test is performed in order to find out if there is a relationship between the growth rate of multifactor productivity in one country and the price movements in another. Therefore we have constructed a correlation matrix with both MFP and prices for the four Nordic countries.

Table 2.4 The correlation between price developments and MFP growth rates in the Nordic countries 1993-2003/4

Pearson Correlation Coefficients					
Prob > r under H0: Rho=0					
Number of Observations					
	Price Nordic	Price Denmark	Price Norway	Price Finland	Price Sweden
MFP Nordic	-0.63 <.0001	-0.51 <.0001	-0.54 <.0001	-0.23 0.09	-0.49 0.00
MFP Denmark	-0.31 0.02	-0.54 <.0001	-0.27 0.05	0.09 0.51	-0.11 0.45
MFP Norway	-0.53 <.0001	-0.38 0.00	-0.69 <.0001	-0.17 0.23	-0.22 0.11
MFP Finland	-0.44 0.00	-0.17 0.24	-0.29 0.03	-0.45 0.00	-0.43 0.00
MFP Sweden	-0.52 <.0001	-0.22 0.12	-0.29 0.03	-0.31 0.03	-0.73 <.0001

On the aggregated Nordic level the relationship is quite strong as can be seen from the 2.5, with a correlation coefficient of -0.63. For Denmark the average technology change had almost as great an impact on the country price movement as it had on the average Nordic one. Furthermore, the impact is as large for Norway and Sweden even if it was lower than the national MFP. The exception was Finland where the impact was markedly lower and just half of the national impact. In addition, the impact of the national MFP growth was rather well correlated with the Nordic price level except for Denmark. It seems that the Danish economy was markedly influenced by the Nordic technological development but the Nordic price level was not marked by the Danish technological development. The explanation for this can be that the Danish industry structure is quite different to the other countries as is their import composition, but as the other countries Denmark's economy is quite open to the others.

It can also be noted that the Danish and the Norwegian MFP growth is related just to each others' price movements while the Finnish and Swedish MFP growth is related to all but the Danish price movement.

The general conclusion is that the Nordic economies are quite international when it comes to technological processes and price movements.

The impact of trade on price movements

It is not only the productivity growth that influences the price development, but also the competition. The major competitive force in our small economies is the international competition. The size of the share of an industry market that is imported should thus have an influence on the price movements in that industry. Even the export share of the production

could be some kind of an indicator of the international influence in the national market.

The mechanism that works in that case could be thus: if the export market is very important for the national players the prices that are charged in the domestic market will naturally follow those which can be charged in the export market. But probably more important is that a high export share could also be interpreted as an indicator of high specialisation in the industry, and thus as an indirect indicator of high import shares in a submarket of this industry. This phenomenon which is quite common among advanced economies is called inter-industry trade.

In more home market oriented industries, primarily the service industries, the national competition probably plays a greater role. The indicator of the national competitive pressure is measured as the five biggest firms' share of the national market.

The coefficient of the multifactor productivity is quite high 0.64, which means that the customers in the Nordic markets get almost two thirds of the benefits of the technological progress. Besides the multifactor productivity, both the import penetration as well as the export share became highly significant.

The country coefficients indicate that the prices have a tendency to increase a little faster in all the other countries compared to Denmark where these other factors have been taken into account. In the dataset with only Finland and Sweden these variables also become significant but just a bit, and the concentration measurement could not explain anything but had the expected sign.

The hypotheses are thus: a high import or export share is negatively related to the price change and a high market share for the five biggest firms is positively related. In the dataset that includes all the countries the correlation between import penetration and export share and the price developments have the right signs but their relationships are not that strong with quite low probabilities of 0.2. The same is true for the set with just Finland and Sweden, the countries for which we also have access to a concentration measurement. The concentration measurement for these two countries has also a positive sign, and is significant on a level between 5 and 10 percent. To further investigate these relationships a simple OLS regression has been estimated with price changes as a dependent and the import share, export share and the concentration measurement as the independent variables. The respective country effect has been corrected.

Table 2.5.a The relationship between the price changes and the MFP growth, the import penetration and the export share for Denmark, Finland, Norway and Sweden

Dependent Variable: Price				
R-Square	0.39			
Adj R-Sq	0.37			
Parameter Estimates				
Variable	Parameter	Standard	t Value	Pr > t
	Estimate	Error		
Intercept	0.015	0.003	5.210	<.0001
MFP	-0.639	0.063	-10.100	<.0001
Import penetrati- on	-0.004	0.001	-2.640	0.009
Export share	-0.004	0.002	-2.480	0.014
Finland	0.013	0.004	3.220	0.002
Sweden	0.010	0.004	2.530	0.012
Norway	0.015	0.004	3.740	0.000

Table 2.5.b The relationship between the price changes and the MFP growth, the import penetration, the export share and concentration for Finland and Sweden

Dependent Variable: Price				
R-Square	0.40			
Adj R-Sq	0.37			
Parameter Estimates				
Variable	Parameter	Standard	t Value	Pr > t
	Estimate	Error		
Intercept	0.0234	0.0036	6.58	<.0001
MFP	-0.6964	0.0981	-7.10	<.0001
Concentration	0.0036	0.0073	0.48	0.629
Import penetra- tion	-0.0026	0.0014	-1.84	0.069
Export share	-0.0027	0.0016	-1.71	0.090
Finland	0.0027	0.0035	0.77	0.441

The knowledge economy and the price changes

Finally a test is carried out whether the ICT intensity and R&D intensity could explain some of the unexplained variation in equation 2.5 a. and 2.5 b.

Table 2.6.a The relationship between the price changes and the MFP growth, the import penetration and the export share, ICT-intensity and R&D intensity for Denmark, Finland, Norway and Sweden

Dependent Variable: Price				
R-Square	0.399			
Adj R-Sq	0.375			
Parameter Estimates				
Variable	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	0.017	0.003	5.580	<.0001
MFP	-0.615	0.064	-9.650	<.0001
Import penetration	-0.004	0.001	-2.410	0.017
Export share	-0.004	0.002	-2.280	0.024
ICT	-0.010	0.005	-1.800	0.074
R&D	-0.002	0.002	-0.890	0.375
Finland	0.012	0.004	2.900	0.004
Sweden	0.009	0.004	2.390	0.018
Norway	0.014	0.004	3.460	0.001

Table 2.6.b The relationship between the price changes and the MFP growth, the import penetration, the export share, the concentration rate, ICT-intensity and R&D intensity for Finland and Sweden.

Dependant Variable: Price				
R-Square	0.51			
Adj R-Sq	0.47			
Parameter Estimates				
Variable	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	0.026	0.003	7.39	<.0001
MFP	-0.501	0.100	-4.98	<.0001
Concentration	0.009	0.007	1.28	0.202
Import penetration	-0.003	0.001	-2.25	0.027
Export share	-0.003	0.001	-2.13	0.035
ICT	-0.019	0.008	-2.34	0.021
R&D	-0.025	0.013	-1.90	0.060
Finland	-0.0003	0.003	-0.10	0.923

The motivation to this is the idea that the MFP is not catching all the effects of the knowledge economies' influence on the prices. There could still be some further downward pressure on the prices. The result of the equation in table 2.6 is that some of the MFP growth could be explained by the ICT-intensity and there was also a tendency for the R&D intensity to do so.

The introduction of these two variables did little to the explanation in the regression with all countries, and only the ICT variable became significant. However, it made a large difference for the Finish-Swedish subset.

It increased the explanation substantially since the adjusted R-Square increased from 0.37 to 0.47. These new variables became of course significant and it raised the significance levels of the trade variable substantially. However, it did not make the concentration rate in 6 b significant, but you could almost talk about a tendency. This means that the technological progresses as well as the competitive pressure are very important driving forces for the prices in the different industries.

Conclusions of the hypotheses testing

The Nordic countries have had a good growth in their business sectors after the economic crises that hit Finland and Sweden hard during the first years of the 1990s. However, the growth pattern was somewhat different in the Nordic countries. Finland and Sweden seem to be more high-tech oriented than Norway and Denmark, and there are also more similarities between the two countries when it comes to price developments. Generally Denmark's economy seems to be more special than the others, but it is still heavily influenced by the technological developments in other economies. The customers in the Nordic countries and the rest of the world seem to get the majority of the benefits of the technological developments. The price developments seem to be further dampened by the openness of the economies, but the concentration on the home markets seems to be of less importance. The ICT investment also has a positive impact on the prices, and the R&D intensity as an additional positive impact at least in Finland and Sweden.

In addition, this analysis does not give policy conclusions, but it is still possible to point out something that could be of interest. Openness to foreign competitions seems to be of much greater importance than the concentration in the national markets. This gives some implication for the EU-members among the Nordic countries. These Nordic countries have very much to gain from further liberalisations in the international trade with countries outside the EU as well as by reducing the still existing obstacles in the common market not least for the service industries. For Norway it is openness for all its industries towards the rest of the world that seems to be the best strategy for promoting lower prices.

Even if Denmark has increased its ICT-investment much more than the other countries during these years the impact of ICT is substantially larger in Finland and Sweden. So there still seems to be some room for ICT policy in Denmark and Norway as innovation policy.

The distribution industries in the Nordic countries

The distribution industries are an essential part of the business sector and its development since all other industries depend on them. These industries are also important for the productivity growth in themselves and thus for productivity growth of the service industry aggregate as well as for the whole business sector. The distribution industries fall under the category of the service industries where the possibilities to rationalise the production with the help of ICT are probably is best. And these industries have played an important part in the acceleration of the US productivity growth. The distribution industries are defined as: wholesale and retail trade (industry classification: 50-52), the transport industry (60-63) and the post and telecommunication industry (64)

These industries are also subject to a number of special regulations, which could have influenced the outcome both in growth and productivity terms. This means that policy changes could have a significant effect on their performance.

The volume growth in gross production

In figure 2.2 the total growth between 1995 and 2004 is illustrated for these four industries. Besides the four Nordic countries the US¹ has been added as a benchmark, since it is of special interest to put the development in these industries in the Nordic countries into perspective.

¹ The US figure is from the EUKLEMS database so the figures are not completely comparable but the general tendency should be the same. See <http://www.euklems.net/>

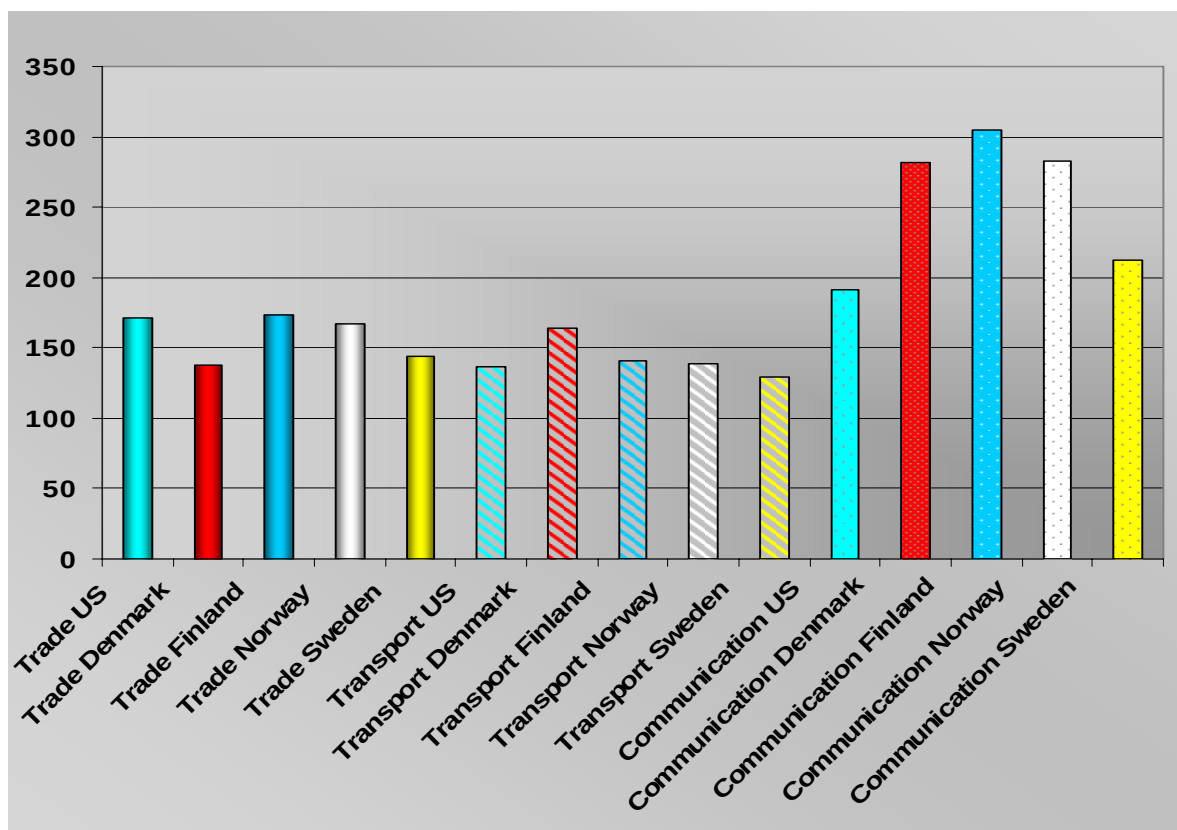


Figure 2.2 The production level 2004 compared with the level 1993 for the distribution industries in the Nordic countries and US.

The development in the distribution industries can be illustrated in different ways. Here the relative growth of the gross production in constant prices has been chosen. This is illustrated by the level in 2004 compared to 1993 year's level, where 1993 is set at 100. The US is marked with turquoise bars, Sweden with yellow bars, Denmark with red bars, Finland with blue bars and Norway with white bars.

The trade and communication industries in the US have expanded by around two thirds from 1993 to 2004. The transport industry has grown by one third and the post and telecommunication industry by 90 percent while trade is more or less on the average. As can be seen from figure 1.1 the Finnish and Norwegian pattern is very similar to that of the US, with one exception: the growth in the post and telecommunication industry has been dramatically faster in Finland and Norway. This industry's production level has tripled in Finland and almost tripled in Norway in just a little more than 10 years time. The Swedish development is much less impressive even if its pattern is rather similar. The Danish growth pattern is somewhat different with a weaker growth in trade and the highest growth in transport of all countries while it has experienced the same dramatic increase in the post and telecommunication industry as in Norway.

The Gross production multifactor productivity growth pattern

The Norwegian productivity increase in the trade industry is really striking and has outperformed its US counterpart which has increased its gross production multifactor productivity by around 30 percent during the same years. But as is mentioned before, the Norwegian growth measurement could be somewhat exaggerated due to the fact that we have no reliable measurement of labour quality improvement. However, the data indicates that it has not been so substantial that it could in any way jeopardise this conclusion. This of course does not mean that the efficiency level in the Norwegian trade is high, only that the improvements from the 1993 level are very large.

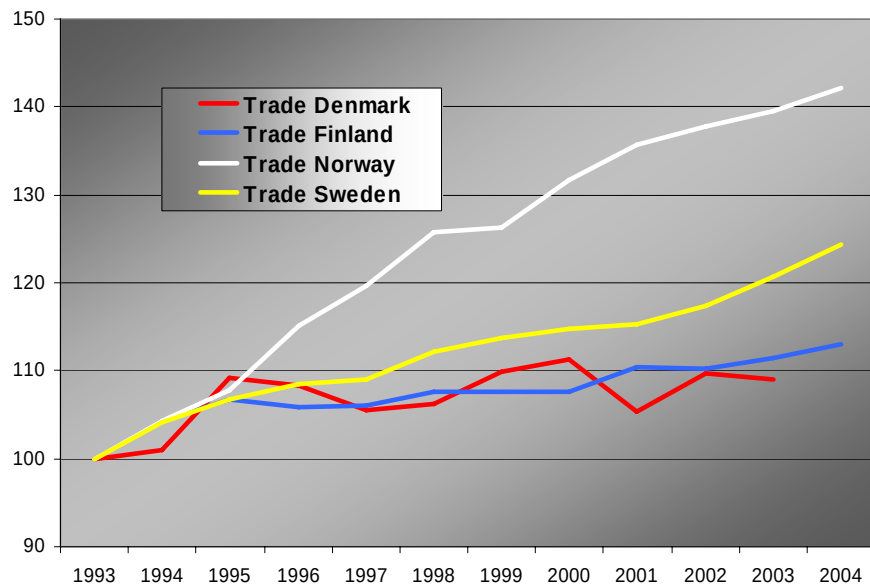


Figure 2.3. The growth in gross production multifactor productivity in the wholesale trade in Sweden, Denmark and Finland 1993–2004

The Swedish trade industry has also grown continuously during these years in line with the US development. The lack of multifactor improvement in the Danish trade from 1995 onwards is in very sharp contrast. This indicates some serious lack of incentive for improvement in this industry, perhaps due to the competitive climate. Trade in Finland also seems to have almost the same problem, even though there has been slight improvement during the last years.

If the Norwegian trade industry has been able to improve its multifactor productivity quite substantially this has not been reflected on its transport industry since its productivity development has actually been negative. In Sweden and Finland the transport industry has been able to avoid deterioration in the productivity level, but only there.

The Danish development is very peculiar with a positive development that reversed itself in just one year. Generally the large potential for productivity improvements does not seem to have been utilized in any of the Nordic countries. And the US transport industry is no exception to this rule. The regulation of the transport industries is quite extensive, so there seems to be some room for changes focused on increasing the opportunities for increased efficiency.

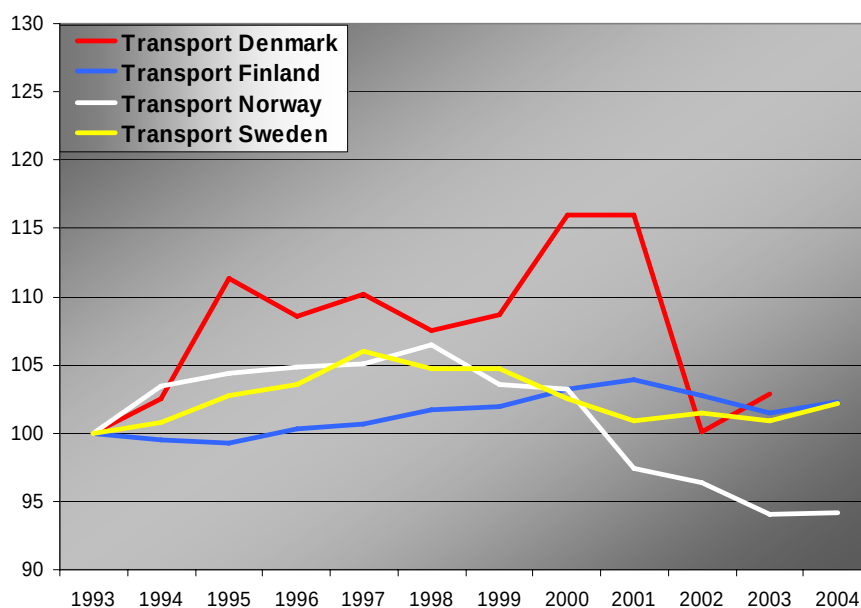


Figure 2.4. The growth in gross production multifactor productivity in the transport industry in Sweden, Denmark and Finland 1993–2004

The dramatic expansion in the post and telecommunication industry in all the Nordic countries but Sweden does not seem to have had its counterpart on the productivity development, with one exception: the Finnish communication industry which has had an enormous increase in its multifactor productivity.

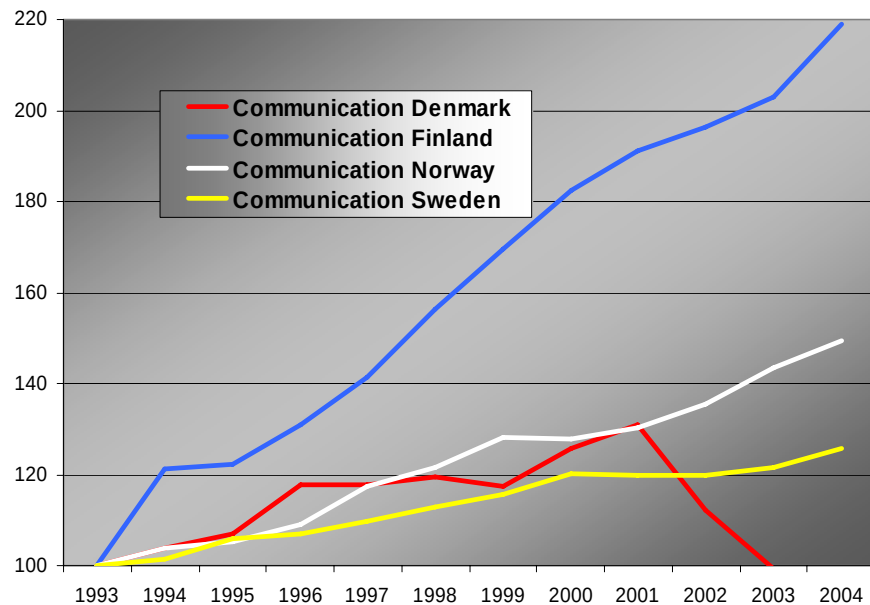


Figure 2.5 The growth in gross production multifactor productivity in the post and telecommunication industry in Sweden, Denmark and Finland 1993–2004

A closer look reveals that the Norwegian productivity growth has been quite good, but it is dwarfed by the Finnish development. The Danish transport industry has had the same development as in Norway till 2001, when it lost all that it had gained so far. The weaker development of the communication industry in Sweden has its mirror image in a weaker productivity development.

The communication industry is also very heavily regulated and thus its development is significantly influenced by these regulations. It seems that the regimes in the Nordic countries have been very successful in stimulating growth in the industry, compared to the US. They have also been much more effective in stimulating the productivity increase, since in the US it has been an actual stand still. Still, Finland has been so markedly better in this area; there could be something to be learned from Finland by the other Nordic countries.