ANALYSIS

DANMARKS NATIONALBANK

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OUTLOOK FOR THE DANISH ECONOMY — SEPTEMBER 2022

The pressure on the economy should be eased

Price inflation will remain high in 2023

Inflation, both in Denmark and abroad, is at a 40-year high. With prospects of high electricity and gas price increases over the winter, inflation is expected to remain high into 2023. Interest rates have increased sharply in response to surging inflation.

Prospects of weaker economic growth

Increasing interest rates and reduced household purchasing power dampen the economy in Denmark and abroad. Last year saw a strong recovery, leading to a tight Danish labour market, but prospects are for considerably weaker growth in the coming years. High inflation and higher interest rates will also cause house prices to fall.

Fiscal policy should dampen demand

The tightening of monetary policy will dampen inflationary pressures, globally and domestically. But high capacity pressures and low unemployment increase the risk of a self-reinforcing wage-price spiral. The longer inflation remains high, the greater the risk. Therefore, fiscal policy should substantially reduce demand, as quickly as possible.

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HIGH GLOBAL INFLATION

High price inflation across countries has considerably weakened consumer purchasing power. Energy price inflation is likely to remain high for the rest of the year, contributing to even higher inflation at the end of the year. Inflation is not expected to come down to around 2 per cent until 2024.

MONETARY TIGHTENING

High inflation has prompted central banks across the world to tighten monetary policy, resulting in sharp interest rate increases. Tighter financial conditions, along with reduced purchasing power, are entailing strong headwinds for the growth trajectory, both domestically and globally.

TIGHT LABOUR MARKET

Headwinds are already leaving their mark in Denmark, where labour market pressures have eased slightly since spring. But unemployment is likely to remain low over the coming years, and against that backdrop wage growth is expected to accelerate further in the coming years.

GROWTH PAUSE IN DENMARK

Going forward, headwinds are expected to dampen private consumption, in particular, leading to a pause in growth in the Danish economy with slightly decreasing activity next year. The growth pause comes in the wake of a strong economic recovery last year, which sent the Danish economy into a boom.

HOUSING MARKET PRICE FALLS

Higher interest rates and reduced purchasing power are also likely to leave their mark on the housing market. Trading activity decreased substantially over summer, and prices of houses and flats are beginning to drop. A continued slowdown is expected, with house prices estimated to drop by close to 6 per cent next year.

RISK OF WAGE-PRICE SPIRAL

The combination of strong labour market pressures, high demand and high inflation carries the risk of a self-reinforcing Danish wage-price spiral. The longer inflation remains high, the greater the risk. Economic policy should actively help to prevent this risk scenario.

Key economic variables

Real growth relative to the previous year, per cent	2021	2022	2023	2024
GDP (real), per cent	4.9	2.0	-0.1	1.2
Employment, 1,000 persons	3.046	3.161	3.150	3.126
Gross unemployment, 1,000 persons	106	76	89	97
Balance of payments on current account, per cent of GDP	8.8	10.7	10.4	10.2
Government budget balance, per cent of GDP	2.6	1.9	1.9	1.5
House prices[1], per cent year-on-year	11.0	2.9	-5.6	-1.8
Consumer prices, per cent year-on-year	1.9	8.6	4.3	1.7
Hourly wages[2] (manufacturing industry), per cent year-on-year	2.6	3.7	4.5	3.9

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

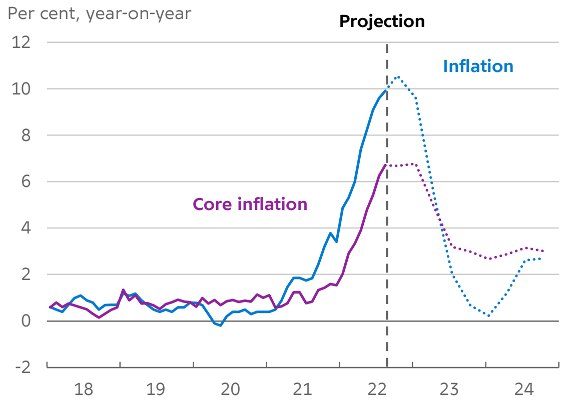
> **Danmarks Nationalbank recommends that fiscal policy helps relieve capacity pressures by close to 1 per cent of GDP in 2023 beyond what the proposal for the 2023 Finance Bill suggests.**

Overview and recommendations for economic policy

Disruptions in production and consumption patterns are weighing on the world economy. Over recent years, several major global shocks, along with accommodative economic policy, have been pulling demand and supply in opposite directions. Recently, the Russian invasion of Ukraine has intensified imbalances. This has been reflected, in particular, in global commodity markets, where uncertainty of future supplies, among other factors, has caused energy and food prices to soar. To this extent, the war has accelerated global inflation, which was already on the rise in the wake of the pandemic.

In Denmark and the euro area, inflation is at a 40-year high. In August, Danish inflation increased to 9.9 per cent, see chart 1. High inflation has prompted central banks across the world to tighten monetary policy, resulting in strong money market interest rate increases. For instance, Danish long-term mortgage bond yields have risen more than 2 percentage points this year, driven by prospects of monetary policy tightening, among other factors.

Inflation is expected to remain high in 2023 Chart 1



Note: *Inflation* and *core inflation* have been calculated using the EU Harmonised Index of Consumer Prices, HICP. Historical data are monthly, while projections are quarterly.
Source: Statistics Denmark and Danmarks Nationalbank.

Global economic headwinds
Strong headwinds from sharp price increases and higher interest rates are already slowing global economic growth. In the 1st half of 2022, total economic activity, measured by the gross domestic product, GDP, fell in the United States, an otherwise booming economy. Activity also decreased in China, caused by corona-related lockdowns and a downturn in the Chinese property market.

The euro area's cyclical position is more neutral than the US position, and euro area activity increased in the 1st half of 2022. However, the rise was largely driven by reopenings after last winter's high infection rates. Consumer confidence plunged across Europe following the Russian invasion of Ukraine and has since been lower than during the coronavirus outbreak in spring 2020. Recently, business confidence has followed the downward trend, indicating overall that economic activity in Europe has slowed down.

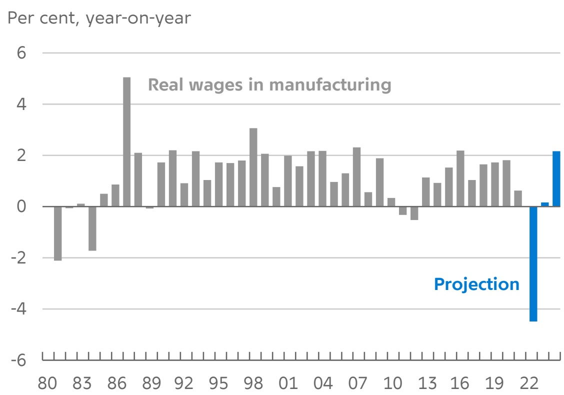
However, the slowdown is in sharp contrast to strong labour markets across countries. Unemployment is very low both in the euro area and in the United States, and employment continues to show strong growth. At the same time, companies continue to report labour shortages.

Growth slows from a strong level
Denmark experienced a pause in growth in the 1st half after strong growth in 2021 with large capacity pressures in the economy. Private sector growth has slowed down, although corporate earnings are high due to strong price increases. High inflation is taking a toll on household purchasing power and will cause a substantial reduction in real wages this year, see chart 2. House prices are also beginning to drop.

However, the labour market reflects that pressures on the Danish economy remain high and that the economy is still booming – although companies are posting slightly fewer jobs than previously and there are slightly fewer reports of labour shortages. The combination of a booming Danish economy and high inflation carries the risk of a self-reinforcing wage-price spiral in which Danish inflation expectations are no longer consistent with stable wage and price growth. The longer inflation remains high, the greater the risk. Although inflation is likely to remain high into 2023, a self-reinforcing wage-price spiral is generally not envisaged, see the theme pages *High consumer price inflation challenges the Danish economy*.

Going forward, strong demand-reducing forces continue to be at play both domestically and globally, for instance in the form of high increases in consumer prices and interest rates. There will be a gradual pass-through of demand-reducing forces which is expected to reduce activity pressures substantially over the coming years. The gradual pass-through leaves some uncertainty about the strength of the Danish and global economies over a 1-2 year horizon. In the projection, Danish GDP is expected to increase by 2 per cent this year, decline by 0.1 per cent next year and rise by 1.2 per cent in 2024. In other words, Denmark is looking at an actual pause in growth, as the high growth rate for 2022 actually masks that GDP will be lower in the 4th quarter of 2022 than in the 4th quarter of 2021.

Prospects of reduced household purchasing power Chart 2



Note: *Real wages* are hourly wages in manufacturing industry relative to the HICP.
Source: Statistics Denmark and own calculations.

Inflation will remain high this winter
Currently, price inflation is the key theme of the global economy. High inflation rates across countries reflect that in parts of the economy supply is struggling to keep up with the strong recovery in global demand in the wake of the pandemic. Moreover, strong global demand provides for an environment in which it is easier than in the pre-pandemic years for companies to pass on higher costs to consumers.

> This year, inflation is expected to be in line with the risk scenario of Danmarks Nationalbank's March projection, reflecting that many of the assumptions of the March risk scenario have materialised since then.

The severe economic shocks from the coronavirus pandemic and subsequently the Russian invasion of Ukraine have been the determining factors of limited supply. Firstly, supply chain bottlenecks caused by lockdowns disrupted global supply in transport markets and manufacturing industry across the globe, leading to steep price rises at the producer level. Subsequently, the Russian invasion of Ukraine has disrupted energy and food markets, resulting in sharp price increases, especially in Europe.

In the United States, consumer price inflation excluding energy and food, i.e. core inflation, has been high for a long time, and in August core inflation, as measured by the Consumer Price Index (CPI), was 6.3 per cent. Core inflation has also increased in the euro area and Denmark and now stands at 5.5 and 6.7 per cent,[1] respectively, so underlying price pressures appear to be largely of the same order in the United States and Europe, albeit driven by different factors. In the United States, inflation is extensively

1 For the euro area and Denmark, core inflation is calculated as consumer prices excluding energy and unprocessed food.

driven by high demand and wage growth, underpinned by previous accommodative economic policy, while euro area inflation is to a greater extent driven by supply disruptions and spillovers from strong US demand, see the theme pages *High consumer price inflation challenges the Danish economy*.

In the energy markets, forward energy contracts, i.e. futures prices, suggest that gas and electricity price increases will remain high throughout the winter. High futures prices should presumable be seen in the context of great uncertainty about future supplies due to Russia's war on Ukraine and the sanctions subsequently imposed on Russia. Moreover, widespread periods of drought and maintenance work have reduced electricity generation from hydro and nuclear power plants. Although oil prices have been declining recently, this does not offset overall prospects of high energy price inflation for the remainder of the year.

High energy prices contribute to the expectation, that Danish inflation will increase further to just under 11 per cent by the end of 2022, and to average 8.6 per cent for the year as a whole, see table 1. This is in line with the risk scenario of Danmarks Nationalbank's March projection, reflecting that many of the energy price assumptions of the March projection have since materialised.[2] However, market participants expect gas and electricity prices to drop considerably in the 2nd half of 2023. Although core inflation is likely to remain high, driven by accelerating wage growth and other production costs that will be passed on to consumers, overall consumer price inflation in Denmark is estimated to be reduced to 4.3 per cent next year. In 2024, inflation is expected to decrease to 1.7 per cent, slightly lower than the euro area target. Energy prices alone are expected to drag down headline inflation by 0.3 percentage points and by 1.7 percentage points in 2024.

High inflation this year Table 1

	2022	2023	2024
Inflation			
Denmark (HICP)	8.6	4.3	1.7
Euro area (HICP)	8.1	5.5	2.3
USA (CPI)	7.5	3.2	2.5
Core inflation			
Denmark (HICP)	5.1	4.5	3.2
Euro area (HICP)	3.9	3.4	2.3
USA (CPI)	5.9	3.1	2.5

Note: Core inflation in the euro area and the USA is measured as HICP and CPI, respectively, excluding energy and food, and for Denmark as HICP excluding energy and unprocessed food. For the USA, inflation for the 4th quarter is shown in the year in question.
Source: Danmarks Nationalbank for Denmark, ECB for the euro area and Survey of Professional Forecasters 3rd Quarter 2022 for the USA.

Inflation in Denmark is expected to be slightly lower than in the euro area from 2022-24. The European Central Bank, ECB, expects slightly lower average inflation in the euro area in 2022 than the projection for Danish consumer prices, but this is offset by higher average inflation in the euro area in 2023 and 2024. These differences reflect three main factors. First, the pass-through from energy commodity prices to energy prices in the HICP index has been faster in Denmark than in the euro area. Second, tax reductions in the euro area cushion energy price increases this year, but push up inflation when they are phased out. Third, there has been large volatility in energy futures prices over recent weeks, which

2 The March projection presented a risk scenario with HICP inflation of 8.8 per cent in 2022, reflecting, among other factors, that the implications of Russia's war on Ukraine would be even higher energy prices than expected by the energy markets at the time. See Danmarks Nationalbank, War in Ukraine dampens growth and increases prices, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 5, March 2022. Oil prices have currently dropped, but gas prices have largely followed the trajectory projected by the risk scenario. At the same time, the pass-through from energy and food prices to consumer prices has been stronger than projected in March. Other elements of the risk scenario, including an escalation of the war and rationing of production in Europe, have not materialised.

heavily affects the inflation projection for Danish consumer prices, se the theme pages *High consumer price inflation challenges the Danish economy*. In other words, there are large differences to the assumptions for energy prices in the ECB projections.

Progress on labour markets across countries
There has been continued progress on labour markets across countries. Employment has grown further this year both in the euro area and in the United States, and, although the US participation rate is still lower than the pre-pandemic level, US employment has now returned to pre-pandemic levels, see chart 3.

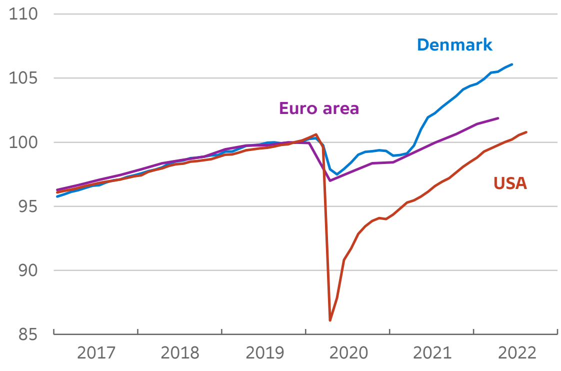
Unemployment has also remained low both in Europe and in the United States, and euro area unemployment is at its lowest level since the introduction of the euro. Although the number of unemployed per job posting has edged up slightly, see chart 4, indications are that considerable labour market pressures still exist in labour markets outside Denmark.

Pressures on the Danish labour market also remain high. Employment in Denmark has grown significantly more than euro area and US employment. Private sector employment, in particular, has continued to rise throughout the 2nd quarter, and public sector employment has remained largely unchanged despite less need for corona-related activities such as testing and vaccination. The number of employees has increased by a total of 161,000 since just before the start of the pandemic. But the labour force has also grown, and the Danish employment rate is at the same level as in the years leading up to the global financial crisis.

However, recent months have been showing incipient signs of easing labour market pressures. Excluding the influx of integration benefit recipients, comprising Ukrainian refugees, unemployment stabilised at a low level, corresponding to the pre-financial crisis period, in the 2nd quarter. Fewer companies are reporting labour shortages, and, in general, companies across industries have lower recruitment activity expectations for the coming months. At the same time, the number of job postings has fallen, albeit from a high level.

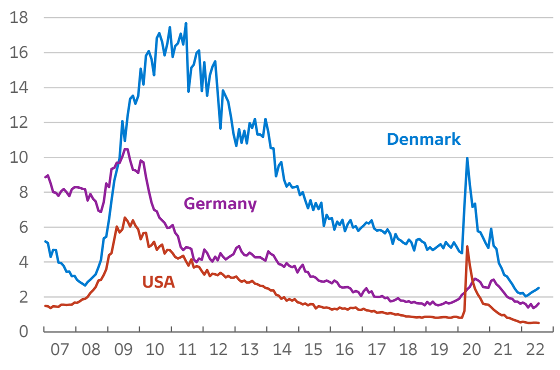
Prospects of higher wage growth domestically and abroad
Labour market pressures have resulted in stronger wage growth. In the United States, wage growth

Continued employment growth across countries Chart 3



Note: Employment in Denmark and the USA is measured on a monthly basis, while it is measured on a quarterly basis in the euro area.
Source: Statistics Denmark, Eurostat and U.S. Bureau of Labor Statistics.

Labour markets are tight both domestically and globally Chart 4



Note: Levels across countries are not necessarily comparable.
Source: Macrobond and own calculations.

The combination of a booming Danish economy and high inflation carries the risk of self-reinforcing wage-price spiral. The longer inflation remains high, the greater the risk.

increased throughout 2021, and is currently almost 3 percentage points higher than in the decade leading up to the outbreak of the pandemic. In Denmark and in the euro area, wage growth has recently increased to a level consistent with productivity growth over the last decade and the ECB's inflation target. In the past, wages have responded with a lag to tighter labour markets. Despite prospects of a more subdued growth trajectory going forward, wage growth is set to accelerate in the coming period.

A natural part of the economic adjustment mechanism of a market economy is that labour market tightness translates into stronger wage growth. If higher inflation expectations and the current erosion of real wages lead to higher future wage demands, and companies subsequently pass on the rise in costs to sales prices, this could trigger a wage-price spiral in which stronger wage and price growth becomes self-reinforcing and out of sync with the labour market.

High current inflation is likely to have some impact on future wage demands; however, the assessment is not that this will trigger an actual wage-price spiral as seen in the 1970s when wage and price growth was self-reinforcing and out of sync with the labour market. This assessment is based on several factors. First, over the past 40 years, central banks have committed to using monetary policy to combat inflation and anchor inflation expectations. Therefore, most measures of inflation expectations are still well anchored at a level consistent with central bank inflation targets. Second, wage inflation indexation has been abolished in Denmark and in many countries globally. So, wages do not automatically follow prices, which reduces the risk of self-reinforcing increases.

Based on the tight labour market, manufacturing industry wages in Denmark are expected to increase by about 3.7 per cent this year, 4.5 per cent next year and around 4 per cent in 2024. The key driver of wage growth is the sharp drop in unemployment over the last year. Seen over the three years, wage growth is considerably higher than in the years leading up to the financial crisis, but slightly lower than in the euro area, where the ECB forecasts wage growth of 4.8 per cent in 2023 and 4.0 per cent in 2024 as measured by compensation per employee.[3] However, domestic wage growth masks considerably more subdued real wage growth this year and next year than seen during the pre-financial crisis boom. Higher wage growth and lower price growth will translate into a recovery in household real wages towards the end of 2024, both in Denmark and the euro area.

Low global economic growth going forward
Very strong price growth across countries has prompted global central banks to tighten monetary policy. This is the key reason why financial conditions in the global economy have become much tighter during the year.[4] The tightening of monetary policy is designed to ease price pressures, on the one hand, and ensure that inflation expectations are well anchored, on the other.

In the United States, the Federal Reserve, Fed, has raised its monetary policy interest rate, the federal funds rate, by 2.25 percentage points this year, and

3 In this projection, the corresponding wage concept is expected to increase by 3.3 per cent in 2022, 3.6 per cent in 2023 and 3.0 per cent in 2024.

4 See Danmarks Nationalbank, Tighter monetary policy has made financing more expensive, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, No. 10, September 2022.

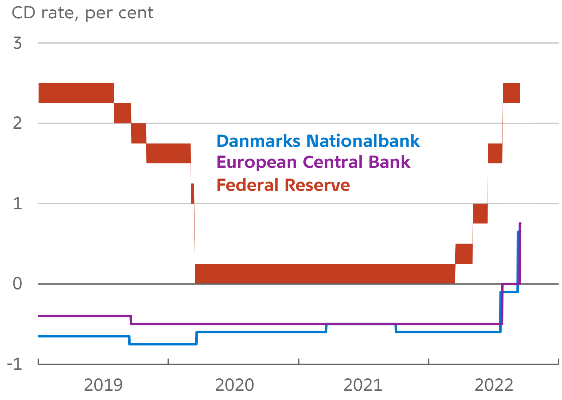
in the euro area the ECB has raised its policy rate, the deposit facility rate, by 1.25 percentage points, see chart 5. Prior to that, the ECB had halted total net asset purchases under its asset purchase programmes, although the ECB still has substantial bond holdings. In addition, both the ECB and the Fed have signalled further tightening of monetary policy. Both central banks stress the importance of a strong and rapid response because tightening acts with a lag, and a prolonged period of high inflation increases the risk that inflation expectations could drift upwards and trigger a wage-price spiral.[5] The market now expects European money market interest rates to increase by a further 2 percentage points over the coming year.

European fiscal policy, unlike monetary policy, has sought to protect purchasing power and compensate for the effects of high consumer price inflation. Many countries have lowered their energy taxes and/or disbursed substantial amounts to households to compensate them for high energy costs. To this should be added initiatives under the roll-out of the EU Recovery Fund and higher government spending on energy transition and defence. Overall, fiscal policy in the euro area will be accommodative both this year and next year, see chart 6. This helps protect demand and, viewed in isolation, increases both the size and duration of price pressures. This, in turn, increases the need for monetary policy tightening.

Tighter financial conditions dampen overall demand. This is reflected, for instance, in US retail sales, which have declined substantially, albeit from a high level. The same is true of the euro area. Industrial production, both in the United States and the euro area, has remained largely unchanged in recent months, while business confidence, as measured by the Purchasing Managers' Index (PMI) indicates lower activity for the coming months. The pass-through from tighter financial conditions to housing markets is also evident in some European countries, while house prices in the United States are still on the rise.

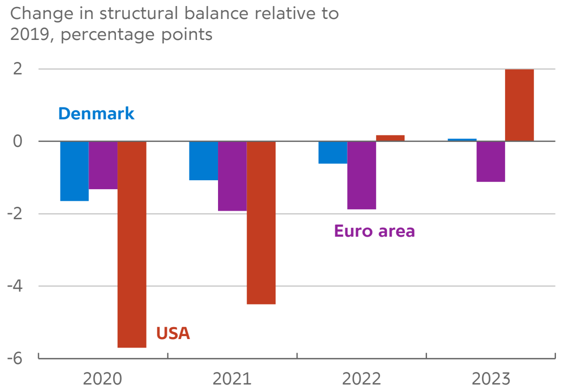
In its latest forecast from July, the International Monetary Fund (IMF) expects the global economy to grow by 3.2 per cent in 2022. But this masks a slowdown during the year following strong growth

Central banks tightened monetary policy and raised interest rates over the summer Chart 5



Source: Danmarks Nationalbank, ECB and Fed.

Accommodative fiscal policy stance in the euro area Chart 6



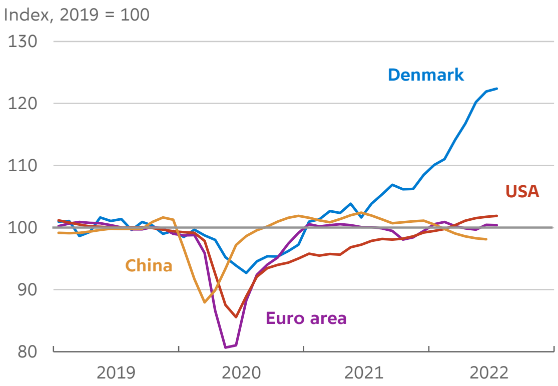
Note: Structural balance based on OECD June *Economic Outlook*. A negative value indicates that fiscal policy is accommodative compared to 2019.
Source: OECD and own calculations.

5 See, for instance, speeches given by Federal Reserve Chair Jerome Powell *(link)* and ECB's Isabel Schnabel *(link)* at Jackson Hole.

in 2021, and year-on-year growth in the 4th quarter of 2022 is 1.7 per cent. The slowdown is even more pronounced among Denmark's closest trading partners. In the United States, the IMF expects year-on-year growth of 1 per cent in the 4th quarter, while in its September forecast, the ECB predicts year-on-year growth of 1.3 per cent in the euro area the 4th quarter. The slowdown in particular reflects tighter financial conditions and high inflation, which is eroding household purchasing power, but also a natural slowdown following the strong recovery from the 2021 lockdowns. The outlook for the European economy, especially the German economy, should be seen in the context of lower gas imports from Russia. For instance, the German government has already introduced explicit guidelines for German gas use.

In 2024, growth in both the US and European economies is expected to pick up slightly, without causing major capacity pressures. In the euro area, this reflects that stronger purchasing power, improved consumer confidence and reduced household uncertainty are contributing to a recovery of consumption growth. However, higher financing costs continue to dampen demand.

Danish industrial production stands out Chart 7



Note: The chart shows 3-month moving averages. For China, industrial production is converted to monthly frequencies.
Source: Macrobond and own calculations.

Prospects of export growth amid current headwinds for goods exports

The slowdown in growth among Denmark's trading partners is dampening Danish export growth. Having performed well during the winter, goods exports in volumes, in particular, fell back in the 1st half of 2022. Shipping has seen slight growth in transported volumes, but due to high freight rates, earnings have been high. But progress in tourism and other services have contributed to robust growth in volumes of total services exports.

Danish industrial production, which is closely linked to exports, stands out from the rest of the world. Danish industrial production has grown by around 10 per cent since the turn of the year, while euro area industrial production has remained largely unchanged, see chart 7. The strong industrial production stands in contrast to the weak exports of goods. Production in the Danish pharmaceutical industry stands out from the euro area. The pharmaceutical industry also accounts for a higher proportion of Danish production.

High capacity pressures and tight labour markets have helped to support corporate investment, which has been on the rise in Denmark and the euro area over the past year, driven, in particular, by construction investment. In the 2nd quarter, corporate investment as a share of total output, i.e. the investment ratio, was close to the average levels of the past two decades both in Denmark and in the euro area.

In the euro area and Denmark, inventory investment has also been growing this year, despite subdued growth. This stands in contrast to the generally close link between increased demand and stockpiling in the economy.[6] However, larger inventories amid subdued demand may reflect that, after a prolonged period of surging prices coinciding with supply difficulties, companies are choosing supply security over higher inventory costs.

6 See ECB, The role of the inventory cycle in the current recovery, *ECB Economic Bulletin,* No. 2, 2022.

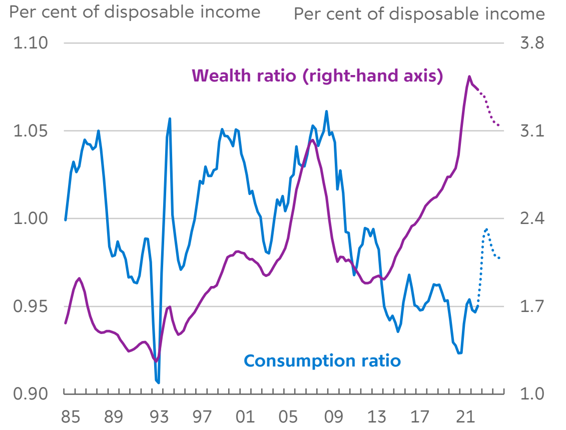
Weaker global economic growth will leave its mark on exports in a small open economy like Denmark. Still, Danish exports are expected to rise by a total of 3.5 per cent in 2022, 2.2 per cent in 2023 and 3.1 per cent in 2024, reflecting that despite lower export market growth than over the last decades, there is still some global growth, and that reflecting that services exports continue to increase from their low pandemic levels. The developments imply that exports on aggregate will contribute further to activity going forward. However, corporate investment is expected to contribute less than previously to activity as rising interest rates start to sour investment appetite.

Reduced purchasing power dampens consumption
Private domestic demand is likely to contribute less to activity growth. The explanation is that high consumer price inflation is eroding household purchasing power in Denmark, which is also the case abroad. This is clearly reflected in Danish consumer confidence, which is lower than during the coronavirus pandemic, and in incomes adjusted for inflation, which have dropped sharply. Payment card use is also indicating that consumption is not keeping up with price inflation. There has been just a slight increase in payment card consumption over the summer while prices have grown considerably, and, in volume terms, consumption is assessed to have fallen. Other areas of private consumption have also been severely affected, for instance household car purchases, which have declined substantially this year. However, this is because of supply difficulties in the auto industry rather than lack of purchasing power, but households are also reporting that this is not the time for durable consumer goods purchases.

Several years of growth with generally declining prices of goods, rising real incomes and asset prices and disbursement of holiday pay have boosted general household resilience. In the last two years alone, households have recorded considerable wealth gains from increasing house and equity prices, among other things. So, in the current economic situation with low unemployment and high job security Danish households are better equipped than households in many other countries to withstand some of the losses of purchasing power they are currently experiencing. But households are already seeing a pronounced decline in their high levels of wealth which is likely to persist for quite some time to come.

Households spend more of their incomes on consumption than before the pandemic

Chart 8



Note: 4-quarter moving averages.
Source: Statistics Denmark and own calculations.

Despite high employment and wage growth, the strong price growth is expected to result both in lower savings and lower consumption. Due to the loss of purchasing power, households must spend more of their income on consumption and less on savings. Therefore, household consumption relative to income, i.e. the consumption ratio, is assumed to rise to a higher level than in the pre-pandemic years, see chart 8.

However, lower savings are not assessed to fully offset the loss in purchasing power. So, households are expected also to reduce consumption, and on an annual basis private consumption adjusted for inflation is estimated to decline by 1 per cent this year and increase by a mere 0.4 per cent next year. In 2024, private consumption is estimated to remain subdued, increasing by 1.1 per cent. This should be seen in the context that, as inflation gradually eases, households will spend part of their renewed purchasing power on increasing savings. Therefore, the consumption ratio is expected to decline slightly.

Rising interest rates and high inflation are dampening house prices
Consumption is closely linked to housing market developments, and housing market prospects have

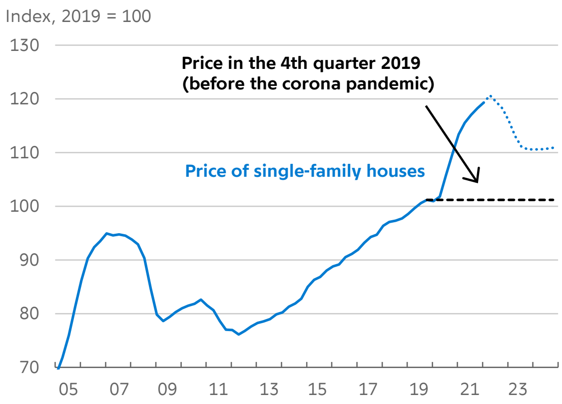
deteriorated considerably this year. The key driver of the deterioration is the steepest increases since 1999 in Danish mortgage bond rates over such a short period. These increases are linked to global monetary policy tightening, but also to higher risk premia.[7]

Higher interest rates are yet to push down housing prices substantially, although the first price falls were recorded over the summer. There are however clear indications that a slowdown is underway, see the theme pages *Housing market headwinds to come*. The slowdown is most pronounced in trading activity, which declined sharply in the 1st half and is now below pre-pandemic levels. The housing market slowdown comes in the wake of two years of record numbers of transactions and high house price increases.

Interest rate increases on long-term mortgage bonds, in particular, will put downward pressure on house prices in the coming years. Higher nominal interest rates should be seen in the context of higher inflation. In the short term, high inflation will squeeze home buyers' disposable amounts, thereby dampening house prices. At the same time, the coronavirus pandemic has loosened its grip on Denmark, and this has probably helped reduce households' appreciation of their homes as workplaces, restaurants and access to foreign travel have reopened.[8]

> Overall, the housing market is expected to slow down with price reductions for single-family houses of almost 6 per cent next year.

Housing market price drop ahead Chart 9



Note: Nationwide nominal house prices on quarterly frequency. Projections from 2nd quarter of 2022.
Source: Danmarks Nationalbank.

On the other hand, house prices are underpinned by several factors. Higher nominal wage increases in the tight labour market will buoy up house price growth in the slightly longer term, while current high and rising construction costs will also help to support prices of existing housing in the short term.

Overall, the Danish housing market is expected to slow down with nominal price reductions for single-family houses of almost 9 per cent over the coming year, see chart 9. In addition to higher interest rates, inflation, and reduced appreciation by homeowners of their homes, housing demand will also be dampened by prospects of slower growth, weakened consumer confidence, and increased uncertainty. The price drop comes in the wake of two years in which nationwide house prices grew by 20 per cent.

Due to the high level at the start of the year, prices for single-family houses are expected to rise by about 3 per cent for 2022 as a whole, while the price drop on an annual basis will not become evident until 2023, when prices are expected to drop by just under 6 per cent.

7 See Danmarks Nationalbank, Tighter monetary policy has made financing more expensive, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, No. 10, September 2022.

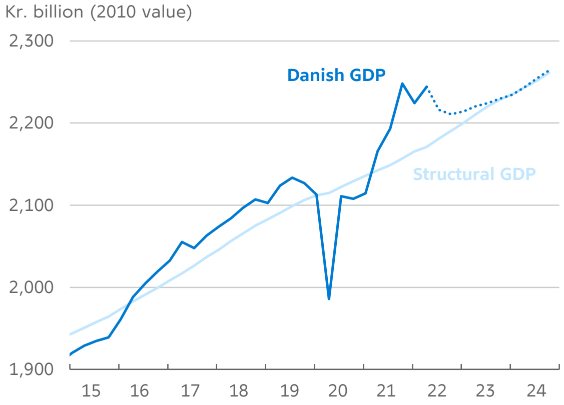
8 See Danmarks Nationalbank, Simon Juul Hviid et al., Housing market robustness should be strengthened, *Danmarks Nationalbank Analysis*, No. 6, June 2021.

As incomes rise, the drop in house prices is expected to slow down towards the end of 2023. At the same time, the market expects more subdued interest rate increases on long-term mortgage bonds over the coming years. In 2024, the housing tax reform will also stimulate nationwide demand for single-family houses, and house prices are expected to increase slightly during the year. On an annual basis, this will cause house prices to drop by close to 2 per cent. The effect of the reform on house prices will vary considerably across the country, and downward pressure on prices is to be expected, especially for owner-occupied flats in Copenhagen, as a result of the reform.[9] The expected development for prices of single-family houses leaves them almost 10 per cent higher in 2024 compared to the end of 2019, before the outbreak of the pandemic.

Generally, the housing market price drop is not expected to seriously limit consumption. So far, homeowners have been cautious about converting increased home equity into consumption, so they have a buffer to withstand house price falls. This expectation should be seen in light of the fact that, during the pandemic, the largest house price gains accrued to households in the upper part of the income distribution.[10]

As a result of the interest rate rises, prices of long-term mortgage bonds have also declined. This enables homeowners with fixed-rate loans to realise capital gains, thereby releasing liquidity. Mortgage refinancing during the 1st half of 2022 is estimated to release liquidity totalling about kr. 6 billion.[11] This liquidity is believed to be able to underpin household consumption in the coming years and partially offset purchasing power losses.

Danish growth slows down Chart 10



Note: *Structural GDP* is the long-term level of sustainable real output in the economy without creating inflationary pressures in the longer term.
Source: Danmarks Nationalbank.

The Danish economy is entering a growth pause
Overall, prospects are for a considerable slowdown in the Danish economy for the remainder of this year. In the 4th quarter this year, GDP is expected to be lower than in the 4th quarter of 2021, see chart 10. So, although the level for this year as a whole implies growth of 2 per cent from the 2021 level, activity will fall in the 2nd half of the year. The economic slowdown and high inflation will be felt by Danish households, but should also be seen in light of the fact that, last spring, the Danish economy entered

9 When fully phased in, the housing reform is expected to reduce prices of flats by 5.8 per cent nationwide, see Danmarks Nationalbank, The impact of the housing taxation agreement on house prices, *Danmarks Nationalbank Analysis*, No. 6, March 2019. However, the calculations of the analysis assumed that the reform would be implemented in 2021.

10 A house price estimation based on micro data suggests that from December 2019 to December 2021, two-thirds of the value gains on single-family houses accrued to the 50 per cent of homeowners with the highest incomes. The estimation will be presented in a publication by Danmarks Nationalbank due later this year.

11 See Danmarks Nationalbank, Tighter monetary policy has made financing more expensive, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, No. 10, September 2022.

a strong boom period following the recovery from pandemic restrictions. Therefore, the output gap[12] is expected to remain moderate, at about 1 per cent of GDP, at the end of this year.

The current account surplus is expected to remain high, just under 11 per cent of GDP this year, primarily reflecting developments in the balance of services, where high freight rates result in high earnings on shipping exports. Overall, imports in volume terms are expected to increase slightly relative to exports. Weak imports are due, among other factors, to modest growth in household consumption, while exports are underpinned by the lower degree of cyclicality of Danish exports of goods.[13]

From next year onwards, Danish economic growth is expected to pick up slightly, but the economy will be operating below its potential. Weaker growth is due, in particular, to the fact that higher price levels, resulting from the current high inflation, will be eroding household purchasing power for an extended period of time. On the other hand, continued growth abroad will support Danish exports and contribute to higher Danish growth. The high average GDP level in 2022 implies that overall GDP is expected to decline by 0.1 per cent in 2023 and grow by 1.2 per cent in 2024. This growth means that the cyclical position of the Danish economy will be largely neutral towards the end of 2024, albeit with some continued capacity pressures in the labour market and strong domestic price pressures. The output gap is expected to be closed by the end of 2024 after peaking at close to 4 per cent by the end of 2021.

The government budget balance is supported by high employment and very low unemployment, and a government budget surplus of 1.9 per cent of GDP is expected this year, 1.9 per cent next year and 1.5 per cent in 2024. High employment, high nominal consumption and increasing corporate earnings will be contributing to high government revenue in the coming years. However, this will partly be offset by lower revenue from the pension yield tax, PAL, and declining equity prices. Next year, refunds of overpaid property taxes will also detract from the government budget balance.

Danmarks Nationalbank's recommendations for economic policy

Danmarks Nationalbank recommends that fiscal policy should help reduce capacity pressures by 1 per cent of GDP in 2023, beyond what the proposal for the 2023 Finance Bill suggests.

If Danish politicians want to compensate selected population groups for high inflation, it is key that such measures do not increase overall activity, thereby increasing pressures on the economy. At the same time, measures should not be price-distorting as this would weaken consumers' incentive to reduce their energy consumption.

Danmarks Nationalbank recommends that fiscal policy helps reduce the risk of self-reinforcing wage-price increases

The combination of high inflation and very tight labour markets in several economies carries the risk of self-reinforcing wage and price expectations. The longer inflation remains high, the greater the risk. This risk could decouple inflation expectations to the extent that they no longer support wage and price stability – although prospects are for a more subdued growth trajectory, both for the Danish and global economies.

Currently, monetary policy across countries is dampening demand, and will help reduce global inflationary pressures. In the course of the year, market rates have risen considerably driven by ECB interest rate rises, market expectations of further increases and halting of asset purchases. As a result of the

12 The output gap reflects the pressure on the economy as measured by the deviation from the output level, which is the long-term level of sustainable output in the economy without creating inflationary pressures.

13 See Danmarks Nationalbank, Adrian Michael Bay Schmith and Helle Eis Christensen, Large drop in Danish exports, but the composition might ease the fall, *Danmarks Nationalbank Economic Memo*, No. 8, June 2020 (in Danish only).

Danish fixed exchange rate policy, Denmark has implemented similar tightening, causing especially Danish housing loan interest rates to rise.[14] This, in combination with inflationary erosion of household purchasing power, will take much of the steam out of the Danish economy.

In the current situation in Denmark, fiscal policy could help reduce the risk that the great pressures on the labour market and consumer prices interact to produce very strong wage growth. In itself it is not a challenge to the Danish economy if labour shortages result in slightly higher wage growth than previously seen during the boom and relative to other countries. This is due to several factors: Wage competitiveness has improved greatly over a number of years, the current account surplus is high and relatively higher wage growth than abroad is the key adjustment mechanism for reducing labour market pressures in a small open economy like Denmark, pursuing a fixed exchange rate policy.

Strong wage increases could however be a challenge to the Danish economy if the combination of high capacity pressures and price pressures triggers an actual wage-price spiral in Denmark in which wage formation maintains purchasing power, and companies at the same time seek to retain or even increase profit margins. This could cause a sudden, major loss of wage competitiveness. This is especially true in case of considerably stronger growth in wages and prices than recorded by Denmark's trading partners. A sudden, major loss of wage competitiveness would render Danish companies vulnerable. The longer inflation remains high, the greater the risk of a self-reinforcing wage-price spiral.

The Danish Government's 2023 Finance Bill proposal entails a tighter fiscal policy than in 2022. However, the economy is still greatly affected by the fiscal policy measures that have been boosting Danish demand in recent years. The Danish Ministry of Finance estimates in *Economic Survey,* August 2022, that fiscal and structural policies will increase the output gap by a total of just under 1 per cent in 2023, measured as the multi-year fiscal effect. Due to the risk of self-reinforcing wage and price growth in the Danish economy, fiscal policy should help to further reduce demand and labour market pressures. Danmarks Nationalbank recommends that the 2023 Finance Bill should help reduce capacity pressures by around 1 per cent of GDP in 2023 beyond what the proposal for the 2023 Finance Bill suggests. Danmarks Nationalbank is aware of the risks involved in tightening fiscal policy amid prospects of lower economic growth. However, these risks are outweighed by the risk of a wage-price spiral.

High inflation is experienced differently by different parts of the population. Across income groups, differences in Denmark are generally limited, see the theme pages *High consumer price inflation challenges the Danish economy*. However, some households may be affected more than others. This applies, for instance, to households heating their homes with gas and/or spending a major part of their incomes on food. If there is political desire to compensate selected population groups, it is key that such measures do not increase overall activity, thereby intensifying pressures on the economy. At the same time, measures should not distort prices, as the incentives to reduce energy consumption should be maintained. Subsidies or tax reductions designed to mitigate the impact of high energy prices should be avoided; such subsidies or tax reductions will simply support energy consumption, and may further increase prices. Targeted, temporary transfers are more appropriate short-term tools, although it should be borne in mind that repeated disbursements will weaken the incentive to shift away from expensive sources of energy.

Downside risks for economic growth but upside risks for inflation

Global growth is characterised, in particular, by downside risks. The strength of the global economic cycle and the trajectory of future growth are currently highly uncertain, which complicates the planning of economic policy. The trajectory of the Danish economy described here is based on external growth from the OECD's June *Economic Outlook*, the IMF's July Interim *World Ecconomic Outlook*, and the ECB's forecast for the euro area in September. These forecasts do not entail prospects of actual economic

14 See Danmarks Nationalbank, Tighter monetary policy has made financing more expensive, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, No. 10, September 2022.

downturn abroad. However, there is considerable risk of an outright downturn in the global economy, and therefore also in the Danish economy. But such downturn could be triggered by various factors, and its implications for inflation will differ depending on whether the downturn is triggered by further supply disruptions or weaker demand.

For instance, global demand could be knocked back severely by further tightening of financial conditions, especially if tightening to bring down inflation is more abrupt than expected by market participants. Global demand could also be dragged down further if a fragile Chinese property market causes a sharper-than-expected slowdown in growth. Overall, there is considerable risk that demand in Danish export markets could be lower than assumed in this projection. Lower global demand will dampen world economic activity and, in itself, contribute to lower inflation.

However, great uncertainty still applies about the duration of the supply disruptions currently affecting the world economy. War is currently raging on the European continent, and in the short term the European desire for less trade with Russia could further dampen growth prospects. A specific short-term risk scenario is full-scale embargo on Russian gas and oil, which could lead to rationing of production among gas using companies. This risk is already close to materialising and will therefore reduce growth only slightly more than assumed in this projection. Moreover, there is risk of even greater food market disruptions. Both outcomes will limit production and consumption opportunities, thereby resulting in lower growth, while at the same time exerting upward pressure on prices.

Also, the spectre of the coronavirus pandemic, and how to address it, still looms large. Western countries have high vaccination rates, but the situation is different in China and among emerging market economies. Supply issues could be dragged out by new mutations or new lockdowns to contain existing mutations, and could, in a worst-case scenario, result in new global production and consumption restrictions.

The common denominator of the risks linked to supply distortions is that they will further increase inflation. Lower growth and higher inflation would be an undesirable combination, necessitating further substantial tightening of monetary policy. This poses a particular risk in Denmark and the United States and certain European countries that have experienced high activity growth until now, tight labour markets and large savings to withstand price inflation. However, if supply disruptions disappear faster than expected, this could significantly ease price pressures.

Key economic variables

Table 2

					2021	2022	
Real growth relative to the previous period, per cent	2021	2022	2023	2024	Q4	Q1	Q2
GDP	4.9	2.0	-0.1	1.2	2.5	-1.1	0.9
Private consumption[1]	4.2	-1.0	0.4	1.1	-0.6	-2.5	-0.6
Public consumption	4.2	0.7	-0.7	1.1	4.0	-1.9	0.5
Residential investments	9.9	4.8	-7.6	-3.2	2.7	5.7	-0.4
Public investments	3.9	-2.3	2.9	4.5	3.0	-5.6	1.9
Corporate investments	6.3	5.0	-1.7	-1.6	1.6	3.2	-2.3
Inventory investments etc.[2]	0.0	0.4	0.0	0.0	0.8	-0.6	1.3
Exports	8.0	3.5	2.2	3.1	3.9	-1.1	0.7
Industrial exports	11.1	1.9	2.0	3.1	3.2	-2.5	1.0
Imports	8.0	2.1	1.7	2.4	3.2	-2.2	0.8
Employment, 1,000 persons	3,046	3,161	3,150	3,126	3,113	3,140	3,162
Gross unemployment, 1,000 persons	106	76	89	97	82	74	73
Balance of payments on current account, per cent of GDP	8.8	10.7	10.4	10.2	9.1	9.8	11.8
Government budget balance, per cent of GDP	2.6	1.9	1.9	1.5	1.4	-0.1	2.5
House prices[3], per cent year-on-year	11.0	2.9	-5.6	-1.8	7.9	5.2	
Consumer prices (HICP), per cent year-on-year	1.9	8.6	4.3	1.7	3.5	5.4	8.2
Hourly wages[4] (manufacturing industry), per cent year-on-year	2.6	3.7	4.5	3.9	3.2	3.8	3.4

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. Confederation of Danish Employers' (DA) pay roll costs including inconvenience supplements for manufacturing.

Current drivers of Danish and international economies

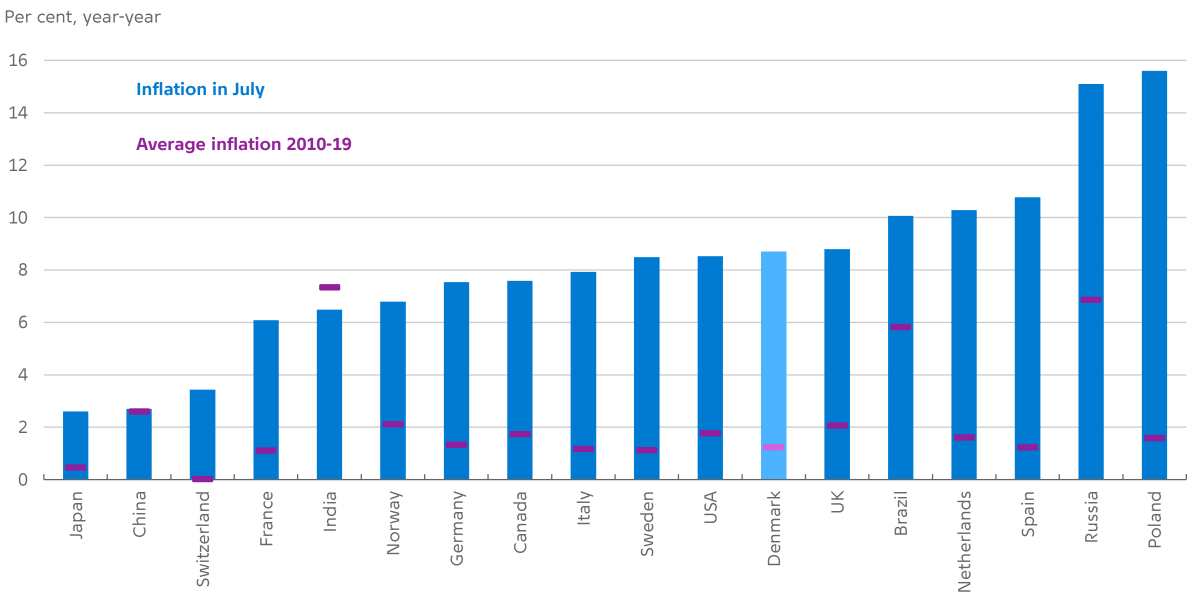
High consumer price inflation challenges the Danish economy

Strong consumer price increases are currently affecting the world economy, as inflation in many countries has risen to an extraordinarily high level, see chart 11. High global inflation also has a knock-on effect on a small open economy like Denmark where consumer prices are largely driven by international conditions, see box 1 on page 29.

High inflation rates essentially reflect that in parts of the economy supply is struggling to keep up

High consumer price inflation is a global phenomenon

Chart 11



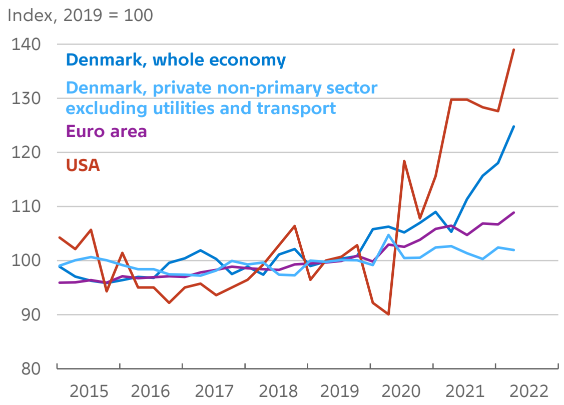
Note: The chart shows CPI inflation.
Source: Macrobond and OECD.

with the strong recovery of global demand in the wake of the pandemic. The strong global demand is buoyed up by, among other factors, past fiscal and monetary stimuli, especially in the United States, making it easier for companies to pass on higher costs for e.g. energy and raw materials to consumers. US companies' unit profits have increased notably since 2021, indicating that rising inflation worldwide is partly a result of companies being able to raise their profit margins as a whole, see chart 12. In Denmark, unit profits have also risen, but this is extensively due to high earnings in the transport sector, affecting domestic price formation only to a lesser extent. In addition, capacity pressures in the labour market and higher wages are also pushing consumer prices upwards in Denmark and elsewhere abroad.

The world economy is still characterised by significant disruptions of production, although they have slowed down throughout 2022. The coronavirus pandemic, together with the strong recovery in the consumption of goods after the reopenings, has been a key driver of several of the supply restrictions. For example, supply chain bottlenecks caused by lockdowns disrupted global transport markets and manufacturing industries worldwide, leading to sharp price rises at the producer level. Supply constraints hamper global production and contribute to the lack of enough goods and services to meet the strong demand.

Inflation has intensified after Russia's invasion of Ukraine, partly because of the resulting significant price increases for energy, metals and food. Since the spring, consumer price inflation has been extraordinarily strong in Denmark and the euro area, whereas it has deflected slightly in the United States, see chart 13. Inflation drivers are not the same across the three economies and are linked more to strong demand in the United States and Denmark than in the euro area. For example, in Denmark and the United States domestic demand in the 2nd quarter of 2022 was back on pre-pandemic trends, while in the euro area it was only slightly above the level at the end of 2019.[15]

Rising unit profits in the United States contribute to high inflation worldwide Chart 12



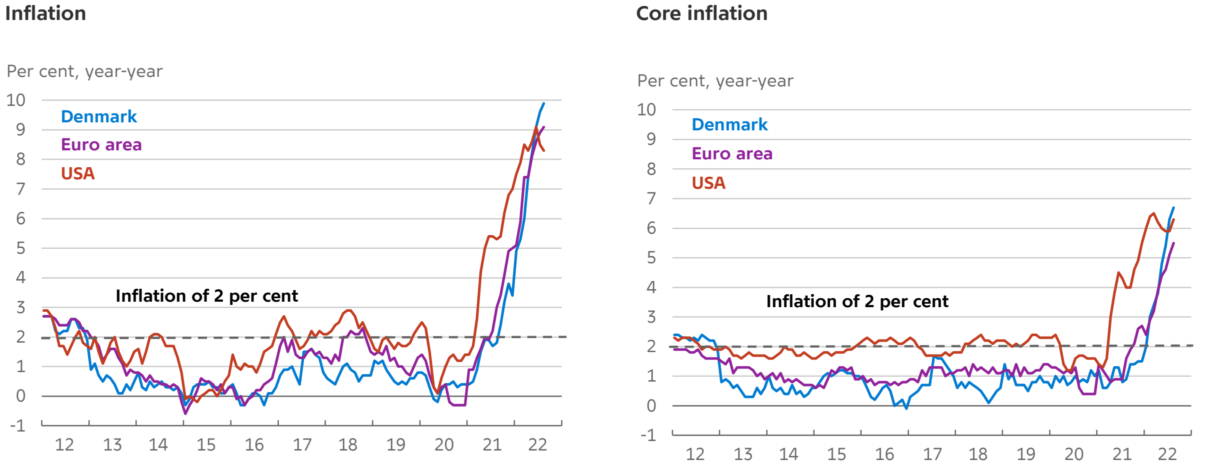
Note: Unit profit is defined as gross surplus in the national accounts in relation to gross value added in volumes, GVA. The private non-primary sector includes the market part of the economy excluding agriculture, housing, raw material extraction, utilities and transport. Data for the United States refer to non-financial corporations.
Source: Statistics Denmark, Macrobond, OECD, U.S. Bureau of Economic Analysis and own calculations.

Danish consumer price increases in 2022 appear to have been driven especially by the combination of the current boom and high energy prices, see chart 14. Specifically, model calculations show that in the Danish economy cyclical pressures alone have increased inflation by 1.3 percentage points in the 2nd quarter of 2022. This is slightly higher than the contribution in the pre-financial crisis years when the Danish economy was also characterised by substantial capacity pressures. In the calculation, the estimated cyclical contribution to inflation is determined in particular by the size of the output gap and the slope of the Phillips curve, i.e. the pass-through from capacity pressure to inflation. According to the model, the Danish economy had a strongly positive output gap in the 2nd quarter of 2022. Together with a relatively large estimated effect on inflation from capacity pressures, this implies a significant cyclical contribution to consumer prices.

15 A number of studies have also indicated that euro area inflation is driven more by supply conditions compared to US inflation, see e.g. ECB, Şebnem Kalemli-Özcan et al. (2022), *Global supply chain pressures, international trade and inflation*, ECB Forum on Central Banking, June 2022.

Inflation has risen to a very high level in Denmark and abroad

Chart 13



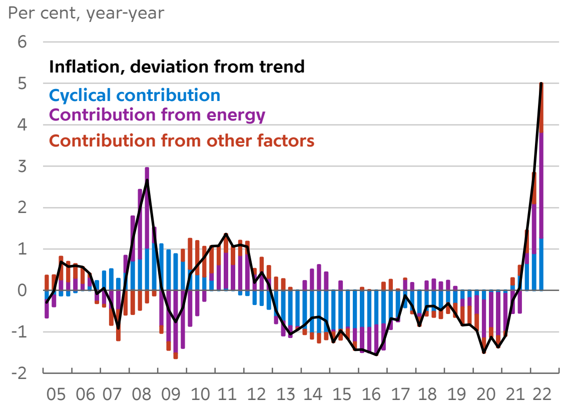
Note: Left-hand chart: HICP inflation for Denmark and the euro area and CPI inflation for the United States. Right-hand chart: Core HICP inflation, i.e. inflation excluding energy and unprocessed foodstuffs for Denmark and the euro area. For the United States, core CPI inflation is shown.
Source: Macrobond.

High Danish consumer price increases are broad-based – not driven only by energy prices

In Denmark, consumer prices rose by 9.9 per cent year-on-year in August as measured by the EU Harmonised Index of Consumer Prices, HICP. This is the strongest growth for 40 years, encompassing large increases in energy and food prices in particular, see chart 15. However, core inflation has also risen throughout 2022, suggesting that price pressures are broad-based and not driven only by high energy and food prices. Excluding energy and unprocessed food, Danish consumer prices rose by 6.7 per cent year-on-year in August. This reflects, among other things, indirect price effects from higher energy costs for companies, supply chain disruptions and reopening effects on pandemic-affected services, which have led to large price increases on e.g. holiday travel, accommodation, restaurant visits and transport. In addition, higher tobacco taxes have also contributed to boosting Danish consumer price inflation[16].

Energy prices and boom boost Danish consumer prices

Chart 14



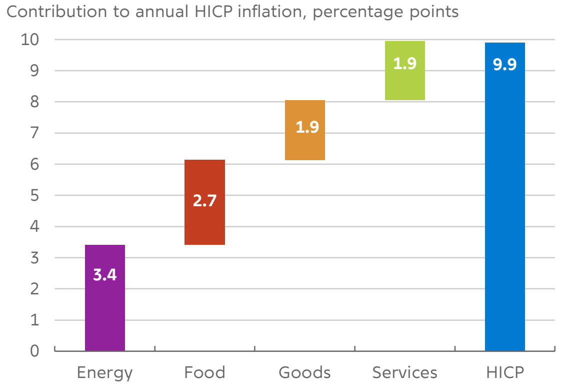
Note: The sum of the contributions in the chart corresponds to the deviation of inflation from a trend, meaning that it is not identical to actual inflation. The chart is based on a trend-cycle model in which HICP inflation is decomposed into contributions from a trend, energy prices and capacity pressures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

16 Tax adjustments alone have increased core inflation, i.e. consumer prices excluding energy and unprocessed food, by around 0.5 percentage points in August measured as the difference between core HICP inflation and core HICP inflation at constant taxes.

Distribution effects of high inflation across income groups

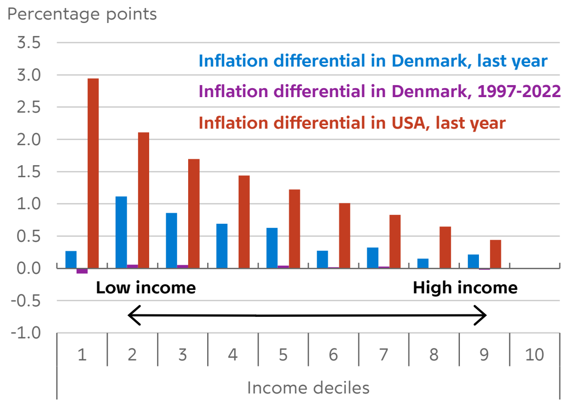
Inflation, measured by the official consumer price index, reflects the general development of consumer prices in the economy, i.e. an average of price increases for various goods and services in total household consumption. However, given the individual consumption patterns of households, inflation may deviate from the average for individual households. For example, basic goods such as food and energy often account for a larger part of the consumption baskets of low-income groups, whereas high-income groups' consumption has a larger share of luxury goods, including holiday travel. A calculation shows that over the past year inflation was only slightly higher for low-income households than for high-income households, see chart 16. For example, the average annual rate of increase in consumer prices for households in the 2nd income decile was 1.1 percentage points higher than for the highest 10 per cent income group over the past year to July. This difference reflects, among other things, that the current strong increases in energy and food prices are affecting low-income households more severely than others. The differences in price increases across income groups are generally smaller in Denmark than in the United States, partly because the difference between incomes and consumption baskets is smaller in Denmark. Moreover, differences tend to even out over time, i.e. in recent decades average inflation has not been higher for low-income groups than for high-income groups.[17] One of the reasons for the reduction of the differences is that food accounts for a larger share of consumption for low-income households, and, viewed over a longer period, these prices have not risen more than general price developments in the economy.[18]

Energy and food price increases contribute to high inflation in Denmark Chart 15



Note: HICP for August. In the chart, food refers to food, alcohol and tobacco, while goods are non-energy industrial goods.
Source: Statistics Denmark and own calculations.

Inflation is currently slightly higher for low-income households Chart 16



Note: For each income group, the chart is based on a Laspeyres price index calculated on the basis of the consumption composition in the period 2010-15 on the basis of microdata from Statistics Denmark's consumer survey. The inflation differential is calculated relative to the 10 per cent with the highest income.
Source: Statistics Denmark, own calculations and Weissert (2022), *Essays in Macroeconomics: Inflation inequality, consumption baskets and impulse responses*, PhD thesis, University of Copenhagen.

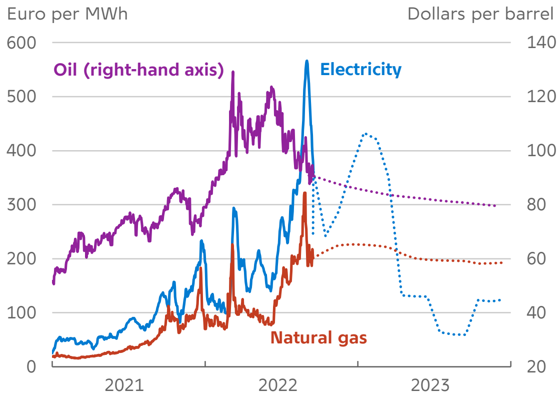
17 See Pettersson, Hochmuth and Weissert, *A Nonhomothetic Price Index and Inflation Heterogeneity* 2022, PhD thesis, University of Copenhagen, for a detailed discussion of inflation across income distribution.

18 Inflation has a number of distributional effects in addition to the different price increases across income groups. First, high inflation implies a redistribution from people with savings to people with debt. Second, high inflation affects persons with sticky nominal wages or social benefits more than people who have the opportunity to increase their nominal income. A study on Spanish data finds that these effects both have larger distributional impact than different price increases across income groups, see Miguel Cardo et al., The Heterogenous Impact of Inflation on Households' balance sheets, *Red Nacional de Investigadores en Economia Working Paper,* No. 176, September 2022.

Although the difference in price increases between income groups is currently relatively limited, high inflation may nevertheless have distribution consequences for several reasons. Firstly, low-income households often have lower savings so it becomes more difficult to even out consumption over time when prices rise sharply. Secondly, high-income households typically have more opportunity than low-income households to adjust their consumption downwards towards low-quality goods when prices rise. Lower-income households exposed to large price increases are therefore to a higher degree forced to make volume adjustments. Thirdly, the decline in purchasing power is more pronounced for benefit recipients than for employees, partly because the rate adjustment rate of 1.2 per cent in 2022 results in a lower nominal increase in transfer incomes than in wages.[19] Finally, there may also be differences within the same income group, e.g. if a home is heated by gas, the price of which had increased more than prices for other energy sources.

Strong growth in gas and electricity commodity prices since the summer

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.

War in Ukraine entails potentially high energy price increases towards winter

Global energy markets are characterised by strongly elevated and very volatile prices as a result of the war in Ukraine, see chart 17. This reflects, among other things, Russia's position as a major producer and exporter of energy commodities, especially to Europe. Energy prices are generally determined by supply and demand factors in the relevant markets. Consequently, since the spring, reduced supplies and uncertainty about the future supply of energy from Russia have hit the European energy markets particularly hard, while e.g. US gas prices have risen less that the European ones.

EU imports of Russian natural gas accounted for around 40 per cent of consumption in 2021, but Russia has reduced its gas supplies to the European market since last autumn. Over the summer, Russia has further reduced its gas supply to Europe, which has led to new, marked increases in the price of natural gas. Nevertheless, gas stocks in the EU have increased in recent months and at end-August, they were on a par with the same time in 2015-20, partly due to increased LNG gas inflows. High gas prices, together with droughts and other weather-related events, have also increased the price of electricity, partly because the electricity price is set by the most expensive essential electricity-generating unit, i.e. in many cases a gas-powered plant. Conversely, oil prices, determined in the global rather than the European market, have gradually fallen back from very high levels over the summer, partly due to a weaker growth outlook and increased global oil supply.

The energy commodity price increases affect consumer prices both directly through higher prices for energy products and indirectly through higher costs for companies. This raises consumer prices for other goods and services as higher costs are passed on to consumers. However, the indirect pass-through typically occurs with a certain lag and depends on companies' ability to pass on the rising production costs to consumers. Furthermore, the fluctuations in energy commodity prices are not passed through proportionally to consumer prices for e.g. electricity, heating oil and petrol, as consumers' purchase prices for energy also consist of distribution costs, taxes

19 See Ministry of Finance, *Economic Survey*, August 2022.

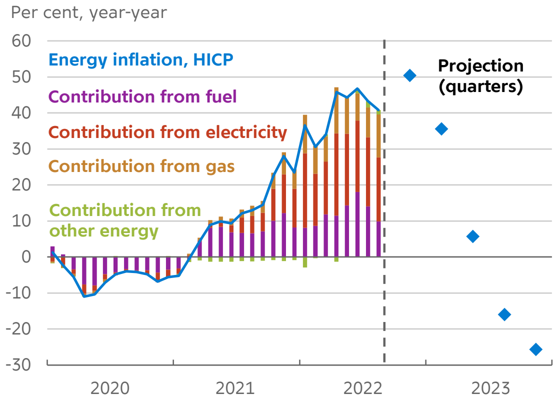
and gross profit margins, etc. Fixed-price contracts for electricity play only a limited role in the calculation of the Danish consumer price index, where the majority of electricity prices are adjusted either monthly or quarterly. This suggests that the pass-through from energy commodity prices to consumer energy prices occurs fast in Denmark.

Danish consumer energy prices rose by 41 per cent year-on-year in August due to rising commodity prices for gas, oil and electricity, see chart 18. Moreover, higher refining margins have increased petrol prices more than oil prices would normally warrant. There is increasing evidence that companies have passed on higher energy costs to consumers. This is evidenced by e.g. the higher increases in the elements of core inflation that are sensitive to oil prices, compared with core inflation as a whole. In August, these elements reached an annual rate of increase of almost 13 per cent. This implies that the oil price sensitive elements of core inflation, which may give some indication of the extent of indirect price effects from higher energy prices, have themselves boosted actual inflation by about 1 percentage point.[20] The trend towards rising indirect energy price effects is also seen in the euro area, where the oil price sensitive elements of core inflation rose by about 10 per cent year-on-year in August, somewhat stronger than general core inflation.[21]

There is considerable uncertainty about the outlook for energy prices in the light of the war in Ukraine and the derived measures to secure energy imports from sources other than Russia. In addition, the European Commission proposed in September a series of policy measures in the EU, including targets for reducing electricity consumption during peak periods and caps on the earnings of low-cost electricity producers.

High consumer price increases for energy in Denmark expected to deflect next year

Chart 18



Note: The chart shows energy prices in the HICP index at monthly frequency and Danmarks Nationalbank's projection for energy prices at quarterly frequency.
Source: Macrobond and own calculations.

The projection is based on futures prices for energy commodities, indicating that oil, electricity and gas prices will remain high during winter. The assumptions imply that the annual rate of increase in consumer energy prices in the projection peaks at a very high level in the 4th quarter of 2022 and then becomes strongly negative in the 2nd half of 2023 due to market expectations of falling energy commodity prices and base effects. This means that the annual rate of increase in energy prices slows down as the lower prices before the war in Ukraine drop out of the annual price comparison used to measure inflation. Against this background, consumer energy prices are projected to rise by 45 per cent in 2022, drop by almost 3 per cent in 2023 and to fall by about 15 per cent in 2024.

20 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 Danmarks Nationalbank, Anne Ulstrup Mortensen and Jonas Staghøj, Falling oil and consumer prices, *Danmarks Nationalbank, Monetary Review 1st quarter 2015*, March 2015.

21 The calculation of oil price sensitive core inflation for the euro area is based on the same methodology as in *ECB Monthly Bulletin*, Box 3, "Indirect effects of oil price developments on euro area inflation", December 2014.

Consumer food prices have risen further after the war in Ukraine

Global food commodity prices have risen sharply over the past year and further immediately after Russia's invasion of Ukraine, see chart 19. The war in Ukraine and the subsequent sanctions against Russia have pushed food prices upwards, as the two countries are among the world's largest food producers, accounting for a large part of global trade of e.g. wheat, grain and sunflower oil. Food commodity prices have also risen further due to higher energy prices as a consequence of the war in Ukraine, because large amounts of energy are used in the production of food and fertilisers. Over the summer, however, several food commodity prices fell back somewhat due to, among other factors, a weaker global growth outlook and the agreement between Ukraine and Russia on resuming exports of grain to the global market via a safe corridor in the Black Sea.

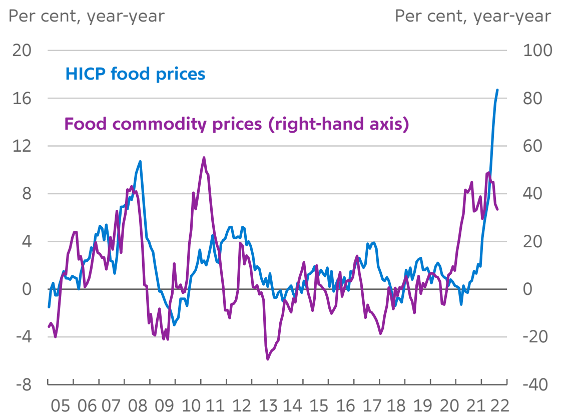
High food commodity prices, together with indirect effects from rising prices for energy and transport as well as wages, have also increased consumer food prices in Denmark. In August, food prices in HICP terms rose by almost 17 per cent year-on-year, the strongest increase for several decades. In the short term, high consumer food price increases are still expected as pressures remain on the early parts of the pricing chain. For example, the food producer price index rose by about 22 per cent year-on-year in August. Experience also shows that the pass-through from food prices to consumer prices occurs with a certain lag.

The projection expects Danish consumer prices for unprocessed food to rise by 11 per cent in 2022, after which the rate of increase will decline to 6 per cent in 2023 and 2 per cent in 2024. The development reflects, among other things, that futures prices indicate that the price increases for food commodities will slow down in the coming years as the balance between supply and demand is restored. In addition, the expected dampening of the currently high energy price increases will over time result in smaller increases in food input costs. This will offset the effect of higher wage growth, which in itself puts upward pressure on a number of consumer prices, including food.

Wage increases and higher costs for companies push core inflation up to a high level in Denmark

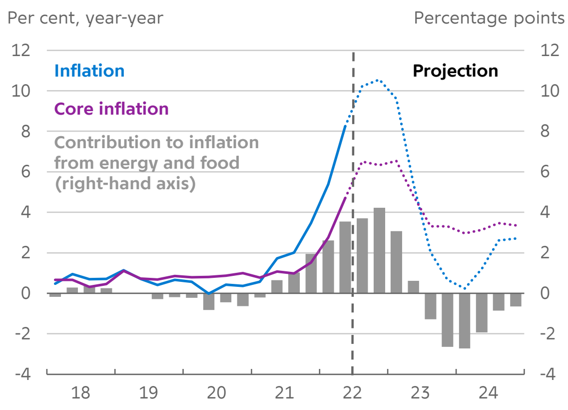
In Denmark, inflation is expected to peak at around 11 per cent in December 2022, after which the cur-

Very high food price inflation in Denmark Chart 19



Note: Food commodity index of the Hamburg Institute of International Economics (HWWI). HICP is the EU Harmonised Index of Consumer Prices.
Source: Macrobond.

Outlook for high core inflation in Denmark in the coming years Chart 20



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

rently very high price increases for energy and food will deflect, thus contributing to gradually lower inflation in the coming years. Specifically, the projection expects Danish consumer prices to rise by 8.6 per cent in 2022, after which the rate of increase will decline to 4.3 per cent in 2023 and 1.7 per cent in 2024, see chart 20.

Core inflation in Denmark, i.e. consumer prices excluding energy and unprocessed food, is projected to rise to 5.1 per cent in 2022. This rise reflects that wage increases driven by labour market pressures and companies' costs related to higher commodity prices, including for energy, are expected to be passed onto consumer prices with a certain lag. Core inflation is projected to moderate gradually in the coming years to 4.5 per cent in 2023 and 3.2 per cent in 2024. The expected decrease is due to several factors: Firstly, demand is likely to be lower as a result of tighter global monetary policy and erosion of real household income. Secondly, core inflation is also dampened by diminishing indirect energy price effects, less pressure on supply chains and the disappearance of current reopening effects on several service prices after the pandemic, such as holiday travel, accommodation, restaurant visits and transport. Finally, the diminishing price pressure in 2024 is based on the assumption that the main scenario of the projection does not envisage an actual wage-price spiral in Denmark or decoupling of inflation expectations.

Rising rent prices, accounting for almost 10 per cent of the consumer price index, are pushing Danish core inflation upwards and, viewed in isolation, will entail more sustained price pressure in the coming years. Specifically, rent prices are projected to rise by 3.1 per cent in 2022, 4.0 per cent in 2023 and 4.0 per cent in 2024. The assumed trajectory of rent prices is based on e.g. the agreed cap on rent increases, meaning that private landlords using net price indexation may not allow rents to rise by more than 4 per cent over the next two years[22]. The tendency towards higher rent prices is more pronounced in some other countries than in Denmark. In particular, US rent prices have risen strongly and are currently a major driver of high inflation in the United States.

Like Denmark, the euro area has prospects of high inflation in the coming years. The ECB's latest forecast, based on information up to 22 August, estimates that consumer price inflation in the euro area will peak at 9.2 per cent in the 4th quarter of 2022, averaging 8.1 per cent in 2022, 5.5 per cent in 2023 and 2.3 per cent in 2024. The expected fall in the rate of price increase in the coming years is based, in particular, on the assumption that increases in energy prices will diminish over time. Core inflation in the euro area, measured by the consumer price index excluding energy and food, i.e. a different measure of underlying price pressures than the one Danmarks Nationalbank applies to Denmark, is expected to increase by 3.9 per cent in 2022, 3.4 per cent in 2023 and 2.3 per cent in 2024.[23] According to the ECB, some of the drivers of core inflation in the coming period are tight labour markets with rising wage growth, indirect price effects from energy and a weaker euro.

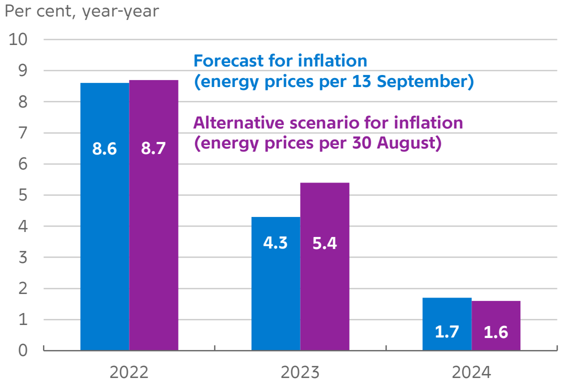
The expected accumulated headline inflation in Danmarks Nationalbank's projection for Denmark is slightly lower than in the ECB's forecast for the euro area in the years 2022-24. However, Danmarks Nationalbank expects Danish inflation to peak at a higher level than in the euro area in the 4th quarter of 2022 and subsequently decline more rapidly towards the 1st quarter of 2024. Consequently, average inflation in Denmark in 2022 is expected to be higher than in the euro area, and that it is matched by lower average Danish inflation in 2023-24. The difference in profile of inflation forecast profiles reflects, among other things, that the euro area had implemented a higher number of temporary policy measures, such as tax cuts, which initially cushion energy price increases but then push inflation up in the longer term when they are phased out. In addition, the pass-through from energy commodity prices to consumer prices has been faster in Denmark than in the euro area, especially for gas. Finally, Danmarks Nationalbank's projection is based on data up to mid-September, meaning that it contains more up-to-date information on energy commodity prices than the ECB forecast. There have been major fluctuations in market expectations for future

22 For a more detailed description of the measure, see Ministry of the Interior and Housing, *Agreement caps rent increases* (in Danish only), press release, 26 August 2022.

23 There are several different ways to quantify core inflation. Danmarks Nationalbank's projection is based on consumer prices excluding energy and unprocessed food, while the ECB applies consumer prices excluding energy and all food.

Sensitivity calculation shows that fluctuations in energy prices significantly affect the inflation forecast

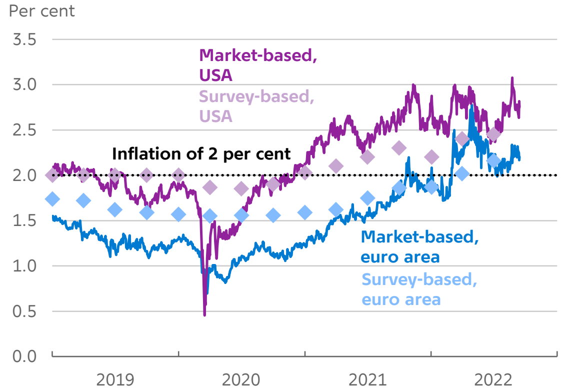
Chart 21



Note: The chart shows Danmarks Nationalbank's forecast for HICP inflation and an alternative course based on market expectations for energy commodity prices for oil, gas and electricity at the end of August.
Source: Own calculations.

Long-term inflation expectations are well-anchored, but risk of decoupling exists

Chart 22



Note: Market-based inflation expectations are based on a 5-5-year inflation swap. The questionnaire-based inflation expectations for the euro area refer to long-term inflation expectations in the Survey of Professional Forecasters published by the European Central Bank (ECB), while, for the United States, inflation expectations over the next 5-10 years are shown from the Survey of Professional Forecasters published by the Fed.
Source: Macrobond and Refinitiv Eikon.

energy commodity prices in recent weeks, and the exact cut-off date for the projection is thus relatively important for the inflation forecast. For example, a sensitivity calculation shows that Danmarks Nationalbank's forecast for inflation in Denmark in 2023 would increase to 5.4 per cent from 4.3 per cent if the forecast was based on market expectations for energy commodity prices at the end of August rather than mid-September, see chart 21.

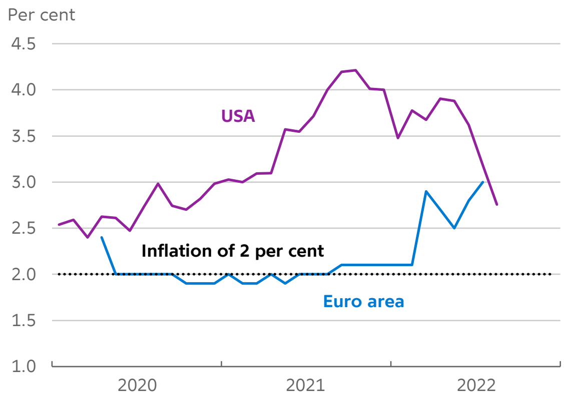
Inflation expectations are well-anchored, but a prolonged period of high inflation increases the risk of decoupling

Well-anchored inflation expectations are crucial for current price increases to stabilise over time and not give rise to self-reinforcing price dynamics. This is partly because expectations of future price developments influence corporate pricing and household behaviour today.

Most evidence suggests that inflation expectations are well-anchored around 2 per cent in the medium term. However, the risk of a deanchoring of inflation expectations is increasing as long as inflation remains high. Both market and survey-based indicators indicate that long-term inflation expectations are generally anchored around the US and euro area inflation targets, see chart 22. This supports the

Households expect high inflation 3 years ahead in the United States and the euro area

Chart 23



Note: The chart shows the median household questionnaire-based inflation expectations 3 years ahead.
Source: ECB, Federal Reserve Bank of New York and Macrobond.

expectation that the high price increases will deflect over time. However, in both the United States and the euro area, households still expect inflation 3 years ahead to exceed the inflation target of 2 per cent, see chart 23. The risk of decoupling inflation expectations thus exists and is likely to increase, the longer inflation remains high. For example, traditionally, the prices of frequent purchases such as food have a greater impact on households' perception of inflation than consumer prices as a whole, and a possible shift in inflation expectations could thus occur suddenly if the currently high food price increases are reflected in the formation of expectations.[24]

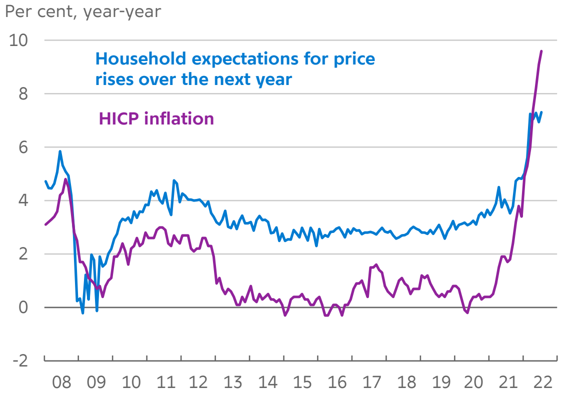
In Denmark, households' average expectations of price increases over the next 12 months have increased and stood at 7.3 per cent in July, see chart 24. The distribution of household inflation expectations provides further useful information on future price developments.[25] For example, past evidence has shown that growing dispersion and skewness may be an indication that average inflation expectations will increase later.[26] Currently, the dispersion of household inflation expectations is relatively substantial, suggesting that households have become more divided on future inflation after the pandemic outbreak, see chart 25.Conversely, the skewness of household inflation expectations is close to its long-term average, i.e. no more households than usual have very high inflation expectations.

Conditions for a stronger price cycle exist, but a self-reinforcing wage-price spiral as in the 1970s is not envisaged

The outlook for future price developments is subject to greater uncertainty than usual, entailing a risk of stronger and more persistent inflation than envisaged in the main projection scenario. Upside risks to consumer prices include the possibility of higher-than-expected energy prices due to the war in Ukraine or weather-related events and a possi-

Households in Denmark expect high price rises over the next year

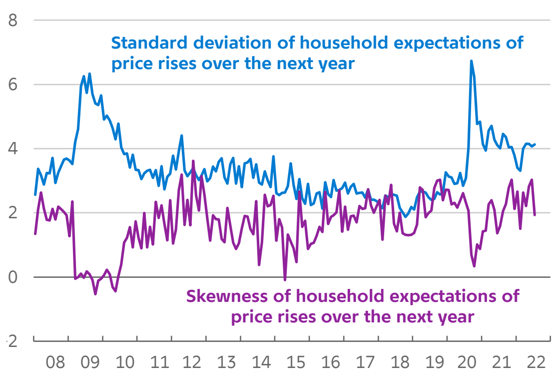
Chart 24



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.

Greater dispersion of household inflation expectations in Denmark

Chart 25



Note: *The standard deviation* is a measure of the dispersion of household inflation expectations, i.e. how divided they are about future inflation. *The skewness* measures whether the distribution is symmetrical around the mean value, i.e. whether most household inflation expectations are above or below average.
Source: Statistics Denmark, Macrobond and own calculations.

24 See Danmarks Nationalbank, Kim Abildgren and Andreas Kuchler, Revisiting the inflation perception conundrum, *Danmarks Nationalbank Working Paper,* No. 144, November 2019.

25 For example, an analysis of US data finds that the median, dispersion and skewness of household inflation expectations all help to explain the development of future inflation, see IMF's Tobias Adrian's speech, *Are household inflation expectations de-anchoring,* 17 May 2022.

26 See Ricardo Reis, *The burst of high inflation in 2021-22: How and why did we get here?*, June 2022.

ble decoupling of inflation expectations leading to self-reinforcing wage jumps. Moreover, a prolonged period of high consumer price increases can quickly trigger a psychology of inflation in the economy, i.e. households and companies adjust their behaviour in line with the expectation of future price increases to such an extent that this maintains the current high price increases. For example, this can happen if households bring forward consumption to avoid future price increases or if the general willingness to pay shifts in the economy, i.e. consumers accept price increases for their preferred products to a greater extent rather than looking for alternatives. Once inflation expectations are decoupled and sow the seeds of a wage-price spiral, it may subsequently take a significant economic slowdown to reduce inflation again. However, the main scenario does not envisage a self-reinforcing wage-price spiral in the Danish economy as in the 1970s. This is partly due to the increased independence of central banks with a clear focus on price stability and the declining use of automatic wage indexation, see box 2.

In addition to uncertainty about future wage developments, there are also other risks to the inflation outlook. There is currently strong price pressure at the early stages of the pricing chain domestically and globally. For example, Danish producer prices in industry have risen further after Russia's invasion of Ukraine and reached around 13 per cent year-on-year in August. In both Denmark and the euro area, the European Commission's business confidence indicator up to August also indicates that companies still expect to raise their sales prices at a strong pace over the next three months. Producer price increases usually affect consumer prices with a certain lag, meaning that companies' pricing behaviour may give rise to stronger price pressures than assumed, depending on whether they are fully reflected in consumer prices or partially absorbed into profit margins.

At the same time, there are also downside risks that could lead to lower-than-expected inflation. For example, a strong international cyclical reversal may weaken demand and thus dampen underlying price pressures. It is also possible that the current supply restrictions will decrease and lead to actual price falls on some goods that saw very high price increases during the pandemic, such as cars.

Global inflation cycle and strong domestic capacity pressures are increasing consumer prices in Denmark

Box 1

High inflation has returned in almost all OECD countries. Out of 23 OECD countries, only Japan and Switzerland recorded consumer price increases below 4 per cent year-on-year in July. The strong consumer price increases across countries are thus very much a global phenomenon, also affecting Danish consumer prices via various channels. For example, Danish consumer energy and food prices are extensively determined by supply and demand conditions in the global market. In addition, a small open economy like Denmark has substantial international trade and is deeply integrated into international supply chains. Consequently, price developments in Denmark largely depend on the prices of imported goods, the global economic situation and the supply situation.

To get an indication of the significance of high global inflation for Danish consumer prices, a global inflation cycle is estimated, i.e. the part of inflation that is common across countries not reflecting specific domestic conditions, see the note in the chart for a description of the methodology. The calculation shows that the global inflation cycle has intensified over the past year and generally has a significant impact on consumer prices in Denmark, see chart A. In the period 2001-22, the global inflation cycle accounts for approximately 85 per cent of the fluctuations in Danish CPI inflation.[1] Most of the current increase in Danish consumer prices also reflects increased global price pressure. Specifically, a model calculation indicates that spillover effects from the global inflation cycle lifted Danish inflation by almost 6 percentage points in July, see chart B. This is less than the overall increase in inflation, indicating that the strong capacity pressure in the Danish economy is also contributing to the high consumer price increases in Denmark.[2]

The global inflation cycle is driven by energy and food prices, among other factors. For example, a statistical analysis shows that the oil price and the food commodity price index of the Hamburg Institute of International Economics explain 42 per cent of the variation in the global inflation cycle. However, there is also a global cycle in core inflation, i.e. consumer prices excluding energy and food, although slightly less evident than for actual inflation.[3] This suggests that the global inflation cycle reflects not only synchronous movements in energy and food prices, but also relates to other factors such as the global cyclical situation and pressure on international supply chains. Fluctuations in the global inflation factor are often greater than in inflation in individual OECD countries because, among other factors, the global price shocks are partly absorbed into corporate profit margins and thus do not pass through one-on-one to consumer prices.

Chart A

Global inflation cycle has increased notably

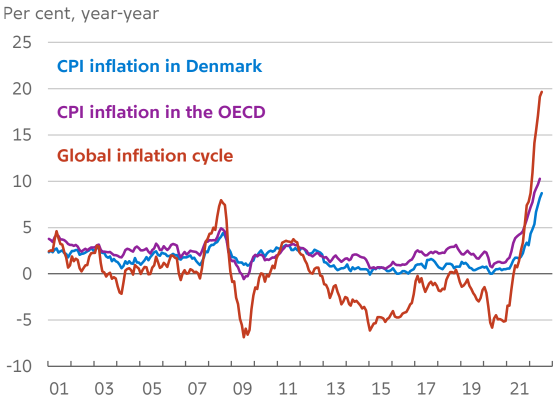
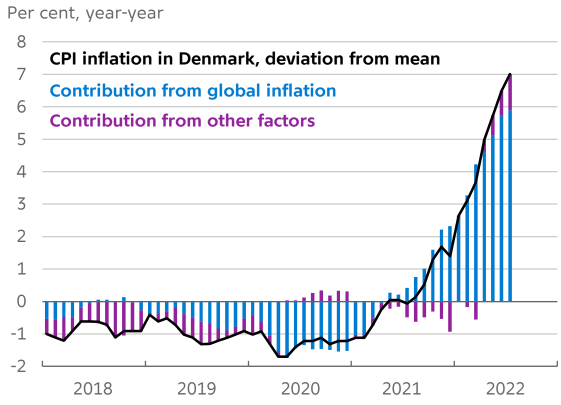


Chart B

Model calculation shows that high Danish inflation is currently mainly driven by global factors



Note: Chart A: The global inflation cycle is estimated as the first principal component of inflation in 23 OECD countries in the period January 2001-July 2022. Chart B: The decomposition is based on an econometric model explaining Danish inflation on the basis of a constant and the global inflation factor.

Source: OECD, Macrobond and own calculations.

1. The share of the variation in Danish inflation explained by the global inflation cycle is estimated as R^2 in the regression model mentioned in the note to the chart.
2. The contribution of Danish capacity pressures to inflation is not modelled directly in chart B. However, the residual from the estimated model, i.e. the part of inflation that can neither be explained by a constant nor by global inflation, may give an impression of the importance of domestic conditions. The residual has increased from around zero at the beginning of 2022 to just over 1 percentage point in July, indicating that the strong capacity pressure in the Danish economy is also increasing inflation.
3. For example, the first principal component of core inflation across OECD countries explains approximately 70 per cent of the variation in Danish core inflation in the period 2001-22.

Combination of boom and strong inflation generates risk of price-wage spiral

Box 2

Tight labour markets have already given rise to some upward pressure on wages in Denmark and elsewhere abroad. If rising inflation expectations and erosion of real wages lead to higher future wage demands, and companies subsequently pass on the increased costs to their sales prices, this could trigger a wage-price spiral in which the higher wage and price increases become self-reinforcing. The risk of such a scenario materialising increases, the longer high inflation persists, but currently the main scenario does not envisage a self-reinforcing wage-price spiral as in the 1970s. In particular, the increased independence of central banks with focus on ensuring price stability, well-anchored long-term inflation expectations and less use of automatic wage indexation across countries are crucial differences compared to previous episodes of high inflation.[1 2 3]

In Denmark, automatic wage indexation as part of the cost of living adjustment was one of the drivers of a wage-price spiral throughout the 1970s, see chart A. The scheme was suspended in 1983 and later abolished. In the following decades, the covariation between wage and price increases has been lower in Denmark, the euro area and the United States. This arguably reflects institutional changes, such as the declining use of automatic wage indexation, but also the fact that consumers and companies are generally less aware of price developments in a low inflation regime. Extrapolating conclusions from historical periods of low inflation directly to the current high inflation situation can therefore be problematic. For example, the pass-through from rising consumer prices to wages in Denmark has traditionally been stronger when inflation is already high, see chart B. There are indications that this correlation also applies across advanced economies.[4] This entails a risk that wage growth will suddenly pick up if high inflation persists over a longer period. The cyclical position of the economy probably also affects the interaction between wages and prices, since in a situation such as the current one with strong demand pressures, it is easier for companies to raise prices and for workers to negotiate wage increases.[5] It is therefore likely that the currently high inflation rate will have some impact on wages going forward, although the current situation differs significantly from that of the 1970s in several crucial respects.

Chart A
Indexation fuelled price-wage spiral in Denmark throughout the 1970s

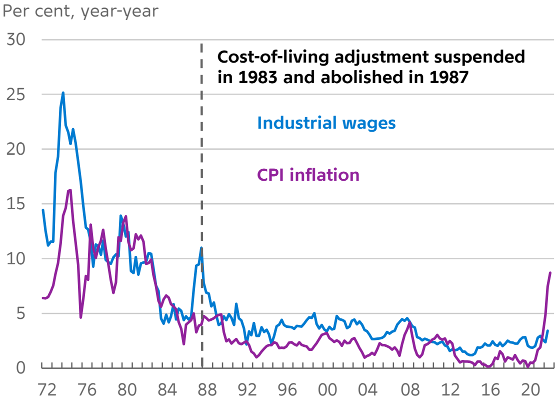
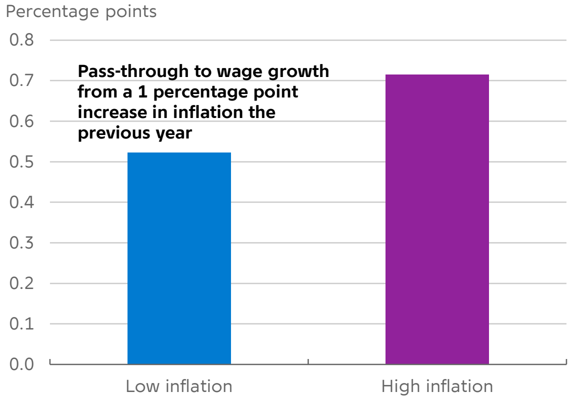


Chart B
Wages react more strongly to rising prices when inflation is already high



Note: Chart A: CPI inflation in the 3rd quarter of 2022 shows data for July. Chart B: A high inflation regime is a period of inflation above 3 per cent. The pass-through is estimated via a regression model, where wage growth in industry is explained by inflation, the unemployment gap and productivity growth the year before in the period Q1 1985-Q2 2022. In addition, an interaction element between inflation and a dummy variable is included for whether the economy is in a high inflation regime.
Source: Macrobond, Danmarks Nationalbank, Statistics Denmark and own calculations.

1. See, for example, ECB, Rodolfo Dall'Orto Mas et al., The case for central bank independence, *ECB Occasional Paper,* No. 248, October 2020.
2. In the euro area, the share of private wages formally dependent on inflation declined from 24 per cent in 2008 to 16 per cent in 2021, of which automatic wage indexation represents only a small part, see BIS, Koester et al., The prevalence of private sector wage indexation in the euro area and its potential role for the impact of inflation on wages, *ECB Economic Bulletin,* No. 7, 2021.
3. In the United States, the proportion of wages automatically indexed to inflation or otherwise dependent on the cost of living had fallen to 20 per cent in the mid-1990s from about 60 per cent in the late 1970s, see BIS, Boissay et al., Are major advanced economies on the verge of a wage-price spiral?, *BIS Bulletin,* No. 53, May 2022.
4. For example, the BIS finds that the pass-through from inflation to wages is higher during periods of high inflation, see BIS' Claudio Borio's speech, *Inflation: A look under the hood*, Bank for International Settlements, 26 June 2022.
5. For example, the pass-through from wages to consumer prices is greater in the euro area when demand is strong, see ECB, Elena Bobeica, Matteo Ciccarelli and Isabel Vansteenkiste, The link between labor cost and price inflation in the euro area, *ECB Working Paper* No. 2235, February 2019.

Housing market headwinds to come

After two years of historically high sales volumes and house price increases of 20 per cent, activity in the housing market has now slowed down. Especially headwinds from higher interest rates and rising prices are weighing on home buyers' disposable amounts. This is not only a Danish phenomenon, but is also seen in several other countries.

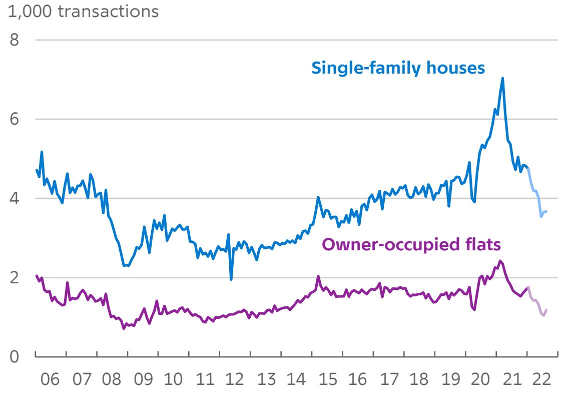
The headwinds have already resulted in lower house prices in Denmark, and there are prospects of further declines in the near future. There is great uncertainty about the price development, but overall, prices of single-family homes nationwide are expected to remain significantly higher than before the coronavirus pandemic. At the same time, the housing burden is still low nationwide.

Substantial drop in trading activity

The slowdown in the housing market is particularly evident in the number of housing transactions, which has fallen significantly for both single-family houses and owner-occupied flats, see chart 26. By August 2022, the number of single-family houses sold nationwide had fallen by more than 30 per cent compared to the high level the year before, according to the Boligsiden website. The decline is seen across the country, but is most pronounced in and around the capital. This is especially true for owner-occupied

Considerable decline in trading activity in the housing market

Chart 26



Note: Nationwide figures. Seasonally adjusted. In the faded lines, the development in the number of transactions from Statistics Denmark is projected with the development in the number of transactions from Boligsiden.

Source: Statistics Denmark, Boligsiden and own calculations.

flats, now showing the lowest number of transactions since 2012.[27]

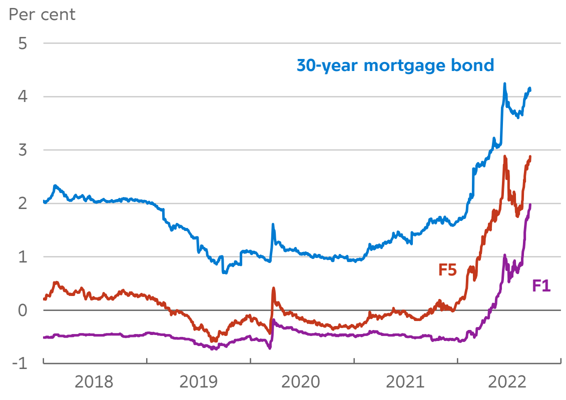
The lower activity comes after the number of housing transactions in 2020 and 2021 was almost 25 per cent higher than in the previous two years. The lower number of transactions can therefore be partly attributed to the housing market returning to a more normal state, and a period of lower trading activity is consistent with many home buyers bringing forward their buying decisions during the pandemic.[28]

The slowdown in the housing market should also be seen in the light of several factors that have taken up parts of home buyers' budgets. Mortgage rates increased significantly this year, see chart 27. This has increased the costs associated with home ownership changes. At the same time, inflation has risen, especially regarding energy for heating homes.[29]

The pandemic is also playing a role in lower trading activity. Over the year, the coronavirus pandemic has loosened its grip on the Danish society. This may have helped reduce households' appreciation of their homes in step with the reopening of workplaces, restaurants and access to foreign travel. It is found that some of the increased appreciation of homes during the pandemic was temporary[30], which, in isolation, reduces the demand for housing when society is less affected by the pandemic.

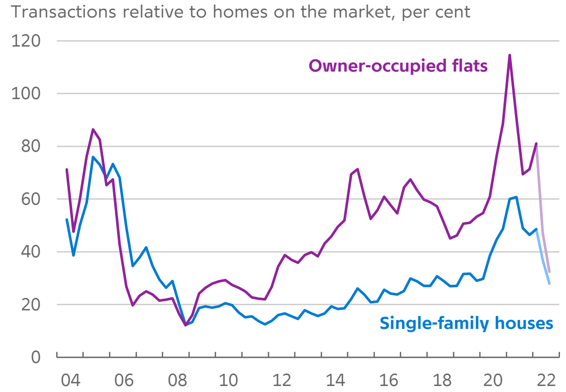
The lower trading activity contributes to longer time on the market and to a higher number of homes for sale. The relationship between the number of transactions and the number of homes on the market has recently decreased considerably, see chart 28. Thus,

Large increase in mortgage rates this year Chart 27



Note: Data through 13 September 2022.
Source: Danmarks Nationalbank and Nordea Analytics.

Fewer transactions relative to the number of homes on the market Chart 28



Note: Nationwide statistics. In the 2nd and 3rd quarters, the sales and supply statistics from Finance Denmark are projected with the sales and supply statistics from Boligsiden, which is reflected in the faded lines.
Source: Statistics Denmark, Finance Denmark, Boligsiden and own calculations.

27 Seasonally adjusted.

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

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

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

there are indications that the housing market is now less tight than a year ago.

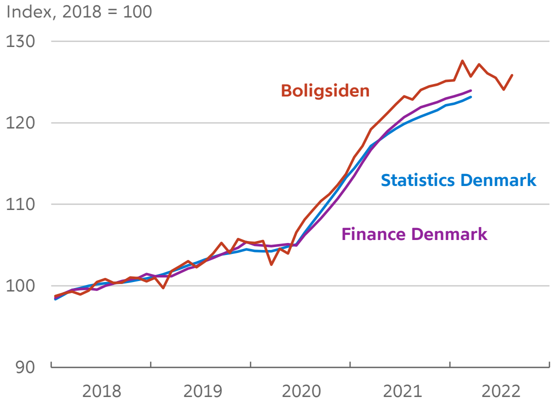
House prices fell over the summer
Given the large increases in consumer prices, higher interest rates and weaker trading activity in the 1st half of the year, house prices have now started to fall, see chart 29. Prices of single-family houses fell by 1.4 per cent nationwide from April to August, according to Boligsiden. The decrease should be seen in the light of average price increases of 2.6 per cent every quarter since the outbreak of the pandemic. Consequently, there are signs of an incipient shift in the housing market. This development is even more pronounced for prices of flats, which fell by almost 5 per cent from April to August.

The price declines have only become apparent over the summer after several months of gradual slowdown. Up to that time, however, sellers' discounts on the asking price had risen strongly. Discounts are now on a par with the level before the pandemic, although they are 40 per cent higher in the market for flats in Copenhagen. A study on US data has shown that asking prices are the first to respond to interest rate changes, while the adjustment of final sales prices is more gradual.[31] That is why discounts can be an indicator of price developments.[32]

Developments over the past half year have especially amplified the downside uncertainty about price developments. An indicator-based model for house price growth indicates that the risk of major house price falls has increased over the past year, just as the model's most likely estimate of house price growth has declined, see box 3.

Rising interest rates and high inflation cause house price falls in the short term
Looking ahead, the interest rate increases on long-term mortgage bonds in particular will put downward pressure on house prices. Calculations based on the macroeconomic model MONA indicate that interest rate increases over the year, viewed in isolation, contribute to dampening house prices by

House price increases have been replaced by declines Chart 29



Note: Figures from Statistics Denmark and Finance Denmark are quarterly, while figures from Boligsiden are monthly. Seasonally adjusted.
Source: Statistics Denmark, Finance Denmark, Boligsiden and own calculations.

around 9 per cent towards 2023 and 20 per cent overall by 2024.

However, higher nominal interest rates should be seen in the context of higher inflation, which has both short-term and long-term effects on house prices, see box 4.

In the short term, higher prices for essential goods, such as energy and food, and rising nominal interest rates will weigh on the budgets of home buyers. This helps to dampen the demand for housing.

Conversely, upward pressure on house prices is expected in the longer term – more specifically towards the end of the projection period, and increasing in the years after that. The pressure comes partly from nominal wage increases, partly from rising construction costs, if they help to retain construction activity and thus stimulate the price of existing housing. The large house price increases

31 See e.g. Denis Gorea et al., House Price Response to Monetary Policy Surprises: Evidence from the U.S. Listings Data, *IZA Institute of Labor Economics Discussion Paper,* No. 15481, August 2022.

32 A discount time series is not available for periods of both upward and downward house price developments.

in 2020 and 2021 exceeded increases in construction costs, meaning that the current level of house prices is high relative to construction costs, see chart 30. Over the past year, however, construction costs have risen more than house prices, and at the same time widespread labour shortages in construction may help to further support demand for existing housing.

High inflation also affects the relationship between the owner-occupied housing and rental markets. Many Danish tenants have inflation-indexed rents. Despite the agreement on a cap on rent regulation,[33] adopted by a majority in the Danish Parliament, many tenants will presumably still be facing significant rent increases in the coming year. This makes it more attractive to buy owner-occupied housing, putting upward pressure on house prices.

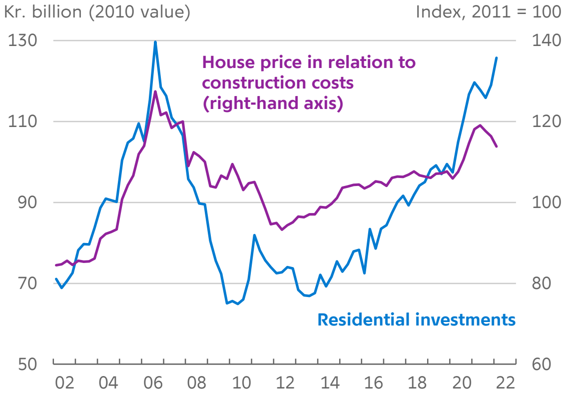
The strong Danish labour market with high job security and the prospect of wage increases also counteracts some of the downward pressure on house prices from interest rate increases. High employment and rising disposable income, viewed in isolation, stimulate the demand for housing.

The housing burden has increased significantly in recent months, but is still low

The sharp rises in interest rates over the past six months have increased housing costs for home buyers. Expenditure as a share of disposable income has increased by 3 percentage points since the start of the year, see chart 31. However, in a nationwide perspective the increase comes after a long period with a low housing burden.[34] Despite higher interest costs, the housing burden is therefore still low, considering the housing market as a whole, even though house prices have risen slightly faster than incomes in recent years.

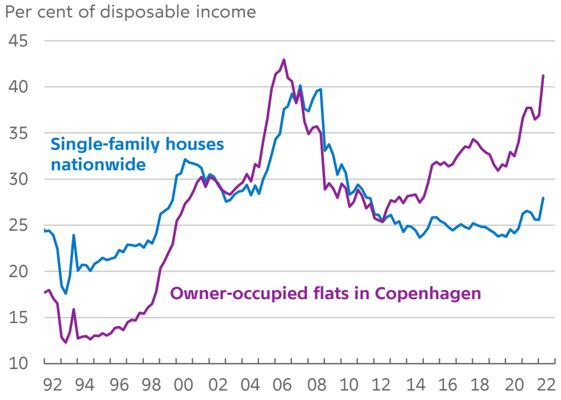
But in the market for owner-occupied flats in Copenhagen, the housing burden is high and on a par with the pre-financial crisis level. Even with deferred amortisation, the housing burden is high, increasing the risk that buyers will not be able or willing to accept

High house prices relative to construction costs Chart 30



Source: Statistics Denmark.

High housing burden in Copenhagen Chart 31



Note: The housing burden is a stylised calculation of the financing costs, including property taxes, of buying a single-family house or owner-occupied flat as a share of average disposable household income. The financing costs include administration margins and brokerage fees, plus a bank loan for the share that cannot be financed by a mortgage loan.
Source: Danmarks Nationalbank.

33 The agreement on "Initiatives to counteract large rent increases" means that private landlords who use net price indexation may not allow rents to rise by more than 4 per cent over the next two years.

34 The housing burden does not necessarily give an adequate picture of homeowners' costs.

asking prices. This could amplify the expected drop in prices for owner-occupied flats in the near future.

Several housing markets abroad show signs of reversal

During the pandemic, house price developments abroad and in Denmark correlated strongly. Abroad, too, the pandemic appears to have had an impact on households' appreciation of their homes.

Some signs of a reversal in house price developments appeared abroad during the 1st half of the year. For example, Sweden and New Zealand saw significant price declines during the 1st half of the year, see chart 32. Swedish house prices have fallen by 5.4 per cent nationwide from their peak in February 2022. Home financing in Sweden generally involves shorter maturities, which may be a contributing factor to the already substantial house price falls in Sweden. In its latest forecast, the Swedish central bank, Riksbanken, expects house prices to fall by 16 per cent overall from their peak in February to the end of 2023.

Elsewhere abroad, house prices have just stagnated for now, e.g. in Norway and the Netherlands, while the upward price trend has continued in the UK and the United States. In the United States, price growth has continued, even though housing loan interest rates have risen significantly and the number of homes sold has fallen below pre-pandemic levels. This leaves some uncertainty about the possible duration of the price increases.

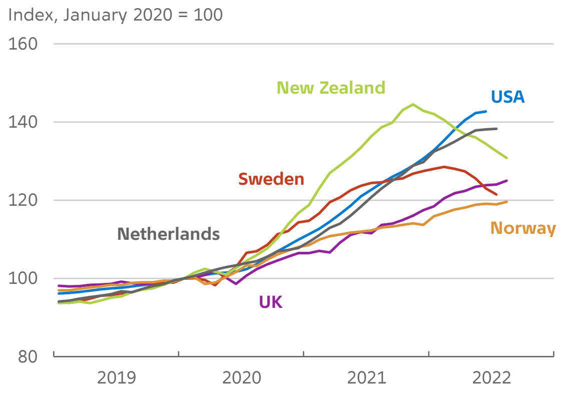
Falling prices expected in the coming year

Overall, moderate price declines are expected in the housing market in Denmark. House price developments are subject to great uncertainty, especially given the risk of a sharp downturn in house prices. However, this projection assumes that prices of single-family houses will fall over the next year, see chart 33. In addition to the dampening effects of higher interest rates and inflation, the decline is due to the prospect of more subdued growth, weakened consumer confidence and heightened uncertainty.

As a result of the strong price growth last year, the expected price increase for single-family houses for 2022 as a whole is 3 per cent, while the price decline will not be visible on an annual basis until 2023, when a decline of 6 per cent is expected.

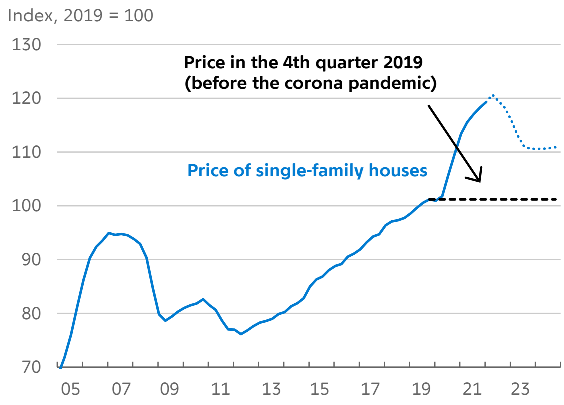
As incomes rise, house price falls are expected to slow down towards the end of 2023. The market

Falling prices in several places abroad Chart 32



Note: Seasonally adjusted.
Source: Macrobond.

Prospects of lower house prices Chart 33



Note: Nationwide nominal house prices.
Source: Statistics Denmark and Danmarks Nationalbank.

Model estimates indicate an increase in the risk of substantial declines in house prices

Box 3

There is considerable uncertainty about house price developments in the coming years. Many opposing drivers exist, and it can be difficult to determine their interrelationships and thus the pass-through to house prices. This projection for the Danish economy provides an overall central assessment of house price developments in the coming years.

However, the literature considers[1] that risk scenarios for house price developments may be relevant in order to assess price developments. This applies in particular to the development of these risk scenarios over time. On this basis, a model is established for the outcome for house price developments in Denmark.[2]

The model describes house price scenarios based on cyclical and structural factors as well as regulatory measures, respectively. The cyclical factors are represented by developments in a credit and house price cycle.[3] This is determined in the model by developments in house prices relative to income. The structural factors are represented partly by housing investment as a percentage of GDP as a measure of the importance of the housing market to the economy, partly by the average debt servicing ratio of homeowners. The regulatory measures are represented by first-year payments for first-time home buyers net of interest rate developments to reflect only changes in regulation.[4] On the basis of these factors, a probability distribution of house price growth within a given time horizon can be estimated, inter alia.

Firstly, the model indicates a general shift towards lower house price growth over the past year. The median estimate for house price growth over the next two years has moved from 2.3 per cent based on developments in cyclical, structural and regulatory factors, respectively, up to and including the 1st quarter of 2021 to -1.5 per cent based on developments up to and including the 1st quarter of 2022. The development is mainly due to higher growth in house prices than in incomes, so that new homeowners have stretched their finances more, viewed in isolation.

Secondly, the model indicates a risk of stronger house price falls than previously. This can be illustrated by looking at how much house prices can fall in a specific risk scenario. Here, the risk scenario is defined at 5 per cent probability, i.e. the 5th percentile in the probability distribution of house price growth. The model shows that house price growth in this risk scenario has moved downwards. The risk scenario for house price growth over the next two years has thus moved from a fall of 13 per cent in the 1st quarter of 2021 to 18 per cent in the 1st quarter of 2022, see chart A. This indicates a risk of a larger decline over the next two years than a year ago. The risk scenario is the most negative for more than 30 years, excluding the financial crisis, see chart B.

Chart A
Risk scenarios for house price growth are now more negative

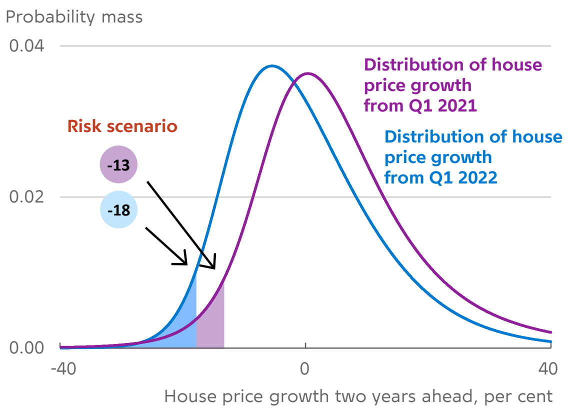
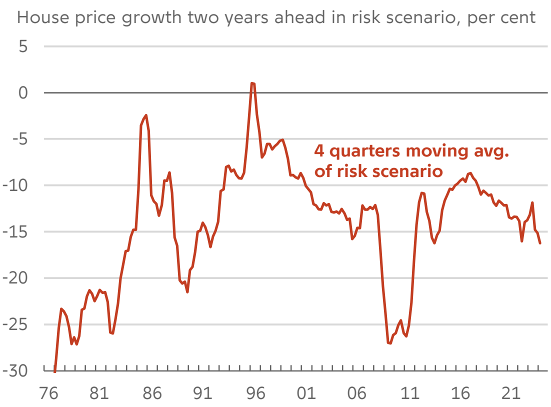


Chart B
Limited movement in a historical context



1. See, for example, International Monetary Fund, Downside Risks to House Prices, *Global Financial Stability Report,* chapter 2, April 2019, and Adrian Alter and Elizabeth M. Mahoney, Local house-price vulnerability: Evidence from the U.S. and Canada, *Journal of Housing Economics,* No. 54, 2021.
2. The model will be described in a forthcoming publication from Danmarks Nationalbank later this year.
3. See Danmarks Nationalbank, Grinderslev et al., Financial Cycles: What are they and what do they look like in Denmark?, *Danmarks Nationalbank Working Paper,* no. 115, June 2017.
4. See Danmarks Nationalbank, Alexander Meldgaard Otte and Ianna Georgieva Yordanova, What's the story behind Danish households' rising debt?, *Danmarks Nationalbank Analysis,* No. 13, June 2020.

expects a subdued interest rate development for long-term mortgage bonds going forward, and the headwinds from interest rate increases therefore to a lesser degree counteract the price development towards the end of the projection period.

The housing tax reform in 2024 is also expected to contribute positively to the prices of single-family houses nationwide. Thus, they are expected to remain approximately unchanged throughout the year. However, on an annual basis this corresponds to a house price drop of almost 2 per cent. But the effect of the housing tax reform on house prices will vary considerably across the country, and downward pressure on prices is to be expected, especially for owner-occupied flats in Copenhagen. The fall in prices of single-family houses follows a period of large price increases, and house prices are still expected to be 10 per cent higher than before the coronavirus pandemic.

The current headwinds in the housing market do not change the fact that it needs structural improvement. Automatic stabilisers are still needed in the housing market, ensuring uniform taxation and reducing increases and falls in house prices around structural house price trends. In Denmark, there is substantial interaction between developments in the housing market and the rest of the economy. That is why healthy housing market structures help to ensure a robust Danish economy.

The entry into force of the housing tax reform in 2024 is the most significant contribution to healthier structures in the housing market. From 2024, property taxes will again rise and fall with house prices, thus dampening fluctuations. Overall, the implementation will boost house prices slightly around 2024 and re-establish more uniform taxation across the country.

Temporarily higher inflation may reduce house prices, viewed in isolation

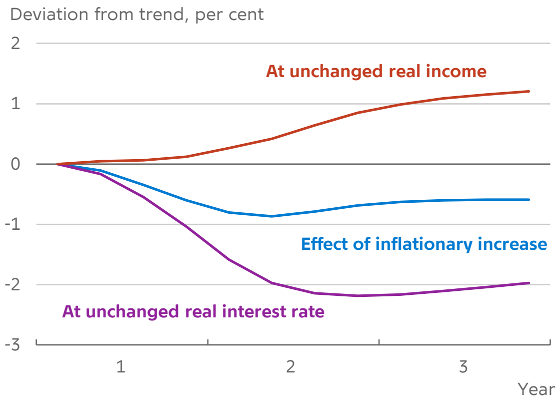
Box 4

The starting point for illustrating the effects of rising inflation on house prices is the house price relation in the macroeconomic model MONA.[1] To illustrate the effect on house prices, a version of the relation is used in which real compensation is included as a concept of income. The use of compensation is due to the fact that wage income to a high degree informs cyclical fluctuations in housing demand.[2] In addition, projected house price growth is disregarded to exclude expectation effects.

The effects of inflation on house prices are illustrated by a gradual, permanent boost to consumer prices. Consumer prices rise by 1 per cent over a year, after which they are maintained at the higher price level.

The rise in consumer prices, viewed in isolation, entails a fall in house prices as real income is permanently eroded, illustrated by the blue line in the chart. This is partly offset by lower real interest rates, as the model's households look back to historical inflation when forming their inflation expectations. The rise in consumer prices therefore temporarily increases household inflation expectations, lowering real interest rates and encouraging higher housing demand. This is reflected as inflation expectations rise.

Assumptions about the trajectory of nominal interest rates and incomes are important for the final impact on house prices. In the short term, allowing long-term nominal interest rates to change will intensify the fall in house prices so that real interest rates remain unchanged before tax (purple line). On the other hand, house prices will rise nominally if nominal incomes follow the rise in consumer prices, so that real income is maintained (red line). In the long term, however, house prices will remain unchanged in real terms.



1. A detailed description of the house price relation in MONA can be found in the article The housing bubble that burst: Can house prices be explained? And can their fluctuations be dampened?, *Danmarks Nationalbank Monetary Review 1st quarter*, part 1, pp. 47-70, 2011.
2. A similar correlation exists in the ADAM model, including private consumption in the house price relation.

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 2nd quarter of 2022. The projection is based on statistics published up to and including 13 September 2022. 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 5.5 per cent in 2022, 2.5 per cent in 2023 and 2.9 per cent in 2024. The assumptions are based on the latest OECD *Economic Outlook*, June 2022, and the IMF *World Economic Outlook*, July 2022, and have been revised downwards based on the latest ECB forecast. Export market growth for 2022 has been revised upwards by 1.7 percentage points from the latest projection from March 2022, primarily reflecting that higher growth in 2021 creates a greater economic overhang to 2022. Export market growth from the 4th quarter of 2021 to the 4th quarter of 2022 is 2.1 per cent, entailing just a small slowdown in growth throughout 2022. Export market growth has been revised downwards by 1.4 percentage points in 2023 and 0.3 percentage points in 2024.

Overview of projection assumptions Table A1

	2021	2022	2023	2024
International economy:				
Export market growth, per cent, year-on-year	8.7	5.5	2.5	2.9
Foreign price[1], per cent, year-on-year	9.1	16.5	4.1	1.3
Foreign hourly wages, per cent, year-on-year	2.6	4.2	4.4	3.8
Financial conditions etc.:				
3-month money market interest rate, per cent, p.a.	-0.4	0.3	2.5	2.5
Average bond yield, per cent, p.a.	0.4	1.8	2.4	2.4
Effective krone rate, 1980 = 100	103.9	101.7	101.7	101.7
Dollar exchange rate, DKK per USD	6.3	7.1	7.3	7.3
Oil price, Brent, USD per barrel	70.7	101.2	85.6	79.0
Fiscal policy:				
Public consumption, per cent, year-on-year	4.2	0.7	-0.7	1.1
Public investments, per cent, year-on-year	0.4	-2.3	2.9	4.5
Public sector employment, 1,000 persons	854	860	857	855

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

Based on the OECD's June Economic Outlook and revised based on the latest ECB forecast, foreign prices are assumed to rise by 16.5 per cent in 2022, following a slightly higher increase in 2021. Over the coming years, foreign price growth is assumed to slow considerably to 4.1 per cent in 2023 and 1.3 per cent in 2024. Foreign wage growth is assumed to pick up substantially from 2.6 per cent in 2021 to 4.2 per cent in 2022 and 4.4 per cent in 2023. Assumptions are based on the OECD estimate of compensation per employee, adjusted based on the latest ECB forecast.

Interest rates, currency and energy 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. On this basis, the 3-month money market interest rate, measured by the CITA swap rate, is expected to increase gradually throughout the projection period from its current level of 1 per cent in September 2022 to 2.5 per cent in 2024.

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 sharp energy price fluctuations caused by Russia's invasion of Ukraine, the oil price has been fixed in the projection based on an average of futures prices between 2 and 13 September. In early September 2022, the oil price was around 100 dollars per barrel, and it is expected to decrease gradually to around 75 dollars per barrel at the end of 2024.

In the current situation of extraordinary increases in gas and electricity prices, this projection includes separate assumptions as regards these prices. Just like oil prices, gas and electricity prices are determined based on an average of futures prices between 2 and 13 September. On this basis, the price of gas is assumed to remain around 230 euro per MWh during the rest of 2022 and then to fall to around 100 euro per MWh by the end of 2024. Correspondingly, the electricity price is assumed to drop from around 300 euro per MWh at the end of 2022 to 120 euro per MWh at the end 2023 and 60 euro per MWh at the end of 2024.

Fiscal policy assumptions
The projection is based on preliminary national accounts data on public sector consumption and investment and the planned fiscal policy in *Economic Survey, August 2022,* and *Updated 2030 development: Grundlag for udgiftslofter i 2026* (in Danish only), August 2022.

On this basis, real public consumption is expected to increase by 0.7 per cent in 2022, to decrease by 0.7 per cent in 2023 and to increase by 1.1 per cent in 2024. Public investments are expected to fall by 2.3 per cent this year, to increase by 2.9 per cent in 2023 and by 4.5 per cent in 2024, see table A1.

Revisions in relation to the previous projection
Projected GDP growth has been revised downwards by 0.1 percentage points this year, by 2.2 percentage points in 2023 and by 0.5 percentage point in 2024 relative to the previous projection from March, see table A2. Viewed in isolation, revised export market growth and exchange rate assumptions contribute to a 0.9 per cent increase in growth in 2022, but this is offset by other factors that are not attributable to exogenous assumptions. In 2023 and 2024, both export market growth and developments in interest rates detract from growth. 2023, in particular, will also see large negative contributions from other factors. The large negative contributions from other factors should primarily be seen in the context that considerably higher consumer price inflation weakens household purchasing power and reduces consumption.

The forecast of the rate of increase in consumer prices, HICP, has been revised upwards by 3.7 percentage points in 2022, 2.9 percentage points in 2023 and downwards by 0.5 percentage points in 2024. Exchange rates and export market growth contribute slightly to the upward revisions, but the largest contribution comes from other factors. The large contribution from other factors reflects that electricity and gas prices have risen by more than the normal oil price pass-through suggests. In addition, other factors also reflect the price increases caused by delivery difficulties.

Changes in the projection

Table A2

	GDP			Consumer prices (HICP)		
Per cent, year-on-year	2022	2023	2024	2022	2023	2024
Projection from March	2.1	2.1	1.7	4.9	1.4	2.2
Contribution to revised forecast from:						
Export market growth	0.6	-0.2	-0.3	0.0	0.1	0.2
Development in interest rates	-0.1	-0.4	-0.2	0.0	0.0	0.0
Exchange rates	0.3	-0.1	-0.1	0.1	0.2	0.1
Oil prices	0.0	0.0	0.0	-0.1	-0.1	0.0
Other factors	-0.9	-1.5	0.1	3.7	2.8	-0.7
This projection	2.0	-0.1	1.2	8.6	4.3	1.7

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

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