

Persistently high inflationary pressures call for tight economic policy

Inflation has been easing since late 2022, driven, in part, by lower energy prices. Weaker purchasing power, along with interest rate hikes, put a damper on Danish economic growth. Core inflation remains high, and prospects are that high wage growth will extend the period of high inflation. A tight economic policy is required to bring down inflation.

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Slow growth across large segments of the Danish economy

Since early 2022, large segments of the Danish economy have experienced slow growth. As a result, economic pressures have eased, but remain significant. The slowdown is expected to cause employment to decline, thereby further reducing pressures.



Wage growth will extend the period of high inflation

Inflation has been easing since late 2022, driven, in part, by lower energy prices, but core inflation is still high. The expected wage growth will contribute to persistently high core inflation in the coming years.



Fiscal policy should continue to contribute to tight economic policy

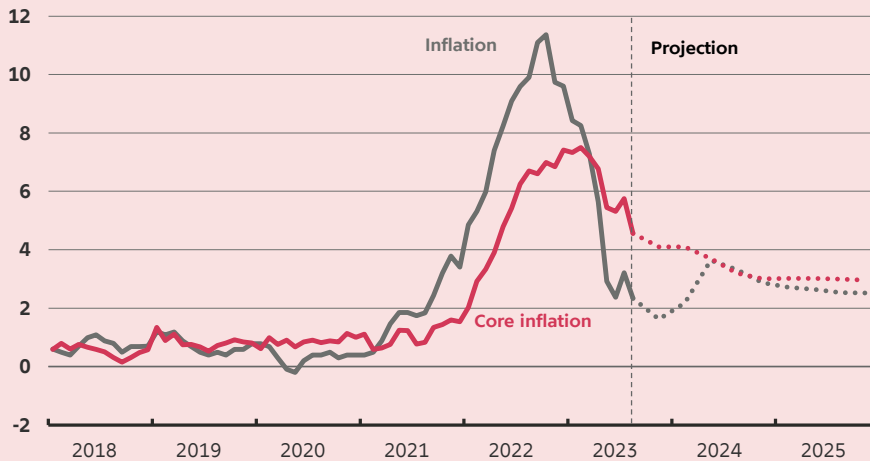
Danish capacity pressures and wage growth are expected to be in line with the euro area. Therefore, with the currently planned fiscal policy, monetary policy will generally be sufficient to bring down inflation in Denmark. It is key that fiscal policy does not counteract monetary policy in bringing down inflation.

Why is this important?

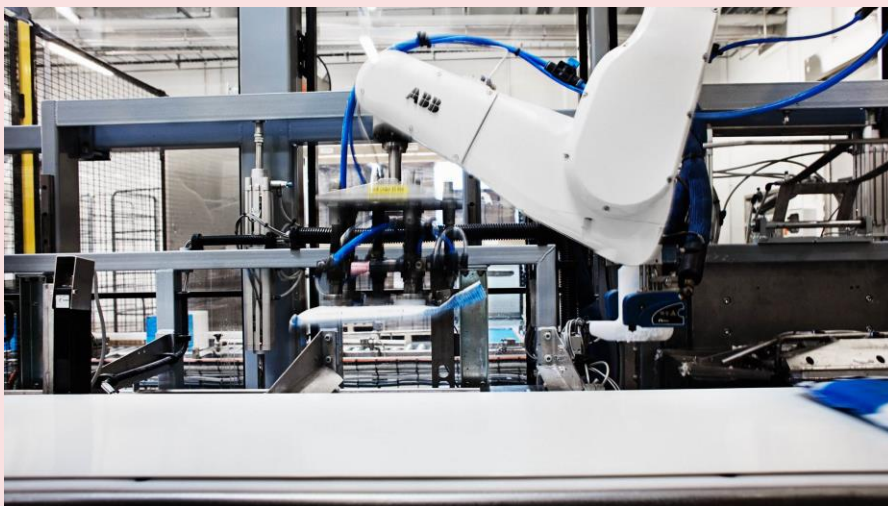
Danmarks Nationalbank continuously oversees the Danish economy to meet our objective of ensuring price stability. To this end, we prepare assessments of economic trends and macroeconomic projections to have the best possible foundation for assessing whether economic imbalances are building, such as the recent spike in inflation. As Danmarks Nationalbank's interest rates are reserved for managing the exchange rate of the krone, it is important that other aspects of economic policy are aimed at ensuring a stable economy. Therefore, we make, for example, fiscal policy recommendations.

Main chart: Wage growth will extend the period of high inflation

Per cent, year-on-year



Note: Core inflation excluding energy and unprocessed food.
Source: Statistics Denmark and own calculations.



Keywords

Danish economy

Inflation and price development

International economy

Outlook for the Danish economy

Economic activity

Economic policy

01 Highlights



Tight economic policy is required to bring down inflationary pressures.

Higher interest rates are dampening growth

The interest rate hikes implemented by central banks to bring down inflation have dampened growth in Denmark and abroad. Higher interest rates, along with weak Chinese growth, are also likely to dampen world economic growth going forward.

Capacity pressures have eased

Large segments of the Danish economy have seen a slowdown, with easing capacity pressures, due, among other factors, to a large contraction in private consumption in 2022. Driven by a markedly increase in the production of pharmaceutical products abroad under Danish ownership, GDP is still growing.

Consumer finances are recovering

Due to lower energy prices and persistently higher employment, household finances are slowly recovering, and consumption and house prices are picking up. The recovery in consumption is likely to continue and will contribute to slightly higher growth going forward.

Capacity pressures are easing further

As a result of higher interest rates and slow growth abroad, growth is expected to be weak going forward, causing capacity pressures to ease further. But the slowdown in growth is not expected to be strong enough to trigger a Danish recession.

Employment is set to decline

Labour markets in Denmark and abroad are still growing and have so far defied the slowdown in growth. The growth slowdown is expected to gradually cause employment to drop and current labour market pressures to ease.

Inflationary pressures are shifting from energy to wages

Wage growth is picking up, thereby increasing inflationary pressures from domestic sources. Inflation is currently being contained by lower energy prices, but high wage growth is likely to keep inflation elevated.

Key economic variables

Real growth relative to the previous year, per cent	2022	2023	2024	2025
GDP (real), per cent	2.7	1.7	1.3	1.3
Employment, 1,000 persons	3,168	3,205	3,190	3,170
Unemployment, gross, 1,000 persons	76	84	96	105
Balance of payments on current account, per cent of GDP	13.5	12.0	11.8	11.9
Government budget balance, per cent of GDP	3.4	3.1	2.0	2.2
House prices, per cent year-on-year ¹	-0.1	-3.2	0.7	2.1
Consumer prices, per cent year-on-year	8.5	3.8	3.0	2.6
Hourly wages (manufacturing), per cent year-on-year ²	3.4	4.2	5.7	3.9

¹ Nominal prices of single-family houses.

² Confederation of Danish Employers' (DA) pay statistics for profits including inconvenience supplements for manufacturing.

Source: Statistics Denmark and own calculations.

02 Overview and recommendations for economic policy

Since early 2022, Danish economic growth has been subdued, thereby easing some of the pressure on the economy. The slowdown comes in the wake of eighteen months of boom in Denmark and abroad and three years of pandemic and war in Europe.

Subdued growth is easing capacity pressures in the Danish economy

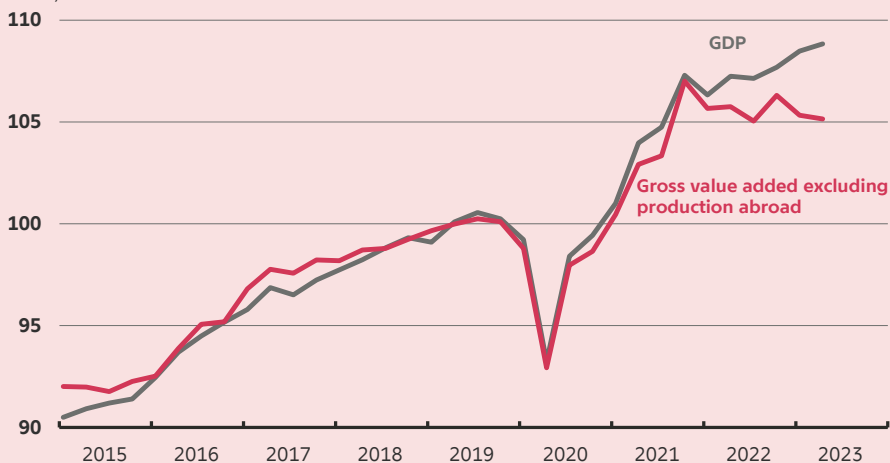
Inflation has been easing considerably since late 2022, driven, in part, by lower energy prices. Underlying inflationary pressures and core inflation, which excludes energy and unprocessed food, are also coming down, but remain high.

High inflation has weakened household purchasing power and led to severe monetary tightening both in Denmark and abroad. Since early 2022, growth in large segments of the Danish economy, for instance domestic demand, has been subdued, with value creation below its potential.

CHART 1

Sharp slowdown in the Danish economic growth excluding production abroad under Danish ownership

Index, 2019 = 100



Note: *Production abroad* covers sale relating to production abroad under Danish ownership, excluding directly related costs of materials. It is not possible to determine the value added from production abroad under Danish ownership because this production may involve a number of joint costs that are shared with traditional Danish production and cannot be separated. Therefore, the calculations should be seen as an estimate of the growth trajectory excluding these activities.

Source: Statistics Denmark and own calculations.

So far, exports have been keeping aggregate demand afloat, and the gross domestic product, GDP, has been expanding, driven by a surge in the production of pharmaceutical products abroad under Danish ownership, see chart 1 and a detailed description in box 2. Production abroad under Danish ownership does not significantly impact Danish economic pressures in the short term because many of the jobs associated with such production are located abroad. So, overall, capacity pressures in the Danish economy are estimated to have eased.

Despite the economic slowdown, employment is still growing, unemployment is low and labour market pressures are strong. The same trend applies abroad, where labour markets have also been quite resilient to the slowdown in growth. In Denmark, last year's strong labour market pressures and higher inflation were reflected in considerably higher-than-usual wage growth in the spring collective agreements, and this trend is also seen abroad.

In the coming year, growth is still expected to be below its potential, while the interest rate hikes of recent years work their way through the Danish and international economy. Subsequently, growth is likely to be more in line with its potential. The slowdown in growth is expected to cause employment to fall by 40,000 from the end of 2023 towards the end of 2025. Higher wage growth is assumed to increase inflationary pressures from domestic sources, keeping core inflation about 4 per cent in the coming year.

With the slowdown in growth, capacity pressures will ease further over the coming year, and the Danish economy is expected to approach a neutral cyclical position during 2024, although with continued labour market pressures. There are no prospects of recession in the Danish economy. However, this expectation is based on the forecasts of a number of international organisations, assuming that inflation will be brought down without the current slowdown in growth sending the global economy into recession.

If production abroad is excluded, as described above, the slowdown in demand seen since late 2021 has been stronger in Denmark than in the euro area. As a result, capacity pressures in the Danish economy, which were considerably stronger than in the euro area a year or so ago, are now in line with those of the euro area. For instance, survey-based assessments of capacity utilisation in the manufacturing industry and shortages of labour and demand no longer indicate that capacity pressures in Denmark are stronger than in the euro area. Although capacity pressures in Denmark have been stronger than in the euro area, this has not translated into higher wage and price growth than in the euro area, and, based on the collective agreements concluded, overall wage growth is expected to be in line with the euro area throughout the projection period. However, throughout the projection period, Danish core inflation is projected to be slightly higher than most forecasters expect for the euro area.

Fiscal policy should continue to contribute to tight economic policy to dampen capacity pressures and inflation

Core inflation in Denmark and in the euro area is still high. So, overall, fiscal and monetary policy in Denmark still needs to help alleviate capacity pressures and underlying inflationary pressures. Both fiscal and monetary policy has been tightened in Denmark in recent years.

Danmarks Nationalbank has been raising interest rates considerably since summer 2022 in response to the monetary policy tightening by the European Central Bank, ECB, in the euro area to bring down inflation. The Danish fixed exchange rate policy means that Danmarks Nationalbank's monetary policy instruments are reserved for ensuring a fixed exchange rate against the euro. Therefore, fiscal policy must ensure stable economic developments in Denmark. When capacity and inflationary pressures in Denmark and the euro area are

uniform, Danish monetary policy will usually be broadly aligned with inflationary pressures. Conversely, if capacity and inflationary pressures are not uniform across Denmark and the euro area, fiscal policy will be used to address this issue.¹

Overall, both capacity pressures and inflation in Denmark are in line with the euro area, and Danish wage growth is expected to be on a par with the euro area throughout the projection period. There are no indications that the risk of an independent Danish wage-price spiral has risen in the past six months, and inflation expectations are well anchored. So, basically, the monetary policy that will slow economic activity sufficiently to bring down inflation in the euro area will also be sufficient to bring down inflation in Denmark with the currently planned fiscal policy.

Therefore, fiscal policy should continue to contribute to a tight economic policy, as envisaged by the current Finance Bill, so as not to counteract the interest rates hikes implemented in the euro area to bring down inflation. Accordingly, any measures in the Finance Act that increase capacity pressures must, at least, be matched by measures to ease capacity pressures correspondingly.

**Danmarks Nationalbank's
recommendations for economic policy**

Tight economic policy is required to bring down inflationary pressures.

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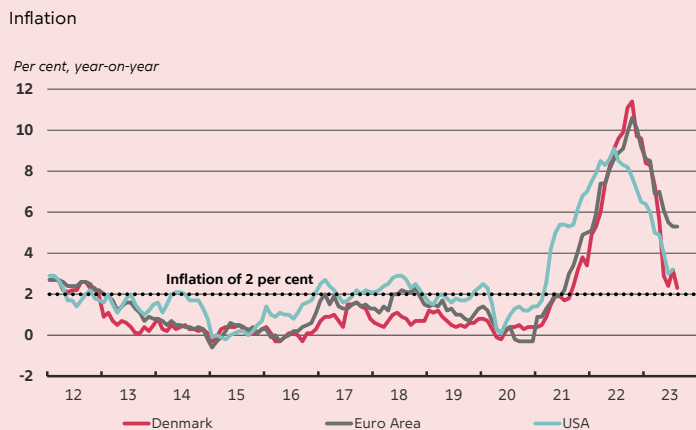
¹ See Morten Spange, Monetary and fiscal policy in Denmark, *Danmarks Nationalbank Analysis*, No. 12, October 2022.

03 Cyclical assessment and projection for the Danish economy

Inflation has cooled considerably across most of the world since late 2022, primarily because energy prices (especially electricity and gas prices) have fallen from their exceptional highs, see chart 2. In Denmark, inflation dropped from more than 10 per cent in October 2022 to 2.3 per cent in August, and consumer energy prices are now making a negative contribution to inflation. Although consumer energy prices have declined, they are still about 25 per cent higher than in the 1st half of 2021, before energy prices skyrocketed.

CHART 2

Consumer price inflation has eased considerably ...

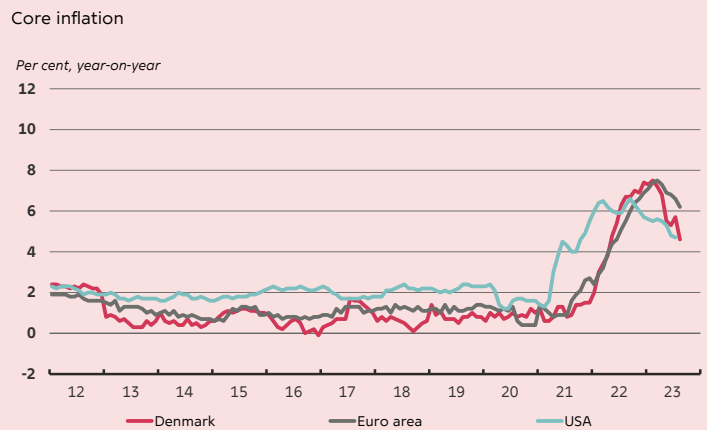


Note: HICP inflation for Denmark and the euro area and CPI inflation for the USA.

Source: Macrobond.

CHART 3

... but core inflation is still substantially higher



Note: Core HICP inflation, i.e. inflation excluding energy and unprocessed food for Denmark and the euro area. For the USA, core CPI inflation is shown.

Source: Macrobond.

Underlying inflationary pressures are still high

Core inflation, which excludes consumer prices of energy and unprocessed food, remains high both in Denmark and the euro area, see chart 3. One reason is a lagged effect from higher energy prices in the production of other goods and services, the so-called *indirect effects*. Since early 2023, core inflation has been declining, partly in response to waning indirect effects. In Denmark, indirect effects contributed 3-4 percentage points to core inflation in late 2022, but in the

2nd quarter of 2023, this contribution decreased to between 1 and 2.5 percentage points.²

Core inflation in the USA is lower than in Denmark and the euro area, and is also largely driven by rent consumer price increases. Rents have increased more in the USA than in Denmark and the euro area and their weight in the consumer price index is higher. Calculated using the corresponding HICP measure, US core inflation is just under 2 per cent.

BOX 1

Core inflation momentum has slowed

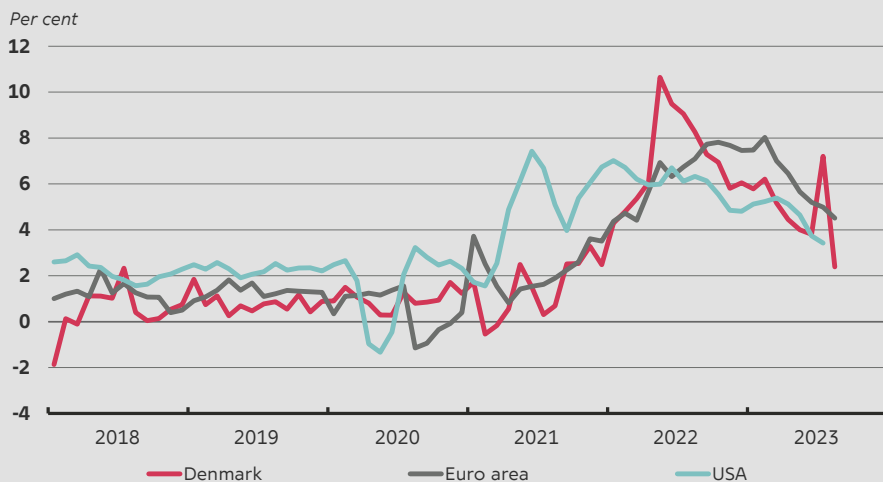
Assessing the momentum of inflation using the traditional annual rate of increase of the consumer price index can be difficult because this measure is impacted also by fluctuations that occurred 12 months ago, the so-called base effect. This also applies to other short-term rates of increase, for instance a monthly rate of increase, i.e. changes relative to the last month in which inflation may often be affected by seasonal and random variations, making it difficult to distinguish between trends and statistical noise.

To supplement the assessment of the underlying momentum of inflation, a measure of *instantaneous inflation* has been developed in an attempt to minimise the noise of random monthly fluctuations. Instantaneous inflation is determined as a weighted sum of seasonally adjusted price changes over the past 12 months in which the monthly weights are determined to get the most precise information from the monthly changes, while minimising the noise from random fluctuations.¹ As a result, instantaneous inflation tends to emphasise the price changes of recent months.

Core inflation momentum in Denmark was determined at 2.4 per cent in August using *instantaneous inflation*, see chart A, indicating that underlying inflationary pressures in the Danish economy and the euro area have weakened slightly relative to early 2023, but they remain high.

CHART A

Instantaneous core inflation has eased



Source: Eurostat and own calculations.

¹ See Jan Eeckhout, *Instantaneous Inflation, working paper*, July 2023.

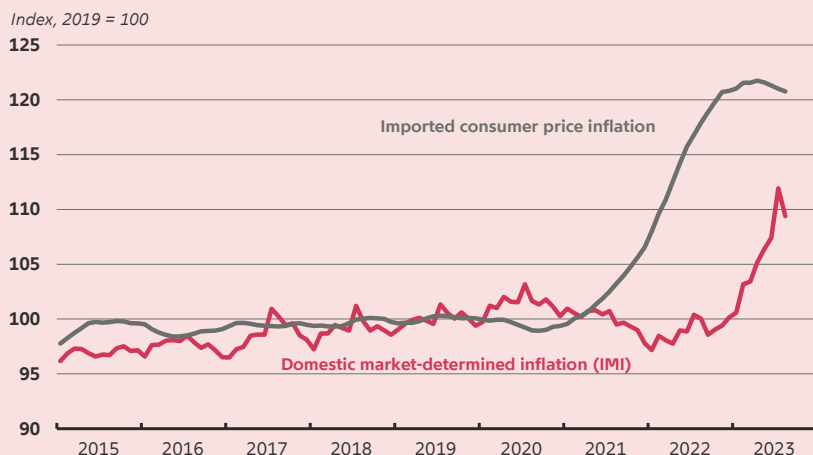
² Indirect effects are based on calculations in Mose and Hansen, Wage increases prolong period of high core inflation, *Danmarks Nationalbank Analysis*, no. 11, September 2023, and on updated calculations of the contribution of energy prices to core inflation in Danmarks Nationalbank's trend cycle model. See the thematic section "Inflation is on the wane" in Danmarks Nationalbank, Declining but still high inflation, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, no. 4, March 2023, for a detailed description of the model.

To assess current inflationary pressures, it is necessary to look at the momentum of consumer price changes rather than at the annual rate of increase. Momentum can be illustrated, for example, using *instantaneous inflation*, which emphasises developments in recent months, see box 1. Using this measure, Denmark’s core inflation momentum weakened from about 6 per cent around the turn of the year to about 2.5 per cent in August. Momentum has slowed correspondingly in the USA and the euro area. Although core inflation momentum has decelerated, it is still high, indicating that underlying inflationary pressures remain high.

Since early 2023, inflationary pressures have been shifting from energy and other imported goods, determined largely by global markets, to domestic factors driven by wage growth. In Denmark, this shift is illustrated, for instance, by Danmarks Nationalbank’s measure of imported consumer price inflation, which has been declining slightly following a rise of more than 20 per cent in 2021 and 2022, see chart 4. Since late 2022, domestic market-determined inflation, IMI, which excludes factors such as direct and indirect price increases for energy and imported goods and services, increased sharply after having fallen in 2021 and the beginning of 2022. The recent increase is driven, in part, by a pick-up in price inflation of a number of services that are typically heavily dependent on wage developments.

CHART 4

Inflationary pressures have shifted from imported goods to domestic factors



Note: *Imported consumer price inflation* includes direct and indirect price increases of imported goods and services calculated net of taxes. *Domestic market-determined inflation* excludes direct and indirect price increases for energy and imported goods as well and price increases for unprocessed food, rent and administered prices calculated net of taxes.

Source: Statistics Denmark and own calculations.

Wage growth has started to pick up following the spring collective agreements

Danish wage growth accelerated sharply in the 2nd quarter following the spring collective agreements, but it remains lower than in the euro area. Wages are expected to grow further, catching up with the euro area during the autumn.

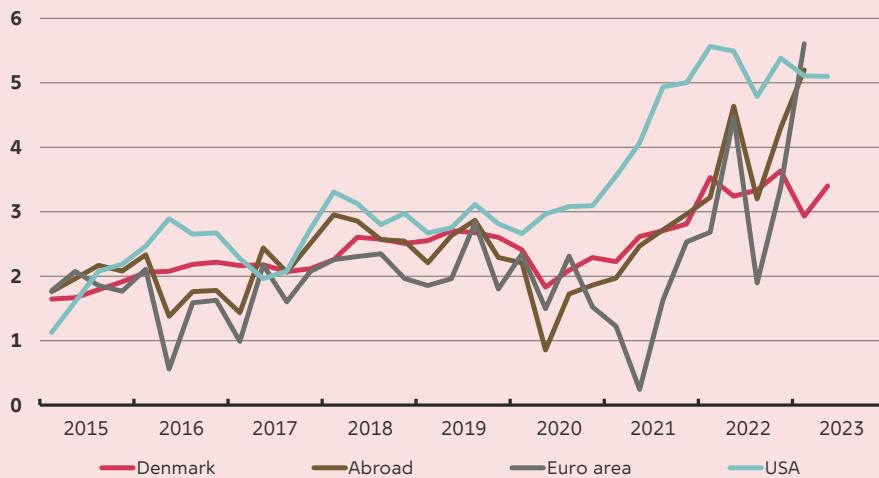
Admittedly, manufacturing wage growth, at 3.4 per cent in the 2nd quarter, was in line with wage growth in 2022, see chart 5. However, the 2nd quarter figures

mask the abolition of the adjustment of the flexible spending supplement from the latest collective agreement period, which contributed 0.7 percentage points to wage growth, while the increase in company pension contributions only takes effect from the 3rd quarter of 2023. This means that basic pay will rise considerably relative to 2022. Until early 2023, wage growth in Denmark was relatively moderate considering the cyclical position of the economy.

CHART 5

So far, wage growth in Denmark is lower than abroad

Per cent, year-on-year



Note: The euro area is weighted using the weights of the krone rate.
 Source: Confederation of Danish Employers (DA) and own calculations.

Manufacturing wage growth is currently lower in Denmark than abroad. In the USA, wages already started growing at a faster pace in 2021 as labour market pressures mounted, with many frequent job changes and many people leaving the labour market.³ In the euro area, wage growth has also been accelerating since the 2nd half of 2022 as labour market pressures have intensified and households have been trying to recover some of their lost purchasing power following the sharp rise in consumer price inflation. The pick-up in wage growth has been driven partly by minimum wages, which have been raised in a number of European countries.⁴ This may have contributed to stronger wage growth in the euro area than in Denmark.

However, Danish wage growth is expected to catch up with wage growth abroad relatively quickly as local wage negotiations are completed and other parts of the collective agreements take effect later this year. Already from the 3rd quarter, an increase in company pension contributions is expected to boost wage growth in Denmark by up to 2 percentage points, which could be topped by a further rise in basic pay at the completion of the remaining local wage

³ See, for instance, Renato Faccini and Leonardo Melosi, Job-to-Job Mobility and Inflation, *Federal Reserve Bank of Chicago Working Paper*, no. 3, January 2023, Serdar Birinci and Trần Khánh Ngân, The great resignation vs. the great reallocation revisited, *Federal Reserve Bank of St. Louis Economy blog*, June 2022, and Rakesh Kochhar, Kim Parker and Ruth Igielnik, Majority of U.S. workers changing jobs are seeing real wage gains, *Pew Research Center*, July 2022.

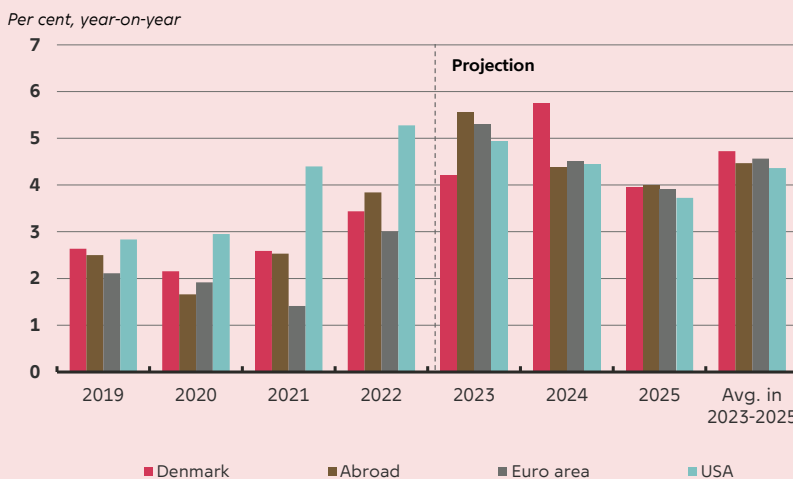
⁴ See, for instance, Gerrit Koester and David Wittekopf, Minimum wages and their role for euro area wage growth, *Economic Bulletin*, no. 3, April 2022, and OECD, *Employment Outlook*, July 2023.

negotiations. Therefore, it is assessed that the commencement date of the new collective agreements is the primary reason why wage growth in Denmark is lower than abroad.

Based on the spring collective agreements, manufacturing wage growth in Denmark is expected to be about 5 per cent per year in the coming collective agreement period, lasting until spring 2025, see chart 6. So, Danish wage growth is expected to be largely in line with the euro area, where the European Central Bank, ECB, expects that wage growth will pick up in 2023, to 5.3 per cent, before slowing to 4.3 per cent in 2024 and 3.8 per cent in 2025 as labour market pressures ease.⁵ Conversely, the US Congressional Budget Office expects wage growth in the USA to gradually slow to 4.9 per cent in 2023, 4.4 per cent in 2024 and 3.7 per cent in 2025.

CHART 6

Danish wage growth is expected to be in line with wage growth abroad over the coming years



Note: Historical observations are based on the international pay statistics for the manufacturing industry of the Confederation of Danish Employers (DA). Estimates for abroad are based on the ECB's June forecast for the euro area and the Congressional Budget Office's July forecast for the USA. For Sweden, the UK, Japan and Norway, data from the latest OECD forecast are applied. All estimates for abroad, except for the USA, are calculated as compensation per employee. Growth rates for compensation per employee in Denmark are shown in footnote 5.
 Source: Confederation of Danish Employers (DA), OECD, ECB and own calculations.

Wage growth in Denmark is expected to fall to 3.9 per cent in 2025 as labour market pressures ease, inflation comes down and wage growth also slows in the export markets in which Danish manufacturing companies compete.

Higher wage growth is expected to keep inflation high over the projection period

Inflation is expected to decline a little further during the rest of 2023 before picking up again in 2024, see chart 7. This masks a negative energy price

⁵ The ECB expresses wage estimates as compensation per employee. For Denmark, in the current projection period, this concept is expected to increase 3.8 per cent in 2023, 5.1 per cent in 2024 and 4.4 per cent in 2025. This should be seen in the context that public sector wage growth is expected to be slightly lagged relative to the private sector when a new collective agreement is to be concluded in 2024.

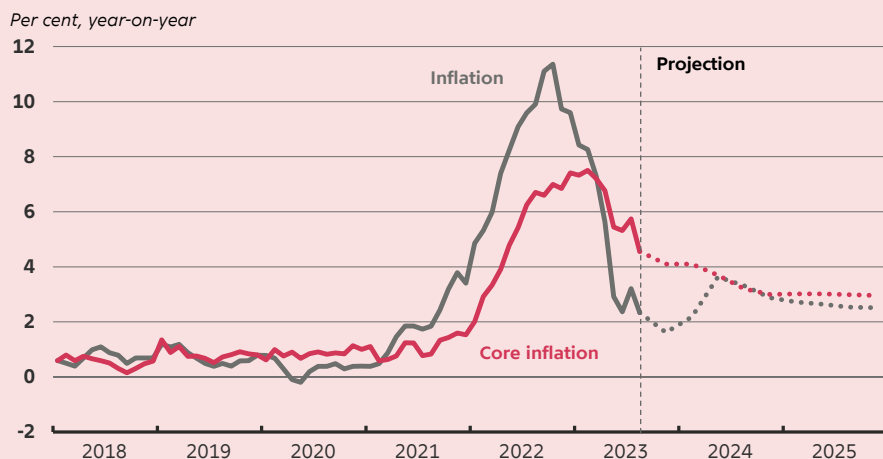
contribution to inflation until early 2024, while underlying inflationary pressures are likely to remain high.

Based on futures prices of electricity, gas and oil, i.e. the prices of forward energy contracts, consumer prices of energy are assumed to remain around the current level for the rest of the year, which is in line with early 2022. Therefore, consumer energy prices are expected to be below their very high 2022 levels, thereby contributing negatively to inflation. However, inflation is expected to pick up again from early 2024 as the base effects of the high 2022 levels are excluded from the annual rate of increase of inflation, and base effects of the temporary reduction of electricity tax boosts inflation in the 1st half of 2024.

Core inflation is likely to remain high throughout the projection period, although trending downwards. Large segments of the private sector saw weak growth in earnings during the period of high inflation, although earnings were stronger in some of the industries in which prices reflect global conditions.⁶ So, broadly and across all industries, there is little indication to suggest that companies will be able to absorb higher payroll costs in their profit margins. This suggests that the pass-through from wages to core inflation will be relatively strong.⁷ However, capacity and demand pressures in the Danish economy are expected to ease slightly, which will weaken companies' possibility of passing on higher payroll costs to consumers. Also, lower *indirect effects* from energy will help to bring down core inflation.

CHART 7

Core inflation remains high, although inflation remains close to 2 per cent for the remainder of the year



Source: Statistics Denmark and own calculations.

Core inflation is expected to be 6.0 per cent in 2023, 3.5 per cent in 2024 and 3.0 per cent in 2025. The core inflation forecast reflects substantial domestic inflationary pressures, with domestic market-determined inflation, IMI, projected to be higher than core inflation, while, based on the forecasts of a number of

⁶ See Morten Spange and Christoffer Jessen Weissert, Corporate profits and inflation, *Danmarks Nationalbank Analysis*, no. 10, September 2023.

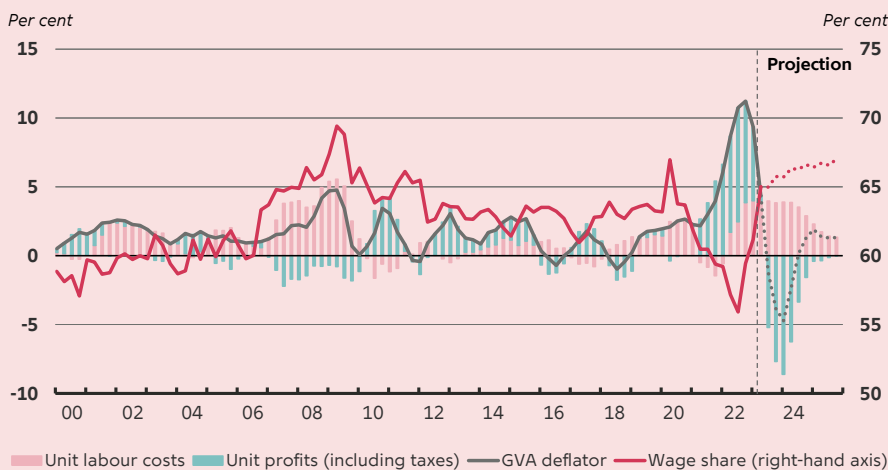
⁷ See Rasmus Mose Jensen and Nikolaj Mose Dreisig Hansen, Wage increases prolong period of high core inflation, *Danmarks Nationalbank Analysis*, no. 11, September 2023.

international organisations, imported consumer price inflation is assumed to be about 2 per cent. Headline inflation is projected to decline significantly to 3.8 per cent in 2023 and 3.0 per cent in 2024 and 2.6 in 2025, i.e. as a result of lower consumer energy prices. Inflation in Denmark is projected to be somewhat lower than estimated by international organisations for the euro area in 2023, while the forecast for core inflation is in line with the euro area for the following years.

The wage and price projection implies a considerable recovery in real wages, which will grow quite strongly, especially in 2023, driven by lower energy prices. The following years will see more subdued growth, with real wages increasing only slightly faster than the projected, structural productivity growth of just over 1 per cent per year. In 2025, real wages are projected to be slightly lower than in 2021, before inflation took off; one reason is that consumer energy prices (excluding taxes) in 2025 are expected to be about 60 per cent higher than before inflation took off.

CHART 8

The wage share has recovered quickly and is projected to be higher than before the pandemic



Note: The left-hand axis is the annual increase measured by four-quarter moving averages. The right-hand axis is the ratio of gross value added, GVA, in the private sector. The dotted lines indicate the projection period from the 3rd quarter of 2023 up to and including the 4th quarter of 2025. The GVA deflator describes developments in the price of Danish value added, calculated at base prices, i.e. the relative difference between GVA in current and chained values. Base prices include 'other production taxes, net', but not product taxes.

Source: Statistics Denmark and own calculations.

However, during the projection period, wage growth will bring the wage share, i.e. the share of value added going to employees, back to slightly above pre-pandemic levels when excluding production abroad under Danish ownership and directly related costs, see chart 8. Wages will increase while corporate earnings in energy supply and transport companies come back down as energy prices and freight rates decline. Therefore, earnings per unit are not expected to contribute to higher prices in the private sector in the coming years.

Significant global monetary policy tightening

Central banks in most countries have tightened monetary policy significantly since early 2022 to bring down inflation, and Danmarks Nationalbank has generally continuously followed the ECB's interest rate hikes. Tighter monetary policy and high inflation have led to higher mortgage rates and bank interest rates for Danish households and companies.⁸ At the same time, banks have tightened credit standards. Overall, financial conditions have been tightened substantially, and credit growth has weakened both in Denmark, the euro area and the USA.

Higher wage growth provides a lower limit for the decline in house prices

House prices declined steadily in 2022 on the back of interest rate hikes and high inflation, but in spring 2023, they picked up slightly. Since their peak in April 2022, prices of single-family houses have decreased by 8 per cent, or somewhat less than might be expected given the substantial interest rate hikes and high inflation. Recent developments are in line with several other countries, including Sweden and the USA where house prices are increasing, while developments are flat in Norway and the UK, see chart 9. Among our usual benchmark countries, Swedish and Danish house prices have still declined the most since their peak in 2022, despite the increases seen in recent months. However, Danish and Swedish house prices were also the first to start falling. The earlier turnaround could be associated with the relatively fast transmission of monetary policy to Danish mortgage rates, occurring as a result of the mortgage credit system in which homebuyers' mortgage rates are determined on market terms.

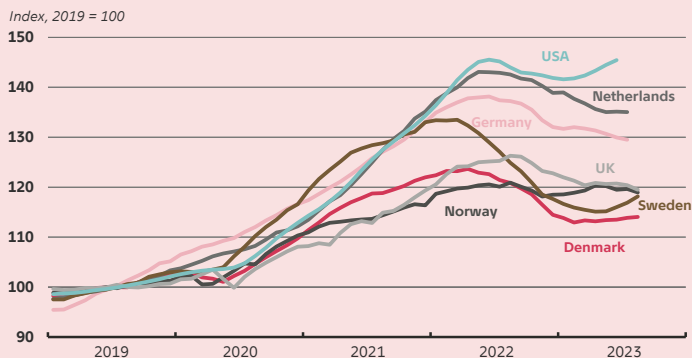
In 2022, higher interest rates and inflation both took a toll on homebuyers' disposable amounts, causing house prices to decline. Since then, inflation has come down and does not add further pressure to the housing market. Lower energy prices have reduced housing costs and could be part of the explanation for the slowdown in house price declines. Also, employment is high, which underpins purchasing power in the housing market. In 2023, income growth will ensure higher real disposable incomes, and real disposable income growth is expected to pick up in the coming period following the spring collective bargaining rounds. This contributes to pushing up nominal house prices.⁹ Housing costs as a share of income, the 'housing burden', have risen over the past eighteen months, to a higher level than seen in the 2010s when Danish households spent a relatively small share of their income on housing, see chart 10. The current level is not high in a historical context.

⁸ See the section "Households interest costs are rising, but incomes even more so" in Danmarks Nationalbank, Monetary policy has been tightened further, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, no. 12, September 2023.

⁹ See box 4, "Temporarily higher inflation may reduce house prices, viewed in isolation" in Danmarks Nationalbank, The pressure on the economy should be eased, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, no. 11, September 2022.

CHART 9

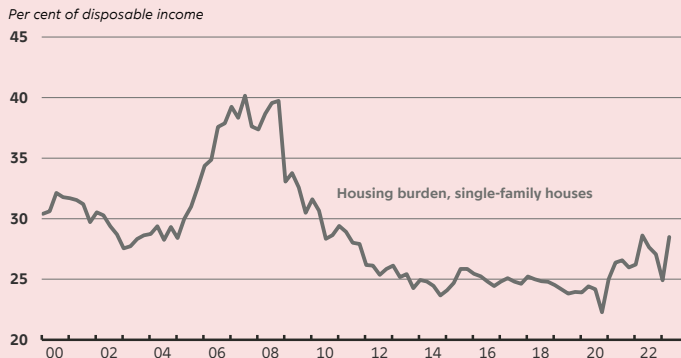
The decline in house prices has halted in several countries



Note: Danish single-family house prices from Boligsiden. House prices of both owner-occupied flats and single-family houses for Germany, the Netherlands, Norway, the UK and the USA. Swedish house prices.
Source: Macrobond and Boligsiden.

CHART 10

The housing burden has increased in recent years



Note: The housing burden for Denmark is a stylised calculation of the financing costs, including property taxes, of buying a single-family house as a share of average disposable income. The financing costs are calculated on a 30-year fixed rate loan with amortisation, including administration margins and brokerage fees, plus a bank loan for the share that cannot be financed by a mortgage loan.
Source: Own calculations.

Danish house prices are expected to increase slightly during the rest of 2023 before picking up halfway into 2024. Market expectations indicate that interest rates will drop only slightly over the coming years; as a result, interest rates, along with an expected contraction in employment, will continue to dampen house price growth. Single-family house prices are projected to drop 3.2 per cent in 2023 and then grow 0.7 and 2.1 per cent, respectively, in 2024 and 2025. So, house prices will remain below their latest peak over the projection horizon. The 2023 price fall, measured as annual averages, reflects the sharp house price declines in 2022, as house prices in late 2023 are expected to have picked up slightly from the beginning of the year.

New housing taxes will take effect on 1 January 2024. This will restore the effect of a key automatic stabiliser in the housing market, given that housing taxes will again rise and fall with house prices, which will dampen house price fluctuations. The housing tax reform will create a more uniform tax regime across geography and property types. Viewed in isolation, the new housing taxes are expected to translate into a small increase in house prices and a small price drop for owner-occupied flats, but they will help dampen price fluctuations going forward.¹⁰

Higher purchasing power will boost private consumption

Household consumption started to pick up again in the 1st half of 2023 following a sharp fall in 2022, see chart 11. The recovery in household consumption is driven mainly by higher real incomes in the 1st half of 2023, as employment has continued growing and real wages have increased as a result of lower energy prices.

Consumer confidence has also improved considerably since the autumn 2022. The improvement in private consumption and consumer confidence should be seen in the context that energy supply uncertainty is less pronounced than in the

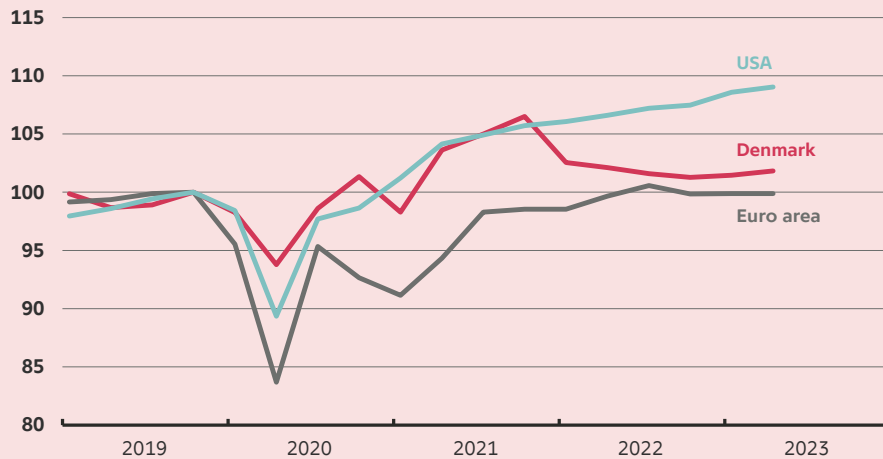
¹⁰ See Simon Juul Hviid and Paul Lassenius Kramp, Housing taxation agreement stabilises house prices, Danmarks Nationalbank Analysis, no. 14, September 2017.

autumn 2022. Still, consumer confidence is weaker than anytime during the pandemic and in line with the financial crisis.

CHART 11

Consumption grew in the 1st half of 2023

Index, Q4 2019 = 100



Note: The chart shows real private consumption.
Source: Statistics Denmark and Macrobond.

So far, the cyclical decline in consumption is more advanced in Denmark than in the euro area and the USA, although households are largely facing the same global impacts. The difference is due both to differences in financial support to households during and after the pandemic¹¹ and to the fact that some of the effects of monetary tightening have been transmitted faster to households in Denmark than in the euro area.¹²

The improvement of household purchasing power is expected to continue in the coming period as wage growth accelerates further. Purchasing power increases although, viewed in isolation, the tightening of monetary policy significantly weakens purchasing power in 2023 as households' interest costs rise¹³. From the 2nd half of 2023 to the end of 2025, real incomes are expected to rise about 1 per cent per year because the relatively high wage growth offsets the decline in employment starting towards the end of 2023. This means that the loss of purchasing power in 2022 will gradually be recouped, and in the course of 2025 real disposable incomes will be back to pre-inflation levels.

Private consumption growth is expected to continue throughout the projection period, with consumption projected to increase in line with the improvement in purchasing power, see chart 12. Consumption relative to income, i.e. the

¹¹ See Danmarks Nationalbank, Declining but still high inflation, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, no. 4, March 2023.

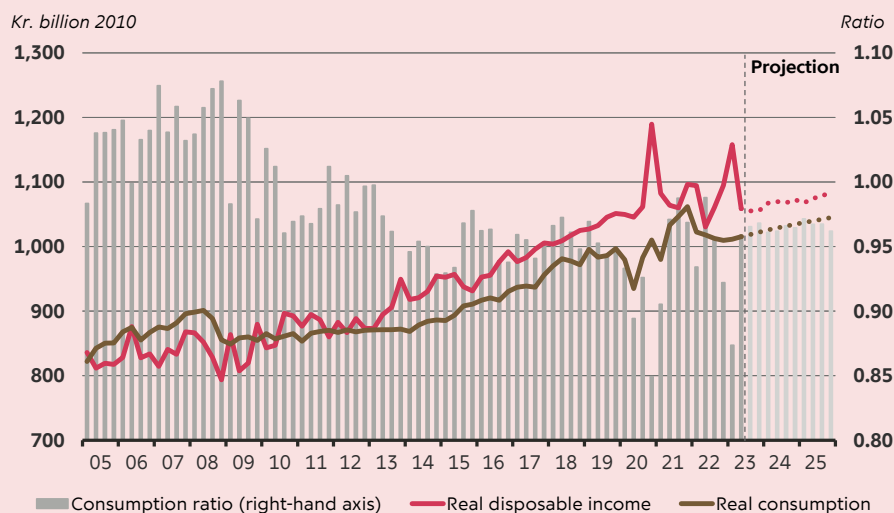
¹² See the section "Tighter monetary policy is slowing economic growth" in Danmarks Nationalbank, *Monetary policy has been tightened further, Danmarks Nationalbank Analysis (Monetary and financial trends)*, no. 12, September 2023.

¹³ See Danmarks Nationalbank, Monetary policy will cool down the economy, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, no. 3, March 2023.

consumption ratio, is estimated to remain at pre-pandemic levels. This is relatively low in a historical perspective.¹⁴

CHART 12

Private consumption growth with prospects of higher incomes



Source: Statistics Denmark and own calculations.

Global growth is slowing following the past year’s interest rate increases

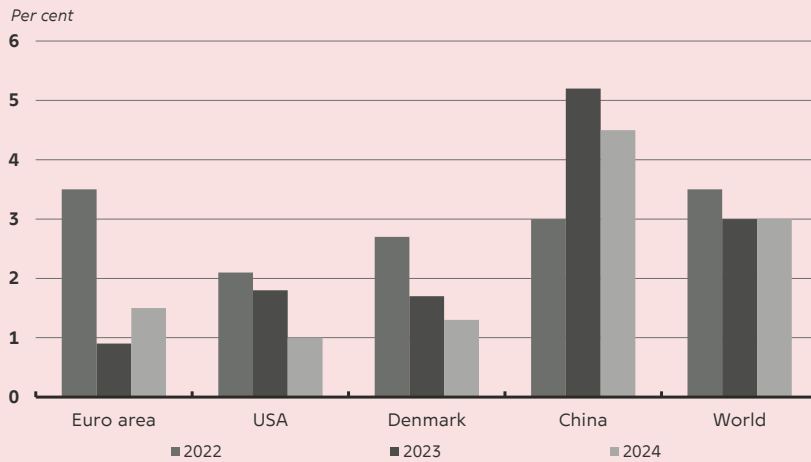
Global economic growth is expected to slow over the coming years. For instance, the International Monetary Fund, IMF, forecasts that the economies of the euro area and the USA will grow only slightly in 2023 and 2024, see chart 13. On the other hand, the real wage declines of 2022 are set to reverse to a moderate recovery before long. Business expectations for the coming quarters are mixed. The service sector expects a small slowdown, while construction and manufacturing, especially in the euro area, expect a more substantial drop in activity.

Euro area growth was weak in the 1st half of 2023, and the business confidence, measured by the Purchasing Managers’ Index, PMI, indicates that the slow growth has continued over the summer. A key reason is weak private consumption, probably impacted by higher prices and monetary policy interest rates. In the USA, strong wage growth and ‘dissaving’ of financial wealth accumulated during the coronavirus pandemic translated into higher private consumption and solid growth in the 1st half of 2023.

¹⁴See Andreas Kuchler and Simon Juul Hviid, Consumption and savings in a low interest-rate environment, *Danmarks Nationalbank Working Paper*, no. 116, June 2017. Updated calculations show that highly mortgaged households cut their spending drastically up to 2021.

CHART 13

International forecasts indicate a slowdown in global growth



Note: Figures for 2023 and 2024 are forecasts. Danmarks Nationalbank has prepared the projection for Denmark.

Source: IMF, *World Economic Outlook*, and own calculations.

Slowing inflation, high employment and wage growth may boost economic growth in the coming quarters, thereby continuing to contribute to the recovery in real income and consumption. On the other hand, the outlook is for weaker global demand and tighter credit conditions, driven by high monetary policy interest rates.

The European Commission expects a gradual tightening in the euro area fiscal policy stance in 2023 and 2024. However, this should be seen in the context of the relatively accommodative stance in 2022 when the euro area countries launched a number of major energy relief packages. Also, the tightening of fiscal policy requires the euro area countries to phase out their relief packages during the period; this is not a given because several member states are still extending such measures, while a few others are introducing new ones.

When China abandoned its zero-tolerance approach to coronavirus in December 2022, expectations were that China's reopening would boost global demand. But following a strong, though short-lived, recovery in the 1st quarter of 2023, the momentum of the economic recovery has slowed, which is evidenced also by the drop in business and consumer confidence. Since spring, the slowdown in the Chinese economy has been dampening international growth prospects.

Slowdown in export market growths weakens exports and investment

Already at this stage, Danish companies seem to be impacted by the slowdown in growth abroad. Growth in large Danish export segments is also expected to be subdued going forward, given that growth abroad remains relatively weak due to monetary policy tightening.

So far, pharmaceutical production has been keeping overall Danish exports and GDP afloat, while the rest of the manufacturing industry is in downturn. Pharmaceutical industry growth seems to be driven largely by subcontractors abroad; this growth is included in Danish exports and value added because production takes place under Danish ownership, see box 2.

BOX 2

Pharmaceutical production abroad has been keeping growth and exports afloat since early 2022

Since 2022, Danish economic growth has been led largely by strong export growth in Danish manufacturing companies. Since the 4th quarter of 2021, manufacturing value added has increased almost 25 per cent, and excluding the manufacturing industry, the rest of the economy has been contracting slightly, by 0.8 per cent.

Manufacturing growth is driven largely by the Danish pharmaceutical industry, with production soaring by almost 110 per cent since the 4th quarter of 2021. However, manufacturing production excluding the pharmaceutical industry has been declining about 8 per cent since the 4th quarter of 2021, and in the 1st half of 2023, GDP excluding the pharmaceutical industry was 0.3 per cent lower than in the same period in 2022.¹

Pharmaceutical sales are driven largely by the sale of goods produced by subcontractors; for the pharmaceutical industry as a whole, sales more or less correspond to exports of goods sold abroad in connection with processing abroad. This indicates that the strong rise in production in the pharmaceutical industry is largely driven by production abroad under Danish ownership, which is included in Danish value added.

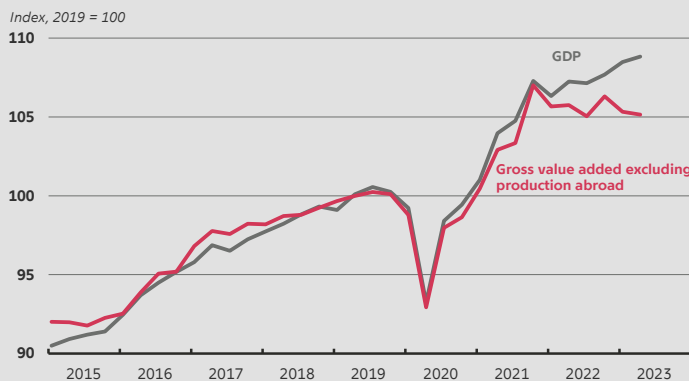
Value added of production abroad under Danish ownership cannot be determined precisely because often a number of joint costs are shared with production at factories in Denmark.² However, calculations of production less directly related costs indicate that growth has been considerably weaker since early 2022, with a contraction of 1.7 per cent, see chart A.³ But this calculation should be regarded as an overestimate because it does not include any costs of materials for, for instance, administration, development, marketing and other activities coordinated by the Danish parent company, but it is hardly a question of large amounts.⁴

On the demand side, strong pharmaceutical production is matched by strong growth in exports of manufactured goods, rising by close to 15 per cent since the 4th quarter of 2021, see chart B. Excluding production abroad under Danish ownership, manufactured exports are estimated to have been about unchanged in real terms.⁵

The surprisingly strong growth in the Danish economy over the past year seems to be driven by production in a very small segment of the economy, largely taking place abroad under Danish ownership, which means that production is included in Danish value added. Production abroad under Danish ownership is not assessed to draw on resources in the Danish labour market to the same extent as production in Denmark, and production abroad is not assessed to significantly increase capacity pressures in the Danish economy. This assessment is underpinned by manufacturing employment growth, which is considerably more subdued than growth in value added, increasing by 4.6 per cent since the end of 2021.

CHART A

Activity excluding production abroad under Danish ownership has fallen ...

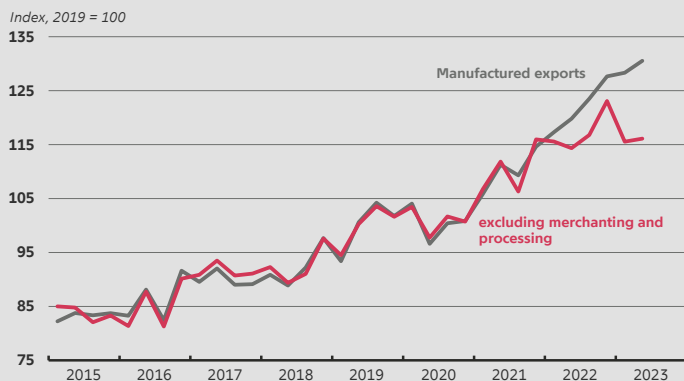


Note: *Production abroad* covers sale relating to production abroad under Danish ownership, excluding directly related costs of materials. It is not possible to determine the value added from production abroad under Danish ownership because this production may involve a number of joint costs that are shared with traditional Danish production and cannot be separated. Therefore, the calculations should be seen as an estimate of the growth trajectory excluding these activities.

Source: Statistics Denmark and own calculations.

CHART B

... and exports have stagnated



Note: *Production abroad* covers sale relating to production abroad under Danish ownership.

Source: Statistics Denmark and own calculations.

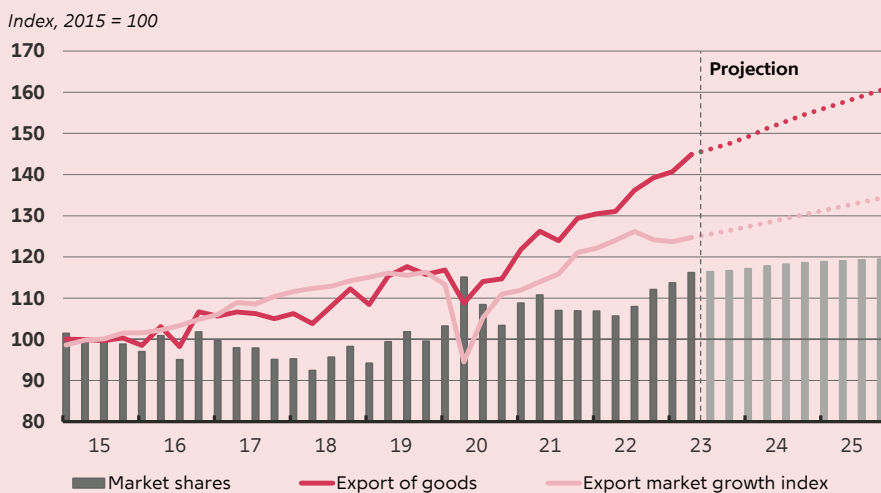
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BOX 2 (continued)

¹ See Statistics Denmark, BNP-fremgang på 0,3 pct. i andet kvartal 2023 (GDP growth of 0.3 per cent in the second quarter of 2023 (in Danish only)), *Nyt fra Danmarks Statistik*, no. 300, August 2023.
² See, for example, Anette Thomasen and Dan Knudsen, Hvordan indgår dansk produktion af varer i udlandet i nationalregnskabet? (How is Danish production of goods abroad included in the national accounts? (in Danish only)), *DST Analyse*, March 2021.
³ See, for example, Anette Thomasen and Dan Knudsen, Hvordan indgår dansk produktion af varer i udlandet i nationalregnskabet? (How is Danish production of goods abroad included in the national accounts? (in Danish only)), *DST Analyse*, March 2021, for the calculation of output value and output consumption in current prices. Deflation of the output value is described in footnote 5 below. Output consumption is deflated by the deflator of output consumption in the manufacturing industry.
⁴ See Dawit S. Temere and Dan Knudsen, *Produktion og salg af varer i udlandet indsat i ADAM* (Production and sale of goods abroad, included in ADAM (in Danish only)), *Statistics Denmark Model group papers*, May 2022.
⁵ *Goods sold abroad in connection with processing abroad* is deflated by weighted developments of manufacturing of pharmaceutical products and machinery and equipment in other nations as well as other manufacturing activities in the export price indices from manufacturing price indices for goods. The three industries reflect that the pharmaceutical industry, manufacturing of engines, wind turbines and pumps as well as toys, medical instruments and other manufacturing activities account for about 85 per cent of the manufacturing industry's sale of goods produced by subcontractors in 2021 and 2022. *Merchandising* is deflated by an index, with quarterly developments in the output value deflator in *Trade and transport etc.* listed at the annual level of the output value deflator of *wholesale trade*.

Based on market analyst expectations, pharmaceutical production and exports of a number of large pharmaceuticals in Denmark are also projected to rise sharply in the coming years. Also in the coming years, this growth is expected to help boost Danish exports considerably. On the other hand, excluding pharmaceutical production and exports, Danish export growth is projected to be roughly in line with growth in Denmark's export markets, indicating that Danish wage growth will be in line with wage growth abroad. So, the underlying outlook is for relatively subdued growth in Danish exports of goods. However, the strong growth in pharmaceutical production and exports implies that, overall, the market shares of Danish export companies are expected to increase further during the projection period, see chart 14. Exports of services are also projected to rise in line with growth in Denmark's export markets. Overall, exports are expected to grow by 7.0 per cent in 2023, 3.8 per cent in 2024 and 3.6 per cent in 2025.

CHART 14
Pharmaceutical production provides for continued growth in Danish exports in the coming years



Source: Statistics Denmark and own calculations.

Corporate investments are expected to decline by 4.1 per cent in 2023. The sharp fall is attributable to slow growth in most Danish export companies and higher corporate financing costs. However, total corporate financing costs have not increased nearly as much as the price of debt financing, given that the price of equity financing has edged up only slightly since 2021.¹⁵ Moreover, a large single patent investment at the end of 2022 reduces annual growth in 2023¹⁶. Towards the end of the projection period, investments will pick up slightly as the tightening of monetary policy will be fully transmitted to corporate investments.¹⁷

Slowdown brings the Danish economy close to a neutral cyclical position

Aggregate demand in the Danish economy is projected to be relatively weak in the coming year, and the Danish economic slowdown is expected to persist a little longer. Private demand, in particular, will be weak for the rest of 2023, with declining residential and corporate investment and weak growth in private consumption and exports, excluding production abroad under Danish ownership, see the description earlier. Aggregate demand is projected to grow 1.6 per cent in 2023, resulting in estimated Danish GDP growth of 1.7 per cent, given that import growth is projected to be slightly weaker, at 1.3 per cent.

Private demand growth is expected to pick up slightly in 2024 as the decrease in residential and corporate investment slows a little. GDP is projected to grow 1.3 per cent in 2024 and 2025, but the 2024 figure includes relatively large contributions from public consumption and the reopening of the Thyra gas field.

Viewed in isolation, the sharp increase in production abroad under Danish ownership is estimated to contribute about 2.5 percentage points to GDP growth in 2023, 0.5 percentage points in 2024 and 0.3 percentage points in 2025. So, excluding production abroad under Danish ownership, the level of economic activity in Denmark declines in 2023, and growth will be quite weak in 2024 and 2025. Therefore, growth excluding production abroad under Danish ownership is expected to be slightly weaker than abroad, where a mild growth pause with no decrease in activity is assumed.

Capacity pressures in the Danish economy are assessed to have eased considerably since early 2022, driven by the slowdown in growth excluding production abroad under Danish ownership. The large contribution to GDP from production abroad under Danish ownership is matched by a corresponding contribution of around 5 per cent from 2020 to 2025 to the estimated potential output level that is compatible with stable wage and price growth, see chart 15. Moreover, the reopening of the Thyra gas field, the abolition of Great Prayer Day as a national holiday and a large influx of foreign labour also contribute to relatively high potential growth.

With prospects of a continued economic slowdown in Denmark in the next six months and high potential growth, the output gap, i.e. the difference between actual output and the estimated potential output, is projected to narrow further. During 2024, growth is expected to be in line with potential growth, and the Danish economy is projected to be close to a neutral cyclical position. However, the outlook for the Danish economy is contingent on inflation being brought down without sending the global economy into recession. Currently,

¹⁵ See the section "Tighter monetary policy is slowing economic growth" in Danmarks Nationalbank, Monetary policy has been tightened further, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, no. 12, September 2023.

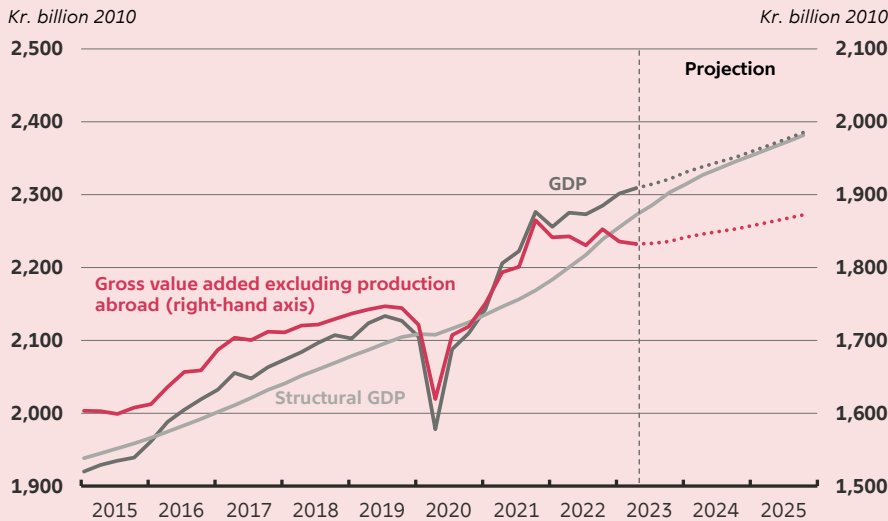
¹⁶ This patent investment is offset by a corresponding increase in imports, which entails that the investment does not impact GDP.

¹⁷ See Danmarks Nationalbank, Monetary policy will cool down the economy, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, no. 3, March 2023.

international organisations such as the International Monetary Fund, IMF, forecast that recession will be avoided.

CHART 15

The output gap will be closed during 2024



Note: *Structural GDP* is the long-term level of sustainable real output in the economy without creating inflationary pressures. *Structural GDP* is boosted by the exceptional increase in pharmaceutical production at the end of 2022 and early 2023.

Source: Statistics Denmark and own calculations.

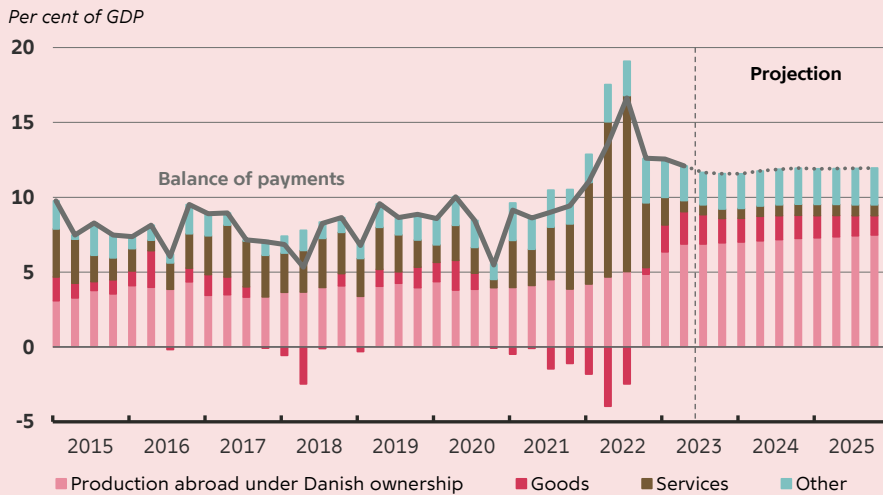
Continued outlook for large balance of payments surpluses

In the coming years, the balance of payments surplus is expected to remain around 12 per cent of GDP until 2025. In 2022, the services trade surplus was boosted by exceptionally high freight rates, but freight rates are back down, and the services trade surplus is now in line with the pre-pandemic years, see chart 16.

Over the past year, the pharmaceutical industry’s strong growth in production abroad under Danish ownership has helped improve the balance of goods; however, this is partly offset by pharmaceutical prices, which seem to have declined. Moreover, since autumn 2022, the energy trade deficit has been reduced as energy prices have decreased, and the deficit is projected to reverse to a surplus in the coming years with the reopening of the Thyra gas field and higher North Sea production. Throughout the rest of the projection period, the balance of payments surplus is projected to be about 3.5 percentage points higher than in the pre-pandemic years, an increase that is largely driven by production abroad under Danish ownership.

CHART 16

Production abroad under Danish ownership is boosting the balance of payments surplus



Note: Services are calculated excluding the impact of processing services included in production abroad under Danish ownership.
Source: Statistics Denmark and own calculations.

Fiscal policy is neutral for growth in 2024

Danish fiscal policy was tightened considerably in 2022 and 2023, and more so than in the euro area. No further tightening is envisaged in the 2024 Finance Act, in which fiscal policy is assessed to be neutral for growth although the government budget surplus is projected to be slightly lower than in 2023. The Danish Ministry of Finance estimates that the 2024 fiscal policy stance is largely neutral for the capacity pressures in the Danish economy measured by one-year fiscal effects, which are determined at 0.0 percentage points.¹⁸

In 2023, the government budget surplus is projected to be 3.1 per cent of GDP, representing a slight weakening from the 2022 surplus of 3.4 per cent of GDP. The large surpluses should be seen in the context that high inflation improves public finances in the short term, as higher wage and price increases improve tax revenues relatively quickly, while public wage expenditure and income transfers are adjusted to private wage growth with a lag. However, in 2023 and 2024, disbursement of overpaid housing tax weakens the government budget balance.¹⁹ The government budget surplus is projected to weaken further to 2.0 and 2.2 per cent of GDP in 2024 and 2025, driven by relatively large increases in income transfers and public wage expenditure as these are indexed and adjusted, respectively, to account for private sector wage growth.

Labour market defies slowdown in growth

The Danish labour market is still growing, although the slowdown in growth seems to have manifested itself in most segments of the Danish economy. However, there are indications that the momentum of the labour market is

¹⁸ See Ministry of Economic Affairs, *Economic Survey*, August 2023.
¹⁹ The Ministry of Finance estimates that extraordinary disbursement of overpaid housing tax amounts to 0.2 and 0.3 per cent of GDP in 2023 and 2024. See appendix, table 8.4, in Ministry of Economic Affairs, *Economic Survey*, August 2023.

slowing down, and the current employment growth is projected gradually to reverse to a small decline over the coming years.

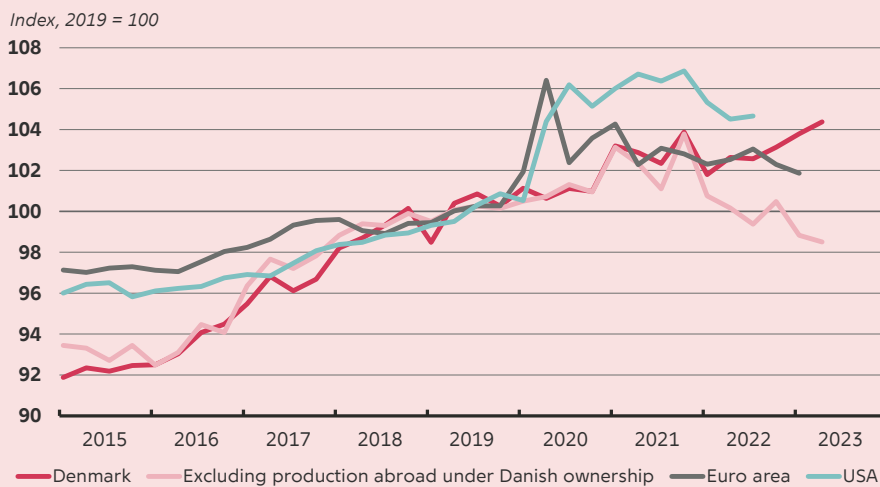
Employment has grown by 40,000 people in the past year, and during the same period, unemployment has risen only slightly from a low level. The same applies to the euro area and the USA, where employment is still growing, and in the euro area unemployment rates are currently at their lowest ever.

In Denmark, employment growth is driven mainly by an increase in working elderly people and by a large influx of foreign labour. This means that the labour force has expanded significantly, while the employment rate of 30-59-year-olds has risen only slightly.

Employment has grown in most industries, with a sharp increase in non-manufacturing employment, which has otherwise been the driver of growth in Danish production. With the underlying slowdown in the Danish economy since early 2022, this means that productivity growth has been weak. In Denmark, private sector productivity has fallen by up to 5 per cent, excluding production abroad under Danish ownership and directly related costs, see chart 17.

CHART 17

Productivity growth excluding production abroad under Danish ownership has been weak



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

Weak productivity growth is not an isolated Danish phenomenon; employment growth in the euro area and the USA has also been strong relative to GDP recently, and this has generally taken major economic institutions by surprise in their growth outlook.²⁰ In the USA, productivity growth has been stronger as a result of less distortive labour market policy measures following the coronavirus pandemic, among other factors.²¹

²⁰ See IMF, *World Economic Outlook*, April 2023, and ECB, *Eurosystem staff macroeconomic projections for the euro area*, June 2023.

²¹ See OECD Databank, GDP per hour worked.

Weak productivity growth probably suggests that the slowdown in production has yet to impact employment. Historically, employment has responded with a lag relative to production,²² but there may be several explanations why the impact has yet to be passed through to the labour market in the current situation.

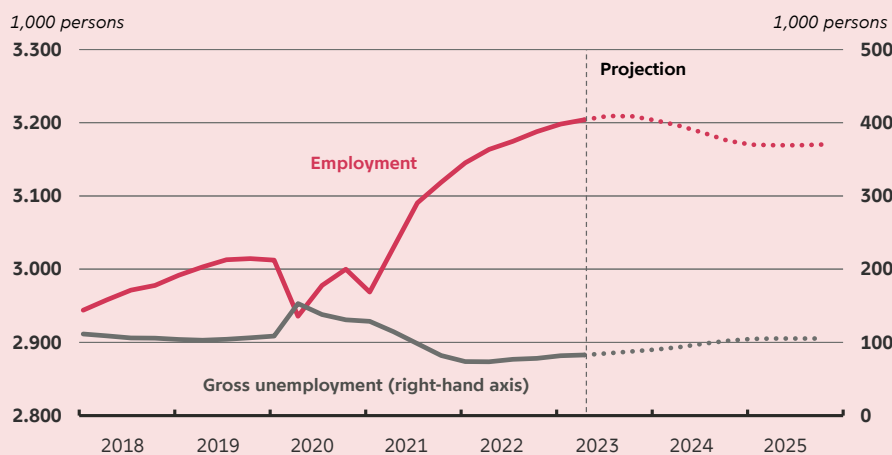
Firstly, tight labour markets at the peak of the global boom could mean that employment has grown because many people from the fringes of the labour market with low productivity have entered the labour market, which is often seen during a boom period.

Secondly, weak productivity growth may also be the result of *labour hoarding*, with companies retaining employees at the start of a downturn while waiting to see the depth of the downturn.²³ Currently, this impact could be especially pronounced because companies have been reporting exceptional recruitment difficulties in many segments of the economy, and the number of hires per vacancy is lower than in the pre-financial crisis years.

With prospects of a persistently weak growth trajectory in Denmark, employment growth in terms of number of people is also projected to slow gradually and reverse into a slight downturn by the end of 2023, see chart 18. This expectation is underpinned by a considerable decline in the number of job postings. However, we are not likely to face a significant downturn in the labour market because companies' reported labour shortages are still slightly higher than before the pandemic. Employment is estimated to fall by 40,000 people from the end of 2023 and towards the end of 2025, entailing that total productivity growth will be just under 2 per cent per year until the end of the projection period.

CHART 18

Employment is estimated to fall by 40,000 people from the end of 2023



Source: Statistics Denmark and own calculations.

²² See Danmarks Nationalbank, Declining but still high inflation, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, no. 4, March 2023.

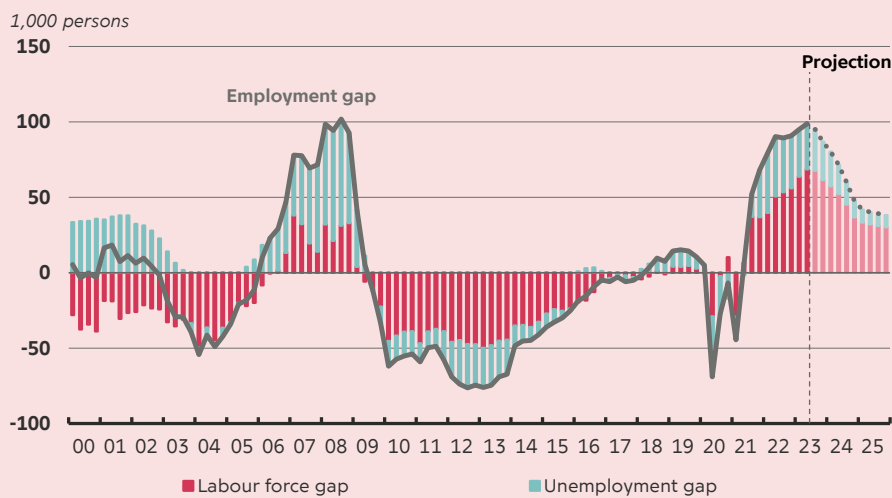
²³ For an elaboration of the labour hoarding indicator, see European Commission, European Business Cycle Indicators - A new survey-based labour hoarding indicator, *European Economy Technical Papers*, July 2023.

Productivity growth is projected to be relatively high in a historical context, but still lower than in the post-financial crisis years. The employment estimate means that the employment gap will gradually narrow towards the end of 2025, but employment will still be above its structural level.

Unemployment is estimated to grow by 20,000 people by the end of 2025, thereby remaining slightly below its structural level, see chart 19. In other words, the labour market downturn will be relatively mild.

CHART 19

Pressure on the labour market is expected to ease off towards 2025



Note: Gaps reflect differences between the actual and structural levels, with the structural level reflecting the level at which the economy can perform without long-term inflationary pressures.
 Source: Statistics Denmark and own calculations.

Risk outlook is linked to persistently high inflation

The risk outlook for the Danish and international economy largely depends on the speed and effectiveness of monetary policy transmission to growth and inflation; these effects will be instrumental in bringing down inflation. The energy supply situation and developments in China, including geopolitical US-China tensions, also carry risks.

Central banks have adjusted their monetary policies to bring inflation under control, and judging by market expectations, analysts still believe they will succeed. Although central banks are prepared to adjust their monetary policies, it may not be possible to adjust monetary policy quickly enough to avoid a recession. For instance, if the pass-through of interest rate hikes is stronger than expected. On the other hand, a recession may also occur if the pass-through of monetary policy tightening has not been strong and fast enough to avoid a slide in inflation expectations, entailing that a recession is necessary to bring down inflation to target.

A strong pass-through of interest rate hikes carries the risk of a flare-up of the financial turmoil seen in the spring. This risk scenario could, for instance, materialise because of the interest rate hikes already implemented, or because

more interest rate increases than expected will be needed. See box 3 for modelling of a scenario of severe tightening of US credit conditions.

Due to the supply situation in the energy market, there is also still considerable uncertainty about inflation. If the supply situation worsens, this could lead to higher energy prices, which will increase inflation and weaken household finances and potentially weaken consumption and the housing market. On the other hand, an improvement of the supply situation in the energy markets could also accelerate consumption, house prices and capacity pressures in the economy.

BOX 3

Renewed turmoil in the US financial sector could weigh on growth

This spring, Silicon Valley Bank and a number of other US banks had to be handled by the authorities following turmoil in the US banking sector. In Europe, the Swiss bank Credit Suisse was also in financial distress and regulators had to facilitate its acquisition. Although there have been no similar cases since then, credit conditions in the US financial sector remain very tight, and the high interest rates that contributed to the spring banking turmoil have not come down. Therefore, financial turmoil in the USA should still be considered a substantial risk factor in the coming quarters.

Tight credit conditions are part of the desired impact of a tight monetary policy. But in some situations, the tightening of credit conditions could become self-reinforcing, for instance in a banking or financial crisis. When that happens, both the tightening of credit conditions and its subsequent impacts on the real economy could be stronger than intended.

The Global Projection Model, GPM¹, is used to calculate the short-term impact on the euro area of a scenario in which US financial conditions are tightened sharply. The tightening corresponds to the US credit tightness index reaching about three-fourths of its level from the 2008 financial crisis. Chart A illustrates how the GPM model projects US credit tightness and how the risk scenario deviates from this development.

Chart A

US credit tightness is assumed to increase considerably in the risk scenario

Credit tightness index (0 = neutral)



Note: The credit tightness index applied in the GPM model is based on the FED's "Senior Loan Officer Survey" for the USA and the ECB's "The euro area bank lending survey" for the euro area. Since these data are harmonised, the time series above is not identical to FED data.

Source: GPM Network.

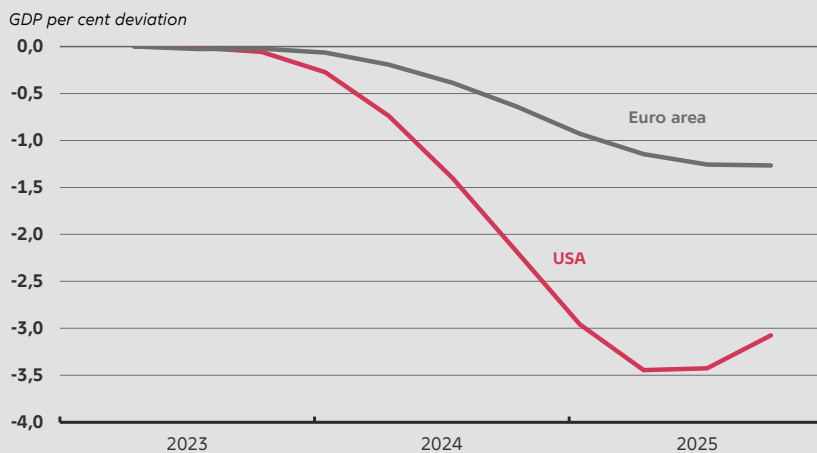
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BOX 3 (continued)

When credit conditions in an economy are tightened, demand contracts and output is reduced. Central banks may opt to cushion the impact on credit conditions and thereby demand by easing monetary policy, for instance by cutting interest rates. However, in this scenario, we assume that interest rates will not be cut until the 2nd quarter of 2024, owing to persistently high inflationary pressures. Other things being equal, this causes a stronger demand shock than would be the case if central banks cut interest rates.

Chart B

Tighter credit conditions hit the US economy hard and spill over into the euro area



Note: The chart illustrates the relative deviation in GDP between a benchmark scenario with gradually more relaxed credit conditions and the risk scenario.

Source: The GPM network.

Model calculations show that US GDP gradually slows relative to the situation without tighter credit conditions. Chart B shows that the greatest impact on GDP materialises about one year after the peak of the tightening of credit conditions. A gradual pass-through peaking after about one year is aligned with the research conducted in this field.²

Where the impact on US GDP is just under 3.5 per cent at its peak, euro area GDP is about 1.3 per cent lower in the risk scenario relative to the situation without tighter credit conditions. Part of the impact is due to a decline in exports to the USA. However, it is assumed that credit conditions in the euro area worsens as a consequence of tighter American credit conditions, which has a further negative impact on euro area GDP.

¹ Global Projection Model, GPM, is a quarterly projection model with 10 individual economies as well as 22 economies aggregated as 'rest of the world'. Together, these economies account for more than 80 per cent of global GDP. For an elaboration of the GPM model, see box 2 in Amy Yuan Zhuang, Casper Winther Nguyen Jørgensen and Mikkel Bess, A downturn in China will reduce growth in Denmark significantly, *Danmarks Nationalbank Analysis*, no. 8, June 2023.

² See, for example, IMF, A Small Quarterly Projection Model of the US Economy, *IMF Working Paper*, no. 08/278, December 2008.

Developments in China are of great significance to the risk outlook for the Danish and international economy. According to the IMF's July forecast, about 30 per cent of global growth in 2023 and 2024 is expected to be generated by Chinese growth. Therefore, the outlook for the global economy will weaken considerably if the Chinese economy grinds to a halt. Several current challenges could pose a major risk to China's economic stability. One risk is heavy indebtedness in the Chinese property sector and large shifts between supply and

demand, which could trigger a sharp fall in house prices. In that case, a sharp contraction in investment and private consumption is likely, given that activity in the property market and the construction sector has been the driver of Chinese growth. Another risk factor to the Chinese economy is geopolitical tensions between the US and China, which could result in more trade and investment restrictions. This could hamper global trade and increase inflationary pressures by causing new international supply chain challenges, see box 4. These challenges could trigger a sharp fall in Chinese growth that will have a spill-over effect on Danish and global economic growth. For example, Danmarks Nationalbank's calculations show that a 1 percentage point growth decline in China could reduce Danish GDP growth by 0.4 percentage points after one year.²⁴

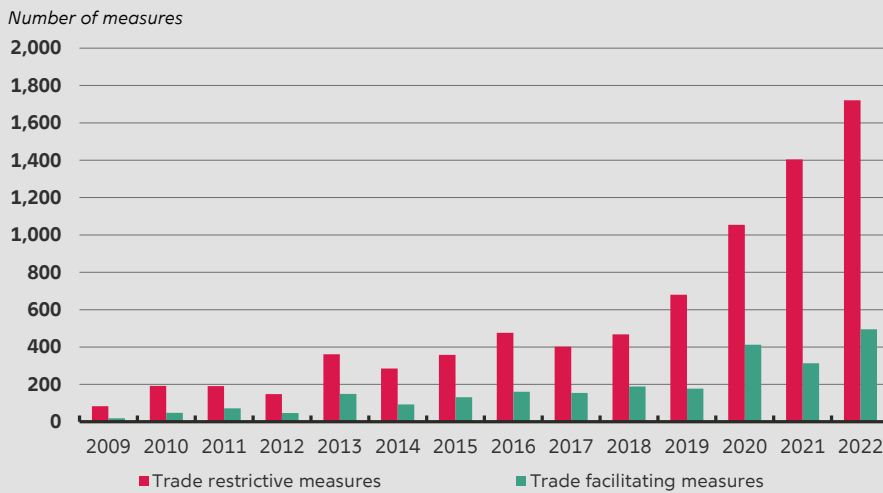
BOX 4

Geoeconomic fragmentation could affect consumers through higher prices

After several decades of increasing economic integration, the events of recent years such as Brexit, mounting China-US trade tensions, the coronavirus pandemic and Russia's invasion of Ukraine have put increased focus on supply chain security. This increases the risk of geoeconomic fragmentation. Geoeconomic fragmentation is a policy-driven reversal of global economic integration through various channels such as global trade, labour force mobility and multilateral cooperation.¹ The increased risk is demonstrated by companies increasingly showing an interest in reshoring and nearshoring,² and globally the number of trade restrictive measures more than doubled from 2019 to 2022, see chart A.

CHART A

Number of trade restrictive measures is rising globally



Note: Data from Global Trade Alert, GTA, document trade facilitating and trade restrictive changes in the treatment of foreign versus domestic commercial interests. All included measures reflect unilateral government actions and exclude bilateral or multilateral trade agreements. The database includes only measures that are very likely to change international commercial flows. Data adjusted for reporting lags.

Source: Global Trade Alert.

The box continues on the next page

²⁴ See Danmarks Nationalbank, A downturn in China will reduce growth in Denmark significantly, *Danmarks Nationalbank Analysis*, no. 8, June 2023.

BOX 4 (continued)

While geoeconomic fragmentation may entail strategic advantages for some countries, it is very likely to involve economic costs in the aggregate, for instance as a result of higher import prices or restricted possibilities of allocation of production. Therefore, gradually increased geoeconomic fragmentation could be perceived as negative supply shocks that could hit consumers through higher prices. The ECB estimates that geoeconomic fragmentation in which global countries are divided into two blocs could lead to global price increases of between 4.8 and 0.9 per cent, depending on the assumptions of wage rigidity and elasticity of substitution across production inputs.³ Despite potential repeated supply shocks, central banks will continue to be able to ensure price stability over the medium term by raising interest rates.

A number of model-based analyses indicate that geoeconomic fragmentation could also generate significant economic losses.⁴ As a case in point, the IMF estimates that geoeconomic fragmentation could result in permanent GDP losses of up to 2.3 per cent globally.⁵ As a small open economy, Denmark has benefited from globalisation both through increased demand for Danish goods and through access to cheap foreign-produced goods for Danish companies and consumers. Therefore, geoeconomic fragmentation will impact the Danish economy. The Danish economy is, for instance, dependent on China because 7 per cent of Danish gross value added linked to exports was driven by Chinese demand in 2020. China is also a key supplier of semi-manufactured products for Danish exports and finished products for Danish consumption.⁶ Geoeconomic fragmentation could also affect Denmark's access to a number of minerals of key importance to the green transition.⁷ Generally, the extraction of these minerals is concentrated on a few countries, leaving the market exposed to trade restrictions.⁸

¹ See IMF, *Geoeconomic Fragmentation and the Future of Multilateralism, Staff Discussion Notes*, no. 2023/001, January 2023.

² See chapter 4, "Geoeconomic Fragmentation and Foreign Direct Investment", in *IMF World Economic Outlook: A Rocky Recovery*, April 2023.

³ See the section "Friend-shoring global value chains: a model-based assessment" in ECB, *Economic Bulletin*, no. 2, March 2023.

⁴ See, for example, Cerdeiro et al., *Sizing Up the Effects of Technological Decoupling, Working Paper*, no. 2021/069, March 2021, Goes and Bekkers, *The Impact of Geopolitical Conflicts on Trade, Growth, and Innovation, WTO Working Paper*, June 2022, and Bolhuis et al., *Fragmentation in Global Trade: Accounting for Commodities, IMF Working Paper*, no. 2023/073, March 2023.

⁵ See IMF, *The Cost of Geoeconomic Fragmentation, IMF Finance and Development*, June 2023.

⁶ See Amy Yuan Zhuang, Casper Winther Nguyen Jørgensen and Mikkel Bess, *A downturn in China will reduce growth in Denmark significantly, Danmarks Nationalbank Analysis*, no. 8, June 2023.

⁷ See IEA, *The Role of Critical Minerals in Clean Energy Transitions, World Energy Outlook*, May 2021.

⁸ This is the case, for example, for graphite (China, 79 per cent), cobalt (DR Congo, 70 per cent), rare earths (China, 60 per cent) and lithium (Australia, 55 per cent).

There is considerable uncertainty about GDP growth the coming years as Danish-owned production abroad may be scaled up relatively quickly because of for example change in ownership structures of Danish subsidiaries etc. However, production abroad does not significantly affect the outlook for capacity pressures because only a small share of employment in Denmark is directly linked to this production abroad.

Key economic variables

TABLE 1

Real growth relative to the previous period, per cent	2022	2023	2024	2025	Q4	Q1	Q2
GDP	2.7	1.7	1.3	1.3	0.5	0.7	0.3
Private consumption ¹	-1.4	0.1	1.3	1.0	-0.3	0.2	0.4
Public consumption	-2.8	1.0	2.5	1.3	0.1	1.0	0.1
Residential investments	-8.5	-11.9	0.4	2.1	-3.9	-3.8	-4.4
Public investments	0.3	-0.2	4.4	1.5	2.0	-4.1	-1.4
Corporate investments	9.4	-4.1	-1.9	-0.2	23.3	-19.6	4.3
Inventory investments etc. ²	0.4	-1.5	-0.2	0.0	3.6	2.9	3.4
Exports	10.8	7.0	3.8	3.6	-0.9	3.4	2.2
Manufactured exports	10.7	7.5	5.0	4.8	3.3	0.5	1.7
Imports	6.5	1.3	3.7	3.5	1.1	-2.4	2.0
Employment, 1,000 persons	3,168	3,205	3,190	3,170	3,188	3,198	3,204
Gross unemployment, 1,000 persons	76	84	96	105	78	82	83
Balance of payments on current account, per cent of GDP	13.5	12.0	11.8	11.9	12.6	12.6	12.1
Government budget balance, per cent of GDP	3.4	3.1	2.0	2.2	3.8	2.0	3.9
House prices ³ , per cent year-on-year	-0.1	-3.2	0.7	2.1	-5.5	-5.8	-4.9
Consumer prices (HICP), per cent year-on-year	8.5	3.8	3.0	2.6	10.2	8.0	3.6
Hourly wages ⁴ (manufacturing), per cent year-on-year	3.4	4.2	5.7	3.9	3.6	2.9	3.4

¹ Includes both households and non-profit institutions serving households (NPISH).

² Contribution to GDP growth (this item comprises inventory investments, valuables and statistical discrepancy).

³ Nominal prices of single-family houses.

⁴ Confederation of Danish Employers' (DA) pay statistics for profits including inconvenience supplements for manufacturing.

Source: Statistics Denmark and own calculations.

04

Appendix: Assumptions in and changes of projection for the Danish economy

The projection has been prepared using Danmarks Nationalbank's macroeconomic model MONA and is based on available economic statistics, including Statistics Denmark's quarterly national accounts for the 2nd quarter of 2023. The projection is based on statistics published up to and including 12 September 2023. The projection also includes a number of assumptions concerning the international economy, financial conditions, labour force developments and fiscal policy.

International economy

Export market growth is assumed to be 0.8 per cent in 2023, 3.0 per cent in 2024 and 3.1 per cent in 2025, see table A1. Wage growth abroad is assumed to amount to between 4 and 5 per cent over the next three years. Price increases of imported goods and services are assumed to slow down sharply and stabilise at just under 2 per cent. Assumptions are based on the latest OECD forecast and adjustments based on forecasts and economic data of other international organisations since then.

Interest rates, exchange rates and oil prices

Developments in short-term and long-term interest rates in the projection are based on the expectations of future developments that can be derived from the yield curve in the financial markets. Against this backdrop, the 3-month money market interest rate as measured by the CITA swap rate is assumed to rise a further 0.1 percentage points towards the end of this year, peaking at 3.3 per cent. It will then gradually decline throughout the projection period to 2.7 per cent by the end of 2025.

In the projection, the effective krone rate and the dollar rate are assumed to remain constant at their current levels.

Energy prices are generally expected to follow the development in oil prices, which are assumed to follow futures prices during the projection period. Due to the large fluctuations in energy prices, the oil price in the projection is determined on the basis of an average of futures prices for 6 days prior to the completion of the underlying data. In early September, the oil price was around 90 dollars per barrel, and it is expected to decrease gradually to just over 80 dollars per barrel at the end of 2025.

As in Danmarks Nationalbank's projections since March 2022, this projection also takes into account the current situation with unusual developments in gas and electricity prices. As for oil prices, gas prices are assumed to follow futures prices going forward, and they are assumed to increase for the rest of 2023 to about kr. 370 per MWh from their current level of kr. 250 per MWh, and then to fall to about kr. 350 per MWh by the end of 2025. Electricity prices are assumed to follow futures prices for the first five months, but because few contracts are traded for delivery more than five months ahead, electricity prices are subsequently assumed to follow futures prices of gas. Against this backdrop, electricity prices are assumed to lie more or less stable around euro 100 per

MWh. Therefore, the price of electricity and gas is assumed to remain higher than in 2019.

Fiscal policy assumptions

The projection is based on preliminary national accounts data on public-sector consumption and investment as well as the Finance Bill in *Economic Survey, August 2023* and the medium-term scenario in *Updated 2030 development, August 2023*. On this basis, real public consumption is expected to increase by 1.0 in 2023, 2.5 per cent in 2024 and 1.3 per cent in 2025. Public investment is expected to fall by 0.2 per cent in 2023 and increase by 4.4 per cent in 2024 and 1.5 per cent in 2025.

Revisions in relation to the previous projection

Projected GDP growth has been revised upwards by 0.8 percentage points in 2023 and 0.1 percentage points in 2024 and 2025, see table A2. Revised assumptions of export market growth, interest rate developments and exchange rates contribute to dampening growth in all years. The upward revision in 2023 reflects other factors, mainly covering the sharp increase in production and exports of pharmaceutical products, including production abroad under Danish ownership.

The forecast of the rate of increase in consumer prices, HICP, is adjusted down by 0.2 percentage points in 2023, 0.6 percentage points in 2024 and 0.4 percentage points in 2025. Changed assumptions of oil prices and foreign wages and prices contribute to adjust the inflation forecast in 2023 downwards, while changed interest rate assumptions contribute to dampening inflation in all years up to 2025. The negative contribution from other factors partly reflects assumptions of lower electricity and gas prices. Other factors also come into play, as electricity and gas prices have developed more than the normal oil price pass-through suggests.

TABLE A1

Overview of projection assumptions

	2022	2023	2024	2025
International economy				
Export market growth, per cent year-on-year	7.3	0.8	3.0	3.1
Foreign price, per cent year-on-year ¹	16.8	0.5	2.0	1.8
Foreign hourly wages, per cent year-on-year	3.8	5.5	4.4	4.0
Financial conditions etc.				
3-month money market interest rate, per cent p.a.	0.3	3.3	3.5	2.7
Average bond yield, per cent. p.a.	2.0	3.5	3.5	3.4
Effective krone rate, 1980 = 100	101.9	104.8	105.5	105.5
Dollar exchange rate, DKK per USD	7.1	6.9	6.8	6.8
Oil price, Brent, USD per barrel	98.8	86.1	87.8	82.4
Fiscal policy				
Public consumption, per cent year-on-year	-2.8	1.0	2.5	1.3
Public investment, per cent year-on-year	0.3	-0.2	4.4	1.5
Public-sector employment, 1,000 persons	865	873	876	878

¹ Weighted import price for all countries to which Denmark has exports. The projection assumes the same growth rates for the weighted export prices in the countries from which Denmark receives imports.

TABLE A2

Changes in the projection

Per cent, year-on-year	GDP			Consumer prices, HICP		
	2023	2024	2025	2023	2024	2025
Projection from March	0.9	1.2	1.2	4.0	3.6	3.0
Contribution to revised forecast from						
Export market growth	-0.5	-0.2	0.0	0.0	0.0	0.0
Interest	0.0	-0.1	-0.1	-0.1	-0.2	-0.2
Exchange rates	-0.3	-0.3	-0.1	0.0	0.2	0.0
Oil prices	0.0	0.0	0.0	-0.1	-0.2	-0.1
Foreign prices and wages	-0.4	-0.3	-0.2	0.0	0.0	-0.2
Other factors	2.0	1.0	0.5	0.0	-0.4	0.0
This projection	1.7	1.3	1.3	3.8	3.0	2.6

Note: The transition from the previous projection to this projection may not add up due to rounding.

Wage increases prolong period of high core inflation

High wage increases are expected in Denmark and parts of the rest of the world in 2023-24. Over time, higher wages will affect consumer prices and put upward pressure on core inflation. Accordingly, Danish core inflation is expected to remain high in the coming years, even though the significant indirect price effects from energy are abating. However, it is not expected that the Danish economy will face a wage-price spiral, although the risk of inflation expectations deanchoring increases the longer wage and price inflation remains high.

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Prospect of high wage increases in Denmark and abroad

Danish wage increases have been moderate up until mid-2023 in light of labour market pressures and high inflation. However, high wage increases are expected in Denmark and parts of the rest of the world in the coming years.



High wage increases are affecting core inflation and service prices

High wage growth traditionally impacts core inflation and particularly service prices with some time delay. So far, however, wage increases have not been the main driver of the high core inflation.



Wage growth prolongs period of high core inflation

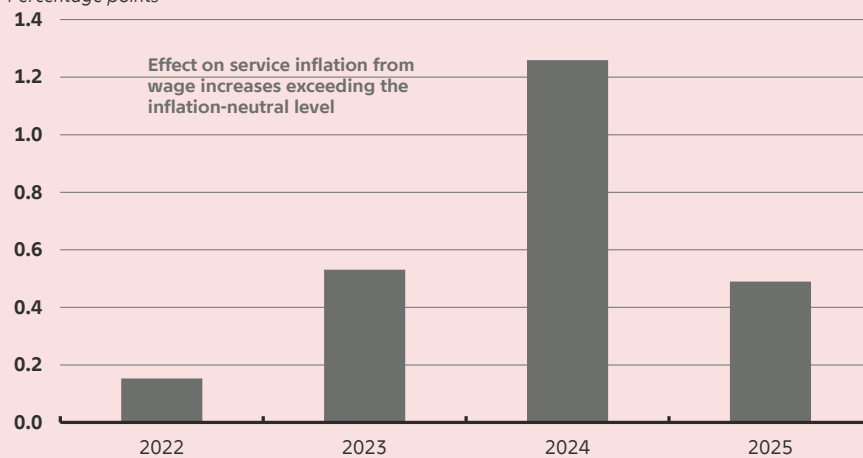
Model calculations indicate that an increase in wage growth of 1 percentage point over time can translate into an increase of 0.6 percentage points in core inflation. High wage growth will push up consumer prices and prolong the period of high core inflation in Denmark.

Why is this important?

After the elevated inflation peaked in autumn 2022, the focus of the economic debate is now revolving around how quickly it will abate. Wages will play a crucial role in inflation going forward, as the spring collective agreements lay the basis for significant wage increases in Denmark. With this analysis, Danmarks Nationalbank therefore examines how higher wages may be expected to affect consumer prices.

Main chart: Wage increases push up service prices in particular

Percentage points



Note: The chart shows the contribution to service inflation from wage increases above the inflation-neutral level, i.e. above productivity growth and an equilibrium inflation of 2 per cent. See the note to chart 12 for a description of the calculation.

Source: Own calculations based on the macroeconomic model ADAM.



Topics

Inflation and price development

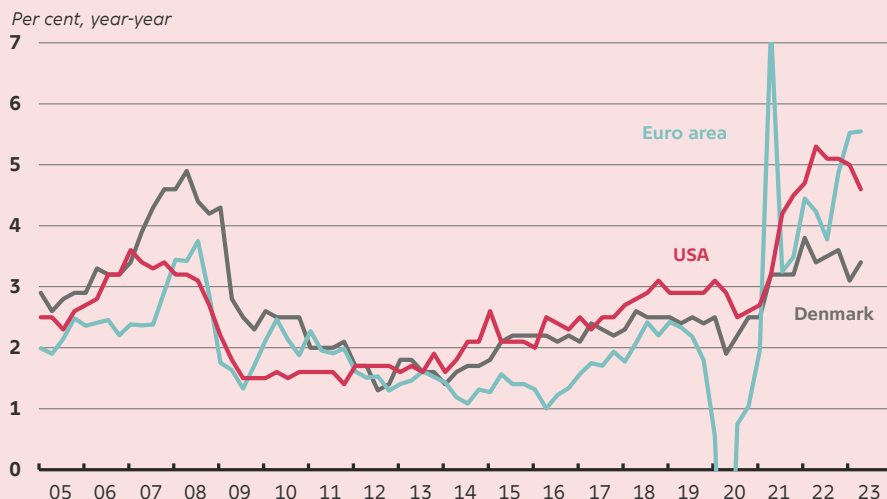
01 Prospects for high wage growth in Denmark and abroad

Wage increases in Denmark and parts of the rest of the world have accelerated over the past year, driven by strong labour market pressures and the high inflation, see chart 1. Even though Danish wage increases are still moderate and even somewhat smaller than in, for example, the USA and the euro area, increasing wage growth is expected in the coming years. Following the spring collective wage negotiations, a significant boost in wage increases in Denmark is in the pipeline. Against this background, overall wage growth is expected to increase significantly towards 2024, see chart 2. Higher wage growth is not an isolated Danish phenomenon, and wages in Denmark are estimated to develop roughly in line with those in the euro area over the entire 2023-25 period.¹

CHART 1

Wage increases have accelerated in Denmark, but are currently rising less than abroad despite strong labour market pressures

Wage growth in Denmark, the euro area and the USA



Note: The chart shows the Confederation of Danish Employers' (DA) wage statistics in the DA area for Denmark, compensation per employee for the euro area and the Employment Cost Index for the USA. The Y axis is limited to the range from 0 to 7 per cent, as the wage growth measured in the euro area was characterised by large fluctuations during the pandemic in 2020-21, partly due to wage compensation schemes.

Source: Macrobond and the Confederation of Danish Employers.



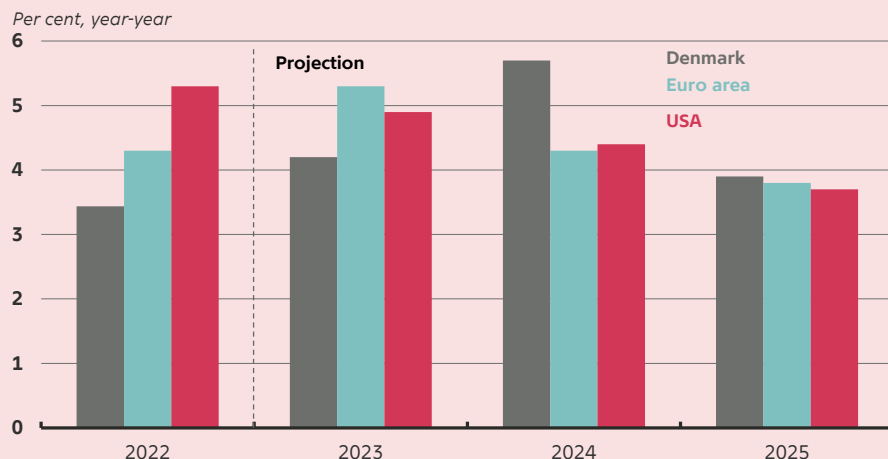
Danish wages increased by 3.4 per cent year-on-year in the 2nd quarter of 2023.

¹ For a more detailed review of Danmarks Nationalbank's projection for wage growth in Denmark, see *Cyclical overview and projection for the Danish economy* in Danmarks Nationalbank (2023a).

CHART 2

Prospect of high wage increases in Denmark and abroad in 2023-24

Wage growth projections



Note: The chart shows industrial wages for Denmark, compensation per employee for the euro area and the Employment Cost Index for the USA.

Source: Danmarks Nationalbank (September), ECB (September) and Congressional Budget Office (July).



Danish wage growth is expected to be 5.7 per cent in 2024.

Wage increases over and above productivity growth will lead to inflation without a corresponding fall in corporate profit margins

Rising wage growth will eventually be passed on to the prices that companies charge for their goods and services. For example, compensation of employees accounts for a significant part of companies’ total costs, although this is subject to marked differences across industries. Specifically, wages account for approx. 30 per cent of unit costs in the Danish economy as a whole, but only about 20 per cent in manufacturing and almost 40 per cent in private services, see chart 3. The remainder of unit costs includes, inter alia, costs of materials and return on capital. Higher wages affect both companies’ costs directly through wage costs for employees and indirectly through increased costs for, e.g., materials, when their subcontractors’ wage costs also increase and are added to prices. Thus, wage increases have a greater effect on companies’ total costs than what can be explained by their own wage costs.

In the shorter term, several factors can potentially affect the relationship between wages and prices. Theoretically, higher inflation is only caused by wage increases in excess of productivity growth and possible adjustments of company profit margins. Firstly, this reflects the fact that a more efficient production reduces the pressure of higher wage costs on companies’ costs per unit produced. Thus, their sales prices do not have to increase as much as wages to maintain a given earnings level. Secondly, it is possible that companies will absorb part of the wage increases in their profit margins, for example if the market situation does not allow them to increase sales prices accordingly. In other words, companies set a price that is realistic considering the current supply and demand conditions on the market, regardless of the evolution of their actual costs. Finally, high wage growth can also stimulate demand through higher household disposable income, thereby driving up prices. In principle, this can give a pass-through to inflation that exceeds the wage component of production.

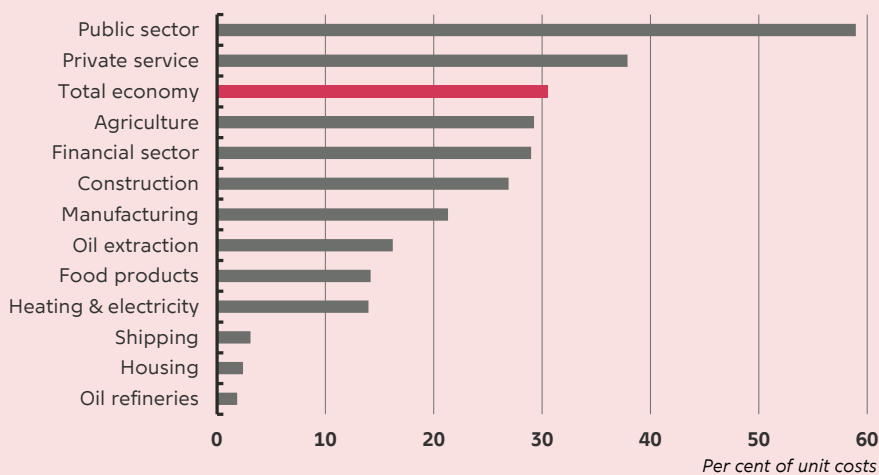
CHART 3

Wages make up a large proportion of companies' costs in Denmark, with pronounced differences across industries

Labour cost share of unit costs



Wages account for almost 40 per cent of companies' costs in the private service sector.



Note: The chart shows the labour cost share of industries' total unit costs in 2021 and measures the direct impact of wage increases in the industry concerned.

Source: Own calculations based on the macroeconomic model ADAM.

Wage increases in excess of productivity growth are a prerequisite for achieving stable price developments over time and do not in themselves pose a problem. This means that in order for inflation to stabilise close to 2 per cent over time, wage increases above this level are necessary, as long as productivity keeps improving in the economy. At the same time, however, it is essential that wage increases do not persistently exceed productivity growth to such an extent that they are no longer compatible with stable inflation over the medium term.

As described above, the effect of high agreed wage increases in Denmark on consumer prices in future will depend, among other things, on the development in productivity and company profit margins. Wage costs per unit produced, i.e. unit labour costs, increased by 3.4 per cent year-on-year in the 2nd quarter of 2023. So far, wages are, thus, rising slightly faster than productivity in Denmark, which is different from the euro area, where unit labour costs have increased more than in Denmark.² However, Danmarks Nationalbank expects Danish wages to rise somewhat more sharply than productivity over the coming years, with the effect that wage growth may have an impact on consumer prices, see *Cyclical overview* in Danmarks Nationalbank (2023a).

The development in earnings does not suggest that all companies are able to absorb the higher wage increases fully in their profit margins. Profit margins in the private non-primary sector excluding utilities and transport, which is an employment-intensive sector and closely linked to domestic price formation, have increased slightly since the pandemic and until the 2nd quarter of 2023, see *Corporate earnings and inflation* in Danmarks Nationalbank (2023a) for a discussion of corporate earnings and their impact on price developments in recent years. In some sectors, such as manufacturing, companies' profit margins

²According to Eurostat, unit labour costs based on hours worked increased by 6.7 per cent year-year in the euro area in the second quarter of 2023.

have even declined since 2019 as measured by unit profits, i.e. gross operating surplus in relation to gross value added in volumes. Together with the expected productivity development, this supports the view that the Danish economy is facing an economic cycle in which high agreed wage increases will give rise to a shift in the driver of consumer prices from energy to wages, thus prolonging the period of high core inflation.

02

High wage increases are affecting core inflation, particularly service prices

As wages and prices are interdependent, it is generally difficult to establish the causal link between them. This means that higher prices may lead to greater wage increases, just as higher wages may cause prices to go up. However, in the current situation, the high agreed wage increases in Denmark are clearly not the main reason for the sharp and sudden inflation in 2021-22, but rather a reaction to it.³ Rising wages thus lead to a recovery in real wages, i.e. the purchasing power that workers actually derive from their wages. Nevertheless, wage increases will likely prolong underlying inflationary pressures for some time, but without giving rise to a wage-price spiral in the main scenario for the Danish economy. However, the risk of inflation expectations deanchoring will increase the longer wage and price inflation remains high.⁴

Calculations show that wage increases spill over into consumer prices

Experience from recent decades indicates that wage increases often precede consumer price increases in Denmark, thus having a spillover effect on inflation. For example, the correlation between wage growth today and core inflation is strongest after a few quarters, see chart 4. When the correlation between the two is not at its peak within the same quarter, but instead increases afterwards, this indicates that wages are rising before core inflation. This suggests that higher wages traditionally impact Danish consumer prices with some delay. The calculations also show that the correlation between wages and service prices is stronger and more sustained than for goods, partly because service industries are often wage-intensive, making service prices more likely to react more to wage increases.

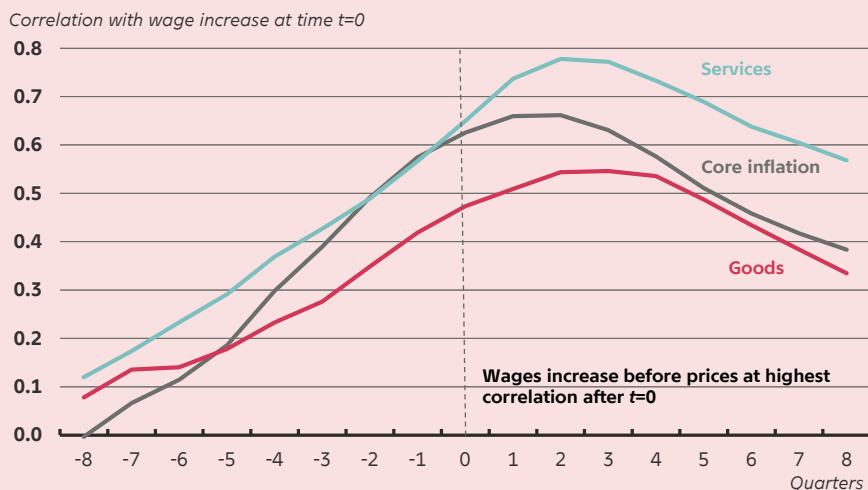
³ Based on a model calculation, the International Monetary Fund has found that approximately half of Danish wage growth in 2022 can be explained by the lagged inflation, and that the tight labour market measured by the unemployment gap has also contributed to wage increases, see Huidrom (2023).

⁴ For a more detailed discussion of what a wage-price spiral is, see *Inflation expectations are still well-anchored* in Danmarks Nationalbank (2023b).

CHART 4

Correlation analysis shows that wage growth in Denmark often rises before core inflation and is closely related to service prices

Correlation between wage growth at time $t=0$ and inflation at time t



Note: The chart shows unconditional lead-lag correlations between year-on-year DA wage growth and different parts of HICP inflation over the period from the 1st quarter of 2001 to the 4th quarter of 2021.

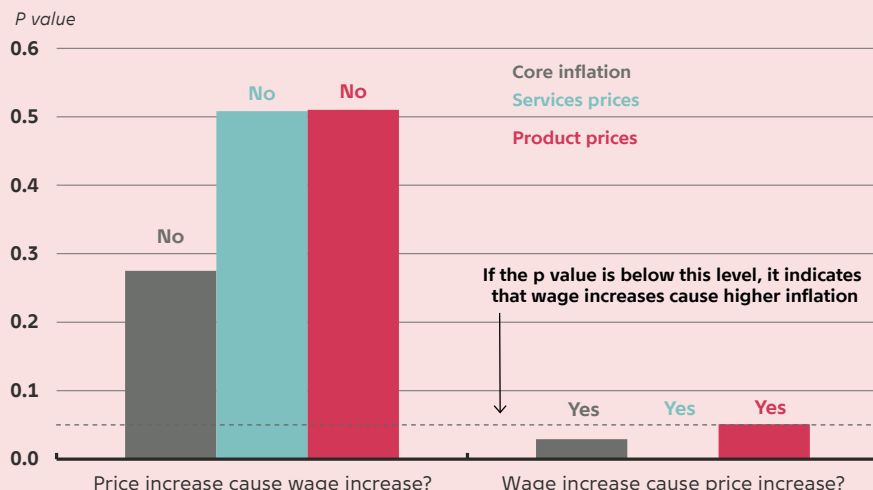
Source: Macrobond and own calculations.

In addition to the simple correlation analysis, formal statistical tests also suggest that higher wages affect core inflation beyond the lagged values of core inflation itself, see chart 5. This suggests that wage increases in Denmark provide useful information to predict future changes in core inflation and service prices in particular. Conversely, the statistical test shows that price increases have not had any appreciable impact on wage increases in the period under review. This reflects, among other things, that inflation has been low for much of the period and, thus, has not had a major impact on wage demands, which probably does not hold true for the period of extraordinarily high inflation in 2022-23.

CHART 5

Statistical tests indicate that wage increases have previously caused increased inflation in Denmark

P value from Granger causality test



Note: The chart shows the *p* value from a Granger causality test in a VAR model with DA wage growth and different parts of the HICP index estimated over the period from the 1st quarter of 2001 to the 4th quarter of 2021. A Granger causality test shows whether lagged X values have explanatory power for Y beyond that which can be explained by the lagged Y values themselves. The null hypothesis of lack of Granger causality from X to Y is rejected if the *p* value is below 5 per cent. The *p* value is defined as the probability of obtaining a test result that is at least as extreme as the actual observed test result, if the null hypothesis is correct. A low *p* value is thus an indication that X has explanatory power for Y.

Source: Macrobond and own calculations.

High service inflation in Denmark is hardly due to wages already

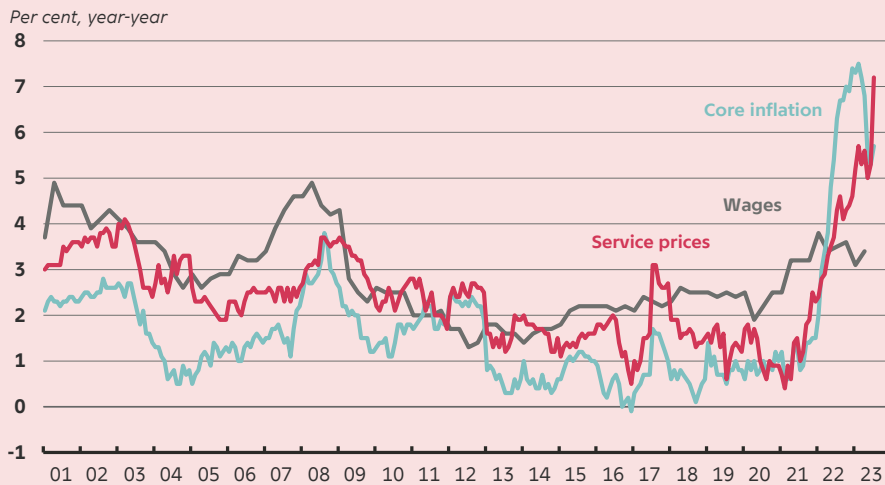
The statistical analysis above and chart 3 with an overview of companies’ wage costs across industries both suggest that high wage increases have a particular impact on service prices. Danish service prices are currently rising faster than wages due to, among other things, indirect energy effects and shifts in demand patterns following the pandemic, which have resulted in large price increases in, e.g., restaurants, hotels and travel, see chart 6. Therefore, there is no evidence that wage spillovers are a significant explanation for the strong underlying inflationary pressures at this moment. To some extent, prices are to be expected to rise faster than wages after a sudden shock to the economy, as prices are usually changed faster than wages, which often evolve gradually through annual wage reviews, job changes or collective bargaining. At the same time, the fact that wages are slow to adjust relative to prices of other production inputs combined with the high share of labour costs in services means that price increases for services are traditionally relatively persistent once they take a hold.⁵

⁵ For a discussion of inflation persistence in Denmark, see the chapter *Inflation is on the wane* in Danmarks Nationalbank (2023b).

CHART 6

Service prices are currently rising more sharply than wages in Denmark due to indirect energy effects and shifts in demand

Wages, core inflation and service prices in Denmark



Note: Core inflation shows the HICP excluding energy and unprocessed foods, while wages refer to the Confederation of Danish Employers' wage statistics in the DA area.

Source: Macrobond and own calculations.

03

Wages are not yet the primary driver of high core inflation

It is possible that wage increases will impact prices of certain goods and services in particular. Therefore, to get an idea of whether higher wage growth is currently affecting inflation, an indicator of wage-sensitive consumer prices, i.e. those parts of core inflation that have historically had the closest correlation with wage growth, is established, see box 1 for a more detailed description.

BOX 1

How is the wage-sensitive core inflation calculated?

Wage-sensitive core inflation consists of those components of core inflation that have a significant and positive correlation with wage growth in the previous year. Specifically, wage-sensitive consumer prices have been selected by estimating a number of regression models in the period from the 1st quarter of 1997 to the 1st quarter of 2020, when the annual rate of increase in 67 subparts of the HICP index excluding energy and unprocessed foods is explained by its own lag and wage growth in the DA area the previous year. If the coefficient of the lagged wage growth is significantly positive, the consumer price in question is designated as wage sensitive, after which it is weighted together with all other wage-sensitive consumer prices in a new price index.

Overall, the selected wage-sensitive consumer prices account for almost 30 per cent of the weight of Danish core inflation and primarily include a number of service prices, including services related to sports and leisure, services related to housing and rent. Some of the prices are probably not driven solely by wages, but simply correlate with them. The calculation for the euro area is basically similar to the Danish one and uses compensation per employee as a measure of wage growth.

Wage-sensitive consumer prices are rising less than core inflation

The results show that the increase in wage-sensitive consumer prices in Denmark is smaller than core inflation as a whole, see chart 7. This suggests that wages are not yet the main driver of core inflation, although the indicator is based on historical correlations, not necessarily having a causal interpretation. In other words, price increases may also be driven by other factors besides wages. The moderate increase in wage-sensitive consumer prices reflects, among other things, the fact that Danish wage growth was still relatively subdued until the 2nd quarter of 2023.

Similar calculations of wage-sensitive consumer prices for the euro area show basically the same trends as in Denmark until mid-2023, see chart 8. The development in wage-sensitive consumer prices in both Denmark and the euro area is in contrast to the USA, where similar analyses indicate that wage-sensitive service inflation peaked in the 2nd half of 2022, before declining again throughout this year, see Council of Economic Advisors (2023). The difference is partly explained by the fact that US wage growth increased faster after the pandemic than in Denmark and the euro area.

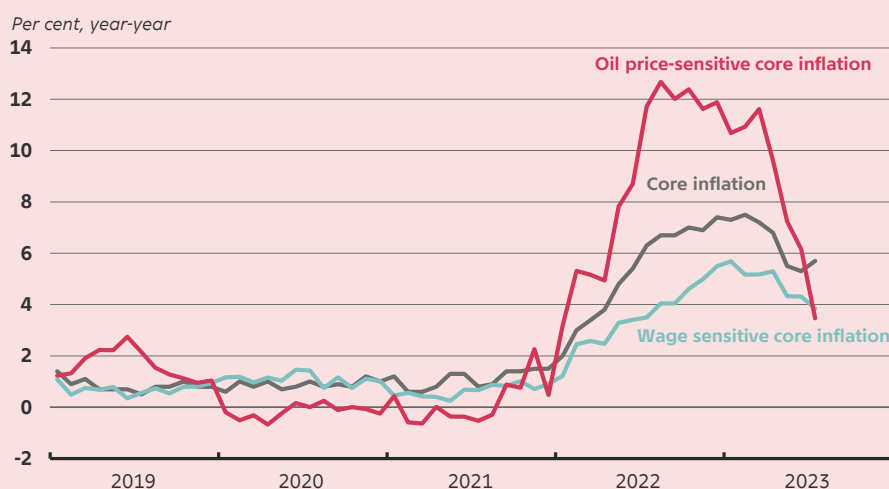
In contrast to the wage-sensitive consumer prices, oil price-sensitive core inflation has slowed down somewhat during 2023. This suggests that indirect

energy price effects have peaked in Denmark, meaning that energy prices have fallen and are no longer causing new increases in corporate costs which are then passed on to consumers. This assessment is also supported by model calculations showing that indirect energy price effects pushed Danish core inflation up by less in the 2nd quarter of 2023 than at the turn of the year, see chart 9.

CHART 7

In Denmark, the wage-sensitive components of core inflation are rising less than core inflation as a whole

Wage-sensitive core inflation in Denmark



Note: See box 1 for a description of wage-sensitive core inflation. Core inflation refers to HICP excluding energy and unprocessed foods. The oil price sensitive elements of core inflation consist of the prices that are affected by oil price fluctuations, including transport and horticultural products. For a more detailed definition, see Mortensen and Staghøj (2015).

Source: Macrobond, Statistics Denmark and own calculations.

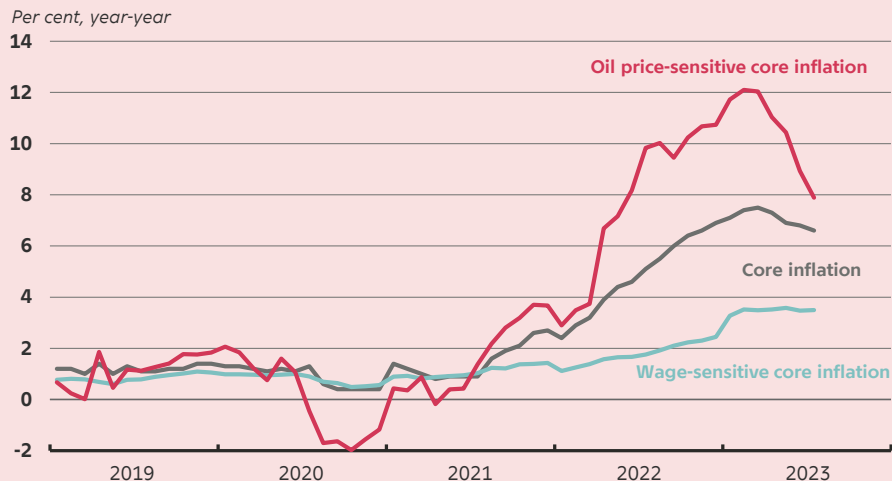


In Denmark, the most wage-sensitive consumer prices rose by 3.8 per cent year-on-year in July.

CHART 8

In the euro area, wage-sensitive consumer prices are also rising less than core inflation

Wage-sensitive core inflation in the euro area



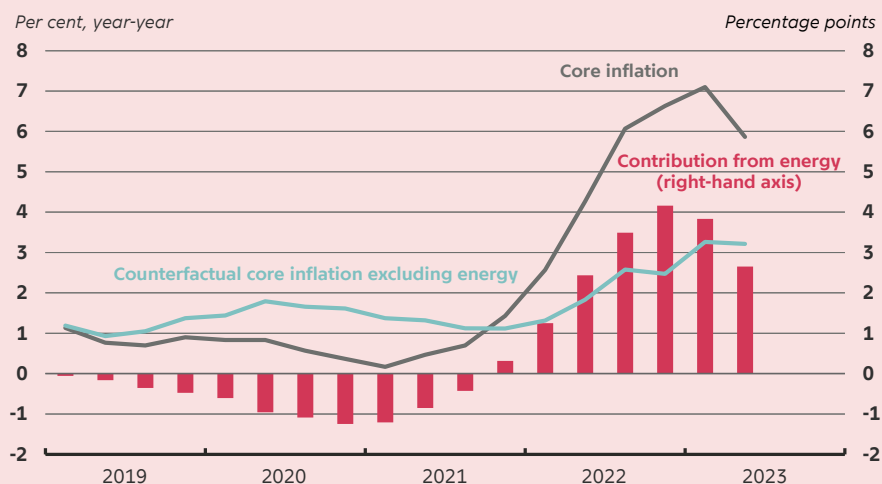
Note: See box 1 for a description of wage-sensitive core inflation. Core inflation refers to HICP excluding energy and unprocessed foods. Oil price-sensitive core inflation is based on the ECB's methodology (2014).

Source: Macrobond, ECB and own calculations.

CHART 9

Model calculation shows that indirect energy price effects are exerting a smaller upward pressure on Danish core inflation than before

Indirect contribution of energy to core inflation



Note: Core inflation is HICP inflation excluding energy and unprocessed foods measured with constant taxes. The methodology is described in box 3 in Danmarks Nationalbank (2023b).

Source: Macrobond, Eurostat and own calculations.



Core inflation was just over 3 per cent year-on-year in the 2nd quarter of 2023, excluding indirect energy price effects.

04

High wage growth will push up inflation in the coming years

To have an informed perspective of the development of Danish core inflation in the coming years, it is necessary to understand the extent and timing of the expected pass-through from higher wages to consumer prices. Therefore, in order to get an indication of the extent to which wage increases are expected to push up inflation over the projection period, two separate calculations based on a statistical model and the macroeconomic model ADAM, respectively, are performed. The two model calculations basically indicate that wage increases in Denmark affect consumer prices over time and particularly impact services. The calculations thus support Danmarks Nationalbank's expectation that Danish core inflation will remain relatively high in the coming years, despite the fact that the significant indirect price effects from energy are falling.

Statistical model calculations suggest that higher wage increases usually push up core inflation with some lag

Specifically, the statistical model calculation shows, for example, that a shock to wage growth of 1 percentage point will increase core inflation in Denmark by approx. 0.6 percentage points after 1-2 years, see chart 10. The fact that the pass-through is higher than the share of wages in total corporate costs in chart 3 may reflect that wage growth is at the same time exerting demand pressures on consumer prices. In addition, the calculation also captures, to a certain extent, the effect of simultaneous foreign wage increases rather than pure Danish wage growth and indirect wage effects caused by expenses for e.g. materials purchased from subcontractors. Finally, the calculation is subject to statistical uncertainty, as illustrated by the confidence interval, which includes a relatively wide range for the most likely actual pass-through.

The estimated pass-through reflects how core inflation has historically responded to higher wage increases, and it is possible that the picture will change in future. International studies of the interaction between wages and prices indicate, for example, that the pass-through depends, among other things, on the state of the economy and thus may fluctuate over time, see box 2.

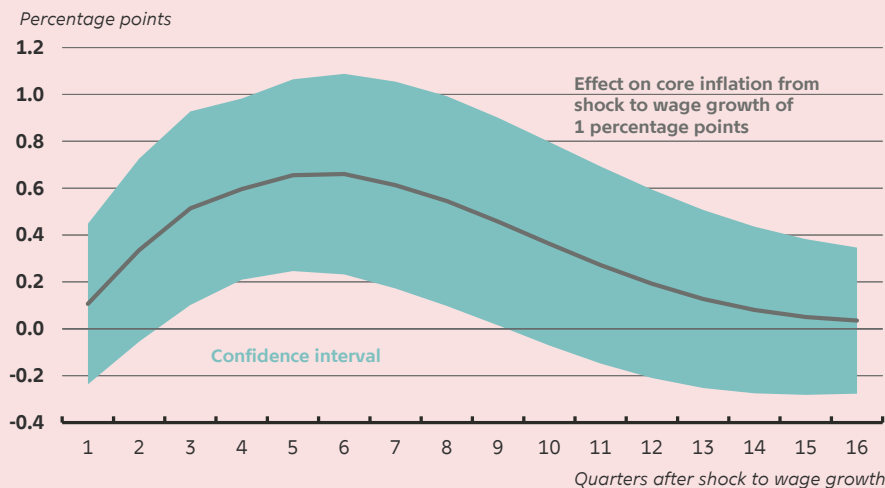
CHART 10

Statistical model calculations show that wage increases in Denmark usually push up core inflation with some lag

Effect on core inflation of shock to wage growth



Statistical model shows that an increase in Danish wage growth of 1 percentage point will translate into an increase of 0.6 percentage points in core inflation.



Note: The effect is calculated using a structural auto-vector regression model (SVAR) estimated in the period from the 1st quarter of 2001 to the 4th quarter of 2021 with the following variables: Danmarks Nationalbank's unemployment gap, year-on-year DA wage increase and year-on-year HICP excluding energy and unprocessed foods with constant taxes. The shock is identified using a Cholesky causal order in that order. The green area shows a 95 per cent confidence interval.

Source: Own calculations.

BOX 2

International studies find that the pass-through from higher wages to inflation depends on the state of the economy

A number of international studies generally confirm the impression from chart 10 that higher wages typically affect inflation, although the exact pass-through varies across countries and depends, among other things, on the state of the economy. For example, according to an analysis by the European Central Bank, the ECB, rising wages are more likely to affect inflation in the euro area if the economy is driven by a demand shock rather than a supply shock, just as the pass-through is higher in periods of high inflation, see Bobeica et al. (2019). Similarly, in a group of advanced economies, BIS (2022) finds that the pass-through from wages to inflation is greater when price increases are high. There is also evidence that booms increase the pass-through from wages to prices in the euro area compared to recessions, see Hahn (2020). This may be due, among other things, to the fact that companies have greater pricing power during a boom and can thus more easily pass on wage increases to their sales prices instead of absorbing them into profit margins. In addition, an analysis from the International Monetary Fund concludes that the pass-through from wages to prices among European countries is lower when corporate earnings are already high, inflation expectations are well anchored and there is intensive competition, see Boranova et al. (2019).

The pass-through from wages to inflation is not necessarily the same across countries. Among the four largest euro area countries, for example, the ECB has found a pass-through from unit labour costs to the gross value added deflator ranging from 0.4 in Germany to around 0.7 in France, see Bobeica et al. (2019). The results for Germany are consistent with a number of different model calculations in Deutsche Bundesbank (2019), which overall indicate that German consumer prices increase by 0.3 per cent when labour costs increase by 1 per cent. The fact that the pass-through is lower than the Danish results in chart 10 reflects, among other things, that the Danish results are calculated based on core inflation, which is more wage-intensive. In Denmark, an analysis from Danmarks Nationalbank based on microdata estimates that the pass-through of wage increases to producer prices is about a third after one year, see Hviid and Renkin (2020).

In the USA, recent studies have pointed out that the pass-through from wages to core inflation has slowed in recent decades to a modest level, see Peneva and Rudd (2015). The conclusion is also supported by the empirical analysis in Bobeica et al. (2021), which shows that the US pass-through has declined since the 1990s to a level around 0.1. This may be driven by more well-anchored inflation expectations, increased trade integration and companies' increasing market power. In the euro area, by contrast, there is no indication that the pass-through from wages to inflation has slowed over the same period, remaining broadly unchanged over time at around 0.5. The spillover effect of wages on inflation potentially occurs through different channels. However, Shapiro (2023) argues that higher wage increases in the USA affect service prices in particular because they increase corporate costs (supply channel) and only to a lesser extent due to higher household incomes (demand channel).

Scenario calculation using the macroeconomic model ADAM shows that higher wage increases will add to inflation in 2023-25

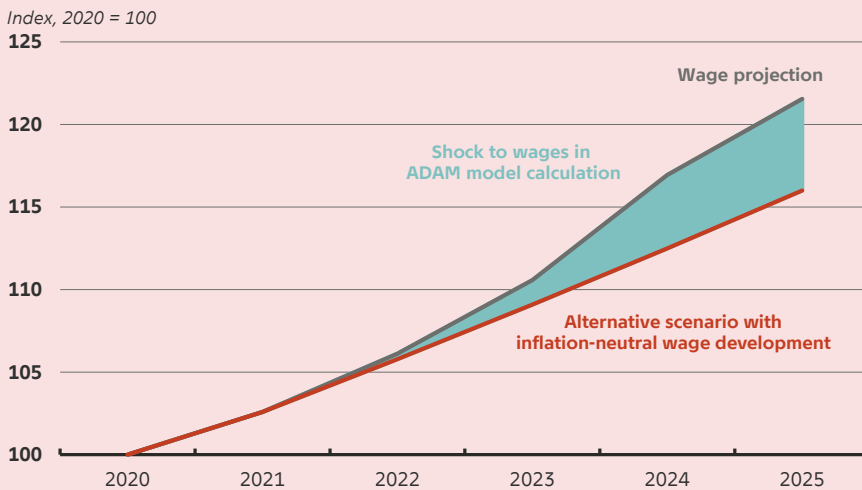
As an alternative to quantifying how consumer prices will develop after a wage shock, one could instead look into what will happen in a given wage development scenario. Such a scenario calculation is made below using the macroeconomic model ADAM and may, among other things, be used to get an indication of how much Danmarks Nationalbank's assumed wage growth, if seen in isolation, will increase Danish inflation over the projection period.⁶ In the scenario, the effect on consumer prices of a development corresponding to the difference between wage developments in Danmarks Nationalbank's projection and an alternative inflation-neutral development given by the sum of structural productivity growth of 1.1 per cent and equilibrium inflation of 2 per

⁶ There are some differences between the two methods, which means that the results are not directly comparable, but instead complement each other. Firstly, the ADAM calculation shows how inflation will develop, assuming that wages develop in a certain way. On the other hand, the statistical model (SVAR) tells us how inflation and wages will develop if wage growth increases by 1 percentage point, i.e. there are feedback effects between inflation and wages after the shock. Secondly, the statistical model (SVAR) calculates the pass-through to core inflation measured by constant taxes, which are arguably more wage-intensive than the actual inflation used in the ADAM calculation. The shocks to wages are also not identical. Thirdly, in the ADAM calculation, foreign wages are unchanged, while it is possible that the statistical model (SVAR) to some extent also captures simultaneous foreign wage increases rather than only Danish wage growth.

cent is calculated, see chart 11.⁷ The scenario thus captures the extent of the additional inflation that occurs when Danish wages rise more than what is compatible with consumer price increases of 2 per cent over time.

CHART 11

Wages in Danmarks Nationalbank's projection will rise more than in an alternative scenario consistent with inflation of 2 per cent over time



Note: The chart shows industrial wages. *Inflation-neutral wage developments* correspond to annual structural productivity growth of 1.1 per cent and inflation of 2 per cent.
Source: Own calculations based on the macroeconomic model ADAM.

The results show that high wage increases that follow the developments described above increase Danish inflation as measured by the CPI consumer price index by 0.3 percentage points in 2023, rising to 0.7 percentage points in 2024, after which the effect will gradually decline in 2025, see chart 12. If realised productivity growth was to be lower than projected in the scenario, this would lead to a stronger wage pass-through to prices and vice versa.

There is considerable variation in the results across different parts of consumer prices. For example, the calculation points to wage growth increasing service inflation by 1.3 percentage points in 2024, which is somewhat more than the effect on both inflation as a whole and the prices of goods. The greater impact on service prices is due, among other things, to the fact that services are relatively wage-intensive, and wage increases therefore affect their production costs and selling prices more than in other industries. In addition, the increase in headline inflation is curbed by the fact that a number of consumer prices such as car consumption, petrol and oil only react to a limited extent to wage increases in Denmark.

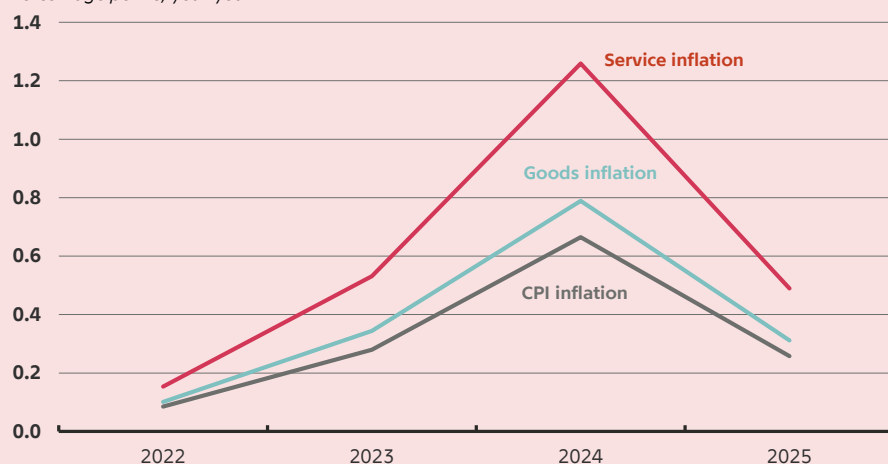
⁷ The assumed productivity growth in the scenario is roughly in line with the assumption in the Danish Government's convergence programme, see the Danish Government (2023).

CHART 12

ADAM model calculation suggests that wages are pushing up inflation – especially in wage-intensive industries such as services

Effect on inflation of shock to wages

Percentage points, year-year



Note: The chart shows the effect of a shock to wages corresponding to the difference between Danmarks Nationalbank's actual projection for industrial wages and an inflation-neutral wage development, i.e. the sum of structural productivity growth of 1.1 per cent and inflation of 2 per cent. Goods and services inflation is measured as the deflator of private consumption of goods and services, respectively.

Source: Own calculations based on the macroeconomic model ADAM.



The ADAM model calculation indicates that wage increases will lead to a 1.3 percentage point rise in service inflation in 2024.

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Corporate profits and inflation

In 2021-2022, inflation increased significantly in Denmark and several other countries. This has been reflected in a diverse development in corporate profits across industries. Large parts of the private sector saw weak profit growth during the period with high inflation. Conversely, profits have been strong in selected industries where prices reflect global conditions, and where there have been supply problems and an increase in demand. These developments generally conform with historical experiences. There are consequently no clear indications that the competitive situation has changed towards corporate market power having increased, thereby acting as a driver of inflation.

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Higher prices have not resulted in increased corporate profits in general in the high-inflation period

The high inflation must be seen in conjunction with strong demand, while supply problems have affected selected industries such as energy, utilities, transport, and agriculture, where profits have been high. These factors primarily reflect global conditions and do not reflect domestic price formation. In industries that use, for example, energy and transport services in their production, profits fell slightly during the period with high inflation. These developments follow the historical pattern.



Large differences in profits across industries

There are significant differences in the development in profits across industries. In the manufacturing industry, for example, profits per unit of output have fallen, while profits have developed more strongly in trade and in the restaurant industry. The differences may reflect industry-specific supply and demand conditions, differences in production structures and use of commodities and other raw materials in production as well as differences in the competitive situation.



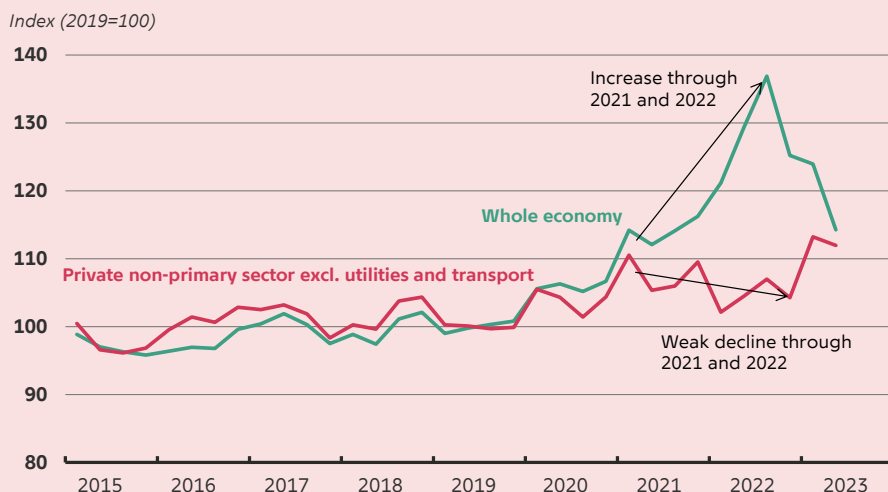
The correlation between inflation, profits and corporate market power is not clear cut

Increased profits do not necessarily reflect a change in corporate market power, i.e. the ability of companies to set prices higher than their costs of production. Higher costs of input materials or changes in demand may shift the distribution between payroll costs and profits in companies, and the adjustment may resemble a temporary wage-price spiral. In the long term, the income distribution is expected to stabilise around the pre-pandemic level.

Why is this important?

One of Danmarks Nationalbank's main objectives is to ensure stable prices. Therefore, it is important to understand inflationary drivers. It has been debated in both Denmark and internationally whether and to what extent corporate behaviour has been the cause of high inflation. This analysis sheds light on these questions in a Danish context to qualify the Danish debate.

Main chart: Higher prices have generally not resulted in increased corporate profits in period with rising energy prices



Source: Statistics Denmark and own calculations



Keywords

Inflation and price development

Danish economy

01 Higher prices have not resulted in increased corporate profits in general in the high-inflation period

At the beginning of 2021, inflation started to rise sharply in several countries, including Denmark. Although inflation has abated in recent months, the period 2021-2023 has been characterised by significantly higher inflation than in the previous decades. The higher inflation reflects a number of factors, including significant increases in the prices of a number of commodities, which has resulted in rising costs for companies. Across industries, there have also been large differences in the development in profits, while the development in payroll costs has generally been more subdued.¹

This analysis looks at the development in profits in Denmark since 2019 and examines whether there are indications that the higher inflation also reflects higher profits. In the euro area, it has been suggested that in the period of high inflation, companies increased prices by more than the increase in costs would suggest, thereby increasing profits. The increase in profits in the euro area happened in light of the uncertainty over costs that arose in connection with the substantial increases in energy prices in combination with strong demand.²

Inflation is usually assessed based on the development in consumer prices (HICP). However, it is not possible, based on consumer price data, to establish whether a price increase reflects increased payroll costs and costs of materials for companies or whether they have increased their profits. This distinction can, however, be made by looking at the price development of Danish value added, calculated at base prices, i.e. the rate of increase in the gross value added (GVA) deflator, which is therefore used as a measure of inflation in this analysis.

The GVA deflator is linked to HICP inflation, see chart 1. However, there are differences between the two calculation methods and, for example, increasing costs of materials and rising import prices will typically result in an increase in HICP, but will not necessarily affect the GVA deflator, see box 1.

¹ For a more detailed description of the correlation between wages and inflation and how the development in wages is expected to affect inflation in the coming years, see Hansen and Jensen (2023).

² See, for example, Arce et al. (2023) and Lagarde (2023).

BOX 1

Corporate profits and their effect on inflation are analysed using GVA deflator

The GVA deflator describes the development in the price of Danish value added, calculated at base prices. Base prices include 'other production taxes, net', but not product taxes.

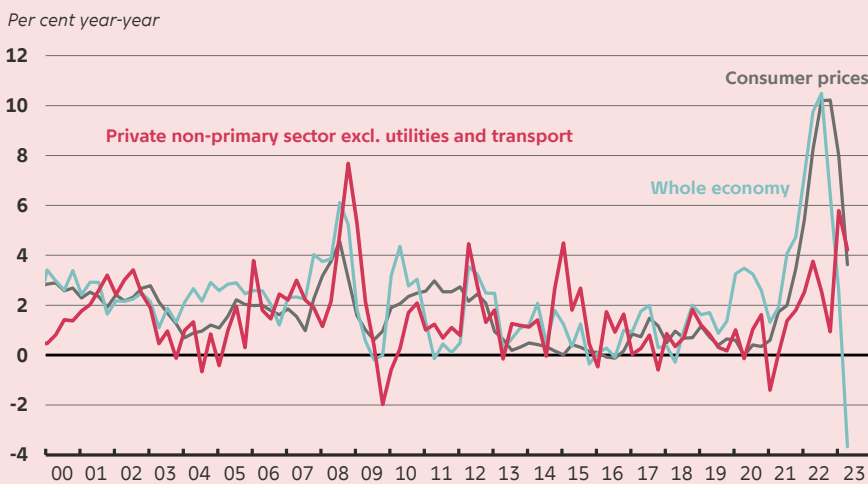
The differences between the GVA deflator and HICP are due to several factors: Prices are calculated differently in HICP and the GVA deflator, which means that the two indicators develop differently to some extent. In addition, costs of materials are not included in GVA, while rising costs of materials will typically result in higher consumer prices. Finally, there is a difference in the weight with which the various goods and services are included. For example, unlike consumer prices, GVA does not contain imported goods. Therefore, a strong development in import prices will pull towards consumer prices rising more than the GVA deflator.

Technically, in relation to the national accounts, GVA can be divided into contributions from remuneration of three subcomponents: labour, taxes/subsidies and corporate profits. An increase in the GVA deflator may thus reflect that payroll costs are increasing or that labour is becoming less productive, so that more labour must be used to generate a given GVA. Both cases give a higher contribution from unit labour costs. An increase in the GVA deflator may also reflect increased production taxes or that production subsidies are being phased out. An increase in GVA may thus also reflect increasing profits.

The profits are used for remuneration of the capital etc. and are occasionally referred to as 'residual income', which is the part of GVA that remains after deduction of payroll costs and other taxes. In the analysis, the term 'profits' is used instead of 'residual income'. From a strict theoretical economic perspective, a distinction is made between residual income and pure economic profit as economic profit also includes opportunity costs, i.e. the return that the company could alternatively have achieved by investing in, for example, securities rather than in capital for production.

CHART 1

Correlation between consumer prices and GVA deflator



Source: Statistics Denmark.

Chart 1 shows that the GVA deflator for the Danish economy as a whole rose substantially in the period 2021-2022 with high consumer price inflation, while it has recently declined sharply due to a number of factors, including falling energy prices. However, in large parts of the economy, the GVA deflator has developed more moderately overall. This can be illustrated by looking at the private non-primary sector excl. utilities and transport. The private non-primary sector

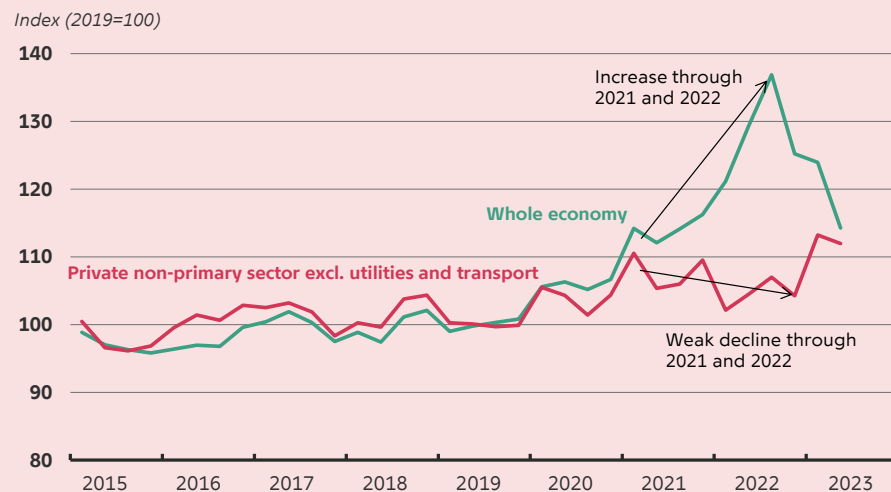
comprises most of the private sector, with the exception of mining and quarrying, agriculture and fisheries.

The difference between the deflator for private non-primary sector excl. utilities and transport and the deflator for the overall economy underlines that the large increases in the GVA deflator are primarily driven by selected industries. These are transport, utilities, mining and quarrying and agriculture, which are characterised by reflecting domestic conditions only to a limited extent, see also Chapter 2, *Large differences in profits across industries*.

The GVA deflator can be divided into contributions from wages, corporate profits and tax payments. In the private non-primary sector excl. utilities and transport, profits per unit of output decreased slightly in 2021-22 where energy prices rose substantially. Profits are calculated in Danish kroner, and this must be taken into account when looking at the decrease, as the profits are moderately increasing as a result of the underlying price development in the long term. Profits only recovered in Q1 2023, which is probably connected with energy prices having started to fall in October 2022. In turn, profits in the economy as a whole increased in 2021-2022. This reflects that a non-negligible part of the Danish economy is constituted by industries in which the GVA deflator increased very sharply because of global conditions.³

CHART 2

Profits per unit of output increased in the aggregate in the period with rising energy prices, but declined in the private non-primary sector excl. utilities and transport



Note: The chart shows profits per unit of output, measured by profits above real GVA. Profits have been calculated in nominal terms and therefore show an upward trend over time. The trend growth makes the decline in the private non-primary sector excl. utilities and transport during 2021 and 2022 more marked.

Source: Statistics Denmark and own calculations.

³ Overall, transport, utilities, mining and quarrying and agriculture accounted for just under 10 per cent of Danish GVA in 2019.

Developments are in line with historical contexts

Overall, the increase in profits in the economy is in conformity with the usual pattern seen in situations with rising energy prices. The usual pattern can be analysed on the basis of estimates of how profits normally react to changes in oil prices, see box 2. The analysis indicates that higher energy prices lead to temporary increases in overall profits per unit of output in Denmark. It should be taken into consideration in this connection that production of commodities forms part of the Danish economy. Therefore, when commodity prices rise, there is a part of the economy in which profits will naturally increase.

The development of profits in the overall private non-primary sector excl. utilities and transport is also in accordance with the usual pattern, see box 2. It should be taken into consideration that companies in these industries use energy as production input. When energy prices rise, this thus corresponds to an increase in costs of materials, resulting in rising production costs. In the short term, companies may absorb part of the higher costs in their profits, which thereby decline. This is confirmed by the analysis in box 2, which also shows that the negative effect on profits is typically only present in approx. four quarters, after which the decline in profits has been recouped. This is in conformity with the recovery of profits per unit of output in Q1 2023, when, moreover, energy prices declined, see chart 2.

A comparison with how profits have historically reacted to oil price changes gives an idea of what could be expected in light of the energy price increases seen during 2021 and 2022. However, an assessment of the exact magnitude of fluctuations in prices and profits requires up-to-date information on the exact scale of the shocks to energy prices. The analysis thus does not provide a clear answer to whether profits in the private non-primary sector excl. utilities and transport could have been expected to fall by more than what was actually observed during the period with rising energy prices. If the actual fall in profits has been lower than the increase in energy prices would indicate, seen in isolation, this may, for example, reflect that strong demand has supported sales prices in the private non-primary sector.

BOX 2

An increase in energy prices typically leads to an increase in profits for the overall Danish economy, but to a decrease in the private non-primary sector excl. utilities and transport

The following empirical analysis shows how profits per unit of output in the overall economy and in the private non-primary sector excl. utilities and transport, respectively, typically develop when the Danish economy is hit by oil price increases.

To establish the causal effect from oil price increases on changes in profits, the exogenous variation in oil prices is first obtained. Exogenous variation in oil prices follows Känzig (2021), which identifies the shocks using high-frequency information regarding OPEC meetings.

The causal effect of an oil price increase on profits per unit of output has subsequently been estimated using local projections. Four lags are used, and the time series for profits is first detrended using an HP filter and then seasonally adjusted.

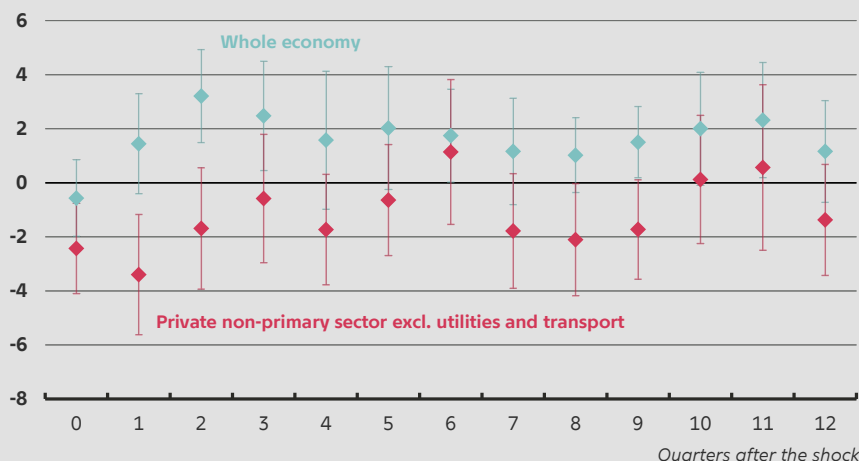
The results, shown in chart A, are to be interpreted as the typical percentage deviation in profits per unit of output from the trend development following an oil price increase. The size of the shock has been scaled so that consumer prices for energy in Denmark increase by 10 per cent when the shock hits. Quarterly data from Q1 1990 to Q4 2022 have been used.

Profits for the overall Danish economy typically increase as a result of a positive shock to oil prices. This reflects that a significant part of the profits generated in Denmark depend positively on the price of energy. However, due to rigidities in the adjustment of sales prices, industries that use energy as production input often have a negative correlation between energy prices and profits. This applies, for example, to the private non-primary sector excl. utilities and transport. However, the negative correlation quickly ebbs out, and less than a year after the shock, profits have in general bounced back to the trend level.

Chart A

When the oil price increases, profits per unit of output temporarily increase in the Danish economy as a whole, but fall overall in the private non-primary sector excl. utilities and transport

Percentage points



Note: The vertical lines indicate Newey-West standard errors (68 % confidence band) in line with Känzig (2021).

Source: Känzig (2021), Statistics Denmark and own calculations

02

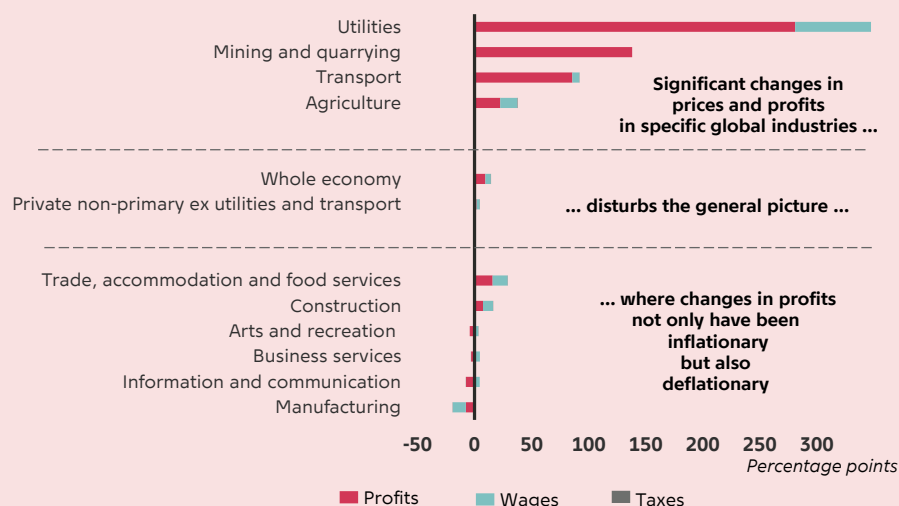
Large differences in profits across industries

The overall increase in the GVA deflator and corporate profits covers significant differences across industries, see chart 3. The chart focuses on the period Q4 2019 to Q4 2022, i.e. from just before the outbreak of the coronavirus pandemic and until inflation peaked at the end of 2022.⁴

CHART 3

Large differences in price development and drivers across industries

Q4 2019 – Q4 2022



Note: The chart shows the total increase in the GVA deflator broken down by contributions from wages, profits, and taxes. In 2019, the GVA of the industries, relative to aggregate GVA, amounted to 1.9 per cent for utilities, 0.8 per cent for mining and quarrying, 5.4 per cent for transport, 1.6 per cent for agriculture, 62 per cent for private non-primary sector excl. utilities and transport, 14.6 per cent for trade and restaurants, 5.3 per cent for construction, 3.1 per cent for culture and leisure, 9.6 per cent for business services, 4.9 per cent for information and communication and 15.4 per cent for the manufacturing industry. The percentages do not add up to 100 because some sectors, such as public administration, have been omitted and because an average over 2019 is taken.

Source: Statistics Denmark and own calculations.

⁴ One of the reasons for choosing this period is to avoid that the introduction of various compensation schemes introduced during the period in connection with the lockdowns of society blurs the picture. By looking at the period since before the lockdowns, the effect of the compensation schemes is offset, as they are virtually no longer used.

Strong profits in global industries

In the mining and quarrying, utilities and transport industries, where the GVA deflator increased very sharply, the increase primarily went to corporate profits. However, the deflator has decreased significantly since the turn of the year in all three industries. Together with agriculture, the three industries are characterised by prices being largely determined by global supply and demand. In addition, these industries have been characterised by supply problems and, in some cases, also a sharp increase in demand in the wake of the pandemic.

For example, the increased demand posed great challenges in many commodity markets. Here, supply could not adjust to increased global demand in the short term, resulting in a heavy increase in commodity prices on the global market. Danish companies followed the higher global market prices, and profits per unit of output in, for example, mining and quarrying therefore increased significantly, see chart 3. However, the increase in prices cannot be regarded as active action taken by the individual commodities producer to increase its profits, as the companies have limited pricing options when trading on international exchanges.

The utilities industry also comprises a number of activities where prices are largely determined internationally, such as electricity and gas supply. In this industry, profits thus also rose sharply, without this reflecting a changed approach to pricing among the producers. The same applies to agriculture, where profits were supported by global price increases for a wide range of agricultural products.

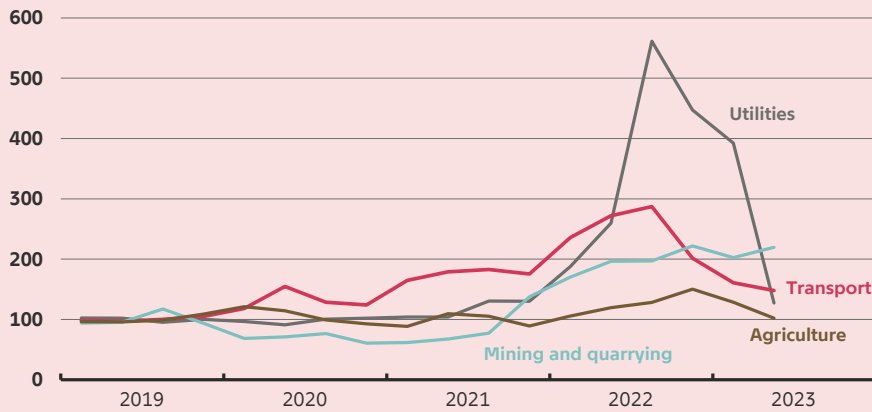
Within sea transport, freight rates also reflect global conditions, and, for Denmark, sea transport accounts for a large part of the total value creation in the transport industry. The reopening of the economies during 2020 put much pressure on capacity in the industry, and as it is not realistic to adapt the fleet of cargo ships to a sharp unexpected increase in demand, this resulted in a heavy increase in freight rates.

For both transport and utilities, the very large increases in the GVA deflator have been partially reversed in 2023, while, for agriculture, the deflator is now even below the level from Q4 2019, see chart 4. The decreases reflect that prices of a wide range of commodities have decreased significantly, just as freight rates are back to pre-pandemic levels. Provided that new unexpected events do not occur, profits in these industries are consequently expected to be at a more moderate level going forward. However, this does not change the fact that some companies in selected industries achieved very high profits during the period with high inflation.

CHART 4

GVA deflator has fallen back totally or partially in transport, utilities and agriculture

Index (2019=100)



Source: Statistics Denmark and own calculations.

Diverse developments in profits in other industries

In the private non-primary sector excl. utilities and transport, the GVA deflator increased by 4.4 per cent from Q4 2019 to Q4 2022, corresponding to an annual rate of increase of 1.4 per cent. However, in the first two quarters of 2023, when overall inflation abated, the deflator increased by 3.1 per cent. There have been large differences across the private non-primary sector. For example, the GVA deflator increased significantly in trade and restaurants, while it decreased in manufacturing industry. The differences may reflect sector-specific supply and demand conditions, differences in production structures and consumption of commodities and other raw materials in production as well as differences in the competitive situation.

The manufacturing industry is an example of an industry in the private non-primary sector in which the GVA deflator has developed weakly. From Q4 2019 to Q4 2022, it decreased by approximately 19 per cent, reflecting approximately equal negative contributions from wages and profits. The decrease in the GVA deflator is unusual in a longer-term perspective. Among other factors, this reflects a weak price development in the pharmaceutical industry, where the GVA deflator fell by 10.0 per cent in 2021 and by 30.7 per cent in 2022.⁵ For the rest of industry, the GVA deflator decreased by 4.8 per cent in 2021 and by 0.5 per cent in 2022. The industry is characterised by energy, commodities and transport, where prices rose markedly, being a significant production input.

In the part of the private non-primary sector that consists of trade and restaurants etc., the GVA deflator increased by 29 per cent from Q4 2019 to Q4 2022. Just over half of this increase went to increased profits, while the rest went to wages. The industry covers both retail and wholesale trade as well as hotels and restaurants, and a number of factors may therefore have driven the price

⁵ Figures for the pharmaceutical industry are for 2021 and 2022 and are a special extract of unpublished figures. They are therefore subject to greater uncertainty than published figures (in DataBank etc.).

development. For example, strong demand for hotels and restaurants after the period of lockdowns may have supported the development in consumer prices. This should also be seen in the context of the difficulties that the industry has of increasing its capacity in the short term.

Statistics Denmark assesses that data are currently too uncertain to calculate figures for the development in the deflator broken down by more specific industries than those shown in chart 3. This means that it is not possible to look at, for example, restaurants separately to map the observed increase in greater detail.⁶ Since Q4 2022, there has been a slight decrease in the deflator for trade and restaurants etc. This may reflect that the situation in the industry is normalising in the wake of the lockdowns.

The construction industry has also been characterised by a significant increase in the GVA deflator, which has largely gone to profits. Here high demand for home improvements resulting from the lockdowns may have contributed to an extraordinary development. Housing investments have subsequently declined substantially. In culture and leisure, business services and information and communication, the increase in the GVA deflator has been at a level between the observed development in industry and in trade and restaurants, respectively. However, a more detailed review of the individual industries is beyond the scope of this analysis.

⁶ It also indicates that uncertainty about the price development is greater than usual, underlining the need to interpret the results of the analysis with caution.

03

The correlation between inflation, profits and corporate market power is not clear cut

Higher profits and higher prices may reflect that companies increase their markups. Markups describe the extent to which companies' sales prices exceed their costs of producing an additional item. See box 3 for an explanation of technical terms and key economic mechanisms discussed in this chapter. An increase in markups may reflect an increase in market power by companies because of weaker competition or that consumers become less responsive to changes in relative prices. An unchanged markup may be interpreted as suggesting that there has been no change in corporate market power. In addition to causing higher inflation, an increase in markups may also lead to a deadweight loss in the economy, i.e. in the form of lower consumption and employment.

Developments in profits can be used as an indicator of whether companies have increased their market power. Other analyses of the development in profits have also been performed for a number of other countries.⁷ This reflects that profits can be computed based on timely quarterly data while the computation of actual markups requires access to data which is often only available with a lag. Developments in profits should however be assessed with caution, as there is no perfect correlation between profits and markups, see, for example, Colonna et al. (2023). Rising profits may reflect an increase in markups, but theoretically, it is not impossible for profits to increase while markups remain constant or even decrease.

⁷ ECB (2023), Arce et al. (2023) and Hansen et al. (2023) analyse the contribution from profits to the GDP deflator for the euro area, while Haskel (2023) looks at the contribution to the GDP deflator for the UK, the United States and the euro area.

BOX 3

Explanation of concepts and key mechanisms

Corporate profits correspond to total revenue less total costs. Revenues are equal to the price multiplied by the quantity sold. Costs are equal to the average cost per unit sold multiplied by the quantity sold. **Marginal costs** describe the costs associated with the production of one additional unit. Marginal costs typically increase as production increases and consequently exceed average costs. This may reflect that a company wishing to increase production must pay a higher hourly wage for overtime work.

Companies will often face a degree of **monopolistic competition**, implying that they have **market power** to set prices. Market power reflects that consumers have preferences for consuming specific products or varieties. If the price of a particular variety goes up, demand for this variety will typically fall but not disappear completely. This is illustrated by a negatively sloping demand curve, see chart A. Under monopolistic competition, companies will set a price that exceeds marginal costs, thereby giving rise to a **markup**. Together, marginal costs and markups form the company's supply curve, which is upward sloping.

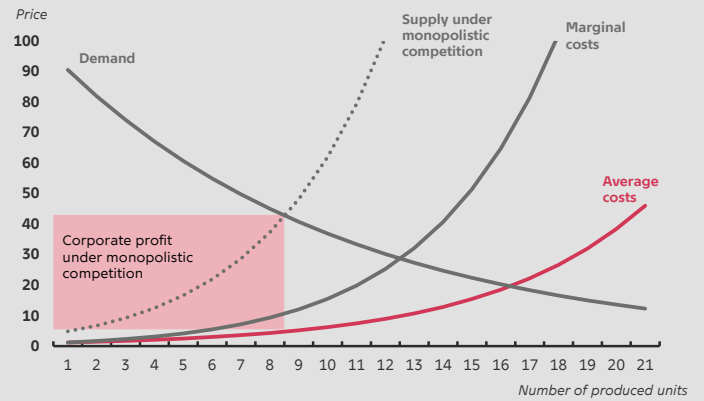
In the following, it is illustrated how changes to supply and demand conditions affect costs, prices, and profits. If marginal costs increase, companies will want to increase prices, see chart B. This leads to a decline in the number of units produced, while profits are also affected. An increase in the costs of materials used in production could be an example of an increase in marginal costs.

An increase in demand will typically also be associated with an increase in marginal costs as production increases. However, as opposed to the example above, this does not reflect a shift in the cost curve. Rather, the demand curve shifts out such that it crosses the cost curve further to the right, where marginal costs are higher. This leads to an increase in prices, while the company also increases its production and profits, see chart C.

The degree of market power affects corporate profits. If companies' market power increases, this will typically lead to an increase in profits. An increase in market power may reflect that consumers become **less price sensitive**, i.e. they become less inclined to substitute away from an expensive variety towards a cheaper alternative even though the price of the expensive variety goes up. A situation where consumers become less price sensitive can be illustrated by a steepening of the demand curve, see chart D. This leads to higher prices and profits.

CHART A

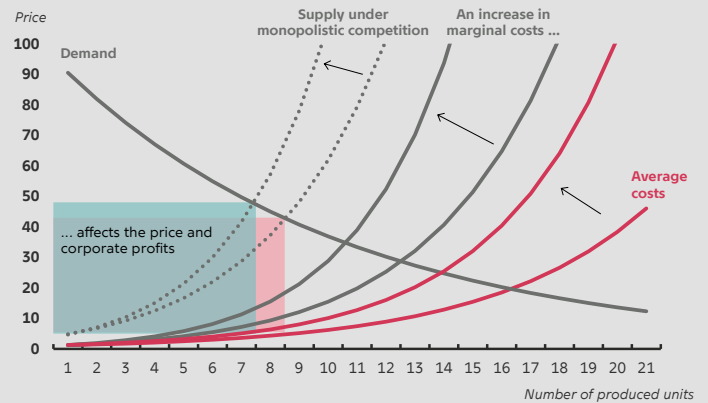
Under monopolistic competition, companies set prices in order to maximise profits



Note: The red area indicates the company's profits under monopolistic competition. The price results from a constant markup over marginal costs.

CHART B

Higher marginal costs lead to higher prices and affect profits



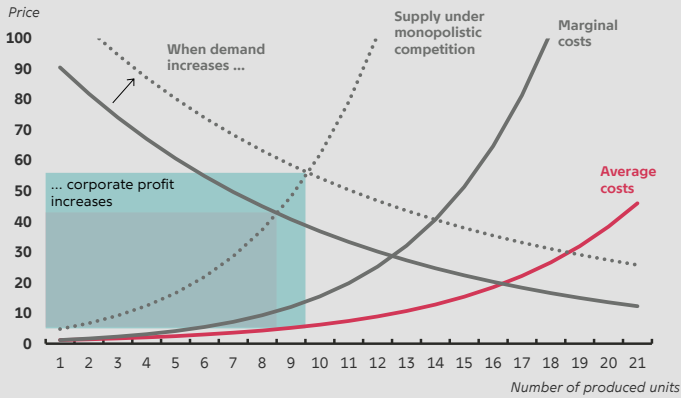
Note: The red area indicates the company's profits before the increase in marginal costs. The green area indicates the company's profits after the increase in marginal costs. Prices in the two states are given by the intersections between the dotted grey lines and the demand curve.

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BOX 3 (continued)

CHART C

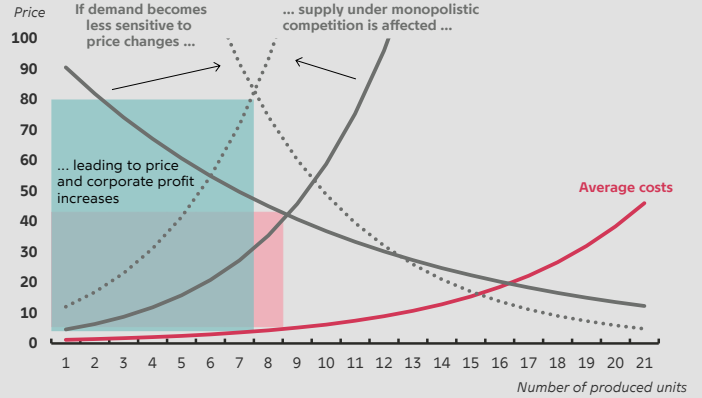
An increase in demand leads to higher prices and higher profits



Note: The red area indicates the company's profits before the increase in demand. The green area indicates the company's profits after the increase in demand.

CHART D

A reduction in the price sensitivity of consumers leads to higher prices and higher profits



Note: The red area indicates the company's profits before the reduction in consumers' price sensitivity. The green area indicates the company's profits after the reduction in consumers' price sensitivity.

Correlation between markups and profits – an illustrative example

To examine more closely the correlation between profits and markups, three examples are reviewed of how they may have developed as a result of an increase in costs of materials. Firstly, a situation with unchanged demand conditions is examined, i.e. how large a consumption households want to have and how they react to changes in prices. This is followed by a discussion of the role played by changes in demand conditions.

The correlation between markups and the different contributions to the GVA deflator is illustrated in chart 5. The left column shows a situation in which it is assumed that a company generates revenue of kr. 200, of which it has costs of materials of kr. 100, resulting in a GVA of kr. 100. Of this, kr. 60 is assumed to go to remuneration of the labour input in production, and the remaining kr. 40 to profits for the company. This gives a markup of 25 per cent, which is calculated as the profit share (kr. 40) of the total costs of materials and labour (kr. 100 + kr. 60).

The analysis then looks at the possible adaptation to a situation where the costs of energy consumption in production increase, for example as a result of higher electricity or fuel prices. Specifically, it is assumed that the (unit) price of materials increases, so that the overall costs of materials increase by kr. 50. In turn, payroll costs are assumed to be unaffected. Other things being equal, the higher costs of materials lead to an increase in the company's average costs. Under some assumptions, the cost of producing one additional unit will increase one-to-one with the average costs.⁸ As the markup indicates the relative difference between the company's sales price and its costs of producing one additional unit, this means that profits in kr. per unit of output increase for an unchanged markup.

⁸ See Colonna et al. (2023).

Based on the increase in production costs, three possible scenarios for how companies react are considered. The three scenarios are illustrated by the three columns to the right of the dotted line in chart 5.

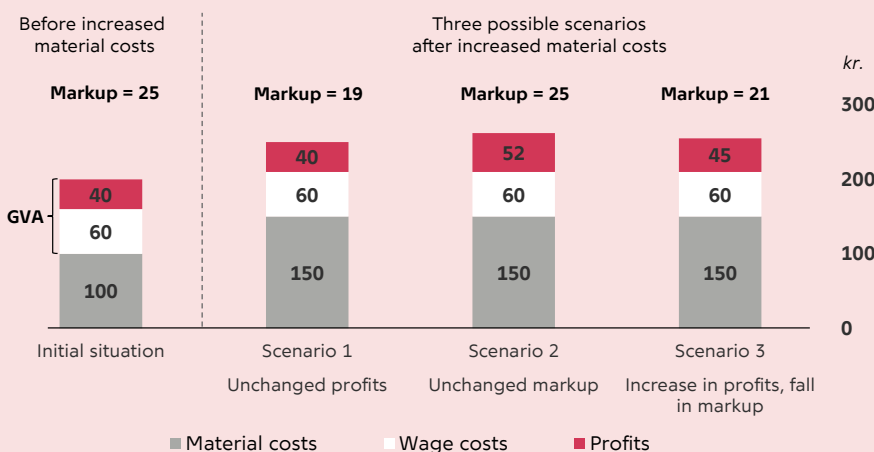
Scenario 1) The company increases its sales price so that profits in kroner per unit of output are unchanged. In this situation, GVA remains unchanged and the total revenue increases to kr. 250, as illustrated in column two. It should be noted that, in this situation, the markup decreases to 19 per cent and that the company’s behaviour thus contributes to alleviating the price pressure from the increased costs. However, a reduction in markup will often not immediately be compatible with unchanged competitive conditions for the companies.

Scenario 2) The company’s markups are kept constant, and the sales price therefore increases due to increased costs. In this situation, the markup is maintained at 25 per cent. However, as the costs on which the markups are based have increased, the profits have also increased and will be kr. 52 in the example shown. GVA thus increases to kr. 112 and the GVA deflator increases by 12 per cent, as illustrated in column 3. The increase in profits leads to inflationary pressure, but this is not due to the companies having gained more market power and having consequently increased their markups.

Scenario 3) The sales price and profits increase, but the company’s markups decrease. There may also be a situation in which the profits increase while the markup decreases. This is illustrated in column 3. In this scenario, the profits increase to kr. 45, and the GVA deflator increases by 5 per cent, but the markup decreases to 21 per cent. The decrease in markups contribute to dampening the inflationary pressure, despite rising profits. A decrease in markups may be due to a sluggish pass-through from increased production costs, but, in the long term, the markup is expected to decrease to 25 per cent subject to unchanged competitive and demand conditions.

CHART 5

Profits may well increase, while markups fall and the company’s behaviour dampens the inflationary pressure



Demand also plays a role in prices and markups

A number of studies have emphasised that high inflation during 2021-2022 was not only driven by increased costs of materials for production, but also by

increased demand to a great extent.⁹ The demand reflects both the level of consumption households want to have and how they react to changes in prices. Both factors may have played a role in the rise in inflation. However, their impact on corporate profits and markups as well as on the pass-through from increased costs to prices differ.

In a situation where consumers will be less inclined to reduce their consumption or switch to the goods and services of a competing company, despite rising prices, the market power of the companies will increase. Companies will therefore be able to increase their profits and markups. In relation to the examples in chart 5, this also means that the pass-through from increased costs to prices will be higher under higher markups, other things being equal.

The situation is different when the households want to increase their overall consumption, but maintain their reaction to price changes. When the reaction to price changes does not change, the market power of the companies and thus their markups do not change either. However, the increased demand results in companies increasing their production, which will often lead to increased costs for the last product produced. This leads to higher prices, even though markups remain unchanged. Increased costs associated with producing the marginal unit may reflect that additional production puts increased pressure on the companies' capital stock. In addition, capacity constraints may make it difficult to increase production, implying that costs rise strongly. This means that an increase in demand may lead to an increase in prices and inflation, thereby affecting corporate profits, even if markups are unaffected.

Restoration of income distribution may resemble a temporary wage-price spiral

The above illustrative example, where the increase in costs of materials increases profits for maintained markups, entails that the wage share, i.e. the labour share of GVA, decreases. The wage share generally depends on a number of factors, including the structures of the labour market and the bargaining position of employees. Provided that these conditions have not changed, it is therefore conceivable that the distribution of GVA between wages and profits will return to the point of departure, so that the decrease in the wage share is restored. For maintained markups, the restoration of the wage share entails further price increases, and the dynamics may resemble a temporary wage-price spiral.

In the example in chart 5, where the company's behaviour pattern does not change and where the markup is therefore kept at 25 per cent, the increased costs of materials result in an increase in profits to kr. 52. With unchanged payroll costs, this means that the wage share in GVA decreases from 60 to 54 per cent, see column two in chart 6. The employees can now try to recoup their share of the income. To achieve a wage share of 60 per cent in a situation where profits are kr. 52, this requires that the wage increases to kr. 78, as illustrated in column 3. However, the wage increase causes the company's costs to rise. With a maintained markup, the price is therefore increased and profits again increase, now to kr. 57. The new increase in profits subsequently means that the employees must again try to obtain a wage increase to recoup the wage share of 60 per cent. With profits of kr. 57, this requires a wage increase to kr. 86, as shown in column 4.

The process of wage and price increases can continue until a new equilibrium is found, in which the wage share is restored and the markup remains unchanged. The new equilibrium is illustrated in column 5. Here, employees and business owners share the income in exactly the same way as before the increase in costs of materials (column 1). However, the increase in costs of materials has not only caused the sales price to increase by kr. 50, but by kr. 100. The extra kr. 50

⁹ See, for example, Harr and Spange (2023) and the references there.

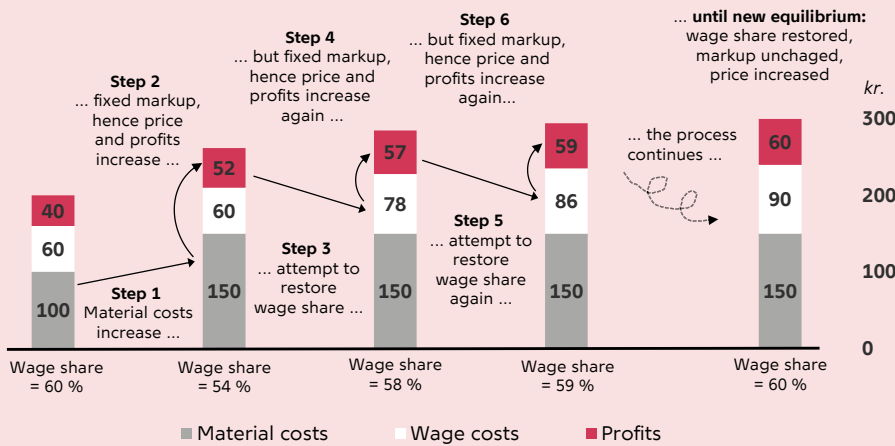
reflects a monopolistically competitive situation in which the business owners receive a share of the profits from production, in combination with an income distribution conflict, in which the employees maintain their share.¹⁰ However, while the adjustment may resemble a temporary wage-price spiral, a genuine spiral can only occur if there is a shift in long-term inflation expectations among households and companies.

Demand conditions also play a role in the adjustment to the new equilibrium. Where consumers have become less inclined to reduce their consumption or switch to the goods and services of a competing company in reaction to increased prices, markups may increase in the long term. This leads to an increase in corporate market power, and thus to an increase in the profit share of GVA. However, if the increased demand during 2021-2022 does not reflect a changed reaction to price changes, but only higher desired consumption, this will generally not change the income distribution in the long term.

How fast the economy adjusts to the new equilibrium depends on how quickly prices and wages react.¹¹ The price reaction may reflect the size of the shock, as there are indications that companies typically change prices more frequently in the event of large shocks.¹² The wage reaction depends to a large extent on the structures of the labour market.

CHART 6

The increase in costs of materials may trigger a chain reaction in which price and wage are increased until the wage share has been restored and the markup remains unchanged



¹⁰ See Lorenzoni and Werning (2023a) for a discussion of the importance of income distribution conflict to the price development, and Lorenzoni and Werning (2023b) for an elaboration on how this is connected with wage-price spirals.

¹¹ See Hansen and Jensen (2023) for an analysis of how wage increases are expected to affect inflation in the coming years.

¹² See, for example, Bobeica et al. (2019).

International studies of markups do not give a clear-cut picture

The approach adopted in this analysis does not make it possible to determine to what extent scenarios 1, 2 and 3 have been dominant in the individual industries since 2019. Based on up-to-date company data, international studies have analysed the development in markups and found mixed results.¹³

For Germany, Italy and Australia, these international studies find that markups do not seem to explain the higher inflation in general, when excluding global industries such as mining and quarrying. However, there are indications that corporate behaviour in specific industries where competition is less global may have contributed to increasing inflation. For the United States, there is conversely evidence that rising markups contributed significantly to the increase in inflation in 2020-2021. However, there are also indications that the increased US markups reflected, to some extent, that companies were raising their prices in anticipation of rising future costs rather than weakened competition.

Stable distribution between wages and profits going forward

From 2021 to 2022, the profit share of GVA for the economy as a whole increased and was around 43 per cent in Q3 2022.¹⁴ However, the profit share has subsequently decreased to approximately 37 per cent, which is approximately equal to the pre-pandemic level, see chart 7. The development largely reflects the global industries, where there have been heavy fluctuations in profits in recent years. For the private non-primary sector excl. utilities and transport, the shares going to profits and wages, respectively, have developed in a more stable manner.

The future development will depend on a number of factors, including the development in markups. A number of international studies document that corporate market power has increased over the past several decades, while the wage share has decreased across countries.¹⁵ For Denmark, the Danish Economic Councils (2022) find an increase in companies' markups from 2000 to 2018. However, Pedersen et al. (2019) find that the wage share has not decreased in Denmark in the same way as in other countries when adjusted for Danish companies' trading and production abroad.

Danmarks Nationalbank forecasts that the wage and profit share of GVA will stabilise around the historical levels in 2023-2025. The forecast reflects a number of assumptions, including that wages are expected to increase and that companies' profits in special industries such as mining and quarrying as well as utilities, where they have increased significantly, are expected to fall. The reversal has already occurred to a significant extent, for example in the utilities sector, where profits have fallen significantly in Q2 2023.

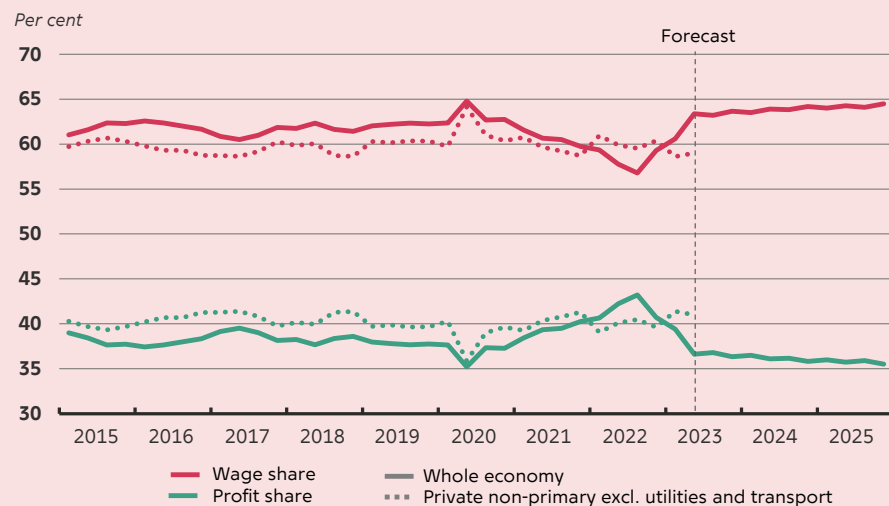
¹³ See Colonna et al. (2023), Reserve Bank of Australia (2023) and Glover et al. (2023).

¹⁴ In this context, GVA excludes merchanting and processing.

¹⁵ See, for example, IMF (2019).

CHART 7

Profits as a share of GVA is at pre-pandemic level



Note: Profits also include taxes. Gross value added is excl. of trading and processing abroad. There is no projection for the private non-primary sector excl. utilities and transport.

Source: Statistics Denmark and own calculations.

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