Denmark's Competitiveness and Export Performance

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1. INTRODUCTION AND SUMMARY

The Danish economy is characterised by close integration with the rest of the world in both financial and real economic terms. The sum of Denmark's imports and exports almost matches the total gross domestic product, GDP, and one in every four jobs depends directly or indirectly on exports. While Danish exports of goods and services in volume terms have doubled since 1995, exports have fallen as a share of the overall import market. Part of this fall reflects the increased emerging market share of world trade, but that is not the whole explanation.

Exports make up the difference between the influx of resources (production and imports) on the one hand, and domestic absorption (consumption and investment) on the other. During periods of strong domestic demand, a smaller share of output will be left for exports compared with periods of normal economic conditions. This was the case during the boom years in the mid-2000s.

Periods of strong domestic demand are usually characterised by a tight labour market. This normally leads to wage increases exceeding what is warranted by productivity growth. The result is an adverse impact on competitiveness and squeezed exports. In recent years, Danish firms' international competitiveness has deteriorated when calculated on the basis of relative unit labour costs, reflecting both higher wage growth and weaker productivity growth in Denmark than abroad.

Under a fixed-exchange-rate regime such as the Danish one, where the principal objective of monetary policy is to keep the krone stable, fiscal policy is the primary instrument for managing domestic demand. Denmark's competitiveness calculated as production costs relative to international production costs thus depends on the fiscal policy pursued.

A country's export performance is not just dependent on the corporate sector's ability to compete with foreign firms through low production costs. The composition of exports across product groups and destination countries also plays a role. By being present in expanding markets, Denmark may see its share of global exports grow, even if its market

shares in individual submarkets remain unchanged. We find that the composition of Denmark's exports of goods across product groups since 1995 has made a moderately positive contribution to the market shares in its eight largest export markets. The composition across countries has made a largely neutral contribution to the market share over the period as a whole.

Low-tech products account for a large share of Denmark's exports compared with the other OECD countries. This reflects Denmark's specialisation in food, beverages and tobacco, among other products. On the other hand, Danish firms are underspecialised when it comes to high-tech products. What is important is that Denmark is present in industries offering opportunities to benefit from a high level of knowledge in order to cover the high Danish wages. This is also possible in industries other than the high-tech ones. For example, the technological level of the manufacturing process may be high, even for low-tech products. The ability to be present in the fastest growing markets through flexibility and adaptability is also an expression of competitiveness. This ability is best promoted through structural-policy measures that ensure free competition and a flexible labour market.

Traditionally, Denmark's competitiveness has been associated with price competitiveness, which is calculated on the basis of the prices of goods manufactured in Denmark relative to goods manufactured in competitor countries. But in recent years there has been growing focus on non-price competitiveness. Non-price competitiveness comprises non-price factors that affect competitiveness. For example, the ability to manufacture particularly high-quality products or products otherwise differing from those of the competitors has a positive effect on competitiveness.

It is difficult to measure a country's non-price competitiveness, so it is usually assessed on the basis of indicators. Examples include research and development expenditure, the number of patents awarded and the level of education of the labour force. Assessed on the basis of these indicators, Denmark's non-price competitiveness is good compared with other Western countries. For instance, Denmark's research and development expenditure as a ratio of GDP is higher than for the OECD countries overall. Presumably, this is an important reason why Denmark is also at a high level in terms of patents awarded per capita. Furthermore, the improvement in the terms of trade is seen as an indication of Danish firms' ability to compete on other factors besides price. Since the terms of trade indicate the price of exports relative to the price of imports, improved terms of trade reflect that Danish goods have become relatively more expensive. Hence, there are indications that in Den-

mark's case, non-price competitiveness has to some extent been able to compensate for the high unit labour costs.

In order to analyse the drivers of export market growth for a group of OECD countries, we construct an econometric model. The model explains exports in terms of both price and non-price factors. While there is a clear relationship between the development in a country's price competitiveness and its export performance, the effect of non-price competitiveness is less evident. However, countries where research and development expenditure has risen relatively markedly have tended to perform better. The analysis also confirms that in Denmark, price competitiveness has curbed exports, while non-price competitiveness has made a positive contribution.

Despite the loss of market shares, the Danish economy continues to be in a relatively favourable position. The balance of payments displays a surplus, and structural unemployment is moderate. For this development to continue, it is crucial that fiscal policy and the other economic policies are designed so as to ensure that domestic demand develops in accordance with the output potential of the economy. This offers the best conditions for stable export growth combined with wage increases in step with the growth in productivity.

Furthermore, being present in the fastest growing markets may also have a favourable effect. This applies across both countries and product groups. The composition of Danish exports across countries and markets is largely a result of Denmark's business structure, which evolves only slowly over time.

It is difficult to predict the markets where demand will see the strongest future growth. However, it is important to focus on the flexibility and adaptability of the Danish economy to ensure that production resources will be attracted to the industries that are internationally competitive. Finally, the ability to compete on other factors besides price may be improved, e.g. through stronger focus on research and development. While there is a clear favourable effect of adapting fiscal policy to cyclical developments, the other ways to improve competitiveness are associated with a higher degree of uncertainty.

2. BALANCE OF PAYMENTS, EXPORTS AND MARKET SHARES

In 2010, Denmark's external trade in goods and services accounted for 96 per cent of its GDP, a higher share than in most other countries, cf. Table 2.1. Small economies generally tend to be more open than large ones. The Dutch economy is more open than the Danish one, but this should be viewed in the light of the Netherlands' sizeable transit trade, primarily out

EXPORTS AND IMPORTS OF GOODS AND SERVICES AS A SHARE OF GDP AT
CURRENT PRICES   Table 2.1

	1995	2000	2005	2010
Denmark	71	87	93	96
Germany	47	66	77	88
UK	57	57	56	63
Sweden	73	87	89	94
USA	23	26	26	29
France	44	57	53	53
Norway	70	76	73	71
Netherlands	113	135	131	149

Source: OECD, *Economic Outlook*, No. 90.

of Rotterdam. The position of the Netherlands as the European sea
freight hub is the reason why the import content of its exports is
particularly large. A large import content of exports implies that domestic
value added is lower than indicated by the export figures at first sight.

Balance of payments

Danish hourly wage costs are among the highest in the world.
Nevertheless, Denmark has had large current-account surpluses in recent
years. In 2011, the current account displayed a surplus of kr. 115.8 bil-
lion, or around 6.7 per cent of GDP, which is a large surplus by inter-
national standards. The current-account surplus can be attributed mainly
to a large surplus on trade in goods. Moreover, while Denmark has a
small surplus on trade in services, its position as a creditor country has
resulted in a rising investment income surplus, cf. Chart 2.1.

Denmark is a net exporter of oil and gas, and since 1998, the value of
Danish oil and gas production in the North Sea has contributed signifi-
cantly to the trade surplus. The trade balance excluding energy has also
displayed a substantial surplus, cf. Chart 2.2. The trade balance weak-
ened during the boom years in the mid-2000s, but it has improved con-
siderably since 2007, partly as a result of a more pronounced slowdown
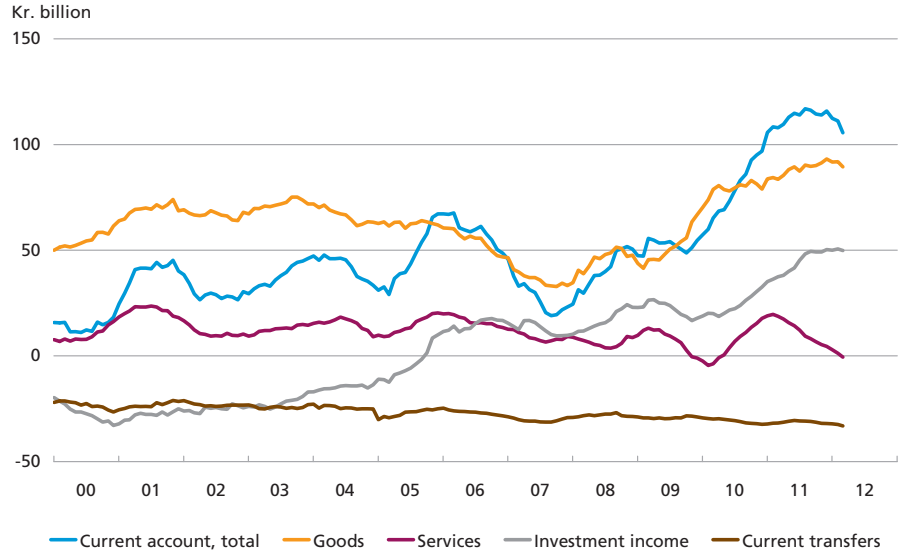in domestic demand in Denmark than abroad.

Danish export performance in an international context

Since 1995, Denmark's total exports of goods and services in volume
terms have grown by approximately 5 per cent p.a., cf. Chart 2.3, which
is somewhat more than the country's GDP growth. At the same time,
global trade has grown at a faster rate than the global economy over
the last 15 years. The trend towards increased trade implies that exports
now have a greater impact on the Danish economy.

The development in Danish exports in volume terms reflects a steady
upward trend from 1995 to mid-2008. In the latter part of 2008, exports

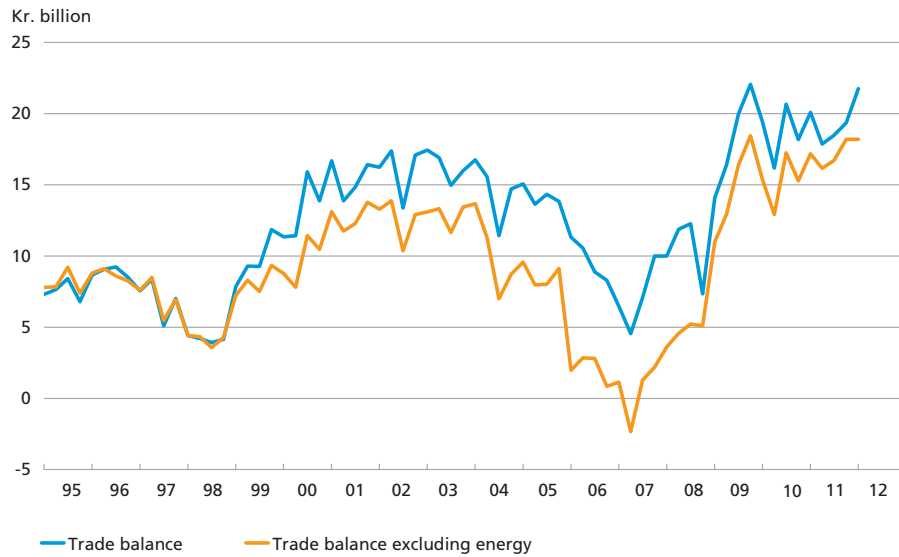CURRENT ACCOUNT OF THE BALANCE OF PAYMENTS   Chart 2.1

Kr. billion

150

100

50

0

-50

       00   01   02   03   04   05   06   07   08   09   10   11   12

━━ Current account, total   ━━ Goods   ━━ Services   ━━ Investment income   ━━ Current transfers

Note: Calculated as 12 month running sums. The most recent observations are from March 2012.
         Adjustment has been made to the effect that bunkering in relation to sea freight is included under services
         rather than under goods.
Source: Statistics Denmark, Balance-of-payments statistics.

were hit by the international economic downturn and fell considerably
as in other countries. Exports levelled off in the course of 2009 and have
picked up again since 2010. Over the period 1995-2011 taken as one,

TRADE BALANCE EXCLUDING ENERGY IN CURRENT PRICES   Chart 2.2

Kr. billion

25

20

15

10

5

0

-5

  95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11 12

━━ Trade balance   ━━ Trade balance excluding energy

Note: Quarterly observations. Seasonally adjusted. The most recent observations are from the 1st quarter of 2012.
Source: Statistics Denmark, External trade statistics.

EXPORTS OF GOODS AND SERVICES IN VOLUME TERMS   Chart 2.3
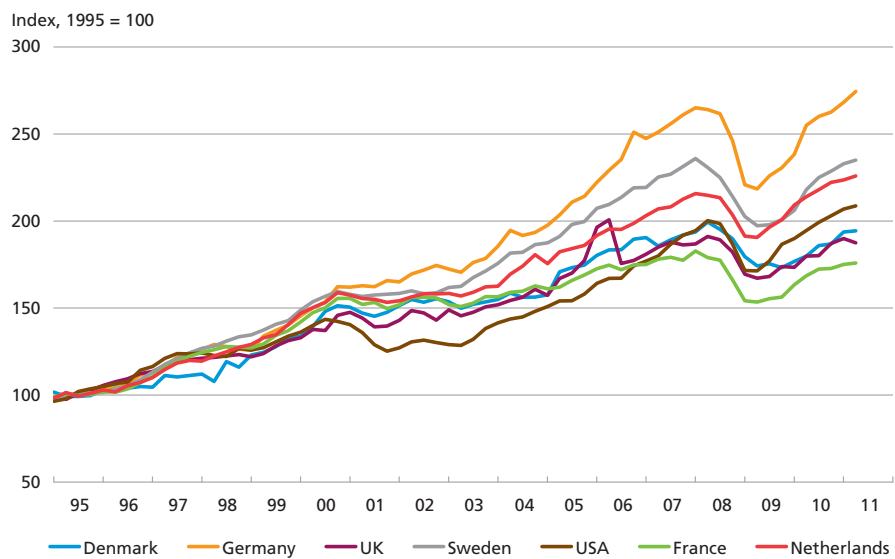
Index, 1995 = 100

Note: Quarterly observations. The most recent observations are from the 2nd quarter of 2011.
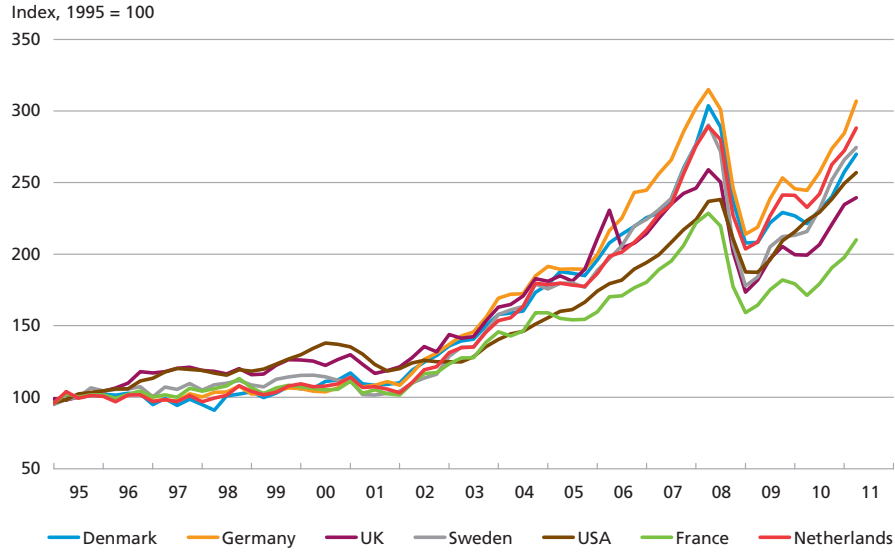Source: OECD, *Economic Outlook*, No. 90.

Danish export growth in volume terms matched that of the UK, France and the USA, but was less favourable than the growth rates in the Netherlands, Sweden and Germany.

Danish exports fared better in value than in volume terms, cf. Chart 2.4, reflecting that Denmark's terms of trade have improved, i.e. the price of exports relative to the price of imports has risen, cf. Chart 2.5. As a result of its improved terms of trade, Denmark has to export less in order to be able to import a given volume of goods and services, which is beneficial to the country's overall economic welfare. Hence, a boost in the terms of trade is positive in so far as it reflects increased demand for Danish goods relative to foreign goods.

Chart 2.4 shows the value of the countries' exports of goods and services in dollars. This measure is sensitive to fluctuations in exchange rates between the dollar and the euro, pound sterling and Swedish krona, respectively. For example, a strengthening of the dollar vis-à-vis the euro means that Danish exports are worth less compared with US exports when the value of Danish exports is exchanged for dollars. While the calculation in volume terms is most relevant for output and employment, the calculation in value terms is most relevant for the purchasing power and thus the economic well-being of the population. Besides, the value of exports affects the balance of payments. The improvement in the terms of trade has thus contributed to the current-account surplus.

EXPORTS OF GOODS AND SERVICES IN VALUE TERMS, IN DOLLARS   Chart 2.4

Index, 1995 = 100

Denmark — Germany — UK — Sweden — USA — France — Netherlands

Note: Quarterly observations. The most recent observations are from the 2nd quarter of 2011.
Source: OECD, *Economic Outlook*, No. 90.

The calculation of the price of exports, the deflator, is subject to uncer-
tainty, and for that reason the calculation of exports in value terms is
more reliable than the calculation in volume terms.

TERMS OF TRADE   Chart 2.5

Index, 1995 = 100

Terms of trade for goods and services — Terms of trade for goods

Note: Quarterly observations. The most recent observations are from the 1st quarter of 2012.
Source: Statistics Denmark.

CALCULATION OF MARKET SHARES	Box 2.1

Danish export market shares indicate Denmark's exports as a share of the size of a weighted export market. The market share at the time is defined as:

$$DK\_MA_t = \frac{X_{DK,t}}{DK\_XMKT_t}$$

Here, $X_{DK,t}$ is total Danish exports at time t to a group of N countries, and DK_XMKT_t is the size of the export market at time t.

Our calculation of market shares is based on an export market defined as a weighted average of our trading partners' imports, in which the weightings reflect the country's impact on Danish exports. The Danish market share of the country concerned *i* in a given base year, here set at 2005, is used as weights. This approach is also applied by e.g. the OECD.

The total Danish export market, DK_XMKT_t, is defined as:

$$DK\_XMKT_t = \sum_{i=1}^{N} \frac{X_{DK,i,2005}}{X_{total,i,2005}} M_{total,i,t}$$

Here, $X_{DK,i,2005}$ is Denmark's exports in 2005 to country *i* in dollars; $X_{total,i,2005}$ is total world exports to country *i* in 2005 in dollars; ($X_{DK,i,2005}$ / $X_{total,i,2005}$) is the fixed weight to country *i* when calculating the export market; and $M_{total,i,t}$ is country *i*'s total imports at time t in 2005-dollar terms.

Market-share-based measuring of export performance implies the assumption that Danish exporters compete only with the exporters of other countries and not with manufacturers in the domestic market. For example, our market share in Germany will only measure how well we doing in terms of competition with other exporters to Germany, and not how well we are doing in relation to German manufacturers.

Market shares in volume terms

A country's market share is measured as its exports relative to the development in its export markets, cf. Box 2.1. Like France and the UK, Denmark has been unable to maintain its market share for exports of goods and services in volume terms, cf. Chart 2.6. The loss of market shares reflects that import volumes abroad have grown at a faster rate than Danish exports. Part of the rise in import volumes can be attributed to increased international division of work and integration of e.g. the BRIC countries in the world economy.[1] Since this development is not linked to exports from Western European countries and the USA, it entails a re-

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[1] The BRIC countries, i.e. Brazil, Russia, India and China, are often highlighted as examples of countries whose relative weights in the world economy have increased substantially in recent years.

MARKET SHARES FOR EXPORTS OF GOODS AND SERVICES IN VOLUME
TERMS   Chart 2.6
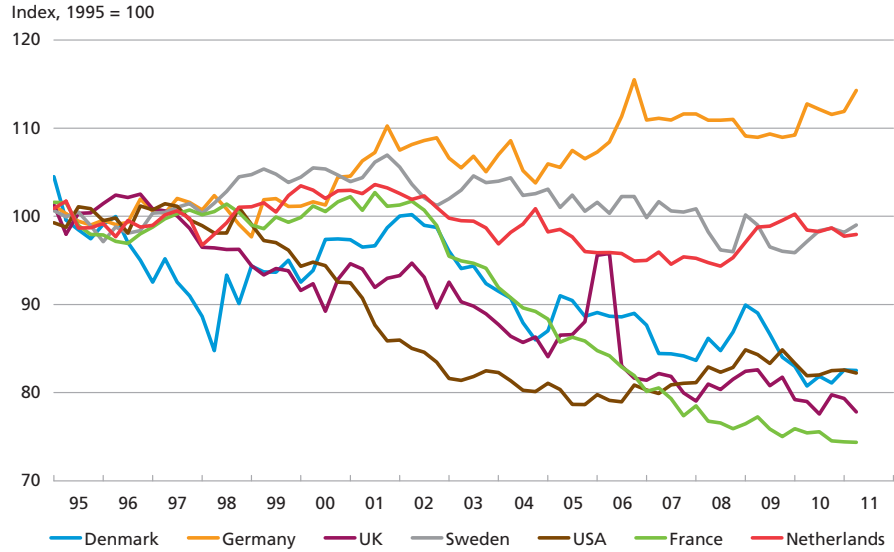
Index, 1995 = 100

Note: Quarterly observations. The most recent observations are from the 2nd quarter of 2011.
Source: OECD, *Economic Outlook*, No. 90.

duction of those countries' market shares that does not reflect a deteri-
oration of competitiveness. However, Denmark's loss of market shares in
volume terms is relatively large compared with other Western European
countries.

Denmark's loss of market shares is even more pronounced when con-
sidering goods exports alone, cf. Chart 2.7. This reflects how the market
share for total exports is supported by growth in sea freight exports.
Shipping is Denmark's second-largest export sector after manufacturing
industry. This contributes to explaining why exports of services consti-
tute just over one third of Denmark's total exports, while trade in ser-
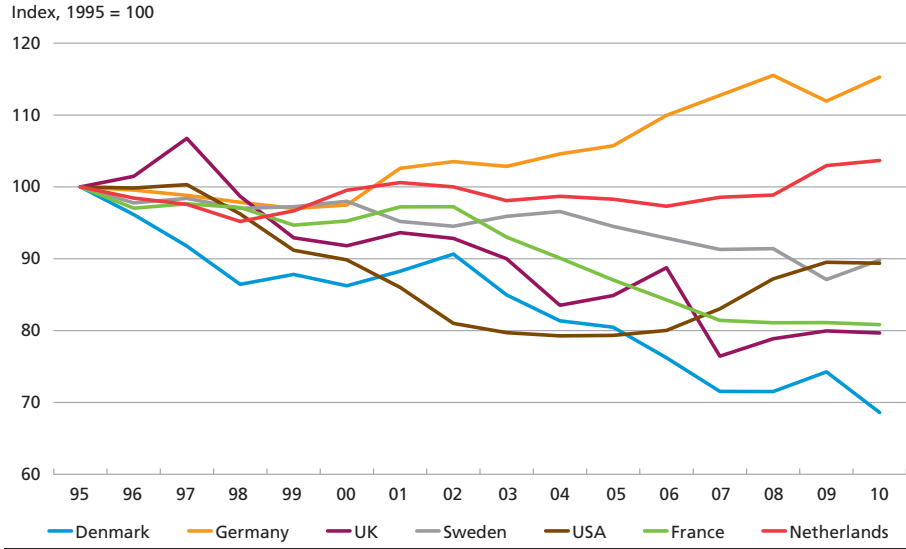vices only accounts for around one fifth of total international trade.

In the short term, Danish exports tend to gain market shares during
international downturns while losing market shares during upswings, cf.
Chart 2.8. This reflects that Danish exports are to a large extent made up
of goods that are less cyclical than goods in our export markets, includ-
ing e.g. medicines and many agricultural products.

Market shares in value terms
The market share for Danish exports of goods and services has been flat
over the period 1999-2009, cf. Chart 2.9. Hence, the fact that Danish
firms have achieved higher price increases on their export products and
higher revenue growth from services than the average rise in import

MARKET SHARES FOR EXPORTS OF GOODS IN VOLUME TERMS   Chart 2.7
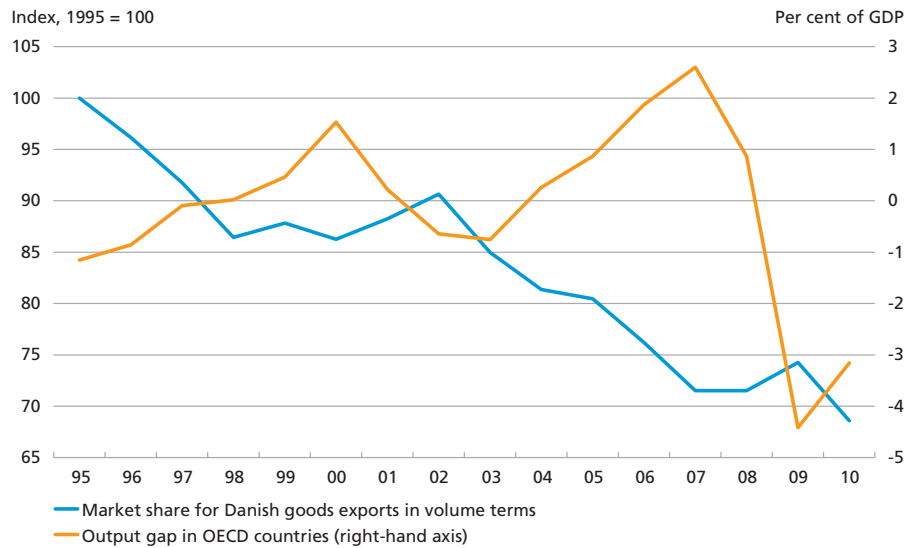
Index, 1995 = 100

(Chart: line graph showing market shares indexed to 1995=100, y-axis from 60 to 120, x-axis years 95 to 10, with lines for Denmark, Germany, UK, Sweden, USA, France, Netherlands)

Denmark   Germany   UK   Sweden   USA   France   Netherlands

Note: Annual observations. The most recent observations are from 2010.
Source: OECD, *International Trade Statistics*, OECD, *National Accounts*, and own calculations.

prices for goods and services in Denmark's destination countries has to a substantial degree made up for the loss of market shares in volume terms. The market share for exports of goods and services in value terms has evolved more or less in parallel with that of Sweden, even though

DANISH MARKET SHARE AND THE INTERNATIONAL BUSINESS CYCLE   Chart 2.8

Index, 1995 = 100   Per cent of GDP

(Chart: line graph with left y-axis Index 105 to 65, right y-axis Per cent of GDP 3 to -5, x-axis years 95 to 10, with two lines)

Market share for Danish goods exports in volume terms
Output gap in OECD countries (right-hand axis)

Note: Quarterly observations. The most recent observations are from the 2nd quarter of 2011.
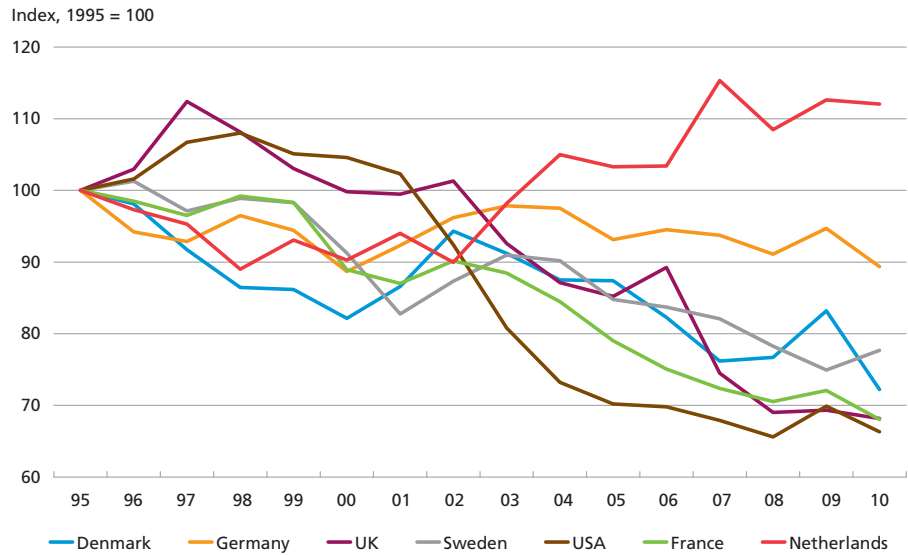Source: OECD, *International Trade Statistics*, OECD, *Economic Outlook*, No. 90 and own calculations.

MARKET SHARES FOR EXPORTS OF GOODS AND SERVICES IN VALUE TERMS   Chart 2.9

Index, 2002 = 100
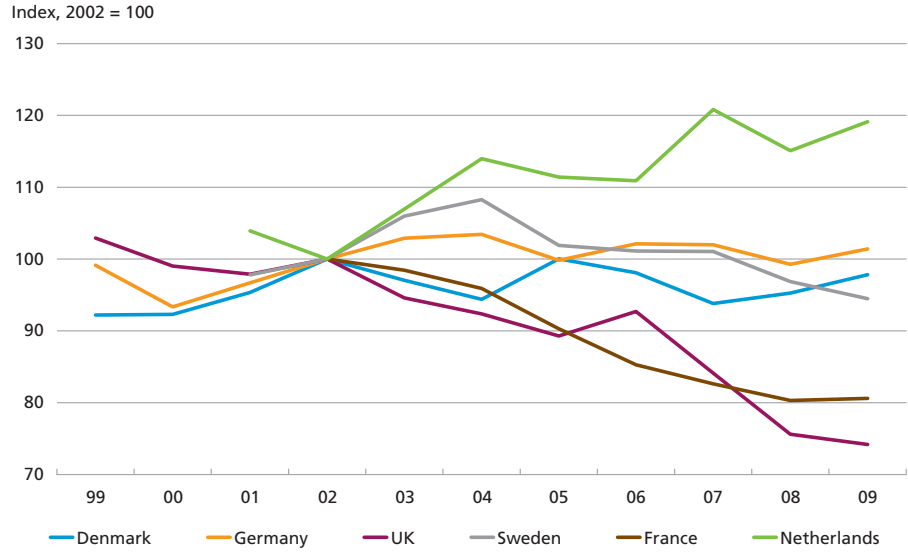
Note: Annual observations. The most recent observations are from 2009.
Source: OECD, *International Trade Statistics*, OECD, *Balance of Payments Statistics* and own calculations.

the development in the Swedish market share in volume terms was much more favourable during the same period. This means that the Swedish terms of trade for goods and services taken as one did not improve to the same degree as in Denmark.

MARKET SHARES FOR EXPORTS OF GOODS IN VALUE TERMS   Chart 2.10

Index, 1995 = 100

Note: Annual observations. The most recent observations are from 2010. The market shares are calculated as the country's exports of goods.
Source: OECD, *International Trade Statistics* and own calculations.

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Denmark has lost market shares in terms of value when trade in services is excluded from the calculation, cf. Chart 2.10. The loss of market share in volume terms for Danish exports of goods equalled just over 30 per cent over the period 1995-2010, cf. Chart 2.7, while the loss in value terms was slightly smaller, cf. Chart 2.10. Consequently, the almost flat profile for the market share in value terms for total exports of goods and services reflects that Denmark has gained market shares in the services market while losing market shares in the goods market. The positive evolution in the market share for services market can be attributed to Denmark's substantial sea-freight exports.

3. PRICE COMPETITIVENESS

Products are priced with a mark-up over production costs. In 2011, labour costs amounted to about one third of the total production costs of Danish firms and two thirds of gross value added. So when assessing price competitiveness on a cost basis, it is important to consider unit labour costs in a common currency, to allow for the development in labour costs, currencies and productivity across countries. Over the period 1995-2010, the rise in unit labour costs was higher in Denmark than in most comparable countries, cf. Chart 3.1.

Industrial products account for the largest share by far of exports of goods. Unit labour costs in manufacturing have generally grown more

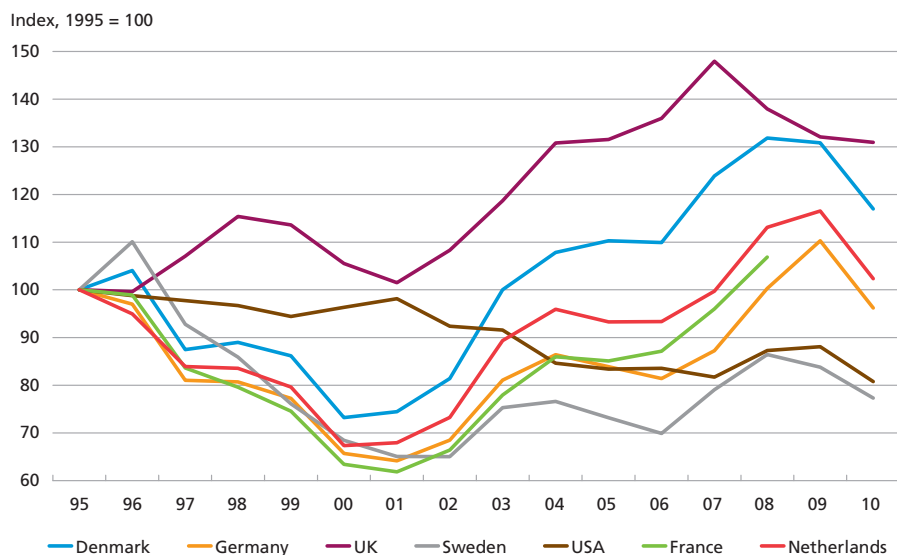| UNIT LABOUR COSTS FOR THE OVERALL ECONOMY IN DOLLARS | Chart 3.1 |

Index, 1995 = 100
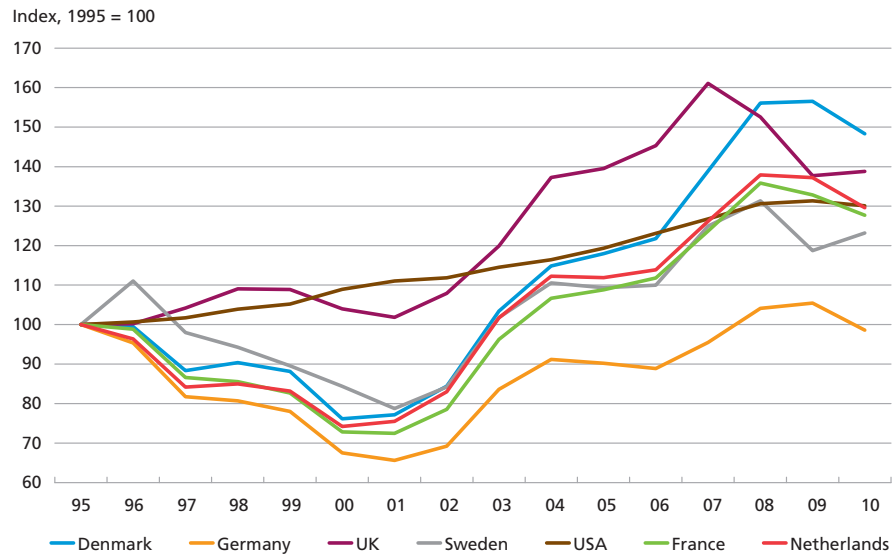
Note: Annual observations. The most recent observations are from 2010.
Source: OECD, *Main Economic Indicators*.

UNIT LABOUR COSTS FOR MANUFACTURING IN DOLLARS   Chart 3.2

Index, 1995 = 100

Note: Annual observations. The most recent observations are from 2010 with the exception of France, for which the
        most recent observations are from 2008.
Source: OECD, *Main Economic Indicators*.

moderately than for the economy overall. However, Danish unit labour costs in manufacturing have risen compared with other countries, cf. Chart 3.2.

The development in wages and productivity in Denmark compared with abroad can be measured as one by considering the relative unit labour costs in manufacturing. The loss of market shares for Danish exports of goods in volume terms has coincided with the rise in relative unit labour costs, cf. Chart 3.3.
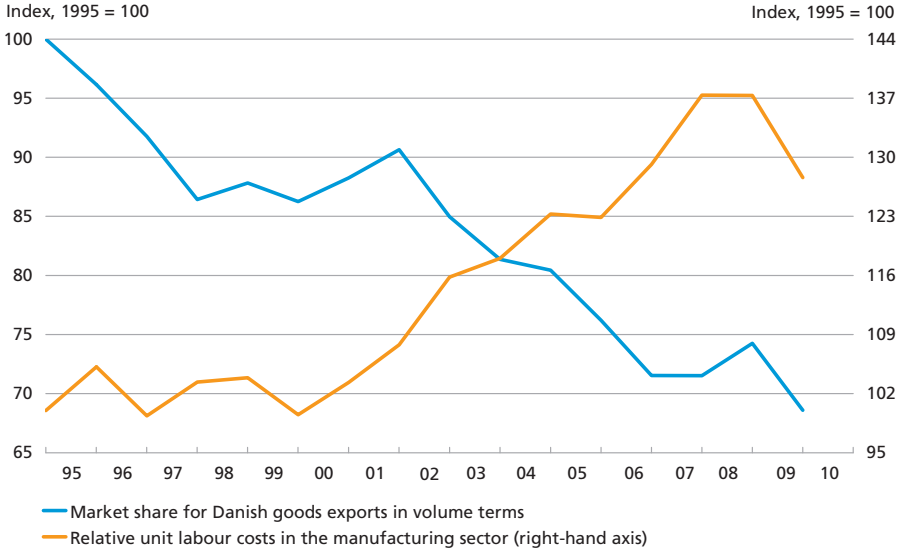
Exchange rate and production costs
As a consequence of the fixed-exchange-rate policy, the krone is stable against the euro, while it has fluctuated somewhat against a number of non-euro currencies. For the period taken as one, the krone exchange rate has remained almost unchanged, however, cf. Chart 3.4. Hence, the development in exchange rates cannot explain the rise in relative unit labour costs in manufacturing since 1995.

Since 1995, countries that have seen the strongest deterioration of wage competitiveness in manufacturing have tended to show the poorest performance in the export markets, cf. Pedersen and Riishøj (2008). Wages in Denmark have increased compared with wages in most other countries since 1995, and especially since 2000, cf. Chart 3.5. In 1995, Danish labour costs were already high compared with other countries, cf. Beier and Pedersen (2005). Conversely, German exports have

DANISH MARKET SHARE AND UNIT LABOUR COSTS

Chart 3.3

Index, 1995 = 100

Index, 1995 = 100

— Market share for Danish goods exports in volume terms
— Relative unit labour costs in the manufacturing sector (right-hand axis)

Note: Annual observations. The most recent observations are from 2010. Relative unit labour costs in manufacturing
are weighed together using weights from the krone effective exchange rate index.
Source: OECD, *International Trade* Statistics, OECD, *Economic Outlook*, No. 90 and own calculations.

gained market shares in volume terms since 1995, and wage growth in
Germany was noticeably lower than in other countries over the period
1995-2010. This should be seen in the light of higher unemployment

NOMINAL KRONE EFFECTIVE EXCHANGE RATE

Chart 3.4
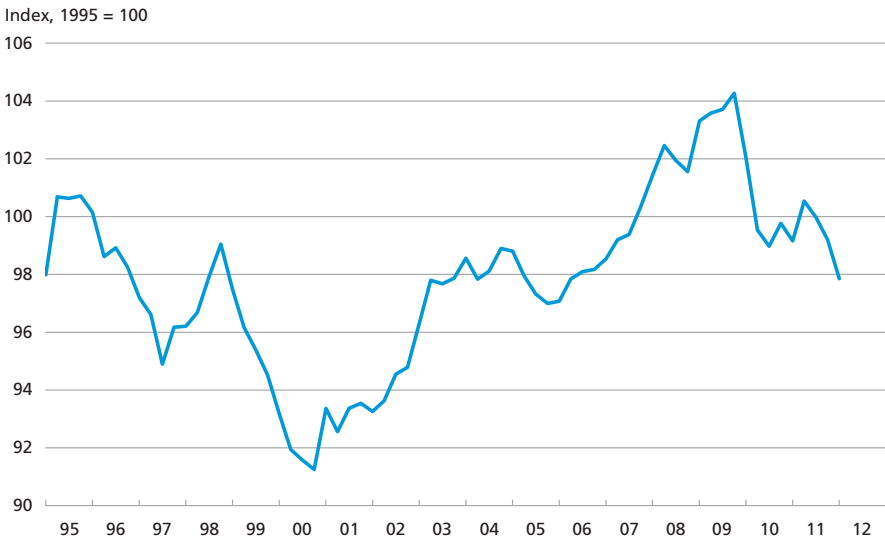
Index, 1995 = 100

Note: Quarterly observations. The most recent observations are from the 1st quarter of 2012. The krone effective
exchange rate shows its strength vis-à-vis the currencies of 27 of Denmark's largest trading partners. An increase
in the index indicates a stronger Danish krone.
Source: Danmarks Nationalbank.

HOURLY WAGES IN MANUFACTURING, NATIONAL CURRENCY   Chart 3.5

Index, 1995 = 100
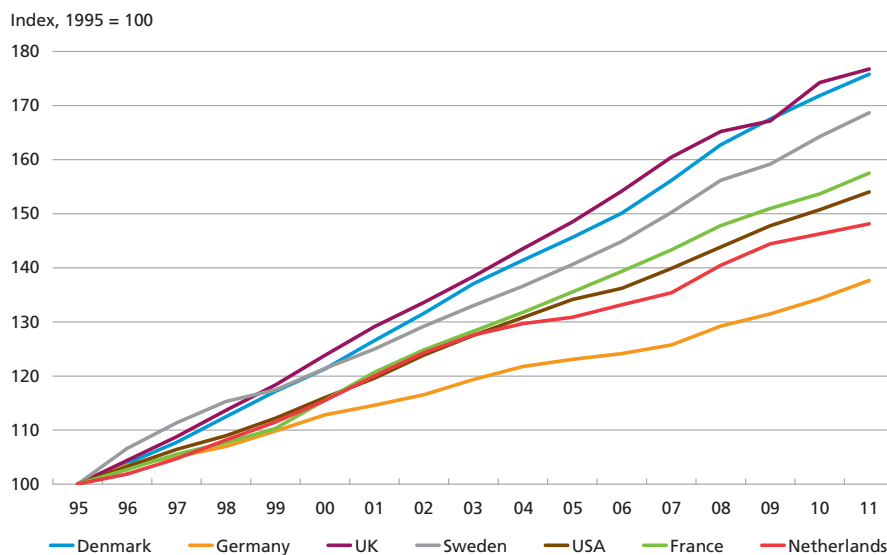
Note: Annual observations. The most recent observations are from 2011.
Source: OECD.

throughout the 1990s. Since the mid-2000s extensive labour market re-
forms have been implemented, which has helped increase the supply of
labour and reduce wage pressures in the short term.

Wage inflation in Danish manufacturing industry was substantially
higher than abroad throughout most of the period, and only in 2010
and 2011 did Danish wages increase by less than abroad for several
successive quarters, cf. Chart 3.6. This explains a large part of the rise in
relative unit labour costs in manufacturing.

In addition to wages, raw materials account for a substantial part of
total production costs. Energy is generally a weighty cost item for indus-
trial production. However, compared with other countries, energy con-
sumption in Denmark is low in relation to the size of the economy. This
means that the pass-through from higher energy prices to product prices
is less pronounced in Denmark than in competitor countries. According
to Pedersen and Riishøj (2009), a doubling of energy prices in the world
market would improve the price competitiveness of Danish exports by
approximately 2 per cent.

Productivity
Productivity growth in the Danish economy since 1995 has been low in
relation to a number of comparable countries, cf. Chart 3.7. Over the
period 1995-2010, labour productivity in Danish manufacturing industry
increased by approximately 2 per cent p.a., while Sweden and the USA

WAGE INFLATION IN THE MANUFACTURING SECTOR   Chart 3.6

Per cent, year-on-year


Denmark ——— Abroad ———
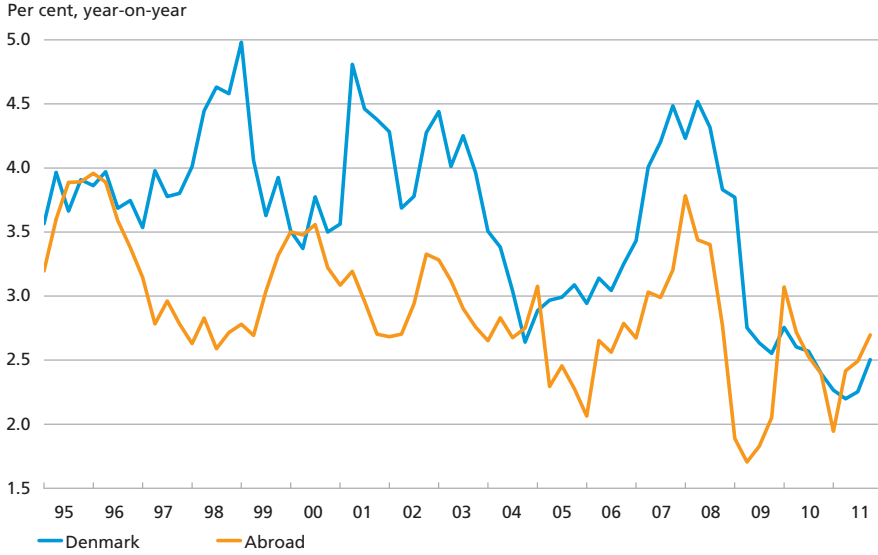
Note: Annual observations. The most recent observations are from the 4th quarter of 2011. Wage inflation abroad is
        based on weighting together weights from the krone effective exchange rate index.
Source: OECD.

saw annual productivity growth of just over 5 per cent. German manu-
facturing industry achieved labour productivity growth of 3.5 per cent
on average up to 2007. In 2008 and 2009, labour productivity in German
manufacturing industry declined considerably, partly reflecting the

HOURLY PRODUCTIVITY IN MANUFACTURING   Chart 3.7

Index 1995 = 100

Denmark ——— Germany ——— Sweden ——— USA ——— UK ——— France ——— Netherlands ———
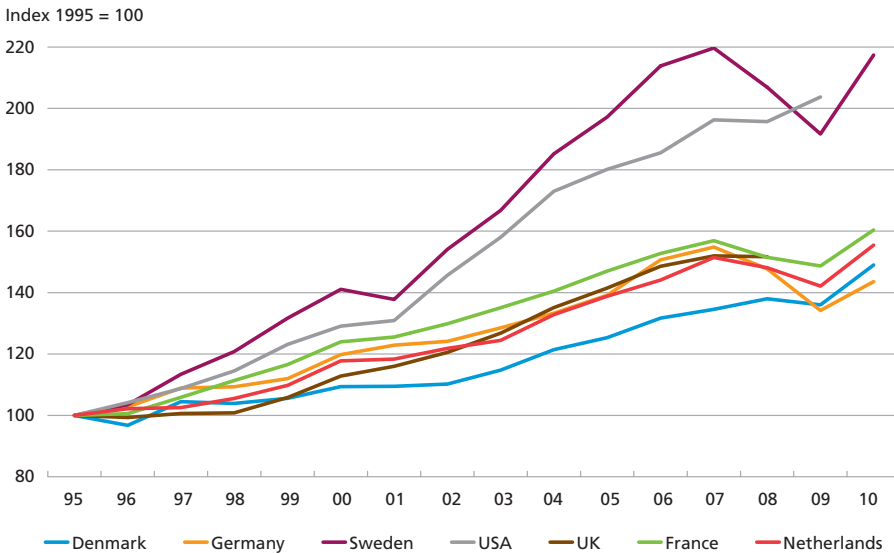
Note: Annual observations. The most recent observations are from 2010.
Source: Eurostat (Denmark, Germany, Sweden, France and the Netherlands) and the OECD (the UK and the USA).

higher level of job protection in the German labour market than in the Danish one. So when global demand fell in 2008 as a result of the crisis, it was more difficult for German firms to reduce employment.

The weak Danish productivity growth poses a particular challenge to competitiveness. Andersen and Spange (2012) discuss how to boost productivity growth. In addition to increased flexibility and openness, reinforced education and research initiatives are emphasised. The weak Danish productivity growth has also attracted political attention, and in 2012, the government set up a commission of independent experts who are to present concrete ideas on how to strengthen productivity in Denmark.

Overall, the above analysis indicates that the substantial fall in Danish market shares for exports of goods in volume terms over the last 15 years reflects a marked deterioration of wage competitiveness vis-à-vis abroad. This can be attributed to the fact that despite weak productivity growth, Danish wage increases have for some years been substantially higher than those abroad.

4. DISAGGREGATED ANALYSIS OF DENMARK'S EXPORT PERFORMANCE

Sections 2 and 3 primarily discussed the link between export perform-ance and price competitiveness. However, Denmark's export perform-ance does not only depend on its ability to compete with foreign manu-facturers within individual product groups. The composition of exports across products and destination countries also plays a role. Being present in expanding markets may cause Denmark's total market share to grow, even if its market shares in individual submarkets remain unchanged. Thus, the ability to be present in these markets through flexibility and adaptability is also an expression of competitiveness.

Structure effect and submarket-share effect
In the following, we decompose the development in Denmark's aggre-gate market share of goods into two overall effects, i.e. the structure effect and the submarket-share effect.[1] The *structure effect* indicates the hypothetical change in the aggregate export market share which would have occurred if Denmark's market share had remained unchanged across product groups and destination countries. A positive structure effect thus reflects relatively strong growth in Denmark's primary export markets. The *submarket-share effect* is the difference between the over-

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[1] A comparable analysis was conducted by the ECB (2005). The Ministry of Finance has conducted similar analyses on previous occasions, see e.g. Ministry of Finance (1986).

all change in the market share and the structure effect. This effect is thus an expression of exporters' performance in the individual submarkets. The structure effect can be further decomposed into three components: the *product effect*, measuring how export performance is affected by the composition of exports across products; the *market effect*, measuring how export performance is affected by the composition of exports across markets; and a third component, which captures the interaction between the product and market effects. This component is called the *mixed structure effect*. Box 4.1 shows the detailed calculations of the individual effects.

The analysis is conducted on the basis of detailed data for trade in goods with Germany, France, the UK, Italy, the Netherlands, Norway, Sweden and the USA. These eight countries together have accounted for a total of approximately 60 per cent of Denmark's exports of goods since 1995. We use data broken down by goods according to the Standard International Trade Classification (SITC) at two-digit level. To prevent the results from being dominated by the large energy price fluctuations in recent years, the main category, "Mineral fuels, lubricants, etc.", is left out. The category entitled "Various goods and transactions not included elsewhere" is also excluded. This leaves 59 different product groups.

Data are only available in value terms. This means that an increase in Denmark's market share may reflect both strong export growth in volume terms and improved terms of trade. Since exports are measured in dollars, they are affected by changes in the dollar exchange rate. If, say, the share of Denmark's exports denominated in dollars is smaller than the share of the eight OECD countries' imports denominated in dollars, an increase in the dollar exchange rate will, all else equal, lead to a decline in Denmark's market share, even if the volumes remain unchanged. This is captured by the submarket-share effect.

Due to the distinction between product groups and export markets, the data basis differs from the one used in section 2. Overall, Denmark's export market share in value terms declined by approximately 25 per cent from 1995 to 2010, cf. Chart 4.1. This was caused by a loss in competitiveness in the individual submarkets. It supports the assumption that Denmark's export performance has been impeded by the rise in Danish export prices relative to the prices abroad. Moreover, the growing importance of emerging markets to global trade will contribute to reducing Denmark's market share, cf. section 2 of this article.

On the other hand, the composition of Danish exports of goods across countries and product groups has contributed to increasing Denmark's market share, cf. the red curve. This reflects a negative structure effect up to 2000, after which time the structure effect has been positive.

DECOMPOSITION OF DENMARK'S EXPORT PERFORMANCE	Box 4.1

The basis of the decomposition of Denmark's export performance is that the change in market shares from one year to the next (the total effect) can be broken down as follows:[1]

$$g - g^* = \left[\sum_i \sum_j \left(\theta_{ij} - \theta_{ij}^*\right)g_{ij}^*\right] + \left[\sum_i \sum_j \theta_{ij}\left(g_{ij} - g_{ij}^*\right)\right] \quad (1)$$

where:

$$g = \frac{X_t - X_{t-1}}{X_{t-1}} \quad \left(g^* = \frac{M_t - M_{t-1}}{M_{t-1}}\right)$$

is the percentage growth in Danish exports to the eight OECD countries included in the analysis (the eight OECD countries' total imports) in period t

$$\theta_{ij} = \frac{X_{ij,t-1}}{X_{t-1}}$$

is exports of product i to market j as a share of Denmark's total exports to the eight countries in period t-1

$$g = \sum_i \sum_j \theta_{ij} g_{ij} \quad \left(g^* = \sum_i \sum_j \theta_{ij}^* g_{ij}^*\right)$$

where g_{ii} $\left(g_{ii}^*\right)$ is the percentage change in Denmark's exports to the eight OECD countries (the eight OECD countries' total imports) of product i to/from country j.

The first term in (1) is the structure effect. This effect will be positive if Denmark's exports to the eight OECD countries are more concentrated on products and markets with high growth than total OECD imports. The structure effect can be decomposed into three components:

$$\textit{Product effect} = \sum_i \left(\theta_i - \theta_i^*\right)g_i^*$$

$$\textit{Market effect} = \sum_j \left(\theta_j - \theta_j^*\right)g_j^*$$

$$\textit{Mixed structure effect} = \sum_i \sum_j \left[\left(\theta_{ij} - \theta_{ij}^*\right) - \left(\theta_i - \theta_i^*\right)\frac{\theta_{ij}^*}{\theta_i^*} - \left(\theta_j - \theta_j^*\right)\frac{\theta_{ij}^*}{\theta_j^*}\right]g_{ij}^*$$

where:

$$\theta_i = \sum_j \theta_{ij} \quad \left(\theta_i^* = \sum_j \theta_{ij}^*\right)$$

is product i's share of Danish exports to the eight OECD countries (the eight OECD countries' total imports) in period t-1

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[1]   The decomposition is in accordance with ECB (2005).

CONTINUED   Box 4.1

$$\theta_j = \sum_i \theta_{ij} \quad \left(\theta_j^* = \sum_i \theta_{ij}^* \right)$$

is country j's share of Danish exports to the eight OECD countries (the eight OECD countries' total imports) in period t-1

$$g_i^* = \frac{\sum_j \theta_{ij}^* g_{ij}^*}{\theta_i^*} \quad g_j^* = \frac{\sum_i \theta_{ij}^* g_{ij}^*}{\theta_j^*}$$

is growth in the eight OECD countries' imports of product i (goods from country j) in period t.

The positive structure effect reflects that Danish exports are concentrated on product groups for which the destination market has grown since 2000 relative to the total export market, cf. Chart 4.2. The composition of exports across the eight countries had a negative impact on Danish export growth in the period 1995-2000, primarily because import growth in the USA was much higher during that period than import growth in the European countries. Since Denmark's presence in the US market is relatively weak, this contributes to reducing Denmark's total market share.
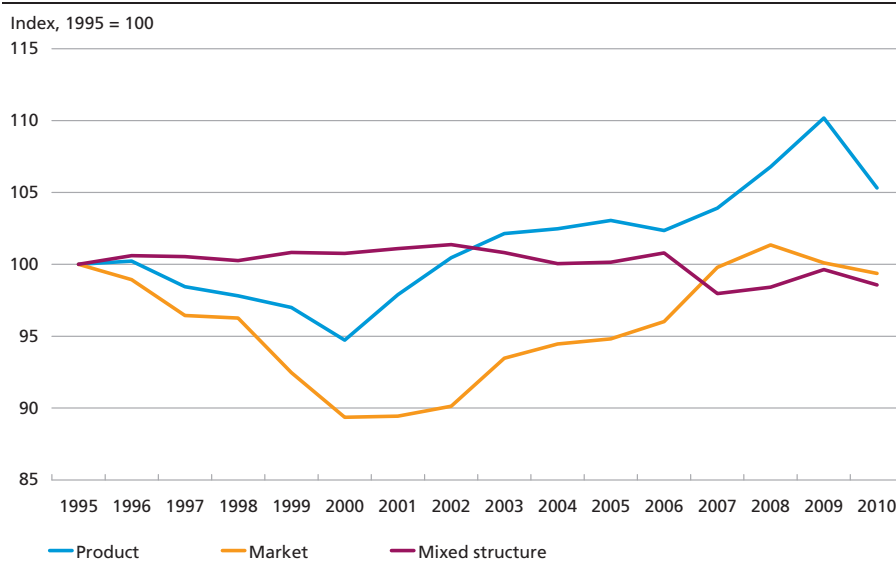
MARKET SHARE, GOODS   Chart 4.1
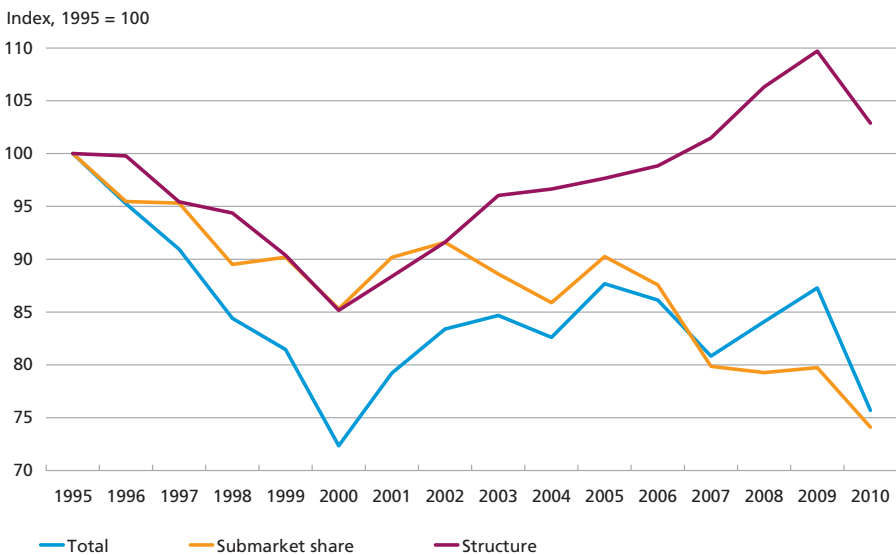
Source: OECD and own calculations.

MARKET SHARE, GOODS, STRUCTURE EFFECT   Chart 4.2

Index, 1995 = 100

Source: OECD and own calculations.

Specialisation of Danish exports

The following section analyses the composition of Danish exports across product groups. Low-tech products as a percentage of exports have declined considerably over the last 50 years, cf. Table 4.1, the primary rea-

COMPOSITION OF DANISH EXPORTS   Table 4.1

	1960-69	1970-79	1980-89	1990-99	2000-10
Food, beverages and tobacco (FOD)	53.7	39.9	35.5	29.4	23.2
Textile and leather apparel (TEX)	5.4	7.2	6.9	7.1	7.5
Wood and wood products (WOD)	3.1	3.9	5.9	7.0	5.4
Paper and paper products	0.7	1.0	1.4	1.5	1.3
Non-metallic mineral products (MNM)	1.2	1.8	1.8	1.8	1.7
Basic metal industries (BMI)	1.6	2.6	3.0	2.4	2.7
Fabricated metal products (BMA)	1.8	2.5	2.9	3.6	3.8
Low-tech, total	67.5	58.9	57.4	52.8	45.6
Chemical products (CHE)	6.3	7.9	10.2	11.6	15.8
- of which medicines and pharmaceutical products	1.8	2.1	3.2	5.2	9.0
Manufacture of agricultural and industrial machinery (MAI)	14.6	17.2	16.0	16.2	18.3
Manufacture of transport equipment (MTR) ..	5.4	6.5	5.5	5.7	5.2
Medium-tech, total	26.3	31.6	31.7	33.5	39.3
Professional and scientific equipment (MIO) ..	2.2	3.3	4.6	5.7	6.0
Manufacture of electrical machinery (MEL)	4.0	6.3	6.4	8.0	9.1
High-tech, total	6.2	9.6	11.0	13.7	15.1

Source: OECD and own calculations. The breakdown by industry follows from Anderton (1999).

son being the declining importance of agricultural exports. From constituting more than half of Denmark's total exports, food, beverages and tobacco now account for less than one fourth. On the other hand, the share of goods from medium-tech sectors has increased substantially, mainly because Denmark has generated very considerable exports of medicines and other pharmaceutical products.

The shift across sectors towards more high-tech products reflects the general increase in wealth experienced by all countries. As a result of rising incomes, high-tech products will generally account for a larger part of consumption. Compared with the rest of the OECD, agriculture has traditionally made up a substantial part of Danish exports, cf. Chart 4.3. This is still the case, although it is less pronounced than previously.

On the other hand, Denmark used to be underspecialised in metals, but that trend has also been less pronounced in recent decades.

The increasing relative specialisation in textiles is attributable to the decline in the sector's share of total OECD exports, while its share of Danish exports has been relatively stable since the 1970s. However, the large volume of textile exports may to some extent reflect that Danish firms import textiles from less cost-intensive countries in order to re-export them to its neighbouring markets. But the extent of this effect cannot be illustrated on the basis of the data set used. Overall, due to its

DENMARK'S RELATIVE SPECIALISATION IN LOW-TECH PRODUCTS	Chart 4.3
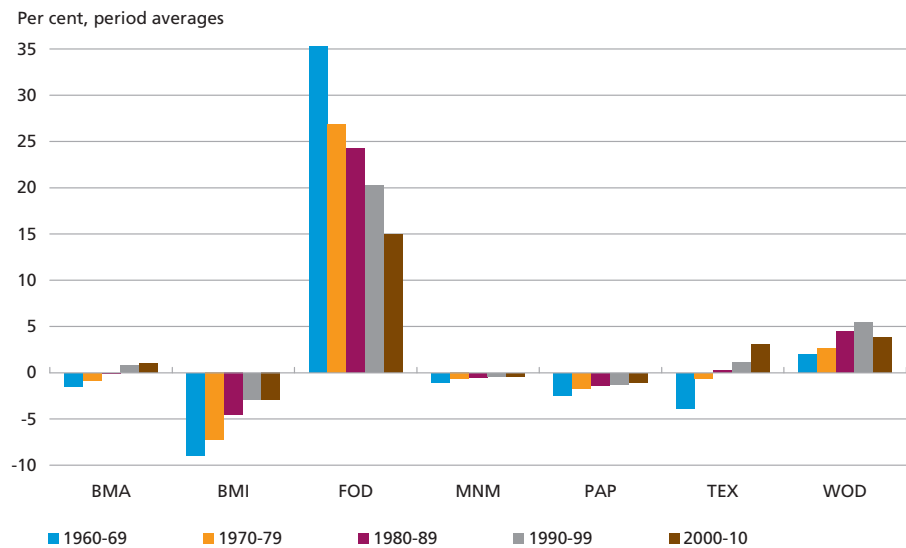
Per cent, period averages

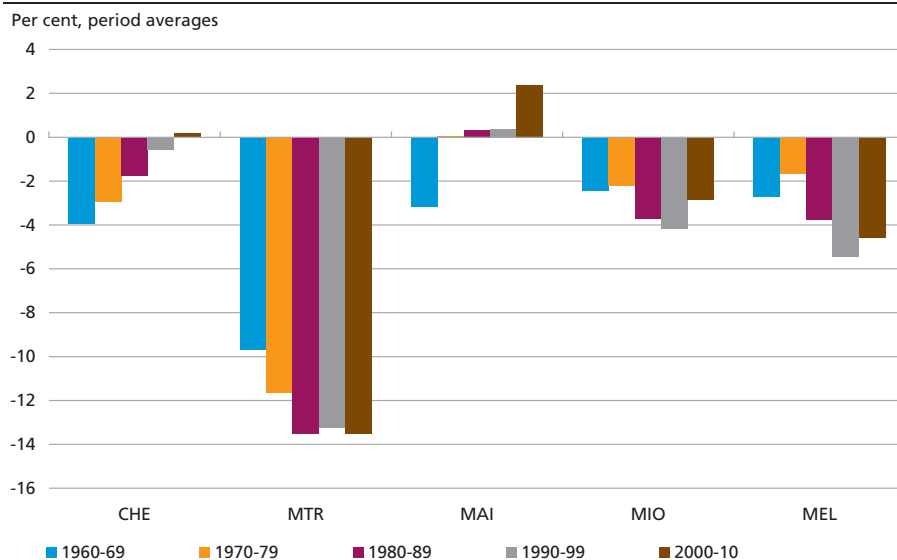■ 1960-69 ■ 1970-79 ■ 1980-89 ■ 1990-99 ■ 2000-10

Note: The indicator shows the difference between a sector's share of Danish exports and its share of OECD exports. A high value indicates that Denmark has a relatively high level of specialisation in the sector under review. BMA: fabricated metal products; BMI: basic metal; FOD: food, beverages and tobacco; MNM: non-metallic mineral products: PAP: paper and paper products; TEX: textile and leather apparel; WOD: wood and wood products.
Source: OECD and own calculations.

DENMARK'S RELATIVE SPECIALISATION IN MEDIUM-TECH AND HIGH-TECH
PRODUCTS   Chart 4.4

Per cent, period averages

Note: The indicator shows the difference between a sector's share of Danish exports and its share of OECD exports. A
         high value indicates that Denmark has a relatively high level of specialisation in the sector under review. CHE:
         chemical products; MTR: manufacture of transport equipment, MAI: manufacture of agricultural/industrial
         machinery, MIO: professional and scientific equipment, MEL: electrical machinery.
Source: OECD and own calculations.

large agricultural exports, Denmark continues to be relatively specialised
in low-tech products compared with the OECD as a whole.

Compared with the other OECD countries, Denmark is underspecial-
ised in medium-tech and high-tech products, cf. Chart 4.4. The negative
specialisation in medium-tech products is mainly attributable to Den-
mark not having an auto manufacturing sector. However, compared
with the OECD as a whole, Denmark is specialised in manufacturing agri-
cultural/industrial machinery. The negative specialisation in high-tech
production is broadly based across the scientific equipment and electric-
al machinery industries.

In some low-tech industries it may be difficult for individual manu-
facturers to differentiate their products from those of their competitors.
Consequently, low costs of production have a major impact on competi-
tiveness. A high technological level in the manufacture of low-tech
products will often be associated with high productivity, which reduces
costs. Advanced economies may therefore have a comparative advan-
tage when it comes to the production of low-tech products.

Sectors manufacturing more sophisticated products provide better
opportunities for individual firms to manufacture products that differ
from those of their competitors and thus to obtain higher prices. This

often requires a well-educated labour force and investment in research and development in the corporate sector. Accordingly, innovation is key in terms of staying competitive in high-tech industries.

Looking forward, it is important to ensure that labour and the other production resources will be attracted to those industries and firms with the highest level of international competiveness. Measures ensuring free competition among firms and a flexible labour market may therefore have a favourable effect on Denmark's export performance.

Dynamic OECD export sectors

It is crucial for Danish export growth that the categories of goods for export are in demand. However, growth in OECD exports in the textiles and wood product sectors, where Denmark is relatively specialised, has been weak in the last decade compared with growth in total OECD exports, cf. Chart 4.5. On the other hand, OECD exports of food and machinery, where Denmark is also relatively specialised, have grown more than average. Presumably, the positive growth indicator of basic metal and food exports since 2000 reflects to some extent that the prices of many commodities have risen substantially. Unless commodity prices increase further, the indicators for those sectors can be expected to become negative again in the future, as was the case before 2000.

SECTOR DYNAMICS IN OECD EXPORTS – LOW-TECH PRODUCTS	Chart 4.5

Per cent, period averages

■ 1961-69 ■ 1970-79 ■ 1980-89 ■ 1990-99 ■ 2000-10
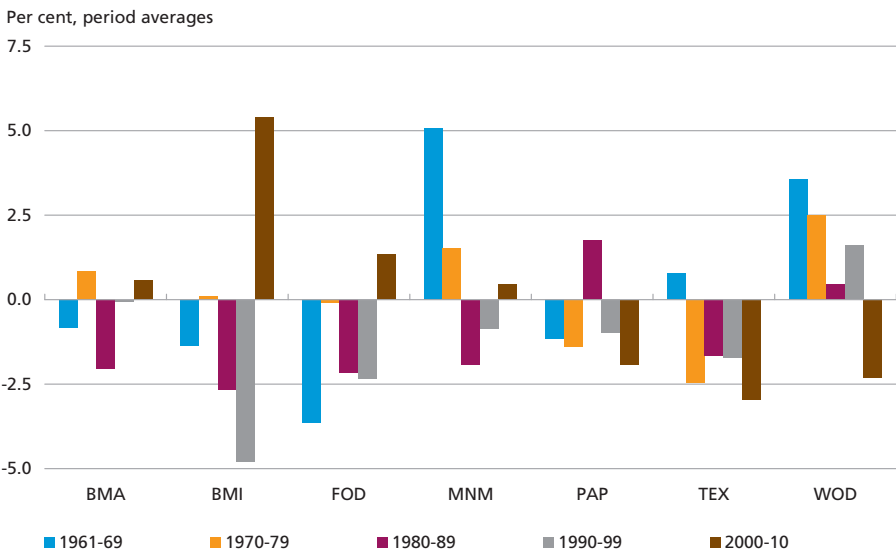
Note: The indicator shows the difference between growth in OECD exports for a given sector and growth in total OECD exports. A positive value indicates that exports in a given sector are higher than the total growth in exports. For the names of sectors, see the note to Chart 4.3.
Source: OECD and own calculations.

SECTOR DYNAMICS IN OECD EXPORTS – MEDIUM-TECH AND HIGH-TECH
PRODUCTS   Chart 4.6

Per cent, period averages
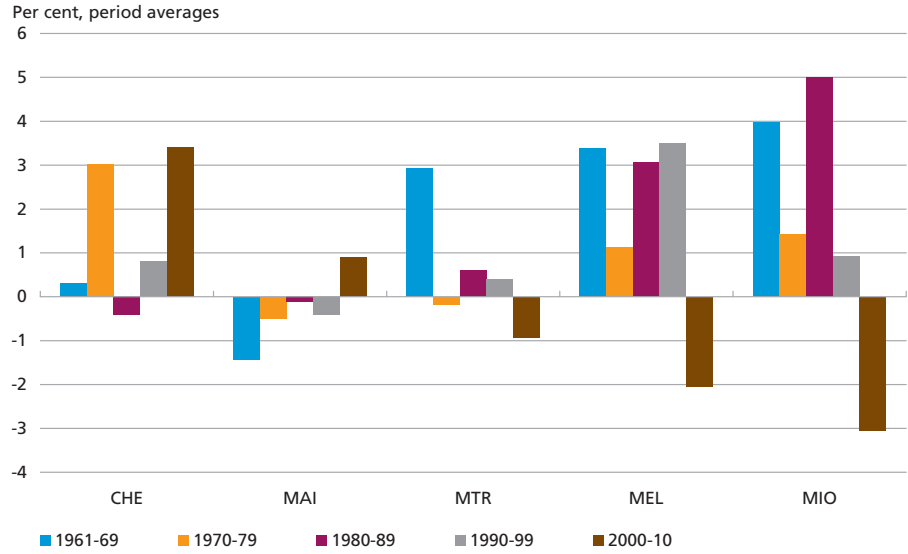
Note: See the note to Chart 4.5. For the names of sectors, see the note to Chart 4.4.
Source: OECD and own calculations.

Metals and chemical products are the industries in which total OECD
exports have seen the fastest growth since 2000. Denmark has gradually
become increasingly specialised in the sector of chemical products so
that the sector's share of Danish exports now matches its share of OECD
exports. This mainly reflects the good performance of the Danish
pharmaceutical industry in the export markets. At the same time, the
pharmaceutical industry is more dynamic in the OECD export market
than the chemical industry as a whole, thereby contributing positively to
Denmark's export performance.

   Exports of high-tech products as a percentage of OECD exports have
declined since 2000, cf. Chart 4.6. The negative indicator of electrical
equipment reflects weak growth in exports of both telecommunications
equipment and other electronics. The indicator of professional and sci-
entific equipment is pushed down mainly by a large negative contribu-
tion from office equipment. Denmark is relatively less specialised in this
industry than the OECD countries as a whole. Part of the explanation for
the relatively weak growth in OECD exports of high-tech products is that
a large proportion of this production now takes place in the Asian
emerging market economies that used to manufacture primarily rela-
tively simple products.

   Denmark's relative export specialisation is generally neither unequivo-
cally good nor bad. The relative specialisation in low-tech products may

seem to be a cause for concern, but there is no unequivocal connection between a sector's value added and the technological content of its products. Thus, because of improvements in the technology of production, labour productivity growth, e.g. in the agriculture sector, has exceeded the average productivity growth in the economy for many years. This has resulted in high value added within the sector, even though it is categorised as low-tech. OECD high-tech exports, where Denmark is relatively underspecialised, experienced high growth until 2000. However, this trend was broken in the last decade during which high-tech exports in value terms grew by less than total OECD exports.

Exports to emerging market economies
Traditionally, Denmark's exports have been aimed at the old industrialised countries. Germany is the largest individual market, accounting for 15 per cent of Denmark's exports of goods in 2010. In second place, Sweden accounts for around 13 per cent, cf. Chart 4.7. On the other hand, only around 24 per cent of Denmark's exports go to non-OECD markets, and that share has risen only slightly since 1995.

The BRIC countries' impact on world trade has increased in recent years. Together, the four countries now take 10 per cent of German exports and as much as 12 per cent of US exports, cf. Chart 4.8. Even though Denmark's exports to the BRIC countries have also increased, they still constitute less than 5 per cent of Denmark's total exports. The

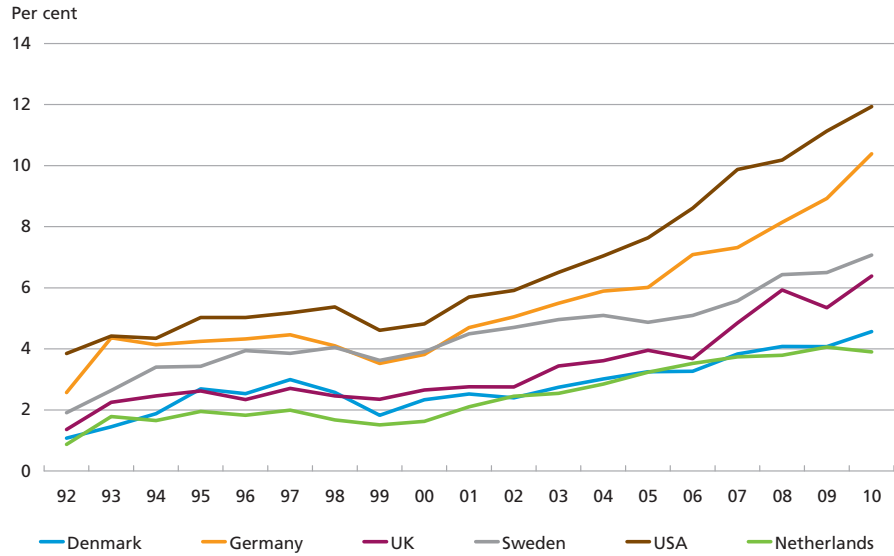| COMPOSITION OF DANISH EXPORTS OF GOODS IN VALUE TERMS	Chart 4.7

Per cent

Germany ■ UK ■ Sweden ■ USA ■ Norway ■ Other OECD countries ■ BRIC ■ Other
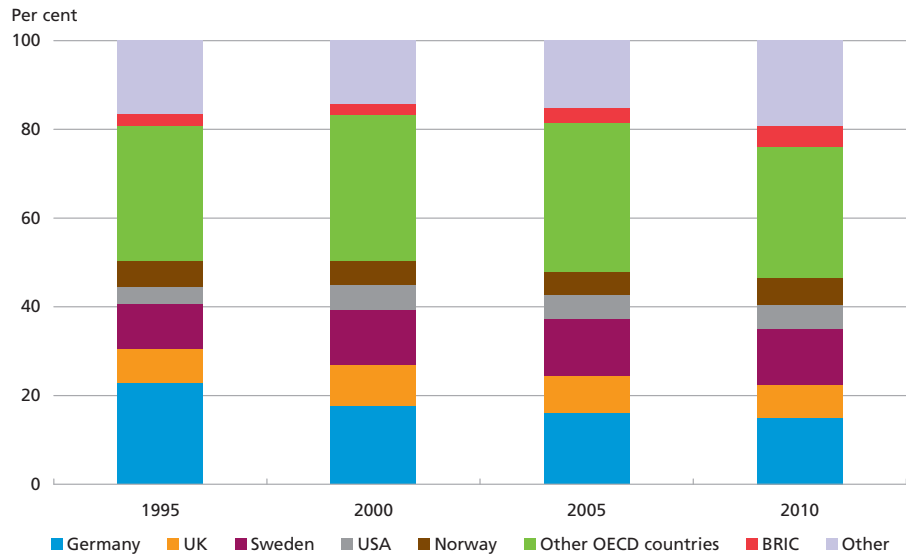
Note: The BRIC countries are Brazil, Russia, India and China.
Source: OECD and own calculations.

EXPORTS TO THE BRIC COUNTRIES   Chart 4.8

Per cent

Source: OECD and own calculations.

BRIC countries' imports can be expected to continue their strong growth in the future, so it is attractive to be present in those markets.

There may be several reasons why Denmark's trade with distant markets is relatively limited. One of the reasons is of a technical nature. Because the distance from an average firm to the nearest border is greater in a large country, firms in a small country will always have a larger share of their near market abroad. Hence, exports to neighbouring countries will account for a larger share of firms' sales in a small country. As a consequence, exports to distant markets will automatically account for a smaller share of the country's total exports. But this does not explain why Danish exports to the BRIC countries are considerably smaller than e.g. Swedish exports. One possible reason is that Danish exports include many relatively expensive quality products. Demand for such products will typically be higher in countries with high average incomes. Hence, Denmark's exports to the BRIC countries may grow with rising incomes in those countries.

Small firms in particular may find it difficult to venture into new markets. Denmark's limited presence in the BRIC markets may thus reflect that small and medium-sized Danish firms are to a large extent subcontractors to e.g. German exporters to BRIC. In that case, Danish exports will also benefit from growing BRIC imports. Compared with the EU as a whole, Denmark is not a country where small firms account for an unusually large percentage of employment, cf. Table 4.2. In large countries

SMALL AND MEDIUM-SIZED ENTERPRISES IN THE NON-
FINANCIAL SECTOR, 2006   Table 4.2

Per cent of total employment	Micro (1-9 employees)	Small (10-49 employees)	Medium-sized (50-249 employees)	Small and medium-sized enterprises, SMEs (1-249 employees)	Large (250+ employees)
Denmark	19.7	25.2	21.0	66.0	34.0
Sweden	24.7	20.9	18.1	63.7	36.3
Netherlands	29.2	21.1	17.0	67.3	32.7
UK	21.5	17.9	15.4	54.8	45.2
Germany	19.3	21.8	19.3	60.5	39.5
France	24.7	20.8	16.2	61.7	38.3
Italy	46.9	21.6	12.5	81.0	19.0
Spain	37.7	25.5	14.8	78.0	22.0
EU27	29.7	20.7	17.0	67.4	32.5

Note: The non-financial sector comprises manufacturing, building and construction and non-financial services. For the
        Netherlands, the data are from 2005.
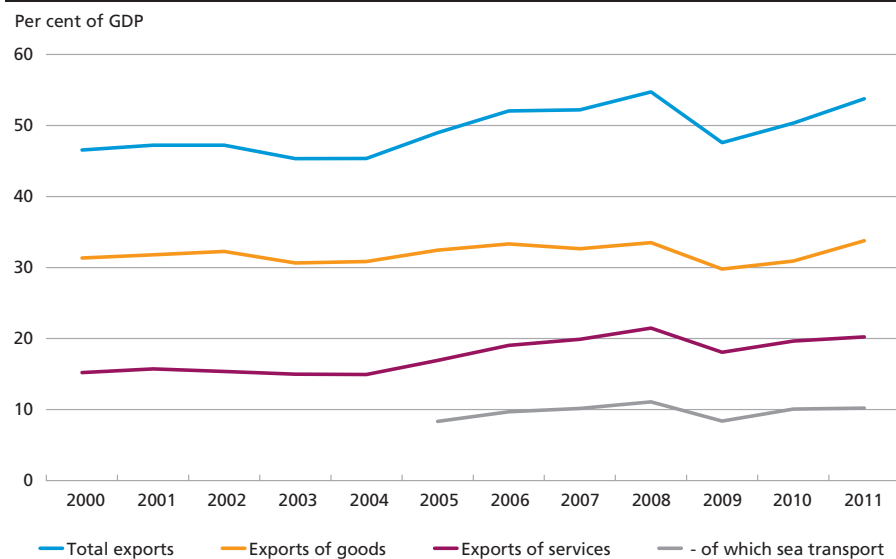Source: Eurostat, *European Business Economy Overview*, 2009.

like Germany, France and the UK, large firms account for a greater part of
total employment, however. But in overall terms, it is difficult to identify
structural conditions that would make it particularly hard for Danish firms
to set up in distant markets compared with the EU as a whole.
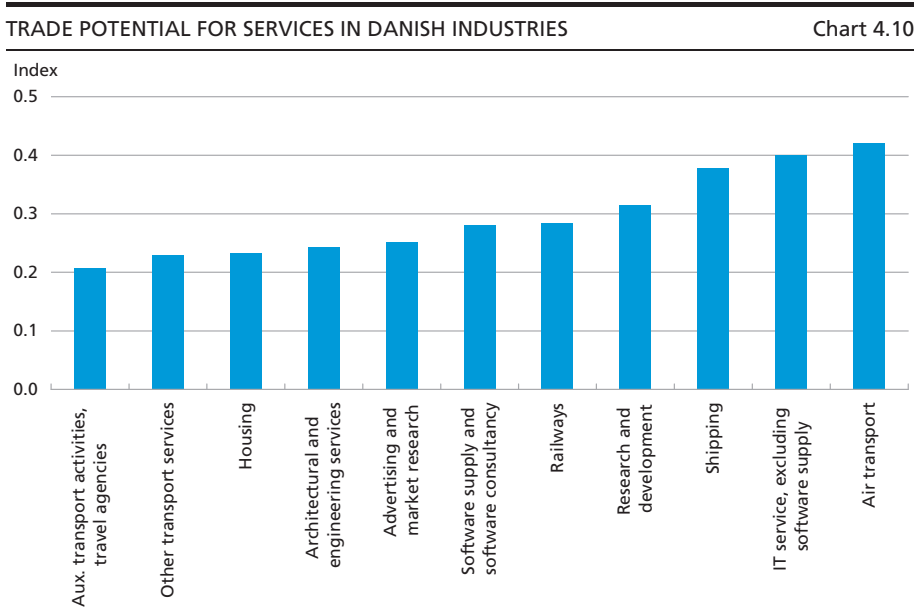
Trade in services
The above analysis concerns trade in goods, reflecting that Denmark's
exports of goods are more than twice the size of its exports of services,

EXPORTS OF GOODS AND SERVICES   Chart 4.9

Per cent of GDP

Total exports   Exports of goods   Exports of services   - of which sea transport

Source: Statistics Denmark.

TRADE POTENTIAL FOR SERVICES IN DANISH INDUSTRIES   Chart 4.10

Index

[Bar chart showing trade potential index values. Y-axis from 0.0 to 0.5 in increments of 0.1. Bars from left to right:]

- Aux. transport activities, travel agencies: ~0.21
- Other transport services: ~0.23
- Housing: ~0.23
- Architectural and engineering services: ~0.24
- Advertising and market research: ~0.25
- Software supply and software consultancy: ~0.28
- Railways: ~0.29
- Research and development: ~0.32
- Shipping: ~0.38
- IT service, excluding software supply: ~0.40
- Air transport: ~0.42

Source: Borchsenius et al. (2010).

cf. Chart 4.9. Besides, Denmark's trade in services is dominated by sea freight.

It is an open question whether Denmark makes sufficient use of its export potential for services, however. Borchsenius et al. (2010) identify a number of highly specialised services which all offer significant potential for international trade, cf. Chart 4.10. The authors use a method comparing the domestic geographical concentration of production and consumption, respectively, of a particular type of service. The idea is that if production of the service in question is concentrated in one particular area, while consumption is spread across the country, this implies that the service is tradable over distances, and it may therefore be assumed that the service can also be traded internationally. By specialising in services such as advisory services, IT services and research and development, Denmark may seek to compensate for declining exports of goods and thus benefit from its highly educated labour force.

5. NON-PRICE COMPETITIVENESS

Competitiveness often implies price competitiveness calculated on the basis of relative unit labour costs, for example. But competitiveness depends on other factors besides prices, wages and productivity. In this section, we look into a number of indicators of non-price competitive-

ness that may impact a country's export performance. The concept of using other parameters besides price to explain a country's exports is based on recent trade theory, see e.g. Krugman (1989). In addition to price, a firm can differentiate its products from those of other firms by improving product quality or by expanding its product range. This enables the firm to raise its prices by making it more difficult for consumers to substitute these products for other products. Hence, it is necessary to consider other parameters besides price when explaining a country's export performance.

According to a survey by the Ministry of Economic and Business Affairs (2007), Denmark ranks second in Europe in terms of manufacturing quality goods. In 2005, quality goods – defined as goods exported at a premium of minimum 15 per cent in relation to average export prices for the EU15 member states – accounted for more than 40 per cent of Denmark's total exports of goods, second only to Ireland. Pedersen and Riishøj (2008) also conclude that Denmark has specialised in products that sell at very high prices in the global market.

High prices do not necessarily equal quality, however. Instead, they may imply that Denmark has higher costs of production than its competitors, and that Danish firms consequently have to charge higher prices. If that is the case, it will further reduce Denmark's market share. It is therefore important to analyse the extent to which the high prices of Danish goods reflect a quality edge.

Indicators of non-price competitiveness
Because it is difficult to measure differentiation by other parameters than price, the use of indicators is necessary. In recent years, policymakers have increasingly focused on indicators of non-price competitiveness. For example, the Ministry of Business and Growth issues an annual competitiveness report, in which they evaluate Denmark's position relative to abroad based on a number of indicators (Ministry of Economic and Business Affairs, 2011).

Some of the indicators of non-price competitiveness are firm-specific, while others are of a more structural nature. The firm-specific indicators include technology, expenditures on research and development and the number of patents, among others, while the structural indicators include the level of education, infrastructure, export barriers, etc. Where the structural indicators measure the extent to which the corporate sector of a country is generally in a position to manufacture products of higher quality and export them, the firm-specific indicators reflect the competitive position of individual exporters in the export market.

Firm-specific indicators

According to the Ministry of Economic and Business Affairs, firms manu-
facturing quality goods have a higher share of employees with tertiary
education and invest more in research and development than other
exporters. It is therefore interesting to analyse Denmark's general per-
formance compared with its trading partners in terms of these indicators
of non-price competitiveness. In Denmark, as in e.g. Sweden and Fin-
land, research and development account for a relatively large share of
GDP, cf. Chart 5.1. From 1995 to 2009, expenditure in Denmark rose by
almost 1 percentage point, moving Denmark from a below-average to
an above-average position in an OECD context. This is a possible indica-
tion of improved non-price competitiveness.

In Denmark, the corporate sector contributes two thirds of the funds
for research and development with the education sector largely account-
ing for the last third, cf. Table 5.1. Compared with the euro area, the
contribution from the education sector in Denmark is substantially
larger, while the contribution from the rest of the public sector is
smaller.

In view of the high research and development expenditure, it may
seem strange that Danish exports are specialised in low-tech products,
while medium-tech and high-tech products account for smaller shares of
Denmark's exports than is the case for the OECD countries overall, cf.

EXPENDITURE FOR RESEARCH AND DEVELOPMENT	Chart 5.1

Per cent of GDP
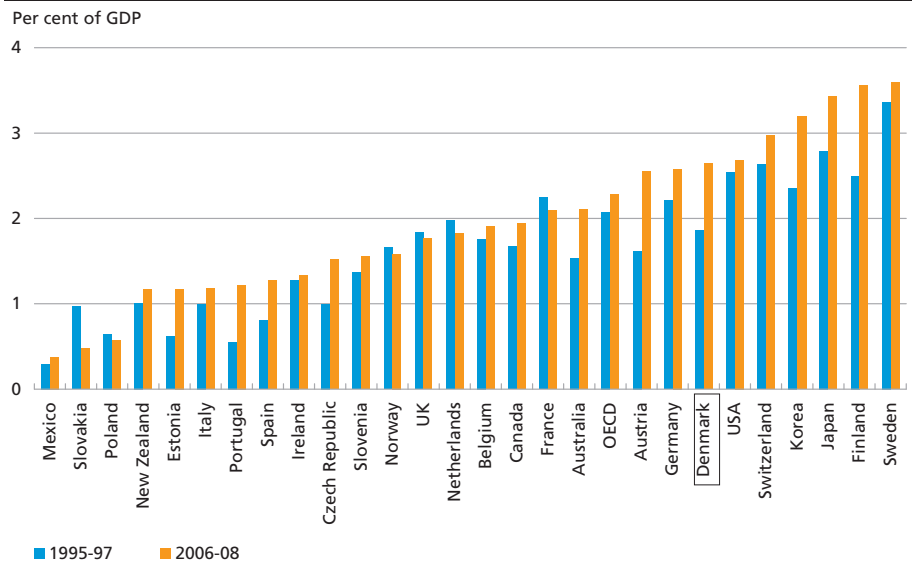
■ 1995-97   ■ 2006-08

Note: The Chart shows a country's expenditure for research and development as an average share of GDP for the
periods 1995-97 and 2006-08. For Mexico and New Zealand, an average for the period 2005-07 instead of 2006-08
is used for data availability reasons.
Source: OECD.

EXPENDITURE FOR RESEARCH AND DEVELOPMENT, PER CENT OF GDP, 2009   Table 5.1

Unit	Private firms	Private non-profit sector	Education sector	Other public sector	Total
Denmark	2.08	0.01	0.90	0.06	3.06
France	1.39	0.03	0.47	0.37	2.26
Norway	0.93	-	0.58	0.29	1.80
Sweden	2.54	0.00	0.91	0.16	3.61
Germany	1.91	-	0.50	0.42	2.82
UK	1.12	0.05	0.52	0.17	1.86
USA	2.02	0.11	0.36	0.30	2.79
The euro area	1.27	0.02	0.47	0.29	2.06

Note: The figure for the expenditure of the rest of the public sector for research in the US does not include military research. The figures for the USA refer to 2008.
Source: Eurostat.

section 4. It should be noted, however, that the breakdown of products according to technology level does not necessarily imply that high-tech products generate the highest value added. For example, it may be pointed out that Denmark is highly specialised in the pharmaceutical industry, which is classified as medium-tech, but which requires a well-educated labour force and provides good opportunities for a high return on investments in research and development.

In addition to having an expected positive effect on a firm's product quality and range, research and development may contribute to re-ducing costs. For example, research and development may reduce costs in low-tech sectors such as agriculture by increasing productivity. On the other hand, an expansion of the product range is more likely in the medium-tech and high-tech sectors. One example that has been de-scribed in the media is Nokia, the Finnish firm which has lost its position as the highest selling mobile phone manufacturer to Samsung. Nokia's failure to develop a competitive smartphone has been cited as one of the reasons for this.

When research and development result in new products, firms will often apply for a patent. In 2007-09, Denmark accounted for 0.64 per cent of the total number of patents taken out according to the OECD triadic database, cf. Chart 5.2.[1] This is an increase by almost 20 per cent compared with 1995-97. Most of Denmark's main trading partners, on the other hand, have seen a decline in their shares of patents issued, so our non-price competitiveness has developed positively in terms of the number of patents issued.

Other firm-specific indicators of non-price competitiveness include foreign direct investment (FDI) in Denmark. Based on all sectors except

[1]   The OECD triadic database weights together patents issued by the European, US and Japanese patent offices, i.e. a patent issued in all three offices counts only as a single patent.

DEVELOPMENT IN THE COUNTRIES' SHARES OF PATENTS ISSUED | Chart 5.2

Per cent
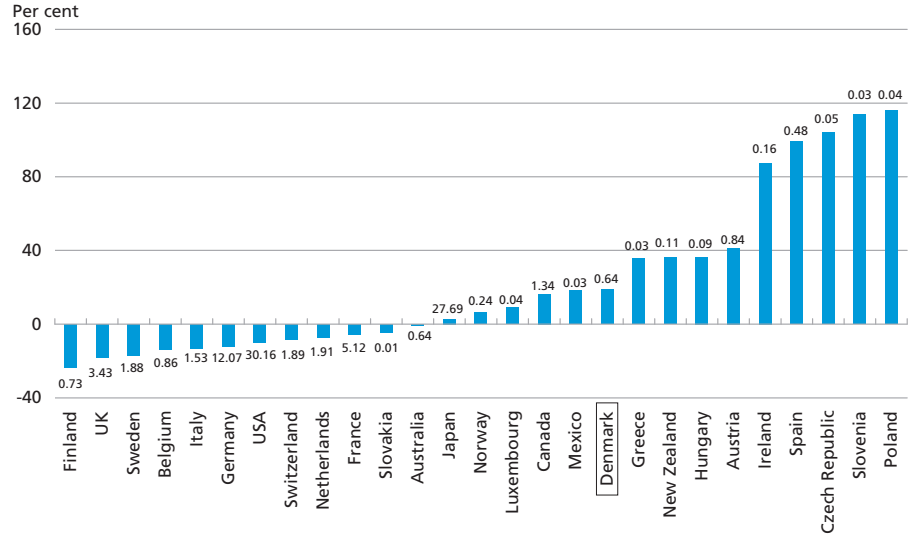
Note: The bars show the growth in the countries' shares of patents taken out from 1995-97 to 2007-09. The figure by the bar indicates the share for the period 2007-09.
Source: OECD.

the service sector, Denmark is in the bottom half, cf. Chart 5.3.[1] Large countries such as Germany, Italy, France, the USA and Japan all have smaller shares than Denmark and other small countries. Sweden and the Netherlands have considerably larger shares, however.

Structural indicators
The level of education is an important structural indicator of non-price competitiveness. Improvement of the level of education of the labour force may both improve the quality of manufactured goods and facilitate expansion of the product range. From 1999 to 2006, the share of the Danish population with tertiary education increased by almost 10 percentage points. This is slightly more than in a number of comparable countries, cf. Chart 5.4.

In addition to the level of education, there are many other structural indicators of non-price competitiveness. For example, the World Bank collects data on infrastructure, the openness of a country, the costs of exporting, etc.

Overall, Denmark has done relatively well in terms of the indicators of non-price competitiveness. The indicators can only hint at the development in competitiveness, however. Analysing more disaggregated data

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[1] Incoming FDI to the service sector accounted for almost 80 per cent of total incoming FDI in the period under review.

VOLUME OF INCOMING FDI FOR NON-SERVICE SECTORS   Chart 5.3

Per cent of GDP
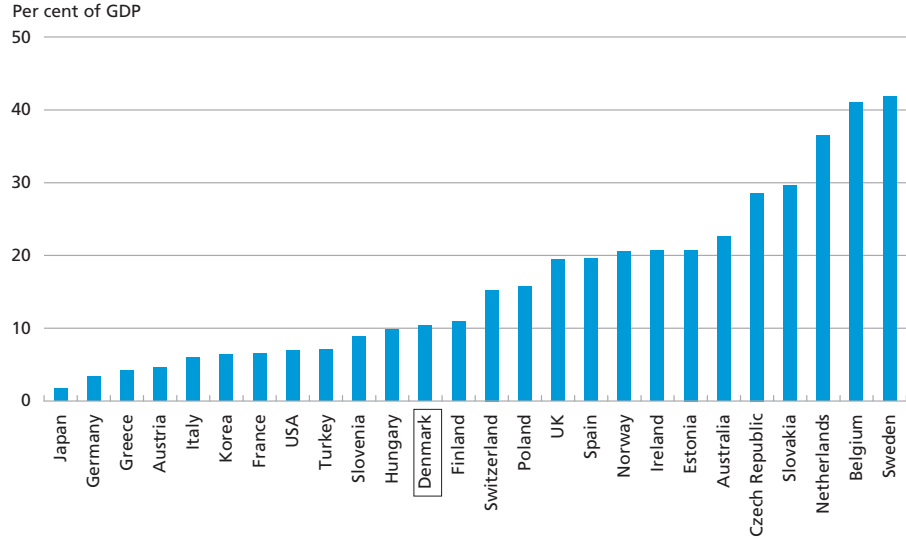
Note: The Chart shows the average volume of incoming foreign investments made in all sectors except the service sector
        in the period 2008-2010. For Estonia, Germany, Poland and Spain, the average relates to the period 2007-09.
Source: OECD.

at firm level may provide a clearer answer. Based on data for 15,000 European firms, Navaretti et al. (2010) find that size, productivity, the skill intensity of the workforce and the ability to innovate are positively related to a firm's export performance. Danish firms are not included in the analysis so in this article we use macroeconomic indicators instead.

SHARE OF THE POPULATION WITH TERTIARY EDUCATION   Chart 5.4

Per cent of 25-64 age group
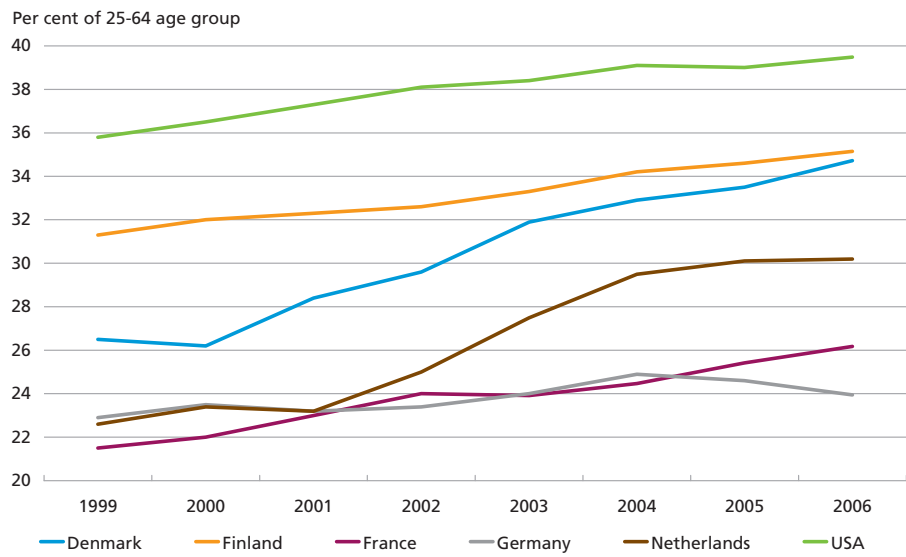
Source: OECD.

Econometric analysis of OECD countries' export performance

In this section we analyse how a country's export performance is dependent on price and non-price factors, respectively. To that end we construct a model for export market growth estimated on the basis of data for 17 OECD countries, including Denmark, for the period 1995-2010, cf. Box 5.1. The model includes indicators of price and non-price

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MODEL FOR EXPORT PERFORMANCE   Box 5.1

The econometric analysis is based on the following log-linearised model for market shares

$$\log(ma)_{it} = \alpha_i + \gamma \cdot trend + \beta_1 \log(rpx)_{it} + \beta_2 \log(rip)_{it} + \varepsilon_{it}$$

The market share, ma, is calculated as described in Box 2.1. α_i are country-specific constants included to allow for basic differences across countries. *trend* is a common trend that is included because the increased market shares of China and other high-growth countries in country i's export market causes the export market to grow more than the exports of country i. The parameter estimate of the trend coefficient is therefore expected to be negative. *rpx* is used as an indicator of price competitiveness and is the relative export prices (in a common currency), calculated as country i's export price, *px*, relative to the export prices of country i's competitors, cpx

$$rpx = \frac{px}{cpx} \, .$$

We expect the price elasticity to be negative, i.e. $\beta_1 < 0$. *rip* is the relative indicators of non-price competitiveness and, like the price, is calculated by taking the indicator of country i relative to that of its competitors. We expect non-price competitiveness to have a positive impact on export performance, i.e. $\beta_2 > 0$.

The competitors' export prices and the indicators of non-price competitiveness are calculated by weighting together country i's competitors in accordance with the calculation in the OECD Economic Outlook:

$$cpx_{it} = \sum_{p=1, p \neq i}^{N} \frac{x_{i \to p, 2005}}{x_{world \to p, 2005} - x_{i \to p, 2005}} * \frac{1}{x_{i \to world, 2005}} * \sum_{r=1, r \neq i, p}^{N} x_{r \to p, 2005} * px_{r,t}$$

x is exports in value terms, and the arrows indicate the direction of exports. px indicates the export price when calculating the competitors' price. For data availability reasons, country p's imports from the world are used instead of exports from the world to country p.

The model is estimated on the basis of a panel of 17 OECD countries: Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Norway, Spain, Sweden, Switzerland, UK and USA. The selection of countries ensures that they are suitably homogeneous. The model is estimated on the basis of annual data for the period 1995-2009.

competitiveness. Export performance is evaluated based on develop-
ments in market share. Focus is on goods, while exports of services,
which in Denmark's case consist mainly of sea transport, are not
included in the model. Competitiveness for this sector depends only to a
limited extent on Denmark's performance in terms of the indicators of
non-price competitiveness under review. On the basis of the model,
market-share developments since 1995 are decomposed to get an indica-
tion of the impact of non-price competitiveness on the countries' export
performance.

As expected, there is a negative relationship between a country's
export performance and the development in its relative export prices
from 1995-99 to 2006-10, cf. Chart 5.5. While its market shares declined
by approximately 20 per cent during that period, Denmark's export
prices increased by around 7 per cent vis-à-vis its competitors.

The link between export performance and relative prices is not un-
equivocal across countries. Hence, large countries such as Sweden, the
USA, France and the UK have seen their market shares shrink despite
improved price competitiveness. Part of this trend reflects the general
decline in the OECD countries' market shares due to the increasing
importance of the emerging market economies to world trade. It may
also have to do with the fact that the large countries compete more in
distant markets where direct competition with the countries in the Chart

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EXPORT PERFORMANCE AND RELATIVE EXPORT PRICES   Chart 5.5
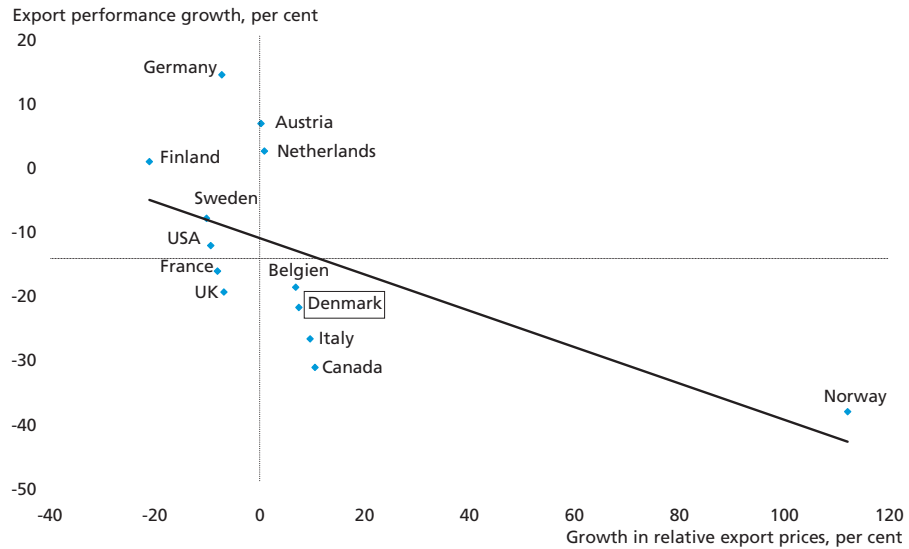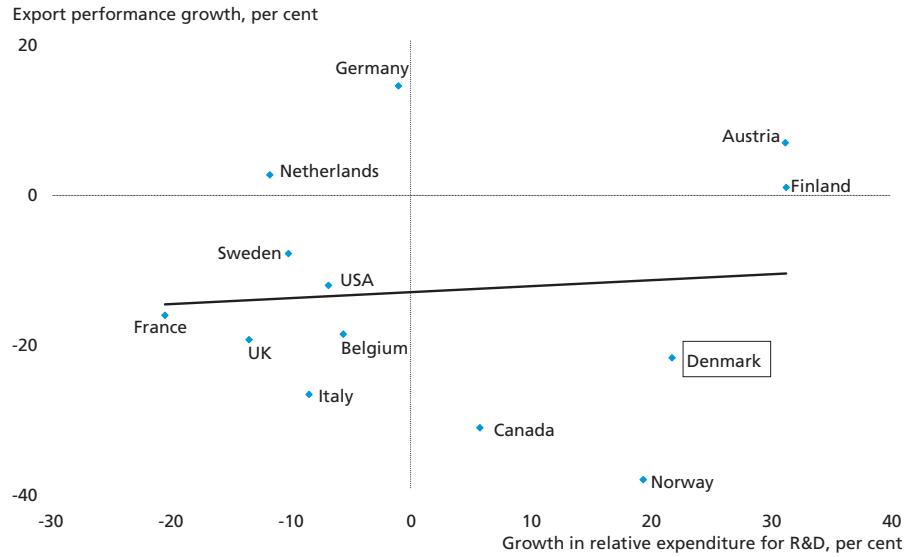

Note: The percentage change is calculated on the basis of average values for the periods 1995-99 and 2006-10. It should
        be noted that the negative relation also exists if Norway is excluded from the analysis.
Source: OECD.

EXPORT PERFORMANCE AND RELATIVE EXPENDITURE FOR R&D   Chart 5.6

Export performance growth, per cent

Note: Expenditure for research and development is stated per capita. The percentage change is calculated on the basis
        of average values for the periods 1995-99 and 2006-10.
Source: OECD.

is less intense, while competition from e.g. the Asian countries is stronger. Furthermore, non-price competitiveness may have been critical to market-share developments.

The link between the development in export performance and non-price competitiveness calculated by expenditure for research and development per capita is not particularly strong, cf. Chart 5.6. Although Denmark is among the countries that have improved the most over the period under consideration in terms of expenditure for research and development, it is also among the countries that have suffered the largest loss of market shares. This presumably reflects a substantial deterioration of Denmark's price competitiveness during the same period. Besides, research and development will often impact corporate performance only with a certain lag.

Structural indicators are not included in the econometric analysis due to insufficient data availability over time and across countries. Moreover, several of the structural indicators develop sluggishly over time, so including them as explanatory variables would not make sense. On the other hand, the country-specific effects included in the model capture differences in the structural conditions across countries.

The model of export performance is estimated with and without indicators of non-price competitiveness. The basic model explains export performance by a set of country-specific constants, a common trend and

ESTIMATION RESULTS FOR EXPORT PERFORMANCE					Table 5.2
Unit	Model 1	Model 2	Model 3	Model 4	Model 5
Price competitiveness	-0.367***	-0.357***	-0.356***	-0.400***	-0.379***
Trend	-0.013***	-0.013***	-0.012***	-0.014***	-0.013***
Expenditure for R&D per capita				0.213**	0.142*
Share of R&D conducted by firms			0.434*		0.292
Expenditure for R&D as a share of GDP		0.134	-0.022		

Note: The models are estimated using panel estimation with country-specific constants (fixed effects). P values are based on White's period robust standard errors which allow for autocorrelation in the error terms. *** (**) (*) indicate that the estimate is significant at a 1 (5) (10) per cent significance level.

Source: OECD and own calculations.

the development in relative export prices. The estimates of the trend and price elasticity are both significant with the expected signs, cf. Table 5.2.[1] In addition, they are largely unaffected by the inclusion of an indicator of non-price competitiveness in the model[2].

Of the indicators of non-price competitiveness, expenditure for research and development as a share of GDP turns out to have a positive impact on export performance, but the effect is not significant at a 10 per cent significance level. If R&D is calculated per capita instead, the correlation is significantly positive. Another indicator is the share of research and development conducted in firms. The coefficient on this indicator is significantly positive in model 3 where total expenditure for R&D is calculated as a share of GDP, as opposed to model 5 where R&D is measured per capita. Overall, the results show that the estimate of the impact of price competitiveness on export performance is robust to the inclusion of indicators of non-price competitiveness. Non-price competitiveness also seems to have a positive impact on exports, although the results are less clear.
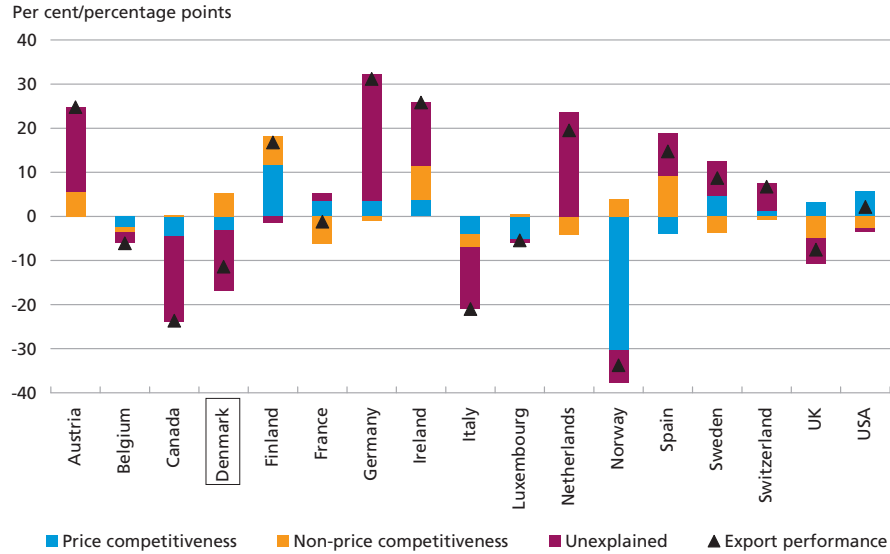
Our results are generally in line with Monteagudo and Montaruli (2009), although they find slightly clearer effects of non-price competitiveness. The authors analyse the exports of 12 euro-area member states using a dynamic panel data analysis. They find that expenditures on research and development as a share of GDP has a delayed, positive, but minor impact on exports of goods. They also find that the number of

[1] The fact that price elasticity is less than -1 does not really make sense economically, since firms would be able to increase turnover by raising prices. Balistreri & McDaniel (2003) point out that an analysis based on more disaggregated data would result in higher price elasticity. Disaggregation implies that the goods would have to be closer substitutes for each other, thereby increasing the impact of price on demand and thus on price elasticity.

[2] We have also estimated the model with an output gap for each country in order to model a possible cyclical effect on exports. We did not find a significant effect, nor did the inclusion of the output gap affect the other estimates.

DECOMPOSITION OF TREND-ADJUSTED DEVELOPMENT IN EXPORT
PERFORMANCE   Chart 5.7

Per cent/percentage points

■ Price competitiveness   ■ Non-price competitiveness   ■ Unexplained   ▲ Export performance

Note: The decomposition has been performed around the negative common trend, showing whether the two measures
        of competitiveness have improved or reduced the countries' export performance relative to trend. The
        development is based on the average value for the period 1995-97 to 2008-10. For Luxembourg, the data are
        from 2000-02 to 2008-10, for Switzerland, the data are from 1996-98 to 2006-08, and for the USA, the data are
        from 1995-97 to 2007-09.
Source: OECD and own calculations.

patents in the manufacturing sector has a significant effect.
Monteagudo and Montaruli (2009) argue that using stocks rather than
new patents is more appropriate, which may explain why we do not find
a significant effect of this indicator in our model.

Based on the estimated export relation, the export performance of
individual countries can be decomposed into contributions from price
competitiveness, the indicator of non-price competitiveness and a con-
tribution that cannot be explained by the model. For about half the
countries, export performance has been improved by better price com-
petitiveness, and for the remaining countries, it has been improved by
non-price competitiveness, cf. Chart 5.7. For Belgium and Italy, price com-
petitiveness and non-price competitiveness have both curbed their export
performance, while the opposite is the case for Finland and Ireland.

As far as Denmark is concerned, the decomposition shows that im-
proved non-price competitiveness has supported exports. Conversely,
reduced price competitiveness has had a downward effect on export
performance. The part of export growth that cannot be explained by
the model varies across countries, being relatively large for Denmark.
This indicates that some factors impacting a country's exports are not
captured by the model.

The results indicate that export performance across countries does not depend only on the countries' price competitiveness. Other ways to differentiate products, which we refer to as non-price competitiveness, may impact a country's export performance and the prices firms are able to charge for their products. The link between the indicators of non-price competitiveness and export performance is not clear, however. In addition, it is subject to considerable uncertainty.

As illustrated above, Denmark is placed at the low end in terms of price competitiveness. Denmark is better placed if the comparison is based on indicators of non-price competitiveness, its position having improved over the last 15 years. This may contribute to explaining the improvement in Denmark's terms of trade, but the effect of non-price competitiveness is generally subject to considerable uncertainty.

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