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OUTLOOK FOR THE DANISH ECONOMY — MARCH 2023

Declining but still high inflation

Pressure is easing in the Danish economy

The Danish economy is facing a slowdown, partly as a result of interest rate increases, which is feeding through to consumption. The slowdown will take pressure off the labour market and will bring the Danish economy close to a neutral cyclical situation from the end of this year.

Inflationary pressures shift from energy to wages

Inflation will fall markedly primarily as a result of falling energy prices, but higher wage increases will cause inflation to remain high. The same applies for the euro area. The risk of inflation taking hold is not averted.

A tight economic policy is required

It is essential that the high inflation is brought down. Monetary policy has been tightened significantly, and it is important that fiscal policy does not counteract monetary policy in bringing the inflation down. A tightening of fiscal policy may become needed if the risk of a wage-price spiral rises in Denmark.

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DOMESTIC INFLATIONARY PRESSURES

Energy price increases that so far have driven up inflation in Denmark are now declining. On the other hand, higher wage increases in Denmark increase domestic inflationary pressures. Inflation is expected to decline significantly in 2023, but is estimated to remain high over the projection horizon.

MONETARY TIGHTENING

High inflation has prompted central banks across the world to tighten monetary policy, resulting in sharp market rate increases. Monetary policy is already dampening activity in Denmark and will further dampen growth and inflation over the coming year.

LOWER DANISH DEMAND

The interest rate increases have led to significant price falls in the Danish housing market over the past year. In addition, consumption has declined as a result of a marked drop in purchasing power. The downturn in domestic demand is more pronounced than in the euro area. Growth has so far been underpinned by exports.

GROWTH SLOWDOWN IN 2023

As higher interest rates dampen growth in Denmark's export markets, this is expected to lead to a slowdown in the Danish economy. However, an unusual increase in the production of pharmaceuticals, most likely related to activities abroad, will raise Danish GDP in 2023.

NEUTRAL CAPACITY PRESSURES

The slowdown is expected to lead to increasing unemployment that will reduce pressure on the labour market. Most likely, the Danish economy will avert recession. However, this is conditional on inflation being brought down abroad without a global slump.

RISK OF WAGE-PRICE SPIRAL

The risk of inflation taking hold in a Danish wage-price spiral remains, even though inflation is on the way down. However, Danmarks Nationalbank assesses that the risk of a Danish wage-price spiral has been reduced since the summer of 2022.

Key economic variables

Real growth relative to the previous year, per cent	2022	2023	2024	2025
GDP (real), per cent	3.6	0.9	1.2	1.2
Employment, 1,000 persons	3,164	3,173	3,148	3,141
Gross unemployment, 1,000 persons	76	88	97	100
Balance of payments on current account, per cent of GDP	12.8	10.3	9.1	9.0
Government budget balance, per cent of GDP	1.5	1.5	1.9	1.5
House prices[1], per cent year-on-year	-0.4	-9.4	-0.3	2.9
Consumer prices, per cent year-on-year	8.5	4.0	3.6	3.0
Hourly wages[2] (manufacturing), per cent year-on-year	3.5	4.7	5.3	3.9

Source: Statistics Denmark and own calculations.
1. Nominal prices of single-family houses.
2. Danish Employers' Association pay roll costs, including inconvenience supplements for manufacturing.

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The Government should be prepared to tighten fiscal policy at short notice if the risk of an independent Danish wage-price spiral rises.

Recommendations for economic policy

The Danish economy is facing a slowdown as a result of the sharp tightening of monetary policy in the USA, the euro area and Denmark, which is implemented to bring inflation down. The slowdown follows the past 18 months of economic boom in Denmark and three years marked by the pandemic and the war in Europe.

Prospect for slowdown and lower inflation
There is a clear decline in private spending and a sharp fall in house prices in Denmark due to higher interest rates and erosion of purchasing power resulting from very high inflation. In the euro area and the USA, private spending and the housing market have so far not seen the same marked decline. Overall, there is continued growth in activity abroad and so far, this underpins Danish exports resulting in continued increases in Danish production and employment over the winter. However, the momentum in the Danish economy is assessed to have declined recently, disregarding an unusually large increase in the production in the pharmaceutical industry, most likely related to activities abroad, that are included in the Danish gross domestic product, GDP.

GDP is expected to increase by 0.9 per cent in 2023, but this reflects a marked lift from production in the pharmaceutical industry, that will likely not affect employment or the capacity pressure in the Danish economy. On the other hand, underlying GDP is expected to fall through 2023 as the impact of central bank interest rate hikes intensifies and dampens growth in Denmark and abroad. The slowdown is a smaller yet broad-based, which will also result in a turnaround in the labour market, where employment will fall and unemployment rise.

The slowdown in the Danish economy is expected to reduce the pressure that has characterised the labour market over the past 18 months, and the economy is expected to be close to a neutral cyclical situation from the end of 2023. However, this expectation is based on the projections of a number of international organisations that central banks will manage to bring down inflation without pushing the world economy into a recession.

The outcome of the collective bargaining in the spring points to higher wage increases than those seen in collective bargaining rounds for the past many years. Although labour market pressures are easing, wage increases in the manufacturing industry are expected to increase to 4.7 per cent in 2023. This will increase the price pressure stemming from domestic factors, such as Danish businesses' labour costs. On the other hand, price pressures driven by foreign factors, such as the prices of energy and other imported goods and services, are expected to ease, mainly as a result of lower energy prices.

Overall, inflation is expected to fall significantly to 4.0 per cent this year, mainly as a result of falling prices on consumer energy. By contrast, the shift towards higher domestic inflationary pressures means that it will take some time to reduce in particular core inflation, which excludes energy and unprocessed food. Core inflation is estimated to remain high throughout the projection period. The same development is seen in the euro area, and the increases in Danish wages and consumer prices are expected to be broadly in line with those in the euro area over the coming years as a whole.

Fiscal policy should not add to inflation
A tight economic policy is required to bring down inflation. Due to Denmark's fixed exchange rate regime, monetary policy in the euro area has the main role in maintaining stable price and wage developments. Fiscal policy in Denmark should address deviations in the cyclical situation between Denmark and the euro area, e.g. if capacity pressures in the Danish economy are significantly greater than in the euro area or if there is an elevated risk of an independent Danish wage-price spiral.[1]

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

Monetary policy in the euro area has been tightened significantly since September and further tightening is expected. This contributes to significantly dampening growth in the euro area and in Denmark.

Currently, Denmark and the euro area are facing the same challenges in terms of bringing down inflation with an outlook of wage increases that are inconsistent with stable low inflation over the longer term. There is no prospect of significant differences in the cyclical situation between Denmark and the euro area that should be addressed separately through fiscal policy. But it is important that fiscal policy does not counteract monetary policy in bringing inflation down, and there is no room to increase the pressure in the economy. Therefore, any new fiscal measures that increase capacity pressures in the economy must at least be matched by measures that dampen the pressure elsewhere correspondingly.

In the summer of 2022, Danmarks Nationalbank recommended that fiscal policy should contribute to dampening capacity pressures by just under 1 per cent of GDP in 2023 in addition to what was contained in the Finance Bill. This was due to the increased risk of a wage-price spiral in Denmark resulting from a markedly greater pressure on the labour market than in the euro area. Danmarks Nationalbank currently considers that there is still a risk of an independent Danish wage-price spiral, but it has decreased since the summer of 2022. This also means that the need for a rapid and significant tightening of fiscal policy is as such also reduced.

The results of the Danish collective agreements and the signs that labour market pressures are reduced provide greater certainty that wages in Denmark will not increase significantly more than in the euro area. The reported shortage of labour has declined markedly since September, and there is a more pronounced decline in private consumption in Denmark than in the euro area. At the same time, house prices are falling faster in Denmark than in the euro area. The decline in private consumption in Denmark may indicate that the after-effects of corona measures as for instance the disbursements of frozen holiday allowance etc. are diminishing.

The risk of inflation taking hold in a wage-price spiral has not been averted. Therefore, an extensive tightening of fiscal policy may be required if the risk of an independent wage-price inflation increases. This may happen e.g. if local wage negotiations result in significantly higher wage increases than agreed in the collective bargainings or if Danish businesses pass on higher wage costs to consumer prices to a greater extent than businesses in the euro area. The Government should therefore be prepared to tighten fiscal policy at short notice.

Danmarks Nationalbank's recommendations for economic policy

A tight economic policy is required to bring down inflation. It is important that fiscal policy does not counteract monetary policy in bringing inflation down.

Any compensation for rising consumer prices must remain activity-neutral and retain incentives to minimise, for example, energy consumption.

The housing tax reform must proceed according to plan as it is a significant contribution to healthier structures in the housing market.

Any compensation for rising prices must maintain the incentive to curb consumption

Political aspirations to compensate selected population groups for rising prices should remain activity-neutral to ensure that the measures will not increase capacity pressures in the economy. At the same time, they should maintain the incentive to reduce energy consumption. Accordingly, subsidies or tax reductions designed to mitigate the impacts of high energy prices should be avoided, as they will simply support energy consumption and may further increase energy prices. Targeted, temporary transfers are a more appropriate short-term tool, while still keeping in mind that repeated disbursements must not weaken the incentive to shift away from expensive sources of energy.

The measures already adopted have largely followed the above principles, and fewer compensation schemes have been introduced than in many other European countries. However, the temporary reduction in the electricity tax in the first half of 2023 is not an appropriate way to compensate households and businesses. In addition, the latest agreement on new inflation relief is hardly activity-neutral, even though the proposal is fully financed, as the taxation of higher-than-normal profits is likely to have a lower activity impact than payments to households with liquidity constraints. At the same time, it will not be expedient to offer liquidity support to businesses once again by deferring payment deadlines on withholding tax and labour market contributions. In the absence of market failures, businesses are best financed on market terms on the basis of a credit rating.

The housing tax reform should go ahead as planned

It is important that the housing tax reform in 2024 proceeds according to plan as it is a significant contribution to healthier structures in the housing market. The reform ensures that housing taxes will again rise and fall with house prices, contributing to reducing fluctuations in house prices, with a spill-over stabilising effect on the rest of the economy. If the housing tax reform had been in place before the pandemic, the current price declines in the housing market would likely not be as pronounced, just as the price increases through 2020 and 2021 would also not have been as high.

Current drivers of Danish and international economies

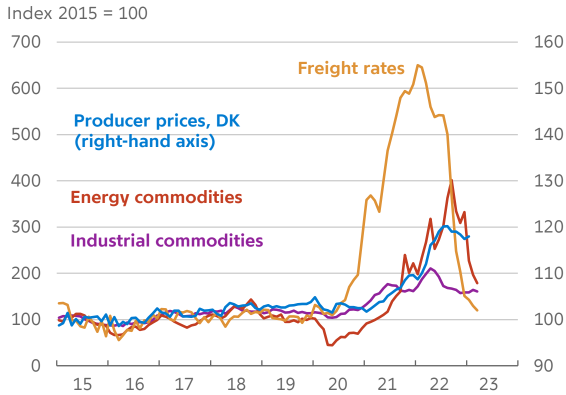
Business cycle overview and projection for the Danish economy

Large inflationary pressures from global conditions are on the decline in Denmark
Inflation in Denmark and the euro area rose during the autumn of 2022 to its highest level in 40 years, but is now once again receding. Several indicators and model calculations indicate that the very high level of inflation in Denmark is predominantly driven by global conditions such as the prices of energy, commodities and other imported goods and services, but several of these conditions are gradually abating, see more in the thematic section *Inflation is on the wane*.

Worldwide, the prices of energy, commodities and freight have fallen significantly in the early supply chains compared to the autumn of 2022, see chart 1. This is beginning to impact Danish industrial enterprises' sales prices, which in January were 1.8 per cent lower than the peak in August. Inflation in Denmark, as measured by the EU harmonised index of consumer prices (HICP), has slowed from 11.4 per cent in October to 8.3 per cent in February. However, the decline is solely driven by lower consumer energy prices. On the other hand, core inflation, i.e. consumer price increases excluding energy and unprocessed food, has not yet fallen and amounted to 7.5 per cent in Denmark in February. The rise in core inflation reflects, among other things, that it takes time for declines in commodity and freight prices to work their way all the way through supply chains to consumer prices.

Producer prices in manufacturing have started to fall in Denmark

Chart 1

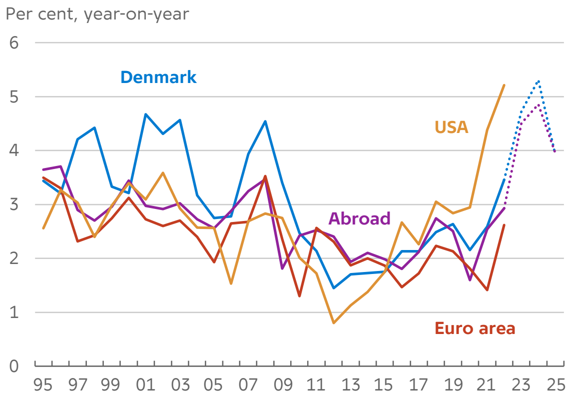


Note: *Producer prices, DK* are shown for manufacturing. *Freight rates* display the SCFI index. *Energy commodities* and *industrial commodities* display the index from Hamburgisches WeltWirtschaftsInstitut.
Source: Macrobond.

So far, the supply crisis in the energy markets has been a major driver of the high inflation in Denmark, which has mainly impacted consumer prices of energy. In addition, energy prices also indirectly contribute to raising core inflation, which otherwise excludes consumer energy prices. The indirect effects of energy prices on core inflation manifest themselves in higher production costs in enterprises which more gradually trickle into goods and services other than the direct effects. The pass-through from indirect effects has undoubtedly been faster and stronger than before, which may be due, among other things, to the fact that in a situation with high demand, businesses are able to pass on increased costs to consumers faster.

In addition to energy prices, much of the inflation is driven by price increases for imported goods and services such as commodities or freight. The increase in Danish businesses' production costs has so far been driven almost exclusively by higher sourcing costs and not by higher unit labour costs or profits[2]. This is supported by a measure of domestic market-determined inflation, IMI, which excludes factors such as direct and indirect increases in the prices of energy and imported goods and services, which shows a more limited increase compared to the general consumer price increases, see more in the thematic section *Inflation is on the wane*.

Prospect of high wage increases in Denmark and abroad Chart 2



Note: Historical observations are based on DA's international wage statistics for manufacturing. The estimates for abroad is based on ECB's latest projection from December 2022 for the Euro area and the OECD's latest projection from November for the USA, Sweden, UK, Japan and Norway, where all estimates are compensation per employee for the whole economy. Growth rates for compensation per employee are indicated in footnote 3.
Source: Confederation of Danish Employers (DA), OECD, ECB and own calculations.

Significantly higher wage increases in new collective agreements

Wage increases in Denmark, which are currently around 3.5 per cent, have so far been moderate in the light of very high reported labour shortages. Thus, wage increases have so far not contributed significantly to bringing inflation above 2 per cent.

However, in the spring collective bargaining round for manufacturing, the agreed wage increases for the coming years took a significant leap, which should be seen in the light of the pressure on the labour market in recent years and the high price increases. However, a large part of the wage increases in manufacturing is yet to be negotiated locally on the firm level, see box 1. Based on the new collective agreements, wages are expected to increase by 4.7 per cent in 2023 and 5.3 per cent in 2024. The higher wage increases in the private labour market are also assumed to have an impact on wage increases in the public sector through an expected continuation of the agreed adjustment mechanism when a new collective agreement is to be concluded in 2024.

Danish wage increases are expected to be broadly in line with foreign wage increases, see chart 2. The OECD expects wage increases in the USA as measured by compensation per employee to be 4.6 per cent in 2023 and 3.5 per cent in 2024, while the European Central Bank, ECB, expects that wage increases in the Euro area will pick up in 2023 to 5.2 per cent and then decline to 4.5 per cent in 2024 and 3.9 per cent in 2025 as labour market pressures ease.[3]

2 Unit profits have risen very sharply in the supply and transport sectors, which are heavily impacted by energy prices and freight rates, but are almost unchanged when excluding these two industries.

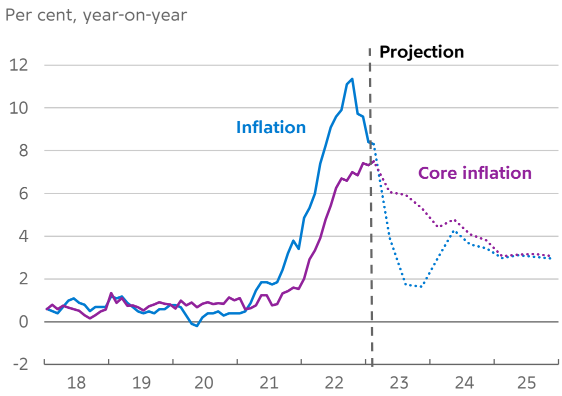
3 Wages in Denmark as measured by compensation per employee is expected to rise 4.4 per cent in 2023, 4.9 per cent in 2024 and 4.3 per cent in 2025 in this projection. This is among other things due to public sector wage increases picking up with a slight delay compared to the private sector.

Wage increases in Denmark are expected to fall to 3.9 per cent in 2025 as the pressure on the labour market eases, inflation comes down, and wage increases also diminish in the export markets with which Danish industrial enterprises compete.

Higher wage increases are expected to maintain a high level of inflation over the projection period

Inflation in Denmark is expected to fall significantly in the course of 2023 as the inflationary pressures caused by global conditions ease. However, this will be replaced by inflationary pressures driven by domestic conditions due to higher wage increases, and inflation is projected to fall, but still be high for most of 2023, see chart 3.

Inflation is expected to fall in 2023 Chart 3



Source: Statistics Denmark and own calculations.

Lower inflationary pressures from global conditions are particularly felt in the energy sector. Based on futures prices of electricity, gas and oil, i.e. the prices of energy contracts with delivery in the future, consumer prices of energy excluding taxes are assumed to remain around the current level for the rest of the year, similar to the level in the beginning of 2022. Consumer energy prices therefore no longer contribute to increasing inflation and are expected to be below the very high levels seen in 2022 in the course of 2023. Futures prices of electricity and gas can be very fluctuating over a short period of time, and the projection is very sensitive to these fluctuations, see more in the thematic section *Inflation is on the wane*. Energy prices are also contributing to bringing down core inflation as the indirect effects of energy price increases are gradually estimated to have had their full impact. For this reason, core inflation is expected to decline significantly during the course of 2023, but for 2023 as a whole, indirect effects will contribute significantly to core inflation due to high levels at the beginning of the year. In addition, core inflation is also assumed to be dampened by lower increases in the price of imported goods and services.

On the other hand, core inflation is expected to increase significantly due to higher wage increases, which are expected to raise domestic inflationary pressures significantly. Core inflation is expected to be 6.2 per cent in 2023, 4.3 per cent in 2024 and 3.1 per cent in 2025. Headline inflation is projected to decline significantly to 4.0 per cent in 2023 and 3.6 per cent in 2024 as a result of lower energy consumer prices. Towards the end of the projection period, headline inflation is estimated to be in line with core inflation at 3.0 per cent in 2025. Inflation in Denmark is projected to be lower than international organisations estimate for the euro area in 2023, while the forecast for core inflation is in line with the euro area for the projection period, see more in the thematic section *Inflation is on the wane*.

Significant monetary tightening worldwide

Central banks in most countries have tightened monetary policy significantly since the beginning of 2022 in order to bring down inflation. Both the European Central Bank, ECB and the Federal Reserve, Fed have also announced that they expect to raise monetary policy interest rates further, and that interest rates will remain high to bring inflation down to target. Market participants expected, when the data foundation for this projection concluded, that monetary policy interest rates will peak at slightly above 4 per cent in the euro area and 5.5 per cent in the USA in the 2nd half of 2023.[4]

In Denmark, Danmarks Nationalbank has largely followed the ECB's interest rate hikes, even though the monetary policy interest rate spread has widened to -0.4 percentage points to counteract an upward mar-

4 The projection is based on financial data up to and including 9 march 2023.

Collective agreements lead to significantly higher wage increases in Denmark and abroad

Box 1

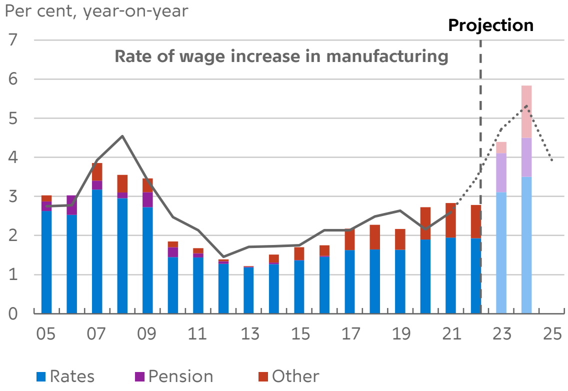
During February and March, a number of two-year collective agreements were concluded, all of which significantly increased the agreed wage increases compared to the previous collective agreement period. The collective bargaining agreements must be finally voted through, when agreements have been reached in all areas.

According to the breakthrough settlement in the manufacturing industry, wages are to increase by up to 11 per cent over two years. The minimum wages will go up by 7 per cent, and the free-choice scheme will be increased by 2 percentage points, while employees' pension contributions will be reduced by 2 percentage points. The changes in the free-choice scheme and pension contributions are determined centrally, while ordinary wage increases are negotiated locally at the firm level. Therefore, future wage developments may differ from what was agreed, but as a rule, wage increases in manufacturing follow the collective agreements relatively closely, see chart. The outcome of the collective bargaining in the other parts of the minimum wage area, which constitutes approx. 80 per cent of the private labour market, largely follows the breakthrough settlement for manufacturing.

In the standard wage area, where wage formation is determined in the central negotiations, a breakthrough settlement has also been made for transport, entailing a wage increase of up to 12 per cent. Here, an increase in hourly wages of 4.3 per cent has been agreed from the 2nd quarter of 2023 and a further 3.5 per cent from the 2nd quarter of 2024, as well as similar changes in the free-choice scheme and pension contributions as for industry, which brings up wage increases a further 4 percentage points. The outcome in other parts of the standard wage area broadly follows the breakthrough settlement in the transport area.

The wage increases in collective agreements are broadly in line with many other countries in Europe. In Germany, the agreed wage increases in the benchmark collective bargaining are at around the same level. In addition, the statutory minimum wages in other parts of the labour market have been raised, and the German central bank, the Deutsche Bundesbank, expects German wages to increase overall by around 5 per cent in 2023 and 2024.[1] In the Netherlands, wage increases of around the same level have been agreed to for 2023 and 2024.

Manufacturing wages typically rise in line with collective agreements



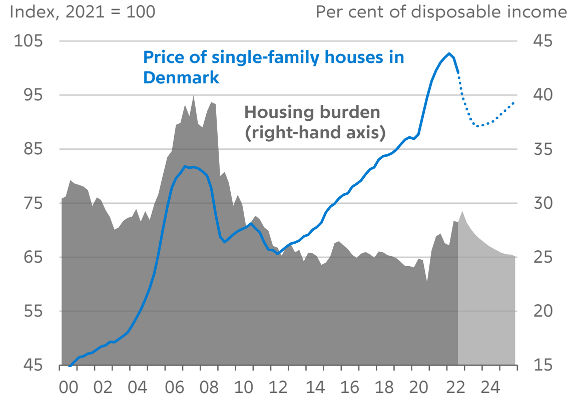
Note: The reference scenario includes rates, pensions, free-choice schemes etc. and has been calculated excl. inconvenience supplements. The reference scenario includes the Industrial Agreement (*Industriens Overenskomst for arbejdere*), Collective Agreement for the Construction and Civil Engineering Sectors (*Bygge- og anlægsoverenskomsten*), Collective Agreement for Retail Trade (*Butiksoverenskomsten*), Collective Agreement between 3F Transport and DI (*Fællesoverenskomsten*) and the Transport and Logistics Collective Agreement (*Transport- og Logistikoverenskomsten*). Own forecasts of the cost impacts of the most recent collective agreements based on information about the cost impacts of previous collective agreements. Forecasts are based on the Industrial Agreement and the Collective Agreement between 3F Transport and DI.

Source: The Statistics Committee's status report and own calculations.

1. See, for example, the German central bank's monthly report from December 2022.

ket pressure on the krone exchange rate against the euro.[5] Interest rates on fixed-rate mortgage bonds rose sharply already during the spring of 2022, and as the ECB and Danmarks Nationalbank started raising monetary policy interest rates from the summer of 2022, variable-rate housing loan interest rates also increased. The monetary tightening is estimated to have dampened growth in the Danish economy in 2022, and interest rate increases will slow growth even more in 2023 and 2024, among other things because interest rates on household and corporate loans will gradually rise.[6]

Significant drop in house prices brings down housing burden Chart 4



Note: Nominal house prices of single-family houses nationwide. 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. From 2024, property taxes are assumed to follow the development in house prices. The projection is Danmarks Nationalbank's projection from March 2023 and covers expectations for house prices, income and interest rates. The projection is based on Statistics Denmark's price statistics, where the latest observation is Q3 2022.
Source: Statistics Denmark, Boligsiden and own calculations.

Interest rate increases expected to cause house prices to decline further

The significant increases in interest rates, together with lower purchasing power, have led to a clear slowdown in the housing market. The interest rate increases add to the home buyers' debt service, while a lower purchasing power limits how much home buyers can or are willing to spend on a new home.

Trading activity has slowed down significantly over the past year and is 25 per cent lower than in the years leading up to the pandemic, see the thematic section *The decline in the housing market is affected by multiple factors*. The sales prices of single-family houses in February 2023 are 9.5 per cent lower than the peak in February 2022, while owner-occupied flats are 10.5 per cent lower than the peak in January 2022, according to Boligsiden's Market index.

This development is an indication of a market where sellers have not lowered sales prices enough considering what buyers are willing to and can afford to pay following the sharp rise in interest rates. Large price reductions are now being negotiated, and they have even increased further in recent months. This indicates that further price falls are in store. The full effect of interest rate increases is therefore not yet estimated to have had hit house prices in Denmark.

Declining house prices are expected to continue in 2023, as interest rate increases take full effect, see chart 4. From the 4th quarter of 2022, prices of single-family houses are estimated to fall by a further 6 per cent and then bottom out in the 3rd quarter of 2023, when prices will reach the mid-2020 level. This represents a price fall of 9.4 per cent for 2023 as a whole.

Prices of single-family houses are expected to rise again in the course of 2024, when interest rate increases have had their full impact and purchasing power continues to improve. In addition, the new property taxes contribute to increasing the prices

5 See the section "The Danish money and foreign exchange market" in Danmarks Nationalbank, Monetary policy will cool down the economy, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, No. 3, March 2023.

6 See the section 'Macro-financial developments' in Danmarks Nationalbank, Monetary policy will cool down the economy, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, No. 3, March 2023.

of single-family houses nationwide. The expectation of large price reductions through 2023 means that house prices measured year-on-year are expected to fall by 0.3 per cent in 2024 and increase by 2.9 per cent in 2025. The development in house prices bring the housing burden back to pre-pandemic levels.

The fall in house prices is also expected to cause a slowdown in residential investment, with rising interest rates leading to higher financing costs and falling house prices reducing incentives for new construction. Residential investment has declined slightly throughout 2022 and is estimated to decline by 7.7 per cent in 2023 and 4.4 per cent in 2024.

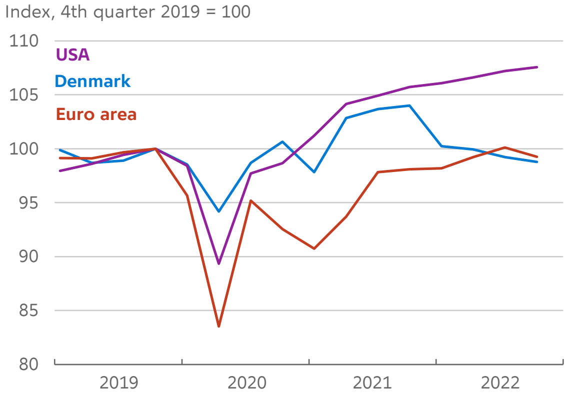
Weakened purchasing power and interest rate hikes also dampen private spending

Lower purchasing power has also led to a fall in private spending, as well as in house prices. Spending fell by around 5 per cent during 2022, mainly in goods. The figures for retail sales and payment card turnover suggest that spending recovered slightly at the beginning of the new year. At the same time, consumer confidence has increased slightly since autumn, although it remains at an all-time low.

The cyclical decline in spending is more advanced in Denmark than in the euro area and the USA, despite the fact that households are largely facing the same global impacts, see chart 5. This may be due to higher subsidies or tax reductions for energy consumption in the euro area, and that many southern European countries in particular have benefited from considerable income growth in the tourism sector. As wages have risen more in the USA, they have not seen the same fall in real wages, which must be seen in the context of the fact that the terms of trade have not weakened in the USA. At the same time, households in both the euro area and the USA have accumulated higher savings during the pandemic than in Denmark, partly as a result of larger relief packages.[7]

Subsidies for household energy consumption in such a large part of the regional energy markets with limited supply capacity will, in the short term,

Real private spending has declined over the past year Chart 5



Source: Macrobond.

inevitably push up market prices further, but this effect is distributed across the territory and not just the countries that subsidise. In addition, all forms of compensation for loss of purchasing power to some degree only postpone the necessary adjustment of spending required to bring down inflation.

Prospects for renewed growth in private spending as inflation slows down

Private spending is projected to pick up going forward in step with higher wage increases and lower inflation, resulting in a recovery of purchasing power as measured by real disposable income, see chart 6. Private spending is forecast to return in 2025 to the same level as before the energy price increases accelerated in 2021.

Households' purchasing power is expected to increase relatively fast in the first half of 2023, particularly owing to the declining energy prices. Purchasing power increases, despite the fact that the tightening of monetary policy in isolation significantly weakens purchasing power in early 2023 as households' interest costs rise.[8] From the second half of 2023, purchasing power is expected to increase

7 In the USA, additional savings during the pandemic amounted to more than 10 per cent of GDP, measured as differences between actual savings and counterfactual savings calculated on the basis of the average savings ratio in 2015-19. In Denmark, the additional savings amounted to around kr. 75 billion, corresponding to approx. 3 per cent of GDP, when disbursement of holiday pay is taken into account.

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

by around 1.0 per cent, since relatively high wage increases outweigh a decline in total employment. The loss of purchasing power in 2022 will thus be gradually recovered, and will be back to the same level as before the energy price increases accelerated in the course of 2025.

Private spending is expected to increase again in the 1st half of 2023, but the progress is estimated to be limited compared to the increase in purchasing power, since consumer confidence continues to be low. Private spending growth is expected to pick up during the second half of 2023, as low consumer confidence is not expected to dampen spending to the same extent. In the following years, spending is estimated to grow in line with the increase in purchasing power.

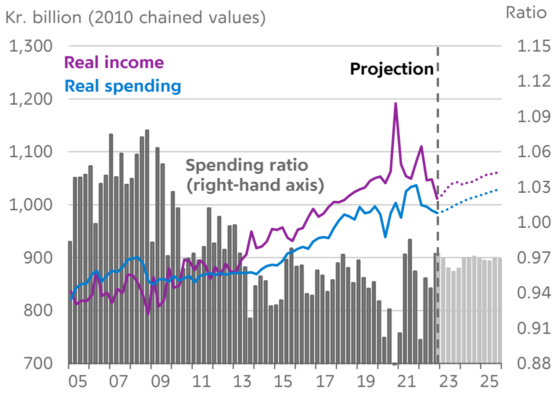
The spending ratio, i.e. spending relative to income, is estimated to remain at the same level as in the pre-pandemic years. This is relatively low in a historical perspective and should be seen in the light of the fact that many highly mortgaged borrowers reduced their spending after the financial crisis.[9] Danish households have gradually consolidated and generally have large savings, making it possible for them to withstand the decline in purchasing power. In addition, over the past year, the significant interest rate increases through 2022 have allowed many households to release liquidity in connection with conversion of mortgage loans. Around 30 per cent of the realised capital gains from conversions in 2022 have been released as liquidity, corresponding to kr. 13.5 billion, which corresponds to 1.1 per cent of disposable income.[10]

Monetary tightening dampens growth in Europe and the USA

The tightening of monetary policy in the euro area, coupled with high inflation, has led to a slight decline in private spending in the 4th quarter, albeit modest compared to the decline in Denmark through 2022. This has contributed to GDP in the euro area remaining unchanged in the 4th quarter relative to the 3rd quarter. In the USA, on the other hand, private spending has been bolstered by high wage increases and large accumulated savings. The US economy thus grew at a solid rate of 0.7 per cent in the 4th quarter.

Spending is on the rise again after large decline in spending and purchasing power

Chart 6



Note: Disposable income adjusted for disbursement of holiday pay.
Source: Statistics Denmark and own calculations.

However, higher interest rates are also likely to weaken growth in the US economy, and growth in both the euro area and the USA will be subdued in the coming years. Household purchasing power will continue to be curtailed by high inflation and more interest rate increases, which, together with low consumer confidence, point to a further slowdown in private spending. Higher interest costs can also dampen private investment. For example, residential investment in the USA has fallen sharply throughout 2022, partly as a result of higher interest rates. In Europe, the implementation of the EU's NextGenerationEU recovery plan and investments in energy

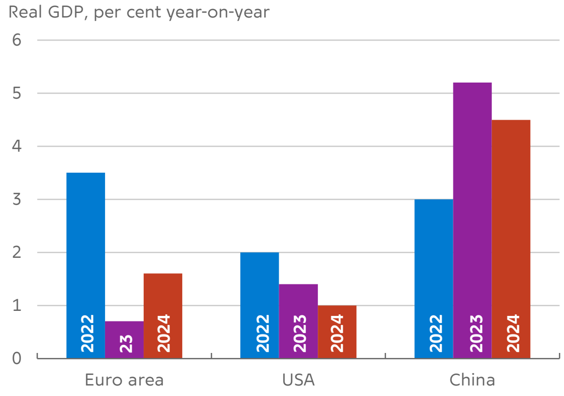
9 See Andreas Kuchler and Simon Juul Hviid, Consumption and savings in a low interest-rate environment, *Danmarks Nationalbank Working Paper*, No. 116, June 2017. Updated calculations show that highly mortgaged households cut their spending drastically up to 2021.

10 See Henrik Yde Andersen et al., *Refinancing behaviour by homeowners in Denmark when mortgage rates rise*, *Danmarks Nationalbank Economic Memo*, No. 2, February 2023.

infrastructure and defence are expected to increase public investment. Overall, the euro area fiscal policy will generally be neutral in 2023 compared to 2022, according to the European Commission, provided that many energy-related relief schemes will be rolled back in the course of the year. However, the neutral fiscal policy in 2023 should be seen in the context of significant fiscal easing in 2020-22. There is a risk that fiscal policy in the euro area could be more accommodative than expected, but it must expectedly be countered by a tighter monetary policy from the ECB, if it increases inflation.

In its latest forecast from January, the International Monetary Fund, IMF, expects euro area and US economies to grow by 0.7 per cent and 1.4 per cent, respectively, in 2023, see chart 7. However, the IMF points out that this is a mild slowdown in growth without a decline in activity. The expected slowdown in growth is reflected in a slight increase in unemployment, taking off some of the current high pressure on the labour market. Growth is not expected to pick up until the second half of 2024, when the slowing inflation will cause households' purchasing power to improve, contributing to a renewed recovery in private spending.

Prospects for lower growth in the euro area and the USA in 2023-24 Chart 7



Source: IMF.

Reopening in China will improve growth prospects but may also increase global inflation

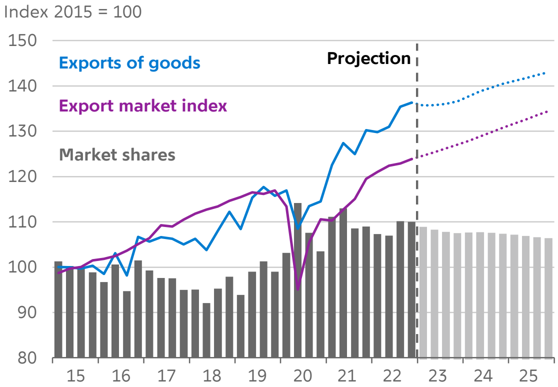
While advanced economies face a slowdown in growth this year, the Chinese economy is set to recover further. The economic development in China plays an important role in the economic growth in Denmark, as China has evolved into a large export market, see box 2. The expectation of higher growth in China is mainly due to the reopening of the Chinese economy in December. The pick-up in domestic activity will largely offset lower exports due to subdued demand from Europe and the USA.

The reopening of the Chinese economy is also expected to contribute positively to growth in the rest of the world, primarily through increased demand for foreign goods and services.[11] The increase in activity in China also has an impact on activity due to two opposing forces. On the one hand, the recovery may help maintain the high pressure on goods and services inflation, including through higher commodity prices. International organisations such as the ECB believe that China's reopening may cause gas prices in Europe to rise again as a result of greater competition for the supply of liquefied natural gas, LNG. On the other hand, fewer coronavirus restrictions in China could boost industrial production and help remove bottlenecks in global supply chains.

The IMF expects the world economy to grow by 2.9 per cent in 2023, of which more than a third will come from Chinese growth, which is expected to be 5.2 per cent. China will thus make a greater contribution to global growth in 2023 than in the years leading up to the pandemic and more than the euro area and the USA combined. According to the IMF, the expected increase in activity in China is one of the reasons for increasing global growth during the course of this year. Global growth through 2023 (from the 4th quarter of 2022 to the 4th quarter of 2023) is expected to be 3.2 per cent.

11 Several international studies, including from the IMF, find that an increase in Chinese GDP growth by 1 percentage point could pull up GDP in the rest of the world by about 0.3 per cent after 2-3 years. See People's Republic of China: 2022 article IV consultation, *IMF staff country report*, No. 2023/67, February 2023.

Danish export companies have gained market shares in recent years Chart 8



Note: The export market index provides a weighted estimate of Danish trading partners' imports.
Source: Statistics Denmark, OECD and own calculations.

Slowdown in export markets weakens exports and investment

Danish export companies have so far benefited from the growth in export markets, but the slowdown abroad is expected to put a damper on growth in exports in the coming year. Services exports in particular have made great progress over the past year as bottlenecks in the world economy have been resolved. At the same time, there has also been extensive growth in goods exports, which has been significantly stronger than export market growth, i.e. the growth in imports for Denmark's trading partners, see chart 8.

Industrial production has fared significantly better in Denmark than abroad, which is mainly due to the extensive production in the pharmaceutical industry. December saw an unusually large increase in production in the pharmaceutical industry of 45 per cent, which resulted in a significant boost to GDP growth in the 4th quarter of 2022. Production fell back partially in January, but is still significantly higher than in the autumn of 2022. It is not yet clear to what extent production in the pharmaceutical industry is now permanently higher, but assuming that the January level is maintained, it will also contribute to GDP growth in the 1st quarter of 2023 and is estimated in isolation to raise GDP levels by almost 1 per cent over the projection period. The sharp increase is presumably due to production abroad under Danish ownership, which

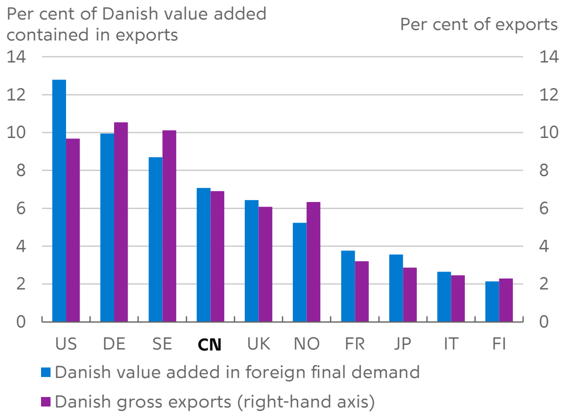
China's importance to the Danish economy has grown Box 2

China has become a major trading partner for Denmark in recent years. In 2018, China was the fourth biggest export market for Denmark and accounted for approx. 7 per cent of the final demand for Danish exports, see chart. This is a significant increase from just under 3 per cent in 2007. Chinese demand plays an important role in value creation in Denmark, especially in the pharmaceutical and transport industries. At the same time, almost 3 per cent of private employment in Denmark was linked to Chinese demand.

China's impact on Danish inflation stems from its important role in world production and influence on commodity prices. According to the IMF, greater recovery in the Chinese economy could bring back inflationary pressures through higher energy and metal prices.[1]

The Danish and global economies share some vulnerabilities in relation to China, primarily related to the security of supply of critical goods. For example, China dominates the supply chains for the green transition and accounts for 70 per cent of the world production of rare earths[2] and 84 per cent of the global production of solar panels.[3]

China is one of Denmark's largest export markets



Note: Data are for 2018 and include goods and services. Danish value added in foreign demand takes into account the full value chain for Danish exports and shows where the Danish value added is ultimately sold.
Source: OECD (TiVA) and own calculations.

1. See IMF *World Economic Outlook Update*, January 2023.
2. See Mineral commodity summaries, US Geological Survey, January 2023.
3. See Executive summary, Solar PV Global Supply Chains, IEA.

means that Danish production increases significantly without having any effect on Danish employment.[12] However, throughout 2022, the pharmaceutical industry was a key factor behind the increasing industrial production, adding to the large increase in goods exports.[13] However, even excluding the pharmaceutical industry, industrial production has performed well measured by an international yardstick.

Lower growth in Denmark's export markets is expected to lead to a weaker development in exports through 2023. In the industrial sector, the export order book has shrunk in recent months. It is now slightly lower than in the years leading up to the pandemic, but this does not signal a major cyclical reversal as during the financial crisis. In the short term, Danish goods exports are expected to lose some of the market shares gained since the pandemic. After this, exports are still expected to progress over the remainder of the projection period.

Corporate investments are expected to decline sharply this year, reflecting lower growth in exports and industrial output, as well as financing costs for businesses. Already, the pressure on production capacity has eased considerably. Corporate investments are expected to decline by 6.6 per cent in 2023, as corporate financing costs increase, and the tightening of fiscal policy in general dampens activity in the economy at home and abroad. In the following years, investments will pick up slightly as exports recover, and the tightening of monetary policy has been fully transmitted to financing costs.[14]

Growth slowdown in Denmark puts the economy close to a neutral cyclical situation

As the monetary policy tightening is transmitted to the Danish and international economy, the downturn in private spending in Denmark is expected to be accompanied by a slowdown in exports and a marked decline in residential and corporate investments. This is expected to lead to an underlying small decline in Danish production in 2023; however, the significant increase in production in the pharmaceutical industry is assumed to increase GDP in Denmark. The higher production in the pharmaceutical industry is not expected to increase employment or capacity pressure in the Danish economy, and the underlying small decline in Danish production is expected to put the economy close to a neutral cyclical situation by the end of the year.

The underlying small decline in Danish GDP is expected to occur especially in the first half of the year, as exports start to decrease, the slowdown in investment accelerates and low consumer confidence continues to dampen private spending. As growth picks up slightly abroad, purchasing power continues to rise, and the low consumer confidence is not expected to dampen private spending to the same extent, renewed growth in exports and private spending is expected to lead to a slight increase in GDP in the second half of 2023.

Aggregate demand is projected to decline by 0.7 per cent in 2023, despite an increase in public demand. Imports are estimated to decline more than aggregate demand by 3.4 per cent and GDP is expected to increase by 0.9 per cent in 2023. The significant increase in production in the pharmaceutical industry taken in isolation is estimated to contribute 0.7 percentage points to GDP growth in 2023, while there is a small underlying decline through 2023. It is weaker than abroad, where the prospect is a mild growth slowdown without a decline in activity.

As the decline in residential and corporate investments slows down during 2024, growth will pick up.

12 See Adrian Michael Bay Schmith, Erik Haller Pedersen and Rasmus Rold Sørensen, Globalisation affects measures of wage competitiveness, *Danmarks Nationalbank Analysis*, No. 27, December 2019.

13 In addition to a large increase in pharmaceutical exports, there has also been a large increase in exports of goods produced abroad under Danish ownership, where the pharmaceutical industry plays a major role. The pharmaceutical industry's share of sales of goods produced by subcontractors has increased from 40 per cent in 2021 to 50 per cent in the 4th quarter of 2022.

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

GDP is projected to grow by 1,2 per cent in 2024 and 2025, respectively.

The growth slowdown in Danish GDP through 2023 implies that most of the output gap, i.e. the difference between actual production and the estimated potential level of production, which is compatible with stable wage and price developments, will be closed by the end of 2023, see chart 9. From the beginning of 2024, growth is expected to be in line with potential growth, and the Danish economy is expected to be close to a neutral cyclical situation. However, the outlook for the Danish economy is contingent on international organisations such as the IMF expecting central banks to successfully bring down inflation without pushing the world economy into a recession.

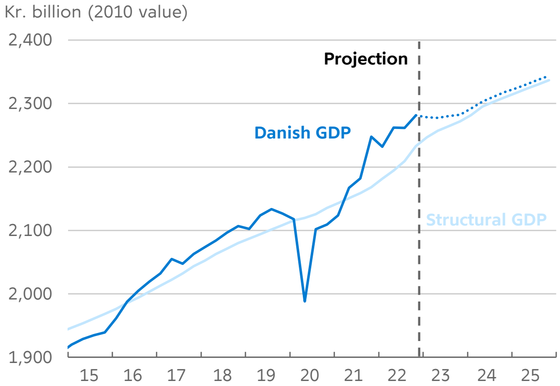
The balance of payments surplus is expected to decline in the coming years from 12.8 per cent of GDP in 2022 to 9.1 per cent of GDP in 2025, as lower freight rates weaken Denmark's terms of trade with the rest of the world, see chart 10. The balance of services surplus was boosted in 2022 by the extraordinarily high freight rates, but is expected in the last part of the projection period to be at about the same high level as in the pre-pandemic years.

High inflation improves government budget surplus

The government budget surplus is projected to reach 1.5 per cent of GDP in 2022, despite a large decline in revenue from the pension yield tax, PAL. The surplus is expected to remain at 1.5 per cent of GDP in 2023, despite the cyclical downturn. This should be seen in the context of high inflation improving 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 the private wage increases with a delay. In addition, the proceeds from the PAL tax will increase slightly again. The government budget surplus is estimated to increase to 1.9 per cent of GDP in 2024, before falling back to 1.5 per cent in 2025.

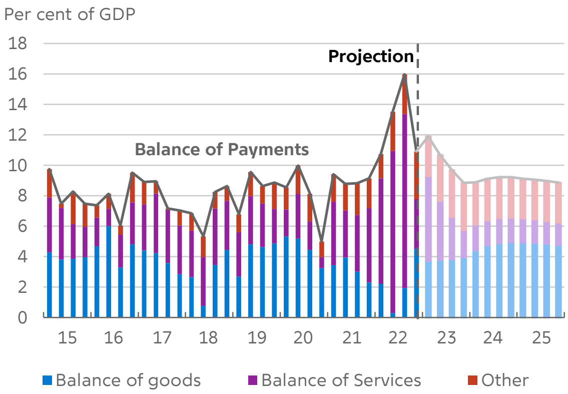
The Ministry of Finance estimates that fiscal policy with the Finance Bill presented in August will dampen growth in 2023 as measured by the one-year financial effects. Much of the tightening is due to the abolition of temporary measures that propped up the economy during the pandemic, including the discontinuation of many compensation schemes. Excluding compensation schemes, there is a slight tightening measured by

The output gap will close by the end of 2023 Chart 9



Note: *Structural GDP* is the long-term level of sustainable real output in the economy without creating inflationary pressures. *Structural GDP* at the end of 2022 and beginning of 2023 is lifted in particular by the unusually large increase in production in the pharmaceutical industry.
Source: Statistics Denmark and own calculations.

Maritime transport surplus reduces balance of payments surplus Chart 10



Note: *Other* indicates net receipts from primary income and secondary income.
Source: Statistics Denmark and own calculations.

the one-year effects. At the same time, however, the Ministry of Finance estimates that there are significant after-effects from the temporary measures during the pandemic, and overall, fiscal policy continues to increase capacity pressures in the economy, as measured by the multi-year effects. There is considerable uncertainty about the extent of the after-effects from, for example, the disbursement of holiday pay, and the sharp decline in spending already in 2022 may indicate that the contribution of fiscal policy to capacity pressure is currently smaller than the multi-year effects implies. The Ministry of Finance estimates that, in the coming years, the activity impact of fiscal policy will be neutral for capacity pressures measured by the one-year effects, and that the surplus on the structural balance will come down from 0.4 per cent in 2023 to balance out in 2025.

Slowdown in the labour market with some delay
The slowdown in activity is also expected to lead to a reversal in the labour market with higher unemployment and lower employment. Growth in employment continued through December, but the pace slowed somewhat towards the end of 2022. At the same time, there has been a slight increase in unemployment over the turn of the year.

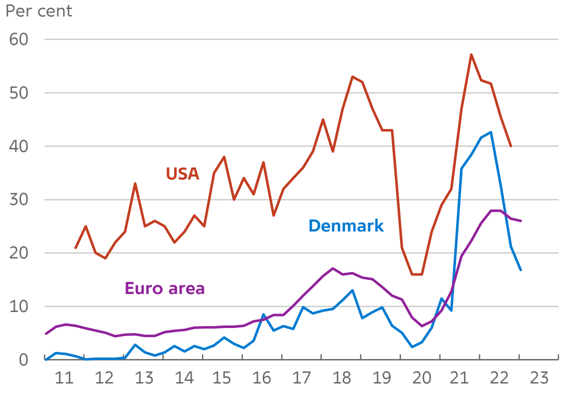
The number of job postings and the labour shortages reported by employers have fallen considerably over the winter, suggesting that labour market growth is slowing down further. However, the number of job postings is still high, just as employers still report extensive labour shortages, leaving some uncertainty about when the turnaround in the labour market will occur and how strong it will be. Labour markets are seeing growth in both the euro area and the USA, with many businesses reporting high labour shortages, see chart 11.

Changes in output will typically affect the level of employment with a delay, and employment is expected to fall in the 1st half of 2023. Output and labour market gaps suggest that the delay is around two quarters for the overall economy, see chart 12. Employment expectations in construction and industry show signs of a slightly faster pass-through of around three months.

The turnaround in the labour market is expected to be moderate when it materialises in the spring of 2023. Employment is estimated to decrease by 45,000 persons towards the end of 2025. This development implies that hourly productivity in the

Many businesses in both Denmark and abroad still report labour shortages

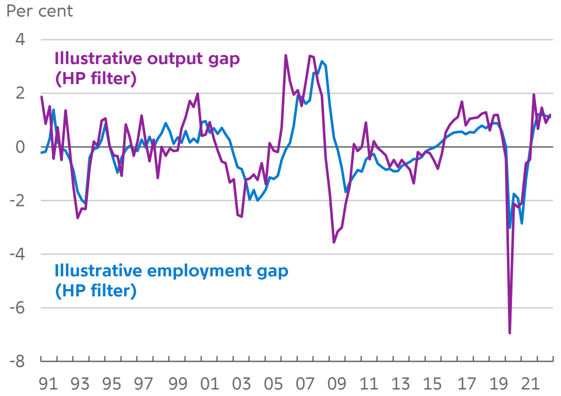
Chart 11



Note: Denmark and the euro area show the proportion of businesses that report labour shortages in manufacturing. USA shows labour shortages of skilled labour.
Source: Statistics Denmark and Macrobond.

Employment typically reverses two quarters later than production

Chart 12

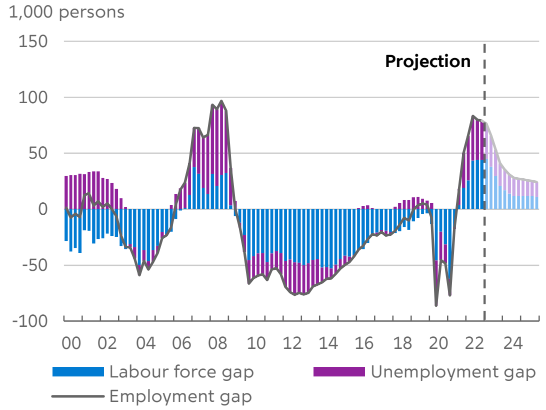


Note: The gap is calculated as the difference between the actual value and an illustrative potential value estimated with an HP filter.
Source: Statistics Denmark and own calculations.

non-primary sector will increase by around 1 per cent over the projection period, which is in line with estimated potential productivity growth.

The fall in employment is taking further pressure off the labour market. Unemployment is estimated to increase by around 20,000 people over the projection period. However, labour market pressures will remain significant through 2023 even if most of the output gap closes, see chart 13. Only towards the end of 2025 will unemployment be around 100,000 people.

Employment gap will be sharply reduced in the coming years Chart 13



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

Risk outlook linked to persistently high inflation
The risk outlook for the Danish and international economy largely depends on whether inflation takes hold. It is crucial that central banks bring inflation under control before high inflation leads to a slide in inflation expectations. Otherwise, this may result in a wage-price spiral in which expectations for future wage and price developments mutually reinforce each other, see more in the thematic section *Inflation expectations are still well-anchored*. The longer inflation is high, this risk will increase. Although inflation is on the decline, energy price developments remain very uncertain, and the risk of a slide in inflation expectations has not been averted. High inflation as a result of a slide in inflation expectations makes it noticeably more costly to reduce inflation through a recession with high unemployment.

There is uncertainty about how quickly central bank interest rate increases will impact activity and inflation, and how much.

On the one hand, there is a possibility that the pass-through of the interest rate assumptions underlying this projection and international forecasts will be more pronounced than expected during this year, thereby reducing growth abroad and in Denmark significantly more than in the main forecast scenario. However, it will also bring down inflation faster.

On the other hand, there is also a risk that the pass-through of interest rate assumptions will not be sufficient to bring inflation under control in the coming years. For example, in both the USA and Europe, there are many vacancies at present, which may prevent labour markets from declining and price and wage pressures from being sufficiently dampened even if demand subsides. Should the pass-through prove insufficient to bring inflation under control, central banks have shown great determination in adjusting monetary policy to achieve their objective.

Judging by inflation expectations in the financial markets, there is confidence that central banks will get inflation under control. If monetary policy needs to be tightened more than currently planned, this could dampen activity in the world economy more than projected in the main forecast scenario.

There are also other risks in the outlook for the Danish and international economy that are not linked to a wage-price spiral. If inflation is brought under control quickly and the supply situation becomes more secure, there are also risks that greater purchasing power and less uncertainty in households will lead to a sharp increase in private spending. This risk is especially prevalent in Denmark, where spending has slowed the most. Greater purchasing power may once again increase the pressure on the labour market and lead to the Danish economy overheating.

Increased protectionism or a shift to greater self-sufficiency motivated by security considerations can also weaken the growth trajectory in the world economy. Ongoing geopolitical tensions between the USA and China could result in more trade and investment restrictions. This could lead to renewed disruptions in international supply chains and, in the longer term, weaken productivity and prosperity through weaker labour and knowledge sharing. Supply disruptions may also resurface if low vaccine

Key economic variables

Table 1

Real growth relative to the previous period, per cent	2022	2023	2024	2025	2022 Q2	2022 Q3	2022 Q4
GDP	3.6	0.9	1.2	1.2	1.3	0.0	0.9
Private spending[1]	-2.5	0.2	1.8	1.2	-0.3	-0.7	-0.4
Public consumption	-2.8	1.2	1.1	1.6	-1.3	-1.8	-0.1
Residential investments	7.8	-7.7	-4.4	-1.2	0.1	1.1	-2.0
Public investments	0.0	2.9	4.5	2.2	1.8	2.8	3.5
Corporate investments	10.8	-6.6	-2.1	0.9	0.0	1.6	19.9
Inventory investments etc.[2]	0.9	-0.4	0.0	0.0	3.2	3.3	3.7
Exports	7.9	0.4	2.4	2.4	2.5	2.3	-1.8
Industrial exports	7.6	5.1	2.1	1.9	2.3	2.2	3.0
Imports	3.8	-3.4	1.9	2.5	2.3	-0.5	0.7
Employment, 1,000 persons	3,164	3,173	3,148	3,141	3,157	3,170	3,183
Gross unemployment, 1,000 persons	76	88	97	100	74	77	78
Balance of payments on current account, per cent of GDP	12.8	10.3	9.1	9.0	13.5	16.0	10.9
Government budget balance, per cent of GDP	1.5	1.5	1.9	1.5	1.4	1.2	2.8
House prices[3], per cent year-on-year	-0.4	-9.4	-0.3	2.9	2.4	-1.8	-7.0
Consumer prices (HICP), per cent year-on-year	8.5	4.0	3.6	3.0	8.2	10.2	10.2
Hourly wages[4] (manufacturing), per cent year-on-year	3.5	4.7	5.3	3.9	3.2	3.3	3.7

Source: Statistics Denmark and own calculations.
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. Danish Employers' Association pay-roll costs, including inconvenience supplements for manufacturing.

uptake in China leads to new flare-ups of infection and new lockdowns. Renewed supply disruptions will also increase inflation.

In China, the real estate sector, with its massive indebtedness, also poses a significant risk to the global economy.[15] Admittedly, the risk of a crisis has diminished in the short term after the Chinese authorities urged banks to meet the financing needs of troubled property developers. However, this will help to increase the already high level of indebtedness and will thus hardly reduce the risk of a serious crisis in the long term.

15 A deep crisis in the Chinese real estate sector could reduce global GDP by up to 1.3 per cent after one year, see box 2. See IMF, Growth spillovers to the rest of the world from a slowdown in China, *IMF Regional Economic Outlook,* October 2022.

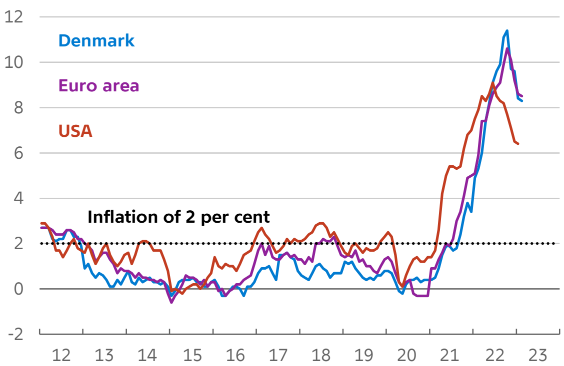
Inflation is on the wane

The world economy is still characterised by large supply/demand shifts, which in several Western countries have led to very high inflation far above the major central banks' targets, see chart 14. It is particularly the combination of the coronavirus pandemic, Russia's invasion of Ukraine and the fierce economic policy responses that have created a situation since 2021 where global goods and services production is not sufficient to meet the increase in demand. The high inflation is very much an international phenomenon, which is characterised by, among other things, strong US demand for internationally traded goods supported by previous fiscal stimuli also having knock-on effects on prices across the other advanced economies.

Consumer price increases have peaked, but core inflation remains high Chart 14

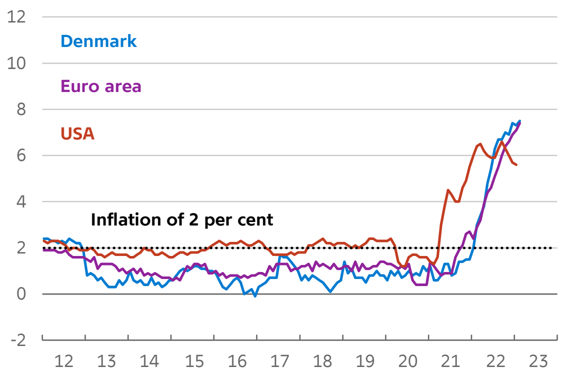
Inflation

Per cent, year-year



Core inflation

Per cent, year-year

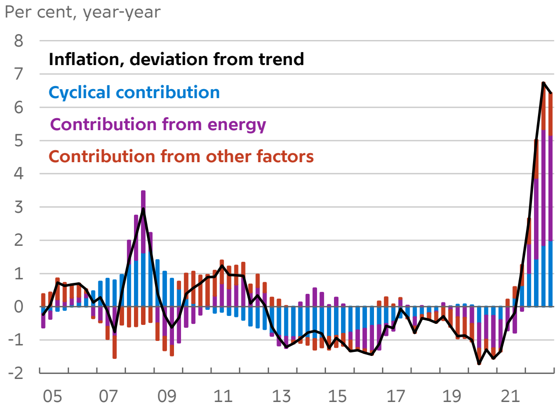


Note: Left-hand chart: HICP inflation for Denmark and the euro area and CPI inflation for the USA. Right-hand chart: Core HICP inflation, i.e. inflation excluding energy and unprocessed food for Denmark and the euro area. For the USA, core CPI inflation is shown.
Source: Macrobond.

In Denmark and the rest of Europe, the high consumer price increases are mainly related to the massive energy shock that through price formation has spread across the economy. The large fluctuations in energy prices are mainly due to a reduced energy supply after the Russian invasion of Ukraine, but energy prices were moving upwards already before the war, partly because the strong economic recovery in the wake of the pandemic increased the demand for energy products.[16]

There are several signs that the extraordinarily high inflation is on the way down, as many of the previous drivers of consumer price increases have faded out over the winter: Firstly, energy prices have fallen from a very high level, as the security of supply situation in Europe towards next winter is now looking better, and energy consumption has fallen. Secondly, lower price increases at the early stage of production and fewer disruptions to global supply chains in isolation reduce price pressures in the goods-producing industries. Finally, tighter global monetary policy and the deterioration of household purchasing power contribute to dampening demand across countries. The current cyclical turnaround is thus expected to gradually reduce consumer price increases with some delay. Nevertheless, core Danish inflation will remain consistently high in the coming years due to the effect of the highest agreed wage increases in several decades.

Energy prices and boom boost Danish consumer prices Chart 15



Note: The sum of the contributions in the chart corresponds to the deviation of inflation from a trend, meaning that it is not identical to actual inflation. The chart is based on a trend-cycle model in which HICP inflation is decomposed into contributions from a trend, energy prices and capacity pressures measured via a Phillips curve for the output gap for the Danish economy.
Source: Statistics Denmark and own calculations.

Danish inflation is largely driven by foreign factors, but is amplified by domestic capacity pressures

Denmark is a small open economy, where price developments are greatly influenced by global conditions, among other things because consumer energy and food prices depend on supply and demand conditions in the global market. In addition, Danish businesses engage heavily in international trade, making the price of imported goods and services extremely important to price formation.

Although the high inflation in Denmark largely comes from outside, the strong domestic capacity pressure in 2022 has also pushed up consumer prices. Model calculations indicate, e.g., that cyclical pressures in the Danish economy measured by the output gap, i.e. the difference between actual and potential production, brought consumer price increases up by approx. 2 percentage points above their trend in the 4th quarter of 2022, see chart 15.

However, several different indicators overall give the impression that the high Danish inflation is mainly driven by global conditions.[17] Specifically, model calculations indicate that indirect price effects from energy currently increase the high core inflation in Denmark significantly, see box 3. Furthermore, wage increases have so far been moderate, and the unchanged profit margins in the private non-primary sector excluding utilities and transport suggest that

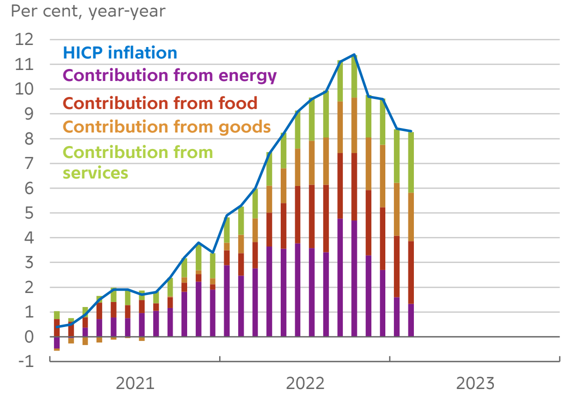
16 For a detailed discussion of the causes of rising global inflation in 2021-2022, see Thomas Harr and Morten Spange, Inflation – why did it rise and what are the drivers ahead? *Danmarks Nationalbank Economic Memo*, No. 3, February 2023.

17 Danmarks Nationalbank has previously estimated that spillover effects from the global inflation cycle lifted Danish inflation by almost 6 percentage points in July 2022, while approx. 1 percentage point could not be explained by global inflation, see box 1, 'Global inflation cycle and strong domestic capacity pressures are increasing consumer prices in Denmark' in Danmarks Nationalbank, The pressure on the economy should be eased, *Danmarks Nationalbank Analysis (Outlook for the Danish economy),* No. 11, September 2022.

the high inflation is not driven by a separate increase in Danish corporate profit margins. However, at the same time, the almost unchanged profit margins despite increased costs for energy, among other things, indicate that the strong demand pressure in the Danish economy in 2022 has also pushed up sales prices. Finally, Danmarks Nationalbank's calculation of domestic market-determined inflation, IMI, i.e. the part of price developments reflecting fluctuations in wages and corporate profit margins, is still limited relative to general consumer price increases, see box 4.

Global and domestic conditions interact to affect consumer prices, and in practice, it is difficult to accurately identify each of their contribution. It is possible that the Danish cyclical situation is further reinforcing the otherwise external price impact. In Denmark, like our closest neighbours, we are now looking at the highest agreed wage increases in several decades. Capacity pressures in the Danish economy and other domestic factors such as wage developments therefore still play a decisive role in determining whether inflation will take hold, even if it initially originates outside Denmark's borders.

All parts of consumer prices contribute to high Danish inflation Chart 16



Note: *Food* covers food, alcohol and tobacco, while *goods* are non-energy goods.
Source: Statistics Denmark and own calculations.

High energy prices affect all parts of consumer prices in Denmark

Inflation in Denmark, as measured by the EU harmonised index of consumer prices (HICP), has slowed down since the autumn due to declining energy price increases and stood at 8.3 per cent year-on-year in February, see chart 16. The high consumer price increases represent large price increases across all parts of the consumer price index, supported by indirect price effects from increased energy costs and accumulated demand.[18] Food inflation was particularly high at approx. 15 per cent year-on-year in February, partly because of the heavy price pressure at the producer level, which is still being passed on to consumers.

Core inflation, i.e. consumer prices excluding energy and unprocessed food, remains very high, rising 7.5 per cent year-on-year in February. In addition to direct increases in the price of energy products, high energy prices also affect consumer prices indirectly by increasing the production cost of other consumer goods. This means that core inflation will also be affected by high energy prices with some delay, even excluding proper energy products. Consumer prices, which traditionally depend on energy prices, are currently rising at a faster pace than the prices of other goods and services. For example, the oil price sensitive part of core inflation rose almost 11 per cent year-on-year in February, which is more than the Danish core inflation as a whole.[19] This adds to the impression that high energy prices are currently affecting all parts of consumer prices.

Energy prices have decreased since autumn, putting less of an upward pressure on inflation

Global energy markets are characterised by strongly elevated and very volatile prices as a result of the war in Ukraine, see chart 17. Energy commodity prices for oil, gas and electricity have generally fallen significantly since the peak last autumn, as the security of supply situation in Europe over the winter

18 Tax changes reduced HICP inflation by 0.9 percentage points in February 2023, measured as the difference between HICP inflation with and without tax changes, i.a. due to lower electricity charges.

19 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 further definition, see Anne Ulstrup Mortensen and Jonas Staghøj, Falling oil and consumer prices, *Danmarks Nationalbank, Monetary Review 1st quarter of 2015*, March 2015.

improved. The decrease is due, among other things, to mild weather and energy savings dampening energy consumption in the EU, which was approximately 15 per cent lower in the 4th quarter of 2022 than the average in the same period in the years 2011-19. On the supply side, the inflow of, among other things, LNG gas has helped to replace the previous gas imports from Russia with other energy sources.

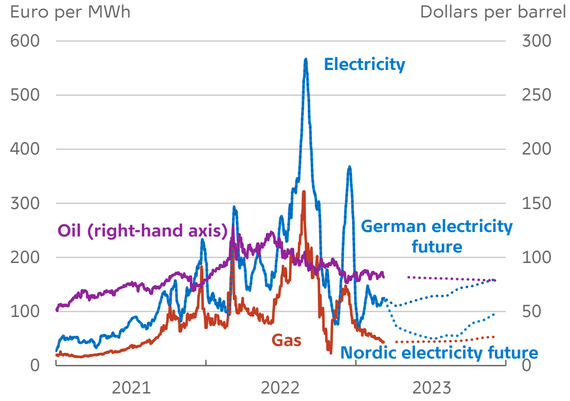
High energy prices are still a major cause of inflation at home and in Europe, while they play a somewhat smaller role as a driver of US inflation. Since the autumn, however, the annual rate of increase in Danish consumer energy prices has fallen noticeably, and energy is now exerting less of a direct pressure on inflation than before, see chart 18.

In Denmark, as part of the winter aid package, the electricity tax was temporarily lowered from 1 January until 1 July 2023, which has further reduced consumer energy prices from the turn of the year, see chart 19.[20] The tax reduction is estimated to reduce headline HICP inflation by 0.4 percentage points in 2023, while the subsequent rollback will, conversely, result in a corresponding increase in inflation of 0.4 percentage points in 2024, which means that the measure merely postpones price increases, and that electricity consumption goes up in the meantime.

In the euro area, comprehensive price-distorting fiscal measures have been implemented to compensate households and businesses for the high energy prices. The use of subsidies and tax reductions supports the consumption of energy and thus increases market prices in the affected regional markets for, among other things, electricity and gas.

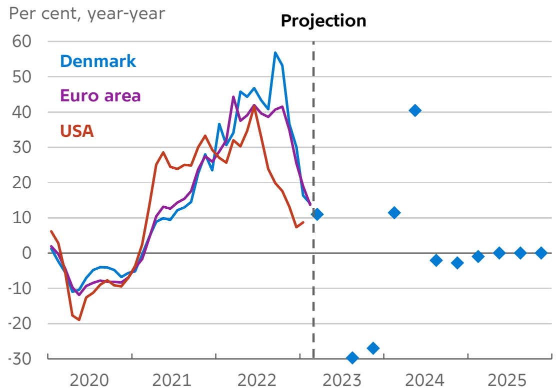
The outlook for energy prices is subject to greater uncertainty, entailing a risk of stronger inflation than envisaged in the main projection scenario. These uncertainties include the fact that energy prices may be higher than expected due to supply problems stemming from the war in Ukraine, adverse weather conditions or that the high level of price-distorting subsidies in the euro area counteract the necessary adjustment of energy consumption and push energy

Commodity prices for energy have fallen since autumn Chart 17



Note: The electricity price refers to the average Nordpool price measured as a 14-day moving average. The gas price is the price of TTF natural gas, and the oil price is the price of a barrel of Brent oil. Dotted lines indicate futures prices.
Source: Macrobond.

Consumer energy price increases are expected to fall further Chart 18



Note: The chart shows HICP energy inflation for Denmark and the euro area, including Danmarks Nationalbank's projection for Denmark. For the USA, core CPI inflation is shown.
Source: Macrobond and own calculations.

20 See Ministry of Finance, *Regeringen indgår bred aftale om vinterhjælp for at afbøde de stigende energiregninger*, press release, 29 September 2022.

commodity prices upwards. In addition, European gas prices have become more sensitive to global energy demand as LNG gas inflows have replaced imports of Russian gas, the price of which was determined to a greater extent by regional market conditions.[21] This entails a risk that, for example, China's reopening will increase energy demand and create new upward pressure on gas prices in Europe.

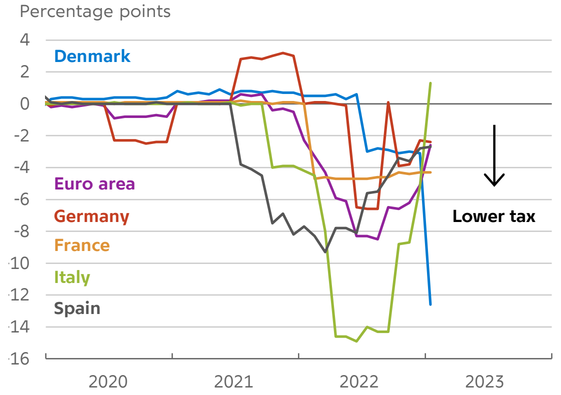
The projection is based on futures prices of energy commodities, indicating that oil, electricity and gas prices will remain approximately at current levels until next winter.[22] The assumptions imply that the annual rate of increase in consumer energy prices will be highly negative at the end of 2023, reflecting market expectations of lower energy commodity prices compared to 2022 and base effects, i.e. energy inflation will decrease mechanically, as the relatively low prices from 2021 are no longer included in the annual rate of increase. In 2024, energy inflation will increase again, in part because the temporary electricity tax reduction is phased out.

Over the past year, the high level of uncertainty about energy supply has led to significant fluctuations in market expectations for future energy commodity prices. Therefore, the exact date of completion of the data underlying a projection is of great importance for the inflation estimate. For example, a sensitivity calculation shows that Danmarks Nationalbank's forecast for inflation in Denmark would be 6.4 per cent in 2023 instead of 4.0 per cent if it were based on market expectations for energy commodity prices in September 2022 instead of at the completion of the data underlying this projection, see chart 20.

Businesses have passed on many of the increased costs to consumers

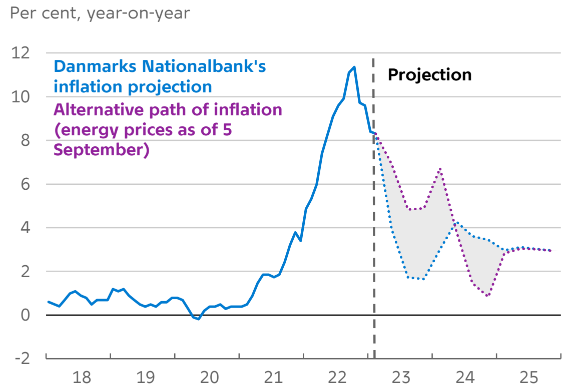
Corporate profit margins play a crucial role in domestic price formation and give an impression of whether increased energy costs, for example, have been fully

In isolation, lower electricity tax reduces energy prices in Denmark Chart 19



Note: The contribution is calculated as the difference between actual HICP energy inflation and energy inflation measured with constant taxes.
Source: Macrobond.

Sensitivity calculation shows that fluctuations in energy prices significantly affect inflation projection Chart 20



Note: The chart shows Danmarks Nationalbank's HICP inflation projection and an alternative scenario based on market expectations for energy commodity prices for electricity, oil and gas.
Source: Own calculations.

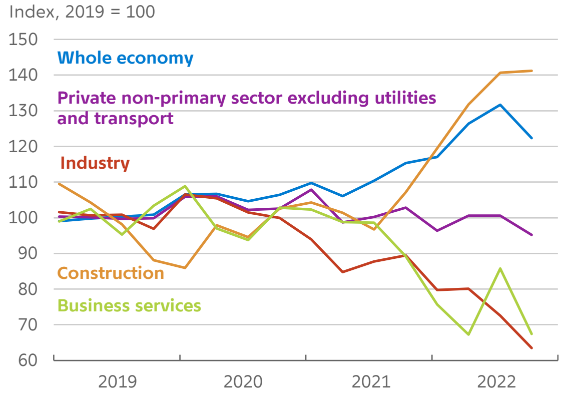
21 See Jakob Feveile Adolfsen et al., Global risks to the EU natural gas market, *ECB Bulletin,* No. 1, February 2023.

22 The projection uses an average of German and Nordic futures electricity prices rather than only the Nordic ones as in Danmarks Nationalbank's projection from September 2022. The change in methodology should be seen in the context of the fact that the high energy prices over the past year have added to the fragmentation of energy markets and resulted in relatively large local price differences across Europe. The information from a wider range of electricity markets is therefore considered to be more accurate for the future development in Danish consumer electricity prices than from just a single market.

reflected in consumer prices. Higher production costs will initially lead to a decrease in profit margins if businesses do not quickly raise sales prices accordingly. A decrease in profit margins may therefore be an indication that indirect price effects from energy and other costs have not yet been fully passed on to consumer prices. However, unit profits, i.e. profits relative to gross value added in volumes, in the private non-primary sector excluding transport and utilities have remained more or less unchanged over the past year despite cost pressures, see chart 21. This indicates that companies have to a large extent already passed a significant part of the increased costs on to their sales prices, although there are differences across industries, and the quarterly national accounts on which the calculation is based may be subject to further revisions.[23] Independently of cost developments, the prices of goods and services are usually pushed up when they are in short supply. This means that the high demand pressure in the Danish economy in 2022 has likely also separately propped up corporate profit margins in parts of the economy.

Unit profit is more or less unchanged in the private non-primary sector despite cost pressures

Chart 21



Note: Unit profits are defined as gross surplus in the national accounts in relation to gross value added in volumes. The chart shows selected industries, i.e. they do not add up to the entire economy.
Source: Statistics Denmark and own calculations.

The development of unit profits suggests that the extraordinarily high energy prices have given rise to a rapid and extensive pass-through from the rising costs to sales prices, possibly because the strong demand in the wake of the pandemic also created an environment that made it easier for businesses to pass higher costs on to consumers. The main scenario in the projection is therefore that the currently high indirect price effects on core inflation will diminish over time, thereby contributing to dampening underlying price pressures in the economy.

Monetary tightening reduces inflation over time

In addition to the fall in energy prices, central bank interest rate hikes around the world will also drag down inflation. However, there is some uncertainty about when interest rate increases will be reflected in activity and inflation, and how strong the pass-through will be. A model calculation indicates that unexpected interest rate increases from the ECB, i.e. increases beyond market expectations, which result in an increase in the Danish 12-month money market interest rate of 1 percentage point, usually dampen consumer prices by just over 1 per cent after one year, see chart 22.[24] The estimated decline in inflation is due to the fact that tighter monetary policy initially affects energy prices, which typically react quickly, after which other consumer prices gradually dampen as activity slows down. Also, a tighter monetary policy will lead to a strengthening of the effective krone rate, which reduces the price of imported goods and thus consumer prices.

Overall, the results of the model calculation suggest that monetary tightening is effective in combating

23 In addition to the statement in the national accounts, the accounts from Danish public limited companies add to the impression of robust corporate earnings despite the increasing cost pressure, see Danmarks Nationalbank, Monetary policy will cool down the economy, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, No. 3, March 2023.

24 Other recent studies find a slightly less pronounced effect of monetary policy shocks on inflation abroad. For example, the ECB estimates that a 1 percentage point increase in the monetary policy interest rate in the euro area dampens inflation by up to 0.4 percentage points after one year, see ECB, Phillip Lane, The euro area hiking cycle: an interim assessment, *speech*, 16 February 2023. In the UK, there is also evidence that a 1 percentage point increase in the monetary policy interest rate reduces inflation by around 0.3 percentage points after one year, see Bank of England, Cathrine Mann, Expectations, lags and the transmission of monetary policy, *speech*, 23 February 2023.

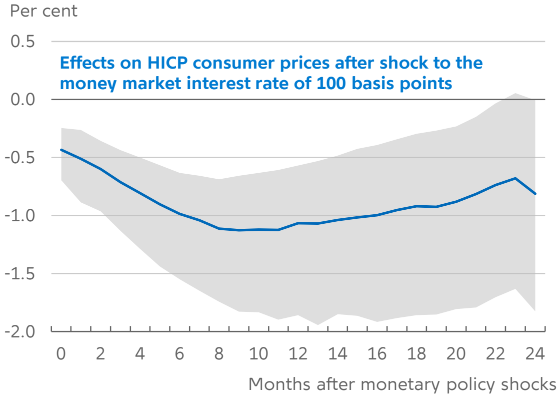
excessive inflation and supports the expectation that current consumer price increases will slow down in the coming years. This expectation is based, among other things, on the fact that the monetary tightening worldwide is dampening economic growth in Denmark significantly.[25]

Prospect of lower inflation in the coming years, but core inflation remains high

The gradual pass-through to consumer prices from a tighter monetary policy, together with lower energy and food price increases, will dampen inflation over the coming years, see chart 23. Specifically, the projection estimates that Danish inflation will be 4.0 per cent in 2023 and 3.6 per cent in 2024, after which it will moderate to 3.0 per cent in 2025.

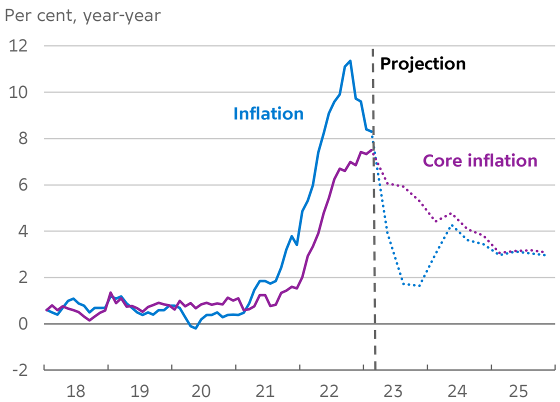
Core inflation will remain high over the projection period, boosted in particular by the prospect of high wage increases. This means that the drivers of consumer price increases shift to some extent from global to domestic factors. Nevertheless, Danish core inflation in the projection is expected to gradually decline from the very high starting point to 6.2 per cent in 2023, 4.3 per cent in 2024 and 3.1 per cent in 2025. The expected decrease in core inflation is due to several factors: Firstly, indirect price effects diminish as the high energy prices stabilise and businesses manage to pass on the increased costs to consumers. Secondly, tighter global monetary policy and the decline in household purchasing power contribute to dampening demand, which over time also reduces underlying price pressures. Thirdly, core inflation is also dampened by lower price increases at the producer level, less pressure on supply chains and the disappearance of reopening effects on some service prices after the coronavirus pandemic. Finally, the diminishing price pressure in 2023-24 is based on the assumption that the projection does not envisage an actual wage-price spiral in Denmark, as inflation expectations as in the euro area are expected to be well-anchored.[26]

Tighter monetary policy dampens inflation in Denmark Chart 22



Note: The grey area shows a 95 per cent confidence interval. The impact of the monetary policy shock to interest rates is estimated with a Bayesian local projection model for HICP consumer prices, industrial production, energy prices, unemployment and the Danish one-year T/N rate in the 2002-21 period. The monetary policy shock is identified using high-frequency information on market participants' reactions following ECB interest rate meetings and excludes simultaneous effects from new communication on the economic outlook, i.e. the chart shows the effect of unexpected interest rate increases. For a similar approach, see Giovanni Ricco et al., The Transmission of Monetary Policy Shocks, *American Economic Journal: Macroeconomics*, July 2021.
Source: Own calculations.

Inflation will come down in 2023-24 Chart 23



Note: *Core inflation* is the HICP index excl. energy and unprocessed food.
Source: Macrobond and own calculations.

25 See box 3, "Macro-econometric models contribute to the assessment of the effects of tighter financial conditions on the Danish Economy", in Danmarks Nationalbank, Monetary policy will cool down the economy, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, No. 3, March 2023.

26 For a general discussion of the future drivers of inflation across Denmark, the euro area and United States, see Thomas Harr and Morten Spange, Inflation – why did it rise and what are the drivers ahead? *Danmarks Nationalbank Economic Memo,* nr. 3, February 2023.

Danmarks Nationalbank expects inflation in Denmark to fall slightly faster than in the euro area

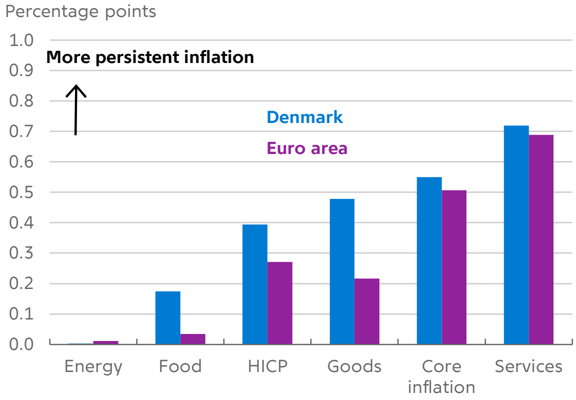
As in Denmark, there are prospects of lower increases in consumer prices in the euro area according to the latest international forecasts. For example, in its winter forecast, which is based on data up to 1 February 2023, the European Commission estimates inflation in the euro area to decline from 8.4 per cent in 2022 to 5.6 per cent in 2023 and 2.5 per cent in 2024. According to the European Commission, the expected fall in inflation is supported by, among other things, lower energy commodity prices, declining producer prices, tighter financial conditions and base effects, which result in a mechanical decline in the annual rate of increase in consumer prices.

Compared to the European Commission's forecast for the euro area, Danmarks Nationalbank expects Danish inflation to fall faster in 2023. This reflects, among other things, the fact that Danmarks Nationalbank's projection is based on data for futures energy prices up to mid-March, which point to lower future energy commodity prices than in the European Commission's forecast. Furthermore, the reduction in the electricity tax mechanically reduces the annual rate of increase in Danish consumer prices, which also contributes to a faster decline in inflation in the first half of 2023 compared to the euro area. The difference in profile of inflation forecasts also reflects that, according to the European Commission, previous energy commodity price increases have not been transmitted to consumer prices yet in the euro area, while the pass-through has been relatively quick in Denmark. Finally, more temporary measures have been implemented in the euro area than in Denmark to support household energy consumption, the rollback of which offsets some of the fall in energy commodity prices.

Moderate Danish inflation persistence suggests that high consumer price increases will end

The rate at which the high inflation can be expected to slow down depends, among other things, on

Increases in consumer prices of services are more sustained than for energy Chart 24



Note: The chart shows the elasticity between inflation measured by constant taxes and last year's inflation estimated using an AR(1) model for the period 2001-21. *HICP* is aggregate HICP inflation. A coefficient of 1 corresponds to full inflation persistence, where a shock to inflation has lasting effects.
Source: Macrobond and own calculations.

whether current consumer price increases take hold or not. The level of inflation persistence in Denmark and the euro area has traditionally been relatively moderate, meaning that consumer price increases are often not very sustained and return relatively quickly to the situation before the price increase. Conversely, persistent inflation will tend to remain constant in the absence of a new economic shock pushing inflation away from its current level.

Model calculations indicate that an increase in Danish HICP inflation of 1 percentage point will already have slowed to around 0.4 percentage points the following year, see chart 24.[27] The estimated level of inflation persistence is slightly lower in the euro area than in Denmark, but there

27 The method for estimating the extent of inflation persistence is inspired by, among others, the Bank of England, Ben Broadbent, Lags, trade-offs and the challenges facing monetary policy, *speech*, 6 December 2021.

are no statistically significant differences between the two results.[28] The relatively moderate inflation persistence is due, among other things, to the fact that credible monetary policy regimes such as that of the ECB in the euro area and the Danish fixed exchange rate policy ensure that price fluctuations do not persist.

As a rule, the moderate inflation persistence suggests that high inflation will decline gradually, although it may be difficult to draw conclusions based on historical periods of low inflation directly to the current period of high price increases. For example, across a number of advanced economies, there are signs that inflation persistence used to be greater during periods of high inflation.[29]

Consumer price increases for services are more sustained than for energy and food, partly because wages account for a larger share of costs in services and typically change more slowly than the prices of other production input. This suggests that price increases on, for example, energy and food may fall relatively quickly, while it may take longer to bring other inflation down completely.

28 Studies have previously found differences in the extent of inflation persistence across European countries, see Filippo Altissimo et al., Inflation persistence and price-setting in the euro area, *ECB Occasional Paper*, No. 46, June 2006. In addition to statistical uncertainty, differences may be due, among other things, to the fact that persistent prices, e.g. core inflation, carry more weight in the HICP index in some countries than less persistent prices, such as energy prices. Moreover, differences in market structures, frequency of price adjustments and use of administered prices and market-determined prices potentially also impact the level of inflation persistence. In Denmark, core inflation and the extent of administered prices both weigh more heavily in the HICP index than in the euro area, which in isolation may slightly increase inflation persistence.

29 See Bank for International Settlements, Inflation: a look under the hood, *BIS Annual Economic Report*, 26 June 2022.

Indirect price effects from energy are a key driver of high core inflation

Box 3

Energy price increases affect consumer prices both directly through higher prices of energy products and indirectly through higher costs for companies. This raises consumer prices of other goods and services as they are passed on to consumers. The precise extent of indirect energy price effects is difficult to determine as businesses' price decisions depend on a wide range of factors other than their energy costs.

To get an indication of the scope of indirect price effects, a counterfactual calculation of core inflation developments in a scenario without extraordinary energy price increases is performed using an estimated Phillips curve. The results indicate that indirect energy price effects accounted for approx. 4 percentage points of the Danish core inflation measured with constant taxes of 6.6 per cent in the 4th quarter of 2022, see chart A. Energy is thus an important driving force behind the high core inflation in Denmark. In the euro area, similar calculations show that indirect energy price effects have added 2.4 percentage points to the core inflation of 6.5 per cent in the 4th quarter of 2022, see chart B.[1] The higher estimated impact in Denmark than in the euro area may be due to the fact that Danish energy prices have so far increased more than in the euro area, among other things due to a faster pass-through from energy commodity prices to final prices and fewer policy measures to mitigate the high energy prices. In addition, the estimated pass-through to core inflation for a given energy price increase is also greater in Denmark than in the euro area. This may be a result of increased energy costs being passed on to consumers more quickly when the capacity pressure is as strong as it was in the Danish economy in 2022.

The extraordinarily high energy prices have likely produced a faster and stronger pass-through from cost pressures to domestic inflation than in the past. This assumption is corroborated, among other things, by the fact that the correlation between energy prices and the Danish core inflation becomes somewhat less pronounced if the model is instead only estimated on data from before the war in Ukraine.
In addition, large energy shocks may affect core inflation proportionately more than small shocks, i.e. the indirect price effects from energy may be slightly greater than calculated if the pass-through from energy is not proportional as assumed, but instead increases with high energy price increases.[2] It is thus likely that the currently high indirect price effects on core inflation will diminish over time. However, how fast this happens is subject to some uncertainty and depends, among other things, on how much of the increased energy costs businesses have already passed on to consumers at this stage. Moreover, indirect price effects may be asymmetrical due to sluggishness in price adjustment, i.e. energy price increases drag up core inflation but energy price falls do not necessarily reduce it correspondingly.

Chart A
Model calculation shows that energy indirectly increases core inflation in Denmark significantly

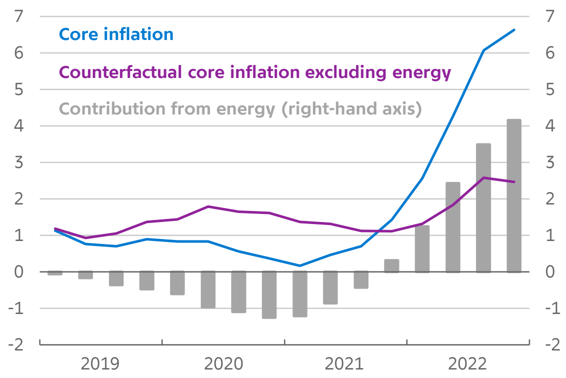
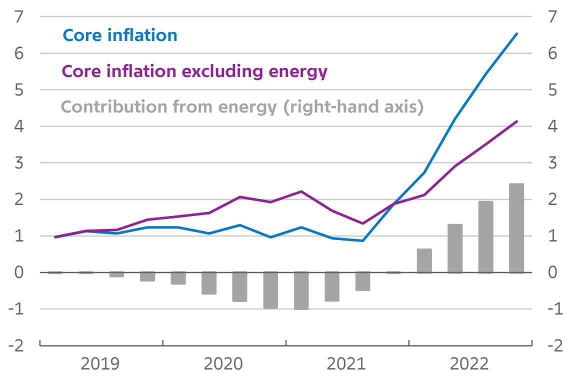


Chart B
In the euro area, indirect energy price effects have so far been slightly lower than in Denmark



Note: *Core inflation* is HICP inflation excluding energy and unprocessed food measured with constant taxes. The calculation is based on a Phillips curve estimated on data from 2001-22, where the annual rate of increase in core inflation is explained by its own lag, the unemployment gap (Danmarks Nationalbank's for Denmark and the HP-filtered unemployment rate for the euro area, respectively) and HICP energy inflation. The contribution to core energy inflation is calculated as the difference between the model's predicted core inflation and a counterfactual simulation of core inflation based on an alternative scenario with energy price increases in line with their historical averages.

Source: Macrobond, Eurostat and own calculations.

1. The Italian central bank finds that indirect price effects from energy explain 2.3 percentage points of the inflation in the euro area in December 2022, see Banco d'Italia, The pass-through of energy prices to consumer price inflation in Italy and the euro area, *Economic Bulletin*, January 2023.
2. An alternative model shows that energy inflation squared also has a significant positive effect on core inflation, i.e. large energy price increases have a stronger impact on core inflation, all other things being equal. However, over the entire estimation period, there is no clear evidence in the common measures for model fit, e.g. R^2, that the alternative model is better than the one in chart A.

Domestic market-determined inflation suggests that Danish inflation predominantly is caused by external factors

Box 4

Price formation in a small open economy such as Denmark depends on both global and domestic conditions, and the overall inflation process is reflected in the development in the consumer price index. However, it is useful to distinguish between the part of the inflation process that is impacted by domestic market conditions and the part that is caused by external factors. In order to get an indication of the impact of domestic market conditions on the development of consumer prices, Danmarks Nationalbank continuously calculates a measure of the so-called domestic market-determined inflation, IMI.[1]

The purpose of IMI is to eliminate the part of the price development in the overall consumer price index that is not determined by conditions in the Danish market economy. These conditions are, for example, international market conditions (e.g. energy), special conditions such as harvest and weather, tax changes, price movements of imported goods and administered prices, i.e. prices fixed in whole or in part by the public sector.

Chart A illustrates how the consumer price index, i.e. the EU harmonised index of consumer prices, HICP, can be broken down into contributions from a number of sub-indices. The size of the different bars indicates the weight each sub-index has in the overall consumer price index. As chart A shows, domestic market-determined prices account for approximately 40 per cent of the Danish HICP consumer price index.

Chart B shows the evolution of IMI since 2000 compared to the overall evolution of the HICP. From summer 2020 until January 2022, domestic market-based prices have declined. The decrease should be seen partly in the light of the fact that, all other things being equal, IMI falls when the prices of the other HICP components rise, and partly that IMI reacts with some delay to, for example, changes in input costs for production. From February 2022 onwards, domestic market-determined prices have picked up, and in January 2023, IMI increased by 3.5 per cent year-on-year, representing a contribution of around 1.4 percentage points out of the overall increase in HICP of 8.4 per cent.The IMI calculation thus supports both the model calculation in chart 15 and previous analyses from Danmarks Nationalbank, which indicate that Danish inflation is predominantly caused by external factors.[2]

Chart A
Decomposition of the consumer price index

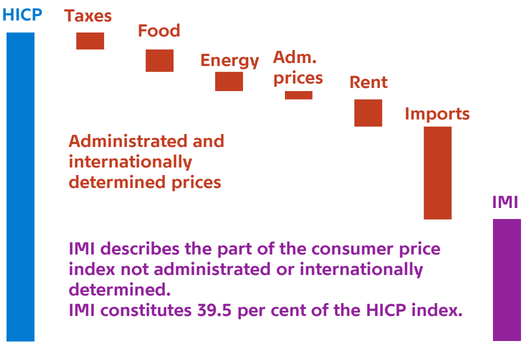
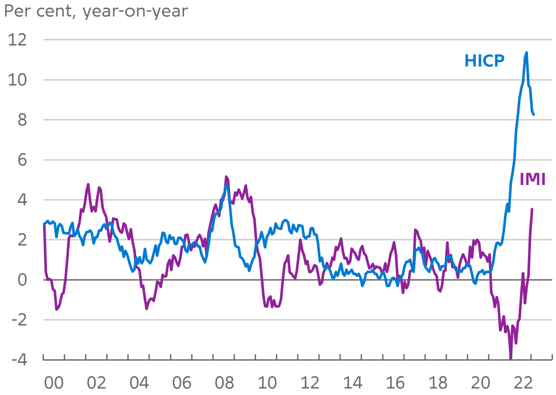


Chart B
Development in IMI



Source: Statistics Denmark and own calculations based on MONA.

1. See also, for instance, Bo William and Dan Knudsen, Indenlandsk markedsbestemt inflation, *Danmarks Nationalbank Monetary Review*, 4th quarter of 2005.
2. See, for example, box 1, 'Global inflation cycle and strong domestic capacity pressures are increasing consumer prices in Denmark' in Danmarks Nationalbank, The pressure on the economy should be eased, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 11, September 2022.

Inflation expectations are still well-anchored

High inflation is typically an expression of a supply-demand imbalance, which, among other things, unfolds over business cycles.[30] High inflation can in some cases cause inflation expectations to de-anchor, also referred to as a wage-price spiral. This is because expectations for future prices affect corporate pricing as well as wage formation. Well-anchored inflation expectations close to the inflation target are therefore essential for the current high inflation rate to fall back and not give rise to self-reinforcing price dynamics. It will typically be more costly to fight inflation resulting from a de-anchoring of inflation expectations, as it may be necessary to force the economy into a recession.

It is relatively rare that inflation expectations de-anchor, and it is part of central banks' mission to ensure that this does not happen. But, when it does, it is usually only for a short period of time.[31] In the wake of the two oil crises in the 1970s, Denmark, among other countries, experienced de-anchoring of inflation expectations.[32]

Since the 1970s, there has been an international shift towards strengthened central bank independence and more widespread use of inflation targeting. Thus, the inflation targets applied by most central banks today revolve around inflation in the medium and long term, which is where monetary policy is the most effective. In the euro area and the USA, among others, the target inflation is 2 per cent over the medium term. The targets and central bank independence have contributed to curbing the overall risk de-anchored inflation expectations and to containing any de-anchoring that might occur. The Danish inflation target is implicitly the same as for the euro area, as the fixed exchange rate policy ensures that Danish prices follow price developments in the euro area.[33]

30 Other factors, such as tax adjustments or changes in competition, may also affect inflation, although they are of a more temporary nature.

31 See Jorge A. Alvarez et al., Wage-Price Spirals: What is the Historical Evidence?, *IMF Working Papers*, 11 November 2022.

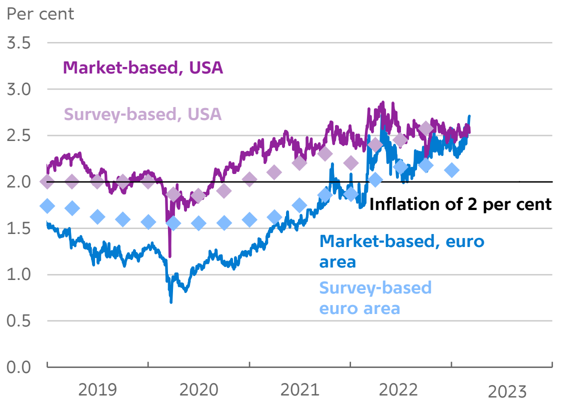
32 See Danmarks Nationalbank, The pressure on the economy should be eased, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 11, September 2022.

33 See Morten Spange, Monetary and fiscal policy in Denmark, *Danmarks Nationalbank Analysis*, No. 12, 27 October 2022.

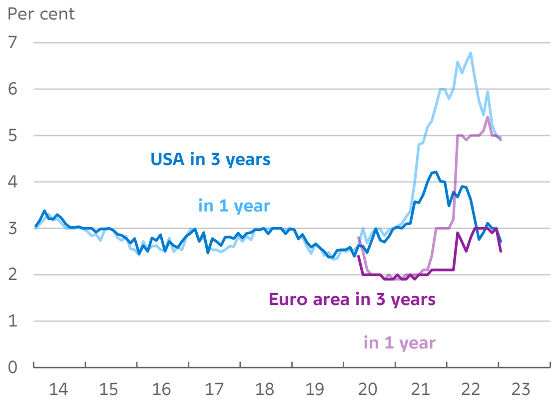
Inflation expectations in the euro area and the USA

Chart 25

Long-term inflation expectations are well-anchored



Households expect inflation above targets



Note: Left-hand chart: Market-based inflation expectations are based on a 5-5-year inflation swap. The questionnaire-based inflation expectations for the euro area refer to inflation expectations in five years in the Survey of Professional Forecasters published by the European Central Bank (ECB), while, for the USA, inflation expectations over the next 5-10 years are shown from the Survey of Professional Forecasters published by the Fed. Right-hand chart: The chart shows the median household questionnaire-based inflation expectations one and three years ahead.
Source: Macrobond, Refinitiv Eikon, ECB and Federal Reserve Bank of New York.

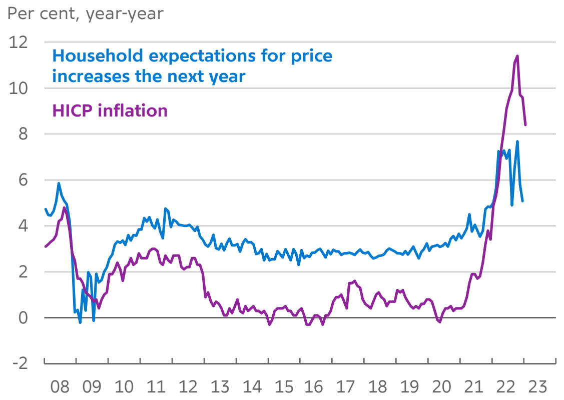
Inflation expectations are well-anchored

Central banks typically address medium-term and long-term inflation expectations, as they are particularly important as a measure of trust in central banks. As a matter of course, it is not possible to identify inflation expectations precisely, but a broad range of market and questionnaire-based indicators show that long-term inflation expectations are generally anchored around the US and euro area inflation targets. As a result, inflation expectations are consistent with the price stability target, see chart 25, left. However, in both the USA and the euro area, households still expect inflation three years ahead to exceed the inflation target of 2 per cent, see chart 25, right. Thus, even though inflation is gradually declining, the risk of a decoupling of inflation expectations has not been averted.[34]

In Denmark, household expectations for consumer price increases, which can only be measured over the next 12 months, have decreased since the autumn. In December, expectations were around 5 per cent year-on-year, see chart 26. This is lower

Households in Denmark expect high price rises over the next year

Chart 26



Note: Household questionnaire-based inflation expectations for the next 12 months weighted by the difference between actual and perceived inflation, i.e. that households which neither overestimate nor underestimate the actual price increases are given a higher weight. *HICP inflation* refers to the EU Harmonised Index of Consumer Prices.
Source: Statistics Denmark, Macrobond and own calculations.

34 See the thematic section *High inflation is on the wane*.

than the current inflation and indicates that households expect consumer price increases to fall going forward, although they will remain at high levels.

The increase in one-year inflation expectations for households does not necessarily reflect an outright de-anchoring of inflation expectations. It may simply be due to households being aware of the inflationary pressures currently facing the economy. Indeed, household inflation expectations over the coming year in the USA and the euro area are higher than longer-term inflation expectations.

Businesses raise prices when wages increase

The prices of goods and services are most often fixed by businesses and updated at varying intervals. Under very general conditions, the price will depend on the marginal cost of the product or service in question and the price charged by the business' competitors.[35] Competitor prices reflect demand and market structure, including the level of competition. Without changes in market structure or demand, prices will be fixed as a constant mark-up above marginal costs. Among Danish businesses changes in, for example, energy costs are passed on to prices relatively quickly.[36] Similarly, changes in marginal wages are partly passed on to prices, and in this context, wages are important, since a significant proportion of corporate costs are made up of wage costs.[37]

In practice, however, it is not the actual but the *expected* competitor prices and marginal costs in the period up to the next pricing that form the basis for the price formation. However, the time between price adjustments varies, as market analyses and assessments of marginal cost are resource-intensive for most businesses. In the event of major fluctuations, businesses will react both to the frequency of price adjustments (the extensive margin) and the size of the adjustments (the intensive margin).[38]

Inflation expectations affect wages

Just as the expected costs affect pricing, employees' expectations of future price increases affect their demands for wage increases in wage negotiations. Depending on the parties' bargaining power, this results in a given functional income distribution, where the value added in the business is shared between its employees and owners.

The parties in the wage negotiation negotiate the nominal wage (growth) for a future period. Here, it is therefore also the *expectations* for productivity, and not least the consumption opportunities over the length of the agreement that are relevant parameters for the negotiation. Ultimately, workers focus on real wages, i.e. the difference between wage growth and inflation over the agreement period, for which reason inflation expectations are a key element in the negotiations. Past developments in, among other things, productivity, inflation and wages may also affect the negotiations if these have led to a shift in the functional income distribution.

Over recent years, inflation and the moderate wage increases so far have led to a decline in the wage share after having been stable for many years for the economy as a whole, see chart 27.[39] However, recent developments are driven by high profits in transport and utilities, while the wage share for the rest of the economy has been rising slightly in recent years. In the projection, the wage share will recover to, and even end up slightly above, the level seen since the financial crisis.

In an empirical analysis of how inflation expectations have affected nominal wages over the past two

35 Mary Amiti et al., International Shocks, Variable Markups, and Domestic Prices, *Review of Economic Studies*, vol. 86(6), November 2019.

36 See Luca Dedola et al., Price synchronization and cost pass-through in multiproduct firms: Evidence from Danish producer prices, *Working Paper*, April 2021.

37 See Simon Juul Hviid and Tobias Renkin, Labor cost pass-through to producer prices in Denmark, *Danmarks Nationalbank Working Paper*, No. 166, December 2020. The authors identify only a partial pass-through from wages to producer prices within a year, which should be seen in the light of the fact that general equilibrium effects are not taken into account.

38 See Luca Dedola et al., Price synchronization and cost pass-through in multiproduct firms: Evidence from Danish producer prices, *Working Paper*, April 2021.

39 The wage share is an expression of the functional income distribution, as it illustrates how much of the value added in businesses is passed on to employees.

decades, market-based inflation expectations for the euro area seem to best explain developments in Danish wages, see chart 28. Conversely, household expectations have been among the least informative, and actual inflation has also played a minor role in wage formation. This is related to Denmark pursuing a fixed exchange rate. In Denmark, it is to a large extent wage formation in manufacturing that guides wage developments in the economy as a whole. Since many of the Danish manufacturing firms' competitors are located abroad, they are more willing to accept wage increases when their foreign competitors do – and vice versa when they do not. The importance of price formation abroad is supported by the fact that inflation expectations for the euro area have a higher explanatory power for wage increases in manufacturing than other Danish measures of inflation expectations.

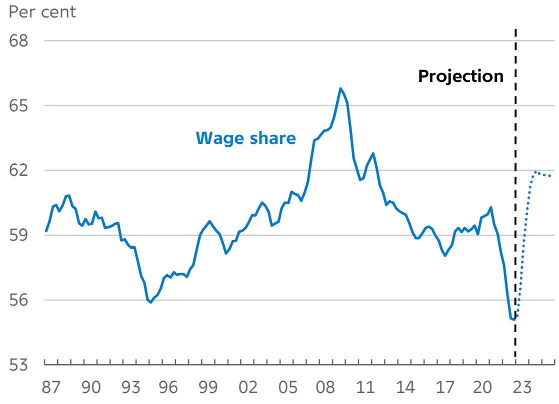
As the past two decades have been characterised by relatively low and stable inflation, it is not certain that the results can be generalised to apply to periods of high inflation such as the present.[40] Regardless of the inflation expectations that have formed the basis for the breakthrough settlement for manufacturing collective agreements in February, the settlement itself is estimated to have reduced uncertainty about wage growth over the next two years, even though wage increases themselves are slightly higher than expected.

De-anchoring of inflation expectations can lead to persistently high inflation

De-anchoring of inflation expectations unfolds as disagreements between employers and workers over real wages. Here, employers will accept the higher wage demands from workers, expecting to be able to raise prices afterwards. This is then followed by even higher wage demands from workers and so it goes on. As a result, inflation expectations increase for both parties, and price and wage inflation pick up.[41] This mechanism has given rise to de-anchoring of inflation expectations, sometimes being described as a wage-price spiral.

Decline in wage share is expected to reverse

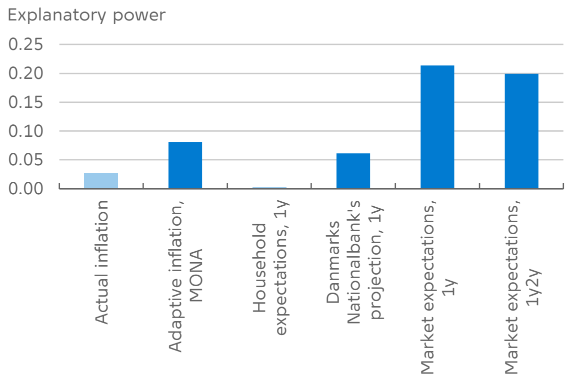
Chart 27



Note: The wage share is calculated as the compensation per employee relative to gross value added in the private non-primary sector. Four-quarter moving averages.
Source: Statistics Denmark and own calculations.

Market-based inflation expectations for the euro area best explain wage formation in Denmark

Chart 28



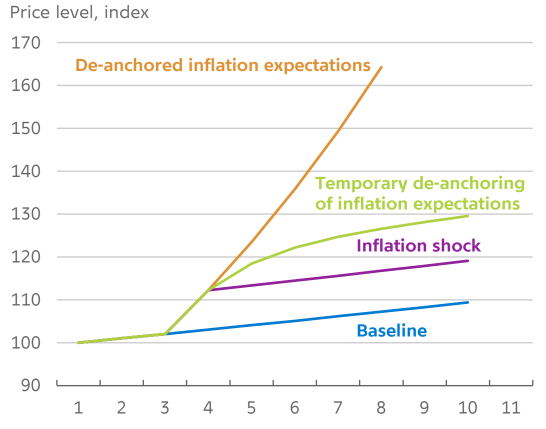
Note: Calculations based on a regression of wage increases on various measures of inflation expectations, controlling for labour market gaps, import prices, energy prices and productivity. The explanatory power is the partial R^2 of the inflation variable. In this way, the results can be interpreted as the independent contribution from inflation expectations, beyond what can be explained by the business cycle, productivity and input prices. Measures of inflation expectations include lagged inflation, MONA's adaptive link, household inflation expectations from the consumer confidence survey, short-term and medium-term market-based inflation expectations (1y and 1y2y) in the euro area and Danmarks Nationalbank's projection. Light blue bars indicate statistical insignificance.
Source: Own calculations.

40 See BIS, Inflation: A look under the hood, *Annual Economic Report*, June 2022.

41 See Guido Lorenzo and Iván Werning, Wage Price Spirals, *Working Paper*, January 2023.

When workers demand higher wages than what can be covered by businesses' expected prices, businesses will under well-anchored inflation expectations oppose wage increases. However, if inflation expectations become de-anchored, the individual business will expect that competing businesses will be met with the same wage demands and that competitors will also pass on the rising marginal cost to prices. In this way, the business will be able to do the same without consequences, i.e. without losing market shares, while still being able to attract the same amount of labour.[42] In the absence of monetary and fiscal responses, this trend could continue indefinitely, see chart 29.

De-anchored inflation expectations lead to higher inflation Chart 29



Note: Stylised illustration.

In the event of inflation expectations becoming de-anchored, real economic activity will broadly be maintained for a period of time.[43] This is because wage increases will continue to cover the rising prices. De-anchoring of inflation expectations can therefore only be halted by monetary policy responses – and will only be maintained if no such responses are adopted. Higher monetary policy interest rates will curb demand sufficiently to restore confidence, and the de-anchoring of inflation expectations is therefore only temporary.

Capacity pressures increase the risk of inflation expectations becoming de-anchored

In itself, the combination of rising inflation and wage growth is not sufficient to say that a wage-price spiral exists. Capacity pressures during an economic boom may trigger the same development without inflation expectations becoming de-anchored.

However, capacity pressures can be a catalyst for de-anchoring of inflation expectations by bringing inflation above central bank targets for a period of time. If capacity pressures last a long time, it could raise doubts about central banks' willingness to bring down inflation, and past inflation will be given more weight when inflation expectations are formed. In this case, businesses will raise prices to a greater extent in the expectation that competitors and suppliers will do the same, and that wage demands will be higher in the future. The longer inflation is high, the greater the risk that inflation expectations will be de anchored. Therefore, it is also important for central banks to curb high inflation driven by capacity pressures. If inflation expectations are well anchored, it will typically be sufficient to neutralise capacity pressures in the economy. If, on the other hand, high inflation is driven by de-anchoring inflation expectations, it may be necessary to create a recession to bring inflation down to target.

Fixed exchange rate policy minimises the risk of an independent de-anchoring of inflation expectations

Denmark's fixed exchange rate policy vis-à-vis the euro area binds Danish price development to that of the euro area in the medium and long term, see chart 30.

42 See Edmund S. Phelps, Money-Wage Dynamics and Labor-Market Equilibrium, *Journal of Political Economy*, vol. 76(4), pp. 678-711, 1968.

43 In periods of high and volatile inflation, real economic activity will be constrained by the greater uncertainty associated with investment and savings decisions by households and businesses, and ongoing fluctuations in relative prices due to sluggish price adjustments will result in an inefficient allocation of resources.

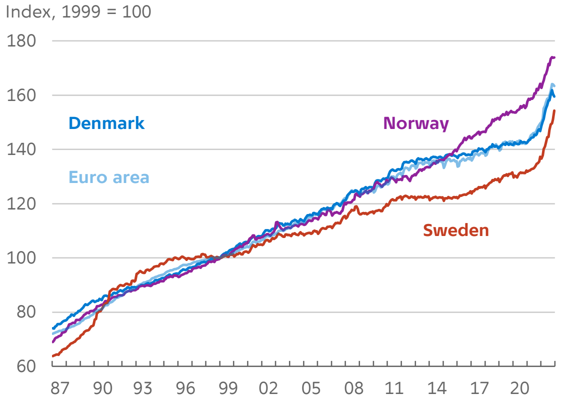
The fixed exchange rate policy basically means that an independent Danish de-anchoring of inflation expectations cannot take place over a longer period of time, as competitiveness in both wages and goods in the medium term will dampen activity and the price development. However, an independent de-anchoring of inflation expectations may take place over a shorter period of time before stabilisation through competitiveness materialises. If the change in inflation expectations is large, after an independent wage-price spiral, the economy will likely have to go through an economic downturn in order to adjust the price level to that of the euro area, see chart 31.

An independent de-anchoring of Danish inflation expectations will in many ways resemble a strong economic cycle, where great pressure on the labour market drives up wages and prices in Denmark relative to the euro area, with a subsequent major downturn to adjust the price level. As monetary policy in Denmark only aims to ensure a fixed exchange rate of the krone against the euro, it is the role of fiscal policy to stabilise such a development and avoid an independent de-anchoring of inflation expectations in Denmark.[44]

Over the past six months, the pressure on the Danish labour market has not led to significantly larger wage increases than agreed in previous collective agreements, and the collective bargaining agreement in February in the manufacturing sector ended on the same level as, for example, the agreement in Germany. At the same time, medium-term inflation expectations appear to be well anchored. There are no longer significant differences in the cyclical situation or in wage and price developments between Denmark and the euro area. For this reason, the risk of Danish inflation expectations becoming de-anchored independently is assessed to be reduced.

Danish prices follow those of the euro area due to the fixed exchange rate policy

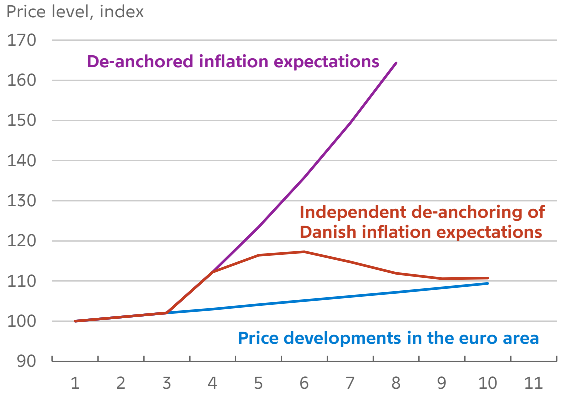
Chart 30



Note: Consumer price index, CPI.
Source: OECD.

Fixed exchange rate policy reduces the risk of an independent de-anchoring of Danish inflation expectations

Chart 31



Note: Stylised illustration.

44 See Morten Spange, Monetary and fiscal policy in Denmark, *Danmarks Nationalbank Analysis*, No. 12, 27 October 2022.

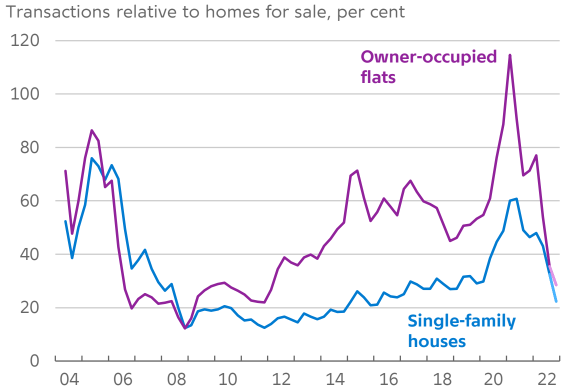
The decline in the housing market is affected by multiple factors

After a number of years of growth in the housing market, strong headwinds are now building. Rising interest rates increase the cost of home financing, while high inflation erodes home buyers' purchasing power. This has led to a slowdown in the housing market and falling prices across the country.

The first sign of a downturn in the housing market was a decline in trading activity, which peaked in 2021. Sales of single-family houses continued to decline through 2022, and in the 4th quarter, the number of housing transactions was the lowest since the 3rd quarter of 2014. The same applies to the sale of owner-occupied flats. However, monthly data from the Danish housing portal Boligsiden indicate that trading activity stabilised at a low level in the last months of 2022. The lower trading activity has led to longer times on market and more homes for sale. Thus, the ratio of transactions to homes for sale has decreased significantly, see chart 32.

The declining activity in the housing market in 2022 should also be seen in the context of the extraordinarily high demand in the previous two years. Then, demand was driven by accommodative financial conditions and increased incomes, but also by increased

Large decrease in number of transactions relative to homes for sale Chart 32



Note: Quarterly transactions relative to the average number of homes for sale in the quarter for the entire country. In the 4th quarter of 2022, the sales and supply statistics from Finance Denmark are projected with the sales and supply statistics from Boligsiden, which is shown by the faded lines.
Source: Finance Denmark, Boligsiden and own calculations.

appreciation of homes.[45] Some of the decline in the housing market can probably be attributed to the fact that this effect diminished as the pandemic subsided during 2022.

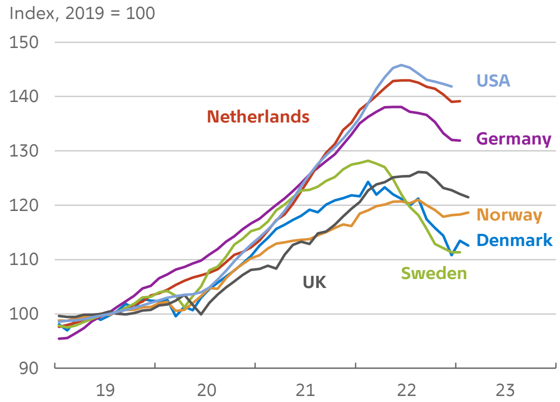
Prices of single-family houses nationwide peaked in February 2022, and by February 2023, prices had fallen by 9.5 per cent, according to Boligsiden's Market index. The prices of owner-occupied flats peaked in January 2022, and by February 2023, prices had fallen by 10.5 per cent. As a result of the low activity in the housing market, higher interest rates and weaker purchasing power, Danmarks Nationalbank expects continued house price declines in 2023.

Slowdown has also hit housing markets abroad
As in Denmark, high consumer price increases have also reduced household purchasing power abroad, while tighter monetary policy has led to higher interest rates on housing loans. This has left its mark on the housing markets in several of the countries with which Denmark normally compares itself. Trade activity has slowed in several countries, and house prices are falling in Norway, Germany, the Netherlands, the UK and the USA, see chart 33. In Sweden, the house price decline started already at the beginning of 2022, as in Denmark, and prices have since fallen by 13 per cent. Within the EU, price data so far show that house prices have fallen the most in Sweden and Denmark.

The downward trend for house prices in many countries follow – as is also the case in Denmark – a period in which house prices have risen sharply since the beginning of 2020. Thus, house prices are still higher than before the outbreak of the pandemic.

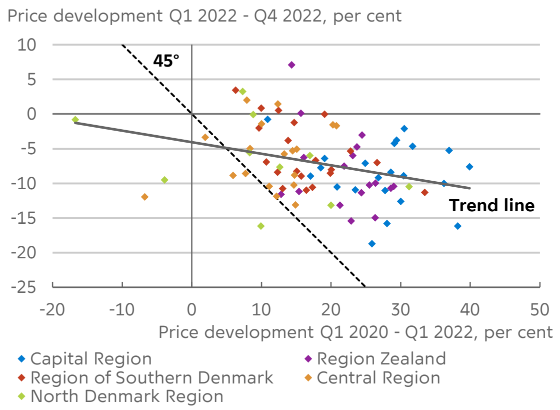
House prices fall across Denmark
Since the 1st quarter of 2022, the prices of single-family houses have fallen in almost all of Denmark. At the municipal level, only eight municipalities have not seen prices falling in the period from the 1st to the 4th quarter of 2022. There is only a slight tendency for prices to have fallen the most in the areas with the greatest hikes during the pandemic, see chart 34.

House price drops in several countries Chart 33



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

Development in house prices across municipalities Chart 34



Note: Price development for single-family houses at municipal level. 11 municipalities are not included in the chart due to unavailability of data as a result of the low number of transactions. The trend line is calculated based on the whole country.
Source: Boligsiden and own calculations.

45 See Simon Juul Hviid et al., Housing market robustness should be strengthened, *Danmarks Nationalbank Analysis,* No. 6, June 2021.

The broad price drop across the country probably reflects that the housing market is currently impacted by a number of factors, with several of them affecting the entire country and others having a more varied effect.

Firstly, everyone in Denmark is affected by the lower purchasing power. In the short term, this puts downward pressure on nominal house prices across the country. As other goods become more expensive compared to housing, there will be a shift towards increased housing consumption, which to some extent will shore up house prices. However, lower purchasing power is considered to be the most important contributor in the short term.[46] Lower purchasing power limits households' disposable incomes and increases the credit limit on home purchases, pushing down house prices.

Secondly, higher interest rates affect all home buyers. However, differences in the financing mix across the country may lead to geographical differences in the pass-through to house prices. More expensive areas in the country, such as Copenhagen, are more interest rate sensitive than the cheaper areas.[47] This is partly due to the fact that a greater proportion of homes in the more expensive areas around Copenhagen are financed using variable rate loans. As the interest rate on variable rate loans is lower than on fixed rate loans, the relative increase in interest rates will be greater. In addition, home buyers around Copenhagen typically have larger loans relative to income, which means that interest rate increases will have a greater impact on the disposable income.

Thirdly, increases in energy prices have a direct effect on the costs of use. Higher energy prices therefore keep down prices in the housing market. Both the energy consumption and the cost of changing heat sources represent a larger share of the total cost of owning a home in the cheaper areas. The price elasticity in relation to energy is therefore greatest in the cheaper areas compared to the more expensive ones.[48] As a result, the cheaper areas are hit harder by higher energy prices than the more expensive areas. Despite the lower price elasticity, there may be downward pressure on house prices in the more expensive areas around Copenhagen, as homes there more often have natural gas heating than in the rest of the country, the price of which rose significantly in 2022.[49]

Finally, a reversal of the trend of increased appreciation of the home during the pandemic could have a varying effect across the housing market. For example, an American study has suggested that the effect on the housing market of the increased appreciation of the home is greatest around large cities.[50] It is assessed that part of the increased appreciation during the pandemic was temporary in nature.[51] This effect can therefore drag down house prices more in the area around Copenhagen than in other parts of the country.

High inflation, including energy prices, is therefore part of the reason why the current price decline will be felt more widely than in just the places where prices rose the most during the pandemic. However, inflation seems to have peaked. Energy prices in particular have fallen significantly in recent months, which may therefore help to curb price falls in the cheaper areas.

Interest rate increases have not shown their full impact

The higher interest rates, which have made it more expensive to finance home purchases, have probably not yet had their full impact on the housing mar-

46 See p. 36 of Danmarks Nationalbank, The pressure on the economy should be eased, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 11, September 2022.

47 See Stine Ludvig Bech et al., Measuring household interest-rate sensitivity in Denmark, *Danmarks Nationalbank Working Paper,* No. 183, November 2021; and Simon Juul Hviid et al., Regionale aspekter på boligmarkedet, *Danmarks Nationalbank Monetary Review*, 4th quarter of 2016.

48 See Alessandro T. Martinello and Niels Framroze Møller, Opportunities and risks in the residential sector during a green transition, *Danmarks Nationalbank Working Paper*, No. 190, September 2022, p. 15.

49 See Marcus Mølbak Ingholt and Niels Framroze Møller, Higher gas prices can lead to lower house prices in parts of Denmark, *Danmarks Nationalbank Economic Memo*, No. 4, April 2022.

50 See Morris A. Davis and Andra C. Ghent, The Work-from-Home Technology Boon and its Consequences, *NBER Working Paper*, April 2022.

51 Previously, it has been estimated that approximately half of home buyers' increased appreciation of their homes was temporary, see Simon Juul Hviid et al., Housing market robustness should be strengthened, *Danmarks Nationalbank Analysis,* No. 6, June 2021.

ket. While interest rates can move relatively quickly, house prices are more sluggish, which the current developments show. The price declines started out slowly after signs of the slowdown had already appeared in other key figures such as the number of transactions.

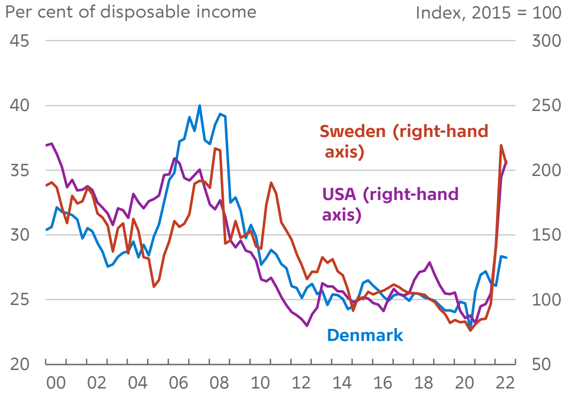
One way to illustrate the extent to which interest rate developments have made their mark on house prices is to look at the housing burden, which reflects financing costs as a share of households' disposable income. As housing financing costs have risen more than income in recent years, the housing burden has increased, see chart 35. A simplified measure of the housing burden paints a similar picture for several other countries, including Sweden and the USA.[52]

Currently, the housing burden for single-family houses in Denmark is significantly higher than before the pandemic, but considerably below the level prior to the financial crisis in the mid-2000s. At the current interest rate and income level, prices of single-family houses must fall another 13 per cent from the level in the 4th quarter of 2022 for the housing burden to reach the average level from 2011-19. This may indicate that the high interest rates have not yet shown their full impact on house prices.

Further house price declines expected in 2023
In the present projection, house prices are expected to continue to decline in 2023, see chart 36. House prices of single-family houses nationwide are estimated to fall by a further 6 per cent from the 4th quarter of 2022 to the 3rd quarter of 2023. After that, house prices are expected to recover gradually, supported by the increase in purchasing power, among other things. The Swedish central bank, Sveriges Riksbank, and the Norwegian central bank, Norges Bank, have similar expectations for the housing markets in Sweden and Norway, respectively.[53]

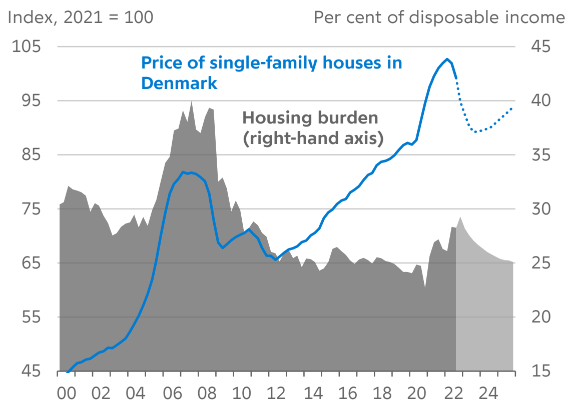
Year-on-year, prices of single-family houses are expected to fall by 9.4 per cent in 2023 compared

Interest rate increases have increased the housing burden Chart 35



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 household 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. For Sweden and the USA, the housing burden is calculated as the ratio of price to income multiplied by the housing loan interest rate. House prices relative to OECD income for the period from the 1st quarter of 2000 to the 3rd quarter of 2022. Long-term mortgage rates for the USA and 5-year mortgage rates for Sweden. It is therefore not possible to compare housing burdens across countries.
Source: Macrobond, Statistics Denmark, Boligsiden and own calculations.

Continued house price declines ahead, while housing burden is expected to ease Chart 36



Note: Nominal prices of single-family houses nationwide. See note to chart 35 on the housing burden for Denmark. From 2024, property taxes are assumed to follow the development in house prices. The projection is Danmarks Nationalbank's projection from March 2023 and covers expectations for house prices, income and interest rates. The projection is based on Statistics Denmark's price statistics, where the latest observation is Q3 2022.
Source: Statistics Denmark, Boligsiden and own calculations.

52 Due to differences in the calculations of the housing burden, see the note to chart 35, it is not possible to compare levels and developments across countries.

53 Norges Bank expects house prices in Norway to turn around in the autumn of 2023, see Norges Bank, *Monetary Policy Report*, December 2022, while Sveriges Riksbank expects a turnaround in the housing market in Sweden in early 2024, see Sveriges Riksbank, *Monetary Policy Report*, February 2023.

to average prices in 2022, after which prices are expected to fall by 0.3 per cent in 2024 and rise by 2.9 per cent in 2025. Towards the end of the projection, house prices will begin to rise, as, among other things, other goods and services will have become more expensive, which over time leads to a shift towards increased housing consumption.

The projection implies that the housing burden nationwide will ease gradually in the coming years, ending around the same level as before the pandemic left its mark on the housing market by the end of the projection period.

However, the dynamics of the housing market may lead to prices falling more than the fundamental factors otherwise dictate. This may be the case, for example, if potential home buyers are reluctant to buy due to falling prices. This can result in a build-up of accumulated demand, which will later boost the housing market when home buyers finally enter the housing market.

The final outcome for house prices depends to a large extent on the development in Danish consumers' purchasing power, in the labour market and in interest rates going forward. If interest rates rise more than assumed on the basis of market expectations in the projection, it will prolong the slump in house prices.

The new housing tax reform will dampen fluctuations

The new housing tax reform is scheduled to enter into force on 1 January 2024. This will put an end to the housing tax freeze, which since 2001 has suspended an important automatic stabiliser in the housing market. The housing tax reform re-establishes the link between house prices and housing taxes, which means that housing taxes will once again help to dampen price fluctuations in the housing market.[54]

The reform also ensures a more uniform housing tax across the country. However, the transition will have an effect on the housing market, as uniform housing taxes generally translate into lower taxes for single-family houses and higher taxes for owner-occupied flats. This is, among other things, a consequence of the fact that the price of owner-occupied flats has increased relatively more over the past 20 years, which implies a lower effective tax rate. Overall, prices of single-family houses are estimated to see a 2.3 per cent increase compared to a situation without the new taxes, while owner-occupied flats are reduced by 3.1 per cent.

Despite the fluctuations caused by the phasing-in of the housing tax reform, it offers a significant contribution to healthy structures in the housing market that dampen fluctuations. The development in the housing market has a major impact on the rest of the economy, which, for example, became evident in the mid-2000s. That is why healthy housing market structures help to ensure a robust Danish economy.

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

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 the available economic statistics, including Statistics Denmark's quarterly national accounts for the 4th quarter of 2022. The projection is based on statistics published up to and including 10 March 2023 (up to and including 9 March 2023 for financial data). The projection also includes a number of assumptions concerning the international economy, financial conditions, development in the labour force and fiscal policy.

International economy
Export market growth is assumed to be 2.6 per cent in 2023, 2.8 per cent in 2024 and 2.9 per cent in 2025. Wage increases abroad are assumed to amount to between 4 and 5 per cent over the next three years, measured as compensation per employee. The price increases of imported goods and services are expected to slow down over the course of this year. The assumptions are based on the latest OECD forecast as well as adjustments based on price developments and economic data 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 background, the 3-month money market interest rate as measured by the Cita swap rate is expected to rise a further 1.2 percentage points towards the end of this year, peaking at 3.8 per cent. It will then gradually decline throughout the projection period to 3.0 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 ten days prior to the completion of the underlying data on 10 March. In early March 2023, the oil price was around 85 dollars per barrel, and it is expected to decrease gradually to around 75 dollars per barrel at the end of 2025.

The projection also takes into account the current situation with unusual developments in gas and electricity prices in the consumer prices of energy as in Danmarks Nationalbank's projections from March and September 2022. As for oil prices, gas and electricity prices are assumed to follow futures prices going forward. On this basis, the price of gas is assumed to remain around the current level of kr. 350 per MWh through 2023 and then to fall to around kr. 320 per MWh by the end of 2025. Correspondingly, the electricity price is expected to drop from around 110 euro per MWh to 100 euro per MWh by the end of 2025. The price of electricity and gas is thus assumed to remain higher than in 2019.

Fiscal policy assumptions
The projection is based on preliminary national accounts data on public-sector spending and investment as well as the Finance Bill in *Economic Survey, August 2022* and the medium-term scenario in *Updated 2025 development, August 2022*. In addition, agreements entered into are taken into account, including the abolition of Great Prayer Day.

On this basis, real public consumption is expected to increase by 1.2, 1.1 and 1.6 per cent in 2023, 2024 and 2025. Public investments are expected to increase by 2.9 per cent this year, by 4.5 per cent next year and by 2.2 per cent in 2025, see table A1.

Revisions in relation to the previous projection
The projected GDP growth has been adjusted upwards by 0.9 percentage points this year and is unadjusted in 2024 relative to the previous projection, see table A2. Revised assumptions of the development in interest rates and exchange rates contributes to dampening growth in all years. The marked increase in pharmaceutical production is estimated to increase GDP growth by 0.7 percentage points this year.

The forecast of the rate of increase in consumer prices, HICP, has been adjusted downwards by 0.3 percentage points this year, but is adjusted upwards by 1.9 percentage points in 2024. The downward adjustment this year is mainly due to energy prices. The upward adjustment in 2024 partly reflects a lesser decrease in energy prices, especially for electricity and gas. This is attributed to 'other factors', as electricity and gas prices have developed more than the normal oil price pass-through suggests. In addition, other factors also reflect changing capacity pressures in the economy, and higher wage increases are also contributing to higher inflation in 2024 compared to the projection from September last year.

Overview of projection assumptions Table A1

	2022	2023	2024	2025
International economy:				
Export market growth, per cent year-on-year	7.1	2.6	2.8	2.9
Foreign price[1], per cent year-on-year	12.0	5.9	3.3	2.3
Foreign hourly wages, per cent year-on-year	2.9	4.5	4.9	4.0
Financial conditions etc.:				
3-month money market interest rate, per cent p.a.	0.3	3.3	3.3	2.8
Average bond yield, per cent p.a.	2.0	3.3	3.1	3.0
Effective krone rate, 1980 = 100	101.9	103.6	103.6	103.6
Dollar exchange rate, DKK per USD	7.1	7.0	7.0	7.0
Oil price, Brent, USD per barrel	98.8	83.9	79.5	75.2
Fiscal policy:				
Public consumption, per cent year-on-year	-2.8	1.2	1.1	1.6
Public investment, per cent year-on-year	0.0	2.9	4.5	2.2
Public-sector employment, 1,000 persons	867	861	858	863

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 has imports.

Changes in the projection

Table A2

	GDP			Consumer prices (HICP)		
Per cent, year-on-year	2022	2023	2024	2022	2023	2024
Projection from September	2.0	-0.1	1.2	8.6	4.3	1.7
Contribution to revised forecast from						
Export market growth	0.3	0.2	0.0	0.0	0.0	0.0
Development in interest rates	0.0	-0.2	-0.3	0.0	0.0	0.0
Exchange rates	0.0	-0.6	-0.1	0.0	-0.2	-0.2
Oil prices	0.0	0.0	0.0	-0.1	0.0	0.1
Foreign wages and prices	-0.4	-0.2	0.4	-0.3	-0.2	0.1
Other factors	1.7	1.8	-0.1	0.3	0.0	1.9
This projection	3.6	0.9	1.2	8.5	4.0	3.6

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

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