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OECD Economic Surveys: Sweden 2023

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Foreword

This *Survey* is published on the responsibility of the Economic and Development Review Committee of the OECD, which is charged with the examination of the economic situation of member countries.

The economic situation and policies of Sweden were reviewed by the Committee on 2 May 2023. The draft report was then revised in light of the discussions and given final approval as the agreed report of the whole Committee on 19 May 2023.

The Secretariat's draft report was prepared for the Committee by Jon Pareliussen, Hyunjeong Hwang, and Axel Purwin, under the supervision of Vincent Koen. Research assistance was provided by Axel Purwin, and editorial support by Michelle Ortiz and Jean-Rémi Bertrand.

The previous *Survey* of Sweden was issued in July 2021.

Information about the latest as well as previous Surveys and more details about how *Surveys* are prepared is available at www.oecd.org/eco/surveys

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Basic statistics of Sweden, 2022

(Numbers in parentheses refer to the OECD average) [1]

LAND, PEOPLE AND ELECTORAL CYCLE					
Population (million, 2021)	10.4		Population density per km² (2021)	25.6	(38.7)
Under 15 (%, 2021)	17.7	(17.4)	Life expectancy at birth (years, 2021)	83.2	(78.7)
Over 65 (%, 2021)	20.1	(17.7)	Men (2021)	81.4	(75.9)
International migrant stock (% of the population, 2019)	20.0	(13.2)	Women (2021)	85.0	(81.7)
Latest 5-year average growth (%)	1.0	(0.5)	Latest general election	September 2022	
ECONOMY					
Gross domestic product (GDP)			Value added shares (%, 2021)		
In current prices (billion USD)	590.7		Agriculture, forestry and fishing	1.5	(2.6)
In current prices (billion SEK)	5951.8		Industry including construction	25.5	(26.6)
Latest 5-year average real growth (%)	2.1	(1.6)	Services	73.0	(70.8)
Per capita (000 USD PPP, 2021)	60.3	(50.8)			
GENERAL GOVERNMENT (Per cent of GDP)					
Expenditure (OECD: 2021)	47.9	(46.3)	Gross financial debt (OECD: 2021)	44.6	(109.6)
Revenue (OECD: 2021)	48.7	(38.8)	Net financial debt (OECD: 2021)	-36.5	(71.0)
EXTERNAL ACCOUNTS					
Exchange rate (SEK per USD)	10.08		Main exports (% of total merchandise exports)		
PPP exchange rate (USA = 1)	8.67		Machinery and transport equipment	33.4	
In per cent of GDP			Manufactured goods	16.6	
Exports of goods and services	52.7	(33.3)	Chemicals and related products, n.e.s.	13.6	
Imports of goods and services	50.0	(34.9)	Main imports (% of total merchandise imports)		
Current account balance	4.2	-(1.1)	Machinery and transport equipment	33.1	
Net international investment position	38.3		Mineral fuels, lubricants and related materials	13.8	
			Manufactured goods	13.3	
LABOUR MARKET, SKILLS AND INNOVATION					
Employment rate (aged 15 and over, %)	62.1	(56.2)	Unemployment rate, Labour Force Survey (aged 15 and over, %)	7.4	(5.0)
Men	65.5	(64.1)	Youth (aged 15-24, %)	21.7	(10.9)
Women	58.7	(48.7)	Long-term unemployed (1 year and over, %, 2021)	1.5	(2.0)
Participation rate (aged 15 and over, %)	74.5	(60.3)	Tertiary educational attainment (aged 25-64, %, 2021)	46.6	(39.9)
Average hours worked per year (OECD: 2021)	1,439	(1,728)	Gross domestic expenditure on R&D (% of GDP, 2020)	3.5	(3.0)
ENVIRONMENT					
Total primary energy supply per capita (toe, 2021)	4.5	(3.8)	CO2 emissions from fuel combustion per capita (tonnes, 2021)	3.2	(7.9)
Renewables (%, 2021)	45.9	(11.6)	Water abstractions per capita (1 000 m³, 2020)	0.2	
Exposure to air pollution (more than 10 µg/m³ of PM 2.5, % of population, 2019)	1.6	(61.7)	Municipal waste per capita (tonnes, 2021, OECD: 2020)	0.4	(0.5)
SOCIETY					
Income inequality (Gini coefficient, 2020, OECD: 2018)	0.276	(0.315)	Education outcomes (PISA score, 2018)		
Relative poverty rate (%, 2020, OECD: 2018)	8.8	(11.7)	Reading	506	(485)
Median disposable household income (000 USD PPP, 2020, OECD: 2018)	32.8	(25.5)	Mathematics	502	(487)
Public and private spending (% of GDP)			Science	499	(487)
Health care (2021, OECD: 2020)	11.4	(9.7)	Share of women in parliament (%)	46.4	(32.5)
Pensions (2019)	9.3	(9.5)	Net official development assistance (% of GNI, 2017)	1.0	(0.4)
Education (% of GNI, 2021)	7.1	(4.4)			

1. The year is indicated in parenthesis if it deviates from the year in the main title of this table.
Where the OECD aggregate is not provided in the source database, a simple OECD average of the latest available data is calculated where data exist for at least 80% of member countries.
Source: Calculations based on data extracted from databases of the following organisations: OECD, IAE, ILO, IMF, United Nations, World Bank.

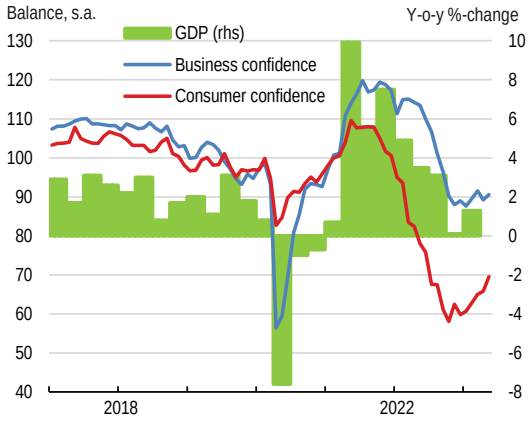
Executive summary

Growth is challenged by Russia's aggression

After emerging from the pandemic in relatively good shape, Sweden's economy is under renewed pressure following Russia's illegal war of aggression against Ukraine and its weaponization of energy.

Growth has slowed down, as private consumption and housing investments have fallen. Consumer and business confidence have plummeted (Figure 1). Direct trade and financial links with Russia and Ukraine are limited, but high energy prices have led to increased inflation, rising interest rates and a housing price correction. Commercial property companies have increased borrowing from the corporate bond market in recent years, but face challenges refinancing their debts.

Figure 1. Growth is losing steam



Source: Statistics Sweden; National Institute of Economic Research.

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The labour market has performed strongly after the pandemic. Unemployment has fallen. Employment surpassed pre-crisis levels in 2021 and grew robustly throughout 2022 and early 2023. Signs of a slowdown are emerging, with layoff notices increasing and companies preparing to downsize their workforce.

The economy is set to contract in the near term. After a 2.9% expansion in 2022, output is projected to shrink by 0.3% in 2023 before growing by 1.4% in 2024. Investment is expected to decline against the backdrop of rising input and financing costs. Unemployment is set to increase. Inflation will ease only gradually and remain high in 2023 (Table 1).

Table 1. GDP will contract in the near term

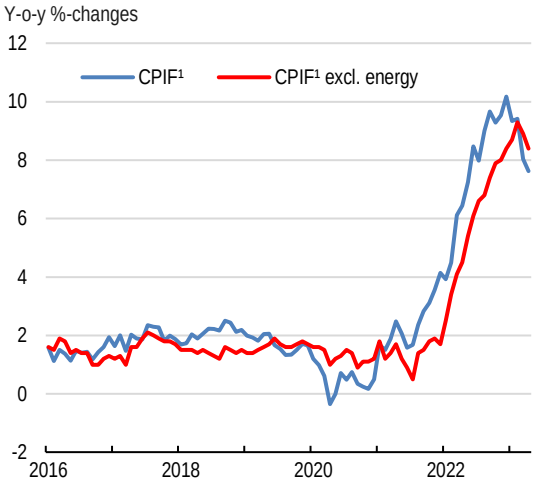
(Annual growth rates, %, unless specified)

	2021	2022	2023	2024
Gross domestic product	5.9	2.9	-0.3	1.4
Private consumption	6.2	2.0	-2.7	2.0
Government consumption	2.9	0.1	1.2	1.2
Gross fixed capital formation	6.8	6.2	-1.6	0.1
Exports	10.8	7.1	4.0	3.3
Imports	11.3	9.4	1.6	3.2
Unemployment rate (% of the labour force)	8.8	7.5	7.9	8.0
Consumer price index	2.2	8.4	7.9	2.4
Current account balance[1]	6.5	4.2	5.6	5.6
General government fiscal balance[1]	0.0	0.7	-0.4	-0.6

1. As a percentage of GDP.
Source: OECD Economic Outlook No. 113.

Monetary policy has been normalising on the back of rising inflation pressures. Consumer price inflation with a fixed mortgage rate (CPIF) stood at 7.6% in April 2023, after peaking at 10.2% in December 2022. CPIF inflation excluding energy moderated to 8.4% suggesting inflationary pressures remain broad (Figure 2). Wage increases are expected to be modest, even as real wages are falling. The Riksbank raised its policy rate from 0% in May 2022 to 3.5% in April 2023 and has embarked on quantitative tightening to bring inflation back towards its 2% target.

Figure 2. Inflation is at a 30-year high



1.CPI with a fixed mortgage rate.
Source: Statistics Sweden.

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The fiscal stance in 2023 is set to be broadly neutral. Fiscal policy remained supportive in 2022, after the pandemic years of spiralling public expenditure. Considerable support was provided to households hit by soaring energy bills in 2022, and more is planned for 2023. The support includes transport fuel tax relief, price support and ex-post compensatory payments based on electricity consumption. Such untargeted support adds to fiscal cost, may fuel inflation and distort incentives to save energy. Defence spending is also rising in response to increased security threats and in anticipation of NATO membership.

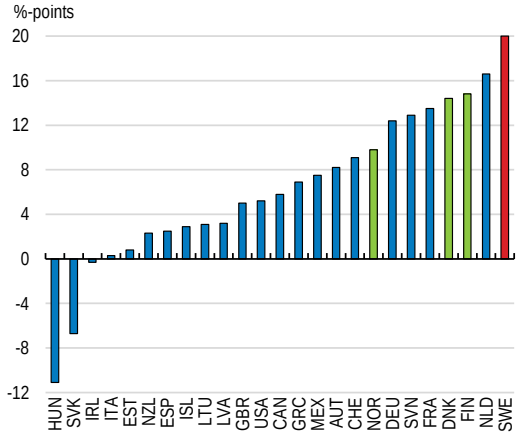
Labour market matching could improve

Sweden's labour force participation and employment rates are very high. Women's and the elderlies' employment rates are also high in OECD comparison. Even so, a compressed wage structure raises demands for workers' productivity and makes it hard for low-skilled people to find jobs, while a high labour tax wedge and recent changes to the pension system reduce work incentives.

Elevated long-term unemployment following the pandemic has coincided with a high level of job vacancies. Most of the long-term unemployed are low-skilled, foreign-born or have disabilities, and an increasing share are older Swedish-born men. Rent controls hold back labour mobility.

Figure 3. The employment gap between native- and foreign-born women is high

2019, 15-64 year-olds



Source: OECD Migration Statistics (database).

StatLink https://stat.link/7nymp8

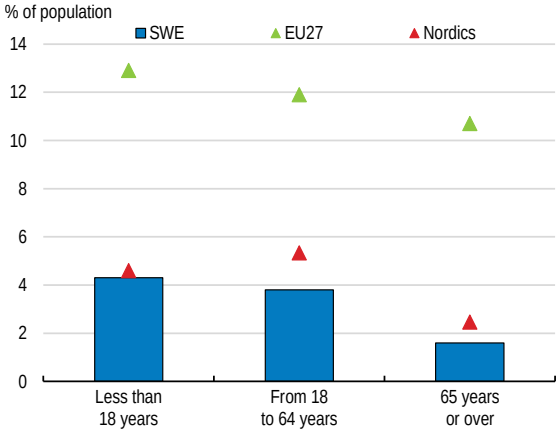
Foreign-born women make up one third of the long-term unemployed, and lag considerably behind the high employment rate of Swedish-born women (Figure 3). They are often low-educated and may face strong gender- and family norms. Weak work incentives for second earners receiving social assistance can contribute to keeping this group out of work. A recent public employment service reform, contracting out activation policies in outcome-based payment schemes, may help if well-implemented.

Sweden's labour tax wedge is high. The top personal income tax rate is among the highest in the OECD and applies at a low threshold, while a large difference in tax rates for labour and capital income incentivises income-shifting. At the same time, Sweden's property tax revenues are among the lowest in the OECD.

Sweden's pensioners are well-off, with already low relative poverty further on the decline, and good material standards (Figure 4). This is much thanks to Sweden's pension system, which has combined decent pensions, fiscal sustainability and incentives to lengthen working lives. The recent increase of the tax-funded basic pension and the introduction of a new tax-funded income pension supplement tend to weaken incentives to lengthen working lives and fiscal sustainability.

Figure 4. Swedish elderly are relatively well-off

Material deprivation by age, 2021



Note: Nordics is an average of values for Denmark, Finland and Norway. 2020 for Norway.

Source: Eurostat, Income and Living Conditions database.

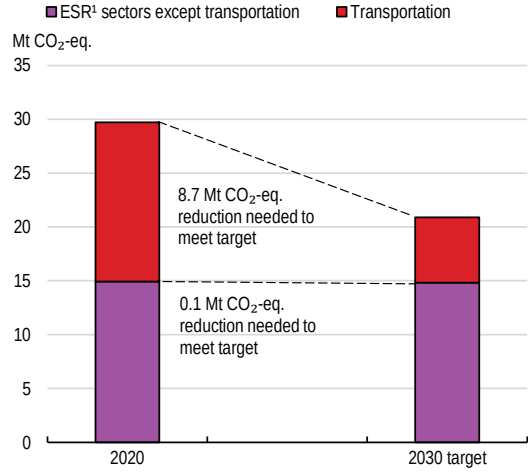
StatLink https://stat.link/qz2lhb

Climate policies need to tighten to reach targets

Sweden has more than halved greenhouse gas emissions since the 1970s and has implemented a comprehensive and relatively efficient policy package comprising carbon pricing, subsidies, regulations and tools for cooperation and dialogue. Nonetheless, recent policy changes have likely put the 2030 target out of reach unless new ambitious policies are put in place.

Mandatory biofuel blending was an important part of Sweden's plan to reach its 2030 target for non-ETS emissions (Figure 5). This policy has a very high price tag, while other emission sources, notably agriculture, face no effective climate policies at all. The new government has proposed to reduce the blending requirement to a low level and scrap other climate policies. By consequence, the country is likely set to miss its 2030 reduction target.

Figure 5. The transport biofuel mandate was an important part of the plan to reach the 2030 target



1. ESR denotes emissions covered by Sweden's 2030 target and the EU's Effort Sharing Regulation. Calculations assuming the transportation target is met and maximum supplementary measures are used.
Source: Statistics Sweden; The Swedish Environmental Protection Agency.

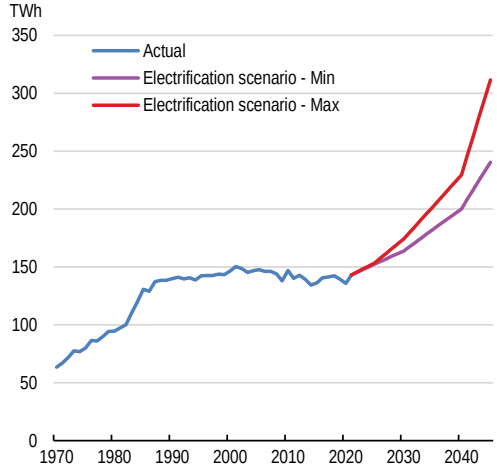
StatLink https://stat.link/cws830

Negative emissions face weaker incentives than reductions from existing sources, and their use to meet climate targets is restricted. Planned reverse auctions for capture, transport and storage of biogenic CO2 is a step in the right direction, but natural sinks remain undervalued.

A nascent green industrial revolution is fuelled by clean electricity

High-emitting industries, notably steel, cement and chemicals, invest heavily to decarbonise, while Swedish mines expand to provide materials for the green transition. Sweden's Northern regions are at the forefront of this nascent revolution, fuelled by an abundance of clean energy. To maintain momentum Sweden will need to roughly double its electricity generation (Figure 6) with renewables and nuclear power and invest in plannable electricity generation capacity, storage and transmission.

Figure 6. Electricity demand could roughly double by 2045



Source: Statistics Sweden; Gode, J. et al. (2021), Efterfrågan på fossilfri el - Analys av högnivåscenario, Energiforsk and Profu.

StatLink https://stat.link/dig7s0

Projects within industry, mining, electricity generation and transmission are challenged by long lead times. Planning and permitting procedures rooted in the Environmental Code are complex and long, while informal coordination of stakeholders in Norrbotten and ongoing pilot projects in transmission demonstrate scope for improvements. A large percentage of wind power projects are struck down by municipalities, who hold a veto in local planning decisions.

The green industrial revolution depends on skills, for industry and for complementary public services. This is a challenge for northern regions and municipalities, which are already suffering labour shortages after decades of demographic decline. Investments are also needed in infrastructure and housing.

MAIN FINDINGS	KEY RECOMMENDATIONS
Stabilising inflation as a foundation for future growth	
Inflation has risen, and price pressures have broadened. Five-year inflation expectations are close to the inflation target, and wage increases are expected to be modest.	Stand ready to tighten monetary policy as needed to bring down inflation and ensure that inflation expectations are anchored.
Fiscal policy is expected to be broadly neutral in 2023, with the energy crisis being met by broad-based energy price support. Energy prices have fallen back considerably since their peak.	Gradually phase out energy crisis support measures.
A number of budget decisions have been taken outside of the ordinary budget process even though not all of them have been urgent and warranted as a crisis response.	Return to the normal practice where spending decisions are taken in the ordinary budget process.
Structural reforms for a stronger and more inclusive labour market	
The labour tax wedge is high. A large difference between marginal taxation of labour and capital income incentivises income-shifting.	Reduce incentives for income shifting by increasing dividend taxation and reducing the top marginal tax rate on labour income.
Foreign-born women have a very low employment rate compared to the high employment rate of natives and many of them are neither employed, nor in training or education.	Carefully review social assistance and other benefits typically taken up by inactive foreign-born women with the aim to strengthen work incentives without exacerbating inequality.
Mortgage interest deductibility and low, regressive recurrent taxes on immovable property create distortions in favour of owner-occupied housing.	Once the housing market cycle has clearly turned, consider reforming the recurrent property tax to better align tax charges with the market values of properties and phasing out mortgage interest deductibility.
Property tax revenue is low and only a minor share befalls municipalities.	Consider delegating authority to collect property taxes and set their rate to municipalities.
Swedish pensioners have decent incomes and material living standards compared internationally and compared to younger generations in Sweden. A large increase in the basic pension and a new income pension supplement in 2022 weaken pension sustainability and work incentives.	Increase the relative importance of earnings-related pensions, for example by reducing indexation of the basic pension and the new income pension supplement.
Strict rent controls discourage mobility, notably for low-income households, and contribute to weak competition in the construction sector together with complex regulations and municipalities' local planning monopoly.	Relax rent controls and streamline building, planning and product market regulations affecting construction.
Revising climate policies and targets	
Reducing the biofuel blending requirement will likely move the 2030 reduction target out of reach unless new and ambitious measures are implemented. An ambitious transport sector reduction target is redundant to the overall 2030 target, and may reduce efforts in other sectors.	Strengthen the overall policy package to ensure the 2030 target for non-ETS sectors as a whole is reached while allowing deviations from the 2030 transport sector target. Complete a country-wide charging network to speed up the take-up of electric vehicles.
Incentives to reduce agricultural emissions are weak. Quantity-based measures like the number of livestock or fertilizer use can be measured and taxed relatively straightforwardly while associated emissions can vary widely.	Improve monitoring and reporting of agricultural emissions, with the aim to introduce a pricing mechanism, while rewarding climate-friendly practices, the provision of nature-based services and green R&D.
Sweden's climate targets and policies are focused on reducing existing domestic emissions, while there are strict limits and weaker policies to instigate negative emissions.	Treat additional negative emissions equally to reduced emissions in the target structure. Introduce a general subsidy or tax credit at the level of the carbon tax for negative emissions not currently covered by the EU ETS or the carbon tax.
Powering up the green economy	
Green industry and electric vehicles are set to roughly double electricity demand by 2045, but permitting slows down investments in industry, renewable energy and transmission.	Streamline and improve coordination of the environmental permitting process.
Municipalities use their local planning veto to shelve a large share of land-based wind power projects.	Consider limiting the municipal veto while allocating a share of wind power profits to host municipalities through for example a local property tax.
New industries raise the need for re-skilling and up-skilling, and the need to draw talent from elsewhere in Sweden and abroad.	Ensure that the Public Employment Service reform contributes to a holistic approach to the supply of people and skills with cooperation between municipalities, universities and industry.
Municipalities home to new industrial development need to attract working-age people to fill jobs in public services as well as industry.	Invest in municipal infrastructure, services and housing to facilitate population increases in hotspots for the green transition.

1. Key policy insights

After a relatively strong performance during and after the pandemic, short-term growth prospects are weak. Inflation has reached a three-decade-high, monetary policy has been tightened and the global environment is uncertain. Falling real wages and rising borrowing costs are taking a toll on household incomes, while lower housing prices reduce their wealth. Structural reforms are needed to lay the foundations for a sustained recovery. Skills are generally high, but need to be better matched to labour demand, and disadvantaged groups need to be better integrated into the labour market to bring down high long-term unemployment. A major recent reform of the employment service can help if skilfully implemented. Tax reform to incentivise work while discouraging income shifting could improve labour market outcomes and inclusiveness. Reforms in the 1990s made Sweden's pension system with its focus on lengthening working lives and in-built sustainability the envy of countries around the world. Decisions taken before fall 2022 put these values into question in the context of population ageing and mounting spending pressures ahead.

Sweden is a knowledge-based economy with high standards of living, well-being, income- and gender equality, as well as high environmental quality. Despite strong population increases, largely related to immigration, GDP per capita has expanded faster than in most OECD countries over the past decade. In the Swedish welfare model, high productivity is matched by workers' skills, and a solid safety net supports people who lose their jobs, reach retirement age or suffer from ill health. A central pillar of this societal model is an employment rate which is among the highest in the OECD, partly reflecting high participation of women and the elderly.

After a strong recovery from the COVID-19 crisis, the economy is slowing due to the ripple effects of Russia's war of aggression against Ukraine. Inflation, climbing to a three-decade high, has forced the Riksbank to tighten monetary policy, further hitting highly indebted households already grappling with declining real wages. Home prices have fallen almost a fifth from their peak in March 2022, sentiment indicators point to historically depressed household confidence, and retail sales have nosedived as households rein in consumption. Commercial real estate companies, who used the years of low interest rates to gear up their portfolios, find it increasingly hard to refinance their debt as interest rates rise and financial conditions tighten. Fiscal policy, expected to be broadly neutral in 2023, has met the energy crisis by mostly broad-based, untargeted energy price support and tax reliefs, although Sweden has shown more restraint on energy price support measures than many other OECD countries. Off-cycle budget decisions have in important cases gone beyond necessary crisis management measures.

Even though Sweden has one of the highest employment rates in the OECD, population ageing increases spending pressures ahead and reduces the economic growth potential. Long-term unemployment has remained relatively high over the past decade. Despite considerable policy efforts, many of the low-skilled, the foreign-born, and the elderly find it difficult to succeed in a labour market where a compressed wage distribution places high demands on skills and productivity. Re-skilling and activation policies are key for these groups, and a recent reform introducing a purchaser-provider model with outcome-based payments for employment services could help if well implemented. The tax wedge on labour is high. The large difference between labour income tax and capital income tax incentivising income shifting, and low and regressive housing taxation, point to significant room to improve the tax mix to better support employment and inclusive growth while preserving fiscal sustainability. Sweden's pension system has long been admired for combining high living standards for Sweden's retirees with long-term sustainability and incentives to extend working lives. However, recent reforms go in the direction of weakening the long-term sustainability of the system and reducing incentives to remain in work for many older workers.

Sweden has led the way in reducing greenhouse gas emissions since the 1970s and has implemented a comprehensive and relatively efficient policy package with carbon pricing, subsidies, regulations and tools for cooperation and dialogue. However, the government's intention to reduce the biofuel blending requirement will likely move the 2030 reduction target out of reach unless new and ambitious measures are implemented to make up for the shortfall. This opportunity should be seized to remove inconsistencies in greenhouse gas reduction targets and extend effective climate policies to agriculture, natural sinks and carbon capture and storage.

A green industrial revolution is taking place with its epicentre in Sweden's northern regions. High-emitting sectors, notably steel, cement and chemicals, have set out to eliminate their emissions by means of electrification, hydrogen and carbon capture and storage, while the mining sector is expanding to provide input materials needed around the world to decarbonise. To maintain momentum, Sweden will need to roughly double its electricity generation with renewables and nuclear power and invest in plannable generation capacity, storage and transmission. These projects are challenged by long planning and permitting processes, and many wind power projects are struck down by municipalities. The green industrial revolution depends on people and skills, for industry and for complementary public services. This is a challenge for northern regions and municipalities after decades of demographic decline.

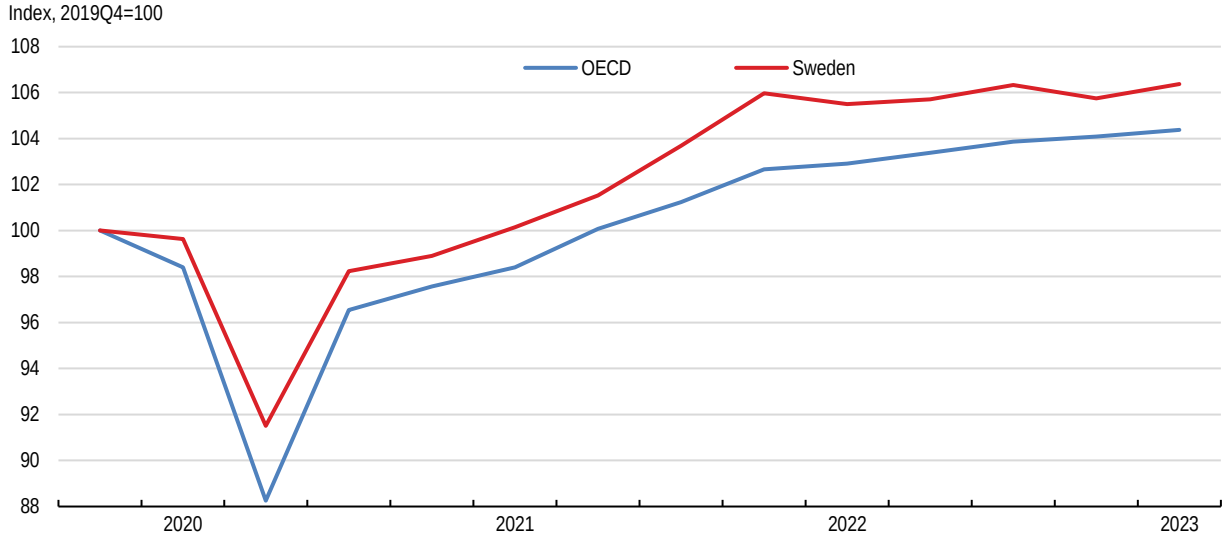
Against this background, the main messages of this *Survey* are:

- Stand ready to tighten monetary policy as needed to curb inflation and ensure that inflation expectations are anchored. Gradually phasing out energy crisis support could help contain ongoing inflationary pressures and support efforts to meet climate targets.
- Population ageing calls for mobilising underutilised labour resources, notably the low-skilled, the elderly, and the foreign-born by means of careful implementation of the employment services reform, reforms to taxes and benefits to strengthen work incentives and discourage income shifting, and by safeguarding the long-term sustainability of the pension system.
- Sweden needs to urgently implement new policies to reaffirm its commitment to climate targets. The nascent green industrial revolution calls for economically viable investments in clean industry, low-carbon electricity generation and transmission to go ahead at speed.

1.1. The economy is facing external headwinds

Russia's war against Ukraine and the associated surge in energy prices put Sweden's economy under renewed pressure from high energy costs and rising interest rates as it was still recovering from the COVID-19 crisis. Sweden fared better through the pandemic than many of its peers (Figure 1.1). After contracting by around 3% in 2020, the economy returned to its pre-pandemic level by the first quarter of 2021. The economy grew by 2.9% in 2022, but momentum waned following Russia's invasion of Ukraine. Real GDP grew by 0.6% in the first quarter of 2023 after a 0.5% contraction in the fourth quarter of 2022. Household consumption and housing investments continued falling. Consumer confidence plummeted with surging inflation and interest rates, but the continued strength of the labour market prevented a larger contraction in private consumption.

Figure 1.1. **Sweden's economy was more resilient to the pandemic than the OECD average**



Source: OECD Economic Outlook database.

StatLink https://stat.link/j6exdk

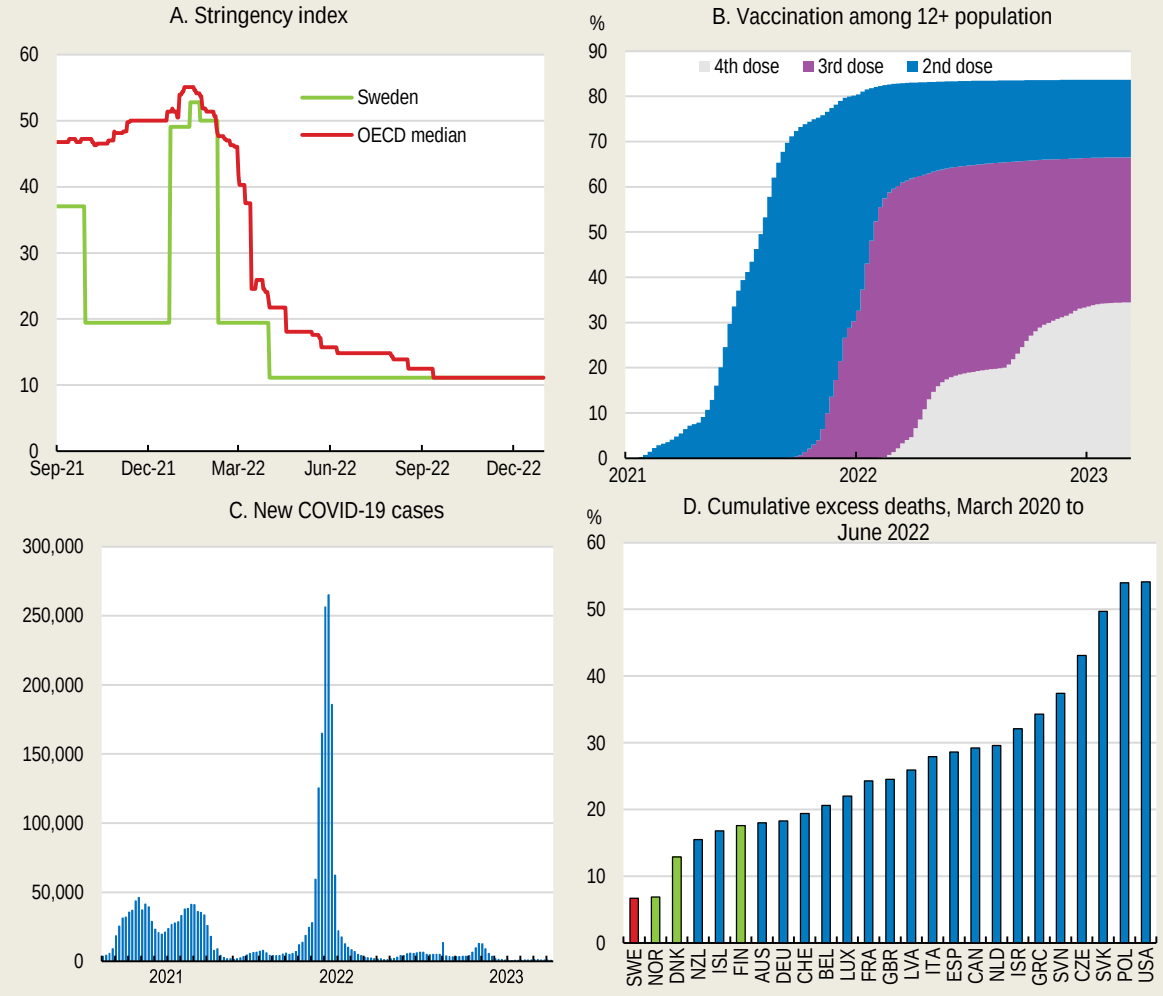
The labour market weathered the pandemic well, supported by public policies. Employment surpassed pre-crisis levels by the end of 2021 and increased at a robust pace in 2022 and the beginning of 2023 (Figure 1.3, Panel A). Unemployment was back at pre-pandemic levels by mid-2022 (Panel B). According to the latest Labour Force Survey, the employment rate reached a new high of 70% in April, and the unemployment rate dropped to 7.2%. The short-term work scheme, the largest pandemic support measure in terms of spending, was introduced promptly in March 2020 and benefitted a large number of workers

until September 2021. Health measures during the pandemic, which were less intrusive in Sweden than in most OECD countries, also played a role in shielding the labour market from the worst consequences of the pandemic (Box 1.1). Sweden showed the lowest increase in unemployment and furloughs among Scandinavian countries during the first six months of the pandemic (Zoutman et al., 2020).

Box 1.1. Health policies in Sweden during the COVID-19 pandemic

Sweden's health policies and responses to COVID-19 during the pandemic stand out as one of the least intrusive in the OECD. Unlike most other OECD countries, Sweden did not impose a national lockdown and relied on public recommendations or voluntary measures. Swedes were only encouraged to work from home and limit travel whenever possible, and those with symptoms of COVID-19 were asked to self-isolate. Preschools and compulsory (primary and lower secondary) schools remained open. As the number of confirmed cases surged in 2021, some restrictions were imposed, such as a ban on visiting nursing homes, but restaurants and businesses were never mandated to completely close. Although Sweden's reported COVID-19 mortality rate was among the highest in the world at the beginning of the pandemic, surpassing those of neighbouring countries in lockdown, its total excess deaths during the first two years of the pandemic were among the lowest in Europe.

Figure 1.2. Excess deaths were among the lowest in the OECD



Source: Public Health Agency of Sweden; Oxford Coronavirus government response tracker; OurWorldinData; and OECD calculations.
Source: KFF (2021) and SOU (2022a).

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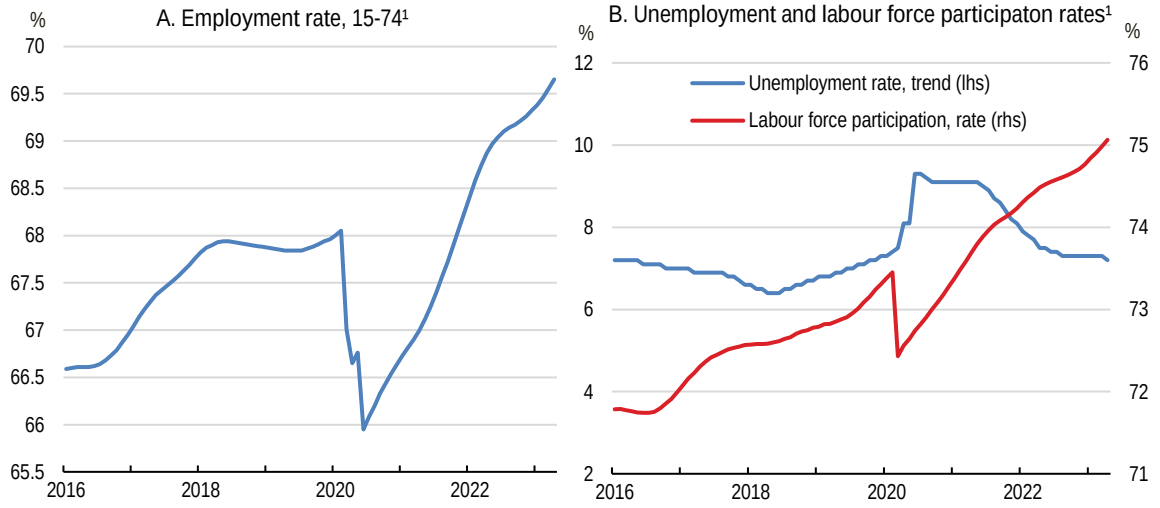
Figure 1.3. The labour market has recovered



1. Smoothed and seasonally adjusted.
Source: Statistics Sweden.

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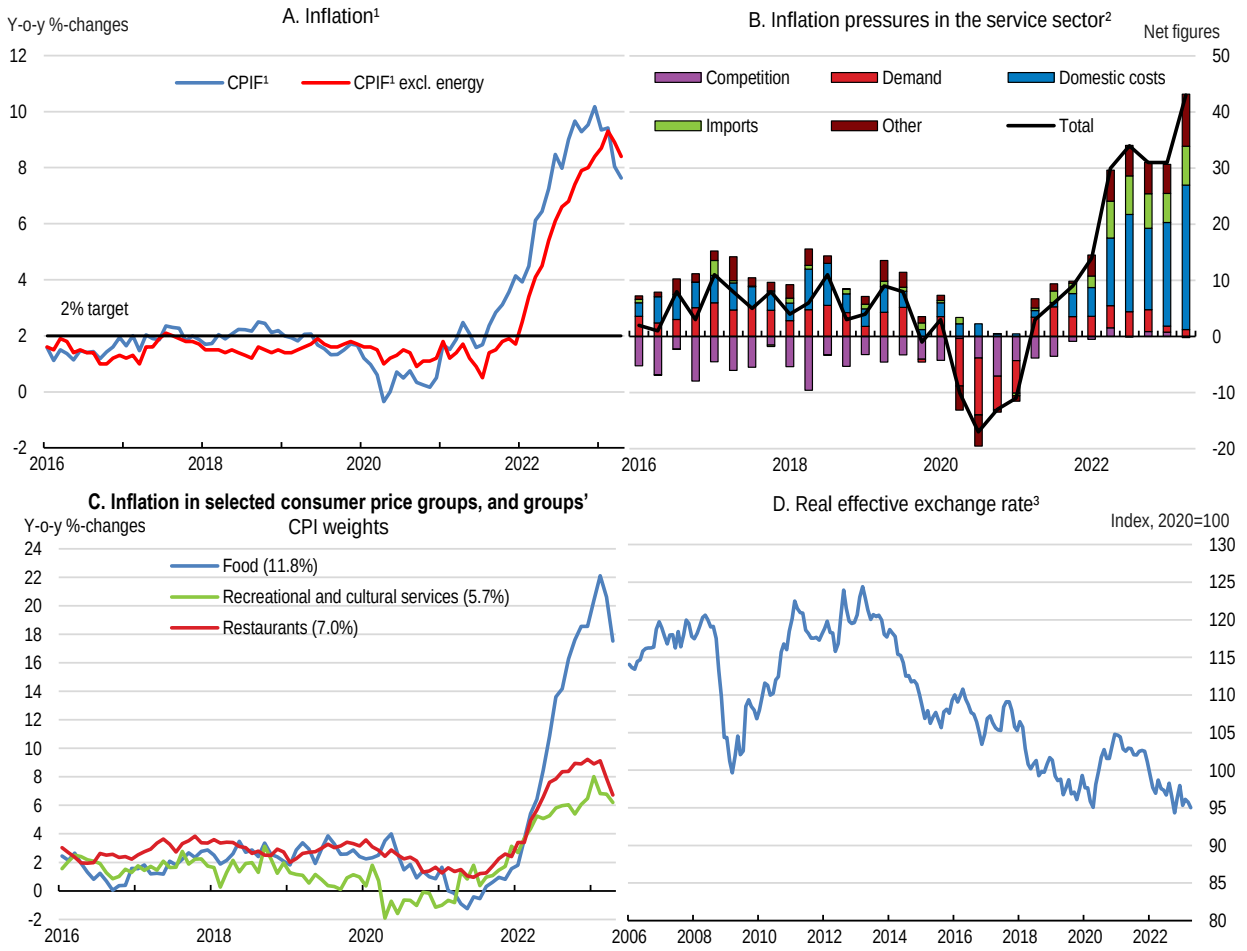
Direct trade and financial links with Russia and Ukraine are limited, but Russia's war against Ukraine is affecting the Swedish economy through higher energy and food prices and slow growth among important trading partners. Inflation started rising from mid-2021 because of soaring energy prices and pandemic-induced supply bottlenecks, and shot up further following Russia's invasion of Ukraine in February 2022. Rising electricity prices were most of the time confined to the southern areas of the country, where increasing electricity market integration means that prices much of the time are set in tune with Central Europe. The government has responded by introducing a number of support policies, including electricity price compensation to households and businesses, and most recently retroactive support to households financed by transmission bottleneck fees collected by Svenska Kraftnät, the transmission system operator. More targeted support has also been handed out, notably by increasing the housing allowance for low-income families with children (Box 1.4).

Consumer price inflation with a fixed mortgage rate (CPIF) moderated to 7.6% in April 2023, after peaking at 10.2% in December (Figure 1.4, Panel A). However, this is still around four times the 2% inflation target, and CPIF inflation excluding energy stood at 8.4%. Inflationary pressures remain broad-based, with prices rising markedly for food, restaurants, and recreation and culture (Panel C). Cost developments in the service sector are now primarily driven by domestic costs (Panel B). Nominal wages grew by around 3% in 2022, while real wages were down 5.2% year on year in March. The contribution of import prices to service inflation has also risen sharply, reflecting soaring global energy and food prices combined with the trade-weighted exchange rate which weakened over the course of 2021-22 (Panel D). Long-term inflation expectations remain slightly above the 2% target (see Section 1.3).

Figure 1.4. Inflation pressures have broadened

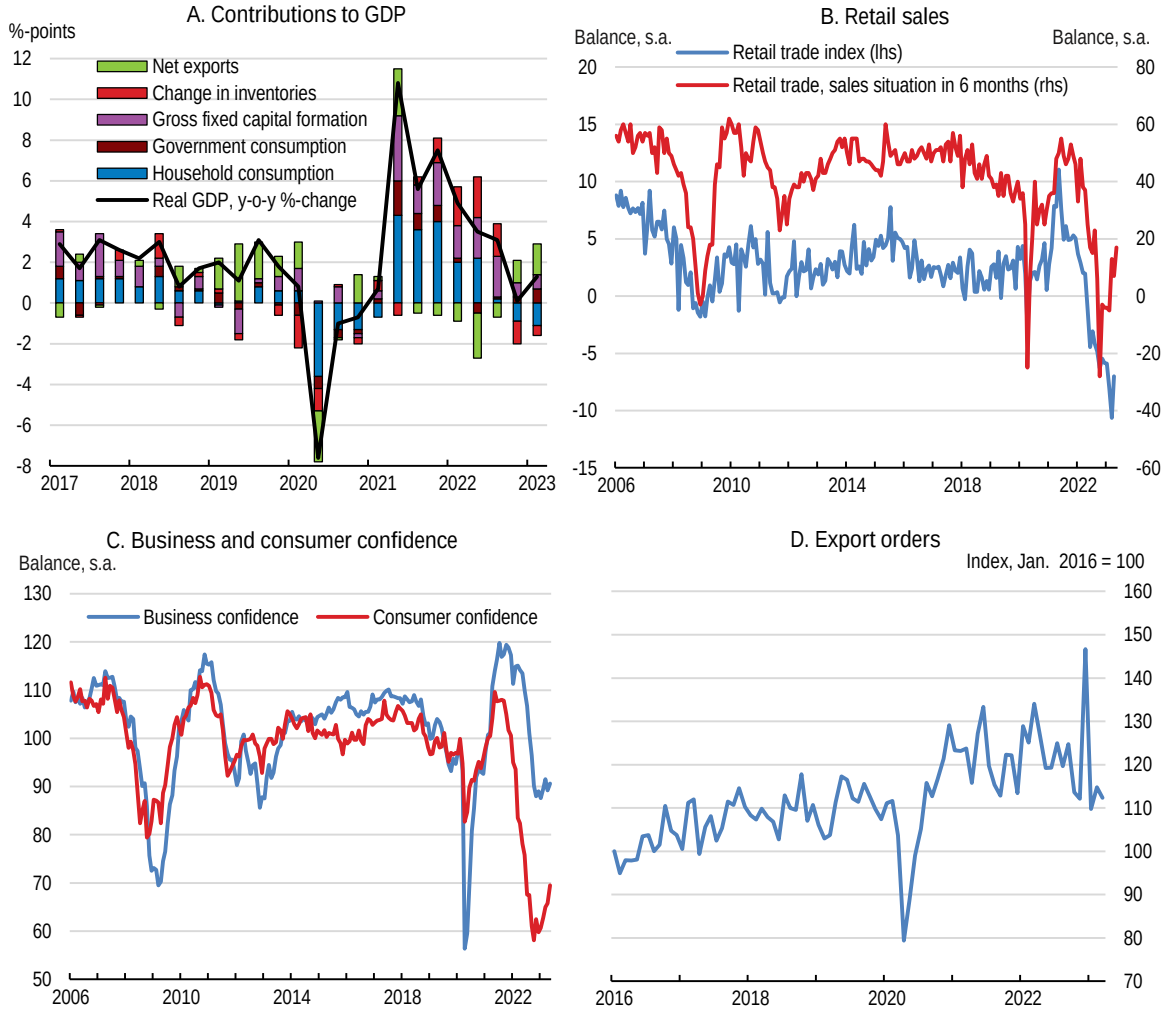


1. Consumer price index with a fixed mortgage rate.
2. This measure is calculated as the share of respondents in the NIER Economic Tendency Survey that raised prices times the share of respondents who mentioned X as the most important factor behind the price hike minus the share of respondents that lowered prices times the share that mentioned X as the most important factor behind the lowered price.
3. Trade-weighted average of 15 bilateral real exchange rates (including the Euro zone as a single entity).
Source: National Institute of Economic Research; Bank for International Settlements.

StatLink https://stat.link/lu08my

Weak household consumption is weighing on growth (Figure 1.5, Panel A). After the contraction in the fourth quarter of 2022, the economy rebounded by 0.6% in the first quarter of 2023, mainly driven by exports and inventories. However, household consumption and residential investments continued to decline. House prices have fallen considerably, reducing household wealth and investment. Consumption of durables such as clothes and household equipment has decreased sharply, in line with plummeting retail sales (Panel B). Household confidence improved slightly in recent months, partly reflecting lower electricity prices, but remained at historically depressed levels, influenced by negative real wage growth, increased debt servicing burdens, and the reduction in household wealth (Panel C). Manufacturing output has held up, with considerable order backlogs, but new orders, notably for exports, are decreasing (Panel D). Business confidence has fallen, driven by labour shortages and shrinking order books.

Figure 1.5. The economic momentum is weak



Source: Statistics Sweden; National Institute of Economic Research.

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The economy is set to contract in the near term. After a 2.9% expansion in 2022, output is projected to shrink by 0.3% in 2023 before growing by 1.4% in 2024. Construction activity is set to decline significantly, against the backdrop of higher construction costs and lower housing prices. Price pressures are broadening. Inflation will therefore come down only gradually and will remain high in 2023. Nominal wage growth is set to increase given the recent wage negotiations for the manufacturing industry that concluded in April 2023, but only modestly. The agreement on 7.4% wage growth over the next two years (4.1 % in 2023 and 3.3% in 2024) sets the wage norm for other sectors to follow. As a consequence, real wages will decline in 2023 and weigh on consumption together with lower housing prices and higher debt-servicing burdens (Table 1.1).

Uncertainty remains high. A long period of very low interest rates has boosted household debt, which amounted to around 200% of household disposable income in 2022. This debt burden could reduce consumption further if mortgage rates rise faster than assumed, given the high prevalence of variable-rate mortgages (see Section 1.2). Highly-leveraged commercial real estate developers may also face severe financial difficulties as interest rates rise, with potential repercussions on financial stability (see Section 1.2). On the upside, lower-than-expected inflation could limit the decline in real disposable incomes

and limit the need for further monetary tightening, boosting housing prices, private consumption and investment.

Table 1.1. Macroeconomic indicators and projections

Annual percentage changes unless specified[1], volume (2009/10 prices)

	2020	2021	2022	2023	2024
Gross domestic product (GDP)	-2.3	5.9	2.9	-0.3	1.4
Private consumption	-3.2	6.2	2.0	-2.7	2.0
Government consumption	-2.0	2.9	0.1	1.2	1.2
Gross fixed capital formation	1.6	6.8	6.2	-1.6	0.1
Housing	1.6	11.5	4.7	-18.4	-4.7
Business	1.4	7.6	8.7	2.1	1.3
Government	2.0	-1.0	-1.2	4.1	0.3
Final domestic demand	-1.7	5.4	2.6	-1.4	1.3
Stockbuilding[2]	-0.7	0.4	1.1	-0.3	0.0
Total domestic demand	-2.4	5.9	3.7	-1.6	1.2
Exports of goods and services	-5.9	10.8	7.1	4.0	3.3
Imports of goods and services	-6.3	11.3	9.4	1.6	3.2
Net exports	0.0	0.3	-0.6	1.3	0.2
Other indicators					
Potential GDP	1.9	1.7	1.8	1.8	1.8
Output gap[3]	-3.5	0.5	1.6	-0.5	-0.9
Employment	-1.3	0.9	2.8	0.1	0.7
Unemployment rate[4]	8.5	8.8	7.5	7.9	8.0
GDP deflator	2.0	2.6	5.6	6.1	2.5
CPI	0.5	2.2	8.4	7.9	2.4
CPIF[5]	0.5	2.4	7.7	6.3	2.4
Household saving ratio, net[6]	17.0	15.5	13.9	13.8	13.6
Current account balance[7]	5.9	6.5	4.2	5.6	5.6
General government fiscal balance[7]	-2.8	0.0	0.7	-0.4	-0.6
Underlying government net lending[3]	-0.4	-0.3	-0.3	-0.1	-0.1
Underlying government primary balance[3]	-0.5	-0.5	-0.3	-0.2	0.1
Gross government debt (Maastricht)[7]	39.9	36.5	32.8	32.7	32.7
General government net debt[7]	-38.3	-42.1	-36.5	-34.0	-32.1
Three-month money market rate, average	0.1	0.0	1.0	3.8	4.1
Ten-year government bond yield, average	0.0	0.3	1.5	2.8	3.2

1. Annual data are derived from quarterly seasonally and working-day adjusted figures.
2. Contribution to changes in real GDP.
3. As a percentage of potential GDP.
4. As a percentage of the labour force.
5. CPI with a fixed mortgage interest rate.
6. As a percentage of household disposable income.
7. As a percentage of GDP.

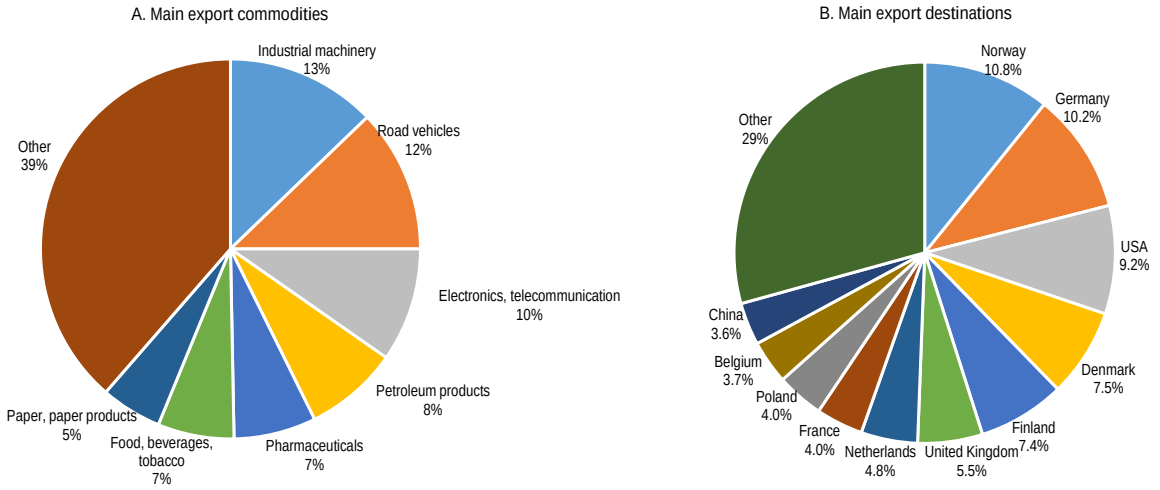
Source: OECD Economic Outlook No. 113.

Sweden's economy is trade-oriented, but exports are relatively diversified in terms of products and destinations (Figure 1.6). However, its deep integration in global value chains implies some vulnerabilities if global trade tensions intensify or supply chains are hit by other shocks (Schwellnus et al, 2023). The country is particularly vulnerable to supply-side shocks in some raw materials including basic metals (Figure 1.7). The raw material supply chain is essential for the green transition in Sweden and elsewhere, and like the rest of the world, Sweden currently depends on a few countries for the import of rare earths necessary to electrification and battery production. The recent discovery in northern Sweden of the largest

rare earth deposit in Europe should in due course reduce heavy reliance on China, also for Sweden's trading partners (Chapter 2). Diversification, stockpiling, early warning systems and homeshoring have roles to play to ensure the supply of essential commodities, intermediates and goods (Box 1.2).

Figure 1.6. Exports of goods by commodity and market

Share of total exports, 2022



Source: Statistics Sweden.

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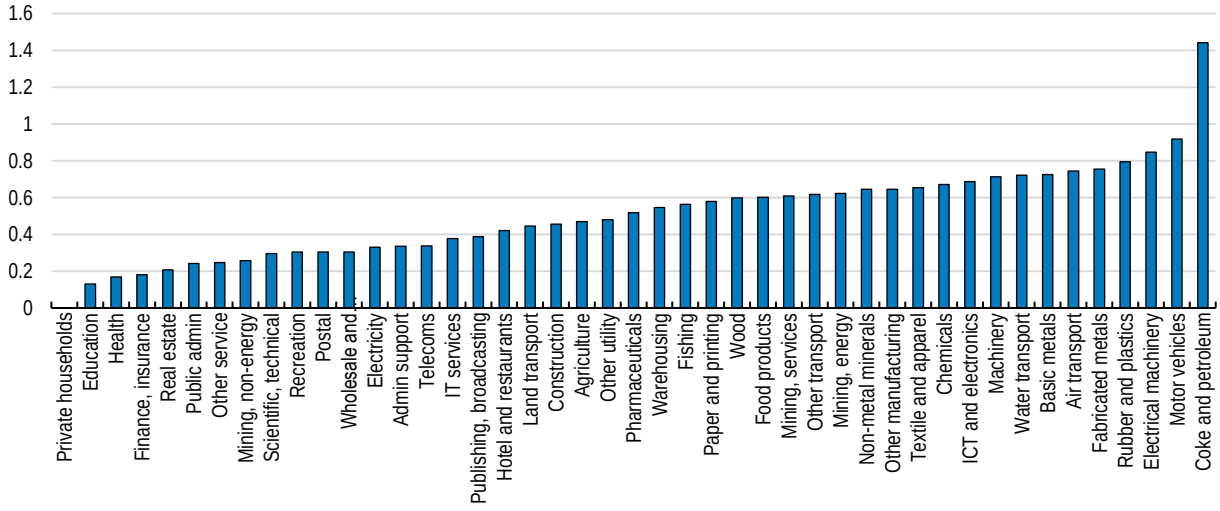
Figure 1.7. Foreign input reliance by sector

The ratio of foreign output used in domestic production to total domestic gross output



Note: The figure accounts for indirect input trade between partner countries based on the OECD Inter-Country Input-Output (ICIO) data. The indicator can take values above 1, given that the numerator counts value added multiple times when goods or services cross borders multiple times. The indicator is calculated as $FIR_{c,j} = \sum_{c'=1}^{N} \sum_{j'}^{J} \left(Foreign\ output_{c,j}^{c',j'} / Gross\ output_{c,j} \right)$ where subscripts c and j denote, respectively, countries and industries; $Foreign\ output_{c,j}^{c',j'}$ denotes gross output of industry j' in country c' used in the production of industry j in country c. Source : Schwellnus et al. (2023).

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Box 1.2. Strategies for raw material supply chain resilience

At the outset, businesses should be expected to adapt to uncertainty and supply chain shocks such as COVID-19, protectionist measures and Russia's aggression against Ukraine without policy intervention. For some essential goods there may nonetheless be a case for government intervention and coordination. Measures to be considered include:

- *Ex-ante* assessment of risks and stress-testing: Governments can introduce a systematic risk assessment framework based on evidence and data. For instance, the Productivity Commission in Australia has developed a 'data-with-experts' framework to identify vulnerable supply chains. It casts a wide net by first identifying those products that are vulnerable to supply chain disruptions using a data scan, to reduce the probability of missing a good or service that is vulnerable. Then it identifies which of these vulnerable products are used in essential industries. The final step relies on expert assessment to stress test the data-driven analysis and to determine, from among the vulnerable products used in essential industries, those which are critical. Korea is also selecting core products to be monitored by the early warning system, based on data such as annual import volume and supplier concentration and strategic importance to the economy. A holistic approach would also be important, given that risks are interconnected across sectors. The Swiss Federal Office for National Economic Supply for instance uses cross-departmental analysis when conducting risk assessments.
- Trade diversification: The government can contribute to trade diversification by mapping vulnerabilities and making this data available to companies, and by more direct support such as using diversification as a criterium when extending export guarantees and other financial assistance to companies trading abroad. For example, Japan provides targeted subsidies to companies which invest in facilities in ASEAN countries for their strategically important industries.
- Stockpiling: Stockpiling comes at a cost, and companies may not internalise the societal costs of shortages. In these cases, governments can facilitate stockpiling of essential goods. In Switzerland, for instance, the importers of designated products, including oil products, are mandated to stock a certain amount by law. This stockpile is privately owned but can only be accessed under government permission in an emergency. In return, the storage costs of companies are financed by state taxes. Likewise, Korea has first drawing rights to oil and gas stored in Korea by foreign oil companies under the International Joint Stockpile programme in case of supply disruptions.
- Home-shoring: Producing at home is expensive as a general strategy, but can be a rational policy if due consideration is given to trade-offs, including opportunity costs of public funds, and possible costs of introducing other distortions into markets. For example, half of the krypton gas used in Korea's semiconductor production came from Ukraine and Russia before the war. The impact has been limited thanks to a combination of raw materials stockpiling, import diversification and the establishment of domestic production.

Source: OECD (2022), Australian Productivity Commission (2021); Korean Ministry of Finance and Economy (2022); JETRO (2022); Swiss Federal Office for National Economic Supply (2021).

Table 1.2. Events that could lead to major changes in the outlook

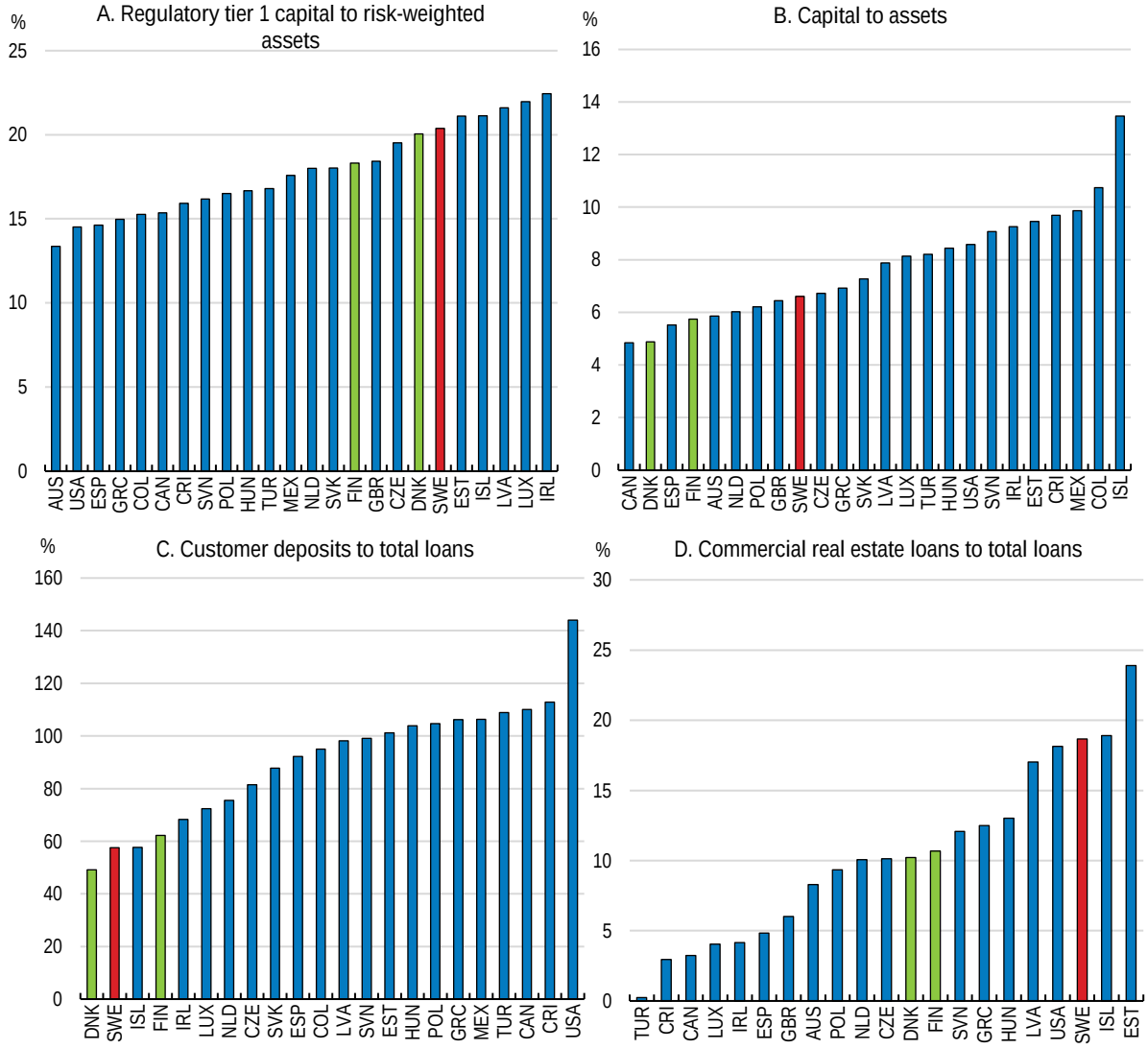
Uncertainty	Possible outcomes
Intensification of global energy supply disruptions.	Inflation could stay higher for longer, negatively affecting real household income and activities in energy-intensive sectors.
Intensification of global trade tensions.	Export growth could weaken and supply chain stress intensify.
Sabotage of critical infrastructure, including sub-sea cables.	The economy could be adversely impacted, for instance by lower labour productivity and interruptions to business and social functions.
Stronger than expected decline in real estate prices.	Private consumption could fall short of current forecasts. The commercial real estate sector could face severe debt refinancing problems, which could threaten overall financial stability.

1.2. Financial stability risks should be monitored closely

Swedish banks have high risk-weighted capital ratios as mortgages with relatively low risk weights account for a large share of their loan portfolio (Figure 1.8, Panel A), but their overall leverage is higher than in many OECD peers (Panel B). The Nordic banks have a narrow deposit base (Panel C) and rely heavily on wholesale funding, which can entail liquidity risks in periods of market turmoil. Sweden's financial system coped well with the pandemic, backed by temporary measures by the authorities including loans, guarantees and tax holidays. Russia's invasion of Ukraine has increased uncertainty and financial conditions have tightened. Consequently, the risk of business failures and repayment difficulties for indebted households has increased. Highly indebted households and a high prevalence of variable mortgage rates make the Swedish housing market sensitive to rising interest rates. Real housing prices increased sharply during the pandemic (Figure 1.9). A number of factors are estimated to have contributed, including the easing of financial conditions, a temporary lifting of the amortisation requirement for borrowers who applied for an exemption, and a shift in demand towards larger apartments and houses outside of the city centres on the back of the expansion of teleworking (André and Chalaux, 2023). This in turn increased the average loan-to-income ratio (Finansinspektionen, 2022a; Riksbank, 2022a). Sweden's households have high debt in international comparison (Figure 1.10, Panel A). Around 80% of the household debt consists of mortgages, and most mortgages are on short-term fixed or floating rates (Figure 1.11, Panels A and B). The share of new loans at variable rates has increased significantly recently, possibly because borrowers expect rates to fall again and therefore do not want to lock in higher rates. Households' debt service is set to increase relatively rapidly as interest rates rise (Figure 1.10, Panel B). Households generally have sizeable asset holdings and hence good repayment abilities, even though a sizeable share of assets relates to illiquid real-estate holdings and pensions and the distribution may be uneven (Figure 1.12). However, housing market corrections, together with rising interest rates, lead over-leveraged households to hold back non-essential consumption. Swedish home prices have fallen around 19% from their March 2022 peak, one of the steepest falls in the OECD, amid tightened financial conditions, and are likely to fall further this year.

Figure 1.8. The banking system is relatively well-capitalised

2022



Source: IMF, Financial Soundness Indicators database.

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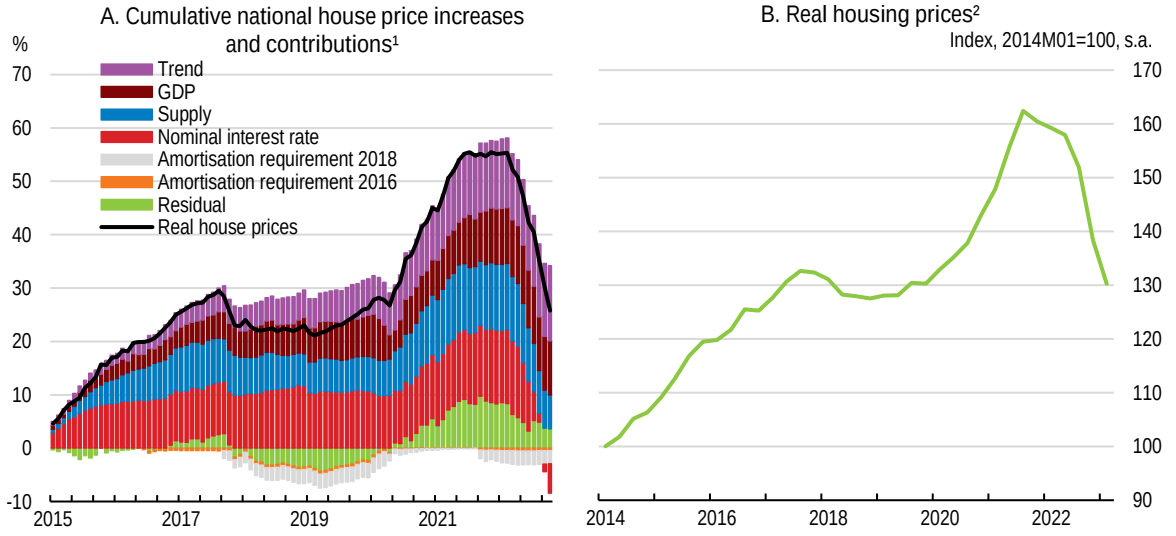
Macroprudential instruments can limit the build-up of financial vulnerabilities. Several steps were taken before the pandemic, including raising the countercyclical buffer from 2 to 2.5% in 2019 and tightening the amortisation requirement in 2018 (OECD, 2021a). After the COVID-19 outbreak, the countercyclical buffer was set to zero and lenders were allowed to provide a temporary exemption of the amortisation requirement. To slow the rapid rise in housing prices and household debt, the exemption to the mortgage amortisation requirement was not prolonged after August 2021. The countercyclical buffer rate is currently 1% and will reach 2% in June 2023.

Figure 1.9. Real housing prices have fallen sharply



1. "Trend" mainly reflects an upward trend. It also includes a small discrepancy between the sum of the contributions calculated through dynamic simulations and the fitted value. "Nominal interest rate" corresponds to the nominal floating mortgage rate. "Amortisation requirement 2016/2018" accounts for the mortgage amortisation requirements introduced in June 2016 and March 2018.
2. Real estate price index for one- or two-dwelling buildings. The index has been deflated with the CPI.
Source: André and Chalaux (2023); Statistics Sweden.

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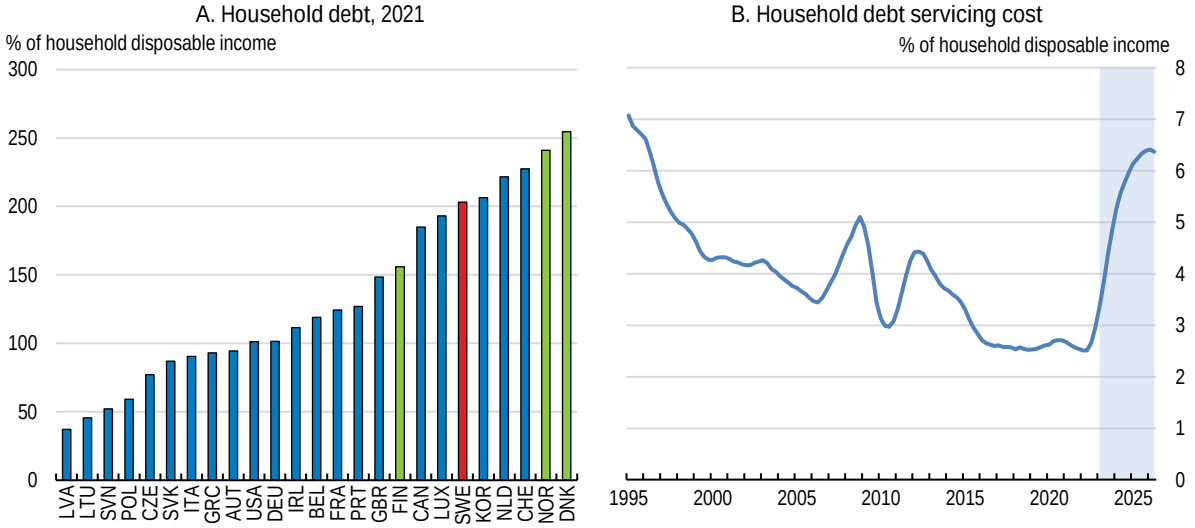
Figure 1.10. Household debt is high



Note: In panel A, households include non-profit institutions serving households. The shaded area in Panel B represents the Riksbank's forecast on household debt servicing costs.
Source: OECD, National Accounts (database); The Riksbank's Monetary Policy Report, April 2023.

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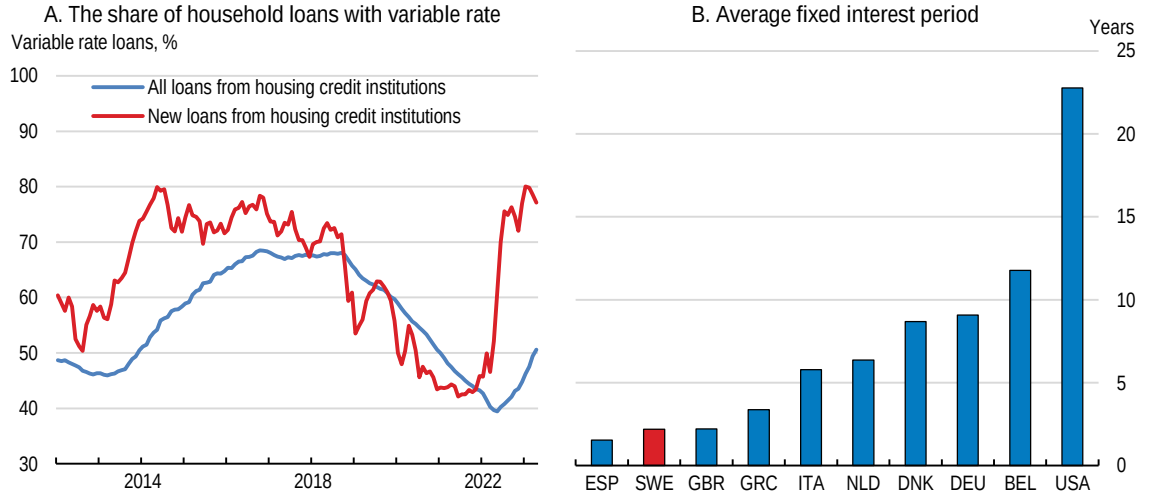
Figure 1.11. Sweden has a relatively high share of variable-rate mortgages



Note: Panel A refers to loans with an original interest rate fixation period of less than three months. Panel B refers to averages over all loans from MFI to households for the period 2003-2013.
Source: Statistics Sweden; The Riksbank's Monetary Policy Report, September 2022.

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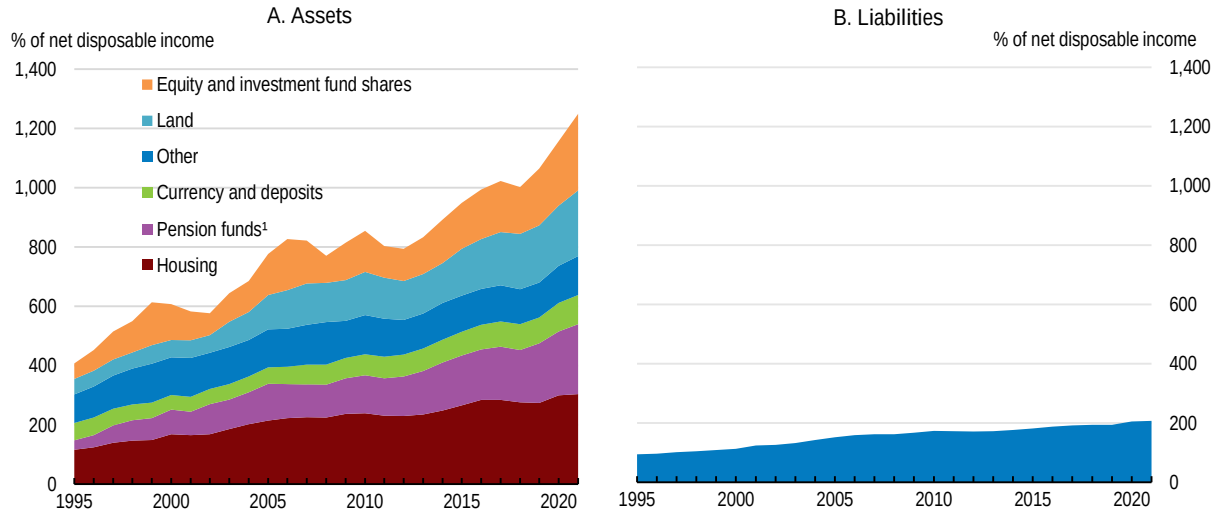
Figure 1.12 Households' asset holdings are sizeable compared to liabilities



Occupational pensions and premium pensions.
Source: Statistics Sweden.

StatLink https://stat.link/p91rgt

Further macroprudential measures may be required as housing prices bottom out and start increasing again in the future. These could include introducing a targeted sectoral countercyclical buffer which imposes a capital buffer specifically for household loans, complementing the existing countercyclical buffer, if EU law allows. The experience of Switzerland suggests that a sectoral countercyclical buffer in the household sector can contribute to lowering banks' mortgage risks and related financial risks (Suh, 2021). It could also help counteract current biases towards financing against housing as collateral. Introducing an

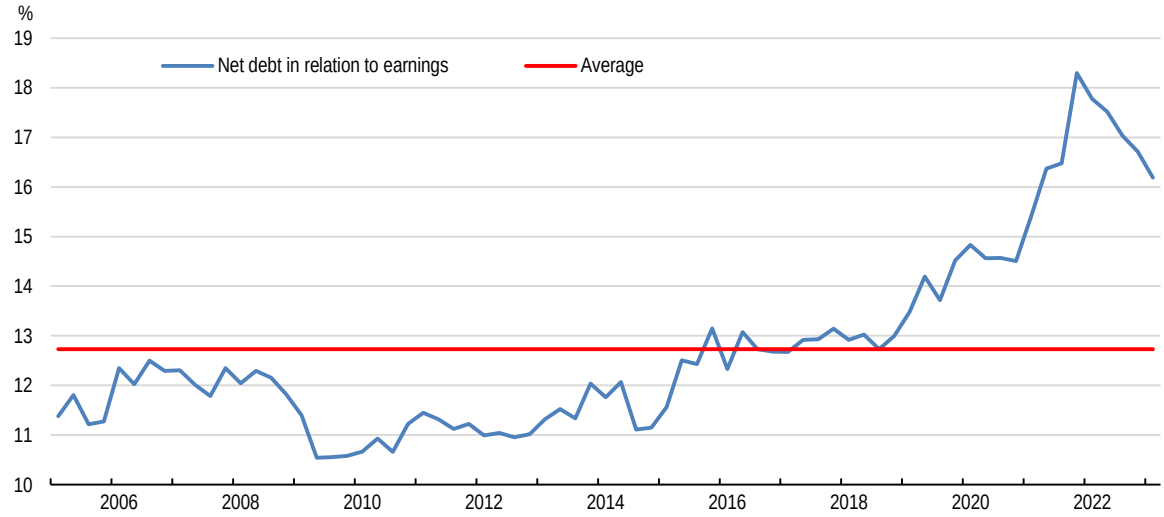
interest rate stress test based on payments as a proportion of income for customers seeking variable rate mortgages could also be considered (IMF, 2023a). This identifies at-risk customers and allows banks to adjust lending practices for more stable loans and mitigating default risk. However, reforming structural weaknesses in housing and tax policy to address the fundamental problems behind high housing prices and household debt is preferable to tighter macroprudential measures. Such reform could include streamlining land-use planning and zoning regulations to increase housing supply, limiting the tax bias in favour of homeownership (OECD, 2021a), and easing rental market regulations to foster a more balanced tenure mix (see Section 1.5).

To better comprehend the risks faced by households and to improve policy evaluations, it would be beneficial to have detailed microdata on household balance sheets. Granular data would provide a clearer picture of household financial situations and potential vulnerabilities, which would inform more targeted policy interventions. Moreover, this data could assist in identifying trends and patterns in household finances, allowing policymakers to better anticipate emerging financial stability risks. Unfortunately, such data has not been available since the discontinuation of the wealth tax in 2007. However, a recent public inquiry has suggested collecting more comprehensive data on household balance sheets, which could be a crucial step towards more informed and effective policy decisions (SOU, 2022b).

Highly leveraged commercial real estate developers pose another financial vulnerability. Real estate companies saw a sharp increase in debt relative to earnings during the pandemic (Figure 1.13). Commercial real estate loans amount to around 18% of total bank loans, one of the highest in the OECD. Real estate companies have also borrowed directly through capital markets (Figure 1.14, Panel A). Low interest rates led investors to consider corporate bonds as an increasingly attractive investment option, as many other interest-bearing assets produced very low returns (Riksbank, 2021). In 2021, the real estate sector accounted for around 40% of outstanding amounts in the Swedish bond market (Panel B) and roughly half of total issuance (Panel C), although this share is currently declining with limited activity by commercial real estate companies since the summer of 2022. This degree of concentration exposes the bond market as a whole to fluctuations within the real estate sector (OECD, 2022j). The recent downward adjustments to real estate valuations have inflated loan-to-value ratios. Refinancing options are running out and several highly indebted commercial real estate firms are now striving to reduce their debt (Finansinspektionen, 2022a). Given their high indebtedness and their large share of outstanding bonds, a shock originating in commercial real estate can spread across the financial sector more quickly than before, threatening overall financial stability. Office vacancy rates in Greater Stockholm roughly doubled from early 2020 to mid-2022, and has continued to increase, especially in less central locations (NPN, 2022; and Cushman and Wakefield, 2023).

The Swedish corporate bond market lacks liquidity, primarily reflecting low pricing transparency and a relatively high share of unrated bonds. This reduces investor confidence, contributing to lower traded volumes (Riksbank, 2022a). The Swedish corporate bond market's structural vulnerabilities are compounded by the homogenous investor base. Pension and insurance companies dominate international markets, typically buying bonds at the issuance and holding them until maturity. In contrast, small private investment funds make up a significant portion of the Swedish market. These funds generally offer daily redemptions, which can result in large price movements if they need to sell significant quantities quickly. This situation, coupled with low transparency in traded volumes and prices, leads to unreliable price formation and liquidity.

Figure 1.13. Property companies have increased their debt relative to their earnings



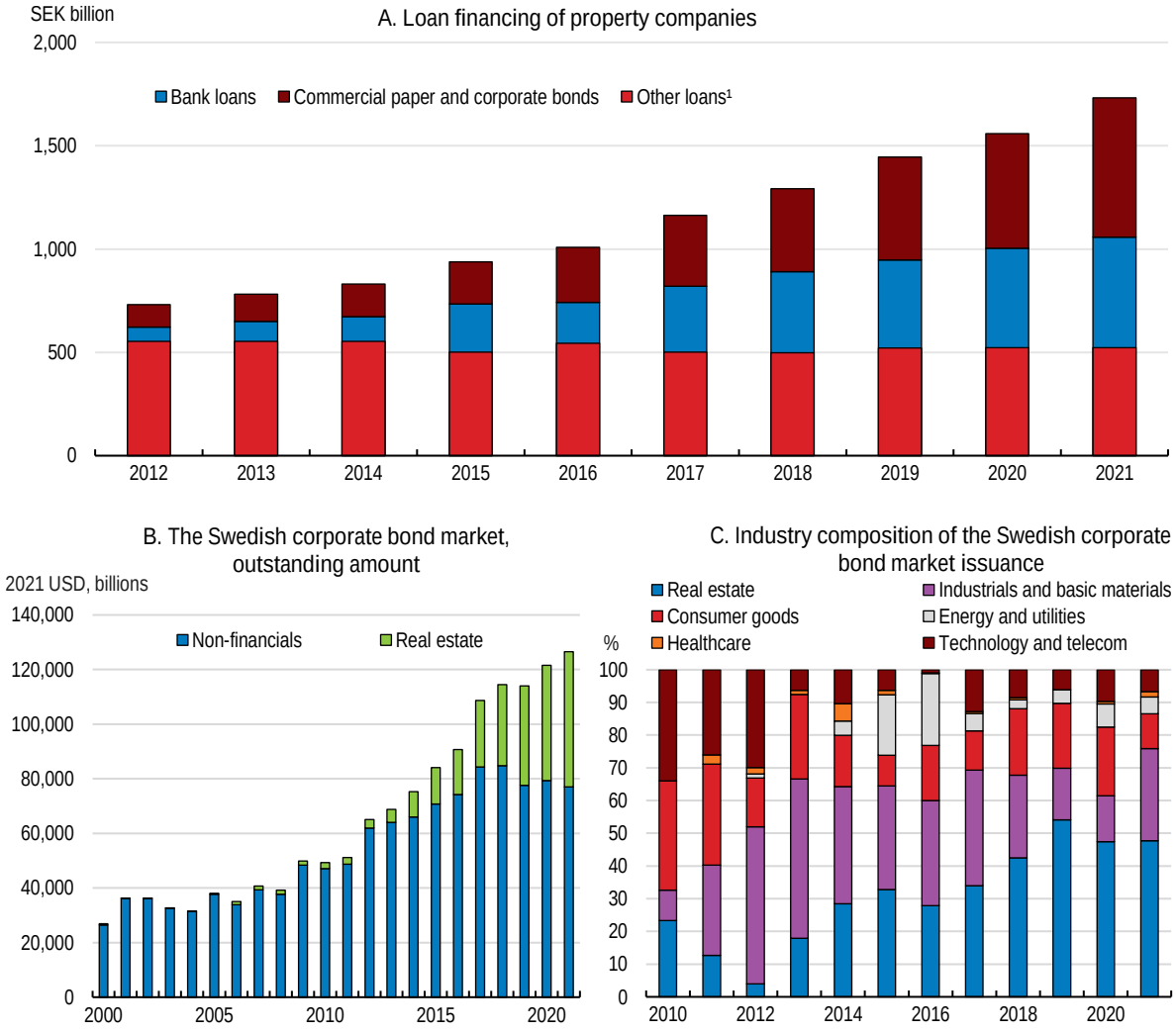
Note: Volume-weighted ratio for 34 commercial real estate companies. The ratio is calculated using interest-bearing liabilities minus liquid assets relative to earnings before interest, taxes, depreciation, and amortisation.
Source: The Riksbank.

StatLink https://stat.link/sdpko4

Despite self-regulatory efforts, transparency in pricing securities remains limited, hampering the price discovery process (OECD, 2022j). Finansinspektionen required fund managers in the autumn of 2021 to conduct a thorough liquidity analysis and to take action if liquidity on the asset side did not meet specified conditions. A recent OECD report proposes further policy options to improve pricing transparency and reduce liquidity risks in Sweden (OECD, 2022j). These include increasing the proportion of corporate bonds with credit ratings through the promotion of domestic rating systems which are relatively inexpensive compared to international ones and involving more intermediaries, notably banks, who can quickly publish price data for the bonds. Finansinspektionen, the Riksbank, and the Swedish National Debt Office have also jointly called for the introduction of a Swedish standard for benchmark bonds, which requires a minimum issuance of SEK 1 billion (i.e. around USD 100 million) and at least two intermediaries (Finansinspektionen, 2022b), which would help increase transparency and liquidity in the market. Despite recent failures of several US regional banks and rising bond rates, the stability of Swedish banks and the financial system remains intact, with limited links and relatively large capital buffers (SOU, 2023). The Riksbank and Finansinspektionen should remain vigilant and be prepared to intervene if necessary to preserve financial stability in the short term.

Sweden's fintech sector has grown rapidly over the past decade and its size is one of the largest in Europe (McKinsey, 2022). The sector is expected to expand further in the coming years, with new technological advancement and a more mature online lending market (Bertsch and Rosenvinge, 2019). The expansion of the fintech industry provides a number of benefits, notably by boosting competition and providing cheaper and easier accessible financial services. It can pose financial risks, however, because loans from fintech companies tend to be directed to high-risk borrowers who are unable to borrow from conventional financial institutions. The fintech sector remains relatively small compared to the rest of the financial system in Sweden, and therefore does not pose financial stability risks for the moment (Riksbank, 2022b). However, careful monitoring is needed given its rapid growth and the growing exposure of commercial banks to fintech credit (Bertsch and Rosenvinge, 2019). Many Fintech companies are not under the supervision of Finansinspektionen, thereby increasing the risk that financial sector vulnerabilities remain undetected (Riksbank, 2022c). Going forward, identifying and rectifying information gaps should remain a priority.

Figure 1.14. The financial sector has become increasingly exposed to property companies



1.The 2021 value is an estimate by the Riksbank.
Source: The Riksbank, Financial Stability report 2022:2; and OECD (2022), The Swedish Corporate Bond Market and Bondholder Rights.

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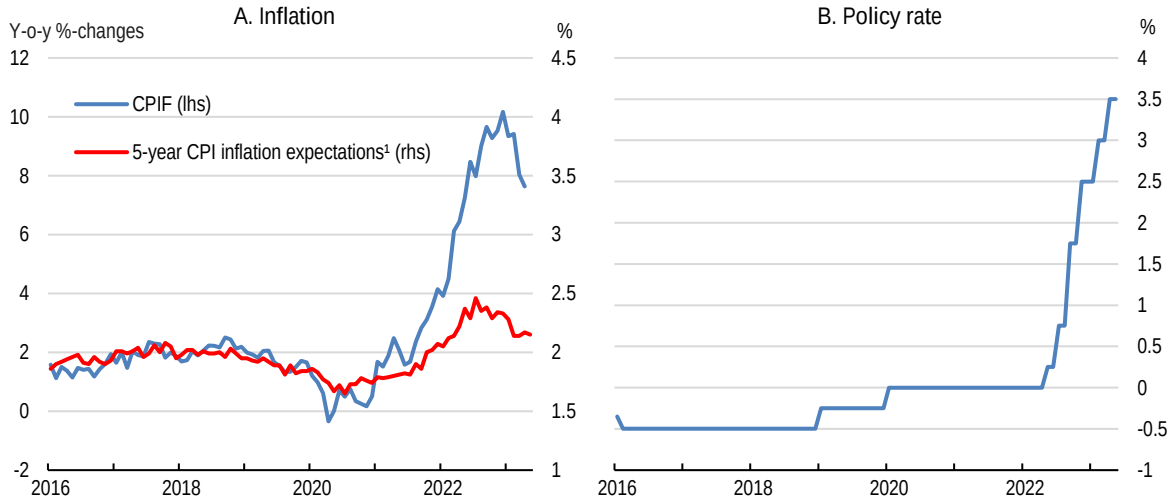
1.3. Monetary policy has been tightened

Responding to rising inflation, the Riksbank raised its policy rate in six steps from 0% in May 2022 to 3.5% in April 2023 (Figure 1.15). These hikes, while somewhat more modest than those of other central banks, partly reflecting high interest-rate sensitivity caused by high household debt with mostly floating rates, have helped contain increases in long-term inflation expectations to only slightly above the 2% target. Wage growth is expected to be relatively modest compared to many other European countries. The wage negotiations have resulted in a two-year nominal wage increase of 7.4%.

Monetary policy should continue to ensure that inflation expectations are anchored to prevent a price-wage spiral. Even though monetary tightening has a cost in terms of reduced demand and financial market strain as discussed above, not tightening enough would further entrench high inflation, and entail far more costly subsequent tightening to re-anchor inflation expectations and restore the credibility of the Riksbank.

Besides raising interest rates, the Riksbank started normalising its balance sheet. It ended net asset purchases in 2021 and tapered asset purchases throughout the second half of 2022 before halting them completely from January 2023. The Riksbank started to sell government bonds in April 2023. It plans to hold its corporate and mortgage bonds until they reach their maturities. The maturities of these bonds are relatively short. Almost the entire holding of these bonds will mature within five years (Flodén, 2022). Such a gradual and predictable quantitative tightening approach is likely to limit how much it increases market pricing of liquidity risks and long-term interest rates (Ono and Pina, 2022).

Figure 1.15. Monetary policy has been tightened



1.Money market players' expectation.
Source: The Riksbank; National Institute of Economic Research.

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Box 1.3. Implications for the Riksbank's long-term earnings capacity from a cashless society

After substantial purchases of mainly fixed-rate government bonds, the Riksbank is expected to face losses of around SEK 80 billion for 2022 and end up with negative equity. Losses occur as policy rate hikes lower asset values and increase interest expenses. This is also the case for other OECD central banks.

In the case of the Riksbank, the challenge is compounded by its low seigniorage (the profit made by printing money), as the country is largely cashless. The Riksbank's earnings capacity to buffer the losses is therefore significantly lower than that of other central banks.

Negative equity may not necessarily be a concern for central banks, as they have the unique ability to finance their activities through seigniorage. Some central banks, such as in Chile, the Czech Republic, Israel and Mexico, experienced negative equity for several years, but financial and price stability were maintained. The problem arises, however, if a central bank experiences a permanent loss of seigniorage. In such a scenario, the central bank's interest-bearing debt could rapidly increase beyond its control, ultimately jeopardising long-term price stability (Flodén, 2022). If there are no alternative ways to generate earnings, the government may need to recapitalise the central bank.

The new Riksbank law taking effect this year mandates equity injections from the state, if the Riksbank's equity is below SEK 20 Bn (or 1/3 of the "target value", 60 billion for 2023). The exact amount depends

on accounting technicalities and a formal adoption by the Riksdag. Many OECD countries do not have a legal obligation for the government to recapitalise the central bank in case of negative equity. Only some central banks have explicit indemnity agreements with the government that allow compensation for losses related to certain quantitative easing policies (e.g., the Bank of England, the Reserve Bank of New Zealand, and the Bank of Canada).

The government's obligation to recapitalise the central bank may raise some issues, including with respect to central bank independence. Central banks are public institutions, but there is broad consensus that their independence is essential to fulfil their mandate of achieving price and financial stability without undue influence from governments with priorities that are sometimes at odds with the central bank's objectives (Bell et al., 2023).

It is therefore crucial to establish transparent and codified arrangements for dealing with potential financial losses or reduced profitability. This can be achieved through implementing fully automated and credible rules for recapitalisation by the government, developing protocols for handling loss episodes, and establishing clear risk-sharing agreements (Bell et al., 2023). Generating earnings through alternative means could also be considered. One promising avenue is through the implementation of a central bank digital currency (CBDC). CBDCs can potentially create seigniorage, for instance by creating differences between returns on central bank assets and currency liabilities or reducing operating costs compared to cash (BIS, 2018), especially when the demand for the CDBCs is high (Riksbank, 2020). Therefore, CBDCs can be considered an important component of promoting central bank independence by providing alternative revenue streams and reducing the risks to long-term profitability in the cashless society. However, issuing CBDCs carries financial and operational risks, including bank runs, capital flow volatility, and cyber risks (IMF, 2023b).

1.4. Fiscal policy support should be gradually phased out

After the pandemic years of increasing public expenditure, fiscal support continued in 2022 albeit to a lesser extent than in many other OECD countries. Discretionary fiscal support during the pandemic is estimated at 4% of GDP in 2020 and 4.5% in 2021, while strong revenue growth in 2021 offset the deterioration of the underlying primary balance (Figure 1.16, Panel A), which helped keep public debt low (Panel B). Temporary employment retention subsidies and cash transfers, together with automatic stabilisers, helped save jobs and limited household income losses. Despite the pandemic, the incomes of the bottom quintile of households grew in 2020, and by more than for the other quintiles (Panel C). However, this pattern reversed in 2021 as the top quintile of households experienced strong income growth, primarily due to increased capital income.

In 2022, in response to increasing energy prices and the deteriorating energy security situation, the government added discretionary spending amounting to 1.2% of GDP to its already expansionary budget. The measures included electricity subsidies for households in southern Sweden where electricity prices are relatively high (Box 1.4). They also included tax cuts on diesel and petrol, and a temporary increase in housing allowances for economically vulnerable families with children. In addition, the measures included a permanent increase of the basic pension and earnings-related pensions (see Section 1.5).

Figure 1.16. Fiscal stimulus has supported household disposable income

Source: OECD Economic Outlook 112 Database; Statistics Sweden Statistical Database: Household finances (Income distribution (fractiles) by region, type of income, distribution measurements, observations and year, 2021).

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Box 1.4. Support measures in the face of rising electricity prices

The government has responded to soaring electricity bills by introducing a number of measures aimed at both households and companies:

- In the spring of 2022, the government set aside SEK 9 billion to compensate households with an energy consumption that exceeded 700 kWh per month in the period December 2021 to February 2022. The support was based on electricity consumption, ranging from SEK 100 to SEK 2000 for households consuming more than 2000 kWh in the given month. The support was then extended, and slightly modified, to include also March 2022 for households in southern Sweden (electricity bidding areas (SE) 3 and 4). Payments were administered by the Legal, Financial and Administrative Services Agency (*Kammarkollegiet*) and private grid operators.
- In February 2023 some 4.3 million households in SE3 and SE4 received retroactive compensation for electricity consumed between October 2021 and September 2022. The support amounts to SEK 0.5 per kWh consumed for SE3 and SEK 0.79 per kWh for SE4

financed by transmission bottleneck fees collected by the Transmission System Operator Svenska Kraftnät. The government has allocated SEK 17 billion to the Swedish Social Insurance Agency, which is responsible for the payments. Companies and other organisations will be able to apply for a similar support (with total cost estimated at SEK 29 billion) until September. Some 27 000 households in southwestern Sweden connected to the European natural gas network will receive SEK 0.79 per kWh (at an estimated total cost of SEK 150 million).

- Another support scheme, covering November and December 2022, was expanded to include households residing in SE1 and SE2 in northern Sweden. The households will be compensated for 80% of their electricity consumption (up until 18,000 kWh) and receive SEK 1.29, SEK 1.26 and SEK 0.9 per kWh in SE4, SE3 and SE1 and SE2 respectively. Payments started in the spring of 2023.
- The government has set aside SEK 2.4 billion to support electricity-intensive companies. Businesses consuming over 0.015 kWh per SEK of turnover in the period October-December 2022 will be compensated for electricity expenditure that exceeds the 2021 average electricity price by more than 50%. The support will have a ceiling of EUR 2 million per firm.

Source: Government of Sweden (2023a); Government of Sweden (2022a); Swedish Energy Agency (2023).

The fiscal stance in 2023 is set to be broadly neutral. A fuel tax reduction and retaining the pandemic-era unemployment benefit increase weaken the budget balance. Recent electricity supports are financed by redistributing to households the extraordinarily high bottleneck fees collected by the transmission system operator Svenska Kraftnät during the energy crisis and will therefore not directly affect the fiscal balance. In response to Russia's war of aggression against Ukraine and against the backdrop of Sweden's NATO application, defence spending is also set to increase. These measures, presented in the autumn budget for 2023, amount to around 0.6% of GDP, which is set to be partly financed by structural savings. In mid-April, the government presented the spring 2023 budget bill which includes new measures of around SEK 4 billion (0.1% of GDP) focusing on defence and education. It also temporarily raises housing subsidies for the economically vulnerable. It follows three off-cycle budgets totalling SEK 2.4 billion (0.05% of GDP) related to a revenue cap for electricity producers, temporary fuel tax reductions, and military aid to Ukraine. Adding up these off-cycle budgets, measures in 2023 supplementary to the autumn budget amount to 6.4 billion (0.15% of GDP).

Extensive fiscal decisions have thus been made outside of the regular budget process. The budget was amended outside of the ordinary budget cycle 12 times in 2022, and eight in 2021 (Figure 1.17). Some off-cycle expenditure increases to respond to major and sudden crises such as COVID-19 and the energy crisis can be seen as a reasonable deviation from the fiscal framework. However, a number of measures have been decided outside of the ordinary budget process even when they were either unrelated to the COVID-19 crisis or Russia's war on Ukraine, or lacking the urgency required for off-cycle treatment. Examples of expenditure which should have been handled in a regular budget process include the new tax-funded income pension supplement (see Section 1.5), increasing the bonus for low-emission vehicles (since abolished, see Chapter 2) and ex-post compensation to households for high electricity prices (Fiscal Policy Council, 2022a). Evidence suggests that the frequent off-cycle tax and spending decisions risk undermining fiscal credibility (End and Hong, 2022), and that lower fiscal credibility is strongly correlated with worse economic outcomes in the medium term, for instance through deteriorating market borrowing conditions (Hameed, 2005; Arbatli and Escolano, 2015; Kemoe and Zhan, 2018). It is important to go back to the normal budget process where different expenditures are weighed against one another in a unified review and expenditure increases are examined in light of a predetermined total fiscal space (Ministry of Finance, 2017).

The Swedish fiscal policy framework consists of budget policy targets (notably a surplus target), a disciplined central government budget process, independent monitoring by the Fiscal Policy Council and rules to secure openness and clarity. The framework, together with the Fiscal Policy Council's ex-post evaluations, has served the country well for a long time, notably in stabilising the economy, including during the global financial crisis (Eyraud et al., 2018). To ensure that off-cycle budget spending is indeed used to respond to crises as opposed to pushing through unrelated measures without the scrutiny of the normal budget process, the Fiscal Policy Council could be encouraged to assess in real time whether or not off-budget spending is urgently warranted as a crisis response. Any new assignments to the Fiscal Policy Council should come with an evaluation of the need to increase its resources, as its staff is limited.

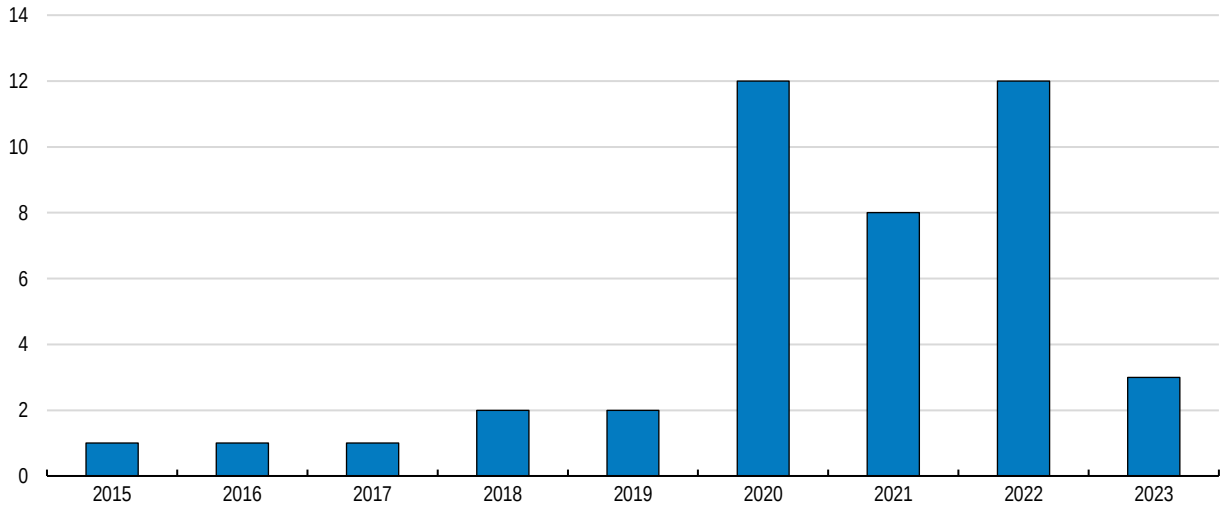
The government should stick to fiscal strategies that do not exacerbate ongoing price pressures, to help the central bank contain inflation and allow for smaller increases in interest rates than would otherwise be the case. The electricity subsidies cover households that paid a higher price than a certain limit, and they are not income-tested. The compensation has been retroactive and therefore not known to customers at the time of purchasing electricity, but it may increase the propensity to spend by making customers expect similar support to be repeated. Also, such generalised energy subsidies including fuel tax cuts are costly, and benefit higher-income households disproportionally (OECD, 2022a). If extended over the long term, they lead to overconsumption and run counter to climate targets. Transfers to those most in need would be a superior alternative. Targeted support has also been handed out, notably by increasing the housing allowance for low-income families with children by up to SEK 1325 per month at a total cost of SEK 500 million. The government plans to increase the housing allowance further (from 25 to 40% of the housing benefit) and push the end date of the increased allowance from 30 June to 31 December 2023, which is a step in this direction. Going forward, temporary energy supports including fuel tax cuts should be gradually phased out and the general social security system should take over in supporting households in need. This would maintain incentives to reduce energy use, while contributing to reducing inflation pressures. At the same time, the social security system should be carefully reviewed to ensure adequate support for those who rely on it, given that major working-age benefits benefits and associated ceilings have not been regularly uprated to match income growth over the past two decades (OECD, 2019), leading to fairly modest benefit levels.

Enhancing the effectiveness of the public administration can also improve the responsiveness, the quality and the cost efficiency of public services, and help the country embrace the green and digital transitions. Sweden has developed a unique public governance model, with relatively few ministries and relastively high independence of public agencies. Satisfaction with public services is high and inequality is low, with a 0.27 Gini coefficient post taxes and transfers (OECD, Forthcoming). Government is large in OECD comparison both in terms of employment (29% of total employment) and expenditures (53% of GDP in 2021) (OECD, 2021d). However, the country also faces regional and sectoral disparities in the access, quality and digitalisation of public services, and faces a number of challenges in governing cross-cutting issues, particularly the digitalisation of the public administration, public sector integrity and climate change, which call for improved coordination and policy coherence (OECD, Forthcoming).

Local government revenue is sensitive to economic cycles, primarily due to its heavy reliance on personal income taxes. This dependence, coupled with the requirement for a balanced budget every year, creates a challenge for local governments to invest in countercyclical public housing and infrastructure projects. The situation has been further exacerbated by increased spending on interest rates. Investing in housing and other infrastructure is particularly important for regions transitioning to a greener economic model, where workers may need to relocate or retrain for new jobs (Chapter 2). To bridge the investment gap, municipalities could be allowed to collect more tax revenues, particularly property taxes (see Section 1.5).

Figure 1.17. Extensive fiscal decisions have been made outside of the regular budget process

Number of extraordinary amendment budgets



Source: The Ministry of Finance.

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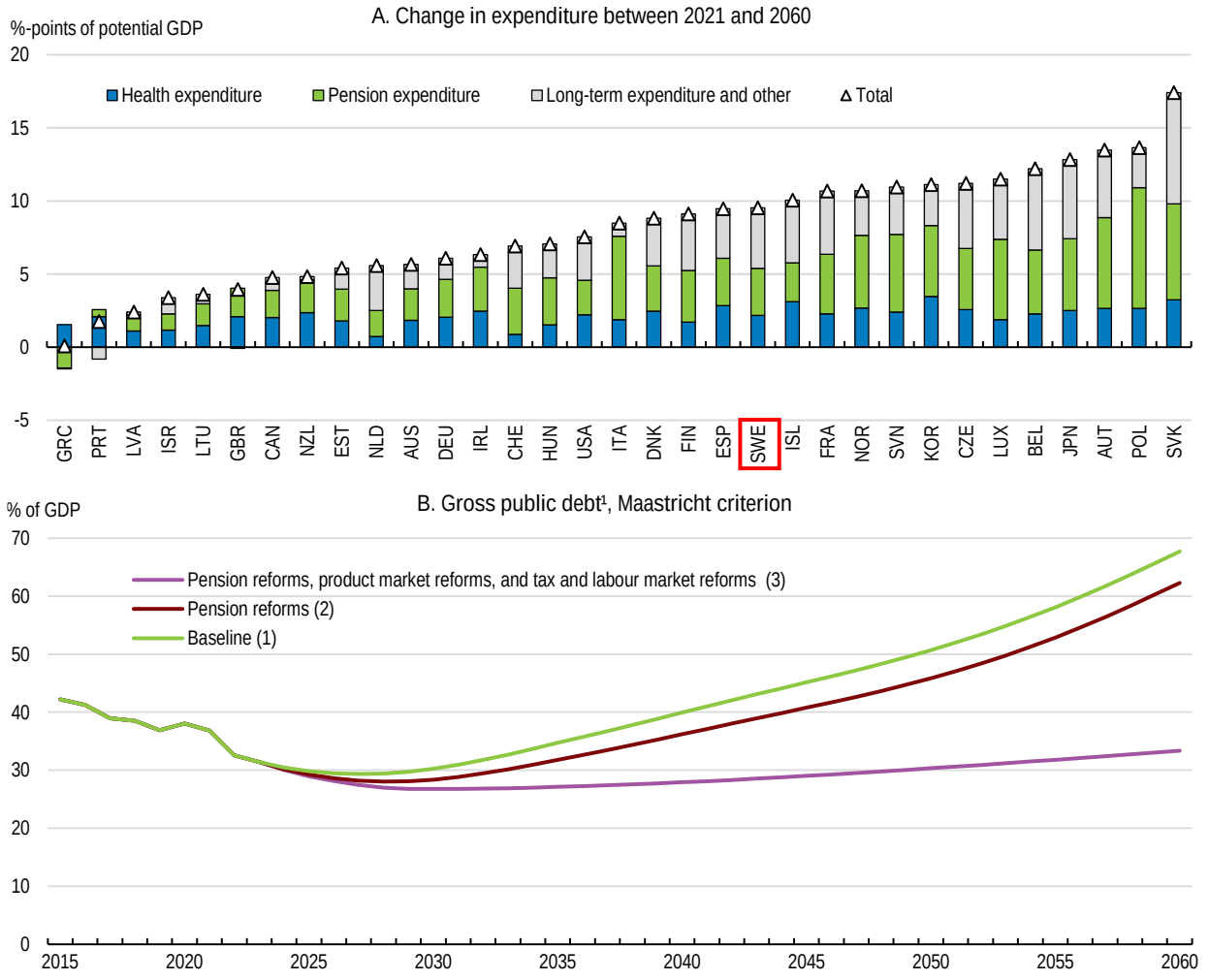
Public debt remains low in international comparison (Figure 1.16, Panel B). Despite the fiscal deficit, the public debt ratio fell in 2022 due to the Riksbank's amortisation of foreign currency loans, together with high inflation, which pushed up nominal GDP. Even so, population ageing is projected to exert relatively high spending pressures ahead, notably in health and long-term care (Figure 1.18, Panel A). According to the OECD Long-term Model, ageing-related public expenditure will increase faster than in many other OECD countries. Without measures to contain ageing-related costs, debt would rise to close to 70% of GDP by 2060. In contrast, assuming ageing costs are contained through increasing productivity and cost-efficiency in public services, such as by expanding home/community-based long-term care and telemedicine as recommended in the previous Survey (OECD, 2021a), and structural reforms implemented in line with the recommendations of this Survey, the debt-to-GDP ratio would stabilise around the current level of 35% of GDP (Panel B and Box 1.5). Increasing tax revenues particularly through higher employment or working hours, together with curbing spending through improving cost efficiency, are key to ensuring long-term fiscal sustainability.

Figure 1.18. Population ageing exerts spending pressures ahead



Note: (1) Based on no policy change and age-related costs as estimated in the OECD long-term model baseline (Guillemette et al., 2017); (2) Also implementing recommendations on pensions as outlined in the Survey (i.e. increasing the relative importance of earnings-related pensions) (3) Also phasing out mortgage interest deductibility, closing the gap in property tax revenues against the OECD average by one-third by 2030, closing the gap in the labour tax wedge against the OECD average by half by 2030, easing rental regulations, streamlining building, planning and product market regulations affecting construction and speeding up climate-friendly investment, and boosting active labour market policies. The model parameters are based on simplified assumptions standardised across OECD countries.

Source: OECD calculations based on the OECD Long-term model; OECD (2022b), Social spending (indicator), doi: 10.1787/7497563b-en; Guillemette and Turner (2021).

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Box 1.5. Quantifying the impact of proposed structural reforms

This box provides a summary of the long-term potential impacts of selected recommendations in this Survey on GDP and the fiscal balance. However, estimating the exact impact of the recommended reforms is often challenging due to the lack of suitable theoretical or empirical models. Therefore, the quantification presented in this section is based on scenarios that capture some aspects of these reforms. It's important to note that the quantified impacts are merely illustrative and subject to large uncertainties.

Recommendation	Effect on the level of GDP per capita in 2050 (percentage points)	Net fiscal impact in 2050 (change in primary balance, % of GDP)
Implement recommendations on pensions as outlined in the Survey (Increasing the relative importance of earnings-related pensions)[1].	+0.3	+0.3
Implement revenue-neutral tax reform to reduce the tax wedge on work, increase property-related taxes, reduce incentives to classify labour income as capital income and expand the CO_2 tax with a tax credit for negative emissions.[2]	+1.8	0
Ease rental regulations and streamline building, planning and product market regulations affecting construction and speeding up climate-friendly investments.[3]	+7.9	+ 1.4
Boost active labour market policies, notably by enforcing activation requirements more strictly. [4]	+2.4	+ 1.6

Note: 1. Increasing the relative importance of earnings-related pensions is assumed to postpone retirement by four months on average by 2050, as it encourages people to work longer. 2. The gap to the OECD average of the labour tax wedge for above-average earners is assumed to be reduced by half by 2030. The capital dividend tax rate in Sweden is assumed to be increased corresponding to one-third of the gap to the OECD average by 2030. One-third of the gap to the average OECD property tax revenues is assumed to be closed by 2030. Mortgage interest deductibility is assumed to be gradually phased out until 2030.The tax reform is assumed to be calibrated so that increased taxes from property and dividends off-set expenditures for a tax credit for negative emissions and reduced revenue from the personal income tax. 3.The strictness of rent control is assumed to move to the level of Norway, where the initial rent level can be freely negotiated and rent increases are regulated. The reform would increase rental housing supply by a more efficient use of the current housing stock and by incentivising additional investments in rental housing. The OECD Product Market Regulation indicator on barriers to investment (ranging from 1 to 6) is assumed to be reduced by 0.4. 4. Boosting active labour market policies spending by 0.5% of GDP by 2050 is assumed to lead to an increase in the employment rate by 6 percentage points by 2050.
Source: OECD simulations based on the framework by Egert and Gal (2017) and Guillemette and Turner (2020).

1.5. Structural reforms for a stronger and more inclusive labour market

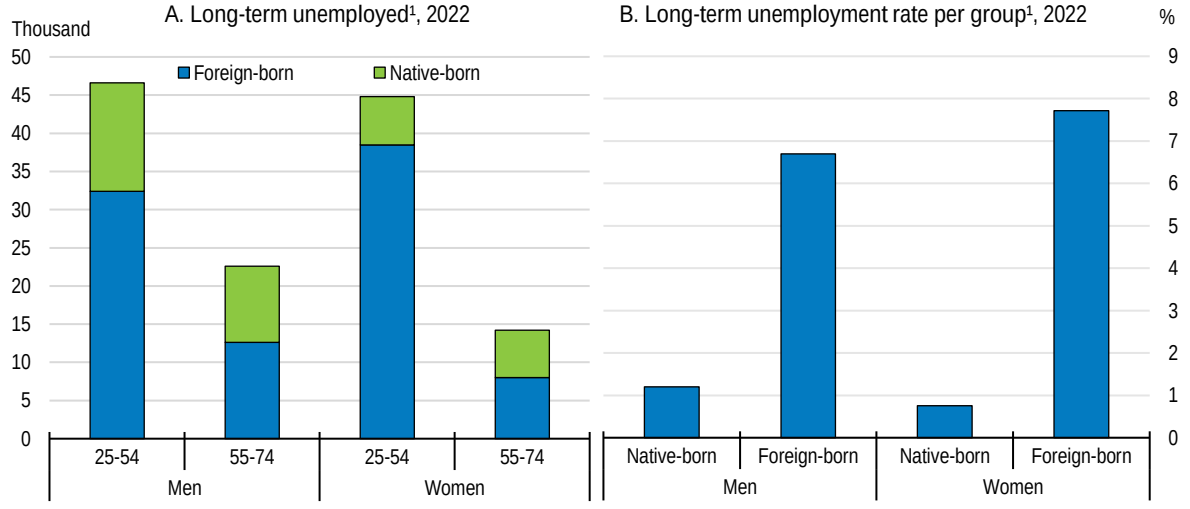
Maintaining high employment is a prerequisite for the sustainability of the Swedish welfare state and to counter the ageing-related contraction of the labour force and its negative fiscal impacts. Sweden has a very high labour force participation rate and one of the highest employment rates in the OECD. The employment rates of women and the elderly are also high in OECD comparison. Even so, unemployment has remained relatively high over the past decade, reflecting a high structural unemployment rate that is now estimated at 7.3% by the National Institute of Economic Research (Konjunkturläget December 2022, 2022). At the same time, labour market mismatch has increased in recent years. Firms report a lack of qualified labour and difficulties in filling vacancies. Labour shortages are most apparent in non-cyclical professions, such as education, health and social care, and in technology and ICT (Statistics Sweden, 2022). A large share of jobseekers lack the needed skills, notably the foreign-born with insufficient education or Swedish language skills. Furthermore, a relatively high labour tax wedge discourages

employment and longer working hours, and some recent pension reforms weaken incentives to continue working in old age counteracting a series of other efforts to extend working lives.

Addressing long-term unemployment notably among the foreign-born

Long-term unemployment is much higher among foreign-born than among native-born people (Figure 1.19). A compressed wage structure raises demands for workers' productivity, which are in general matched by high levels of skills and education. This high-productivity, high-employment equilibrium is at the centre of the Swedish model characterised by a symbiotic relationship between external competitiveness, a strong social safety net and high public investments in people's skills and health. However, high skill demands make it hard for those with low education and low skills to find jobs (Figure 1.20). This leads to high unemployment among the foreign-born, who are on average less educated and may lack some of the skills needed to succeed in the Swedish labour market, such as Swedish language skills, qualifications recognised by Swedish employers and more subtle knowledge of Swedish culture and labour market functioning. Empirical evidence suggests that substantial employment penalties are related to migrants' lower literacy proficiency, but that participation in adult education and training is effective in improving their employment prospects (Bussi and Pareliussen, 2017). Participation in adult education and training is high in Sweden, including among the foreign-born.

Figure 1.19. Foreign-born people are more likely to be long-term unemployed

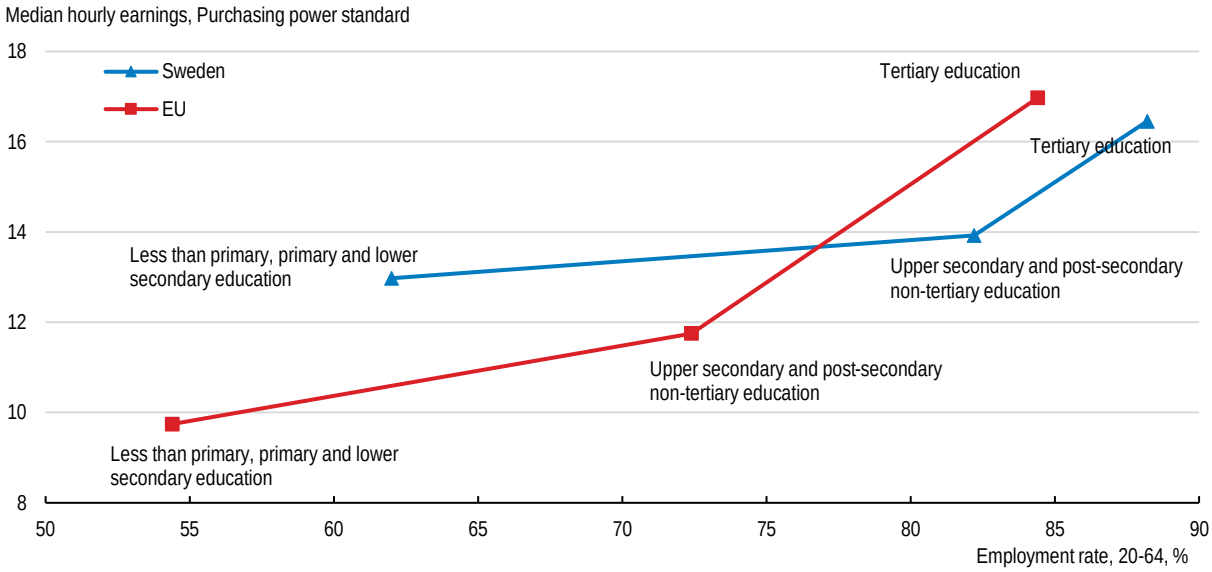


1. People who have been unemployed longer than 27 weeks, as a share of the 15-74 labour force.
Source: Labour Force Surveys, Statistics Sweden.

StatLink https://stat.link/qt9yko

Figure 1.20. Wages are compressed and employment gaps large

2018



Source: Eurostat.

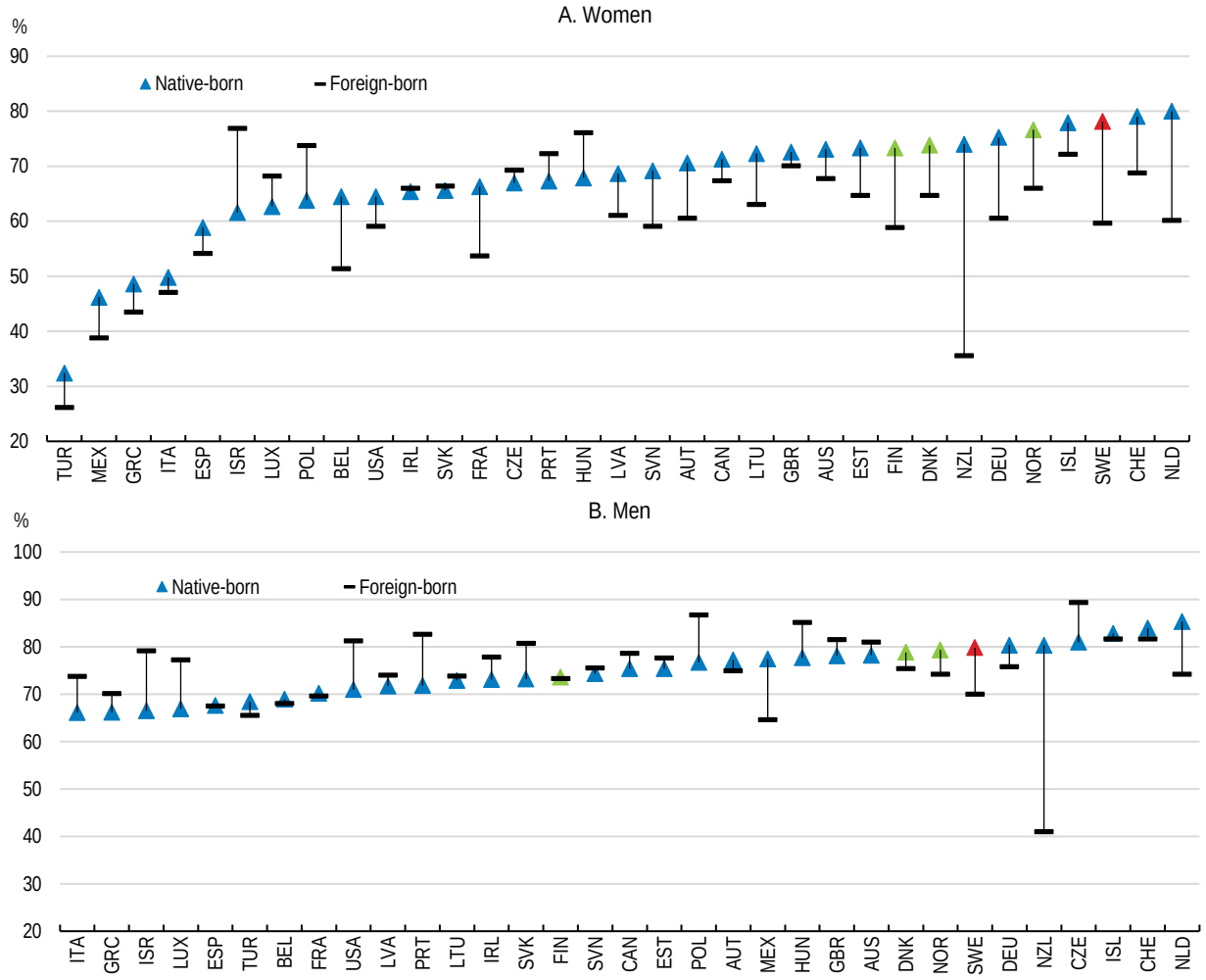
StatLink https://stat.link/jviun2

Foreign-born women, in particular, struggle to enter the labour market. Their employment rate was 18 percentage points lower than that of native women in 2021, although still higher than the employment rate of native-born women in some OECD countries (Figure 1.21). In 2021, foreign-born women made up over a third of the long-term unemployed. They often start from a low level of education (in 2022, over 40% of unemployed foreign-born women had nine years of education or less) and sometimes face strong gender- and family norms.

Relatively weak financial work incentives for low-income second earners receiving social assistance can contribute to the low employment rate of female immigrants, despite individual income taxation. For example, a second earner with children taking up a full-time job at 67% of the average wage would lose around 85% in taxes, social contributions and lost benefits (Figure 1.22, Panel A). The weak financial work incentives increase the risk that social assistance recipients remain jobless and end up in a poverty trap.

Figure 1.21. The foreign-born female employment rate is low

2021, employed as share of population, 15-64 year-olds



Source: OECD Migration Statistics (database).

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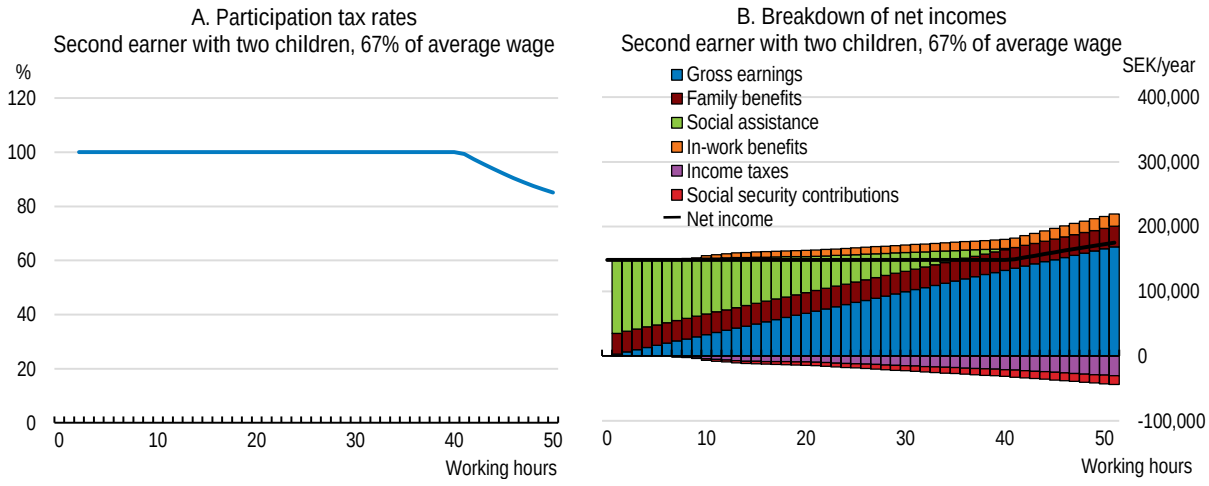
Low benefit levels can encourage the transition to work but can also involve increased income disparities and a greater risk of financial vulnerability, not least for children. A more gradual tapering of social assistance against work income could improve work incentives and reduce poverty risks. Considering fiscal costs, a gradual tapering over time for social assistance recipients moving into employment could be considered. This would still incentivise workers to grow into higher paid jobs and follow career-enhancing training. The relatively high participation tax rates are mainly driven by a generous level of social benefits combined with their withdrawal krona for (after-tax) krona of work income (Figure 1.22, Panel B). This leads to a participation tax rate of 100%, in other words no income gains by working, when taking a low-paid part-time job (Figure 1.22, Panel A). This provides weak financial incentives to take up low-paid employment despite the Earned Income Tax Credit. Also, social benefits such as the multiple child supplement should be carefully reviewed to see whether work incentives could be strengthened without exacerbating inequality.

Figure 1.22. Low-income second earners face weak work incentives

For Sweden, 2022



Note: Participation tax rates refer to the fraction of income that is taxed away by the combined effect of taxes and benefit withdrawals when entering or returning to work.
Source: OECD TaxBen model. http://oe.cd/TaxBEN.

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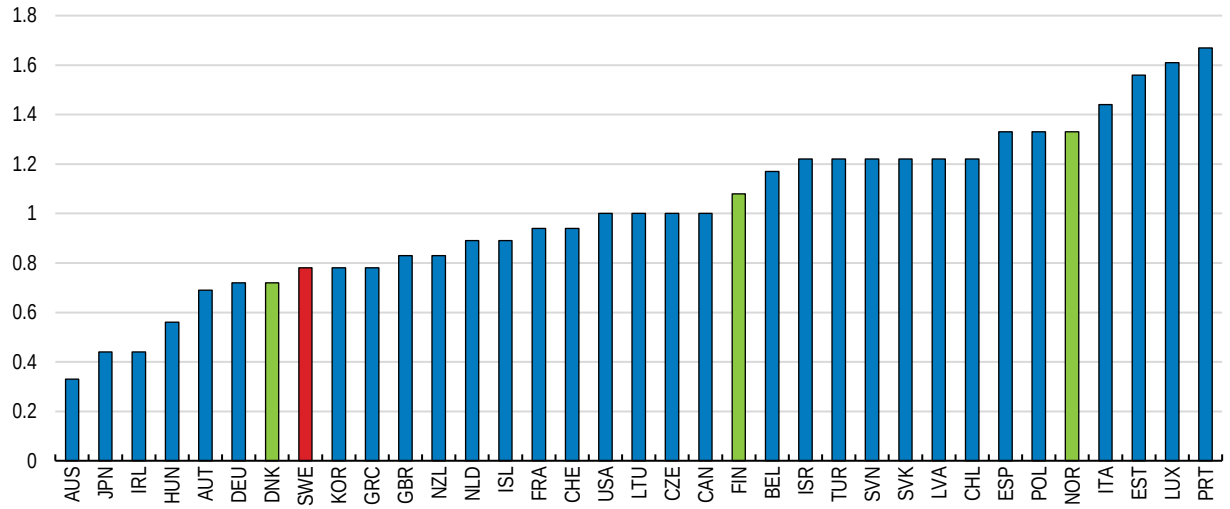
Another way to counter the low work incentives is to calibrate activation policies to encourage the unemployed to step up their job search. In particular, policies that tie benefit receipt to job search or participation in ALMPs can help to ease any trade-offs between benefit generosity and labour market outcomes. Sweden has relatively demanding activation requirements for jobseekers to be entitled to social benefits (OECD, 2017a). For instance, actively and regularly searching for jobs is a precondition for receiving unemployment benefits. However, Sweden's employment services are less likely to sanction those who do not comply with the active job search requirements compared with most other OECD countries, including Finland and Norway (Figure 1.23). An empirical analysis on Sweden suggests that more stringent enforcement of activation requirements increases the likelihood of exiting unemployment into employment, albeit at the expense of slightly lower hourly wages (Van Den Berg and Vikström, 2014). Sweden recently reformed its employment service to expand the use of private providers (see below). Private providers usually have less incentives to sanction those who do not comply with the active job search requirement, because this means losing clients (OECD, 2022c). A recent review by the Swedish Unemployment Insurance Inspectorate (IAF, 2021) found that there is a lack of systematic monitoring by the Public Employment Service (PES) of how private providers enforce activation requirements. Improving the monitoring system, for instance based on sanctioning rates across providers, and using this as a basis for conducting more thorough follow-up checks should be considered (OECD, 2022c).

Dropout rates from Swedish language courses and other early ALMP activities for immigrants are higher for women than for men, and activation programmes generally have a smaller effect on women in the Nordics (Nielsen Arendt and Schultz-Nielsen, 2019). Nevertheless, initiatives such as the *Establishment Programme* for recently arrived immigrants and the pilot project *Equal Establishment* (see below), both run by the PES, show that, if well-tailored, ALMPs could yield significant effects also for women in Sweden. Both these programmes saw a positive impact on immigrant women's employment comparable to that for men (Andersson Joona, Wennemo Lanninger and Sundström, 2017; Swedish Public Employment Service, 2022).

Figure 1.23. Sweden has less stringent sanctions for those who do not comply with the active job search requirements

Strictness of sanctions, 2022



Note: Strictness scores in each category range from 1 (least strict) to 5 (most strict). 'Sanctions' includes 5 items (sanctions for voluntary unemployment, for refusing job offers, for repeated refusals of job offers, for failures to participate in counselling or ALMPs, and for repeated failures to participate in counselling or ALMPs).
Source: OECD Benefits, Taxes, and Wages database (2022).

StatLink https://stat.link/m4ridj

The sanction regime should be accompanied by effective and tailored job search assistance in order not to impoverish already vulnerable people. Over the past years, Sweden has taken some measures to speed up the integration of newly arrived immigrants, focussing on foreign-born women, like funding to increase the possibilities for persons on parental leave to take part in Swedish language courses and training, as documented in the previous *OECD Economic Survey of Sweden* (OECD, 2021a). A pilot project, *Equal Establishment*, targeting refugee immigrants and their relatives was also initiated. The project was a PES-run randomized controlled trial conducted in 16 cities between 2018 and 2021 in which some recently arrived migrants were offered a tailored job matching method and some only took part in regular ALMP activities. The evaluation report by the PES (2022) shows that the new matching method increased the probability of being in work and studies by approximately eight percentage points compared with the Employment Service's regular support. A cost analysis also showed that the project yielded better value for money than regular support, but the pilot project was not scaled up for lack of funding. However, *Matching from day one,* a method used in the *Equal Establishment* programme will be taken further in 2023 as part of the Public Employment Service's efforts to the improve employment outcomes of those furthest away from the labour market.

Sweden has reformed the PES by introducing a purchaser-provider split for activation policies with outcome-based payments, while the focus of the PES has shifted to analytical work and monitoring jobseekers (Bennmarker et al., 2021). At their best, reforms outsourcing publicly financed services to private providers can spur innovation and result in better-quality services at a lower cost. To achieve this, the reform must encourage competition focussed on actually achieving the results desired by the purchaser. This can happen if there are enough providers to stimulate competition, and if outcomes are accurately measured and providers remunerated accordingly.

Jobseekers are segmented into three groups based on their employability (OECD, 2022c). Providers are paid a daily allowance plus a performance compensation based on the employment/education outcome, both of which are differentiated based on a client's employability in order to ensure providers do not focus their attention on only the clients closest to the labour market. The reform has entailed a significant downsizing of the number of local PES offices and employees, and an increased role for digital services. By the end of 2021 all municipalities had access to the new matching tool KROM, which the jobseekers can use to choose job service providers.

Although it is too early to thoroughly evaluate the reformed PES, there have been indications that remote and sparsely populated regions are not sufficiently covered by private sector providers (OECD, 2022d). Furthermore, municipalities have so far not been allowed to provide matching services as they are confined by law to operating within their proper geographical boundries, while KROM service areas often straddle several municipalities. Simplifying application requirements for providers that are already active in other regions and easing requirements on physical presence in rural areas could enhance competition in these areas. Pragmatic solutions should also be found to allow municipalities to provide matching services in fair competition with private providers. Moreover, the payment model needs continued calibrating to make sure that remuneration is properly adapted to the chances of the jobseeker. Providers in the Swedish market cannot refuse certain jobseekers, but indicators focusing on employment/education outcomes can incentivise providers to persuade jobseekers with low potential to switch to other providers (OECD, 2022c).

The expansion of external providers of matching services should be accompanied by measures to enable jobseekers to choose providers that best satisfy their needs. An increase in the number of providers tends to reduce service quality when jobseekers are unable to make informed choices (Moraga-González, Sándor, and Wildenbeest, 2017; OECD, 2022c). In 2022, to help jobseekers make informed choices, Sweden introduced a system similar to Australia's "Star Ratings" assessment system which rates providers according to their overall performance and makes these ratings publicly available. As of March 2023, it is available in 59 out of a total of 72 service areas. However, for many jobseekers, especially less educated individuals and migrants, it can be difficult to make an informed decision based solely on star ratings. This was indeed the case in Belgium and the Netherlands. The experience from a pilot programme in Belgium (Flanders) suggests that assistance from counsellors was particularly useful for less-educated individuals in helping jobseekers make informed choices, with a large majority of participants reporting satisfaction with their provider choice (OECD, 2022c). Due to technical reasons with the matching service procurement, ratings will be temporarily unavailable for up to 20 months from mid-April 2023. Going forward, ensuring consistency in ratings and avoiding such prolonged gaps will be important to provide jobseekers and the PES with the necessary information. The PES should also consider making indicators such as customer satisfaction survey data available to clients to avoid that providers focus their efforts only on the measured outcomes.

The government should consider shifting the focus of ALMP spending from employment incentives to training. Sweden's ALMP spending is currently 2.2% of GDP, around the OECD average, but the spending is heavily tilted towards employment incentives rather than training (OECD, 2022b). The government launched the so-called *entry jobs* (previously *establishment jobs*) in the fall of 2022 in close cooperation with social partners. Under the programme, the government will pay around half of the wage costs for up to two years when a company employs migrants who have been in Sweden less than three years or someone who has been unemployed for at least two years. The scheme costs around EUR 400 million (SEK 4.2 billion) (European Commission, 2022). Subsidised employment could be a step towards work, but should be provided simultaneously with tailored training and mentoring to be effective in the longer run (OECD, 2022e). In particular, evidence from Denmark and Sweden (e.g. the Establishment lift, a joint programme between three Stockholm municipalities) suggests that involving staff with diverse linguistic and cultural knowledge in skills training could enhance the effects of the training (Penje and Ström Hildestrand, 2022).

Box 1.6. Some recent labour market reforms go in the right direction

In order to increase labour market flexibility, employment protection legislation (EPL) was reformed in the fall of 2022, in line with the recommendations in the 2021 Survey (Government of Sweden, 2022b). With the new law, employers of all sizes can exempt three persons from the order of priority rules when laying off employees and no longer bear the wage costs during an ongoing dispute concerning the validity of a contract termination. If the ruling is in favour of the employee, he or she will be compensated retroactively. The new act also facilitates conversion of fixed-term contracts into open-ended ones and makes full-time contracts the new norm. Social partners retain the possibility to deviate from many of the regulations in their collective agreements. Another part of the labour market reform package is the introduction of a new support scheme, consisting of both grants and loans of up until 80% of the wage for up to 44 weeks, for experienced (a minimum eight years of work experience is required for eligibility) workers in need of up- or reskilling. In addition, workers who are not covered by a collective agreement will now get access to transition support in the form of job counselling. The new EPL reform will ease financial risks for businesses - especially for small and growing ones – while maintaining predictability and employment security for workers.

Since the previous Survey labour migration policies have also been adjusted (Government of Sweden, 2022c). The Swedish labour migration regulation had been relatively lax since it was last reformed in 2008, making little distinction between high- and low- educated foreign workers. This spurred cases of tax avoidance, labour exploitation and welfare fraud in low-skill segments of the labour market. The new regulation obliges work permit applicants to present an employment contract and some employers to report any deterioration of the terms of employment. Certain highly qualified persons can apply for a new temporary residence permit allowing them to stay up to nine months while looking for a job or starting up a business. The new government has followed through the initiated reform by proposing to raise the minimum monthly maintenance requirement for labour migrants (currently at SEK 13 000) and introducing a new minimum wage requirement, which would be around the median wage (SEK 33 200). Raising the salary requirements above sectoral minimum standards could help crowd out irresponsible employers and ensure a level playing field for low-skilled workers. However, if raised too much, it could also increase shortages of workers in segments of the labour market. It should also be accompanied by further measures, such as tightening the so-called track change process, whereby an asylum seeker whose application was refused can apply for a work permit instead, and simplifying the process for highly qualified professions where most work permit applications are approved, as suggested by the National Audit Office (2022).

Table 1.3. Past recommendations on labour market policy and action taken

Main recent OECD recommendations	Actions taken since the 2021 Survey or planned
Implement the labour market reforms agreed by the social partners to introduce more job flexibility and security.	Employment protection legislation was reformed in line with the agreement in 2022.
Mainstream the pilot Equal Establishment programme for foreign-born women.	The pilot project was not scaled up for lack of funding, despite promising results, but elements of it are developed further by the PES (notably the Matching from day one methodology).

Lowering taxes on work

The labour tax wedge has been gradually reduced over the past decade, but remains high in OECD comparison. Earned Income Tax Credits (EITC) have been expanded in several steps since their introduction in 2007. A new tax credit from 2021 permanently reduce taxes by at most SEK 1 500 for those who have (non-capital) income over SEK 40 thousand (EUR 3 600) per year. In 2023, the new government strengthened the earned income tax credits for the elderly. The gradual reduction of the labour tax wedge should improve work incentives. Identification of the employment impact of Sweden's previous EITC

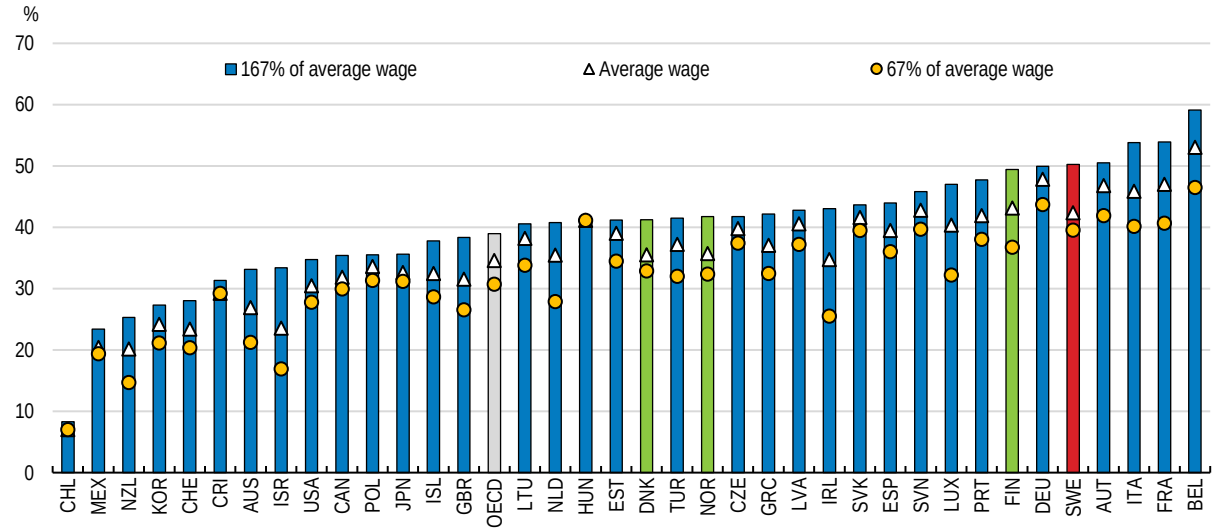
reforms is hampered by the fact that all Swedes face the same tax credit schedule, which does not allow to compare treated and non-treated groups (Edmark et al., 2012). However, empirical evidence in other countries suggest that a narrow earnings distribution, such as in Sweden, makes it much costlier to alter work incentives for a specific target group, which makes policies either expensive or ineffective (Immervoll and Pearson, 2009). Dynamic effects on employment would be stronger from other income tax cuts, such as reducing top marginal tax rates, as discussed below.

The tax wedge on labour is particularly high among above-average income earners in Sweden (Figure 1.24). Personal income taxation consists of two layers in Sweden: the municipal income taxation levied at a flat rate which averages 32%; and the state income tax levied at a flat rate of 20% from just above the average wage. In 2021, Sweden removed a 5% surtax, which was imposed on top of the state income tax for incomes exceeding SEK 703 000 (EUR 63 000). This helped reduce the top marginal tax rates somewhat. The top personal income tax rate is nonetheless, at 52%, among the highest in the OECD (Figure 1.25, Panel A) and it applies from a low threshold, just above the average wage (Panel B). As a result, a relatively large share of taxpayers faces the top marginal tax rate (Panel C), reducing incentives for those affected to pursue additional income or work extra hours.

Increasing the threshold of the state income tax would improve incentives to work more for the many taxpayers who currently face a high marginal tax rate but pay only small amounts in the top marginal tax bracket. Research suggests that a substantial share of the initial revenue loss from increasing the threshold of the state income tax would be recouped via more hours worked (OECD, 2008; and Svenskt Näringsliv, 2017). Another potential adverse effect of the high top personal income tax rate in international comparison is that it may make it difficult to retain or attract highly skilled individuals (André and Hwang, 2018). If such effects were taken into account, the reduction of the top marginal tax rates would be more cost-effective. In addition to increasing the threshold, "flattening" the state income tax by introducing an additional tax bracket with a lower rate for incomes just above the threshold should also be considered to smoothen marginal tax rates which jump at the margin (from 32% to 32+20%) (Bastani and Selin, 2019).

Figure 1.24. The labour tax wedge is high, especially among above-average earners

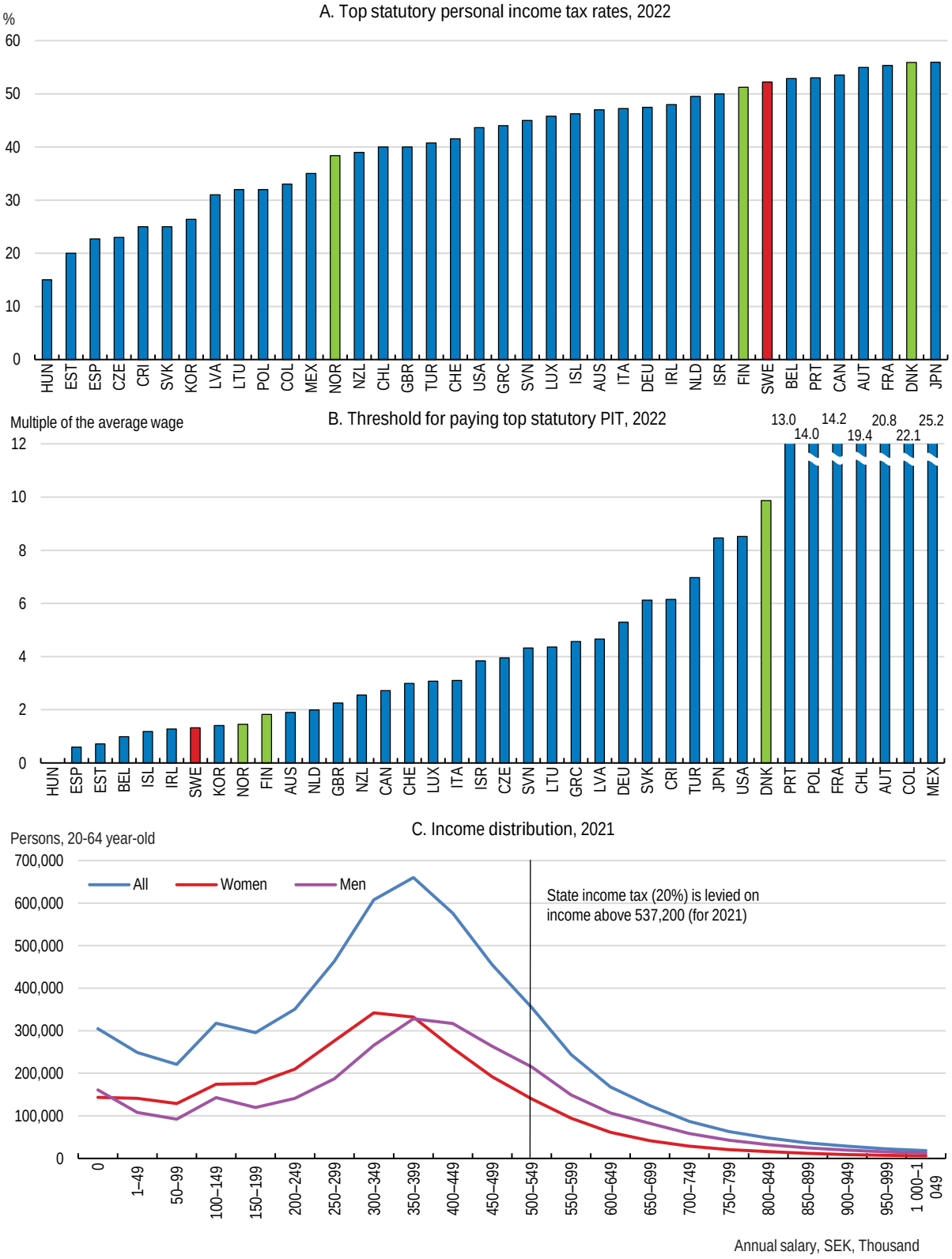
Tax wedge for a single person without children, by earnings level, 2022



Source: OECD Taxing wages.

StatLink https://stat.link/7yoz2q

Figure 1.25. Higher top personal income tax rates apply at a lower threshold



Source: OECD Taxation database; Statistics Sweden.

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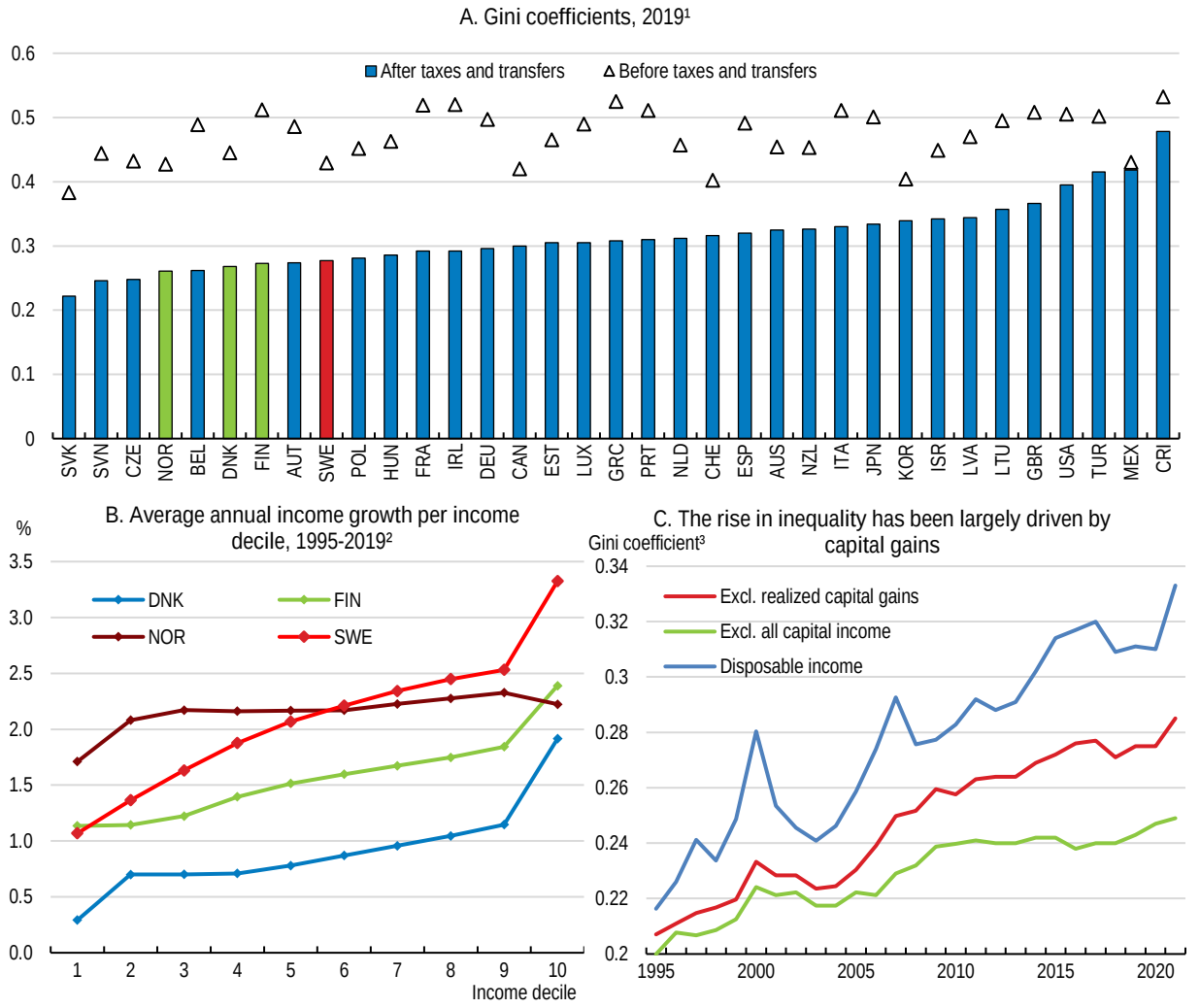
Cuts in these progressive elements are often challenged on the grounds of equity concerns. However, equity might be better served by adjusting capital taxation, increasing labour market inclusion and uprating working-age benefits in line with wage growth (OECD, 2017) than by maintaining very high marginal taxes on above-average earners. The Gini coefficient for household disposable income has increased relatively rapidly over the past decades, resulting in the highest inequality rates among Nordic countries, although it remains relatively low compared to the OECD average (Figure 1.26, Panel A). Increasing income inequality reflects weak income growth in the lower parts of the distribution, and very high growth in the top decile (Panel B). The OECD Economic Survey of Sweden (2019) points to a number of factors contributing to this, including demographic changes and decades of slow uprating of working-age benefits, notably unemployment benefits and social assistance benefits, but it is clear that increasing capital income is a main driving force, driving up top incomes relative to the rest (Panel C).

Figure 1.26. Income inequality has increased



1. 2018 data for Australia, Ireland, Italy, Japan, Mexico and Poland.
2. Equivalised disposable household income.
3. Gini coefficients over the equivalised household distribution.

Source: OECD, Income Distribution Database; Statistics Sweden.

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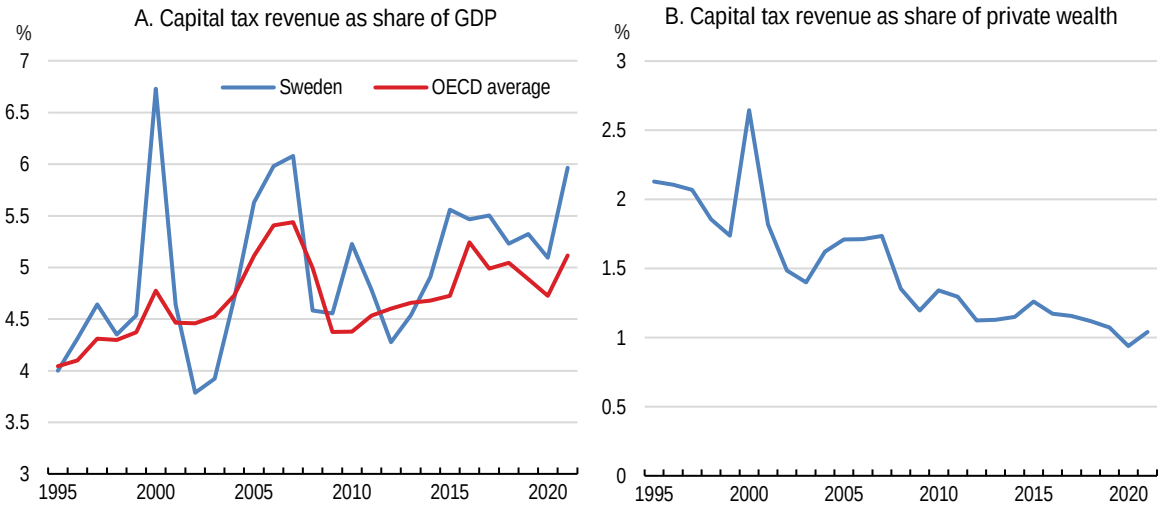
Sweden has a dual-income tax system where capital income is taxed at a lower proportional rate than labour income. Labour income is taxed at a progressive rate schedule, meaning that the more one earns, the higher the marginal tax rate one pays. Capital incomes are taxed at various flat rates. For instance, dividends and capital gains from listed companies are taxed at 30%, around the OECD average, while incomes from non-listed companies are taxed at lower rates ranging from 20 to 25%. For a special savings account introduced in 2012, the effective capital income tax rate has been only about 10% on an average investment.

Sweden has one of the largest differences between the top statutory tax rate on labour income and on dividend income among the OECD countries, with almost an eight percentage point difference when including both corporate tax and individual dividend tax (OECD, 2022f). This far exceeds the 0.6% OECD average. Thus, individuals with high wage income have strong incentives to reclassify labour income as capital income in order to minimise tax when the earnings are a combination of both types of income. Indeed, empirical evidence suggests extensive income shifting across tax bases, especially among owner-managers of closely held corporations (Alstadsaeter and Jacob, 2016). The main motivation for the dual-income tax system and different tax rates across capital incomes was to reduce capital flight and improve business dynamism. However, paying lower taxes through income shifting suggests a significant loss of potential tax revenues. Indeed, capital income tax revenues as a share of total personal net worth have declined over the past decades (Figure 1.27).The reclassification of income from labour to capital can be addressed through anti-avoidance laws. The Automatic Exchange of Financial Account information between tax administrations makes tax evasion more difficult (OECD, 2021b). Since 2017, when the first exchanges took place, over 100 jurisdictions have commenced automatic exchanges. However, a more fundamental way to fix this would be to increase taxation of realised capital gains and dividends while reducing labour taxation (André and Hwang, 2018). Empirical evidence on reform in Norway which substantially realigned the taxation of realised capital gains and dividends with wage income (by reducing the rates of the surtax schedule while introducing a tax on dividends and capital gains above a normal rate of return) suggests that the reform reduced inequality (Thoresen et al., 2011).

Figure 1.27. Capital tax revenues decreased relative to the value of private assets



Source: Statistics Sweden and OECD Global Revenue Statistics Database.

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Sweden's property tax revenues are among the lowest in the OECD. This is mainly because the recurrent tax on residential property is capped at a low level, together with generous mortgage interest deductibility

for owner-occupied houses. Considering the relatively rapid increase in house prices over the past decades, this suggests a significant revenue loss. Forgone tax revenue due to mortgage interest relief on owner-occupied housing is estimated at around USD 2.3 billion (0.4% of GDP) (TRD, 2021). Property tax revenues as a share of GDP have grown in almost all other OECD countries, while they have fallen in Sweden over the past decade (OECD, 2022g). In some OECD countries, higher property tax revenues reflect not only increased property values but also active tightening of the tax regime. For instance, Finland has been phasing down tax relief on mortgages and increasing property taxes, moving away from favoring home ownership towards more tenure-neutral taxation over recent years, in line with OECD recommendations (OECD, 2022h). In the United Kingdom, the tax relief was gradually reduced from the 1980s until its abolition in 2000.

Going forward, once the housing market cycle has clearly turned, the government should consider reforming the recurrent property tax to better align tax charges with market values and phasing out mortgage interest deductibility. Mortgage interest deductibility on owner-occupied housing without properly taxing imputed rents and capital gains amounts to a subsidy to homeowners (OECD, 2019). The significant fiscal cost has been justified by the expected positive impacts on homeownership. However, evidence suggests that mortgage interest deductibility drives up property prices and creates equity concerns, but is ineffective in increasing homeownership in Sweden and elsewhere (Bourassa et al., 2012; Hilber and Turner, 2014). Recurrent taxes on immovable property are generally considered among the least detrimental to growth (Akgun, Bartolini, and Cournède, 2017; Arnold et al., 2011). However, they are usually unpopular and sometimes perceived as unfair, because they are visible and may burden asset-rich income-poor households. These problems can be mitigated by means tested exemptions or tax deferrals for low-income households (Blöchliger et al., 2015).

Municipalities collect property taxes for residential properties (*kommunal fastighetsavgift*) while the central government collect the property tax for non-residential properties. The central government sets the property tax rates. Granting municipalities the authority to collect property taxes and set their rates as in many other OECD countries, including Norway, would provide additional revenue to address the investment gap (Section 1.4). Autonomy to collect property taxes could also strengthen incentives for municipalities to zone more land for development and speed up planning processes, enhancing the responsiveness of housing supply to demand (OECD, 2018), and facilitate the green transition (Chapter 2).

Table 1.4. Past recommendations on tax policy and action taken

Main recent OECD recommendations	Actions taken since the 2021 Survey or planned
Shift taxation further away from labour and towards environmentally-related taxes and recurrent taxes on immovable property, including through phasing out mortgage interest deductibility.	In 2021, Sweden removed a 5% surtax, which was imposed on top of the state income tax. No actions taken on recurrent taxes on immovable property, including through phasing out mortgage interest deductibility. No actions taken to increase environmental-related taxes. In 2022, tax cuts on diesel and petrol and energy subsidies were temporarily introduced.

Reforming the pension system

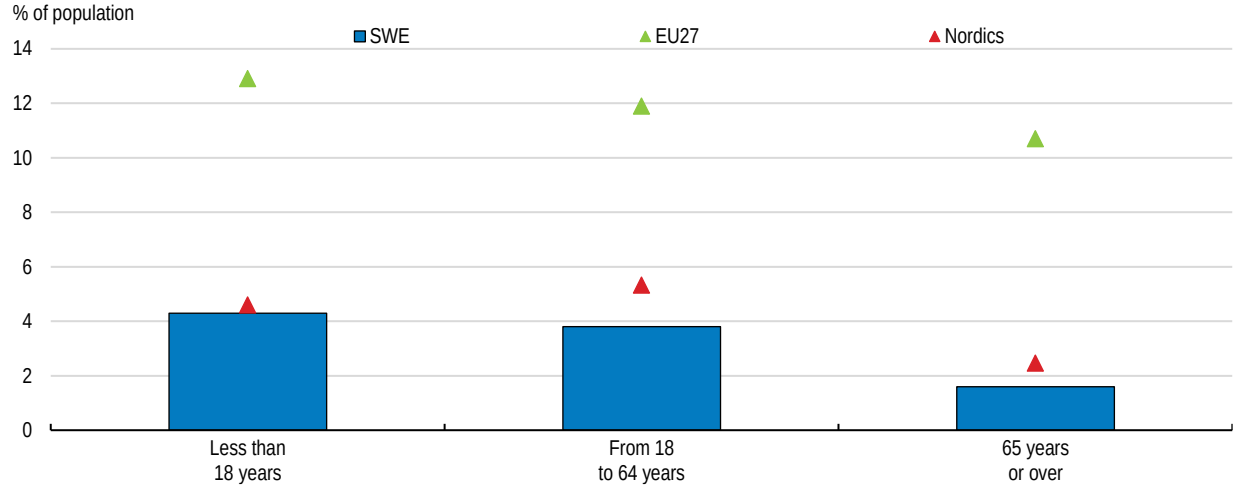
Lengthening working lives as life expectancy increases is essential to strengthen public finances and to ensure sufficient pension income. A series of reforms have been implemented to extend working lives. The “target retirement age”, introduced in 2019 to nudge retirement decisions, was set at 67, effective from 2026, after which it will increase by two-thirds of the gains in life expectancy (OECD, 2021c). From 2020, the minimum age to receive state old-age pension benefits was increased to 62; since the beginning of 2023 it was increased to 63 and from 2026 it will rise to 64 (MBWL, 2020). The maximum age for the right to remain in employment was also raised from 67 to 68 in 2020 and to 69 in 2023 (Swedish Pensions Agency, 2023). This means that normal employment protection remains in place until an employee turns

69, after which employers have the right to terminate the employment contract. The pension net replacement rate (of mandatory and quasi-mandatory private schemes including both state old age pension and occupational pension) for average income earners who retire at 65 in Sweden is currently 56%, around the OECD average. According to the OECD pension model, the pension net replacement rate increases by around 3.5 percentage points per year that pension withdrawal is postponed for a person having earned the average wage through their whole career, under actuarial neutrality (OECD, 2021c).

Retirement generally does not mean a major deterioration in the income situation in Sweden, and on average low-income workers even see their income increase upon retirement. The relative poverty rate has decreased among the elderly in recent years, while it has increased among the working-age population. The proportion living in material poverty is significantly lower among the elderly than among the general population (Figure 1.28). This is because the basic protection for pensioners, in the form of the guarantee pension, housing allowance, and elderly support, is more generous than the protection offered to the working population (Fiscal Policy Council, 2022b). For instance, although the guarantee pension is linked to consumer prices, like most working-age benefits, it has risen several times over the past decades, so the benefit level has grown faster than consumer prices and most working-age benefits (Fiscal Policy Council, 2022b). Earnings-related pensions are indexed to wages, which have grown faster than prices over the past decades. The situation is even better if wealth and public welfare subsidies such as elderly care for people over the age of 65 are taken into account. According to the Pension Authority's calculations pensioners had roughly six times higher non-housing-related net wealth in 2019 than the working-age population (20-64). If housing is included, the pensioners relative situation is likely to be even stronger, although the accuracy of the estimates is uncertain due to the lack of wealth data since 2007.

Figure 1.28. Swedish elderly are relatively well-off

Material deprivation by age, 2021



Note: Nordics is an average of values for Denmark, Finland and Norway. Data for Norway come from 2020.
Source: Eurostat, Income and Living Conditions database.

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Sweden has nevertheless embarked on a number of changes to boost pensions, increasing their fiscal cost and blunting work incentives. Basic pensions were increased by SEK 1 000 (EUR 87) a month before tax from August 2022, giving a new minimum guaranteed pension level of SEK 9 781 (EUR 850) before tax for a single pensioner and SEK 8 855 (EUR 770) a month for a married or cohabiting pensioner. Approximately 1 million pensioners were affected by the change. In 2022, the housing supplement, an

income-tested benefit for pensioners which covers approximately 90% of the housing costs, was also raised twice by SEK 500 (EUR 43) in total for single pensioners and SEK 250 (EUR 22) for married and cohabiting pensioners. The housing supplement was paid to 290 000 persons in August 2022. The so-called "free amount" in the housing supplement asset test was also raised by SEK 1000 (EUR 87). The highest rent that provides compensation was increased by SEK 500. The stated purpose of these changes was "to ensure a reasonable standard of living for pensioners who receive a low level of earnings-related pensions" (Government of Sweden, 2022d; Fiscal Policy Council, 2022b).

The 2021 reform to introduce a new tax-funded income pension supplement to the public earnings-related pension is expected to weaken work incentives and pension sustainability. The supplement is for pensioners who after a long working life have earned only limited pension rights. This breaches the current principle of an income-related pension system that operates autonomously from the state budget, which had been functioning effectively with the automatic adjustment mechanism (Box 1.7). Moreover, it poses a risk of reducing work incentives. The pension supplement of maximum 600 SEK per month (EUR 52) is financed from the state budget. The permanent cost increase from this measure is estimated at around 0.1% of GDP (Fiscal Policy Council, 2022b). The pension is provided to people over 66 with a monthly public pension of around 9000 – 17 000 SEK (EUR 783 – 1478). A person will no longer be entitled to the supplement if earnings-related pension rights exceed a threshold. This means that additional work can in some cases reduce the cumulative income pension supplement. This is the case for those who have an estimated income pension between SEK 14 000 and 17 000, corresponding to approximately half of all current pensioners (1 million individuals) (Fiscal Policy Council, 2022b).

In light of the relatively strong financial situation of Swedish pensioners, the potential reduction in incentives to postpone retirement, and the risk to future financial sustainability resulting from an increasing reliance on tax revenue to fund pensions, these changes to the pension system should be carefully weighed against the need for other public investments. A rebalancing towards the public earnings-related pensions (income pension and premium pension) is warranted to maintain work incentives and fiscal sustainability, for example by reducing indexation of the basic pension and the new income pension supplement. To the extent pension incomes need strengthening in Sweden, the government should rather focus on strengthening public earnings-related pensions.

Box 1.7. The automatic adjustment mechanism in the Swedish pension system

Sweden was among the first OECD countries to reform its pension system to meet the challenge of ageing. Reforms implemented from the mid-1990s ensure the financial viability of the public pension system, which comprises two main elements: a means-tested basic pension (guarantee pension) and an earnings-related pension. The guarantee pension, financed directly by the state budget, is a minimum pension benefit for residents aged 66 or over who have not accumulated enough earnings-related pension rights to earn a decent living. It can be complemented by a housing supplement. Public earnings-related pensions are based on lifelong contributions and consist of two components (income and premium pension). The earnings-related pension system has a "balancing mechanism": pension benefits are adjusted at a slower pace if assets in the pension fund fall below liabilities. The balancing mechanism ensures that the system remains financially sound. Moreover, the mechanism is designed to be transparent and predictable, which means that individuals can plan and prepare for their retirement with a high degree of certainty and predictability about their retirement income. The balancing mechanism was activated in 2010 and disactivated in 2018.

Source: OECD (2021c), and Severinson and Stewart (2012).

Table 1.5. Past recommendations on pension policy and action taken

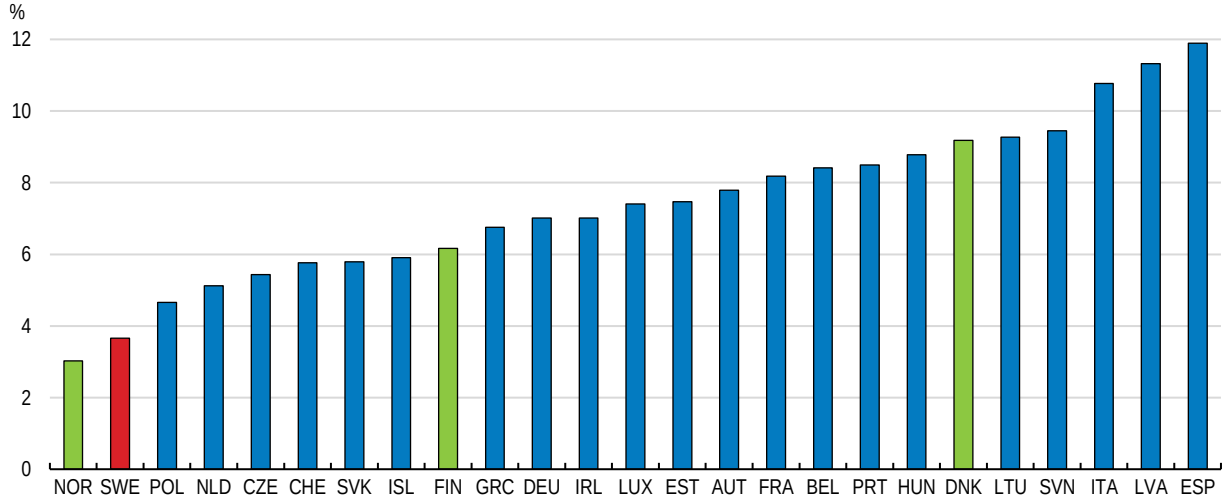
Main recent OECD recommendations	Actions taken since the 2021 Survey or planned
Raise the maximum age for the right to remain in employment and the minimum ages for receiving state old-age and basic pensions in line with developments in life expectancy.	The minimum age to receive state old-age pension benefits was increased from 62 years to 63 from 2023, and will rise further to 64 years from 2026 after which it will increase by two-thirds of the gains in life expectancy. The maximum age for the right to remain in employment has also risen from 68 to 69 in 2023.

Addressing skills mismatch

Skills mismatch is relatively high in Sweden. Sweden has a demanding labour market, with comparatively high entry-level salaries and one of the lowest shares of elementary jobs in Europe (Figure 1.29). Labour market matching, as illustrated by the Beveridge curve (Figure 1.30), has deteriorated in the past decade, likely due to structural factors such as a supply and demand mismatch in level and field of education (OECD, 2016; and Karlson and Skånberg, 2012). Mismatches can make it hard for productive firms to recruit skilled staff and gain market shares at the expense of less productive firms, and it can hold back within-firm productivity, as companies are forced to devote more resources to internal training and recruiting or simply refrain from investing or expanding production for lack of qualified workers (Adalet Mcgowan and Andrews, 2015). Better matching would boost employment and overall productivity by improving allocation of labour resources across firms.

Figure 1.29. The share of elementary jobs is low

Elementary jobs[1] as share of total jobs, 20-64-year-olds, 2022Q4



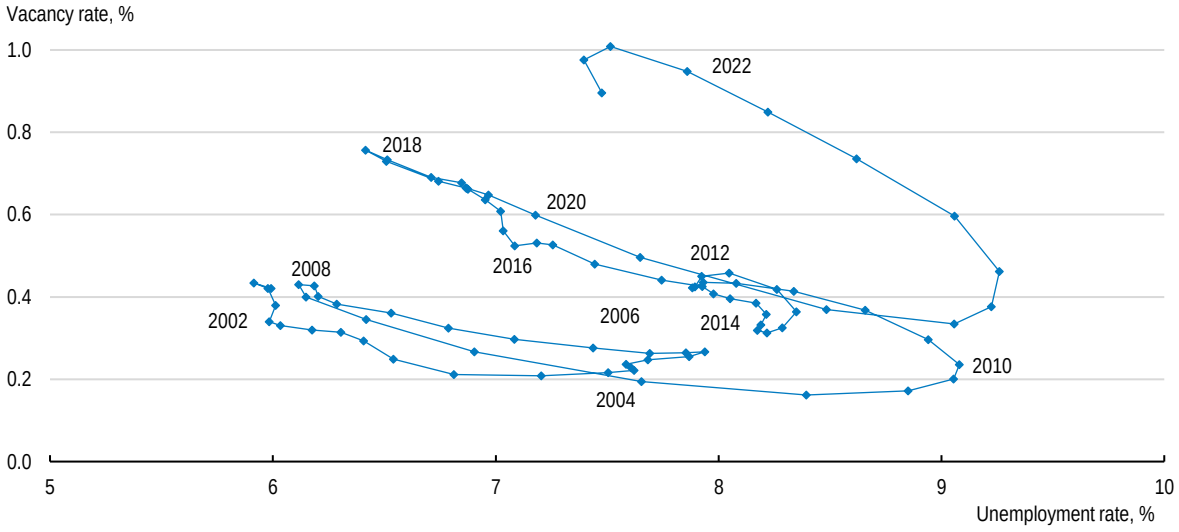
For examples of elementary jobs, see ILO's International Standard Classification of Occupations.
Source: Eurostat.

StatLink https://stat.link/olq8y5

Current skill shortages span from engineers to teachers, nurses and transport workers. There are regional differences, with for example considerable shortages in northern Sweden where a rapid green transition is set to increase demand for industrial workers as well as workers providing complementary public services, notably in education, health and long-term care (Chapter 2). The Swedish PES projects that shortages will persist over the medium term. In the European Investment Bank 2021 survey, 78% of Swedish companies mentioned availability of skilled staff as a long-term barrier to investment. The lack of workers with ICT qualifications is particularly worrisome, as ICT competencies are crucial to adopting new technology and

firms with high shares of data specialists are more likely to innovate and drive productivity gains (OECD, 2021a). Sweden ranks among the top OECD countries when it comes to the share of ICT-intensive occupations and investment in immaterial capital. Although Swedish firms generally make good use of ICT, there are indications that they are beginning to lag behind OECD best performers when it comes to using advanced ICT-tools, such as big data analysis, artificial intelligence and 3D-printing (OECD, 2018).

Figure 1.30. Job matching has deteriorated



Source: The Riksbank.

StatLink https://stat.link/6yhqp5

Over the past decade, the government has tried to address shortages in professions requiring tertiary education by tasking universities with increasing study places in programmes leading to occupations in high demand, including teachers, nurses and engineers. This kind of tailored expansion of university programmes constitutes a deviation from the previous governance model, under which universities are free to decide the allocation of study spots. The approach has increased the number of university students in these fields. However, according to the National Audit Office the measures have failed to meet the intended targets in terms of additional students, partly because of a lack of applicants and partly because universities have not been able to offer the necessary on-the-job training in e.g., nursing schools for lack of staff. Many of the programmes that have been expanded also struggle with low completion rates (National Audit Office, 2021). Increasing the quality of these studies might help, but a fundamental issue with this policy is that it increases supply of study places without addressing the fundamental reasons behind a lack of demand from students. Increasing the attractiveness of occupations with shortages, notably teaching and nursing, in terms of not only pay, but also career opportunities and working conditions should therefore be a priority (OECD, 2019).

The government has also recently taken measures to alleviate shortages in jobs requiring lower qualifications. From 2025, municipalities will need to put a greater emphasis on intermunicipal cooperation and the needs of the labour market when planning vocational upper secondary and adult education (Government of Sweden, 2022e). Moreover, as of this fall, all vocational upper secondary programmes will include the courses necessary to apply to universities, although the student will have the right to opt out from these courses, in an attempt to render vocational programmes more attractive (Government of Sweden, 2022f).

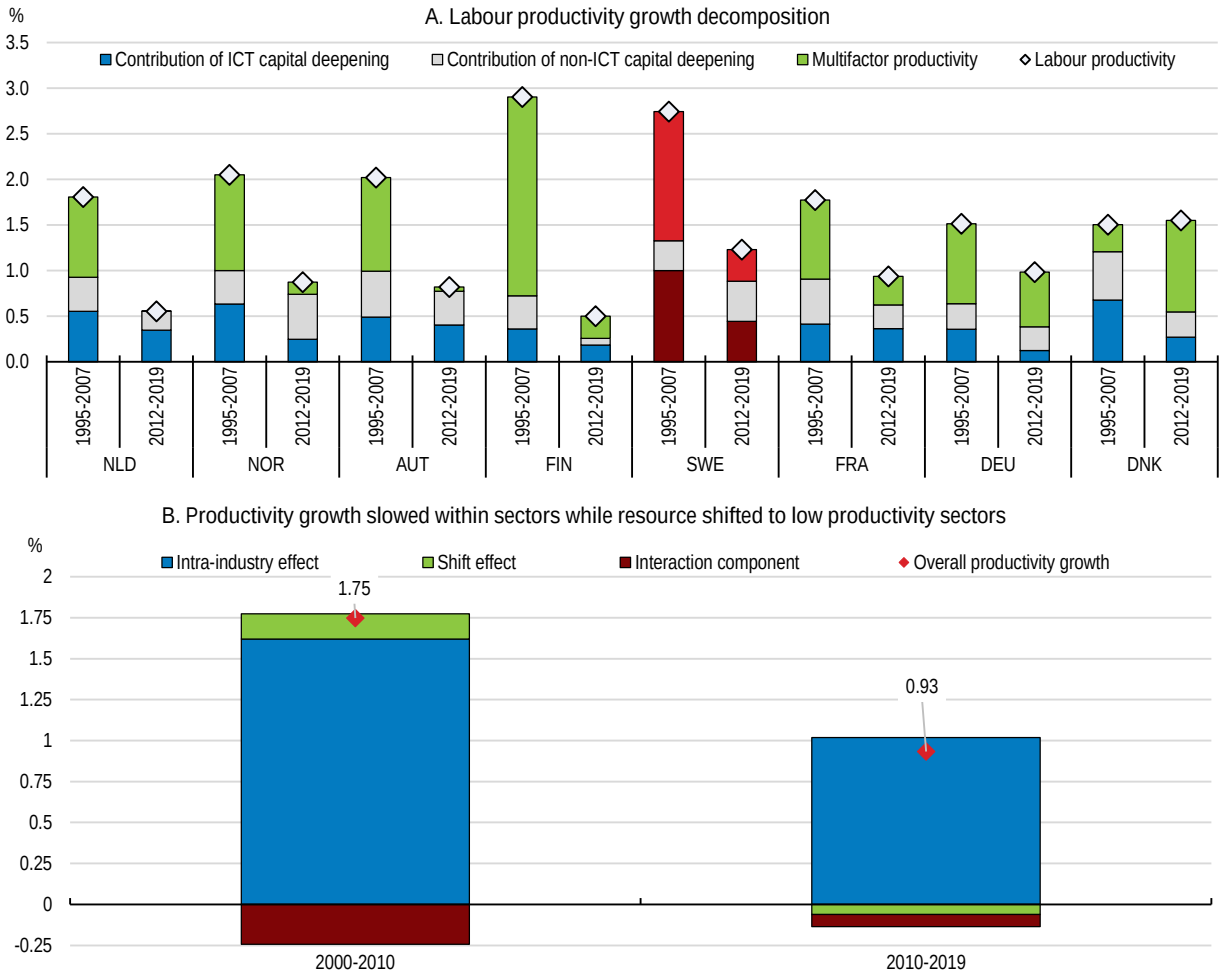
The expansion of study places should be accompanied by increasing completion rates to achieve the intended outcomes. Low completion rates do not necessarily imply an inadequate tertiary education system, as students may drop out for various reasons, such as switching to another programme or taking up work before completing the programme. It might also be the case that the student enrolled in a programme to pursue a specific course as part of upskilling or lifelong learning, without intending to graduate. However, Sweden has one of the lowest tertiary completion rates in the OECD (OECD, 2022i), suggesting that there is room to improve.

New efforts to increase the supply of sought-after professionals should focus on raising completion rates, for instance by setting graduation targets, rather than on adding study places (National Audit Office, 2021). Targeted measures for vulnerable students should be considered given that completion rates in the subject teaching programme are particularly low among students from vulnerable socioeconomic backgrounds (Bertilsson et al., 2022). Making student grants conditional to some extent on completion should be considered. In Norway, for instance, students may have up to 40% of their student loans converted into grants if they progress through their studies without delay and meet the relevant income and residence requirements (OECD, 2022i). Measures to improve the school performance of secondary schools should also be considered, given that students from schools with weak educational outcomes tend to have lower tertiary completion rates in Sweden (Finansdepartementet, 2012; and Skolverket, 2018). Previous Surveys highlighted that reducing school segregation, which has intensified over the past decades, is key to improving aggregate school performance, notably by targeting funding towards disadvantaged groups, taking the socio-economic mix into account when investing in new schools and in school entry, and strengthening teacher education with more instruction time, teacher practice and research (OECD, 2019; OECD, 2021a).

Relaxing rent controls

Strict rent controls tend to discourage mobility, notably for low-income households, by lowering the supply of rental dwellings in some locations (OECD, 2021a). Empirical evidence suggests that this is the case in Sweden, where rent controls are among the most restrictive in the OECD (Karpestam, 2022). Low mobility makes it difficult for workers to move from low to high-productivity firms, reducing total productivity. Labour productivity growth has weakened over the past decade (Figure 1.31). Relaxing strict controls would help improve labour market productivity. Relaxing rent controls would also help the green transition, which depends on an adequate supply of skills and rental housing, notably in northern municipalities which host many emerging green industries (Chapter 2). As discussed in the 2017 *OECD Economic Survey of Sweden*, Swedish rent controls come with a number of well-documented costs but no obvious benefits (Pareliussen et al., 2017). Indeed, residential segregation is a salient feature especially in larger cities in Sweden, and a relatively high share of low-income earners live in overcrowded housing (Figure 1.33). Immigrants are particularly affected, as the combination of relatively low incomes and few assets prevents them from buying, and rent controls prevent attractive housing from reaching the market. They therefore tend to be pushed into substandard, overcrowded housing in less attractive residential areas which have seen increasing violence in recent years. According to the Swedish National Council for Crime Prevention, the number of fatal shootings in Sweden climbed to 63 in 2022, an increase of 40% from the previous year (Brå, 2022). This is the highest number of fatal shootings in the European Union.

Figure 1.31. Labour productivity growth has weakened



Note: The intra-industry effect is counterfactual productivity growth that would have prevailed in absence of any shift in labour across industry. The shift effect is the effect on aggregate productivity growth that arises solely from the reallocation of labour across industries, in absence of any within-industry productivity growth. Its positive (negative) contribution implies that labour has moved to industries with higher (lower) initial productivity levels. The interaction component captures the changes in both labour share and productivity in each industry. The negative contribution indicates that productivity has been growing in contracting industries while declining in expanding industries.
Source: OECD Productivity database; OECD staff calculations based on OECD National Accounts database.

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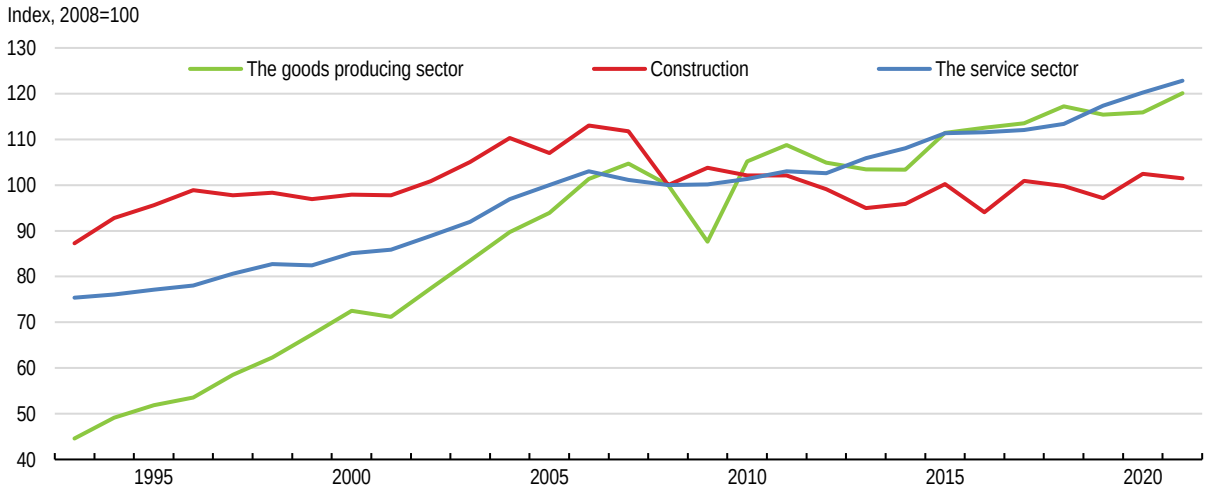
Rent controls could also hinder market competition in the construction sector because developers face low incentives to invest if they cannot charge market-level rents. Indeed, rents have been kept lower than market levels, especially for apartments in attractive metropolitan areas (Ekonomifakta, 2019), and an empirical analysis suggests that the rent controls led to around 40 000 fewer rental apartments on the market than would otherwise be the case (National Board of Housing, Building and Planning, 2013). Even though productivity growth has declined across sectors, the decline is particularly pronounced in the construction sector (Figure 1.32). The sector is relatively large, accounting for 7% of total value added. Unlike in other sectors of the Swedish economy, construction faces higher barriers than the OECD average to both international trade and domestic competition, contributing to the lack of productivity growth (Swedish Competition Authority, 2021). Complex regulations and municipalities' local planning monopoly also make it difficult for new firms to enter the market.

Figure 1.32. Productivity has fallen in the construction sector



Source: The National Institute of Economic Research.

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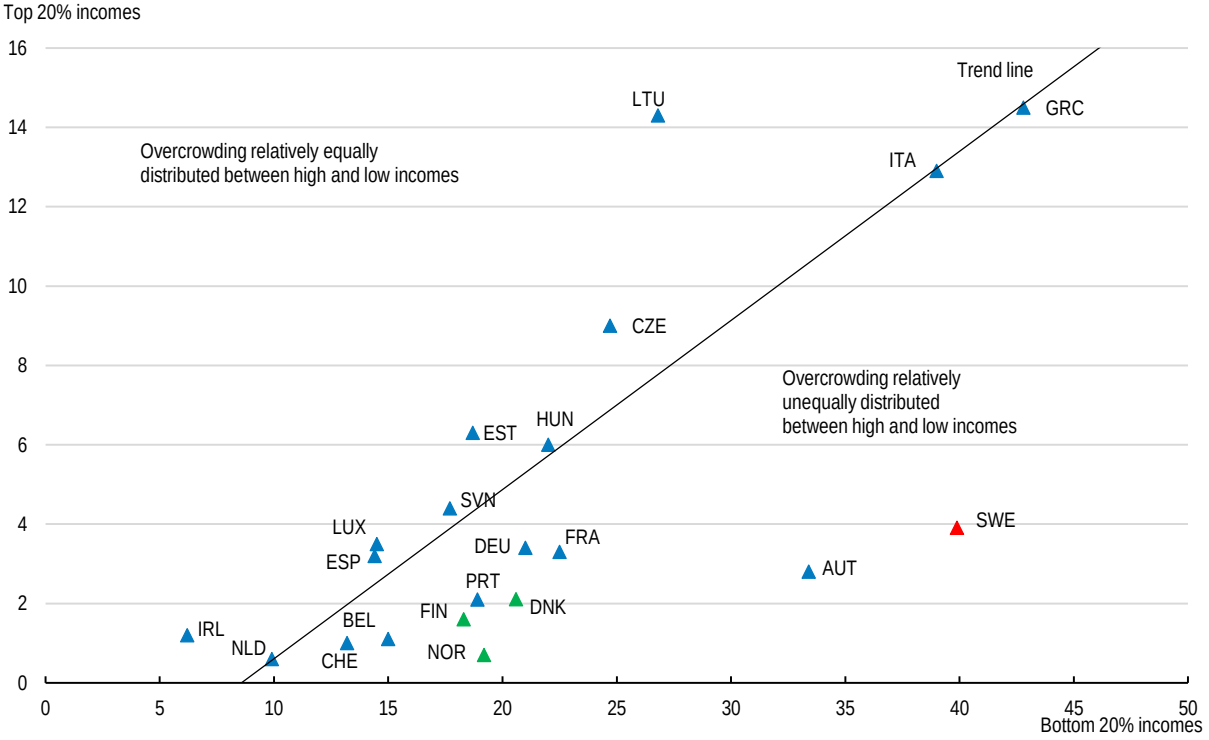
Figure 1.33. Many low-income earners live in overcrowded housing

2021[1, 2]



1. The overcrowding rate is defined as the percentage of the population living in an overcrowded housing unit. A person is considered as living in an overcrowded housing unit if the household does not have at its disposal a minimum number of rooms equal to the sum of: one room for the household; one room per couple in the household; one room for each single person aged 18 or more; one room per pair of single people of the same gender between 12 and 17 years of age; one room for each single person between 12 and 17 years of age and not included in the previous category; one room per pair of children under 12 years of age.
2. 2020 for Norway, Slovakia, Switzerland and Türkiye.
Source: Eurostat, Income and Living Conditions database.

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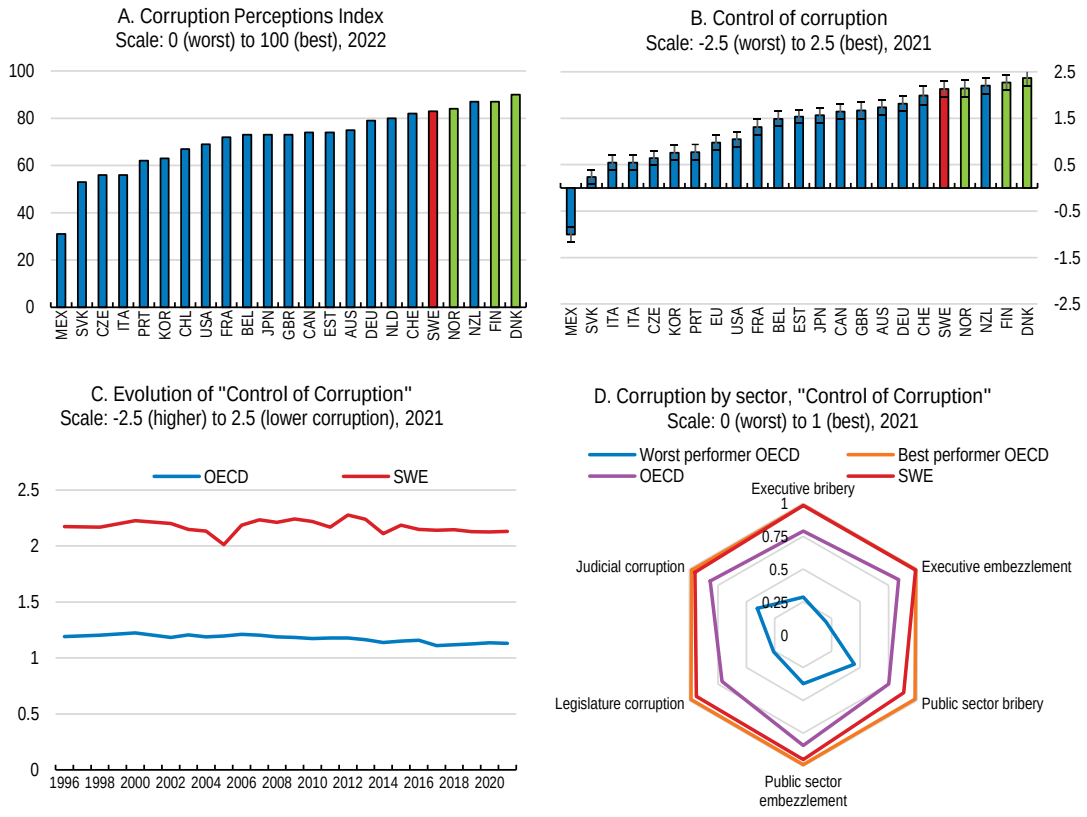
Table 1.6. Past recommendations on productivity policy and action taken

Main recent OECD recommendations	Actions taken since the 2021 Survey or planned
Ease rental regulations to incentivise rental housing supply, while maintaining tenant protection against abuse.	No actions taken.
Simplify land-use planning procedures, balancing economic, environmental and social considerations.	No actions taken.
Strengthen adaptation of vocational education and training to labour market needs by reinforcing regional coordination structures.	From July 2023 municipalities will be obliged to deepen cooperation when planning upper secondary and adult vocational education.

1.6. Keeping corruption low

Sweden is a top performer in controlling corruption and its level of perceived corruption remains among the lowest in the OECD (Figure 1.34). The *Main Findings from the 2021 OECD Survey on Drivers of Trust in Public Institutions* show that Sweden scores better than the rest of OECD countries in people's perception of public integrity, though further progress is called for. 29% of Swedes find it likely that a public employee would accept a bribe, while this fraction is 36% in OECD countries on average (OECD, Forthcoming; and OECD, 2022k).

Figure 1.34. Sweden has low corruption and is a top performer in controlling it



Note: Panel B shows the point estimate and the margin of error. Panel D shows sector-based subcomponents of the "Control of Corruption" indicator by the Varieties of Democracy Project.
Source: Panel A: Transparency International; Panels B and C: World Bank, Worldwide Governance Indicators; Panel D: Varieties of Democracy Project, V-Dem Dataset v12.

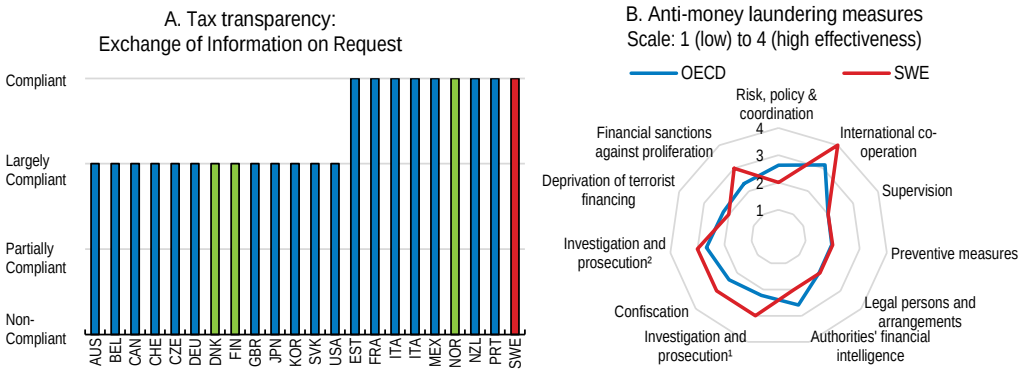
StatLink https://stat.link/eifjp7

With regard to public integrity, public access to official documents, freedom of communication and access to media is guaranteed by several laws and regulations that cover government agencies, municipalities and regions. Relevant regulations directed at either government agencies or municipalities and regions are contained e.g. in the Government Agency Ordinance and the Municipal Act. Legislation is needed for obligations directed at municipalities and regions. In 2020, Sweden adopted its first National anti-corruption action plan for 2021-23 and public agencies are generally well-equipped to prevent and fight corruption (European Commission, 2022a). A key shortcoming of Sweden's 2021-23 National Anti-corruption Action Plan is the lack of clear actions and responsibilities, although this is partially remedied by government processes to assign particular tasks to agencies. The development of future action plans would benefit from the careful design of clear responsibilities and mechanisms to monitor progress across the various levels of government.

Continuous monitoring is warranted in areas, such as the comparatively lax regulation surrounding foreign bribery and lobbying activities, and indications of undue influence in local officials' decision-making (European Commission, 2022a). Recognising the need for more reforms in these areas, public inquiries have been tasked to review measures to address the issues of public procurement and revolving doors between public and private sector in order to address real and perceived conflicts of interest. A public inquiry tasked with drafting a comprehensive review of unauthorised influence and corruption in publicly-financed activities was closed by the incoming government.

In their latest *Multi-agency situation report on organised crime*, public agencies highlight the need to further investigate the extent of corruption, infiltration, and unauthorised influence in the public sector (Government of Sweden, 2022g). Sweden's Municipalities and Regions (SKR) further notes that the incidence of cases of unauthorised influence in local level decision-making seems to have increased, particularly in the area of social welfare fraud (European Commission, 2022a). SKR also warns that, as organised crime spreads, a culture of silence risks becoming entrenched in local agency offices, making officials reluctant to report potential misconduct (SKR, 2021). Although the Swedish system of local governance is set up in a way that makes municipalities and regions responsible for combatting and preventing corruption, it falls on the central government to make sure they have the necessary means to do so. The Government has assigned the Swedish Agency for Public Management to analyse the anti-corruption measures taken by municipalities and regions and if needed propose new measures (Government of Sweden, 2022h). Overall, there is a lack of engagement and coordination between local government entities in anti-corruption initiatives (OECD, forthcoming). While the autonomous local government system in Sweden does not allow the National anti-corruption action plan to steer the activities of the regional and local government entities, stronger models of cooperation between central and local government can promote holistic responses to integrity risks and strengthen anti-corruption efforts across the country. To combat welfare crime and incorrect payments, a new payment agency will be instated in 2024. The new agency will administer and cross-check pay-outs from other agencies, such as the Social Insurance Agency, the Tax Agency, the PES and the Pensions Agency, to identify cases of welfare fraud and incorrect payments. Sweden is fully compliant on exchange of tax information and most FATF anti-money laundering indicators are at least on par with the OECD average (Figure 1.35).

Figure 1.35. Tax transparency is high but some anti-money laundering measures need to be strengthened



Note: Panel A summarises the overall assessment on the exchange of information in practice from peer reviews by the Global Forum on Transparency and Exchange of Information for Tax Purposes. Peer reviews assess member jurisdictions' ability to ensure the transparency of their legal entities and arrangements and to co-operate with other tax administrations in accordance with the internationally agreed standard. The figure shows first round results; a second round is ongoing. Panel B shows ratings from the FATF peer reviews of each member to assess levels of implementation of the FATF Recommendations. The ratings reflect the extent to which a country's measures are effective against 11 immediate outcomes. "Investigation and prosecution¹" refers to money laundering. "Investigation and prosecution²" refers to terrorist financing.
Source: OECD Secretariat's own calculation based on the materials from the Global Forum on Transparency and Exchange of Information for Tax Purposes; and OECD, Financial Action Task Force (FATF).

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Key policy insights recommendations

Key recommendations in bold

FINDINGS	RECOMMENDATIONS
Monetary, financial and fiscal policies	
Inflation has risen, and price pressures have broadened. Five-year inflation expectations are close to the inflation target, and wage increases are expected to be modest.	Stand ready to tighten monetary policy as needed to bring down inflation and ensure that inflation expectations are anchored. Stick to fiscal strategies that do not exacerbate ongoing price pressures to help the central bank contain inflation.
Fiscal policy is expected to be broadly neutral in 2023, with the energy crisis being met by broad-based energy price support. Energy prices have fallen back considerably since their peak. A number of budget decisions have been taken outside of the ordinary budget process even though not all of them have been urgent and warranted as a crisis response.	Gradually phase out energy crisis support measures. Return to the normal practice where spending decisions are taken in the ordinary budget process. Encourage the Fiscal Policy Council to assess in real time if tax and spending decisions taken outside of the ordinary budget process are warranted as responses to major shocks.
Major working-age benefits and associated ceilings have not been regularly uprated to match income growth over the past two decades.	Carefully review major working-age benefits to ensure adequate support for those who rely on it.
Households have a high level of debt, with the majority of it being in the form of short-term fixed or floating rate mortgages.	Consider adjusting macroprudential measures as housing prices bottom out and start increasing again in the future. Collect microdata on household balance sheets to inform more targeted policy interventions and better anticipate emerging financial stability risks.
Commercial property companies who have increased borrowings from the corporate bond market in recent years now struggle to refinance their debts. Transparency of the corporate bond market is insufficient.	Secure the resilience of the corporate bond market, including by improving transparency through a higher share of corporate bonds with credit ratings and bank intermediation.
Structural reforms for a stronger and more inclusive labour market	
Structural unemployment remains a challenge in the labour market.	Intensify job search activities for the unemployed by enforcing activation requirements more strictly.
Sweden has reformed the public employment service by contracting out activation measures in an outcome-based payment scheme.	Monitor employment outcomes of the PES reform carefully and adjust assessment tools and the payment scheme for private contractors accordingly. Ensure geographical coverage and competition by simplifying requirements for already active employment services providers to expand geographically, easing requirements on physical presence in rural areas, and removing obstacles to municipalities competing as providers. Facilitate jobseekers' access to information about employment outcomes, customer satisfaction and other information to make informed choices between providers.
Foreign-born women have a very low employment rate compared to the high employment rate of natives and many of them are neither employed, nor in training or education.	Carefully review social assistance and other benefits typically taken up by inactive foreign-born women with the aim to strengthen work incentives without exacerbating inequality.
The labour tax wedge is high. A large difference between taxation of labour and capital income incentivises income-shifting.	Reduce incentives for income shifting by increasing dividend taxation and reducing the top marginal tax rate on labour income.
The top personal income tax rate, which is among the highest in the OECD, applies at a low threshold, which may deter people from pursuing additional income or working extra hours.	Gradually increase the income threshold of the top marginal tax bracket.
Mortgage interest deductibility and low, regressive recurrent taxes on immovable property create distortions in favour of owner-occupied housing. Property tax revenue is low and only a minor share befalls municipalities.	Once the housing market cycle has clearly turned, consider reforming the recurrent property tax to better align tax charges with the market values of properties and phasing out mortgage interest deductibility. Consider delegating authority to collect property taxes and set their rate to municipalities.
Swedish pensioners have decent incomes and material living standards compared internationally and compared to younger generations in Sweden. A large increase in the basic pension and a new income pension supplement in 2022 undermine pension sustainability and work incentives.	Increase the relative importance of earnings-related pensions, for example by reducing indexation of the basic pension and the new income pension supplement.
Strict rent controls discourage mobility, notably for low-income households, and contribute to weak competition in the construction sector together with complex regulations and municipalities' local planning monopoly.	Relax rent controls and streamline building, planning and product market regulations affecting construction.
Firms increasingly find it hard to recruit skilled staff, holding back productivity.	Incentivise tertiary completion rates by making student grants conditional on students progressing through their studies without delay.
There is a lack of engagement and coordination between local government entities in anti-corruption initiatives.	Encourage stronger engagement and coordination between local government entities in anti-corruption initiatives.

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2. Climate policies and **Sweden's** green industrial revolution

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Sweden is among OECD best performers in reducing greenhouse gas emissions, much thanks to a comprehensive policy framework and relatively efficient policies. There is nonetheless room to further improve consistency of targets and policies, notably for transport, agriculture and carbon removals. Sweden's long record as a climate frontrunner is also threatened by policy changes moving the 2030 reduction target out of reach unless compensated by new ambitious measures. A green industrial revolution is gaining momentum in Sweden's north, fuelled by an abundant supply of clean electricity. Considerable investments in electricity generation, storage and transmission are needed, but long planning and permitting procedures slow many key projects down. The green revolution depends on people and skills to run industry and complementary public services. This is a challenge for northern regions and municipalities already facing labour shortages.

In October 2021, the first vehicle in the world built from fossil-free steel rolled out of a factory in Braås, Sweden. The steel, produced with hydrogen instead of coal, came from a test facility in Luleå that started production two months before. This marked a milestone of a green wave of industrial development washing over Sweden that can showcase the benefits of green industrialisation, the policies and conditions that can bring it about, and the challenges it brings in terms of rising demand for skills, public and private services, clean energy, housing and infrastructure. Momentum is strong, and Russia's illegal war of aggression against Ukraine increases the impetus to speed up investments in clean energy and infrastructure. The wave's epicentre is Sweden's north, a sparsely populated area in demographic decline for decades with a strong tradition in mining and industry. The area is also home to the Sami people and their traditional reindeer herding and strategically important with a heavy military presence.

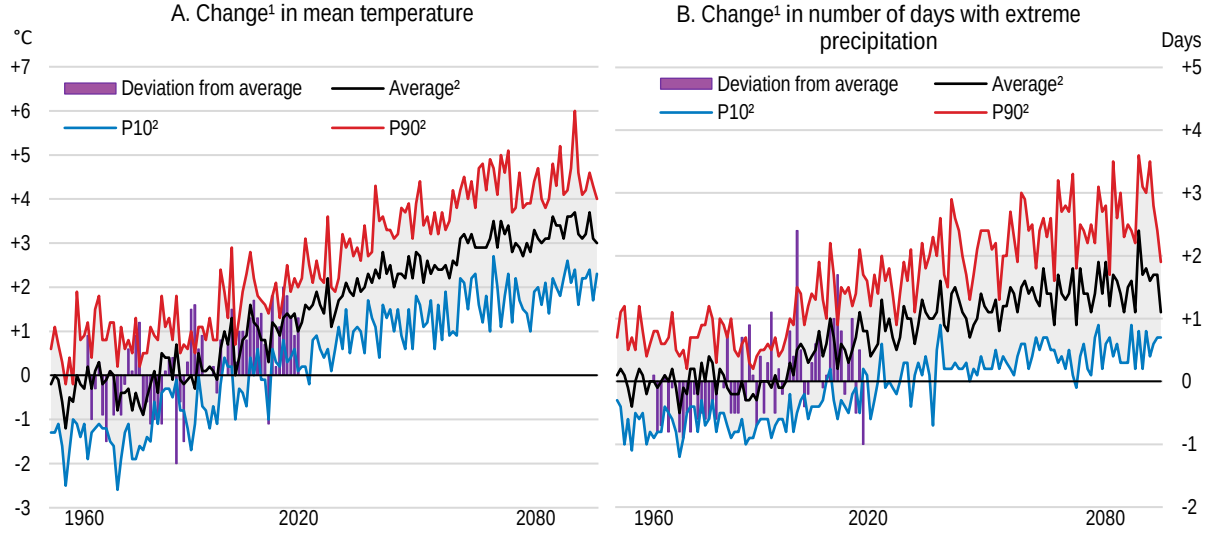
Sweden's consistent climate policies over decades have helped bring this nascent green industrial revolution about, but it is fuelled by access to affordable clean electricity. To maintain momentum, industrial development must be matched by investments in clean energy and electricity transmission, speedier planning and permitting, and the supply of people and skills for industry and supporting public and private services. This chapter analyses Sweden's successes so far, the climate policy framework and other policies supporting the transition as well as challenges going forward to fuel the continuation of Sweden's nascent green revolution. The first main section provides a brief overview of the consequences of climate change in Sweden. The second outlines Sweden's emission reduction efforts to date and points out strengths, challenges and areas of improvement to its policy framework. The third main section describes the green industrial transition sweeping across the country from the north, with its opportunities and challenges.

2.1. Climate change will affect Sweden, but uncertainty is high

Countries around the world have set increasingly ambitious emission reduction targets since the 2015 Paris agreement. It is increasingly clear that reaching these targets in an effort to avoid the most dangerous and devastating consequences of climate change calls for a rapid green transformation. Mean temperatures are likely to increase more in Sweden than the world average. Assuming a global mean temperature increase of 2.1 degrees Celsius by the end of the century, annual mean temperatures are expected to increase by 3.2 degrees in Sweden (Figure 2.1, Panel A), with an expected increase of 2.5 degrees in summer and 4.1 degrees in winter. There are also considerable regional variations, with the largest temperature increases in the North (SMHI, 2023). The extreme summer of 2018 can illustrate some of the issues to face in the future. Heatwaves and low precipitation caused drought, failed crops and health issues. The most severe wildfires since 1888 ravaged 250 square kilometers of land, mostly forested. Average temperatures over the summer were slightly more than 3 degrees above the 1961-90 normal, which is in line with projections for a normal summer by the end of the century. At the same time, rain was much scarcer than climate models predict for the future (SMHI, 2019). The island of Gotland, which was hit by water shortages in 2018, was hit again in 2022 due to low precipitation during the spring. An innovative "ugliest lawn contest" contributed to reducing water consumption and inspired water conservation and debate beyond Sweden's borders due to international media coverage.

The direct negative consequences of climate change on economic output will nonetheless likely be less pronounced in Sweden than in most countries. Extreme weather events are projected to increase, with for example longer heatwaves and more days with extreme precipitation (Figure 2.1, Panel B). On the other hand, a warmer climate will extend the growing season and increase forest growth. It will have both positive and negative effects on agricultural output with a difficult to assess overall effect. The expected increase in precipitation will increase the incidence of flooding and landslides, but is also set to increase hydropower production by 15-20% in the north. A number of effects and risks from climate change are difficult to estimate in quantitative models. It increases the risk of dramatic changes to the ecosystems in the Baltic Sea, declining water quality in lakes and waterways, a shortened season for winter tourism and overgrowth affecting reindeer husbandry and tourism. Sweden will also be affected by events around the world triggered by climate change, such as changes to trade patterns, population displacement and international conflict with likely major negative consequences (NIER, 2017; Hassler et al., 2020).

Figure 2.1. Extreme weather will occur more frequently as temperatures rise



1. Compared with the 1971-2000 average. Projections are based on an average of different climate models.
2. The black line shows an average of several different climate models, based on IPCC's Representative Concentration Pathway 4.5, or intermediate, scenario. P10 and P90 denote the 10th and 90th percentile respectively.
Source: Swedish Meteorological and Hydrological Institute.

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The main purpose of climate damage estimates should be to identify beneficial adaptation measures. Sweden has a well-developed climate change adaptation strategy including Sweden's climate change adaptation goals, guiding principles for the work, organisation and distribution of responsibilities, monitoring, financing principles and knowledge-boosting initiatives. It was first presented by the government in 2018 and is to be updated every five years. The Swedish National Expert Council for Climate Adaptation is tasked with presenting a report to the Government every five years with a summary analysis of the effects of climate change on society, a follow-up and evaluation of the national climate change adaptation work, proposed direction of the national climate change adaptation work, and a prioritisation of adaptation measures based on an assessment of risk, cost and benefit. In addition, the Swedish National Knowledge Centre for Climate Change Adaptation has been tasked with gathering and disseminating information about adaptation needs and activities (SMHI, 2018).

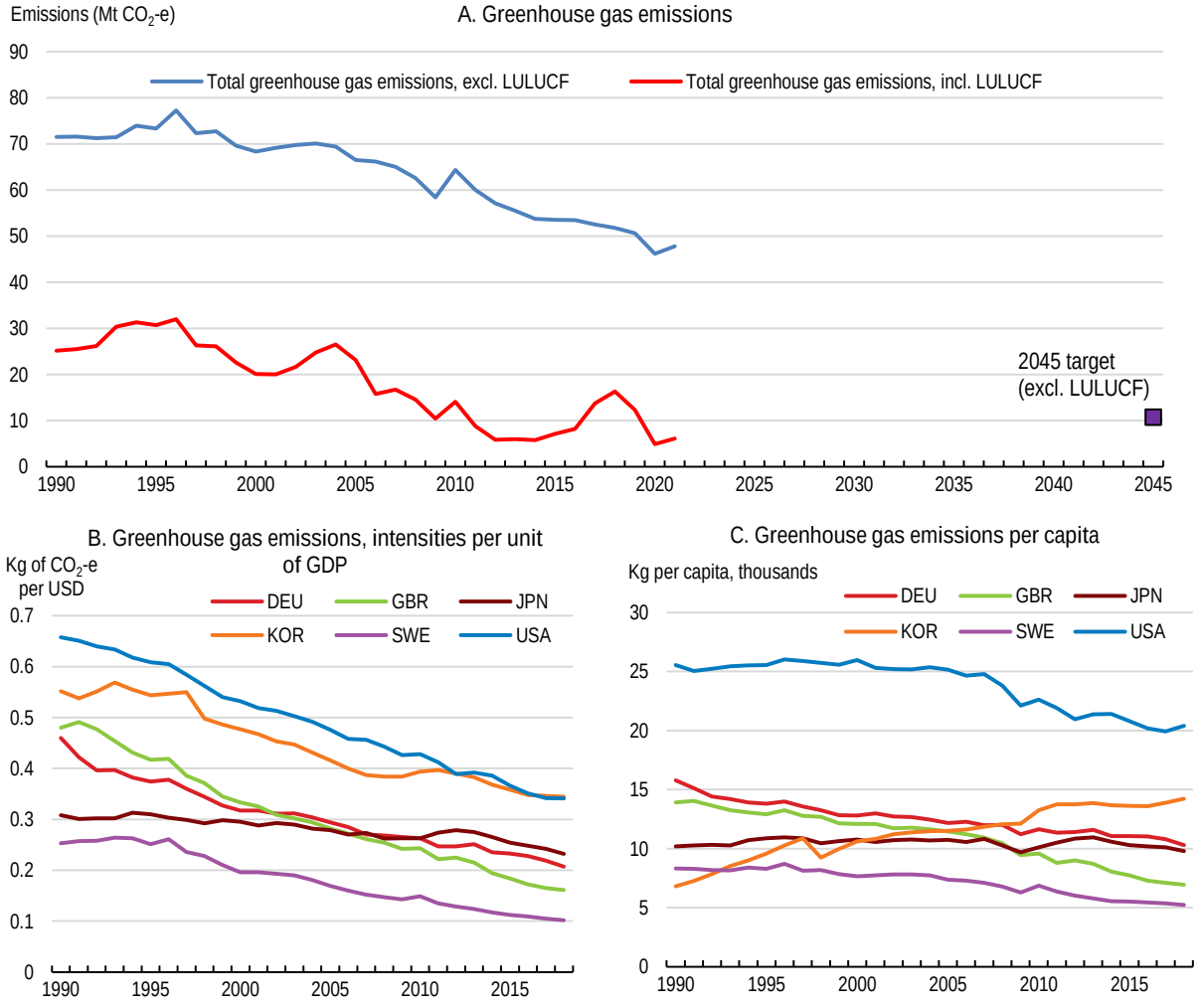
In cases where the consequences of climate change are correctly reflected in market prices, households and businesses should be expected to adapt accordingly. Interventions should therefore be targeted at climate consequences affecting parts of society and the environment without a direct market link. Biodiversity, ecosystem services and the natural environment are prime examples of this. Furthermore, climate change will cause a number of interrelated changes simultaneously, and many adaptation measures will be more effective if implemented collectively at scale, which calls for policy intervention. Public infrastructure for transportation, energy and water management are important examples in this respect. Estimates of climate damages should be improved to correctly identify policy interventions with net benefits to society. Such improvement should better incorporate dynamic changes in market prices and how people and businesses can be expected to adapt, increasing accuracy of estimated effects on non-market services both in terms of their value and spatial distribution. For example, farmers would on average see an extended growing season, while their exposure to extreme weather events would depend on their location, their specialisation in terms of crops and livestock, and any adaptation measures taken. A more granular identification of the groups of people and businesses that will be affected positively and negatively, both in terms of sectors and geography would therefore improve the scope for efficient policy responses going forward (NIER, 2017).

2.2. Climate policy in Sweden: successes and challenges

Despite relatively benign aggregate effects on GDP from climate change, Sweden is one of the world's more ambitious countries in fighting climate change, with a target to reach net zero emissions in 2045, and negative emissions thereafter. It also has a solid track record on reducing emissions. Sweden's fossil fuel use increased largely in line with the global average until the 1960s, but fell rapidly in the 1970s and 1980s, contrary to the global trend. By 1990, fossil fuel use had halved compared to 1970. This development was triggered by higher oil prices and policy changes after the oil crises, notably the large-scale development of nuclear power and combined heat and power plants with feedstock from forestry and waste. Fossil fuel use has continued trending down since, albeit at a slower pace, as fossil fuels were practically phased out from individual and district heating of buildings after the introduction of the carbon tax in 1991 (Hassler et al., 2020).

Since 1990, Swedish emissions have fallen from approximately 72 to 46 million tonnes of CO_2 equivalents. Greenhouse gas emissions per unit of GDP is 0.1 kg CO_2e and emissions per capita about 5 tonnes, both among the lowest in the OECD (Figure 2.2). Main emitting sectors are domestic transport and industry, followed by agriculture (Figure 2.3, Panel A). Emissions from electricity and heat production are low, as it is largely based on renewables and nuclear energy. The manufacture of basic metals stands out with high emissions intensity (Panel B), mostly from the manufacture of iron and steel. The absorption of carbon in Sweden's soil and forests is considerable, but only partially accounted for against official targets (Hassler et al., 2020). Sequestration from land use, land-use change and forestry (LULUCF) has fluctuated around 40-50 million tonnes a year from 1990 to 2017. Taking this fully into account, annual net emissions would have fallen by three-quarters from 25.0 to 6.2 million tonnes from 1990 to 2021 (Figure 2.2, Panel A).

Figure 2.2. Swedish greenhouse gas emissions need to keep falling



Note: LULUCF stands for land use, land use change and forestry. Sweden has a 2045 net zero target for emissions excluding LULUCF, and plans to off-set the ~10000 Mt emissions in 2045 with "supplementary measures", including but not limited to: increased uptake of carbon dioxide by forests, over and above business as usual; verified emission reductions abroad; and bioenergy combustion with carbon capture and storage (BECCS).
Source: OECD, Air and climate (database); Statistics Sweden.

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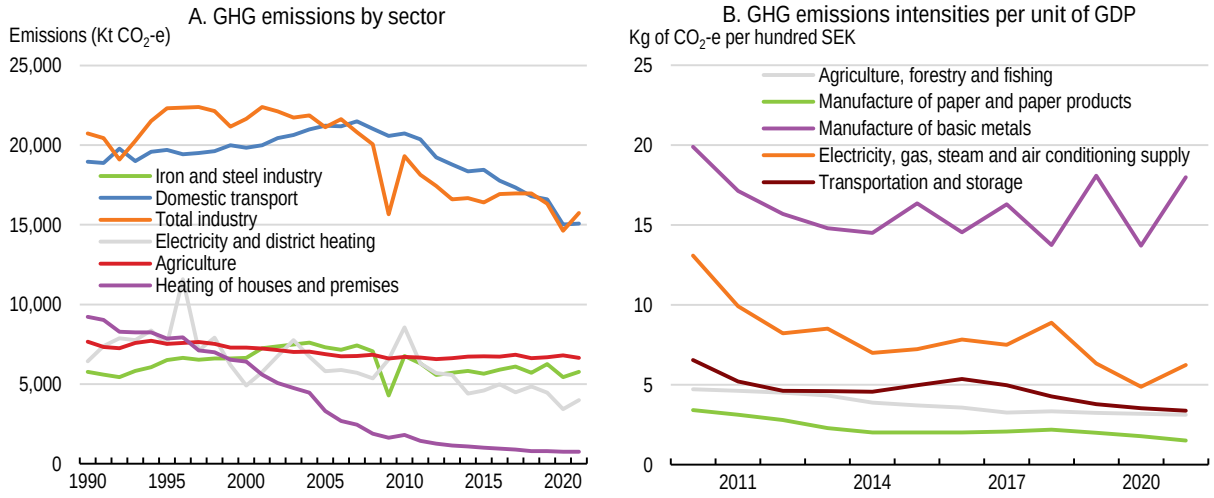
Figure 2.3. Transport and industry are major emitting sectors



Source: OECD Air Emissions Accounts (database); Statistics Sweden.

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Institutional set-up and emission reduction targets

In 2017, a broad political majority of the Riksdag (the Swedish Parliament) approved a climate policy framework to implement the Paris Agreement in Swedish law. This framework rests on three pillars: a climate act; emission reduction targets; and the Climate Policy Council, a climate policy watchdog (CPC, 2022b; Government of Sweden, 2017).

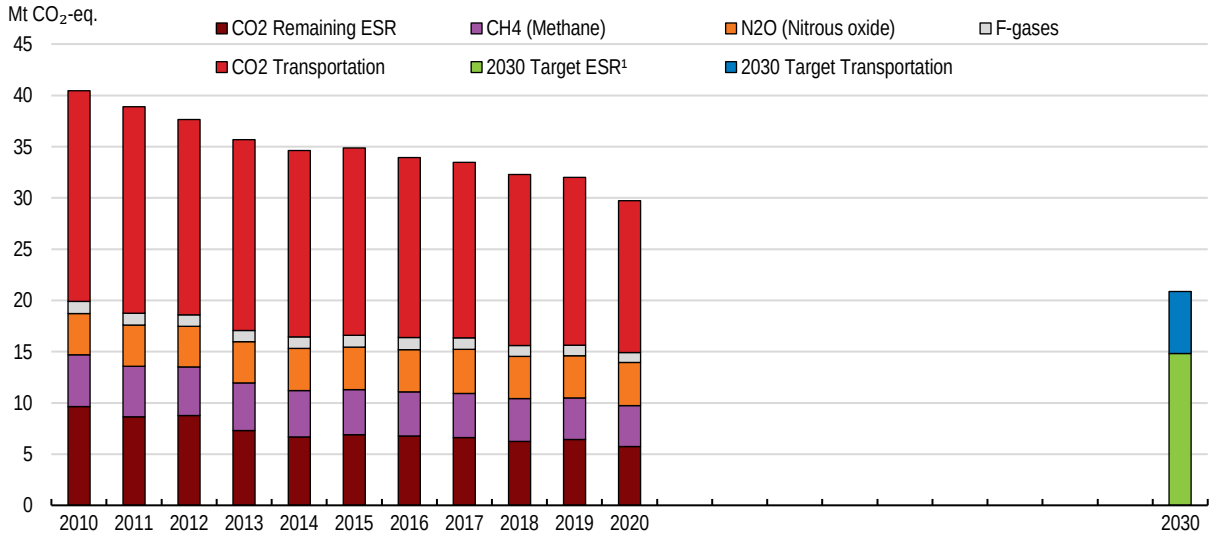
The Swedish Climate Act sets four main duties for the Government. First, climate policy must be based on climate goals. Second, the Government is obliged to present a climate report every year in its Budget Bill. This report should contain a description of emission trends, major policy decisions affecting these trends, and an assessment and plan for additional actions as needed to meet targets. Third, every fourth year the Government is required to draw up a climate policy action plan to describe how the climate goals are to be achieved. Fourth, climate policy goals and budget policy goals should work together (CPC, 2022b; Government of Sweden, 2017).

Sweden's long-term target is to reduce greenhouse gas emissions to net zero by 2045 at the latest, and achieve negative emissions thereafter. At least 85% of emission reductions (compared to 1990) are to be reached by reducing emissions from existing sources on Swedish soil. The remaining 15% can be reached by so-called "supplementary measures", which include but are not limited to: increased uptake of carbon dioxide by forests and other natural sinks over and above business as usual; verified emission reductions abroad; and carbon capture and storage from biomass combustion (CPC, 2022b; Government of Sweden, 2017).

Sweden also has intermediate targets. Contrary to the 2045 target, these only apply to the sectors covered by EU's Effort Sharing Regulation (ESR). These are the sectors not covered by the EU Emissions Trading Scheme (EU ETS). Sweden achieved its 2020 target to reduce ESR emissions by 40% from the 1990 level by 2020. Emission reductions abroad were allowed to cover up to 13 percentage points, but actual use was about two percentage points. The next milestone is 2030, with a pledge to reduce emissions by 63% compared to 1990, with a maximum of 8% through supplementary measures. This implies at least a reduction of 52% since 2005, which is only slightly tighter than the EU Commission's proposal for new targets under the Effort Sharing Regulation to reduce ESR emissions by 50% compared to 2005. By 2040,

emissions should be 75% lower than 1990, with maximum 2% of the reduction achieved by supplementary measures. Finally, Sweden has a separate target to reduce emissions from domestic transport (excluding aviation) by at least 70% from its 2010 level by 2030 (CPC, 2022b; Government of Sweden, 2017). The likely failure to reach the transport sector target because of recent policy changes, as discussed further below, will require considerable emission reductions in other ESR sectors from 2020 to 2030 (Figure 2.4).

Figure 2.4. A likely failure to reach the transport target requires additional action in other sectors



1. Excluding transport. Assuming maximum supplementary measures are used.
Source: Statistics Sweden; The Swedish Environmental Protection Agency.

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The third pillar of the framework is a climate policy council. The Climate Policy Council (CPC) is an independent, interdisciplinary expert body tasked with evaluating how well the Government's overall policy is aligned with the climate targets. Within this overarching mandate, it evaluates existing policy instruments from a societal perspective, identifies areas requiring further action, analyses how to achieve targets cost-efficiently, evaluates the bases and models on which the Government builds its policy, and contributes to the broader societal debate on climate policy (CPC, 2022b; Government of Sweden, 2017).

The CPC consists of experts in the fields of climate, climate policy, economics, social sciences and behavioural sciences. It is required to submit an annual progress report to the Government with an assessment of current emission trends and work carried out to address climate change. Furthermore, the council is obliged to submit an assessment of the Government's four-year climate policy action plan within three months of its publication (CPC, 2022b; Government of Sweden, 2017).

The structure of the Swedish climate policy framework, with a clear legal framework, targets, action plans and independent assessment by the CPC represents international good practice. A number of other OECD countries have similar frameworks, including the United Kingdom, France and New Zealand (OECD, 2022d). However, there is scope to align domestic targets more closely to EU targets and improve coherency of the target structure. Intermediate targets apply only to those sectors not covered by the EU ETS for good reason. Sweden and fellow EU countries have pooled authority for the main policy tool for ETS sectors at the EU level. Structuring the 2045 target in the same way would therefore increase consistency between targets and between the 2045 target and jurisdiction over the main policy instrument to achieve it. There is nonetheless considerable room for supplementary policies to make the most of the

transition also within ETS sectors, such as R&D policies and streamlining regulations and permitting procedures. Mapping options to reduce emissions and expressing a level of ambition at the sectoral level can be a useful analytical exercise and a tool to coordinate policy and stakeholder involvement. However, strict sectoral targets, as the Swedish domestic transport target, are not cost efficient, and may take the pressure off potential emission reductions in other sectors as discussed further below (Hassler, 2021).

Sweden's main climate policy instruments

Sweden has successfully put in place policy packages combining emission pricing with regulation, investments in infrastructure and innovation and industry dialogue to reduce emissions in their sector-specific context. Carbon pricing has been a central element in these efforts. The EU ETS and the CO_2 tax, put a meaningful price on almost 80% of Swedish greenhouse gas emissions in 2021 (OECD, 2022f). Other policies which have been important to drive emission reductions include the renewable electricity certificate system, the blend-in obligation for transport fuels, the bonus-malus system for new cars, various subsidy schemes and systematic government-industry dialogue. EU policies also play important roles outside of the EU ETS. Notable examples are emission performance standards for cars and vans and the Common Agricultural Policy as discussed below.

Sweden and other OECD countries rely on both emissions trading schemes and CO_2 (equivalent) taxes (D'Archangelo et al., 2022). The environmental effectiveness of these two instruments is largely equivalent in principle, as the ETS cap can be adjusted over time to hit a desired price level, and a tax can be adjusted over time to hit a desired quantity. Sweden has a long history of taxing energy, with excise duties levied on gasoline to raise revenue at least from the 1920s. As an EU member, relevant Swedish entities have been part of the EU ETS since its inception in 2005. A carbon dioxide tax was introduced in 1991 at a level of SEK 250 per tonne of CO_2, and gradually increased to SEK 1 330 in 2023. In 2022, the explicit carbon tax on transport fuels as well as the effective tax on emissions also accounting for fuel excise duties were among the highest in the world. Carbon tax rates have been largely streamlined across sectors since 2018. All in all, almost 80% of Swedish greenhouse gas emissions are priced by the EU ETS (39%) or by the CO_2 tax (40%) (OECD, 2022f). The remainder, mostly methane and nitrous oxide emissions from agriculture, remain untaxed. Emissions from domestic shipping, rail traffic and fisheries, are still exempt from both the carbon dioxide tax and the fuel excise duty, and agricultural and forestry machinery carry a reduced carbon tax rate (Hassler et al., 2020).

Regulation and subsidies can be valuable complements to carbon pricing if they are well-designed and targeted to well-identified market imperfections. However, ill-designed and uncoordinated regulations, subsidies and pricing instruments may increase the cost of decarbonisation by complicating performance monitoring, blurring price signals and blunting economy-wide incentives. Furthermore, traditional subsidies and command-and-control regulations give weaker "dynamic" incentives to research, develop and go above and beyond set standards (Blanchard et al., 2022; D'Archangelo et al., 2022) , and they risk being less effective and more costly than assumed before implementation (HMT, 2021). Ex-post performance reviews and evaluations can help, and should be an integral part of policy planning and design (OECD, 2014).

Notable regulations in Sweden include energy efficiency standards for buildings and appliances. The building code sets minimum standards for energy efficiency in new and renovated buildings. Energy labelling and efficiency standards for a range of products like refrigerators, washing machines, and televisions set minimum requirements for energy efficiency and allow consumers to compare the energy efficiency of different products. These policies help overcome information failures, myopia and split incentives between renters and landlords. Standards set at the EU level, notably vehicle tailpipe emissions standards, are also important to reduce Sweden's emissions, as discussed further below.

In the renewable electricity certificate system, which started in 2003 and was joined by Norway in 2012, electricity consumers except in energy-intensive industries facing international competition are obliged to

purchase certificates from producers of renewable electricity. Prices of these certificates fell considerably as wind power increasingly became competitive and new capacity was added. The Riksdag decided to discontinue the support for installations coming on-line after 2021 in order to shore up certificate prices for existing installations.

The bonus-malus system, in which vehicles with low carbon dioxide emissions were awarded a premium, while vehicles with high emissions were subject to increased tax, was put in place in 2018(Hassler et al., 2020). Zero-emission vehicles were rewarded by a SEK 50 000 (around USD 4 900) bonus six months after registration, while low-emission vehicles received a lower bonus. The government abolished the bonus for low-emission vehicles effective from 9 November 2022, noting that electric vehicles are already cost- competitive in a life-cycle perspective. The malus is retained, with vehicles emitting more than 75 grammes per kilometre facing a higher annual vehicle tax by SEK 107 per gramme from 75 to 125 grammes, and SEK 132 above 125 gremmes per kilometre.

The main instrument to reach the transport sector emission reduction target, and by consequence the overall 2030 emission reduction target for non-ETS sectors, was until the 2022 election a progressively increasing blending requirement for biofuels. The blending requirement for diesel is set by law to increase from 21% in 2020 to 66% in 2030, and from 4.2% to 28% for gasoline. This was expected to reduce emissions by more than 7 million tonnes of CO_2 per year in 2030 (Energimyndigheten, 2022). In 2022 the Riksdag halted the blending requirements at their 2022 levels of 30.5% for diesel and 7.8% for gasoline due to concerns about increasing prices at the pump in the context of the energy crisis and Russia's illegal war of aggression against Ukraine. The new government coalition pledged to reduce blending "to EU minimum levels", defined as 6% for both diesel and petrol. Biofuel blending mandates have a number of shortcomings, including their high cost (OECD, 2022c). However, Sweden does not have an alternative plan to reduce emissions by 2030. Unless such a plan is put in place with concrete policies, Sweden is likely to miss its national 2030 target and could potentially miss its 2030 Effort Sharing Commitment to EU partners, as further discussed below.

Subsidy schemes include the "Climate Leap" ("Klimatklivet"), a funding programme for local and regional climate investments administered by the Environmental Protection Agency and County Administrative Boards, established in 2015 and partially funded by the EU Recovery and Resilience Facility. In 2022, the total programme amounted to SEK 2.7 billion. The budget was increased by SEK 400 million from 2023 to speed up the deployment of electric vehicle charging infrastructure. Companies, municipalities, housing associations, County Councils, etc. may apply for funding. The most common projects are within electric vehicle charging, energy conversion, transportation and vehicles. The National Audit Office concluded in 2019 that even though the programme is implemented reasonably effectively, it is not suited to trigger cost-effective emission reductions. Some methodological shortcomings may be rectified, but in the presence of broad pricing measures and extensive reliance on private information from recipients it is difficult to achieve a cost-effective allocation of the aid. The National Audit Office recommended to reserve support for investments to sectors where other measures are weak or where support can be clearly motivated by market imperfections. Furthermore, it recommended to improve work processes and systems, data gathering, and calculation methodology to ensure that support is given to maximise emission reductions per krona of support (National Audit Office, 2019). Considerable work has since been done to make the scheme more efficient and address these weaknesses. The programme is in general well-run, targeted towards market failures and well-funded. Projects are in principle ranked by cost per tonne of CO_2 avoided, and support distributed to achieve cost-effective reductions.

The "Industrial Leap" is a subsidy programme aiming to speed up the green industrial transition. It was established in 2018 and is administered by the Swedish Energy Agency. It had a budget of SEK 900 million in 2022, increased to SEK 1.5 billion in 2023, and is partially funded by the EU Recovery and Resilience Facility. The programme supports projects to develop and implement solutions to reduce process emissions, strategically important projects for industrial transition and capture and storage of carbon from biogenic sources. Historically, applications for support from industrial companies have been focused on

production of iron and steel, cement, pulp and paper, chemicals, refineries, electricity and heat. Strategically important initiatives such as hydrogen production, battery production for electric cars, recycling facilities for plastics and biorefineries have been eligible for support since 2021, (Energimyndigheten, 2023). The programme seems to be adequately funded. So far, it has successfully supported a number of projects in the research, development and early deployment phases, thereby contributing to a faster and less costly green transition by speeding up technology learning.

In 2015, ahead of the Paris Summit, the government initiated “Fossil free Sweden”, an initiative for systematic government-industry and stakeholder dialogue. The aim of the initiative is to accelerate the green transition by identifying business opportunities from decarbonisation as well as obstacles holding back emission reductions. Fossil Free Sweden produces policy proposals to help companies, industries, municipalities and regions reduce their emissions. It also produces strategies to suggest how overarching issues such as energy efficiency, bioeconomy, hydrogen and finance can be handled by the government. As part of Fossil Free Sweden, 22 industries have produced their own roadmaps for fossil-free competitiveness, including fossil-free steel, cement, transportation and electricity. These roadmaps are followed up with progress reports, taking stock of progress both in industry and in political decisions to address priority actions identified by industry (Fossil free Sweden, 2021). Persson and Bengtsson (2022) found that Fossil Free Sweden has established strong legitimacy among businesses and policymakers, and has contributed to increased ambition, knowledge diffusion and to removing policy obstacles to decarbonisation.

The Riksbank (Sweden’s central bank) and Finansinspektionen (the Financial Supervisory Authority) are working to green the financial system. This is appropriate, as demand for more environmentally friendly investment portfolios combined with insufficient emission reduction policies and lacking climate risk assessment and disclosure has left a vacuum in Sweden and elsewhere. Key tasks are to improve financial sector resilience by better assessing and disclosing risks from climate change and transition risks from a changing policy and investor landscape, and integrating these risks into the supervisory framework. In order to develop, implement and promote best practices to address climate risks to the financial sector, Sweden participates in various international fora including the Basel Committee on Banking Supervision (BCBS), the Network of Central Banks and Supervisors for greening the Financial System (NGFS) and various EU fora. However, the financial sector does not work in isolation; it can only be a facilitator, delivering climate-friendly investment in response to effective policies. A clearer transition policy path would therefore allow the financial sector to better support the green transition (Pareliussen et al., 2022).

Consistent use of shadow pricing of greenhouse gas emissions in public sector investments also has an important role to play in climate policies. The social cost of emissions in infrastructure projects was previously set close to the level of the carbon tax, but was raised from SEK 1 140 per tonne of CO_2 to SEK 7 000 per tonne in 2021. This new shadow price was derived from regulations implementing the biofuel blending requirement, seen by the Swedish Transport Administration as the main tool to achieve the transport sector target (Trafikverket, 2021). A shadow price well above the emission pricing faced in the rest of society and well above global estimates of the social cost of emissions is problematic, but it is to an extent internally consistent with the transport sector target, which is discussed further below. In general, there is scope to better integrate climate and sustainable development in Swedish cost-benefit analyses (Crépin et al., 2018). Lessons could be learned from the United Kingdom, where the “Green book” assigns Greenhouse gas emissions values consistent with the UK’s 2050 net zero target. These are used across the government for valuing impacts on GHG emissions resulting from any policy intervention (Pareliussen et al., 2022).

Policy needs tightening and more coherence

Sweden will need to tighten policy to reach its targets, and there is room to increase consistency of both targets and policies. The main areas of improvement of the target structure are how to align targets with

the division of responsibilities between Sweden and the European Union, as well as the differential treatment of the transport sector and negative emissions. Furthermore, the new government has implemented and proposed a number of policy changes expected to contribute to increased emissions, including the reduced biofuel blending requirements in transport, abolishing the bonus for low-emission cars, reversing a climate-friendly reform of tax deductions for commuting expenses, increased tax deductions for in-work travel and lowering the CO_2 tax for agricultural machinery further. These policies are expected to increase emissions considerably compared to previous policies and put both the overall 2030 target and the transport sector target in jeopardy unless urgently compensated by alternative policy measures (CPC, 2023).

Transport sector policies and target

The policy change with by far the biggest expected impact on emissions until 2030 is the government's stated intention to reduce the blending requirement of renewable fuels for road traffic "to the EU minimum level" to reduce fuel prices at the pump (CPC, 2022a). The decision to reduce the blending requirement to 6% for both diesel and petrol could increase road transport emissions by several million tonnes per year compared to previous policies. Without alternative measures this would mean that 2030 non-ETS emissions would be well above target. . So far, the government has not presented sufficient new policies to make up for the expected shortfall (CPC, 2023).

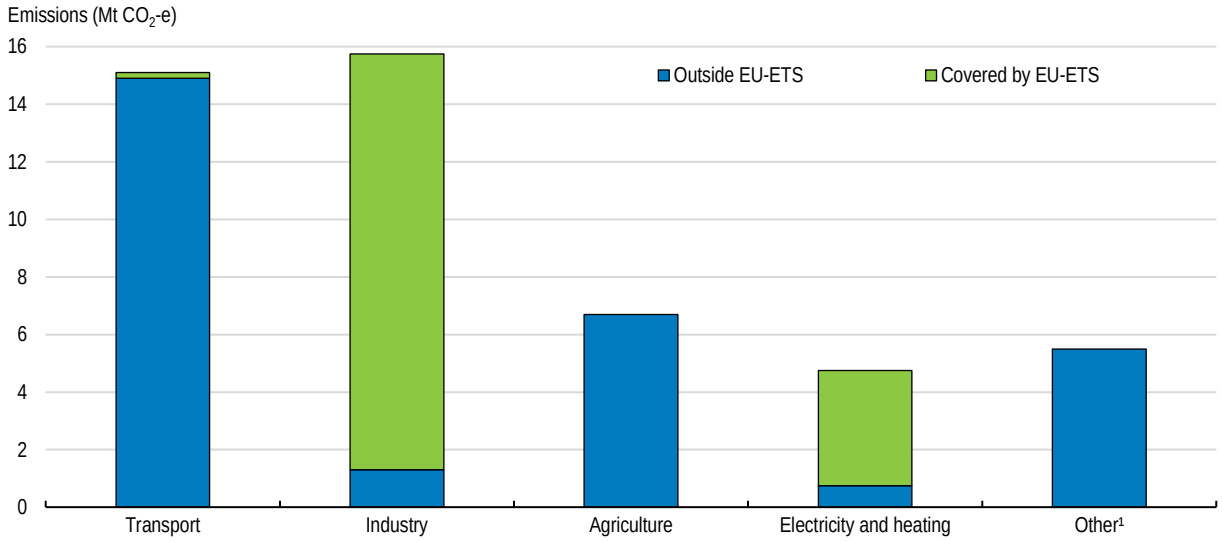
The structure of non-ETS emissions implies that much of the emission reductions up until 2030 will need to come from the transport sector, but the separate target for the transport sector goes against a cost-efficient fulfilment of the overall national target and reduces the pressure to come up with policies and solutions in other sectors. Furthermore, as part of its Fit for 55 package the European Union has decided to start a separate emissions trading scheme (EU ETS2) for transport and heating fuels by 2027, and to ban the sale of (non-e-fuel) combustion engine cars by 2035. The proposal for a revised Energy Taxation Directive sets minimum energy tax rates for fuel consumption based on their energy content and environmental performance. The proposal is still under negotiation (OECD, 2023b).

Using biofuels as the primary solution to reduce road traffic emissions has limitations, which have become increasingly clear in the past few years. Biofuels are expensive, at about EUR 500 per tonne of CO_2 emitted (OECD, 2022c). They require stringent certification to assess their net effect on greenhouse gas emissions, as greenhouse gases are emitted in their production. Many biofuels compete with food production and put pressure on land use including forests and other natural sinks. On a global scale, biofuels are not the solution for road transport, as supply could not realistically meet demand if the world was to adopt Sweden's (past) strategy (De Castro et al., 2014).

Even though there are good reasons to reduce Sweden's reliance on biofuel blending to reach emission reduction targets, it would be a problem for Sweden's credibility as a reliable partner in reaching the goals of the Paris Agreement and its EU commitments if the 2030 target for national (non-ETS) emissions was missed. Therefore, such a change in policy should be accompanied by a general tightening of climate policy across sectors. However, emissions in most other non-ETS sectors are already quite low except in agriculture. Unlike in most other countries, emissions from heating of buildings are close to zero, as most buildings are either connected to district heating from renewables or heated with electricity. Therefore, large emissions reductions would still need to happen within transportation (Figure 2.5).

Figure 2.5. Non-ETS emissions are mostly in transportation and agriculture

2021



1. Emissions from waste, working machines and product use including solvents.
Source: The Swedish Environmental Protection Agency.

StatLink https://stat.link/dlgps8

Rapid technological development and falling costs increasingly suggest that electric vehicles are the technology for the future of road transport, notably for light-duty vehicles. There are no greenhouse gas emissions from their use, if electricity comes from clean sources. This is an additional argument for revising Sweden's past policy on biofuel blending. In 2021, 43% of car sales and 6% of the stock were electric in Sweden, well above the European averages of 17% and 2.3%, respectively, though well below market shares in Norway (IEA, 2022a).

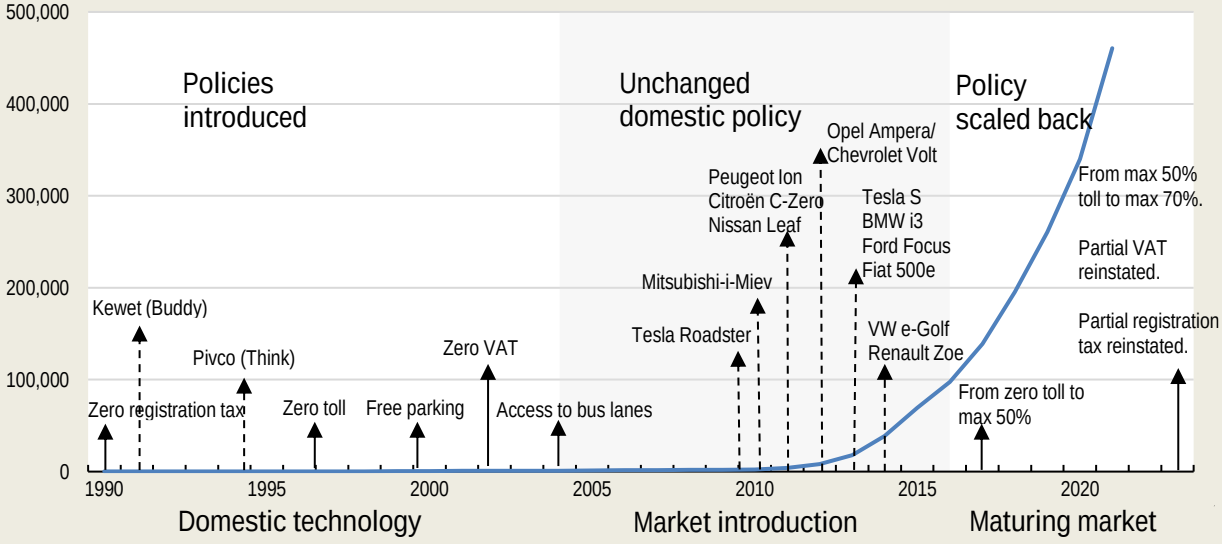
Norway's experience (Box 2.1) illustrates two points with current relevance to Sweden. First, electrification of the vehicle stock will continue almost regardless of national policies due to technological development and increased price competitiveness. Technology development in a highly globalised car manufacturing industry responds to demand in big markets such as the European Union, the United States and China and their policies. The European Union uses fleet-wide performance standards, where car producers need to meet maximum tailpipe emissions, averaged over all cars sold in a given year, to reduce average emissions per car. Such policies have also reduced tailpipe emissions in the United Kingdom and the United States, amongst others (Pareliussen et al., 2022). The second point is that national policy like the Swedish carbon tax and the bonus-malus system may have important roles to play to speed up a transition by incentivising cleaner cars and overcoming households' credit constraints and myopia.

Box 2.1. Electric vehicle incentives and take-up in Norway

Norway's experience illustrates the interplay between national policy and global technology development largely outside of the control of a small country. Despite very strong incentives since the 1990s, electric vehicle sales did not take off. The power of incentives already in place only became clear when international car producers started marketing cars with better technical qualities and design (Figure 2.6). This happened for reasons largely outside of Norway's control, including rapid improvements in battery technology, reduced battery production cost and tailpipe emissions standards in the United States and European Union, amongst others. In 2021, 86% of new cars sold and 25% of the stock in the country were full-electric vehicles, the highest shares in the world (IEA, 2022a).

Figure 2.6. Electric vehicle sales depend on global technology development and national policies

Registered electric vehicles in Norway, incentives and new models available



Note: New electric vehicle models after 2015 are not included.
Source: Statistics Norway and Norwegian Institute of Transport Economics (2013) updated and developed by authors.

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However, the push to encourage households to purchase electric vehicles has come at a cost. The policy has contributed to a sizeable revenue decline from car-related excise duties. This amounts to about 0.1 percentage points of mainland GDP each year. Also, when viewed only in terms of direct CO_2 abatement costs, the policy is not very efficient. The tax breaks and the behavioural responses to them imply an abatement cost of EUR 1370 per tonne of CO_2 for battery electric cars (as of 2019) and EUR 640 and EUR 200 per tonne for light and heavy-duty commercial vehicles. A recent OECD study estimates the cost of emission reduction through the tax concessions to be around ten times the EU ETS quota price – the cost of emitting a tonne of carbon under Europe's emissions trading system. As elsewhere, there are valid arguments for EV-subsidy exceeding the abatement cost. The extra subsidy helps the EV market reach critical mass (reducing the need for a subsidy in the long term). Also, EVs reduce some negative externalities from car use such as reduced noise and air pollution, suggesting that subsidies are worthwhile. However, these benefits are hard to measure and it is unknown how far they justify the current scale of Norway's EV support (D'Archangelo et al., 2022).

The decision to scrap the clean car bonus therefore comes at an unfortunate time, when Sweden needs to strengthen alternative policies to make up for the reduced biofuel blending requirement. Even though electric vehicles have become more cost competitive and zero-emission vehicles made up a third of new cars in Sweden in 2022, a considerable strengthening of policies promoting electric vehicles is likely a necessary part of a policy package to offset increased emissions from the reduced blending requirement. Reinstating a bonus on zero-emission vehicles to overcome households' myopia and credit constraints is an option to consider, but an untargeted bonus comes with a substantial fiscal cost while disproportionately benefitting households with relatively high incomes. Continued investments in a functional country-wide charging network as planned under Klimatklivet is another important policy to increase convenience and reduce range anxiety for prospective EV owners. Furthermore, Sweden introduced regulations requiring charging infrastructure for all parking slots in new buildings in 2020, as well as requirements to equip a certain percentage of existing parking spots with charging to implement the EU Energy Performance in Buildings directive (Boverket, 2020). These regulations are backed by grants covering up to 50% of the investment cost. Strengthening these regulations further, for example by increasing the mandated percentage of parking spots with charging, could be considered.

The technological pathway towards zero-emission heavy goods vehicles is less clear, but some mix of electric vehicles, technology which would allow vehicles to draw power from the grid while in use (route electrification) and fuel cell electric vehicles is assumed to be capable of eliminating their tailpipe emissions by mid-century. Given these uncertainties, interventions in the short term should seek to support R&D across a range of technologies (Pareliussen et al., 2022). Sweden has a support scheme for the introduction of lorries, buses and non-road mobility, and Swedish companies are at the forefront in electrifying raod transport. The share of electric heavy duty vehicles sold increased from 2.2% in Q1 2022 to 3.9% Q1 2023, while the share of electrification is much higher for buses and light trucks. It is also home to one of the major test sites for the European Commission's Green Corridors initiative and for other, similar innovative projects. One of the projects dealing with road freight issues is REEL (Regional Electrified Logistics), a national initiative where leading Swedish actors have joined forces to accelerate the transition to electrified, emission-free heavy road transport (REEL, 2023).

Reducing the emission footprint of road transport will to an extent rely on reducing emissions within the current mix of transport modes for freight and passengers, as the required changes needed to the spatial distribution of the population and transport systems to move a substantial proportion of freight and passenger kilometres to sustainable modes will not alone deliver the necessary reductions by 2030. Shifting journeys to more sustainable modes can nonetheless make a valuable contribution. Countries can reduce emissions and improve well-being if they reduce car demand with transformative policies such as road space reallocation, mainstreaming of on-demand shared services and communication efforts (OECD, 2022g).

Agriculture

Speeding up emission reductions from agriculture, waste, f-gases, working machinery and some remaining non-ETS emissions from the production of electricity and heating could help make up for the shortfall left by likely missing the transport sector target. Apart from ETS sectors and transport, the largest emissions are within agriculture. Except some greening of subsidy schemes, agriculture is a sector with notoriously weak climate policy coverage across the OECD. The main support scheme affecting the Swedish agricultural sector is the Common Agricultural Policy (CAP), set at the EU level. Measures under the CAP have not been effective in reducing emissions in agriculture, pointing to inconsistencies between the European Union's climate and agricultural policies, and only 0.9% of the CAP budget is dedicated to reducing greenhouse gas emissions. Mitigation policies in agriculture involve mainly voluntary measures with a low potential to reduce emissions. Green direct payments for farmers to adopt potentially climate-friendly practices have had a limited impact, with an uptake of environmentally beneficial agriculture observed on only 5% of EU farmland, reflecting low ambition and the fact that green requirements mostly

are adapted to established farming practices. Furthermore, payments are not linked to achieving specific environmental outcomes. For example, some schemes support an expansion of organic farming, although the impact of such practices on greenhouse gas emissions is unclear (OECD, 2023b). Sweden's Rural development programme, which receives funding from various EU sources including the CAP, focuses on restoring, preserving and enhancing ecosystems related to agriculture and forestry (European Commission, 2020). In addition to the CAP, the Climate leap funds climate investments within agriculture, notably anaerobic digestion and biogas production of manure. Emission reductions from these actions are not captured in the statistics due to measuring and methodology shortcomings. Sweden should push for increasingly ambitious policies for future CAP funding, and for making payments conditional on achieving emission reductions. Moreover, it should use the flexibility in implementing the CAP to incentivize emission reduction and sustainable practices in the sector.

Direct emission pricing belongs in a policy package to effectively and efficiently reduce emissions from agriculture, but comes with two main challenges. The base for taxation or inclusion in an ETS is challenging to calculate. Quantity-based measures like the number of livestock or fertilizer use can be measured relatively straightforwardly, but emissions per unit of such measurable input or output vary considerably from farm to farm. These individual variations and reduced emissions from improved agricultural practices are more challenging to measure. Explicit pricing policies are also politically challenging due to carbon leakage concerns, technological difficulties in reducing emissions from agricultural sources, food security concerns and strong agricultural lobby groups (Arvanitopoulos, Garsous and Agnolucci, 2021; D'Archangelo et al., 2022). Some of these concerns, notably regarding carbon leakage, would be less salient if agricultural emissions were priced in an EU-level mechanism.

A hybrid system, in which quantity-based measures are subject to a carbon price, while improved practices, the provision of nature-based services and green R&D are subsidised would likely increase policy efficiency and should be explored, including its compatibility with the CAP. Lessons could be learned from New Zealand, where quantitative measures of agricultural greenhouse gas emissions have been reported at the farm level under the umbrella of the NZ ETS since 2021 and will be included in the NZ ETS or a separate pricing system from 2025 (Box 2.2). If necessary to win political acceptance, such a reform could be fiscally neutral for the sector as a whole, as is the intention in New Zealand (Pareliussen et al., 2022). A subsidy mechanism to incentivise climate-friendly farm-level practices could be designed to also incentivise bottom-up efforts to improve methodologies and measuring, drawing inspiration from project-based offset schemes such as the Kyoto Protocol's Clean Development Mechanism and Joint Implementation.

Box 2.2. Pricing of agricultural emissions and natural sinks in New Zealand

Agriculture accounts for 48% of New Zealand's 79 $MtCO_2$ equivalent gross emissions (2018). Land-use change and forestry is included in the New Zealand Emission Trading Scheme (NZ-ETS). Forest owners are thereby liable for reductions in the carbon stored and credited for carbon uptake in their forests. New Zealand's forests increased their carbon stock equivalent to reducing gross national emissions by 30% in 2018. Under the NZ-ETS, forests are defined as "post-1989 forest land" or "pre-1990 forest land". Post-1989 forests may be voluntarily registered into the ETS and are eligible to earn emissions units that represent the carbon sequestered by the forest since the start of each "mandatory emissions return period" (MERP, a multi-year period defined in legislation, the current one is 2023-25), but are also liable to repay units if there is a reduction in carbon stock. As of June 2018, 50% of post-1989 forest land (approximately 325 000 hectares of 690 000 hectares) had been registered in the NZ-ETS. Furthermore, the majority of landowners with exotic forest land defined as "pre-1990 forest land" (approximately 1 440 000 ha) face deforestation liabilities under the NZ-ETS. There are no liabilities or entitlements for business as usual forest harvest and replanting (Pareliussen et al., 2022).

The 2019 Climate Change Response (Emissions Trading Reform) Amendment Bill mandates pricing of agricultural emissions from 2025 and mandatory farm-level reporting obligations of livestock emissions as of 2024. The government and the agricultural sector are now working in He Waka Eke Noa (Primary Sector Climate Action Partnership) towards developing a system for farm-level pricing by 2025. If an alternative pricing system is not implemented by 1 January 2025, the Climate Change Response Act states that agricultural emissions will be priced under NZ-ETS. In October 2022 the government opened a consultation on farm-level pricing of agricultural emissions, two options for pricing synthetic nitrogen fertiliser emissions, an interim processor-level levy as a transitional step if the farm-level levy cannot be implemented by 2025, and recognition for some types of sequestration in an adjacent contractual system from 2025, with a long-term goal of integration of new vegetation categories into the NZ-ETS (Pareliussen et al., 2022).

Successful communication and education campaigns, phased policy implementation, grandfathering and support measures for stakeholders helped garner public acceptance for these policies. In the context of the 2019 Act, the government reformed the emission trading scheme in 2020, implementing several measures to cushion the transition and allow stakeholders to prepare: a five-year transition phase before pricing agricultural emissions; free allocation of 95% of the carbon credits at the farm level; financial incentives for early adopters; increased farm advisory efforts to help the residents decrease their emissions most cost-effectively; and tools for estimating farms' emissions to help them plan ahead (D'Archangelo et al., 2022).

Negative emissions and supplementary measures

Up to 8% of Sweden's 2030 target for the non-ETS sectors and 15% of Sweden's 2045 net zero commitment (relative to 1990 emissions) may be achieved by so-called "supplementary measures", which include but are not limited to: increased uptake of carbon dioxide by forests, over and above business as usual; verified emission reductions abroad; and carbon capture and storage from biomass combustion (CPC, 2022b; Government of Sweden, 2017). When evaluating the limitations of supplementary measures, one should keep in mind that greenhouse gas emissions do not respect borders, and that a tonne of CO_2 sequestered or stored has the same climate effect as a tonne of carbon not emitted from existing sources. Naturally sequestered carbon may be released back to the atmosphere, but this risk can be handled with for example clearly assigned liability for such events combined with an insurance mechanism. Changes to the structure of the national target with consistent treatment of emission reductions and emission sequestration may be necessary to make up for the shortfall created by abolishing the transport biofuel blending obligation.

The EU ETS already incentivises carbon capture and storage (CCS) from covered entities, in which case the CO_2 counts as "not emitted" from its source. Likewise, entities paying the carbon tax have incentives to reduce the tax bill by means of carbon capture and storage. In contrast, emissions from burning biofuels are counted as renewable and emission-free, and thereby neither covered by the ETS nor the carbon tax. Capture and storage of such emissions are therefore not incentivised. Likewise, natural removals are not incentivised. Reducing the intensity of forestry activities could carry additional benefits in terms of biodiversity and would better balance the value of using forests as a carbon sink and as an important source of renewable materials and energy. Lessons can be learned from New Zealand, where forest owners are liable for reductions in the carbon stored and credited for carbon uptake in their forests (Box 2.2). Insurance providers provide coverage for forest owners' carbon liabilities if the carbon is released back into the atmosphere, for example by fire. The 45Q tax credit in the United States has supported engineered emission removals since 2008. It was expanded and extended with the 2022 Inflation Reduction Act, and now provides up to USD 85 per tonne of CO_2 permanently stored (IEA, 2022b). Sweden should consider taxing the release of carbon stored in natural sinks combined with a general tax

credit for greenhouse gas removals at the level of the CO_2 tax to incentivise such cases and increase policy consistency.

The Swedish Energy Agency has been assigned the role as national CCS centre, and is tasked with following the technical, economic and political development within CCS, and to identify barriers to its implementation. In addition to the Industrial Leap, Sweden plans to perform its first reverse auction for capture, transport and storage of biogenic CO_2 in 2023. Likely bidders can be found within the paper and pulp industry as well as biomass combined heat and power plants (Energimyndigheten, 2023). Sweden is also working with Norway to facilitate cross-border transport of CO_2 for geological storage in reservoirs under the North Sea, which is regulated by the London Protocol on the prevention of maritime pollution. Norway has favourable geological conditions, and has built up technical and practical expertise in the field since the Sleipner Carbon Capture and Storage project was launched in 1996, incentivised by Norway's CO_2 tax. A reverse auction can be a good way to kick-start carbon capture and storage in Sweden, as early projects will suffer from limited experience and infrastructure, while experience and scale will make subsequent projects less costly.

The geographical location of emissions is irrelevant for the atmosphere. The situation of EU ETS sectors, with the overall emission cap set at the EU level illustrates the benefits of international cooperation very clearly. Also for emissions outside the scope of the EU ETS, engaging in international cooperation and market mechanisms can enhance welfare by reducing emissions where it is less expensive. The Paris Agreement allows offsetting residual emissions or reaching negative emissions by emission reductions abroad. The Swedish government has a programme operated by the Swedish Energy Agency to engage in project-based emissions abroad, investing in around 270 projects under the flexible mechanisms of the Kyoto Protocol since the early 2000s. A global tender for projects under the Paris Agreement's Article 6 in 2019 received 60 proposals, of which six were chosen for further development (Energimyndigheten, 2023). Reflecting Sweden's ambition to reduce emissions at home, its surplus allowances, both from its allocation under the Kyoto Protocol and from its flexible mechanisms, have been cancelled until 2019, reducing GHG emissions by approximately 130 million tonnes of CO_2 equivalents, more than twice Sweden's 2019 total emissions (OECD Economic Survey of Sweden, 2021). Sweden provides financial, technological and capacity-building support to developing countries to the amount of more than 0.14% of GNI. Sweden is one of the largest per capita donors in the world to the Green Climate Fund and the Global Environment Facility, the financial mechanisms under the UN Framework Convention on Climate Change, and provides considerable amounts in bilateral support for mitigation and adaptation activities (Ministry of Climate and Enterprise, 2023).

Using the Paris Agreement's Article 6 more actively to fulfil Sweden's national targets is an option to consider. Any emission rights transferred under the Paris Agreement will be subtracted from the transferring country's emission cap (Nationally determined contribution, NDC). This eliminates in principle the concerns of the Kyoto Protocol that over-stating or double-counting project-based emission reductions might increase global emissions. However, such trade should be handled with care to ensure that it does not contribute to higher global emissions. If trading with countries whose NDCs are not in line with the overall ambition of the Paris agreement, the prospect of selling emission rights might discourage them from tightening their targets. Furthermore, such trade depends on trust that trading partners will indeed fulfil their net zero-consistent NDCs, demonstrated by clear plans and timely policy action (Climate Action Tracker, 2021).

2.3. Investing in electricity supply and people to fuel the green transition

Steel production is behind around 11% of Sweden's greenhouse gas emissions, and 7% of global emissions. Eliminating carbon emissions from steel production is now a reality in Sweden's north, where HYBRIT's test facility delivered its first steel in 2021 produced with hydrogen instead of coal, thereby reducing emissions by roughly two tonnes of CO_2 per tonne of iron produced. HYBRIT plans to follow up with industrial-scale commercial production from 2026. Competitor H2 Green Steel has already begun construction of its full-scale production facility in nearby Boden, with production scheduled to start in 2025. The facility is set to produce about five million tonnes a year when finished. Green steel, however significant, is only one of several innovative fossil-free developments in Sweden's north, including fossil-free electricity, fertiliser production, battery production and mining for materials needed in the green transition (Box 2.3). Sweden's high-emitting industries are relatively concentrated, notably in steel, cement, refineries and chemical industries. These industries have concrete plans to apply technological solutions to eliminate most of their greenhouse gas emissions and continue production in their existing locations. For this reason, the green transition is largely seen as an opportunity for new growth in Sweden, rather than a threat to jobs and competitiveness.

Box 2.3. Green industrial developments in Norrbotten and Västerbotten

A number of climate-friendly industrial developments and mining projects for materials needed in the green transition are at different stages of planning and implementation in the Norrbotten and Västerbotten regions in the north of Sweden. This box presents a selection of these.

In operation:

- Northvolt's battery factory in Skellefteå started regular production in 2022 and plans to reach full production volume in 2026.
- HYBRIT's pilot plant for green sponge iron and hydrogen production in Luleå started production in 2021, while its pilot facility for hydrogen storage started operations in 2022.
- Talga's pilot plant for battery anode production in Luleå came online in 2022.
- Markbygden wind power project west of Piteå is constructed in stages, with two out of three stages in operation. It is on track to be one of the biggest onshore windfarms in the world.

Under construction:

- H2 Green Steel's industrial-scale fossil free steel mill and hydrogen production facility is under construction with production planned from 2024.
- Ground works have started on LKAB's demonstration plant in Gällivare to produce fossil-free sponge iron and a further two sponge iron plants are in the process of application for necessary permits.
- Boliden has started ground works to increase the scale of its copper mining operations in Liikavaara.
- Revolt's battery recycling factory is built in parallel with Northvolt's battery factory in Skellefteå, with operations to start in 2023.

Under planning:

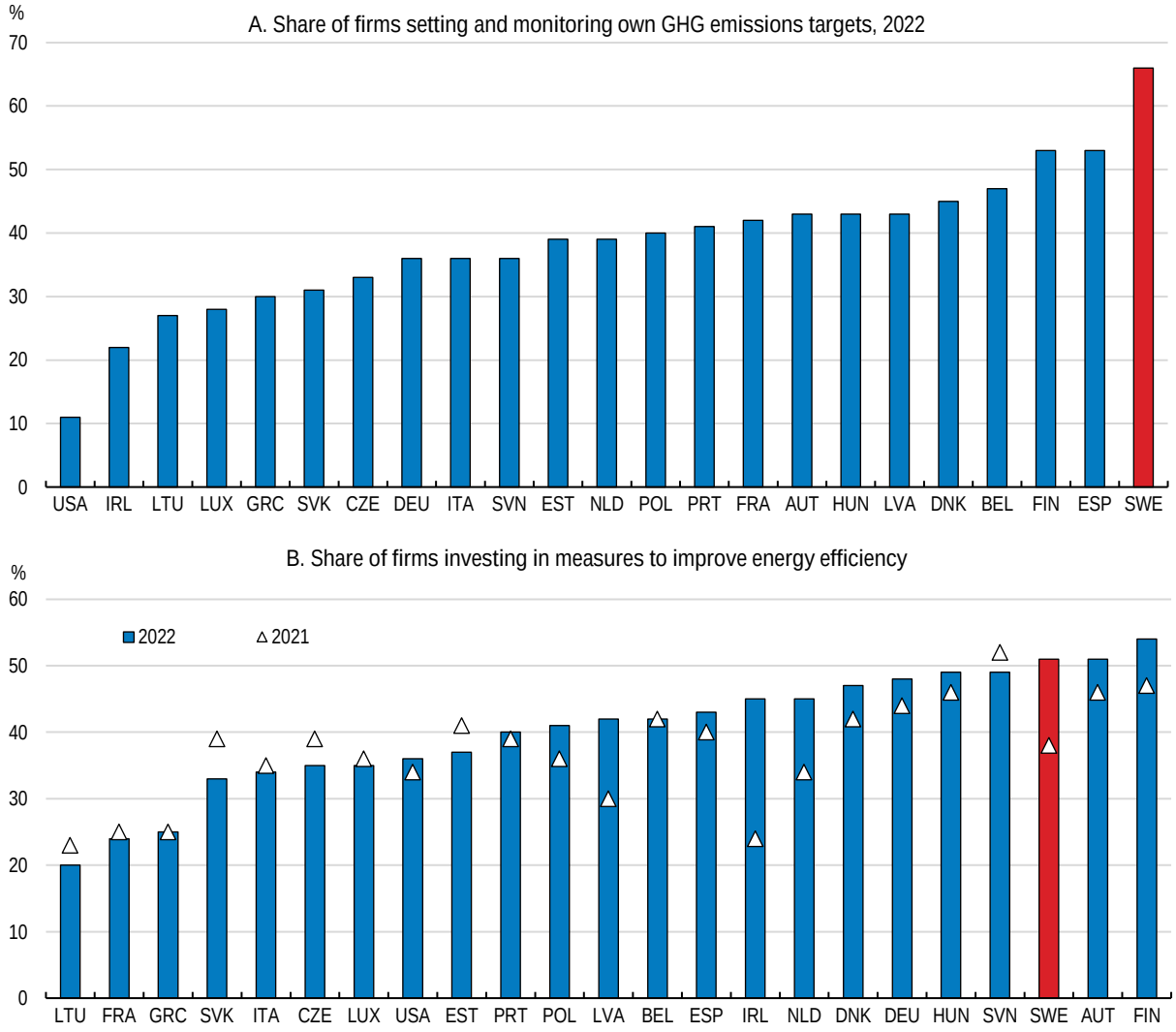
- LKAB is planning a large-scale upgrading of its operations in Kiruna, with among others three green sponge iron plants with planned production to start in the 2030s. The permit application process is delayed.

- LKAB is preparing an environmental permit application for the circular industrial park Reemap in Luleå, with plans to extract phosphor and rare earth metals from mining waste. Production at the plant is planned from 2027.
- LKAB's Reemap will also process materials from the by far largest-known deposit of rare earth minerals in Europe found close to its existing mine in Kiruna and announced in early 2023. The rare earth deposit is still at the prospecting stage.
- SSAB is in the process of applying for permits to construct so-called mini-mills for steel production in Luleå. These facilities include electric arc furnaces, strand casting and rolling mills.
- Copperstone has applied for environmental permission to re-open copper production in the Viscari mine close to Kiruna.
- Talga plans to open a graphite mine in Vittangi, with environmental permissions expected in 2023. Graphite is a key ingredient in battery production, and mined graphite has a considerably lower carbon footprint than graphite produced by pyrolysis.
- Kaunis Iron is awaiting environmental permission to open two additional open-pit iron mines in Palotieva and Sahavaara.
- A 1000 kilometres long hydrogen pipeline between northern Sweden and Finland is under planning by Nordion Energi and Gasgrid Finland, with pre-studies carried out by Luleå University and Rise research institute.
- Fertiberia plans a factory for green ammonia and fertiliser production in Luleå. The application process has started, construction is planned from 2024, and production from 2027.
- Cinis Fertiliser plans a fertilizer factory in Skellefteå, which is in the process of securing environmental permit approval.
- Uniper and Luleå municipality has initiated a pre-study for a hydrogen hub in Luleå.

Source: Framtidsfabriken and Region Norrbotten.

Sweden's green industrial revolution is not confined to the northern regions of Norrbotten and Västerbotten, although it has its epicentre there. Green investments are happening across the country, with for example projects to implement bio-CCS in Uppsala and Stockholm, plans for carbon capture and storage in Cementa's cement production on Gotland, Renewcell's innovative chemical recycling of cotton fabrics in Sundsvall, SSAB's investment in electric arc furnaces in Oxelösund, Northvolt's battery factory in Borlänge, an industrial collaboration in the Stenungsund chemical industry cluster to build a production facility for sustainable methanol and Volvo's factory in Mariestad. The green industry has been incentivised and facilitated by policy and Sweden's long-term commitment to reduce emissions, industry know-how, government-to-business dialogue, and international trends towards increased demand for climate-friendly products. Furthermore, Swedish companies are among the most climate-conscious in the world. A large share of firms have their own climate targets (Figure 2.7, Panel A) and investments in energy efficiency are high and increasing (Panel B).

Figure 2.7. Swedish companies are among the most climate-conscious in the world



Source: European Investment Bank investment surveys 2021 and 2022.

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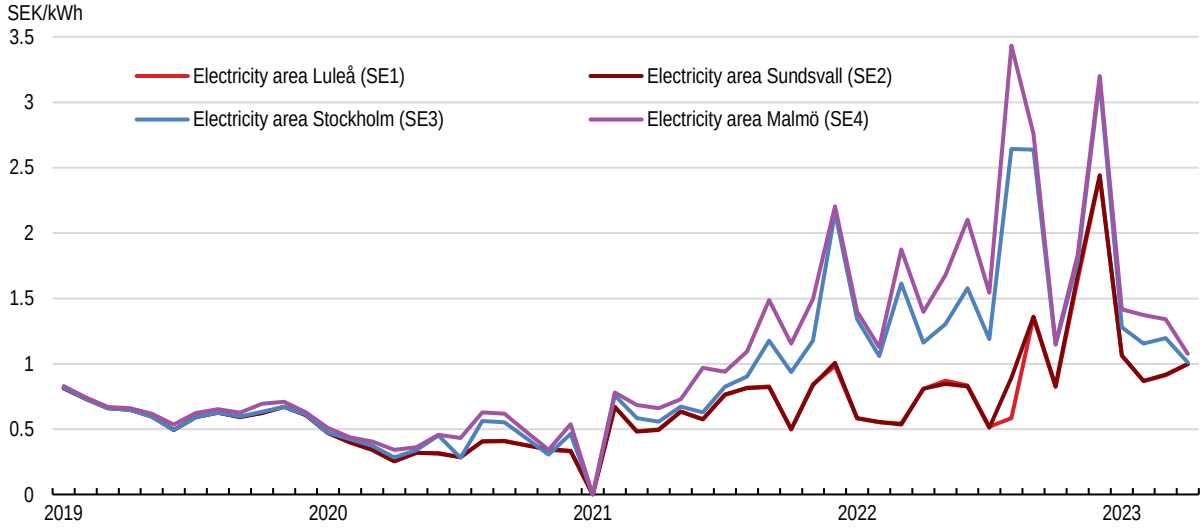
Large investments are needed in clean and reliable electricity

The green revolution is first and foremost fuelled by an until recently abundant and reliable supply of clean and reasonably priced electricity from hydropower, nuclear and increasingly wind power. Large-scale climate-friendly industrialisation requires roughly a doubling of Sweden's electricity supply, and large investments in the grid (Bergman, 2022), storage and plannable electricity generation capacity. Russia's illegal war of aggression against Ukraine increases the impetus to speed up these investments, but the energy crisis also puts strain on the electricity market structure and institutions. Competing land uses, long planning and permitting processes and municipalities vetoing clean electricity investments in their backyards are all challenges that need to be overcome.

Russia's war on Ukraine has highlighted energy security risks. It is also a forewarning of potential shortages and instability to come should investments in production, transmission and storage of electricity not keep up with demand from electrification of industry and transport. Sweden's direct exposure to Russia and

Ukraine is relatively low (OECD, 2022b). Only around 2% of energy consumption is natural gas (the lowest in the European Union) and around half of that came from Russia before the war. Dependency on Russian oil was also low (around 8% of imported oil and 6% of biodiesel, came from Russia). It is nonetheless affected indirectly, with high electricity prices in the south (electricity bidding areas Stockholm and Malmö) and large price differences between electricity bidding areas since late 2021 (Figure 2.8) reflecting natural gas shortages in Central Europe, notably Germany (Chapter 1).

Figure 2.8. The energy crisis has led to large price differentials in Sweden



1. Prices for variable-rate contracts. Assumed annual consumption of 2,000 kWh.
Source: Statistics Sweden.

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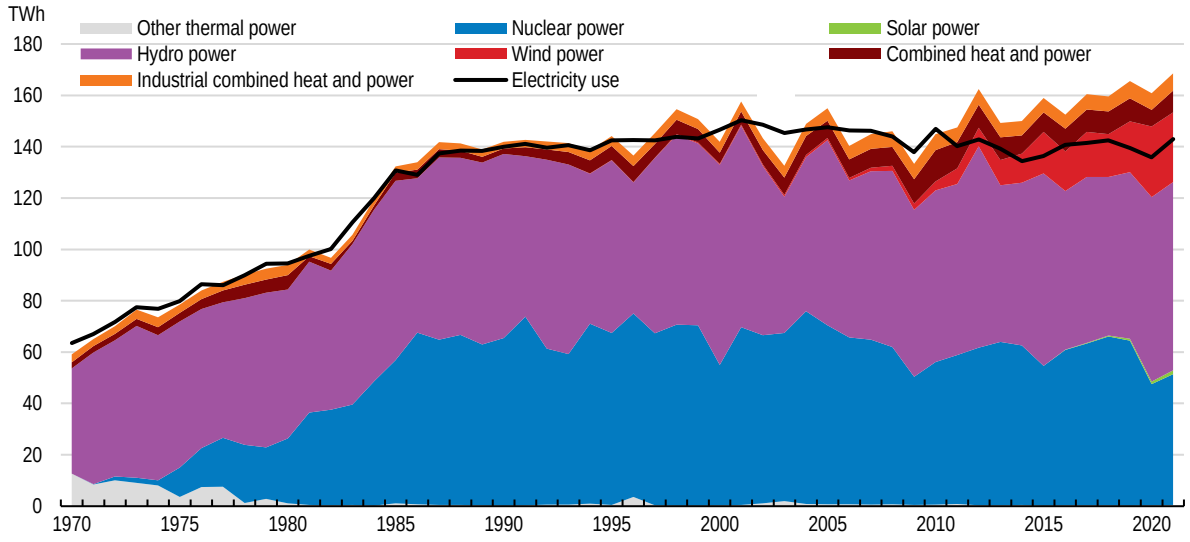
The government has responded to soaring electricity bills by introducing a number of support policies (OECD, 2022b), notably in the form of compensation to households and businesses for electricity use and reduced taxes on fuels. Going forward, Sweden should move from broad-based untargeted energy support to targeted interventions that maintain incentives to reduce energy use, while contributing to reducing inflation pressures (see Chapter 1).

Sweden's electricity market was deregulated in the mid-1990s. Electricity producers sell their production on an exchange to electricity suppliers who supply households and businesses. Some large electricity consumers buy their electricity directly on the exchange or through power purchase agreements with electricity producers. Electricity is traded in the financial market up to ten years ahead of delivery. Spot contracts are traded the day ahead of delivery, and there is an intraday market to adjust volumes. The Transmission System Operator Svenska kraftnät trades electricity in real time to balance the market in the so-called balancing market. Transmission services, the mirror image of the wholesale electricity market, is a natural monopoly and is regulated as such and supervised by the Swedish Energy Market Inspectorate. State-owned Svenska kraftnät is responsible for the national transmission grid and international connections, while a mix of public and private regional and local grid companies have their respective regional and local transmission monopolies (Brännlund et al., 2022).

Sweden is part of the Nordic-Baltic integrated electricity market and is also increasingly connected to electricity markets in the rest of Europe. The country is a net exporter of electricity, but depends on interconnections with neighbouring countries for efficiency and security of supply. Electricity is 98% fossil-free, dominated by hydropower and nuclear power (Figure 2.9).

Figure 2.9. Sweden is a net exporter of electricity

Electricity use and electricity generation by type



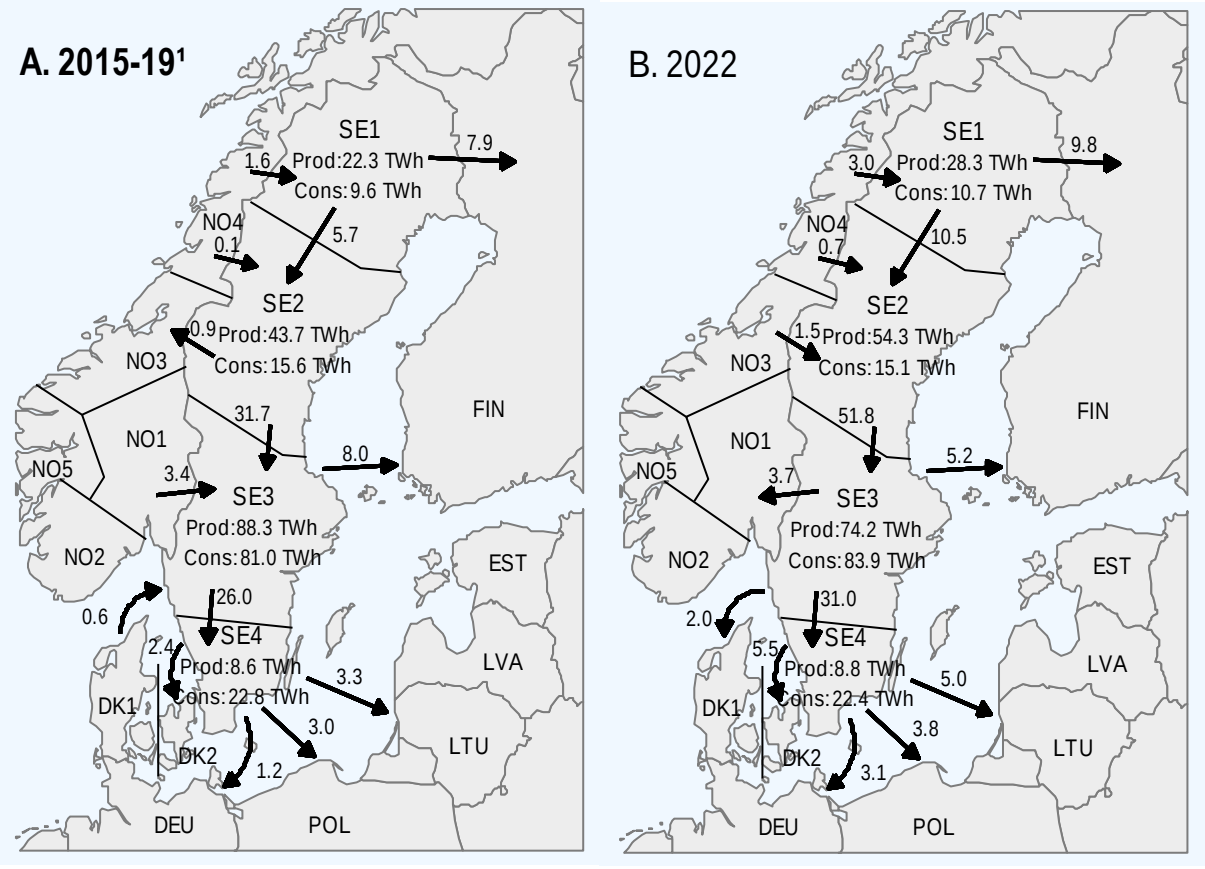
Source: Statistics Sweden; Swedish Energy Agency.

StatLink https://stat.link/ctepj6

In 2011, Sweden was divided into four electricity areas to better reflect scarcity and bottlenecks in transmission capacity in prices and investment decisions in line with OECD best practice. There are considerable geographical variations in the balance of supply and demand. Areas Luleå (SE1) and Sundsvall (SE2) are the two northernmost areas. They are both characterised by surplus production, predominantly from hydropower, and are connected to Norway and Finland. Area Stockholm (SE3), which also encompasses Gothenburg, is dominated by nuclear power, and demand surpasses supply. The area is connected to Norway, Denmark and Finland. Area Malmö (SE4) also has a supply deficit, it is connected to SE2 only indirectly via SE3, but is connected by undersea cables to Denmark, Germany, Poland and Lithuania (Brännlund et al., 2022) (Figure 2.10). Limited transmission capacity between the north and the south has at times resulted in price differences. These differentials reached extremes in 2021 and 2022. In the southernmost energy area, which is importing the bulk of its electricity, prices were set largely in tune with Germany, Denmark and Lithuania, reflecting the marginal cost of producing electricity from natural gas. Prices in the north reflected the variable cost of hydropower and wind power. In late 2022 prices aligned with SE3 and SE4 to reach record levels also in SE1 and SE2 due to a combination of necessary temporary operational adjustments to hydropower output, feeble winds and cold weather.

Figure 2.10. Geographical variations in the balance of supply and demand

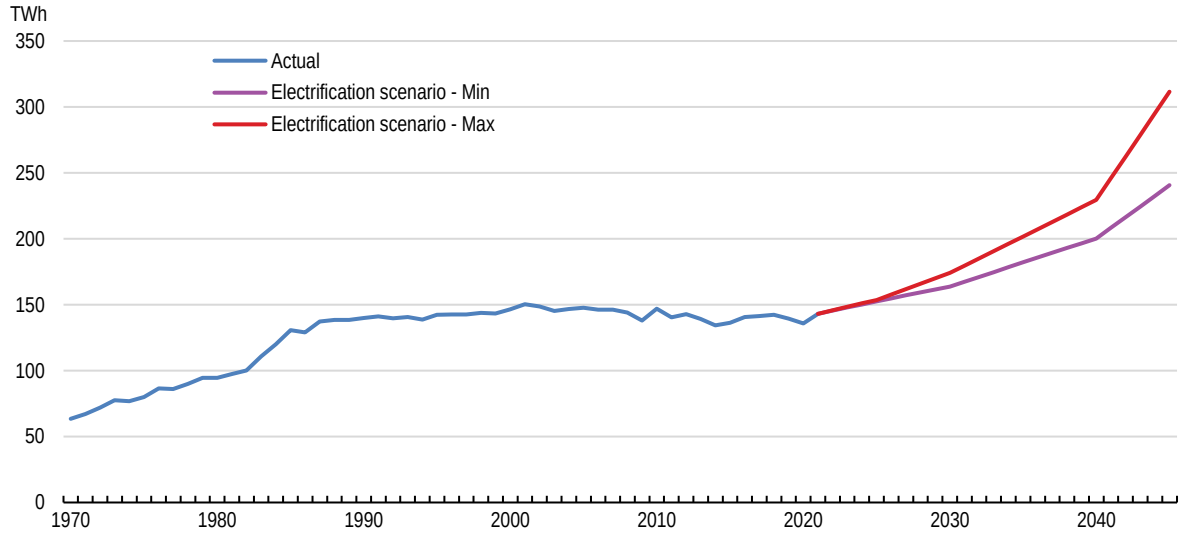
Total electricity supply and demand per Swedish energy area and net exports between areas



1. The figures next to the arrows indicate net exports of electricity in TWh. Panel A shows the 2015-19 average for electricity production, consumption and net exports. For net exports to Lithuania, the 2017-19 average is shown.
Source: NordPool; Statistics Sweden.

Swedish electricity consumption has been stable for decades. As recently as 2019, a scenario analysis commissioned by Swedenenergy (an organisation for electricity companies) forecasting a 35% increase in demand until 2045 was seen as bold. An updated analysis in 2021, based on investments plans and inputs from industry, shows a potential electricity demand of 240-310 TWh per year in 2045, roughly a doubling compared to current demand of about 140 TWh (Figure 2.11). The largest increase is within industry, where iron, steel, metals and mines are seen to increase electricity demand by 72 to 127 TWh. This is connected to concrete investment plans within green steel production (see Box 2.3), where in particular the production of hydrogen to reduce iron ore to sponge iron, but also electric arc furnaces to turn iron into steel and rolling mills consume large amounts of electricity. Electrification of transportation and chemical industries will also contribute considerably. Most of the increase is expected in northern Sweden's electricity area SE1, encompassing the regions of Norrbotten and Västerbotten, where most investments within the iron and steel sector are planned. Electricity demand in SE1 is approximately 10 TWh today, but could increase seven- to twelvefold by 2045 to between 75 and 127 TWh if currently planned investments come to fruition. As an example, H2 Green Steel's Boden facility alone is set to consume around 17 TWh a year, approximately three-quarters of average annual electricity production in SE1 from 2015-2019. Installed capacity may not need to increase commensurately, as industrial users could add demand flexibility, notably by producing hydrogen when electricity is abundant and cheap, while halting production or even using stored hydrogen to produce electricity at times of peak demand or low supply from weather-dependent sources (Gode et al., 2021). Even so, a near-doubling of installed capacity could be necessary.

Figure 2.11. Electricity demand could roughly double by 2045



Source: Statistics Sweden; Gode et al., 2021.

StatLink https://stat.link/dig7s0

There are considerable risks connected to Sweden's drive for fossil-free steel production. A social cost-benefit analysis by Johansson and Kriström (2022) indicates that the net benefit of HYBRIT's pilot facility is negative if it either replaces EU steel production on the margin and therefore reduces scarcity of emission permits in the EU ETS, or if its high electricity consumption increases electricity prices. These concerns need to be taken seriously, also as HYBRIT is owned by a consortium of state-owned companies, and has received considerable funding through the Industrial Leap. H2 Green Steel's facility in Boden was initially developed with minimal public support, but applied for funding in early 2023, arguing that subsidies are necessary to level the playing field with its competitors. Norwegian company Blastr Green Steel, which is considering fossil free steel production in Ingå, 60 kilometers west of Helsinki in Finland. These developments illustrate that HYBRIT's initial deployment of a new clean technology can have repercussions for the entire industry in the longer term. In this case, the argument that these developments on the margin only reshuffle demand for emission permits in the EU ETS is weakened considerably. There is however a technology risk, as potentially more cost-effective technologies such as closed-loop carbon recycling mature (Kildahl et al., 2023). There is also a clear risk that large investments in electricity-intensive fossil-free steel production will be unprofitable unless electricity production and transmission capacity develop at a similar pace as industry.

Hydropower, which represents a considerable share of supply and plays an important role to balance supply and demand, is largely seen as fully exploited in Sweden due to concerns about its effect on nature and wildlife (Bergman, 2022), but there is some scope for upgrading existing facilities and increased precipitation due to climate change is expected to increase output by 15-20%. Solar power is technically ill-suited for production in the far north due to a lack of sunlight in high-demand winter months, but has been expanding rapidly from a low base in the south. Substantial wind power developments since the early 2000s have increased its share in production from near-zero to 17% in 2020, and its share of installed capacity to 24% of the total. Closure of reactors in southern Sweden have reduced nuclear's share of installed capacity from 53% in 2000 to 40% in 2020, and its share of production from 39% to 29% over the same period.

The new government has pledged its support to new nuclear capacity, marking a turn in policy from previous governments that have restricted new nuclear power through tax policy and regulation. In January

2023, the government issued a proposal to lift restrictions in the Environmental Code limiting the number of reactors on Swedish soil to 10 and their placement to the three existing nuclear generation sites (Government of Sweden, 2023).

Nuclear power is a zero-emissions source of electricity, disregarding some emissions connected to the extraction and transport of fuels, but faces commercial and safety challenges. The European Commission has in its taxonomy labelled nuclear power as sustainable, and OECD countries including the United Kingdom, France and Korea are increasingly seeing nuclear power as part of a low-carbon electricity generation mix. Others, notably Germany, are phasing it out. Sweden's approach to nuclear energy should be pragmatic, handling issues of profitability and financial risk sharing as well as nuclear safety and waste concerns responsibly and taking the full range of associated costs and benefits into account (Pareliussen et al., 2022).

Concerns have been raised about the profitability of nuclear power compared to renewable alternatives when the risk of delays and cost overruns as well as life-time social costs of decommission and the risk of accidents are taken duly into account. On the other hand, nuclear is a good low-carbon complement to intermittent supply from wind and solar power (Pareliussen et al., 2022). A global push to develop so-called small modular reactors can potentially overcome commercial hurdles by lowering the initial investment and streamlining their construction, but these reactors have yet to come to the market. The commercial case for new reactors in Sweden without government support or guarantees therefore seems weak for the moment.

Sweden is the second country in the world after Finland to designate a permanent disposal facility for used nuclear fuels. Following a thorough review- and permitting process that started as early as 2011, plans by the Swedish Nuclear Fuel and Waste Management Company for permanent storage of nuclear waste were approved by the government in 2022. The system consists of a plant for interim storage and encapsulation of spent nuclear fuel in Oskarshamn Municipality and a final repository for nuclear waste at Forsmark in Östhammar Municipality. The used fuels will be buried in the bedrock 500 meters underground, encapsulated in copper canisters and Bentonite clay (Government of Sweden, 2022).

There is great potential for further wind power development in Sweden, offshore and on-shore, but wind power faces political barriers motivated by NIMBY-ism, conflicting land claims and technical-commercial barriers due to its weather-dependent nature. The example of Gotland is telling, where habitat protection, territorial defence and owners of expensive holiday homes have conflicting interests, while transmission capacity with the mainland is limited (OECD, 2022e). The United Kingdom's Contract for Difference Scheme is an example of how some of these hurdles can be overcome (Box 2.4). The combination of plannable hydropower and baseload nuclear power ensured a high level of security of supply and stable prices in Sweden in the past, while an increasing share of wind and solar power makes supply dependent on the weather (Bergman, 2022).

Wind power investments in Sweden have increased dramatically in the past few years and have so far been dominated by land-based turbines. The Swedish Energy Agency and the Swedish Environment Protection Agency published a wind power strategy in 2021 with a goal of 100 GWh of electricity produced by wind power by 2040, based on an assumption of 180 GWH of total electricity demand (Swedish Energy Agency and Swedish Environomental Protection Agency, 2021). Considerable plans for further investments exist, with an estimated doubling of on-shore wind power production from 27 GWh in 2021 to 50 GWh in 2024 expected from wind projects already in the pipeline based on previously given permits.

Box 2.4. Contract for difference auctions made the United Kingdom a leader in offshore wind

Renewables are characterised by high capital costs and low marginal costs. Price uncertainty over the lifetime of a new plant is therefore a significant barrier for investment in high capital-cost technologies. Wind conditions tend to be similar over vast areas, which leads to depressed prices when it is windy and concerns about security of supply when the wind does not blow. This gives ground to "cannibalisation" where the profitability of wind power falls the larger its share of installed capacity.

The United Kingdom's Contract for difference (CfD) scheme is an example of how these hurdles can be overcome. It complements pricing by awarding a 15-year fixed price for new renewable electricity generation in competitive auctions. It is a well-designed subsidy, as it encourages competition and minimises the fiscal cost of reaching policy goals through its auction design. Indeed, in recent auctions the strike price for allocations to established technologies has been below the market-derived reference price, which means that instead of receiving a top-up, successful bidders are likely to pay the government-owned Low Carbon Contracts Company.

As part of CfD, the United Kingdom holds separate auctions for less established technologies. This is a way to scale up solutions for the future and could inspire competitive subsidy designs also in other sectors, provided policy objectives are clear and outputs are measurable. However, sector- or technology-specific auctions face a dilemma: grouping technologies together risks crowding out technologies at a current cost disadvantage but high future potential, while more narrowly targeted auctions may waste resources by picking unviable technologies and reducing competition.

Source: OECD Economic Surveys: United Kingdom 2022.

A larger share of unplannable wind in the generation mix also increases the risk that supply will not match demand in periods, which could jeopardise security of supply for example in periods of cold and calm weather during winter. Wind power development will therefore increasingly need to be matched by a combination of more transmission capacity, plannable electricity production, storage and increased flexibility in electricity use. As mentioned above, a large share of increased demand is set to come from hydrogen production through electrolysis and electrification of ground transport. Hydrogen production can help balance supply and demand as discussed above. Likewise, smart charging of electric vehicles and vehicle-to-home and vehicle-to-grid solutions can contribute to smoothen intraday demand. Upgrading existing hydropower plants to increase their output, including with pumped storage in cases where this is compatible with nature preservation, also has a role to play (Bergman, 2022; Brännlund et al., 2022). Electricity prices already reflect supply constraints in the relatively well-functioning Nordic electricity market, and thereby incentivise demand responses. Solutions such as vehicle-to-grid services will need facilitation by working with power and transmission companies to develop contracts and solutions that provide the right incentives, and with vehicle producers to adapt these systems to battery characteristics and battery warranties.

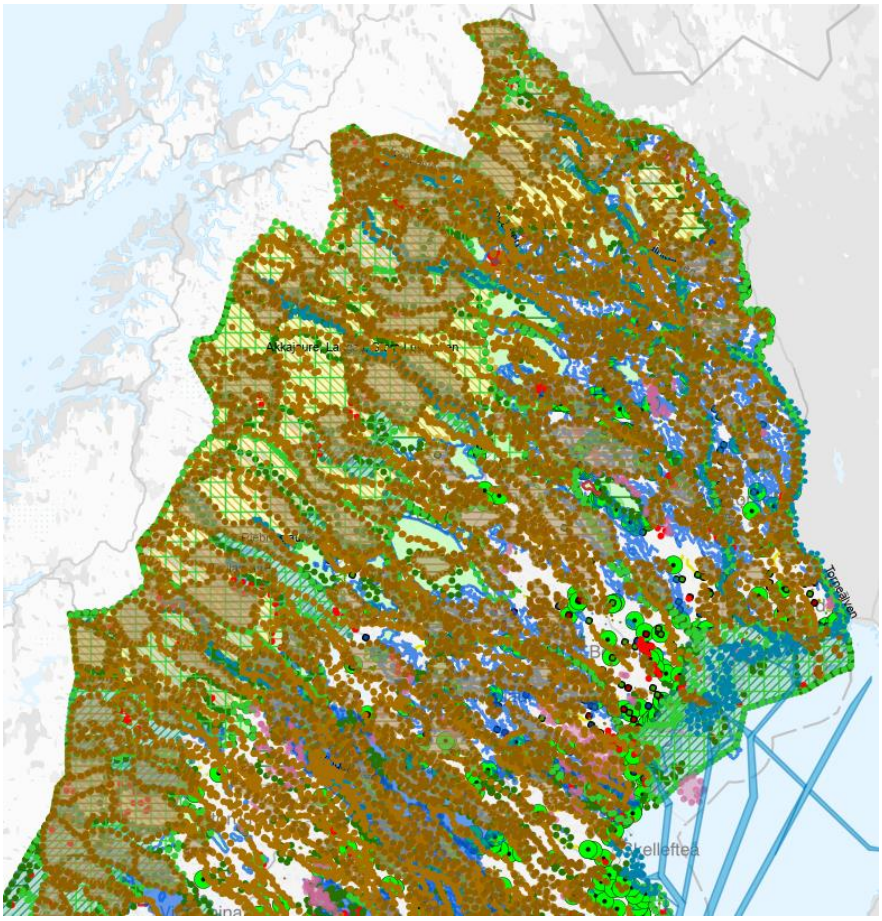
Spatial planning, permits and competing land claims slow down the transition

The large investment needs within transmission, massive plans for further wind power investments, mining and green industry raise the need to shorten permitting procedures. Thorough processes and stakeholder involvement are hallmarks of political decision making in the Nordics, and ensure that good decisions are made and enjoy broad support from society. There is nonetheless an increasing realization that while many companies are ready to advance green investments at the revolutionary speed required to reach net zero, permitting processes, notably for environmental permits, at times move at a crawl. Municipalities hold a local planning veto anchored in the Swedish Environmental Code ("Miljöbalken") which they increasingly exercise to block wind farm projects, notably in the southern part of Sweden, where there is a deficit of

supply. The Swedish Armed Forces also opposes various projects for reasons that are at times perceived as somewhat of a black box by applicants. Investments in transmission capacity face lead times of up to 15 years (Sonder, 2022). While land is abundant, its use often faces several overlapping claims, including defense interests, nature conservation, water management, agriculture, forestry and traditional reindeer husbandry (see example in Figure 2.12).

Figure 2.12. Land is abundant, but with many claims

Overlapping land claims and restrictions in Norrland



Note: This figure is for illustrative purposes only. Every coloured area and every dot represent a land claim or land use restriction relating to nature, scenery and outdoor life, EU directives on habitats and bird life, water and fisheries, reindeer husbandry, public infrastructure and energy production. Private land claims are not included.
Source: Länsstyrelsen Geoportal (accessed 28 February 2023).

Investments in electricity generation, grid, mining and industry all need to secure environmental permits in line with the Swedish Environmental Code. The purpose of the law is to safeguard sustainable development, and it covers areas including: pollution and damage to human health and environment; protection of valuable natural and cultural environments; biodiversity; the use of land, water and the physical environment; and resource efficiency, re-use and recycling. Reducing greenhouse gas emission is an important element of sustainable development, but will often be subordinated to local effects of development such as disturbances to habitats, many of which are regulated based on international treaties and EU law. thereby putting little weight on positive climate effects. Furthermore, unclear language in the Environmental Code causes delays in applications because interpretation varies. It is also lacking in terms of assessing cultural and socio-economic impacts, especially cumulative ones that are important for regions and stakeholders such as Sami that travel across regions (OECD, 2021; OECD, 2019).

In 2020, the government established a commission of inquiry to propose changes to simplify and speed up the process to obtain environmental permits while safeguarding environmental protection. The commission delivered its final report in 2022. It concluded that even though the system itself is in many respects well-functioning, processing times need to be reduced and there is potential to make processes more efficient, predictable and conducive to climate-friendly investments without lowering ambition on environmental outcomes (Box 2.5).

Box 2.5. The Environment Permit Commission's main conclusions

In its final report, "About examination and re-examination - a part of the green transition", the Commission concluded that Swedish environmental permitting procedures are overall functional, but that more is to be done to reduce processing times in certain areas. The Commission identified five main areas of improvement:

The Environmental Code is unclear on when applications can be submitted as amendments to existing permits. Therefore, too many such changes are treated as new applications. The Commission proposes to deal with this by clarifying that amendments should be the default option in applications pertaining to existing permits, by making it easier to change the terms of existing permits when circumstances change, and by clarifying what constitutes an amendment.

Existing permits are mostly without time limitations, risking unnecessary damage to the environment and distorted competition between incumbents and new entrants who need to comply with modern stricter requirements. The Commission proposes mandatory re-examinations at given intervals to update permissions according to recent law.

Consultations with relevant authorities in charge before submitting an application ("Samråd"), are inefficient. Unclear responsibilities and a lack of coordination of central government interests can lead to demands for additional information later in the process. The Commission proposes to strengthen the role of the County Administrative Boards as hubs in the process and their responsibility to map relevant central government interests at an early stage. Further, it proposes to give clear assessments and guidance on issues to be covered in the subsequent environmental impact assessment, and to coordinate agencies responsible for the National interests ("Riksintressen").

A lack of active process management from permitting bodies may slow the process down. Proposals from the Commission include using time schedules and early-stage oral procedures to sort out delimitation issues and the need for completing information, promoting digital processes, facilitating the rejection of incomplete applications at an early stage and making it easier to settle cases without a main hearing in the Land and Environmental Courts.

There is a need to improve knowledge of new climate-friendly technologies and their climate- and environment effects in the County Administrative Boards. The Commission proposes to set up a knowledge centre in the Swedish Energy Agency to help County Administrative Boards make informed and timely decisions on climate-friendly projects, and to establish a climate task force at some of the country administrative boards to assist in the decision process regarding activities materially contributing to fulfil climate targets, supported by the new knowledge centre.

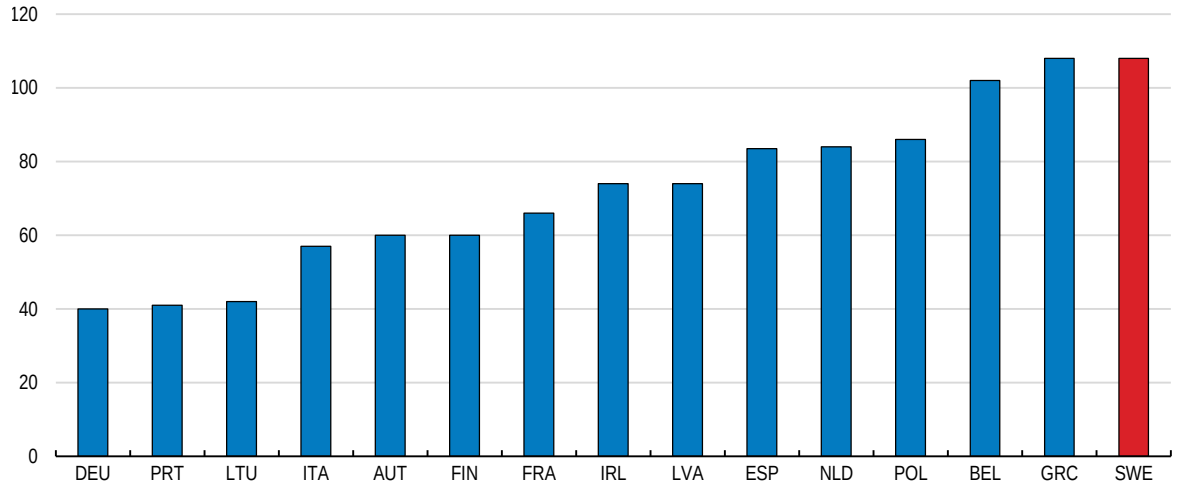
Source: Miljöprövningsutredningen (2022).

One major hurdle, especially for wind power projects, is the municipal veto. The average lead time to secure necessary permits for land-based wind projects is nine years, among the longest in Europe (Figure 2.13), and the share of approved wind power permit applications has been falling over time. More than half of projects that are declined or altered by the Land and Environmental Courts fall through because of opposition from municipalities. In comparison, less than a quarter are declined due to their impact on

nature, biodiversity or landscape (Figure 2.14). The share of rejections is highest in the south of Sweden where electricity demand outpaces supply, with an approval rate of 38% in SE4, 42% in SE3, 46% in SE2 and 55% in SE1 (Westander, Risberg and Henryson, 2022).

Figure 2.13. The permitting procedure for onshore wind is among the slowest in Europe

Average permitting time in months



Source: Fox et al. (2022).

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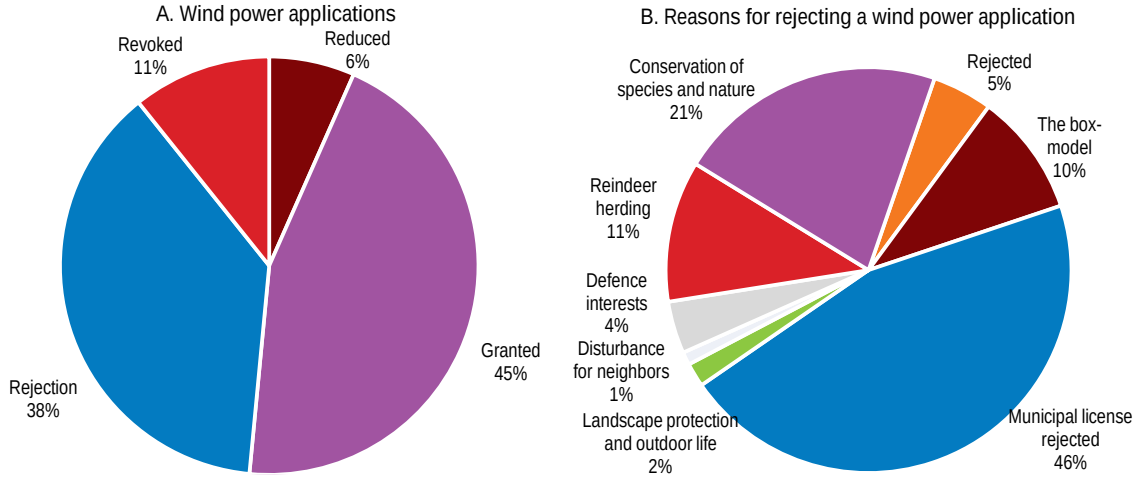
Figure 2.14. Around half of wind power applications are approved

2014-2021



Source: Westander, Risberg and Henryson (2022).

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The municipal veto in local planning decisions is a deeply engrained institution in Sweden, but the government should consider measures for a more balanced approach. The government launched an official investigation into the need and potential scope for national spatial planning in 2022. In addition to changing the law to change the conditions for the veto, measures could include issuing guidelines, mandates and expectations to municipalities, and creating mechanisms to give municipalities a share of profits from these developments. Swedish municipalities raise most of their revenue through personal income taxation, while corporate taxes are collected at the central government level. The benefits of wind power investments befall society at large and the project owners. Local benefits are limited, as wind parks are often seen as a nuisance by local residents, and they generate relatively little local employment. Giving municipalities a share in the profits raised from these developments could be considered. Delegating the authority to collect local property taxes and set property tax rates locally, as in Norway, could be one way to achieve this. It would also facilitate a more growth-friendly tax mix and would give municipalities an additional lever to redress finances under pressure from rising interest rates. An expert commission tasked by the government to propose schemes to compensate those whose environment is significantly affected by wind power deployment and to put forward proposals to give municipalities stronger incentives to contribute to the expansion of wind power is set to report in the first half of 2023.

Box 2.6. Streamlining planning decisions through the AGON coordination network

The Country Administrative Board initiated the founding of the AGON (Accelerated green transition in Norbotten) coordination network in 2021 to accelerate Norrbotten region's green transition by speeding up permitting procedures and the application of rules. The group does not have a formal role in decision making processes but aims to find solutions to allow large-scale projects to go ahead without undue delays. It has for example contributed to shortening lead times for Svenska kraftnät's Vitåfors-Porjusberget transmission project, which is further discussed below.

Another example is that structures above 50 metres of height cannot be built in areas designated as low-fly zones by the Swedish Armed Forces. Early discussions, clarifications and project adaptations if necessary can allow tall structures, notably wind turbines and fossil-free steel plants, to go ahead without unnecessary delay. For example, HYBRIT's test facility limited the height of its iron ore reduction tower to 50 metres due to its situation in a low-fly zone, while H2 Green Steel who do not face such limitations is constructing 120 metres tall towers in Boden to optimize the process.

Members of the group include:

- The County Administrative Board
- Norrbotten region,
- The government's coordinator for Norrbotten och Västerbotten,
- Norrbottens Kommuner, the umbrella organisation for the 14 municipalities in the region,
- Luleå, Boden and Gällivare municipalities,
- The Swedish Armed Forces,
- The Swedish Transport Administration,
- The Energy Market Inspectorate,
- Fossil Free Sweden,
- Svenska kraftnät, and
- The companies Vattenfall, SSAB, LKAB and H2 Green Steel.

Source: luleabusinessregion.se

Green investments and investments in the mining sector need to respect the minority rights of the indigenous Sami people. In a case in Norway's Fosen peninsula, the supreme court judged that the concession to build two major wind power parks breached the UN International Covenant on Civil and Political Rights. Similar issues exist in Sweden, and previous OECD advice can help avoid such conflict, by including Sami land use considerations in regional spatial planning, clarifying Sami rights to consultation on land use issues and supporting capacity building for Sami institutions/organisations to be meaningful partners in such engagement (OECD, 2019; OECD, 2021).

The amount of offshore wind in Swedish power generation is currently negligible but interest from developers is considerable, with projects totalling 67 TWh of annual production in the process of permit application and a further 300 TWh at earlier stages of planning. Almost 90% of offshore wind projects have so far been vetoed by the Swedish Armed Forces, so the realised potential is expected to be considerably lower (Westander, Risberg and Henryson, 2022). Legitimate defence interests must weigh heavily in these decisions, but experience from Norrland shows that engaging the armed forces in dialogue at early stages of project development can help identify acceptable solutions, or at least avoid spending resources on projects doomed to be opposed at a later stage (Box 2.6). The government launched a more coordinated approach with the first national Marine Spatial Plans adopted in 2022. These may enable a faster expansion of 20–30 TWh of offshore wind power. The government has also tasked the Swedish Energy Agency to identify additional areas for energy production, potentially enabling an additional 90 TWh.

Increased production of intermittent electricity will necessitate major investments in the grid to handle increased production and use, and to better match supply and demand geographically and over time. The greatest investment needs are found in the national transmission network and in the regional networks that connect it with the largest the cities' local electricity grid (Bergman, 2022; Brännlund et al., 2022).

Svenska kraftnät, the publicly-owned and financed transmission system operator, plans major investments to strengthen the grid and replace old transmission capacity. These are implemented based on socio-economic cost-benefit analyses, while regional and local grid monopolies invest based on commercial decisions within the income regulation system for grid companies. Transmission companies have repeatedly and successfully challenged in court the calculation interest rate set by the Swedish Energy Inspectorate every four years, which implies that it is too low for private companies dependent on private funding (Bergman, 2022). The government has appointed a commission to review the regulation of electricity network fees. The commission is set to report in October 2023. Bergman and Diczfalusy (2020) argue that a stable calculation rate would reduce commercial risk for companies and might therefore be beneficial to all parties involved. Any new system will need to take into account that the European Court of Justice has judged that National Regulatory Agencies must determine the methodologies used to calculate or establish the conditions for electricity network fees in complete independence.

There is no national plan or coordination for the development of the integrated electricity network. Investments are planned and carried out by a large number of independent grid companies of various sizes and different ownership structures. Svenska kraftnät regularly reports a plan for their future investments, but a more holistic coordination process of the extensive electricity network investments that are expected to take place in the coming decades seems warranted (Bergman, 2022).

Lead times for investments in the transmission grid are long. These are complex processes with three main workstreams: obtaining necessary permits, securing ground rights and planning adequate technological and engineering solutions. Each of these processes go through five main steps: pre-study, impact assessments and consultations, application for concession, design and projecting, and construction. These steps are today carried out in sequence, as the grid operators want to be sure they have a concession before investing in detailed design and projecting. In consequence, new grid investments take seven to fifteen years to materialise, with the longest lead times if the concession is appealed to the Land and Environmental Courts (Sonder, 2022).

In 2021, the government assigned a project to shorten lead times in transmission infrastructure to the Energy Market Inspectorate, the Land Survey and the County Administrative Boards. The project is looking into practical and legal obstacles currently increasing lead times. In addition to grid companies and the Land and Environmental Courts, these institutions are the central decision-makers in the grid investment process. Five pilot projects have been selected to streamline the process. Vattenfall runs two of the included projects, one to strengthen the regional grid in Gothenburg and the other to supply SSAB's electric arc furnace for fossil-free steel production in Oxelösund south of Stockholm. E.ON runs a project to connect a wind power in Åseda in the south of Sweden to the grid, a project that was previously denied a permit by the Land and Environmental Courts. Ellevio runs a project to supply new climate-friendly industry as well as providing connections for expected developments of clean electricity, notably solar, north-east of Gothenburg. The fifth project is run by Svenska kraftnät to supply HYBRIT's clean steel demonstration plant in Luleå through a new 50 kilometre long 400 kV transmission line from Vitåfors to Porjusberget (Energimarknadsinspectionen, 2023).

Transmission companies can also reduce lead times by adjusting their own processes. Svenska kraftnät's Vitåfors-Porjusberget project, which is part of its SEK 10 billion Fossil-free Upper Norrland programme to ensure investments in the grid, move hand in hand with green industrial development in the north. They also use the project as a test case for LEAN production aiming to remove redundancies and unnecessary steps of their internal processes and moving from sequential to parallel processes to obtain permits, secure ground rights and develop technical specifications. With these efforts they aim to halve the project lead time from 14 years, which is currently normal for this kind of large-scale project, to seven (Svenska kraftnät, 2023).

A fast green transition requires people, services and infrastructure

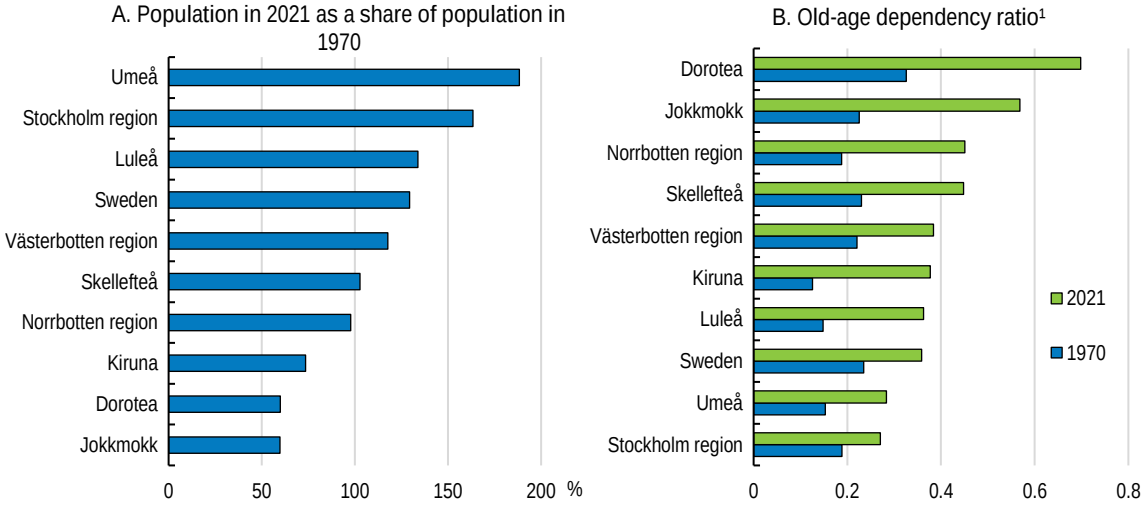
The green revolution offers promises of renewed growth and prosperity to Sweden's remote northern regions after decades of depopulation and lagging productivity growth, but this will require considerable investment to improve availability and access to goods and services that enhance the quality of the living environment, such as housing and public infrastructure. Shortages of specialised skills for industrial development and a general shortage of working-age people to provide necessary public and private services is already a concern and is likely to grow in importance going forward (OECD Economic Survey of Sweden, 2021).

About 40% of the Swedish population lives in the three metropolitan areas with more than half a million inhabitants each (Stockholm, Gothenburg and Malmö), while 43% of the population lives in rural areas and settlements with less than 50 000 inhabitants. The three biggest cities face challenges related to rapid urban growth, such as stress on infrastructure and housing shortages, the need to accommodate growth while reducing carbon emissions, and social polarisation, while small cities and rural areas have to deal with small scale and in some cases remoteness, population shrinkage, ageing, labour shortages and weak productivity growth (OECD Economic Survey of Sweden, 2021).

Some of the bottlenecks to a successful green transition are the same across the country, for example, electricity producers, transmission companies and the green industry draw from the same pool of engineering skills. Even though internal migration from the rest of the country to the north could exacerbate such shortages in particular industries in other parts of the country, the skill pool in the major agglomerations is comparably large and a considerable share of people with these specialised skills are recruited from abroad. Other bottlenecks have a stronger geographical dimension. Norrbotten and Västerbotten have seen weak population growth and ageing for decades, concentrated in rural municipalities, while the main urban agglomerations Umeå and Luleå have done comparatively well (Figure 2.15). New industrial activity has the potential to turn them from demographic decline to development. With it come a number of challenges related to the supply of people and skills to make the wheels turn in industry and supporting services. According to the OECD's innovative and multidimensional

approach to assessing regional attractiveness to international investors, talent, and visitors, the ability of regions to meet their labour needs will depend on their performance in six key areas, which combined are influential in determining the quality of life for residents (economic attraction, connectedness, visitor appeal, natural environment, resident well-being, and land-use and housing) (OECD, 2022a). Sectors like education, health or culture are part of the resident well-being dimension.

Figure 2.15. Rural municipalities are facing demographic pressures



1. 65+ population as a share of the population aged 20-64.
Source: Statistics Sweden.

StatLink https://stat.link/wfzu0j

Housing supply is also a challenge in the northern parts of Sweden, although less acute than in the main agglomerations in the south. A majority of municipalities harbouring cities and towns in the north report housing shortages (Table 2.1). Low second-hand housing values may discourage private housebuilding, notably in rural areas. Rental housing, which is essential to attract workers who are planning to settle in northern Sweden temporarily, is limited. The rigid rent controls that create a mismatch between supply and demand in Sweden's larger cities (see Chapter 1), Stockholm in particular, are less of a binding constraint in the north. However, rent controls in general prevent private investments in rental housing and the development of a functioning buy-to-let market in Sweden. Loosening rent controls would contribute to increase the supply of rental housing, but investments in municipal public housing will maintain a central element in housing strategies in the absence of such reform.

Skellefteå provides a peek into the future for Sweden's northern towns and cities. Its population remained stable at around 72 000 people from the 1960s to 2019. Northvolt's battery factory, which started operations in 2022 hired 600 employees that year and plans to reach 3 000 employees on the site by 2025. Consequently, Skellefteå's population has started increasing, and the municipality plans to accommodate an increase to 90 000 people or more by 2030. A back-of-the-envelope calculation adding indirect job creation and non-working family members to Northvolt's 3 000 indicates that this is a realistic assumption. Direct and indirect employment from Northvolt's establishment alone could increase Skellefteå's population from 73 400 in 2021 to almost 85 000 people by around 2025 (Box 2.7). Skellefteå has responded to the challenge by investing heavily in housing, schools, kindergartens, roads, bridges, parks and a major expansion of port facilities. A logistics hub and an industrial park adjacent to Northvolt's factory are also under construction.

Table 2.1. Most towns and cities in Norrbotten and Västerbotten report housing shortages

Municipality	Population size, 2021	How do you judge the current housing situation?	How do you see the housing situation in three years?
Umeå	130 997	Shortage	Shortage
Luleå	78 867	Shortage	Shortage
Skellefteå	73 393	Shortage	Shortage
Piteå	42 323	Shortage	Shortage
Boden	28 160	Shortage	Balance
Kiruna	22 555	Shortage	Shortage
Gällivare	17 449	Shortage	Shortage
Kalix	15 768	Shortage	Shortage
Lycksele	12 264	Surplus	Surplus
Haparanda	9 496	Surplus	Surplus
Vännäs	9 054	Shortage	Shortage
Älvsbyn	8 009	Shortage	Shortage
Nordmaling	7 100	Shortage	Shortage
Vilhelmina	6 485	Surplus	Surplus
Arvidsjaur	6 143	Balance	Balance
Pajala	5 973	Balance	Balance
Storuman	5 808	Surplus	Surplus
Vindeln	5 550	Shortage	Shortage
Jokkmokk	4 780	Balance	Shortage
Övertorneå	4 211	Surplus	Surplus
Norsjö	3 971	Shortage	Shortage
Överkalix	3 252	Balance	Balance
Malå	3 034	Balance	Balance
Åsele	2 807	Balance	Balance
Arjeplog	2 707	Shortage	Balance
Sorsele	2 460	Balance	Balance
Dorotea	2 459	Shortage	Balance
Bjurholm	2 395	Shortage	Shortage

Note: The Swedish National Board of Housing, Building and Planning's housing market survey asks all 290 municipalities in Sweden whether they think there is a housing surplus, shortage or balance in their municipality. The survey was conducted in 2022.
Source: The Swedish National Board of Housing, Building and Planning.

Like Skellefteå, other municipalities host to new green industry projects will need to invest in housing, infrastructure, public services and attractive living environments in expectation of population growth, while tax income will only increase once new workers are there and pay municipal income tax. Most municipalities borrow through the municipal financing vehicle Kommuninvest at favourable terms due to its AAA-rating and low risk premium. However, many municipalities are indebted, and rising interest rates combined with the obligation to balance budgets from year to year (see Chapter 1) pose a challenge to new investments (Kommuninvest, 2022). Delegating property taxation to municipalities as discussed above could also help redress municipal finances.

Box 2.7. A back-of-the-envelope calculation of future population increase in Skellefteå

Northvolt's battery factory started operations in 2022. It hired 600 employees that year and plans to reach 3 000 employees on the site by 2025. New establishments create direct jobs as well as indirect jobs due to their backward linkages to suppliers and forward linkages to the economic sectors where the industry's workers spend their income.

Moretti and Thulin (2013) find a job multiplier from high-tech manufacturing in Sweden of 1.1 additional job created for each direct job creation. Moritz et al. (2017) studied job multipliers for mining sector jobs in Norrbotten and Västerbotten, and found a multiplier of 0.9 additional jobs created for each new job within mining. Assuming, that the mid-point of the two multipliers hold in Northvolt's case, this would imply an increase in total employment of around 6 000 people.

Many workers bring their families. Assuming that future in-migration will have a similar age and gender distribution as the 2019-21 average, and that their employment rate by gender will equal the average employment rate in Västerbotten region in 2021, each worker moving to Skellefteå will bring an additional 0.8 persons. Combining the job multiplier with the population multiplier per new worker indicates that the population could increase by an average of 3.6 people for each new Northvolt employee. The total population increase from Northvolt's establishment in Skellefteå would in this case be around 11 400.

Table 2.2. Example: population increase per direct manufacturing job created

	Children (age 0-14)	Women (age 15-74)	Men (age 15-74)	Total (age 0-74)
Employment rate Västerbotten 2021		0.61	0.71	
In-migration, 2019-21 average	376	905	1042	2323
Employed	0	551	736	1287
Population per in-migrated employee				1.8
Job multiplier				2.0
Population per direct manufacturing job created				3.6

Note: Employment rate refers to the age group 15-74 and is sourced from Statistics Sweden's LFS (AKU). Population per direct manufacturing job created assumes a multiplier of one indirect job per direct job created.
Source: Author calculations as outlined in this box.

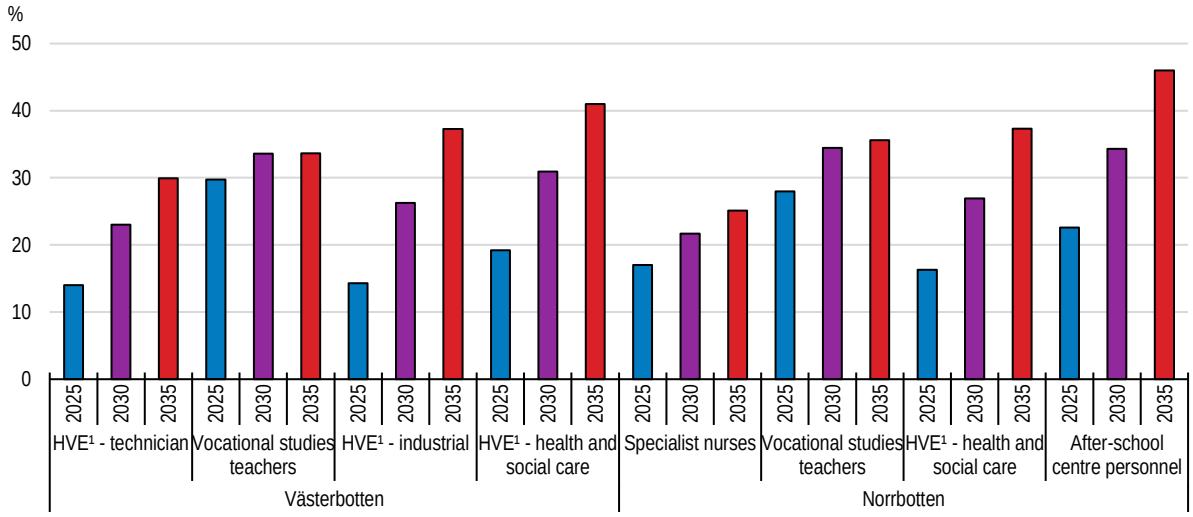
Norrbotten and Västerbotten's main challenge to meet employment demand from industry and private and public services is to attract people of working age. If unsuccessful, they risk that well-paying industry and mining jobs cannibalise employment in other sectors. Unemployment rates among the working age population (aged 15-74) in Norrbotten and Västerbotten stood at 5.6% and 6.6%, respectively, in 2021, well below the national average of 8.8% (Statistics Sweden, 2022). Considerable labour shortages already exist and are projected to increase in the coming decade (Figure 2.16, Panel A). Some shortages are projected within the industrial sectors, but the majority of shortages are within public services such as health and elderly care and teaching (Figure 2.16, Panel B), reflecting that industrial and mining jobs are well remunerated and relatively attractive, which can make it difficult for the public sector to compete for labour.

The structure of local labour markets and the age composition of the population are also reflected in educational attainment. A large share of the population of Upper Norrland (Norrbotten and Västerbotten regions) has upper secondary education (49% vs the 41% national average), which is often sufficient for jobs in mining and manufacturing. A smaller share of the population has tertiary education than the national average (43% vs 47%), and a smaller share has education below upper secondary level (8% vs 13%). In

contrast with the national trend, the share of young adults with post-secondary education has declined in both regions. While tertiary education attainment in Norrbotten has been below the national average at least since the 1980s, in Västerbotten it dipped below the national average for the first time in 2019 (Figure 2.17).

Figure 2.16. Current labour shortages in Norrbotten are projected to become more acute

Skill shortages in % of projected demand, by educational group

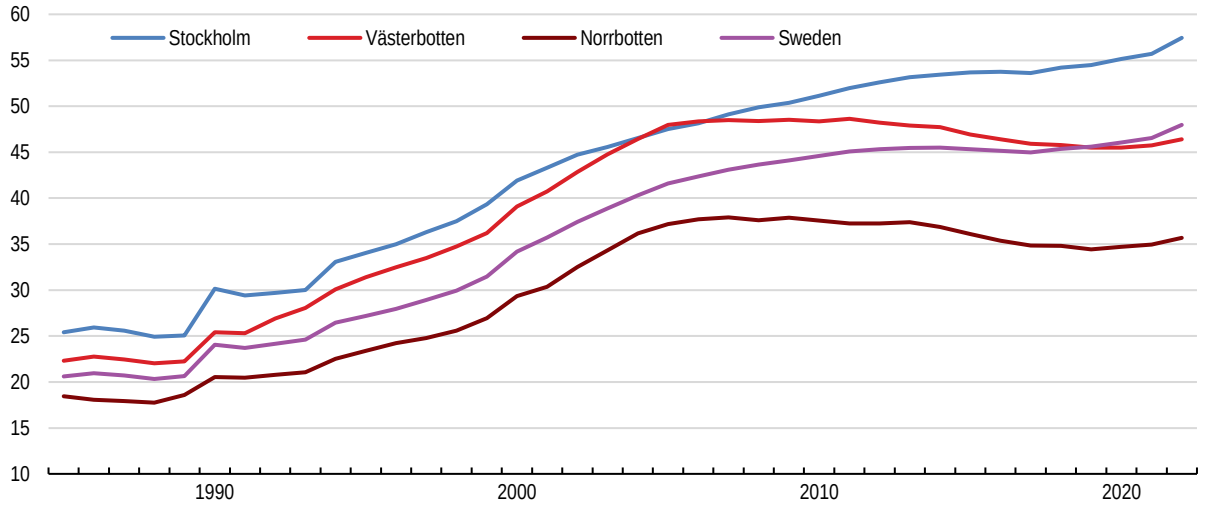


1. Higher vocational education.
Source: Statistics Sweden, Regional Trends and Prognoses.

StatLink https://stat.link/6q2iak

Figure 2.17. The share of young adults with tertiary education is lower than the national average

Share of 25-34 year-olds with post-secondary education, %



Source: Statistics Sweden.

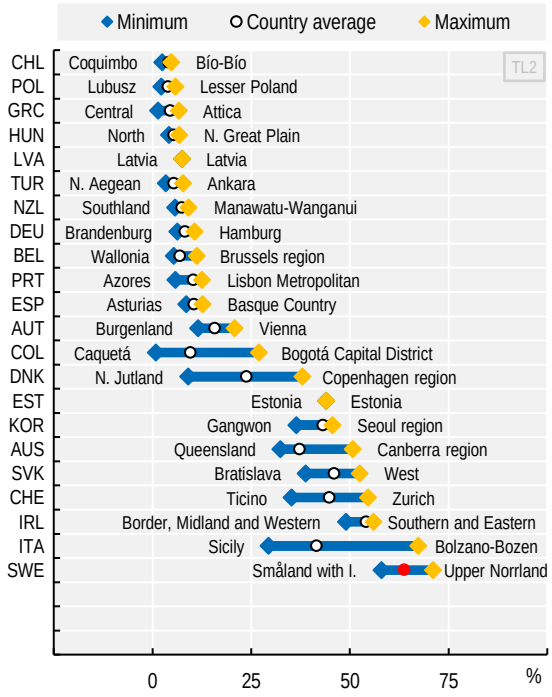
StatLink https://stat.link/sgkfon

The two regional universities of Luleå (Norrbotten), with campuses in Piteå, Kiruna and Skellefteå, and Umeå (Västerbotten), with campuses in Örnsköldsvik and Skellefteå, play an important role in the new industry by supplying skills and by means of research collaboration with industry. The previous *OECD Economic Survey of Sweden* (2021) highlighted the importance of higher education and R&D expenditure in regional productivity and development. The universities are key skill providers to the private and public sector and offer a variety of programmes including within health and social care, engineering and social sciences. They are also important in their role to retain youth in the region and to attract young people from elsewhere, thus providing an important pool of talent for regional employment. Contrary to the region as a whole, the populations of the two university cities have been steadily growing for decades. Strengthening incentives and support could raise the contribution of universities to regional knowledge, innovation and skill supply.

Cooperation between the Public Employment Service, municipalities, universities and employers for a holistic approach to the supply of people and skills matched to changing labour market demands could help alleviate shortages. At the same time, a recent reform of the employment services contracting out activation measures in an outcome-based payment scheme offers opportunities and challenges as discussed in Chapter 1. Participation in adult education and training is high across the country (Figure 2.18), but may be even more important in sparsely populated regions with less diversified labour markets. Apprenticeships can help by providing opportunities to young people, as well as adults, to develop appropriate skills; at the same time, apprenticeships will also need to undergo changes in response to the green transition (Cedefop and OECD, 2022). Following Northvolt's establishment in Skellefteå the government tasked the PES to contribute to improve the skills supply for large company establishments and expansions in general. As a consequence, the PES has decided to open a new office in Skellefteå to better serve the city and surrounding regions. The PES in Northern Sweden has carried out a skills assessment and anticipation (SAA) exercise on the labour market needs of the five largest employers in the region, and is designing services through the PES in Skellefteå, but more analysis will be necessary to take into account the fast-expanding labour market and the rapid increase in skills needs (OECD, 2023a). Furthermore, Skellefteå's municipal adult education has, in cooperation with Northvolt, developed a six-month automation operator training programme at upper secondary level. These developments should be watched closely, and could guide similar initiatives in other localities.

Figure 2.18. Participation in lifelong learning is high throughout the country

Population aged 25-64 in formal or non-formal training, TL2 regions, 2017



Note: Population aged 25-64 in formal and or non-formal training. 2017 or last available year: 2018 for COL, DEU, ESP and PRT; 2016 for AUS, EST, ITA, SVK and SWE; 2015 for BEL, CRI, ROU and TUR; and 2012 for KOR. Countries are ranked in ascending order of the highest regional share of population in formal and or non-formal training.
Source: OECD (2020), OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en.

StatLink https://stat.link/2qf4bo

Recommendations on climate policies and to power up the green economy

Key recommendations in bold

MAIN FINDINGS	RECOMMENDATIONS
Revise climate policies and targets	
Climate change will affect places and groups of people and businesses differently. More granular estimates would improve the scope for efficient adaptation policies	Improve the sectoral and geographic granularity of estimates of climate damages and gains.
Sweden's 2045 net zero target applies to Sweden's total emissions, while 38% of emissions are in the EU ETS, an instrument under EU jurisdiction. Intermediate targets apply only to non-ETS sectors.	Set a 2045 emissions target for sectors not covered by the EU ETS in line with the national targets, until the European trading system for road transport and heating starts operating.
Transport sector emissions face a shadow price well above the emission pricing faced in the rest of society. In general, there is scope to better integrate climate considerations in Swedish cost-benefit analyses.	Strengthen consistency across government of the inclusion of greenhouse gas emissions in cost-benefit analyses.
Reducing the biofuel blending requirement will likely move the 2030 reduction target out of reach unless new and ambitious measures are implemented. An ambitious transport sector reduction target is redundant to the overall 2030 target, and may reduce efforts in other sectors.	Strengthen the overall policy package to ensure the 2030 target for non-ETS sectors as a whole is reached while allowing deviations from the 2030 transport sector target. Complete a country-wide charging network to speed up the take-up of electric vehicles.
Shifting journeys to more sustainable modes can contribute to reducing transport emissions and increase well-being.	Strengthen communication efforts and policies supporting modal shifts, road space reallocation and mainstreaming of on-demand shared transport services.
Incentives to reduce agricultural emissions are weak. Quantity-based measures like the number of livestock or fertilizer use can be measured and taxed relatively straightforwardly while associated emissions can vary widely.	Improve monitoring and reporting of agricultural emissions, with the aim to introduce a pricing mechanism, while rewarding climate-friendly practices, the provision of nature-based services and green R&D.
Sweden's climate targets and policies are focused on reducing existing domestic emissions, while there are strict limits and weaker polices to instigate negative emissions.	Treat additional negative emissions equally to reduced emissions in the target structure. Introduce a general subsidy or tax credit at the level of the carbon tax for negative emissions not currently covered by the EU ETS or the carbon tax.
Power up the green economy	
Green industry and electric vehicles are set to roughly double electricity demand by 2045, but permitting slow down investments in industry, renewable energy and transmission.	Streamline and improve coordination of the environmental permitting process.
Green investments affect the minority rights of the indigenous Sami people.	Include Sami land use considerations in regional spatial planning, clarify Sami rights to consultation on land use issues and support capacity building for Sami institutions and organisations to be meaningful partners in such engagement.
Municipalities use their local planning veto to shelve a large share of land-based wind power projects.	Consider limiting the municipal veto while allocating a share of wind power profits to host municipalities through for example a local property tax.
Weather-dependent electricity supply from wind and solar increases the need for demand flexibility, plannable electricity production, storage and transmission.	Facilitate smart electric vehicle charging and vehicle-to-grid solutions.
Investments in the national grid and regional grids are not coordinated.	Instigate a process for coordination of investment plans for national and regional grids.
Municipalities home to new industrial development need to attract working-age people to fill jobs in public services as well as industry.	Invest in municipal infrastructure, services and housing to facilitate population increases in hotspots for the green transition.
New industries raise the need for re-skilling and up-skilling, and the need to draw talent from elsewhere in Sweden and abroad.	Ensure that the Public Employment Service reform contributes to a holistic approach to the supply of people and skills with cooperation between municipalities, universities and industry.
Universities contribute to regional development by fostering and helping retain local talent and by strengthening competitiveness and business dynamism through participation in local research and innovation networks	Strengthen incentives and support to raise the contribution of universities to regional knowledge, innovation and skill supply.

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After a relatively strong performance during and after the pandemic, short-term growth prospects are weak. High inflation has eroded real wages and tighter monetary policy has increased borrowing costs and led to a housing price correction. Macroeconomic policies should ensure that higher inflation does not become entrenched. Better matching skills to labour demand, loosening rent controls and improving the integration of disadvantaged groups into the labour market could further boost employment and lay the ground for an inclusive recovery. Income taxation and the social safety net could also better incentivise work, in the context of population ageing and mounting spending pressures ahead. Sweden is among the OECD's best performers in reducing greenhouse gas emissions, with a comprehensive policy framework and relatively efficient policies. However, the decision to reduce biofuel blending requirements will likely move the 2030 reduction target out of reach unless compensated by new ambitious measures. Completing a nascent green industrial revolution will require considerable investments in electricity generation, storage and transmission, but long planning and permitting procedures slow many key projects down. Attracting the people and skills to run industry and complementary public services is a particular challenge for northern communities already facing labour shortages.

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