

# DANMARKS NATIONALBANK

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## Globalisation affects measures of wage competitiveness



### Measure of competitiveness is distorted

Danish firms' production abroad increases the statistical measures of wage competitiveness. An adjustment provides a more nuanced impression of developments in wage competitiveness.

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### Wage competitiveness is strong

Along with a high level of employment and a large current account surplus, the adjusted measure of wage competitiveness still contributes to the impression of a robust Danish economy.

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### A broader set of industries refines assessment

New production structures imply that assessment of wage competitiveness should be supported by measures including a broader set of industries than the manufacturing industry alone.

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Denmark is a small, open economy that benefits from trade with other countries. Danish firms' ability to compete in the international markets is thus crucial when it comes to ensuring economic growth and prosperity.

Firms increasingly have goods processed abroad and sell them directly from abroad. This allows for a higher degree of specialisation, as well as capacity expansion. However, when firms outsource production, domestic value added is to some extent decoupled from use of domestic labour input. This is a challenge when compiling the most frequently used measures of wage competitiveness.

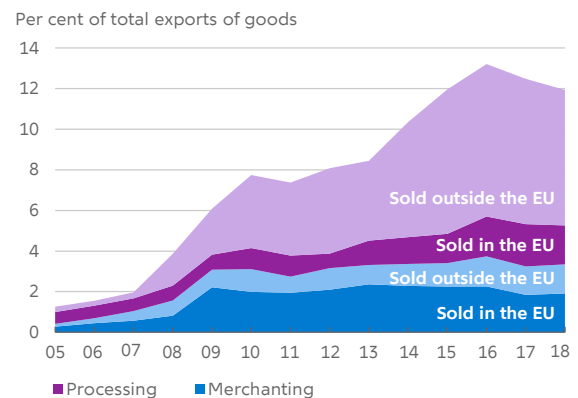
Wage competitiveness is a key parameter in relation to how attractive it is to place production and employment in Denmark. When competitiveness deteriorates, jobs are increasingly placed abroad. This relationship between competitiveness and the labour market means that measures of wage competitiveness are important indicators of imbalances in the Danish economy. So it is essential to understand how the increasing tendency for Danish firms to produce their goods abroad affects the interpretation of these measures.

## Activities abroad have improved measure of Denmark's competitiveness in recent years

There are several measures of wage competitiveness, cf. Box 1. The relative wage share for the manufacturing industry is one of Danmarks Nationalbank's preferred measures. This measure has shown a substantial improvement of wage competitiveness over the past 10 years, driven by a sharp fall in the wage share in the manufacturing industry in Denmark. However, this coincides with an increase in outsourcing of production to foreign entities, especially in recent years.

### A larger share of exported goods is produced abroad and sold outside Europe

Chart 1



Note: While processing is stated as gross exports, i.e. without deduction of input for production, merchanting is stated as net exports, as the compilation relates to trade margins. The trade margin from merchanting is compiled for industrial firms only.

Source: Statistics Denmark and own calculations.

As a consequence, Danish firms are increasingly selling goods produced abroad. The goods are sold directly from production facilities abroad and do not cross the Danish boarder. However, they still count as Danish exports when the activities take place under Danish ownership.<sup>1</sup> There are three types of production abroad: processing, merchanting,<sup>2</sup> and sale and production managed by foreign subsidiaries.<sup>3</sup> The first two take place under Danish ownership and are therefore included in Danish output, cf. Box 2.

Exports that do not cross the Danish boarder are of increasing importance to the Danish economy. In 2018, exports sold directly from abroad accounted for just below 12 per cent of total exports of goods, up from 1.5 per cent in 2005, cf. Chart 1. Processing exports have risen sharply to almost 9 per cent of total exports of goods today. This is in contrast to

1 Cf. Knudsen (2018).

2 This analysis includes processing and merchanting only, as these have an impact on the measures of wage competitiveness.

3 Cf. Bo and Burman (2018).

## Wage competitiveness can be measured in many ways

Box 1

### Relative wage growth

The simplest way to measure firms' ability to compete in foreign markets is to compare wage growth in Denmark with a weighted measure of wage growth among foreign competitors. Relative wage growth gives an indication of the development in a large part of firms' production costs. This measure shows that Denmark's competitiveness improved in the years after the financial crisis, cf. the blue line in the chart.

### Relative unit labour costs

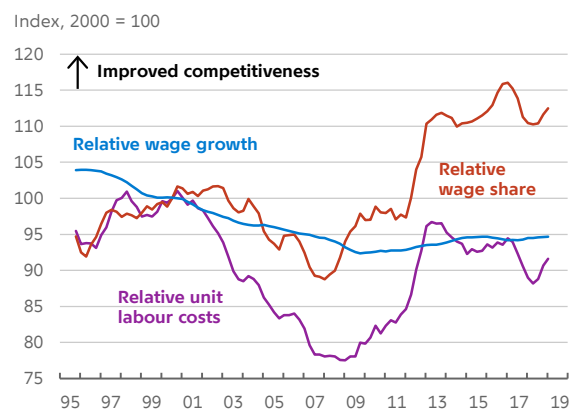
However, higher wage growth may also reflect a stronger increase in productivity. Unit labour costs take this into account by including differences in productivity growth. The compensation of employees is assessed in relation to value added at constant prices. This gives an indication of labour costs per unit produced; and when they are compared with costs abroad, differences in productivity are included. In Denmark, unit labour costs rose compared with those of other countries in the years leading up to the financial crisis, cf. the purple line in the chart. They have since then fallen, which reflects that Denmark's wage competitiveness has recovered.

### Relative wage share

Relative unit labour costs do not capture Denmark's ability to charge higher prices for the goods sold than for those purchased, i.e. a change in the terms of trade. This is reflected in the relative wage share, which is one of Denmark's Nationalbank's preferred measures of wage competitiveness. The wage share describes the relationship between compensation of employees and value added in current prices and thus includes relative price changes for the goods sold by Denmark. Improved terms of trade boost the Danes' consumption opportunities and hence their prosperity in the same way as higher output volumes do. The relative wage share in the manufacturing industry shows a stronger improvement of wage competitiveness over the last decade, cf. the red line in the chart. This trend was particu-

larly strong in 2012, when Danish and foreign wage shares moved in opposite directions. The spread to the relative unit labour costs reflects the improved terms of trade. One of the reasons why it has been possible to sell Danish products at higher prices compared with products purchased abroad for many years is that the Danish manufacturing industry holds a strong position in areas where international price pressures are less pronounced. This applies to e.g. the pharmaceutical industry, toys and clothing submarkets. On the other hand, Denmark's position is not so strong within e.g. consumer electronics, an area in which price developments have been weaker.

## Terms of trade gains have strengthened Denmark's wage competitiveness

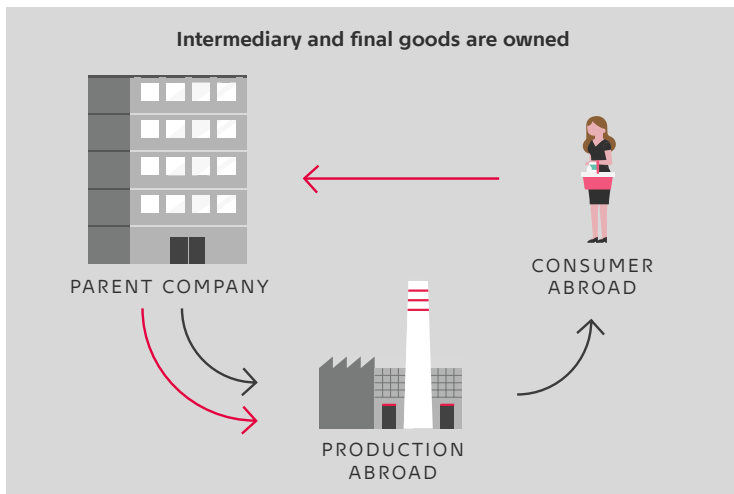


Note: The three measures show developments abroad compared with developments in Denmark. If relative wage growth, unit labour costs or the wage share increases, this is a sign of improved competitiveness. All three measures are for the industrial sector only. Unit labour costs and the relative wage share are adjusted for self-employed.

Source: Bureau of Economic Analysis, Bureau of Labor Statistics and own calculations.

**Firms spread production across national borders**

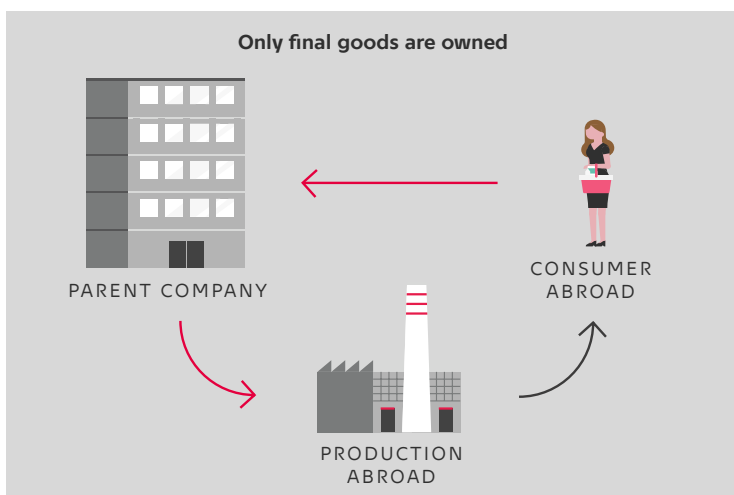
Box 2



**Processing**

Intermediary goods owned by the Danish parent company are sent from Denmark or another country for processing at a foreign factory. The Danish parent company pays for the processing service. The final goods are sent directly to consumers abroad, who remit payment to the Danish parent company. This activity is classified in the manufacturing industry since both the intermediary and the final goods are owned by the Danish parent company throughout the process. The value of the final goods is registered as exports, but the processing services are registered as imports.

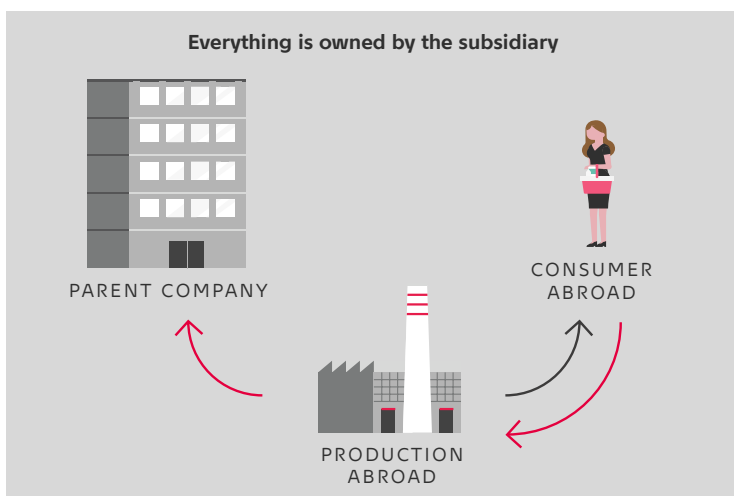
This activity has a direct impact on measures of exports, imports and output.



**Merchandising**

The Danish parent company buys final goods produced by a foreign factory. The finished goods are resold to consumers abroad from the factory. The Danish parent company receives payment from the consumers abroad. The trade margins are registered as value added. This activity is classified as wholesale trading since the production output is a trade margin.

This activity has a direct impact on measures of exports, imports and output.



**Full production, etc. in subsidiaries abroad (investment income)**

A foreign subsidiary of a Danish parent company is in charge of the full production process, as well as sales of the goods. So the goods are not owned by a Danish company at any time during the export process. The profits from the subsidiary flow to the Danish parent company. Consequently, the activity is regarded as investment income.

This activity does not have any direct impact on measures of exports, imports and output.

→ Payments      → Goods

the situation before the financial crisis, when these exports were close to zero. Merchanting by manufacturing firms<sup>4</sup> has also become more common, but the increase has been moderate in the last 15 years. Trade margins from merchanting by manufacturing firms have accounted for just over 3.5 per cent of total exports of goods in 2018.

### Value added abroad distorts Denmark's wage share

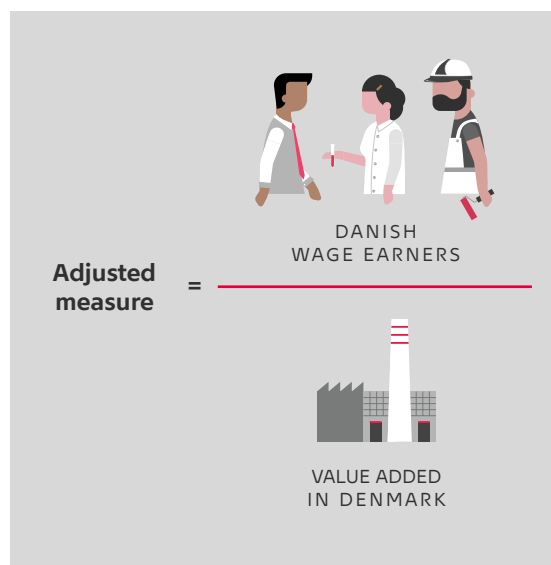
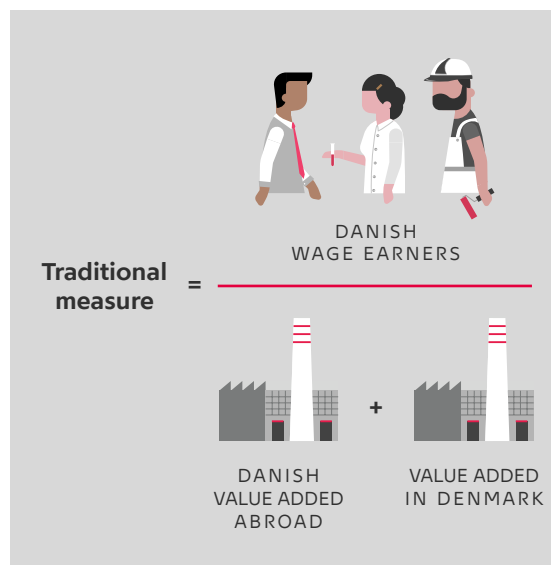
Value created abroad is included in Danish value added but does not imply corresponding labour costs in Denmark. This distorts the link between wages and value added in Denmark: value added (the denominator in the wage share, cf. Chart 2) can increase without affecting compensation of employees (the numerator in the wage share) to the same extent since compensation of employees is narrowly linked to domestic labour input. The weaker link between value added and compensation of employees implies that the wage share, and hence the measure of Denmark's competitiveness, could be distorted. This analysis adjusts the relative wage share for value added from production abroad such that the measure better reflects how attractive it is to place production and employment in Denmark.

The wage share is adjusted by deducting gross value added from goods processed abroad from the denominator, cf. Chart 2. This gives a closer link between value added and labour input for activities taking place in Denmark. In practice, however, processing-related ancillary activities in Denmark (such as marketing and coordination) may also involve labour costs that are classified in the manufacturing industry. Labour costs from ancillary activities should in principle be deducted from the wage share in order to make the numerator and denominator fully comparable. However, that is not possible with the existing data. Labour costs from ancillary activities in Denmark are assumed to involve only a modest number of employees, but will tend to overestimate the wage share, given the adjustment applied.

The decline in the wage share in the manufacturing industry in Denmark over the last decade is less pronounced when value added from processing

### Danish value added abroad is not included in the adjusted wage share

Chart 2



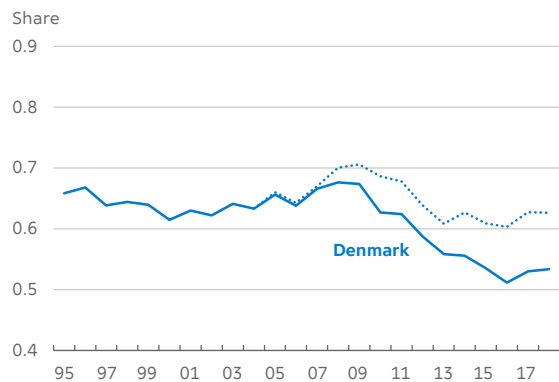
is deducted. The wage share in the manufacturing industry has fallen by just over 12 percentage points from 2005 until today, while it is unchanged when adjusted for value added in foreign entities, cf. Chart 3 (left).

4 Based on the table GLOB1 in Statistics Denmark's Statbank which extracts merchanting by manufacturing firms.

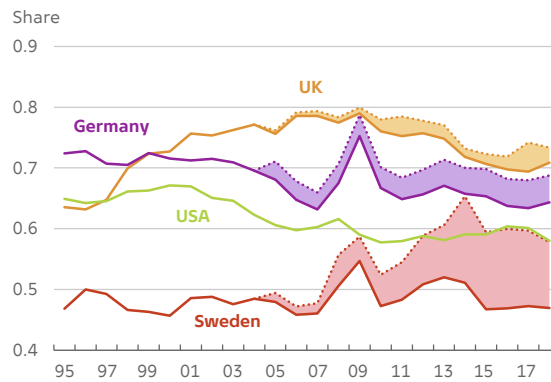
**Production abroad lowers the wage share in the manufacturing industry**

Chart 3

The fall in the wage share in the manufacturing industry reflects increased foreign processing of goods for export ...



... which also seems to be the case among Denmark's European trading partners



— Wage share in manufacturing industry      ..... without gross value added from activities abroad

Note: All the above adjustments begin in 2005. Adjustment of Denmark's wage share is described in Chart 2. The shaded areas for foreign wage shares represent the intervals of the adjustments described in Box 3.

Source: Statistics Denmark, Eurostat, OECD and own calculations.

**Merchanting and processing play a smaller role for Denmark's trading partners**

The fall in the wage share in the manufacturing industry is not an isolated Danish phenomenon. In Germany and the USA, wage shares have also been falling for some time, cf. Chart 3 (right). However, the wage share in the manufacturing industry has fallen more in Denmark than among Denmark's trading partners.

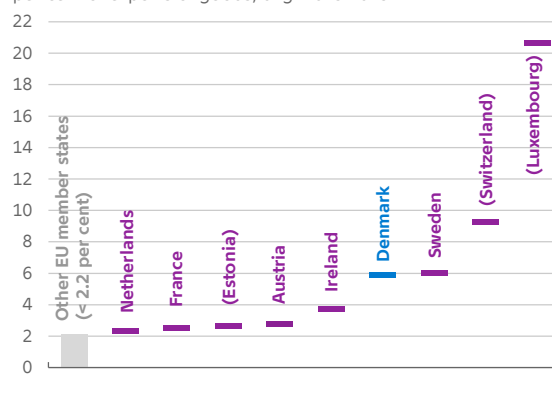
One reason could be that processing of exports is more prevalent in Denmark than among Denmark's trading partners. No compilations of exports of goods processed abroad are available for Denmark's trading partners. But compilations do exist for merchanting. They show that Denmark is among the countries where this production structure is most pronounced, cf. Chart 4.

To adjust the wage shares for processing among Denmark's trading partners, a number of assumptions have been made, as described in Box 3. These adjustments also point to processing playing a larger role in Denmark than in other countries. For our European trading partners that have fairly open economies, the same tendency as in Denmark is to some extent seen. However, the fall in wage share across countries may reflect other circumstances,

**In an international perspective, Danish firms are heavily involved in merchanting**

Chart 4

Profit from merchanting, per cent of exports of goods, avg. 2015-2018



Note: Countries in brackets are not included in Denmark's Nationalbank's measure of the relative wage share.

Source: Statistics Denmark, Eurostat, OECD and own calculations.

e.g. weaker bargaining power among employees. Globally the wage share should remain unaffected by merchanting and processing activities, and there is a broad selection of literature that discusses reasons for the decline in the global wage share, e.g. Autor et al. (2017) and Karabarbounis and Neiman (2014).

### Denmark's competitiveness is strong

If value added abroad is disregarded, the improvement of the *relative* wage share the past ten years is less pronounced, cf. Chart 5. The grey area represents the various estimates of Denmark's trading partners' production abroad. The grey area should be regarded as a reasonable interval for the relative wage share for traditional manufacturing output.

The relatively large distance between the blue line and the grey area implies the need to adjust the relative wage share in order to gain a more accurate impression of wage competitiveness in Denmark. The adjustments reflect that the wage share of traditional Danish manufacturing firms has fallen less than for foreign firms. The distance to the light blue line also suggests that there is a need to adjust foreign wage shares in order to achieve a more accurate impression of wage competitiveness.

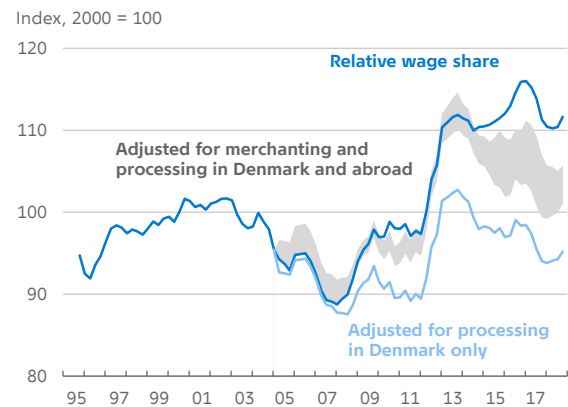
The adjustments of the relative wage share for the manufacturing industry leaves the impression that the measure has overestimated the attractiveness of placing production and employment in Denmark. When adjusting for merchanting and processing, wage competitiveness seems to have deteriorated a little over the past five years. It is important to stress that there is considerable uncertainty linked to statistical compilations of cross-border activities. Consequently, new data on the extent of such activities in Denmark and abroad may alter the impression left from the adjustment. Overall, Denmark's wage competitiveness still seems to be strong. Together with high employment and a significant surplus on the current account, even when disregarding activities abroad, the wage competitiveness adds to the impression of a robust Danish economy.

### Measures of competitiveness should be supplemented by using a broader set of industries

Focus is often on the manufacturing industry when wage competitiveness is assessed. The reason is that the manufacturing industry is highly export-ori-

**The relative wage share in the manufacturing industry is lifted by activities outside Denmark**

Chart 5



Note: 4-quarter moving average. The grey area represents the interval for the adjustments described in Box 3. The adjustments begin in 2005.  
 Source: Statistics Denmark, Eurostat, OECD and own calculations.

ented and hence competes extensively in foreign markets. Furthermore, the manufacturing industry is the benchmark for wage formation in the rest of the economy. The manufacturing industry also has a more homogenous composition of goods than the service sector, which makes it more suitable for comparison across countries.

Adjustment of the relative wage share in the manufacturing industry shows that the traditional measure of wage competitiveness is challenged. Even though the measure is adjusted, there are still challenges linked to the delineation of the manufacturing industry, and this may affect the measure. This relates to the organisationally narrow distinction between merchanting and processing, to the classification of ancillary activities, and to the data available for statistical agencies for compilation and breakdown of activities generally taking place within a group.<sup>5</sup>

*The distinction between merchanting and processing is relatively narrow* and is linked to ownership of intermediary goods. However, merchanting is not classified in the manufacturing industry. This means

5 Cf. Elmeskov (2019).

that relatively small changes in the organisational structures of firms may shift activity into or out of the manufacturing industry.

Furthermore, the *classification of ancillary activities* in the manufacturing industry is fragile. Large firms carry out a wide range of diverse activities, some of which are regarded as ancillary (e.g. marketing and cleaning). If these ancillary activities are modest in extent, they are linked to one of the firm's core activities (e.g. manufacturing, research and development). One consequence could be that ancillary activities are shifted to another industry if the core activities they are linked to change. For example, the number of employees in the manufacturing industry rose by 6,000 in January 2019 as a result of such a change. Another consequence could be that the ancillary activity reaches a scale where it is seen as a separate core activity. This is a natural part of the growth and globalisation of Danish firms. Likewise, ancillary activities may shift out of the manufacturing industry if these functions are outsourced to other firms.

Finally, the *data available can make it difficult to quantify* the value added by the various activities of the firm. This is attributable to the uncertainty linked to intra-group pricing. Firstly, there are no market prices for the activities provided across the group. Instead, internal deliveries are to a certain extent based on assumptions, which creates uncertainty about the distribution of the group's total value added across industries. Secondly, internal pricing across national borders may reflect tax optimisation.<sup>6</sup> Since Danish exports that do not cross Danish borders play a relatively large role in the Danish economy, measurement problems may have a larger impact on the interpretation of macroeconomic indicators in Denmark than among Denmark's trading partners.<sup>7</sup> This could be an argument in favour of using a broader set of industries that captures activity across industries so that it is less vulnerable to reclassification.

### **The relative wage share in the private non-primary sector could well supplement the interpretation**

The private non-primary sector is a broader industrial classification than the manufacturing industry. It will to a larger extent include ancillary activities that only have an indirect impact on Denmark's wage competitiveness, and it can be expected to be less vulnerable to reclassification of such activities. However, this definition will also include services aimed at households, and hence it will be less export-oriented. Nevertheless, the relative wage share for the private non-primary sector could be a relevant supplement for strengthening the assessment of Denmark's wage competitiveness.

The relative wage share shows a smaller improvement in competitiveness for the private non-primary sector than for the manufacturing industry, cf. Chart 6. If this measure is also adjusted for foreign activities, the result is more in line with developments in the adjusted relative wage share for the manufacturing industry. This suggests that the relative wage share in the manufacturing industry has been distorted in recent years, as the two wages shares have historically moved in tandem. The adjustment of the relative wage share is also considerably smaller for the private non-primary sector than for the manufacturing industry. This shows that a broader measure of competitiveness is less affected by globalisation.

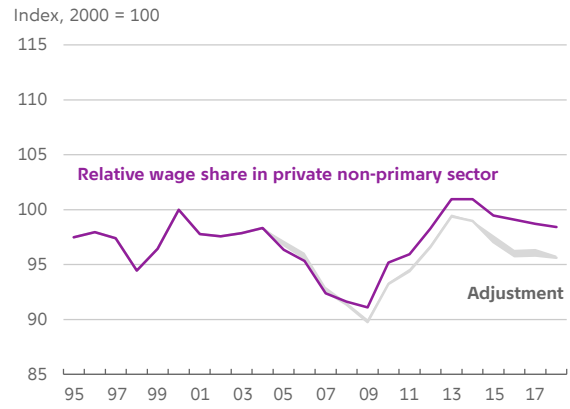
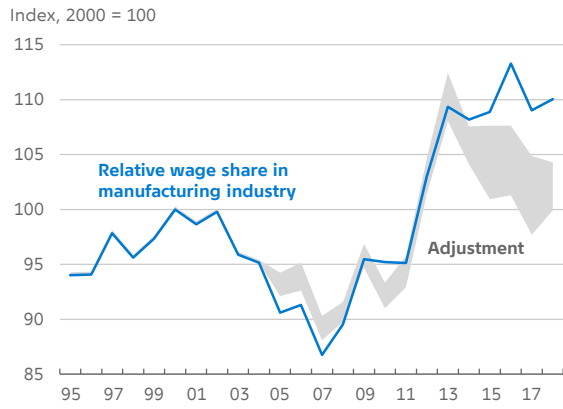
6 Cf. Danish Economic Councils (2019).

7 Cf. International Monetary Fund (2019).



**The relative wage share in the private non-primary sector is less affected by firms' activities abroad**

Chart 6



Note: The grey area corresponds to the adjustment interval described in Box 3. Adjustment of the relative wage share for the private non-primary sector is based on the same principle, but trade margins from merchandising are also included. Annual data has been used in the charts.

Source: Statistics Denmark, Eurostat, OECD and own calculations.

### The adjustments are based solely on structures in Danish manufacturing industry

Box 3

According to international guidelines, statistical agencies must make compilations of merchanting and processing. However, processing exports are not published separately. Consequently, no full compilation exists of gross value added from processing across countries, like the one existing for Denmark. To construct a measure of processing applying to other countries, various assumptions are made, as illustrated in the chart. Below, the assumptions are described on the basis of the colours of the lines in the chart.

#### The light blue line

assumes that foreign firms do not engage in merchanting and processing activities, so all their exports cross their own borders. This implies that only the Danish wage share has been adjusted. This estimate is hence on the low side and reduces the measure of wage competitiveness to a low level. The estimate is not included in the interval for the adjusted relative wage share.

#### The purple line

assumes that the relationship between merchanting and processing is the same abroad as in Denmark. This means that other countries' volumes of processing can be computed on the basis of merchanting in these countries.<sup>1</sup> The extent of merchanting in different countries are shown in Chart 4. Processing exports have risen significantly in Denmark over the last 10 years, cf. Chart 1. Consequently, the assumption can be seen as an estimate on the high side as regards Denmark's trading partners' exports of goods processed abroad. This assumption will mean that the adjusted wage share for other countries can be on the high side.

#### The red line

assumes that the relationship between imports of processing services and value added from processing is the same abroad as in Denmark. In Denmark, this share has been more or less constant at around 25 per cent of value added for the last 10 years. Based on imports of processing services by other countries<sup>2</sup>, this assumption makes it possible to derive an estimate for the value added for Denmark's trading partners from processing. This assumption is regarded as the best adjustment for the extent of processing among

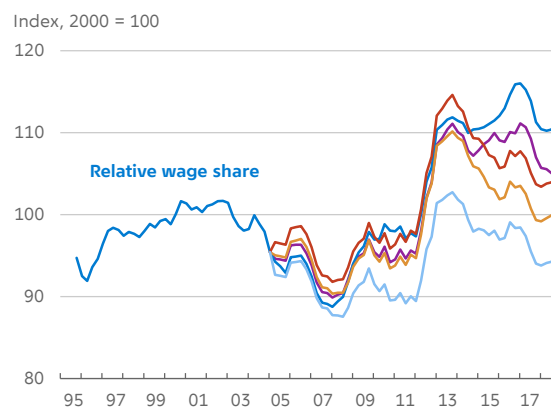
Denmark's trading partners, although the assumption is still subject to some uncertainty.

The purple and red lines assume that trade margins from merchanting are classified in the manufacturing industry in national accounts by foreign statistical agencies.<sup>3</sup> As described in the analysis, that is not the case in Denmark. Consequently, value added from merchanting is deducted from the foreign wage shares in industry in order to improve comparability with Denmark. However, there is much uncertainty as to how foreign statistical agencies classify activities from merchanting in industrial groups.

#### The yellow line

therefore assumes an adjustment corresponding to that in the red line, but without deducting value added from merchanting. This adjustment is assumed to constitute a conservative estimate of the relative wage share.

### The interval for the adjusted relative wage share is based on four assumptions



Notes: 4-quarter moving average.  
 Source: Statistics Denmark, Eurostat, OECD and own calculations.

1. Trade margins from merchanting are not available for Spain, Italy and Norway.  
 2. Imports of processing services are not available for the USA.  
 3. Except in Sweden, where information is available stating that merchanting is classified as trade.

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### ABOUT ANALYSIS



As a consequence of Danmarks Nationalbank's role in society we conduct analyses of economic and financial conditions.

Analyses are published continuously and include e.g. assessments of the current cyclical position and the financial stability.

The analysis consists of a Danish and an English version. In case of doubt regarding the correctness of the translation the Danish version is considered to be binding.

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