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The Finnish Economic Policy Council

THE FINNISH ECONOMIC POLICY COUNCIL

# Economic Policy Council Report 2022

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Economic Policy Council

VATT Institute for Economic Research

Arkadiankatu 7, 00100 Helsinki, Finland

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# Preface

The Economic Policy Council was established in January 2014 to provide independent evaluation of economic policies in Finland. According to the government decree (61/2014) the council should evaluate:

1. the appropriateness of economic policy goals;
2. whether the goals have been achieved and whether the means to achieve the policy goals have been appropriate;
3. the quality of the forecasting and assessment methods used in policy planning;
4. coordination of different aspects of economic policy and how they relate to other social policies;
5. the success of economic policy, especially with respect to economic growth and stability, employment and the long-term sustainability of public finances;
6. the appropriateness of economic policy institutions.

The Council is appointed by the government based on a proposal by economics departments of Finnish universities and the Academy of Finland. Current Council started its work in April 2021. The Council has adopted a rotating scheme, and the term of each member is four years. The Council members participate in the work of the Council in addition to their regular duties.

In the ninth report of the Economic Policy Council we evaluate the government's fiscal policy, fiscal sustainability, and employment policy. In addition, the report concentrates on climate policy and green transition as a special theme.

The Council does not make its own macroeconomic or fiscal projections but relies mainly on forecasts made by the Ministry of Finance. The most recent information used in this report is the Ministry of Finance Winter 2022 Economic Survey and the January 2023 release of the Statistics Finland Labour Force Survey.

The Economic Policy Council has resources to commission research projects to support its work. These reports are published as attachments to the Council report, but the authors of the reports are responsible for their content. Any opinions expressed in them may or may not be in agreement with the Council's views.

Four background reports have been published in connection with this Council report. Päivi Puonti of ETLA discusses EU's fiscal framework and its shortcomings as well as proposed remedies. Selina Clarke of University of Helsinki examines carbon pricing in Finland. Niklas Gäddnäs and Henri Keränen from the secretariat analyse the Beveridgean unemployment gap. Kimmo Ollikka of the VATT Institute for Economic Research investigates patenting and green innovations.

Several experts have attended Council meetings or contributed to parts of the report. We thank Lassi Ahlvik and Selina Clarke of the University of Helsinki, Marita Laukkanen, Kimmo Ollikka and Kimmo Palanne of the VATT Institute for Economic Research, Matti Liski of the Aalto University, Markku Ollikainen of the Finnish Climate Change Panel, Ian Parry of the IMF, Antti Kauhanen and Päivi Puonti of ETLA, and Ilkka Kaukoranta for sharing their views and expertise. We would also like to thank Seppo Orjasniemi, Olli Palmén, Armi Liinamaa, Janne Huovari, Sami Hautakangas, Ilari Valjus, Niina Suutarinen, Veliarvo Tamminen, Jenni Pääkkönen, Jukka Hytönen, Julia Niemeläinen, Ulla Hämäläinen and Jukka Mattila of the Ministry of Finance for patiently responding to several detailed questions by the Council. Selina Clarke, Niklas Gäddnäs and Eemeli Vastamäki have been competent research assistants for the Council. We are also thankful to Anita Niskanen, Anna-Maija Juuso, Netta Pasuri, Ville Pernaa, Marjo Nyberg, Mikko Hyytiälä, Sanna Tiensuu, Riikka Könönen, Tero Järvelä, Markku Kivioja and Outi Örn of VATT for their help in administration and communications.

Helsinki, 1 February 2023

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# 1. Summary

Economic developments over the past three years have been dominated by crises. The start of 2022 was still overshadowed by restrictions related to the Covid Omicron variant, and the war in Ukraine, which started in February 2022, represented another major crisis, also for the Finnish economy.

The war created an energy crisis in Europe, which has also pushed up the overall price level. Because of these developments, economic growth in Finland in 2022-23 is expected to be considerably slower than what was forecast before the beginning of the war. Growth in 2023 is expected to be zero or even negative, and hence the Finnish economy is expected to be operating below its normal capacity in 2023.

Europe, Finland included, is experiencing a supply-side shock. Such a shock is characterized by a disruption of the supply. The war in Ukraine and energy shortages have led to price increases. At worst, this type of supply-side shock may lead to stagflation: a combination of high inflation and low growth. In contrast to a shock created by a reduction in aggregate demand, expansionary policies are less well suited for dealing with the present type of supply shocks, as such policies would further feed inflation. Fiscal policy should not add to inflationary pressures, rather measures that promote structural reforms should be sought.

Since the shock affects the whole economy, it is not really possible to permanently compensate households and firms for any reduction in profitability or disposable income. However, redistributive measures can and should still be taken, and especially the most severely affected households should be assisted. On average, however, fiscal policy can only smoothen the shock to be felt across different years.

Following the increase in inflation, nominal interest rates have risen sharply. However, real interest rates – nominal rates minus inflation – are more

important for economic decisions, including those of the government. The real interest rates currently faced by the Finnish government are decidedly negative, although this situation may not last.

Finland's reliance on trade with Russia had already declined prior to the war, and hence the collapse in the remaining trade had relatively moderate effects. Firm-level analysis suggests that, on average, firms trading with Russia did not face reduced turnover or wage bills, although their exports declined. While some of the most Russia-dependent firms experienced difficulties, this can be seen as a realisation of business risks. This implies that the need to compensate businesses because of the collapse in trade is very limited. However, the longer-term consequences for the Finnish economy must be at least somewhat negative because an important trade channel has been cut off.

New research findings suggest that the Finnish labour market and the social insurance institutions fared well during the Covid pandemic. Inequality did not increase during the first pandemic year, and employment already surpassed the pre-pandemic level in the latter half of 2021.

**Employment policy**

In practical terms, the employment target set by the current government was reached in 2022. Given the harsh economic circumstances, this was a better achievement than what was expected during the pandemic. A rapid economic recovery helped workers to return to their jobs and permanent damage in the labour market was mostly avoided. However, there is still the risk that Covid may have had a negative and more sustained effect on long-term unemployment.

The post-pandemic labour market outcomes in Finland are in line with other EU countries. In addition to the rapid recovery, these common features include labour bottlenecks and labour input increasing faster when measured in headcount employment rather than in hours worked. Accordingly, crisis dynamics and crisis management are important in understanding changes in employment in addition to direct employment policies.

Employment policy measures typically take time to materialise in the labour market because of transition periods and various lags. Recently, the 2017 pension reform has also had a major effect on the overall employment rate.

Similarly, some of the most important measures decided by the current government will contribute mainly to future developments in the labour market. These include the transfer of public employment services from the TE Centres to the municipalities, the phasing-out of extended unemployment benefit entitlements and the extension of compulsory education.

Achieving employment target does not guarantee that its expected positive fiscal effects are reached. The fiscal effect is diminished if a large share of additional employment is part-time, or unemployment does not decrease in line with the increase in employment, or if the fiscal costs of the measures are large. While employment targets will continue to be well motivated in the future since there are many good reasons for these (fiscal reasons, social reasons, as a cure to permanent labour shortages), one needs to be cautious with respect to their fiscal effects. One should also bear in mind that the many lower-hanging fruits have been picked and further increases in employment rates may be harder to achieve.

Job vacancies started their rapid increase in 2021 and employers have repeatedly reported difficulties in recruiting workers. Some of the problems may be temporary, but they also have a more permanent element. From a policy perspective, the sectors differ in the severity and the basic causes of the mismatch problem. In some sectors, the main reason is the nature of the job offers (short hours or contracts or low pay), but in other sectors it is a permanent undersupply of labour due to missing initial intakes in the education system. Clearly, the cure to the problem needs to reflect this differing nature of it.

**Fiscal policy**

The fiscal policy planned for 2022 had to be adjusted because of the onset of the war in Ukraine. Additional spending on military and other security-related areas has most likely been necessary, whereas certain measures to boost purchasing power, such as additional child benefits, have not. Given the persistent deficit in public finances, part of the additional defence and other discretionary spending should have been financed by cutting public expenditure elsewhere or by tax increases.

It has also been appropriate to shelter those households that have been most exposed to the large increases in energy prices via the provision of electricity subsidies. However, the temporary VAT cut on electricity is an untargeted measure and does not efficiently serve the purpose of reaching those households most in need of the subsidy. In general, currently non-existent policy instruments to allow targeted, income-based, one-off payments should have been designed to be available for political decision-making on relief measures.

The Parliament decided on implementation of an R&D tax incentive in 2022. In its 2021 report, the EPC took a positive attitude towards introducing such a measure, albeit with some caveats in mind. The take-up and impact of the new R&D tax incentive need to be monitored closely.

While the output gap estimates for 2023 are still negative, suggesting that an accommodative fiscal policy would be appropriate, there would be good reasons to cautiously execute tighter fiscal policy in 2023. The reasons include bottlenecks in the labour market, implying the presence of only very limited slack in economic capacity, and supply-side phenomena (especially the energy crisis) being behind low growth and high inflation. One should refrain from adding to the inflationary pressures via fiscal policy; rather the goal should be to ease supply constraints, if possible. The long-run sustainability problems also favour setting a tighter fiscal policy stance already in 2023.

The next government term should start with a credible, transparent, and ambitious fiscal adjustment plan. Given the size of the deficit, a gradual and sustained adjustment should be implemented. The goal should be fiscal adjustment in the range of 0.4-0.6 per cent of GDP annually for the duration of two government terms, which would turn the debt-to-GDP ratio on to a declining path. It is important to secure future fiscal space since Finland will likely face negative economic shocks over such a long period. If economic conditions are not very unfavourable in 2024, one should therefore start with sizeable, front-loaded adjustment, rather than postpone consolidation to the end of the next government term.

The required scale of the consolidation is ambitious, and that is why both expenditure and revenue measures are likely needed. There is very little scope for tax cuts in the coming years. Potential tax increases should be designed well, since badly targeted tax increases may undermine incentives

and lead to slower growth. Tax increases may be sought e.g. by discontinuing taxing certain goods at lower VAT rates, limiting dividend tax exemptions of closely held corporations, and by increasing property taxation. Since expenditure cuts and tax increases have different distributional impacts, ultimately the choice between them is a political one. Structural reforms, meant to help in reducing the deficit, would have to be clearly formulated and it would have to be possible to evaluate their impact in a credible manner.

Given the current challenges facing the Finnish economy, it would be important to go through the tax system in a systematic way, to assess how tax changes can contribute to the required consolidation while safeguarding key development in the Finnish economy, such as technological development, conversion to green growth and globalisation. Public expenditures would need to be reviewed in a similar manner. To do so, we propose that the governments set up a committee that considers how tax and spending policies can contribute to redistribution and to consider effects on the economy in general.

The new European Commission proposal regarding fiscal rules in Europe is a move in the right direction, as it simplifies the regulatory framework. It would be desirable that fiscal rules strike a balance between encouraging sustainability and allowing counter-cyclical fiscal policy. It would also be useful that they take into account both expenditure- and revenue-side measures. The domestic proposal by the Ministry of Finance appears to us as rigid and it does not treat symmetrically taxes and spending.

**Climate policy**

Climate change is a global problem. Unchecked, climate change will cause severe health effects, displacement of people and changes to ecosystems, changes in labour and agricultural productivity, and loss of capital assets. Despite the devastating impacts, decisions to tackle climate change globally have proved difficult in the UN negotiation processes. It seems unlikely that any level of common global carbon price could be agreed upon in the foreseeable future.

For a small open economy, international cooperation and coordination towards common policies and regulations is necessary. For Finland, the most important forum for international policymaking is the European Union (EU).

To fulfil its pledge to the Paris Agreement, the EU is tightening its climate policy. The 'Fit for 55' reform includes a reduced supply of emission allowances within the EU Emissions Trading System, the phasing-out of the free allocation of emission allowances, carbon dioxide tariffs on the import of certain goods, emissions trading for buildings and transport, reduced national emission quotas for Member States' Effort-Sharing-Regulation sectors and stricter requirements on net absorption of carbon dioxide in the land use sector.

Compared to several European countries, the Finnish economy is very energy intense. GDP per unit of electricity consumed is strikingly low. For a long time, state-owned enterprises were responsible for the energy infrastructure and carbon-intensive industry. One of the main energy policy goals was to secure inexpensive energy for heavy industry.

Tightening of EU-wide climate policy will affect Finland. The cost of carbon dioxide emissions within the EU ETS and the land use sector are expected to increase. The economic impacts of carbon tariffs, the phasing-out of free allowances and other compensation (business) subsidies remain to be seen.

Finland aims to be carbon-neutral by 2035, which is more ambitious than the overall EU target. Finnish climate and energy strategies have been built on an expected increase in the supply of low-carbon electricity, which has not materialised at the projected pace. Moreover, declining carbon sinks are becoming a major concern for Finnish land use policy.

There is room for improvement in the design of Finnish climate policy.

Agri-environmental policy has not resulted in any reductions in greenhouse gases. Forestry and land use policy have contributed to collapsing carbon sinks.

In the transport sector, transport taxation should be reformed to improve incentives to reduce emissions and to accelerate the electrification of transport.

In the energy sector, infrastructure investments are needed for the power grid, transmission lines and electricity generation capacity. Incentives for private investments should be provided by carbon pricing, regulation, and taxation.

Patenting in environment-related technologies has declined in the last 10 years. Innovation policy should reverse the trend to fulfil the high expectations for Finnish low-carbon technology innovations.

Finally, public expenditures and investments in the green transition are reported to have been considerable in recent years, but ex-ante evaluations on emissions reductions are missing.

The fiscal impacts of mitigation policy are two-sided. The phasing-out free allowances will increase revenue but tax revenue from fossil fuels will decrease due to lower demand.

It is important that the social and economic impacts of carbon emissions are assessed. Even if evaluation of the damage caused by carbon emissions is difficult, estimates of the social cost of carbon (SCC) could be used to monetarise the damage from Finland's carbon emissions. The estimates should be used in cost-benefit analyses for the appropriate design of climate-policy measures.

Decarbonisation of the economy has distributional impacts that need to be addressed in policy. Low-income households are most vulnerable to increased energy and carbon prices due to mitigation policies. Decarbonisation policies could exacerbate energy insecurity. Popular policies to promote the adoption of clean energy technologies such as tax credits, subsidies and efficiency standards may be regressive. Subsidies should be targeted at lower-income households.

Sustainable development budgeting needs further development work, including rigorous impact assessments of Finnish climate policy, considerations of cost-efficiency and distributional impacts. The application of economics to adaptation planning and policy would be needed as well.

# 2. Recent economic developments

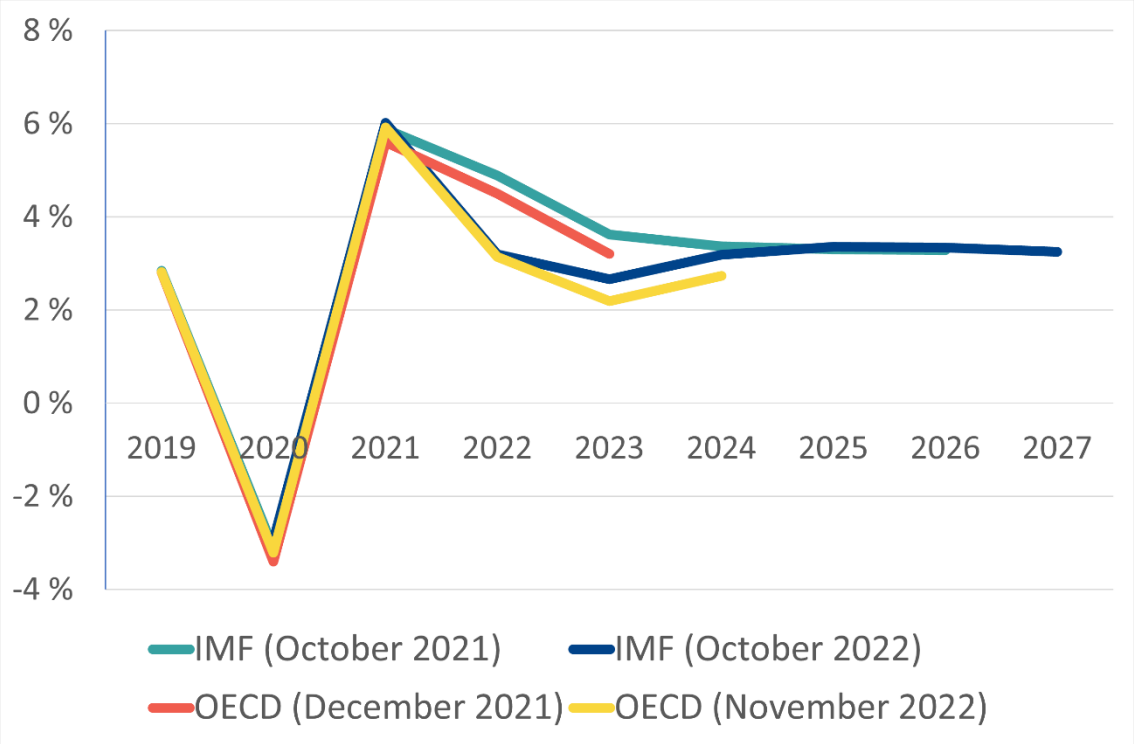
The infection wave related to the Omicron variant of Covid-19 influenced the beginning of 2022, with several restrictions – including in the hospitality sector – still in place. While many restrictions were lifted in March, another crisis, the war in Ukraine, started. It almost immediately led to a worsening of the economic outlook for Europe and the whole world. All this meant that while the Finnish government along with the Economic Policy Council, and other experts, were still worried about uncertainties but cautiously optimistic in the very beginning of 2022, they had to again shift to crisis mode in late February. Longer-term economic policy discussions had to be moved to better times. These developments also provide the backdrop for policy discussion and the setting of fiscal policy.

This chapter first discusses developments in GDP growth and forecasts for 2023 (Section 2.1). In Section 2.2, it then moves to examine in more detail the main drivers of the changes in GDP, the energy crisis, and the war in Ukraine. This discussion also includes an analysis of the impact of the war on exposed Finnish firms. Section 2.3 describes the rise in inflation and some of its consequences for the real economy. Recent, macro-level labour market trends are presented in Section 2.4, while Section 2.5 briefly reviews the implications of the Covid pandemic on the Finnish economy.

## 2.1. Economic outlook

The impact of the war on world GDP growth is demonstrated in Figure 2.1.1., which compares the economic forecasts made by the IMF and the OECD before and after the onset of the war. It depicts how growth forecasts for 2022 were revised downward by approximately two percentage points. Finland is, of course, due to its being neighbours with Russia and because of its greater than average foreign trade share with Russia, one of the countries considerably at risk.

Figure 2.1.1. Revisions to forecasts of world GDP growth.



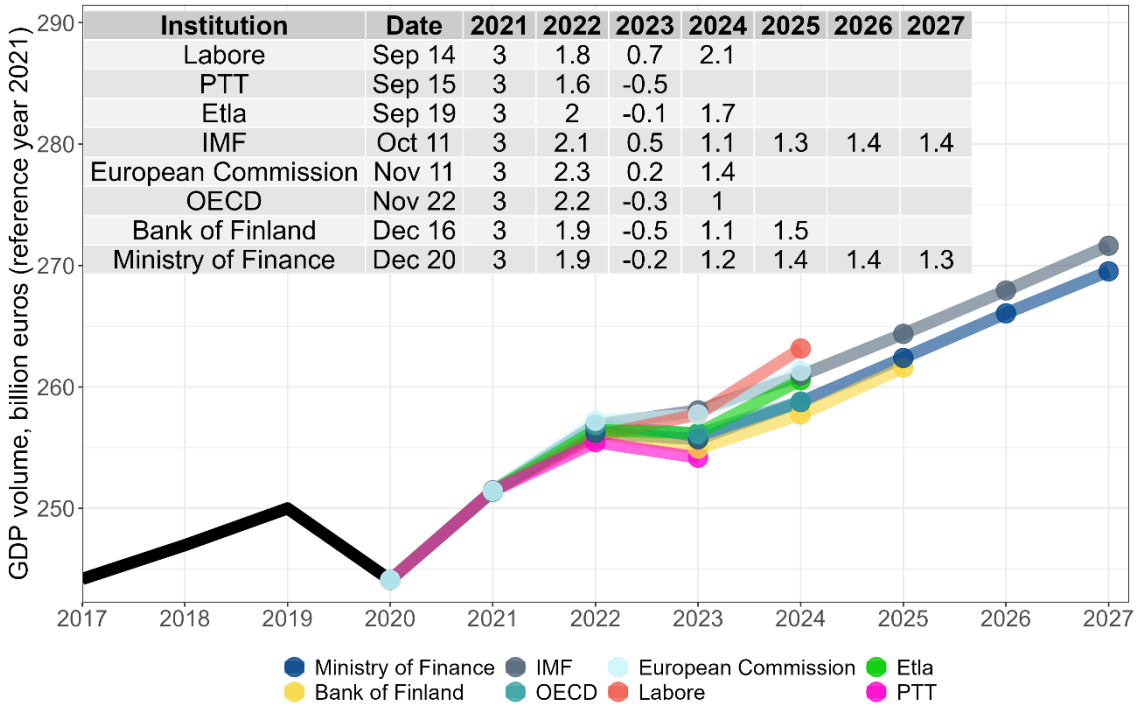

Sources: IMF World Economic Outlook and OECD Economic Outlook.

Due to the increased risk, GDP growth in Finland for 2022 is expected to hover around 2%, whereas it is forecast to stall completely, or even decline slightly, in 2023 (Figure 2.1.2). The downward revision to the Finnish economic forecast is, however, slightly smaller than for European countries on average (Figure 2.1.3). [1]

[1] In fact the European Commission forecasts for Denmark and Sweden are slightly worse for 2023.

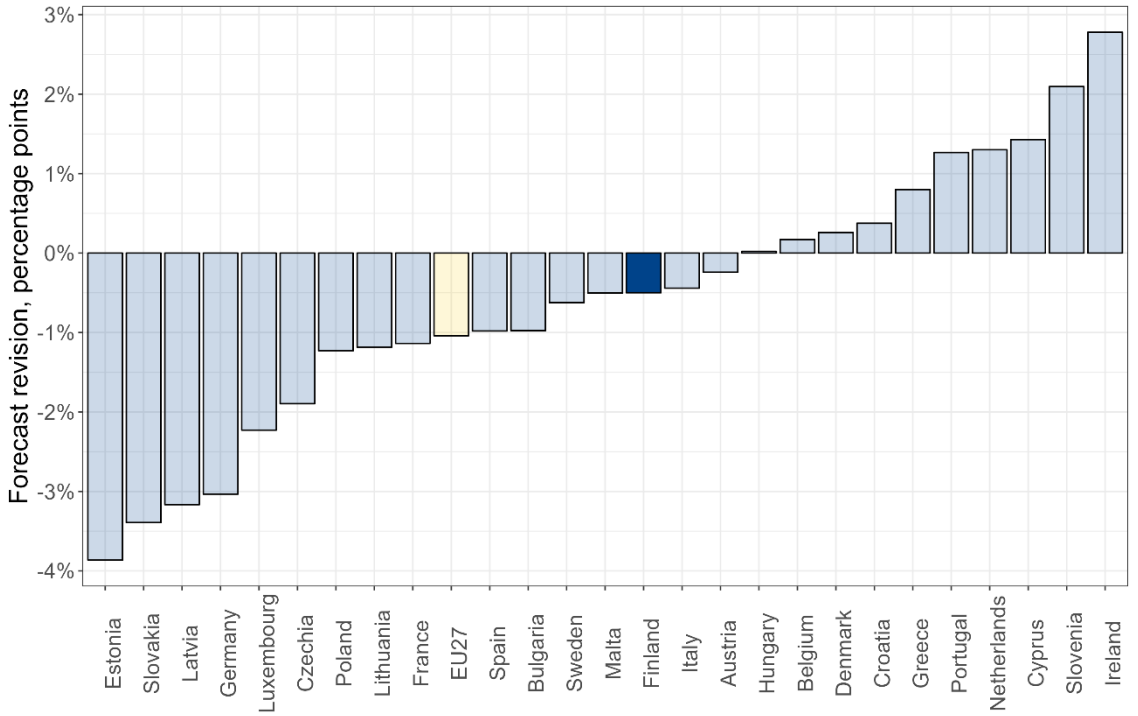
Figure 2.1.2. GDP forecasts for Finland.

| Institution | Date | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
|---|---|---|---|---|---|---|---|---|
| Labore | Sep 14 | 3 | 1.8 | 0.7 | 2.1 | | | |
| PTT | Sep 15 | 3 | 1.6 | -0.5 | | | | |
| Etla | Sep 19 | 3 | 2 | -0.1 | 1.7 | | | |
| IMF | Oct 11 | 3 | 2.1 | 0.5 | 1.1 | 1.3 | 1.4 | 1.4 |
| European Commission | Nov 11 | 3 | 2.3 | 0.2 | 1.4 | | | |
| OECD | Nov 22 | 3 | 2.2 | -0.3 | 1 | | | |
| Bank of Finland | Dec 16 | 3 | 1.9 | -0.5 | 1.1 | 1.5 | | |
| Ministry of Finance | Dec 20 | 3 | 1.9 | -0.2 | 1.2 | 1.4 | 1.4 | 1.3 |




Note: Data on GDP volume from Statistics Finland. Forecasts in table in per cents.

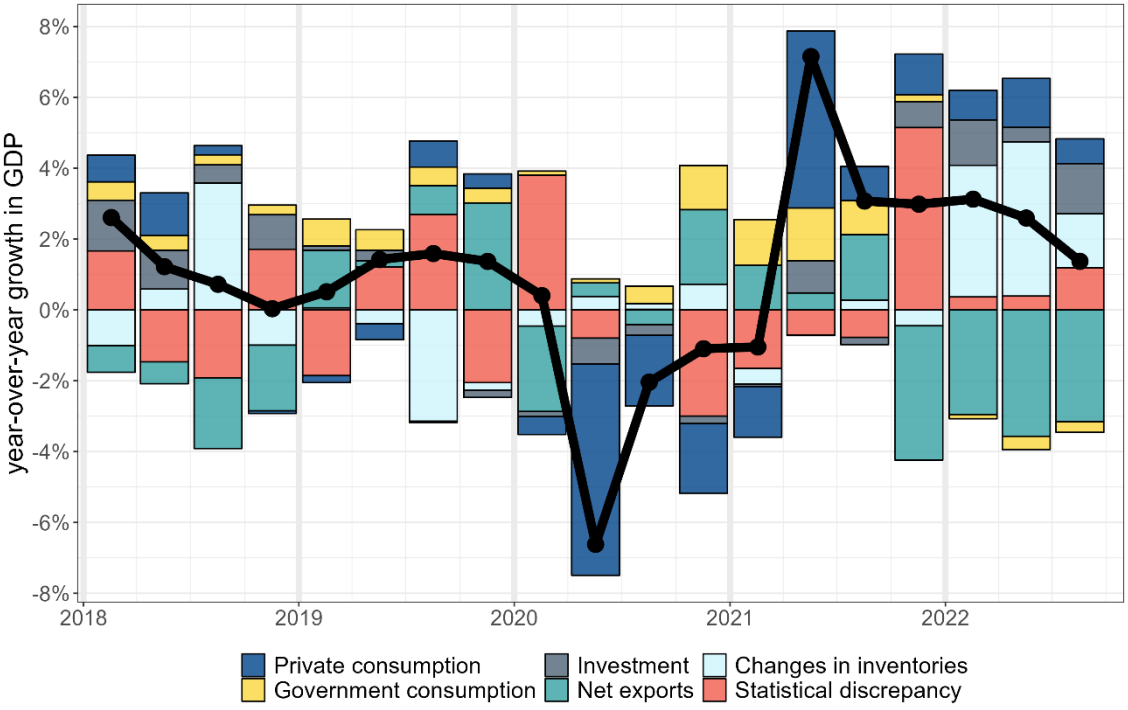
Figure 2.1.3. Revisions to 2022 GDP growth (by European Commission) between autumn 2021 and 2022.




Source: European Commission autumn 2021 and 2022 forecasts (Ameco).

After the improvement in the trade balance and the current account in 2021, the growth contribution of net exports turned significantly negative in 2022, as illustrated in Figure 2.1.4. The growth of private consumption has been moderate at best, constrained by rising price levels and uncertainties related to the war in Ukraine.

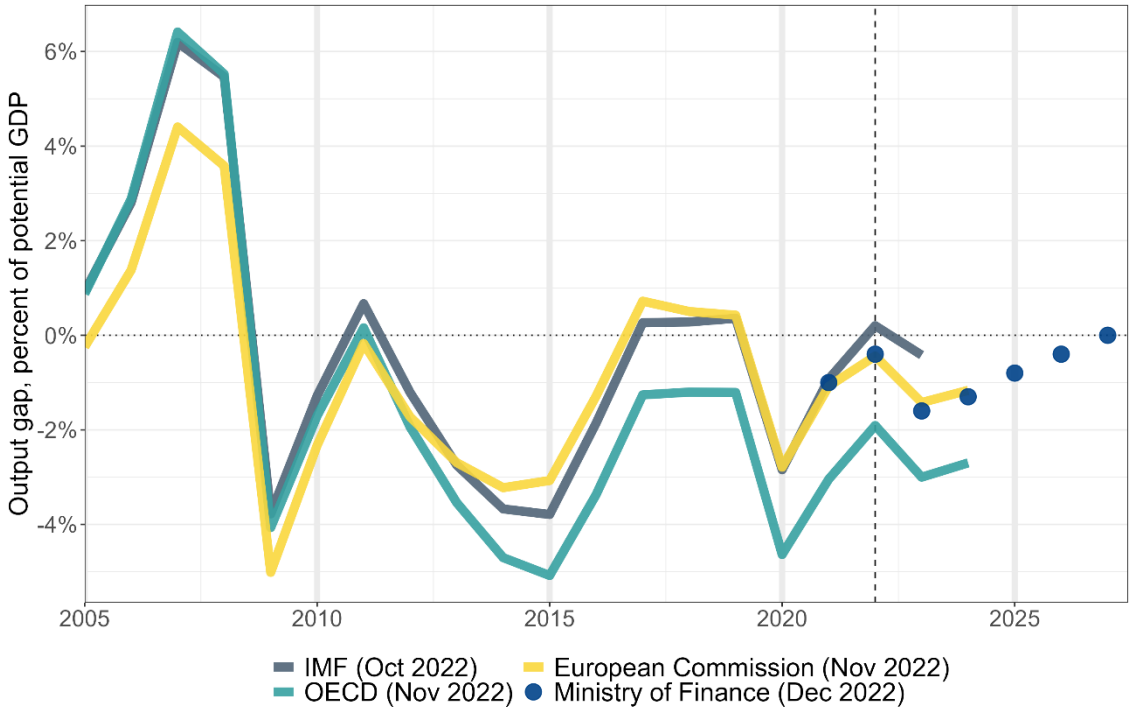
Figure 2.1.4. Contributions to GDP growth.




Source: Eurostat (quarterly national accounts). Note: All series are deflated by GDP deflator.

Output is still expected to remain below the level of full capacity output (Figure 2.1.5). In other words, the output gap is forecast to be negative in 2023. While the Ministry of Finance and the European Commission estimate a relatively sizeable output gap of approximately 1.5%, the IMF's estimate, while still negative, is close to zero. The Ministry of Finance expects the output gap to be closed by 2027. Seen from a simple business cycle viewpoint, the presence of a negative output gap would favour setting relatively lax fiscal policy for the coming years. However, there are numerous caveats for such a policy stance, and we will also return to those in Chapter 4.

Figure 2.1.5. Output gap estimates.




Note: Vertical dashed line is for 2022.

One such caveat is the outlook for inflation. The effects of supply chain disruptions following the Covid pandemic and geopolitical tensions from the subsequent war in Ukraine have increased energy and food prices. These factors represent typical supply shocks to the economy, which have pushed up inflation in Finland (see the discussion below). These shocks do not originate from reductions in aggregate demand, but from – in this case adverse – developments in aggregate supply. For instance, the war in Ukraine led to disruption in the energy sector, and energy is a necessary ingredient in almost all economic activity. This has gradually pushed up consumer prices in Finland. The worry is that this situation could lead to stagflation: the simultaneous presence of both high inflation and low output growth. Such a situation is difficult to remedy. With accommodative monetary or fiscal policy, inflation is fed further, whereas fighting inflation with tight policies leads to negative GDP developments in the short term at least. It is very hard, if not impossible, to correct such a situation without unfavourable consequences either in terms of the price level or low growth.

Another characteristic of the situation is that the increase in the price level, and the related reduction in real wages, is an economy-wide phenomenon: many households have become poorer at the same time. Hence, while

(automatic) stabilisation helps to spread the shock over a number of years, permanent compensation – via subsidy policies, for example – for all groups is hardly possible. The situation would be different if the shock had hit only certain sectors of the economy. In that case, the public sector would be able to share the pain more widely in society by compensating the groups affected.

## 2.2. War and the energy crisis in Europe

The Russian invasion of Ukraine has caused a major humanitarian crisis in Europe. Beyond the direct loss of lives and the massive destruction of the war, millions of refugees have been displaced both within Ukraine and to neighbouring countries.

The European Union has provided humanitarian, financial, and military support to Ukraine, and the EU has adopted several packages of sanctions against Russia.

According to the Ministry for Foreign Affairs, Finland has supported Ukraine to the tune of approximately EUR 300 million, EUR 100 million of which represents humanitarian and development assistance. The rest is material and military support. Of course, on top of this comes the increase in domestic military and other security-related spending, discussed in more detail in Chapter 4.

In the budget for 2023, official development assistance contains EUR 30 million for Ukraine. In addition, humanitarian and military support are likely to continue.

Finland's decision to join NATO may also imply increased military spending, as NATO expects member countries to spend 2% of GDP on defence. Due to increased spending on its armed forces, including new weapons and material, Finland already reached this goal in 2022.

**Box 2.1. European energy crisis**

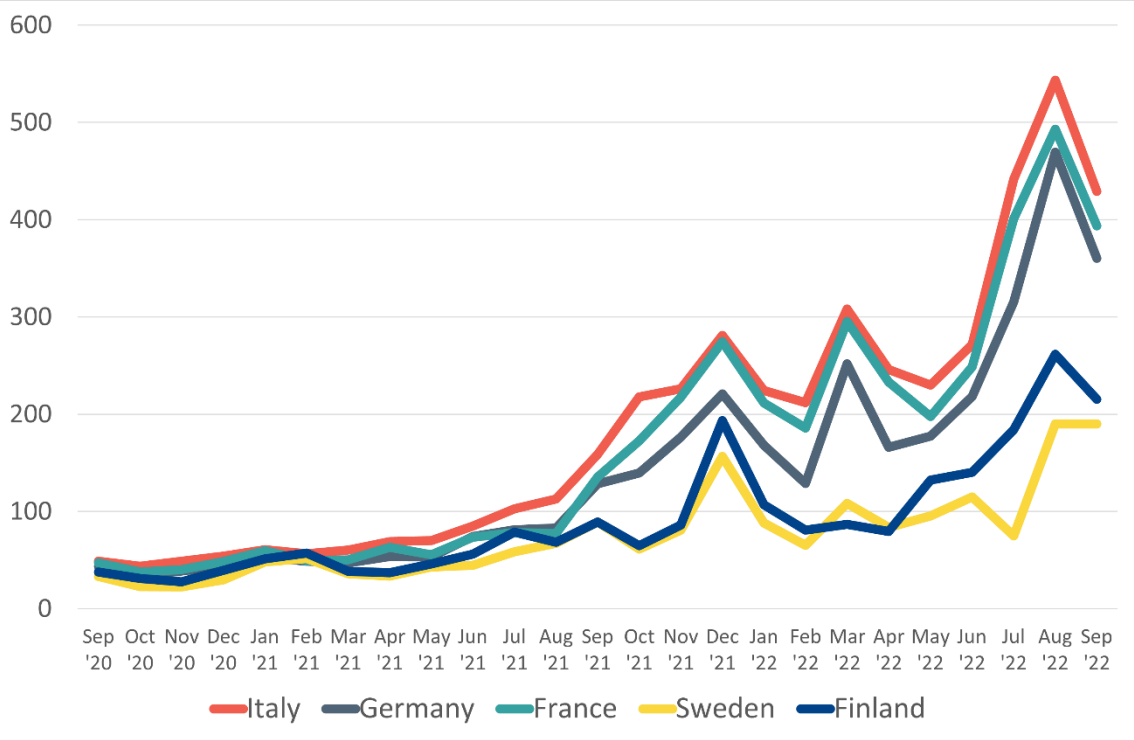
Russia's war of aggression led to a severe energy crisis, risking energy security in Finland and elsewhere in Europe. Before the war, Finland imported approximately 10% of its electricity, around 90% of its natural gas, and a share of reactor-specific nuclear fuel from Russia. Electricity imports from Russia stopped almost immediately after the war started. Natural gas was imported until Russia demanded gas sales in rubles, which, in turn, was prohibited by the international sanctions Finland was committed to. As the share of natural gas in the Finnish energy supply has been only around 5% and it has mainly been used in industrial processes, Russian natural gas has been substituted with other fuels and imports and by delivery capacity for LNG (liquified natural gas). Nuclear fuel is still imported from Russia based on long-term contracts.

Finland operates in the Nordic-Baltic power market (Nord Pool), which is integrated with large parts of Europe through transmission lines. Prices for energy in the euro area started to increase already in the autumn of 2021 because of increased economic activity as Europe recovered from the Covid-19 pandemic. However, major price increases in spring 2022 were a consequence of Russia suspending its deliveries of gas to some major importing countries in Europe, including Germany. As natural gas and coal are among the leading sources of electricity generation in the EU, electricity prices are highly dependent on the price of these commodities. Gas prices in Europe increased more than fourfold since 2021 (by the end of 2022).

The European energy crisis was exacerbated in summer 2022 by heatwaves that increased demand for electricity for cooling. Drought decreased water levels in major rivers, reduced the supply of hydropower and disturbed the operation of nuclear power plants and transportation of coal. Moreover, as electricity is increasingly generated from renewable resources (solar and wind), the intermittency of production creates strong variation in the spot prices of electricity. Price hikes occur during peak consumption hours when the most expensive fuel (natural gas) is used in the merit order of inputs in energy production to meet high final demand.

Electricity prices in Finland have been increasing very fast since spring 2022. However, average electricity prices in Finland are still at the low end of the price range compared to many other European countries (see Figure 2.2.1).

Figure 2.2.1. Electricity prices started increasing in summer 2021.




Source: Ember. Note: Average monthly electricity wholesale prices in selected countries in the European Union from September 2020 to September 2022 (in euros per MWh).

In the autumn of 2022, the Finnish government agreed to set up a EUR 10 billion emergency facility of loans and credit guarantees for public utilities. Utilities were suffering from surging collateral demands as they trade on volatile power markets to meet short-term liquidity needs.[2] These guarantees have not been taken up by the utilities yet (as of December 2022). The costs of the electricity crisis for general government – albeit not directly to consumers – are mitigated by the fact that many of the municipal energy utilities are benefitting in terms of excess profits. The actual extent of the future municipal wealth this represents is as yet hard to estimate.

In the Finnish energy sector, the largest single loser has been the energy company Fortum. In recent years, Fortum invested heavily in a large energy company in Germany (Uniper), most of whose thermal plants use hard coal or

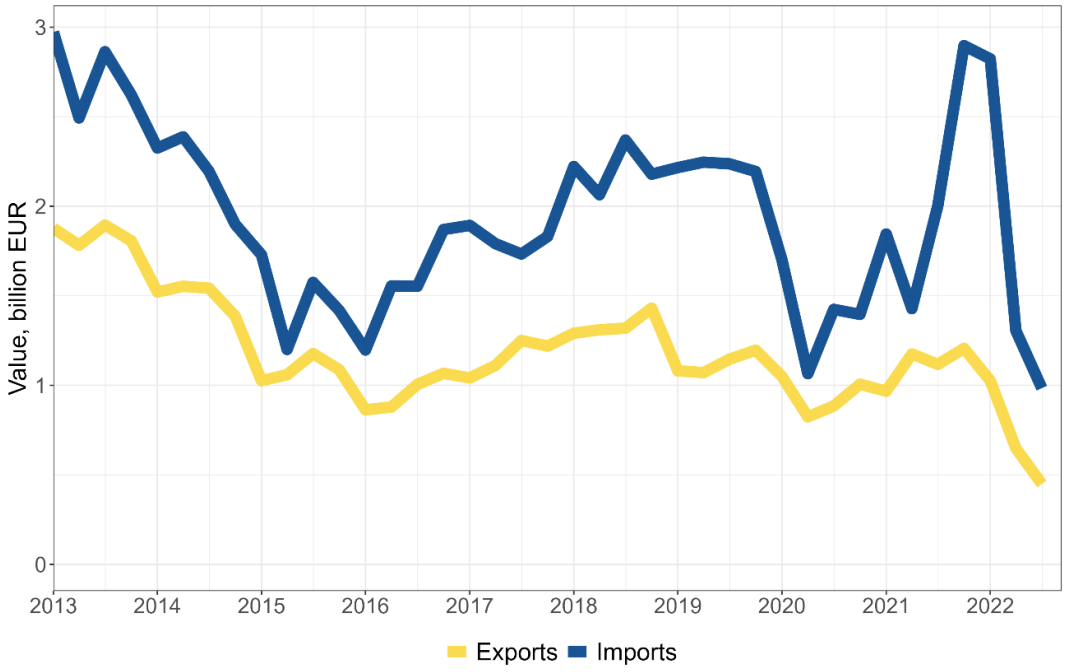
[2] See the continuously updated analysis by Bruegel (Sgaravatti et al. 2021)

natural gas as fuels. The total loss from the Uniper investment is about EUR 6 billion, consisting of the investment in Uniper shares, the dividends received from Uniper and the proceeds from the divestment. The State of Finland is the majority owner in Fortum with about 51 % of the shares.

### 2.2.1. The impact of the war on Finnish firms trading with Russia

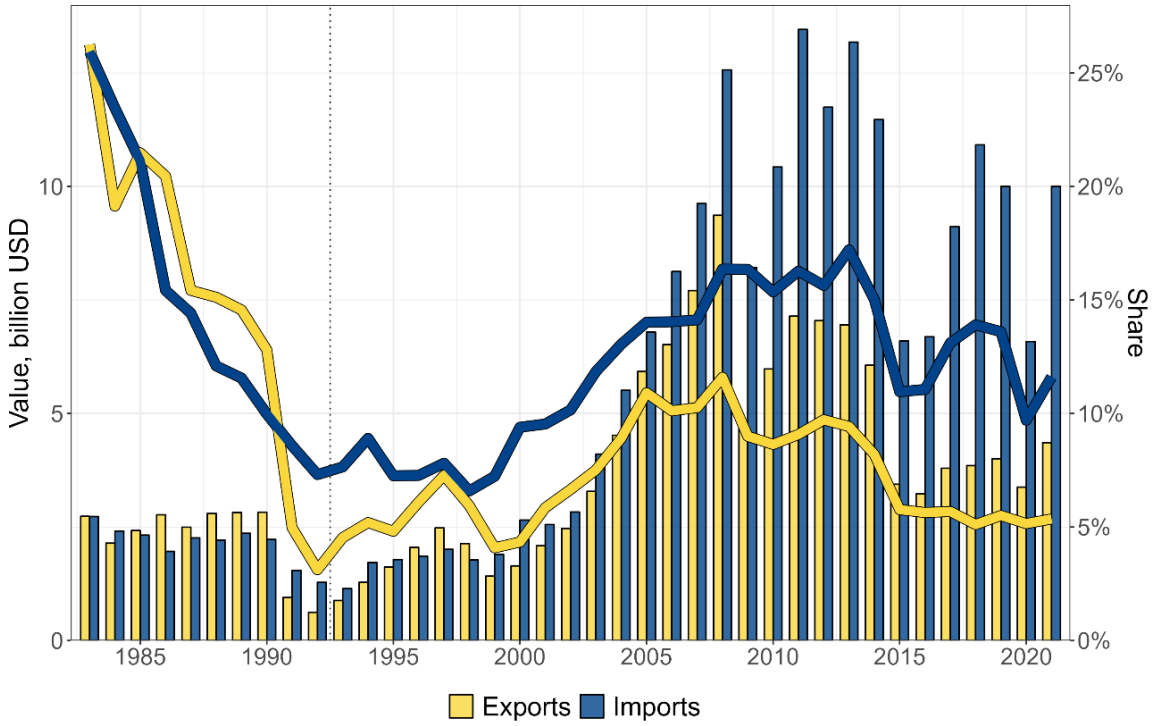
Russia's role as a trade partner of Finland had gradually declined in the period preceding the war. According to Figures 2.2.2 and 2.2.3, Russia has been much more important as an import source country than as an export destination. While in 2013 Russia was Finland's 2nd largest export destination and the largest import country, in 2021 Russia was the 5th largest export and 2nd largest import country in trade in goods. Of total exports, 5% went to Russia. The share of energy products in Finland's imports from Russia was nearly 60% in 2021. Export goods, in turn, were more evenly spread between various products.

Figure 2.2.2. Quarterly trade in goods and services with Russia.




Source: Statistics Finland, International trade in goods and services.

Figure 2.2.3. Commodity trade with Russia.




Source: OECD, International Trade Statistics. Note: Prior to 1993 data is for USSR. Left vertical axis: trade with Russia in USD (bars), right vertical axis: share of total exports/imports (lines).

According to more recent data from Finnish Customs, in January-September 2022 Finland's exports to Russia declined by 40%. In September 2022, imports from Russia had declined more radically, by two thirds.

A group of researchers from the VATT data room (Saxell et al. 2022) have examined the implications of the collapse in trade on firms trading with Russia using firm-level data until either June or August 2022, depending on the outcome used. The firms affected either exported to or imported from Russia in 2019 and the comparison group consisted of exporters and importers to different destinations. The year 2019 was chosen as a benchmark as the Covid pandemic influenced trade in 2020-21.

According to their results, the exports of the affected group declined by 10-20% in the first half of 2022 in comparison to other exporters. However, the turnover or the overall wage bill of these firms was not affected on average. The researchers infer that while the firms were not able to find alternative export destinations for their products, the overall importance of exports to Russia was not very large for their businesses. For importing firms, the

picture is similar: a clear reduction in their imports but no statistically significant reduction in turnover or wages paid. A more detailed analysis reveals, however, that for firms most dependent on trade with Russia, for smaller firms, and for firms operating in wholesale rather than manufacturing, the impacts have been more severe. All in all, the analysis does not suggest that there is any need for (extensive) support for businesses because of the trade disruption. They also note that the realisation of the risks is also a feature of normal business operations. However, some of the developments related to sanctions may have been difficult for the companies to foresee. Over time, the firms may also find new customers and export destinations for their products.

**Box 2.2. Impacts of Russia's war against Ukraine on trade**

After invading Ukraine in February 2022, Russia was hit with international sanctions. Towards the end of 2022 the sanctions were widespread, covering the whole Russian economy from the financial sector to energy. Sanctions on Russia's financial sector include freezing of USD 300 billion of Russia's foreign exchange reserves in western countries and the removal of Russian banks from SWIFT.[3] These measures have effectively cut the Russian financial sector off from the western world. Sanctions on the energy sector include price ceilings on Russia's oil exports to western countries and restrictions on the quantities of oil exported to EU countries.

Furthermore, more than 1000 companies have exited Russia on a voluntary basis since the start of the war. According to Sonnenfeld et al. (2022), these companies represented approximately 40% of Russian GDP. Russian energy exports to the western world have almost completely been halted, exceptions being pipeline exports of gas to Eastern Europe. Since late September 2022 the main pipeline exporting natural gas from Russia to Germany, Nord Stream, has been unavailable for use due to sabotage.

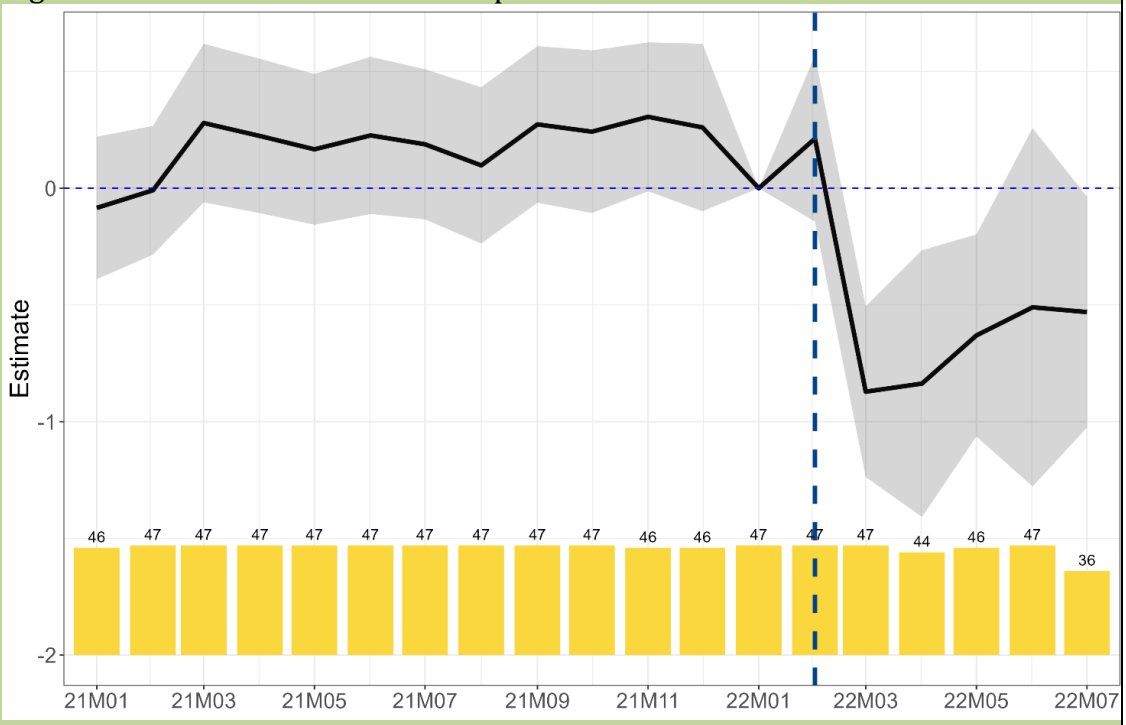
Due to the war, Russia has suspended reporting figures on its foreign trade. However, some estimates indicate that Russia's exports may have initially increased from pre-war levels (Simola, 2022). Sanctions have meant that exports to e.g. the EU have diminished, but at the same time some EU sanctions were implemented with rather long transition periods. In

[3] Society for Worldwide Interbank Financial Telecommunications is an international standardised system for financial transactions.

contrast, Russian exports to many non-western nations seem to have increased. Export revenues have also been supported by increased commodity prices. Over the medium term, Russia lacks gas pipelines from western Russia to the Far East, which makes a quick transition to direct gas exports elsewhere than Europe difficult.

As Russia struggles to find alternatives for western markets for its energy exports, its imports have also deteriorated. Figure B2.2.1 illustrates how exports to Russia as reported by its trading partners have declined significantly since the start of the war. It plots estimates from an event-study regression where exports to Russia are explained by time dummies. The yellow bars indicate the number of trade partners in the sample in that period. The collapse in imports also means that Russia cannot carry on its domestic production at the same level as before as western components, for example, are lacking. Restricted access to western component markets means that Russia's high-technology industry is struggling (Simola 2022, Sonnenfeld et al. 2022).

Figure B2.2.1. Decline of Russia's imports from the West.

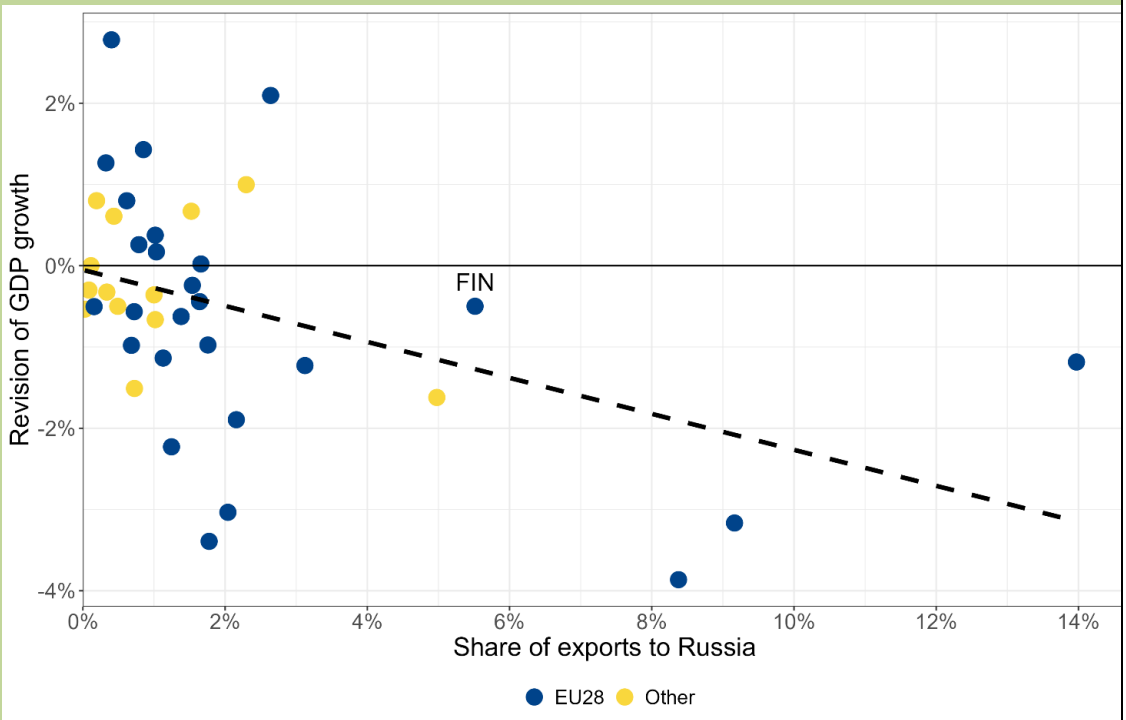



Source: Comtrade Note: The figure plots event-study estimates from a fixed effects model that explains exports to Russia as reported by western trade partners in January 2021 - July 2022. Yellow bars: sample size in that period.

Although the sanctions target Russia, lost exports and rising living costs also affect neighboring countries and previous main trading partners.

Figure B2.2.2 illustrates the revisions to forecasts of GDP growth rates. The forecasts were made by the European Commission between 2021 and 2022 for the year 2022. Figure B2.2.2 shows a clear pattern for countries that have had a relatively large share of exports going to Russia: they have had their GDP growth rate forecasts lowered more than less exposed countries when compared to projections from 2021 (the dashed line is a linear fit to the data). To a large extent, however, the economic shock from the Russian invasion consists of an energy shock. This could explain why Finland is expected to fare quite well compared to Germany, for example, which was more heavily exposed to Russian energy.

Figure B2.2.2. Revisions to GDP forecasts and share of exports to Russia prior to invasion.




Sources: Comtrade, Ameco, European Commission. Note: The share of exports to Russia in 2019 on the horizontal axis, and the forecast revision of GDP growth between autumn 2021 and autumn 2022 on the vertical axis. Dashed line is a linear fit to the data.

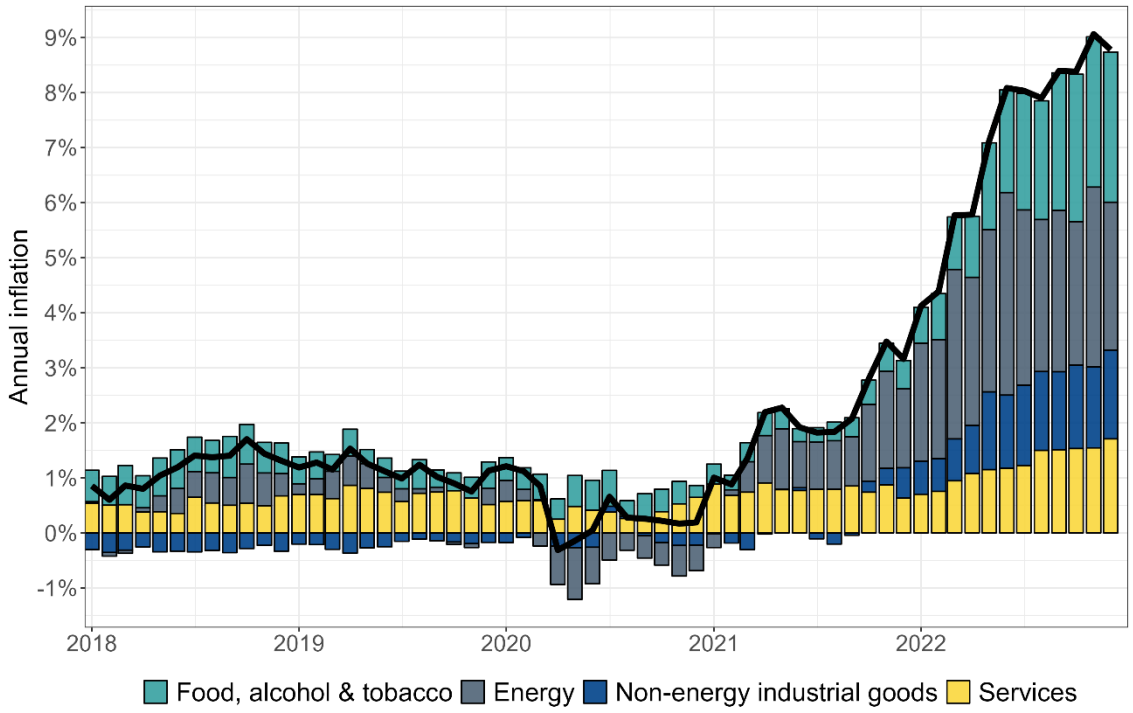
Simola, H. (2022). *Russian foreign trade after four months of war in Ukraine* (No. 5/2022). BOFIT Policy Brief.

Sonnenfeld, J., Tian, S., Sokolowski, F., Wyrebkowski, M., & Kasprowicz, M. (2022). Business retreats and sanctions are crippling the Russian economy. *Available at SSRN 4167193*.

## 2.3. Inflation

The geopolitical conflict has also pushed up food prices in world markets and increased the cost of living. Inflation has been on the rise since early 2021. Initially, the rise was driven in large part by increased consumer demand after the collapse during the pandemic. In 2022, inflation rose to levels not seen for more than three decades in Finland, fuelled largely by energy prices. In addition, food prices, themselves affected by the price of energy, have also contributed significantly (close to 2 percentage points) to inflation. The role of other goods and services has been more muted, but even their influence on the overall price level has been increasing in recent months. An easing of inflation numbers is possible if supply shocks dissipate, whereas the threat of a wage-price spiral could lead to a more prolonged episode of elevated inflation.

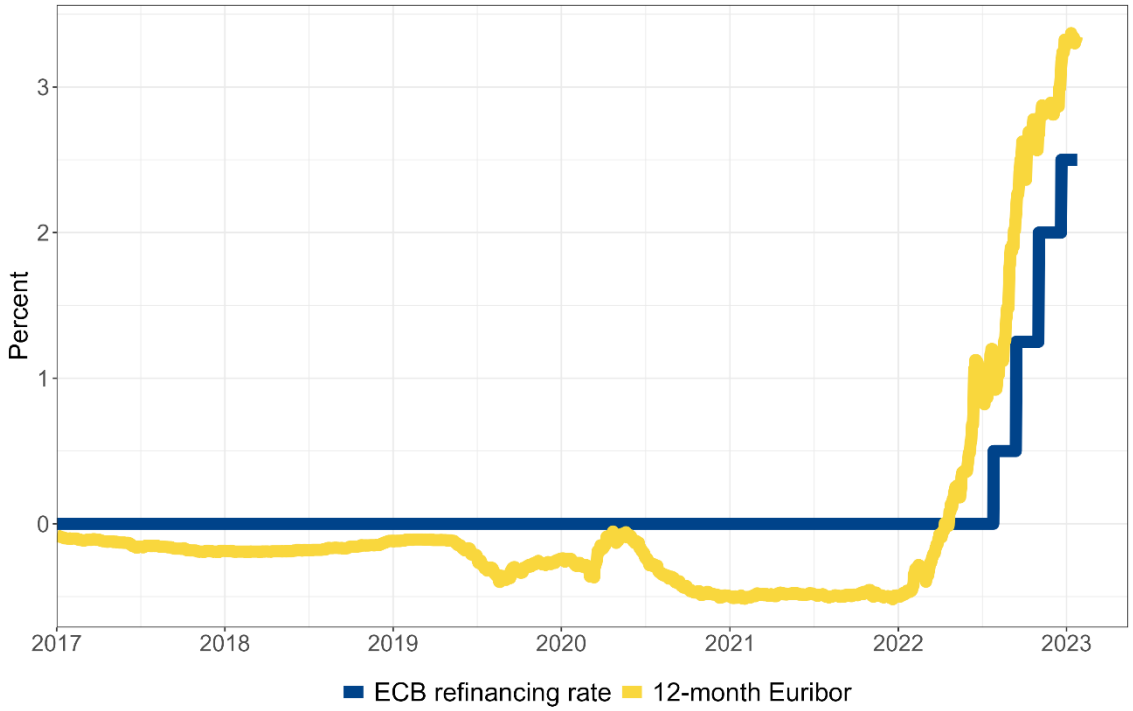
Figure 2.3.1. Contributions to annual HICP inflation.




Source: Statistics Finland. Note: aggregation by EPC following Eurostat.

One key consequence of the rising price level is the tightening of monetary policy. The European Central Bank already increased its interest rates four times in 2022 (as of 15 December 2022), from zero to 2.5%, and market interest rates have followed suit. The ECB has signalled that interest rate increases will continue.

Figure 2.3.2. ECB refinancing rate and 12-month Euribor.



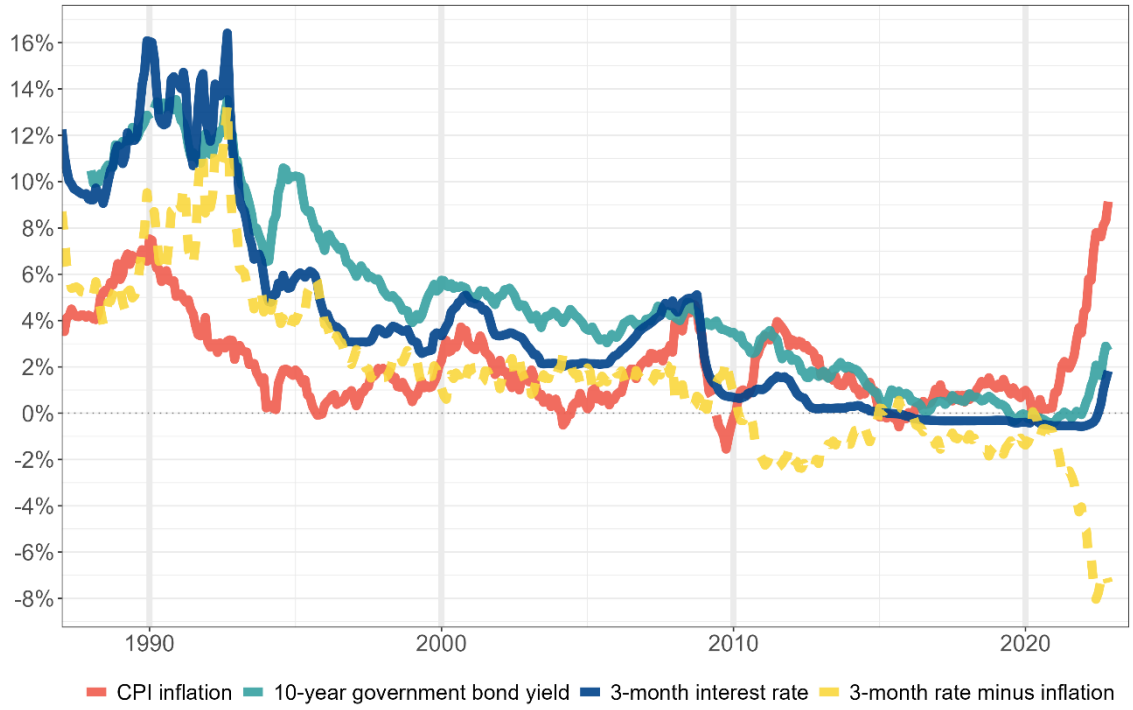

Source: ECB and Banque de France.

However, what really matters for economic development is the real interest rate, defined simply by the difference between nominal interest rates and inflation. This is also key when it comes to thinking about the public-sector debt-to-GDP ratio. Debt evolves from one period to the next according to a well-known formula

$$b_t - b_{t-1} = \left(\frac{r-g}{1+g}\right) b_{t-1} - s,$$

where $b_t$ denotes the debt-to-GDP ratio in period $t$, $r$ is the interest rate and $g$ the GDP growth rate. These can either both be real or nominal. The primary surplus is denoted by $s$. For a given primary surplus, what drives debt ratios is the difference between real GDP growth and real interest rates or the same difference between the two variables in nominal terms.

Figure 2.3.3. Interest rates and inflation.




Source: OECD.

While interest rates have increased sharply, the rise in rates is still below the corresponding increase in the price level, implying that real interest rates have actually dropped (Figure 2.3.3). This is why only looking at nominal interest outlays would lead to misleading conclusions about the increase in the price level is affecting the government budget. These faster-than-expected inflation developments have already been reflected in lower debt-to-GDP ratios worldwide (IMF 2022), and also in Finland.

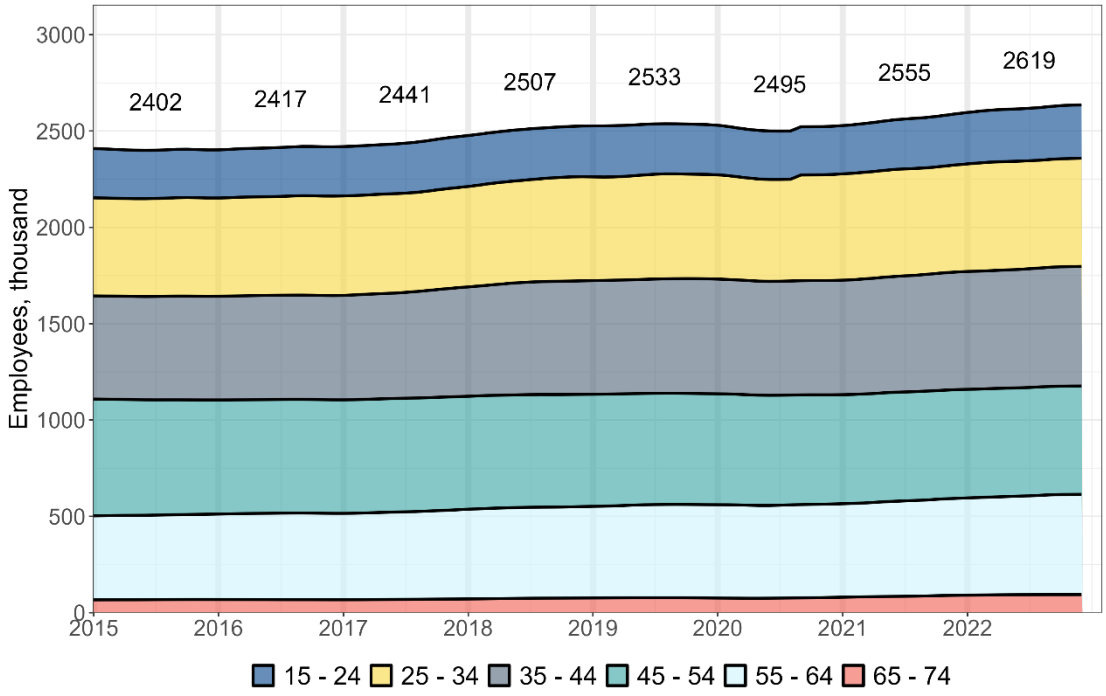
Of course, there are additional considerations that need to be accounted for. While real interest rates have remained negative for more than a decade, this may not necessarily be a permanent situation. Second, as discussed in previous EPC reports (e.g. EPC 2021), since the net asset position of the Finnish general government is positive due to pension funds' investments, the impact of a reduction in interest rates is not necessarily favourable for the public sector as a whole. And third, the threat of stagflation and slow growth will likely worsen the primary balance, implying that the realised reduction in debt levels is far from certain to continue. But it would be likely wrong to conclude that a rise in nominal interest spending from the government budget means that fiscal sustainability has necessarily worsened.[4]

[4] Dynan (2022) provides a helpful discussion of the various forces at play.

## 2.4. Labour market

Employment has developed favourably since the deep, but short-lived, dip caused by the Covid-19 pandemic in spring and summer 2020. Figure 2.4.1 depicts the numbers of employed persons in aggregate and across different age groups. Notwithstanding the drop in employment due to the pandemic, the employment rate has been steadily increasing since 2015. The employment rate was 73,8% in 2022.[5]

Figure 2.4.1. Employment by age group.

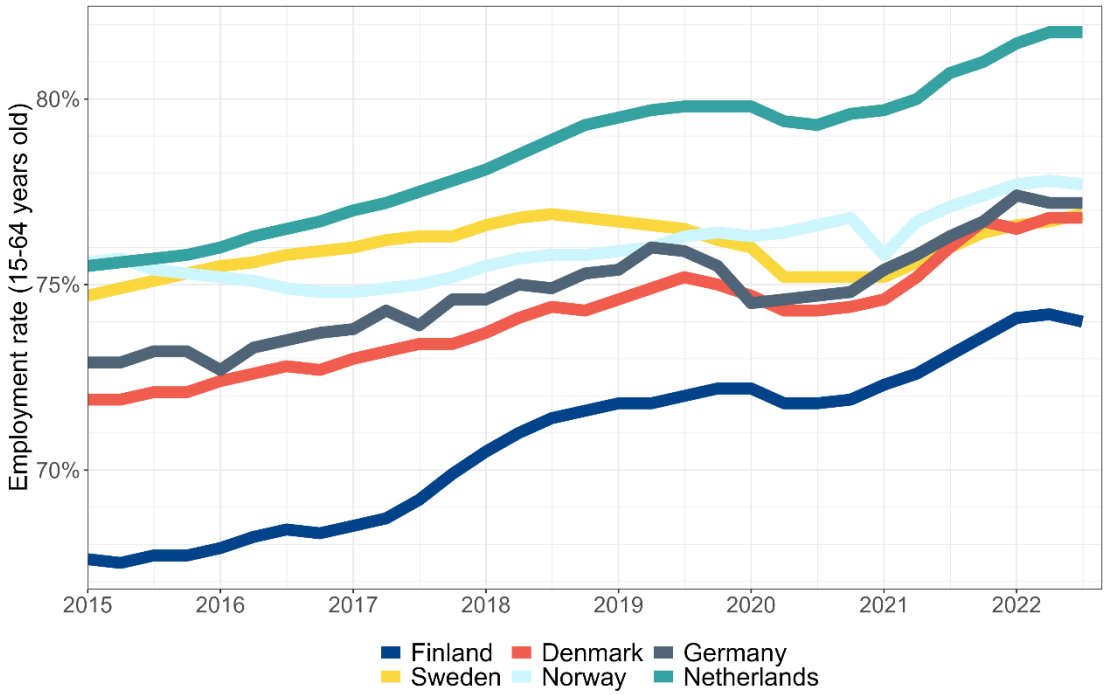



Source: Statistics Finland. Note: Numbers indicate yearly employment in the 15-74 age group.

Figure 2.4.2 depicts employment rates in the 15–64-year-old age group in Finland and five comparison countries: Sweden, Denmark, Norway, Germany, and the Netherlands. While the employment rate has risen in Finland in recent years, it is still behind these five economies.

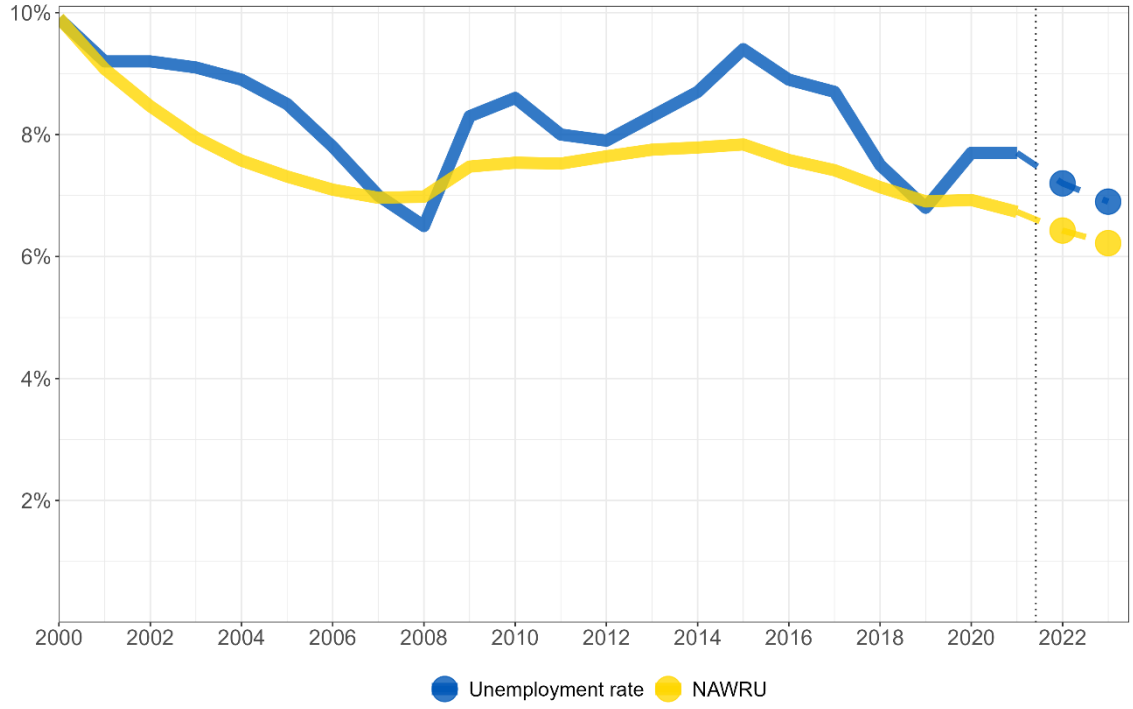
[5] Due to a recent change in the Labour Force Survey, estimates of the employment rate, which is measured in the 15-64 -year-old age group, were revised downwards by roughly 1 percentage point. This means that a 74% employment rate would correspond to roughly a 75% employment rate if there had been no change in how the employment rate is estimated. Trend employment rate in December 2022 was 74,5%.

Figure 2.4.2. Employment rates in selected countries.




Source: Eurostat. Note: Employment rates are trend series.

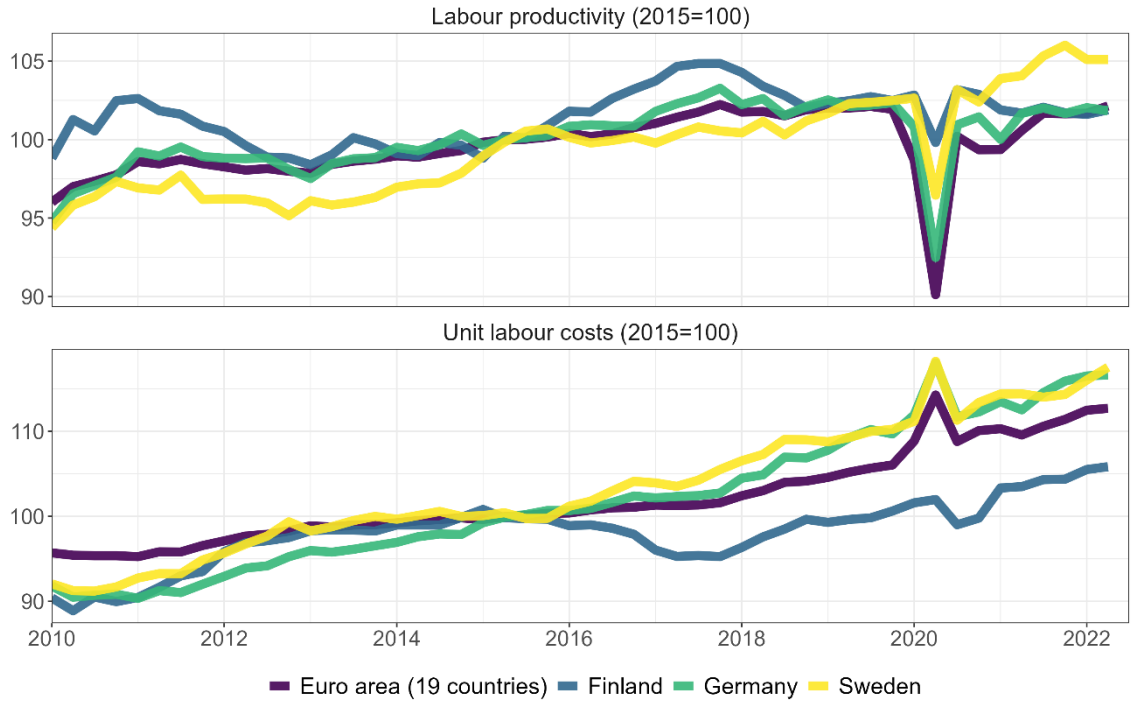
Figure 2.4.3. Unemployment rate in comparison with non-accelerating wage rate of unemployment (NAWRU) in Finland.




Source: European Commission (Ameco database).

Unemployment has also declined and is now approaching 6% (Figure 2.4.3). The gap to equilibrium unemployment, so-called NAWRU, is also narrowing. This may mean that further reductions in the unemployment rate will require structural reforms, in spite of the dependency between actual and estimated structural unemployment.

Figure 2.4.4. Labour productivity and unit labour costs.




Source: OECD.

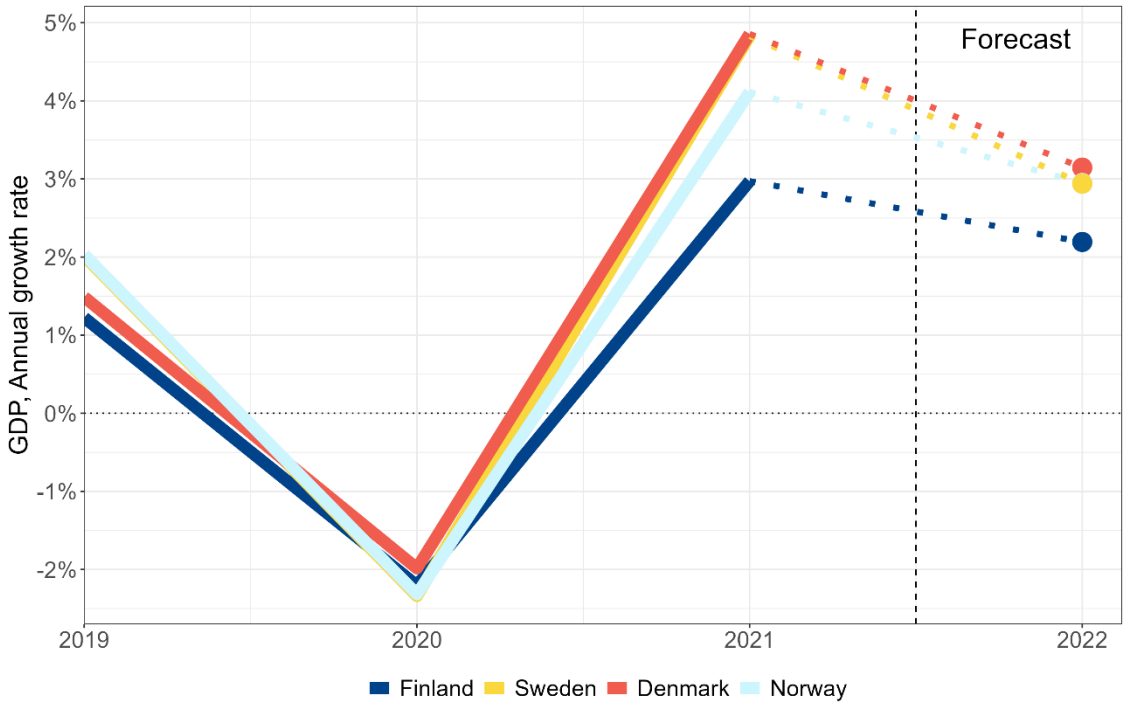
Competitiveness and productivity are also important considerations when it comes to labour market developments (see Figure 2.4.4). Finland's cost competitiveness, as measured by unit labour costs, deteriorated in the early 2010s but improved in 2016-2018. This was driven by the cost competitiveness pact of 2016. The increase in Finnish unit labour costs has been similar to Germany, Sweden, and the euro area as a whole in recent years. Labour productivity growth has been uninspiring in Finland, as in other euro area countries on average.

## 2.5. Recovery from the pandemic

Had the war not begun, the recovery from the Covid pandemic would have still featured more prominently in economic policy discussions in 2022. It may be useful to compare experiences in the Nordic countries in the pandemic years.[6] Figure 2.5.1 displays the growth rate of real GDP in four Nordic countries. All the countries except Norway experienced a very similar decline in 2020, which was much smaller than what was feared at the onset of the crisis. However, after the crisis Finnish growth has been more muted; of course, this was also affected in 2022 by our greater vulnerability to developments in foreign trade with Russia.

In a broader European perspective, Finnish economic developments during the pandemic appear favourable. Especially in contrast to southern European countries, the reduction in GDP in Finland was smaller. This had to do with the structure of the economy (their greater reliance on tourism) and most likely also with teleworking being facilitated by highly developed ICT systems in the Nordic countries.

Figure 2.5.1. Real GDP growth in the Nordic countries.




Source: OECD Economic Outlook (November 2022). Note: Norway = Mainland Norway.

[6] See also the analysis carried out by Nordic statistical offices (Søndergaard Møller et al. 2022).

**Box 2.3. Business subsidies granted in response to the Covid-19 pandemic**

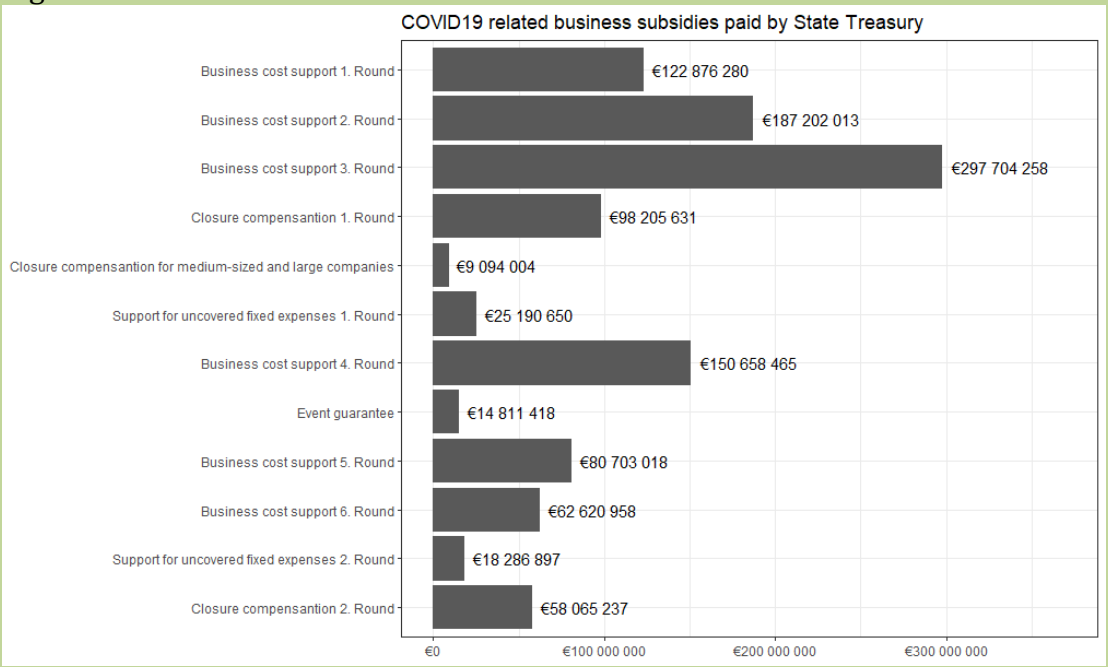
During the Covid-19 pandemic, the Finnish government took measures to save companies from bankruptcy. First, Business Finland (BF) launched a programme for direct business subsidies for Finnish companies. As BF is a public agency providing R&D support and innovation funding, subsidies had to be awarded for company development purposes. The criteria for what was considered a development project were flexible and could vary between similar companies. Afterwards, BF subsidies were heavily criticised by the public and the media on the grounds of the criteria being too lax and companies being treated unfairly. Some companies returned the subsidies they had received. According to an audit by the National Audit Office of Finland, the business development aid granted by Business Finland and by the Centres for Economic Development, Transport, and the Environment in the early stages of the crisis did not function well (NAOF 2021). These subsidies were not well suited for liquidity problems and those firms that suffered most.

The State Treasury of Finland announced its first round of so-called business cost support in July 2020. In total, the State Treasury administered six rounds of business cost support. In addition, more specific support forms were introduced. For example, closure compensation was available for companies (such as restaurants) forced to close for certain periods by government mandates. (See Figure B2.3.1)

There were regional and industry-based support forms, such as subsidies from the Centres for Economic Development, Transport, and the Environment. Entrepreneurs were supported in the form of unemployment benefits, which traditionally only the employees have access to.

In total, 28,735 companies applied for Business Finland subsidies, out of which 20,164 received funding. A total of 51,728 companies applied for various kinds of cost support from the State Treasury of Finland.

Figure B2.3.1. Covid-19-related business subsidies.

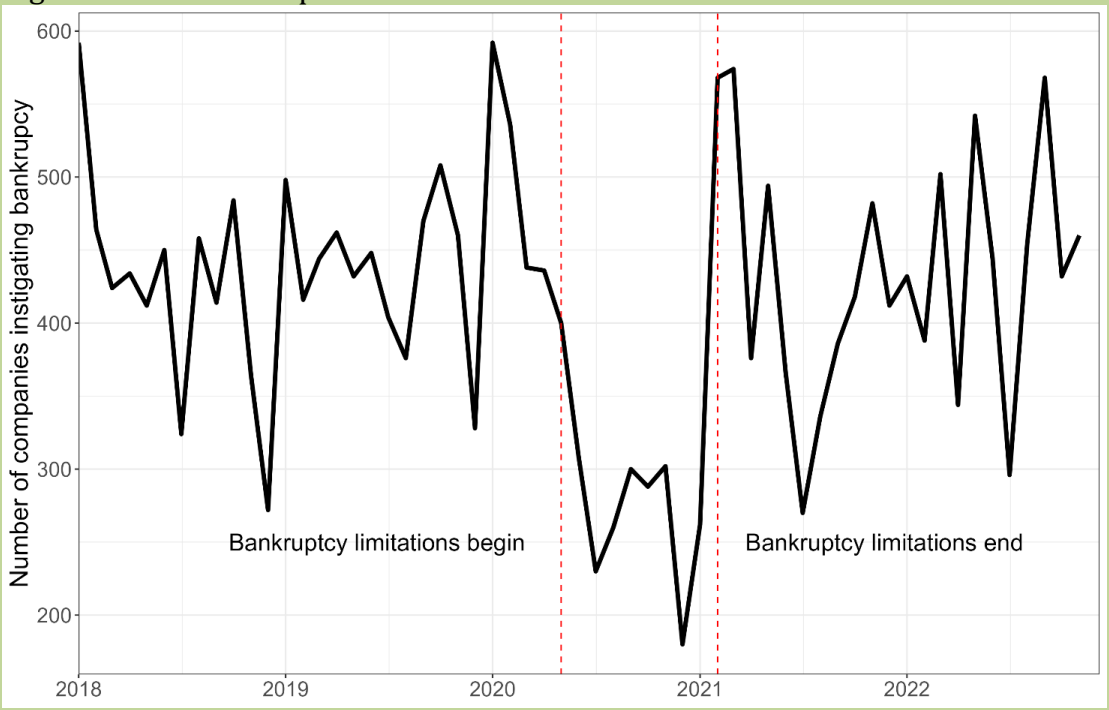



Source: State Treasury Note: Business cost support rounds: 1.4.-31.5.2020 (1.), 1.6.-31.10.2020 (2.), 1.11.2020-28.2.2021 (3.), 1.3.-31.5.2021(4.), 1.6.-30.9.2021 (5.), 1.12.2021-28.2.2022 (6.); Closure compensation rounds: 1.3.-28.4.2021 (1.), 21.12.2021-28.2.2022 (2.); Support for uncovered fixed expenses rounds; 1.3.-31.5.2021 (1.), 1.12.2021-28.2.2022 (2.); Event guarantee 1.6.-7.12.2021.

Business Finland paid out around EUR 994 million to companies during the Covid-19 crisis. The total amount paid by Business Finland and the State Treasury amounted to more than EUR 2 billion in 2020 and 2021. In these years, there were no large-scale bankruptcy waves in Finland. While unemployment levels rose after the start of the pandemic, they rebounded rapidly to pre-pandemic levels.

In 2020, there were fewer bankruptcies instigated than in previous years (see Figure B2.3.2). This is most likely due to the support measures and limitations on filing bankruptcies. According to Statistics Finland, the number of companies that did not go bankrupt but just ceased operating increased slightly. At the same time, however, the number of new companies increased, indicating that there were new businesses taking over from the old ones.

Figure B2.3.2. Bankruptcies in Finland.



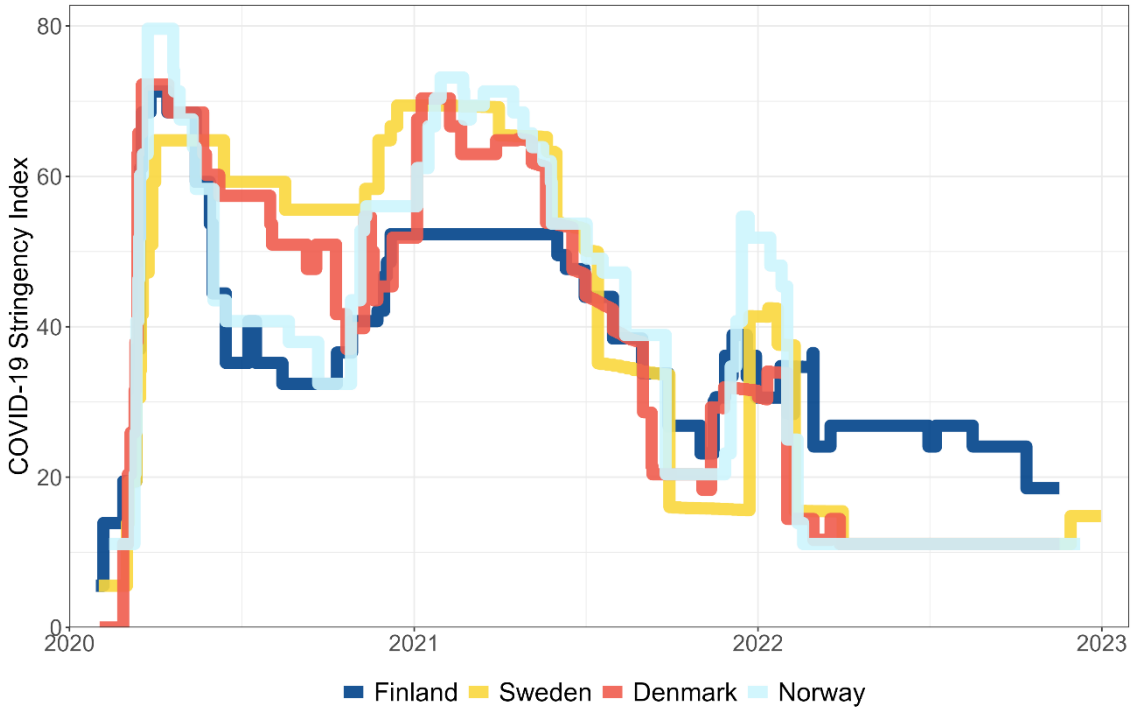

Source: Statistics Finland.

As the pandemic support mechanisms have faded out, the energy crisis caused by the Russian invasion of Ukraine is straining the economy with increasing energy costs. In response, Finnish decision makers have among other things created a cost support vehicle for transport companies and for companies that use work machines running on fuel oil. The fuel subsidy was again implemented by the State Treasury. It is intended to cover 5% of fuel costs in the period 1.2.2022-30.4.2022. As of December 2022, EUR 30 million of fuel subsidy has been paid out to Finnish companies, of the total of EUR 75 million allocated to funding the subsidies.

Sources: MEAE (2021), HE 46/2020 vp, Veistämö (2022)

An ongoing discussion – and some of this discussion was cited in the 2021 EPC report – is related to whether there has been a trade-off between saving lives via strict restrictions versus saving jobs and the economy. [7] While Sweden started its policy with somewhat less strict policies according to an aggregate Covid-19 stringency index (Figure 2.5.2), the restriction policies in the various Nordic countries have followed relatively similar paths across other pandemic periods. In fact, Sweden appears to have implemented stricter policies than Finland did in early 2021. Still, these indicators have to be interpreted with care, as they are measured with uncertainty. In particular, the indicators may not reflect the stringency level that the majority of the population perceives. The reason is that the indicator records the strictest containment measures, regardless of whether the measure applies to the whole country or a smaller region (see Bjørnland et al 2022).

Figure 2.5.2. Covid-19 stringency index among Nordic countries.



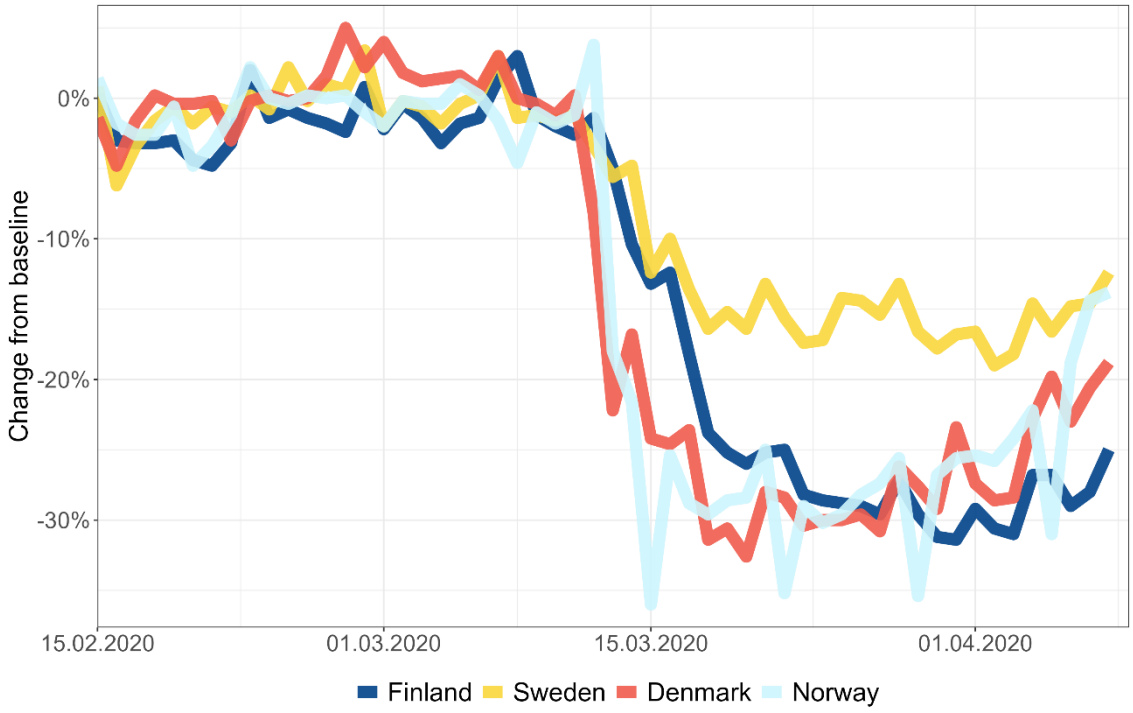

Source: Our World in Data. Note: Stringency index (Hale et al., 2021) is a composite measure based on multiple different indicators. Rescaled to 0-100 (100 = strictest).

An examination of mobility data in the early stages of the pandemic from Google suggests that despite having less stringent policies than the other Nordic countries, Sweden also reduced mobility quickly, although not to the same extent as in Denmark and Norway (see Figure 2.5.3). Finland behaved

[7] An up-to-date treatment is provided by Isotalo et al. (2022).

more in line with Sweden in the first weeks in the pandemic, but eventually mobility was reduced in line with what happened in Denmark and Norway. This suggests that precautionary behaviour was an important issue in all countries.

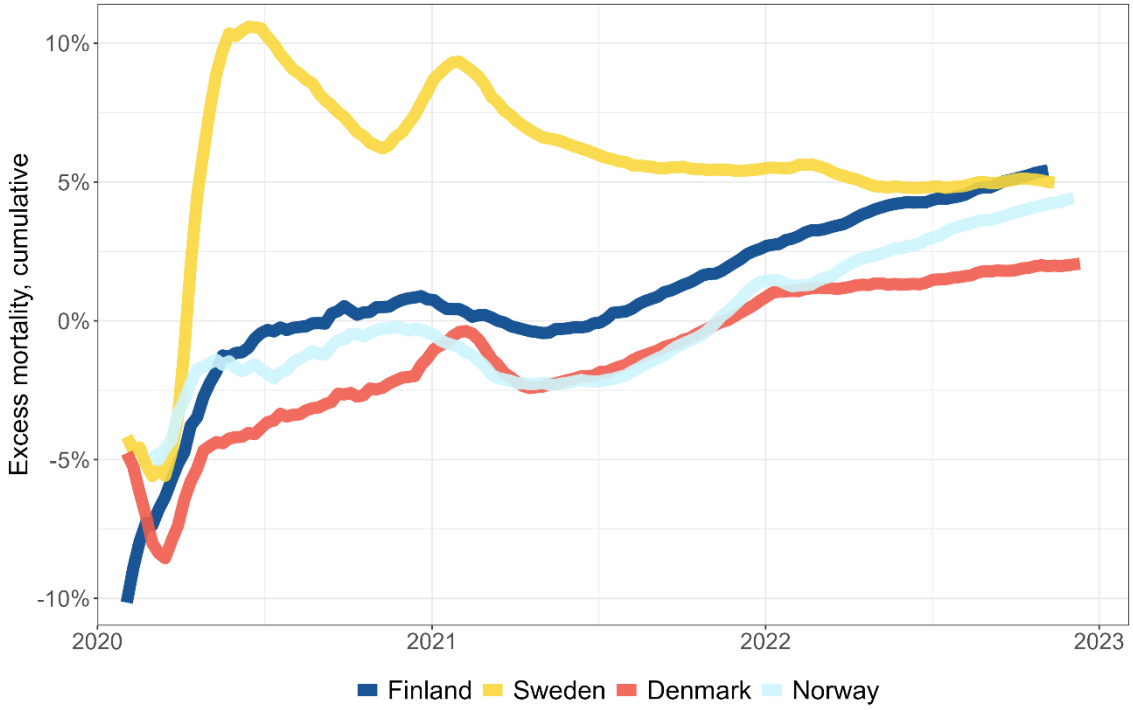
Figure 2.5.3. Google mobility report: all activities except parks, percent change from baseline.




Sources: Google mobility report and EPC own calculations.

Because of differences in the statistical practices measuring Covid-related deaths, the use of an alternative measure, excess mortality, has been suggested. According to this measure, there was a large increase in deaths in Sweden in the beginning of the pandemic, whereas the situation became more even during 2022. In fact, Finnish mortality remained elevated in 2022, which resulted in our cumulative excess deaths catching up with those in Sweden. The EPC is no expert in medical or population science, and we refrain from interpreting these numbers closely. Even this measure is subject to various measurement issues, as it entails a comparison of actual and estimated deaths. One takeaway from the numbers, however, is that a longer-term perspective is needed to evaluate the overall effect of various policy responses.

Figure 2.5.4. Excess mortality in Nordic countries during Covid-19 pandemic.




Source: Our World in Data. Note: Excess mortality is measured by cumulative deaths from all causes compared to projected deaths for the same period based on previous years.

A comprehensive report by Labore and VATT researchers (Isotalo et al. 2022) provides detailed findings on the incidence of the economic burden of the pandemic in Finland. According to their analysis, the overall wage bill surpassed the 2019 level already in late 2020, but the recovery in the number of employees took longer, until Q3 of 2021. The greater-than-average incidence of employment reductions in the lower end of the wage distribution explains these findings. The average developments mask wide heterogeneity across sectors. In October 2021, the final month in their data, the overall wage bill still remained below the 2019 level in the hospitality and logistics sectors. In 2022, restaurants experienced skills shortages as a result of a reduction in the workforce in the sector (See also Chapter 3). The wage bill accruing from hiring workers below 25 years of age saw the greatest reduction and was still below the 2019 level at the end of the analysis period.

The increase in unemployment was driven by furloughed workers at the height of the crisis in the first half of 2020, but since then the share of furloughed workers among the unemployed has dropped dramatically. While overall developments in employment have been positive, the share of the long-term unemployed is high, which is a cause of concern.

The report also examines how well Finland's tax-benefit policies sheltered households against the adverse economic consequences of the pandemic. The analysis takes into account both the tax-benefit arrangements that were in place before the crisis and new policies, including less stringent eligibility for unemployment benefits for the self-employed. The results indicate that the Finnish social insurance system provided ample cushioning for households: while factor income among households with wage earners or self-employed persons dropped by 2.6%, the corresponding reduction in disposable income was 1.2%. Overall, income inequality during the first Covid year (2020) declined, although the share of households below the threat-of-poverty line increased by one percentage point. One policy intervention that the researchers find useful was the extension of unemployment benefits for the self-employed, which is likely to be beneficial in other crises settings to. The authors also note that it is still too early to say what the longer-term consequences of e.g. home schooling and lower employment among young persons will be.

## 2.6. Conclusions

The war in Ukraine created an energy crisis in Europe, which has also pushed up the overall price level. Because of these developments, the Ministry of Finance now expects growth in Finland to be 1.1 percentage points lower in 2022 and 1.7 percentage points lower in 2023 than what was forecast before the beginning of the war. The Finnish economy is expected to be operating below its normal capacity in 2023.

Europe, Finland included, is experiencing a supply-side shock. Such a shock is characterised by supply disruptions and price increases due to rising energy costs. At worst, this type of supply-side shock may lead to stagflation: a combination of high inflation and low growth. In contrast to a shock created by a reduction in aggregate demand, expansionary policies are less well suited for dealing with supply shocks, as such policies would further feed inflation. Fiscal policy should not add to inflationary pressures, rather measures to ease structural reforms should be sought.

Since the shock is economy-wide, it is not really possible to permanently compensate households and firms for the reduction in profitability or disposable income. However, redistributive measures can still be taken, and in particular the most severely affected households should be assisted. On average, however, fiscal policy can only smooth the shock felt across a number of years.

Following the increase in inflation, nominal interest rates have risen sharply. However, real interest rates – where inflation is subtracted from nominal rates – are more important for economic decisions, including those of the government. The real interest rates faced by the Finnish government, when borrowing, are strongly negative at the moment, although this situation may not necessarily be permanent.

Finland's reliance on trade with Russia had already declined prior to the war, and hence the collapse in the remaining trade had relatively moderate effects. Firm-level analysis suggests that, on average, firms trading with Russia did not face reductions in their turnover or wage bills, although their exports declined. While some of the most Russia-dependent firms experienced difficulties, this can be seen as a realisation of business risks. This implies that the need to compensate businesses because of the collapse in trade is very

limited. However, the longer-term consequences for the Finnish economy will most likely be negative due to the shutdown of an important trade channel.

New research findings suggest that the Finnish labour market and the social insurance institutions fared well during the Covid pandemic. Inequality did not increase during the first Covid crisis year, and employment already surpassed the pre-pandemic level in the latter half of 2021.

# 3. Employment policy

As discussed in the previous chapter, the Covid-19 pandemic resulted in a temporary decline in economic activity in Finland in the spring and summer of 2020. Furloughs increased drastically, but the number of unemployed persons increased relatively little. In 2022, the number of registered unemployed decreased to the pre-pandemic level. However, the economic outlook for 2023 appears gloomy, and the continuation of the labour market recovery is uncertain.

Employment policy and its outcomes over the past three years must be assessed against the backdrop of the shocks that could not be foreseen in 2019. Then the government adopted in its programme a 75% employment rate target by 2023. Having a separate target for the employment rate was motivated by the sustainability of public finances as well as alleviation of the social costs of unemployment.

In this chapter, we provide an overview of the development of the labour market over the parliamentary term. We discuss the employment policy targets and measures announced by the government. In this context, the effects of employment growth are briefly considered from the point of view of public finances. Finally, we discuss a potential mismatch in the current Finnish labour market, where the vacancy rate approached a historically high level. For appropriate policymaking it is important to detect whether a tightening labour market will lead to severe shortages that could limit economic growth.

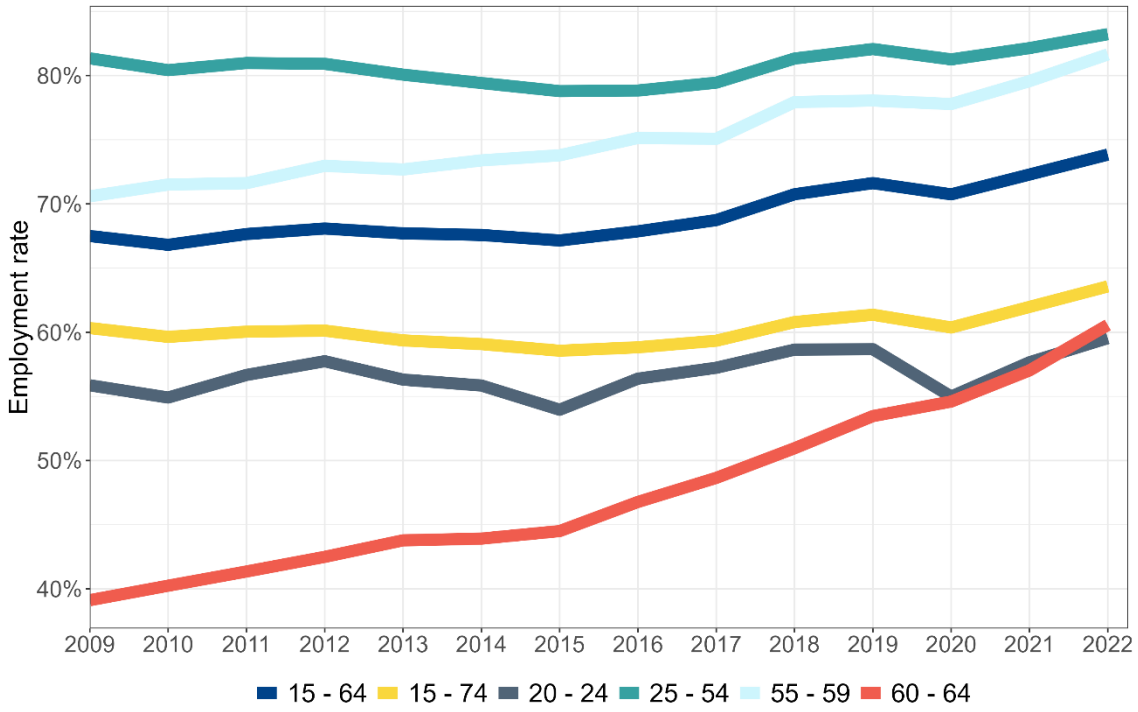
## 3.1. Labour market developments

The rapid post-pandemic employment growth started to slow down towards the end of 2022, but overall the continuation of the recovery has been noticeable in the light of the challenging economic environment. This positive

labour market outcome is shared by many other EU Member States (European Commission 2022a). This seems to stem from common elements related to the rebound from Covid-19 and the associated economic policies to tackle the pandemic.

Figure 3.1.1 shows that employment rates have increased most in the 60-64 age group, while employment has remained quite stable in the "prime" age group (here 25-54).

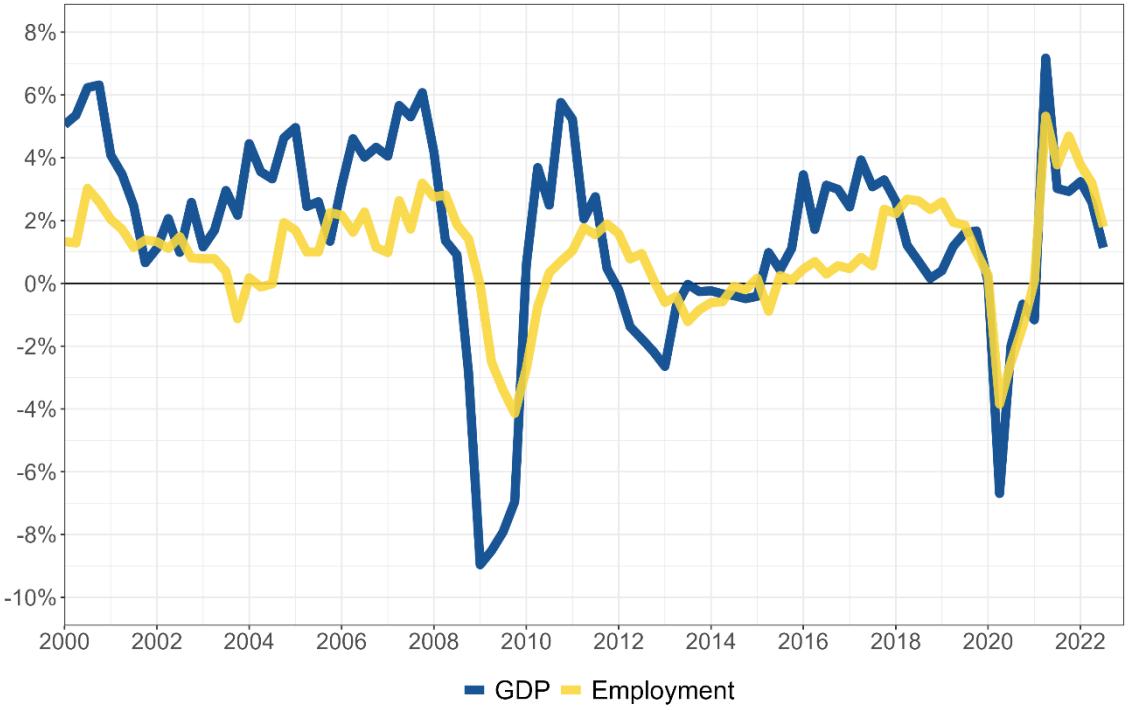
Figure 3.1.1. Employment rates by age group 2009-2022.




Source: Labour Force Survey (Statistics Finland)

The recovery has been remarkably fast. Labour markets normally adjust with a lag, but recently the labour market response to changes in economic activity has been immediate (Figure 3.1.2). Covid-19 itself was a sudden shock and both the policy reactions, such as the restrictions, and the behavioural changes of consumers and firms were instantaneous. The temporary lay-off scheme helped many employees to stay attached to the labour market, and when the recovery started, they quickly returned to their earlier jobs.

Figure 3.1.2. Quarterly annual changes in employment and GDP (%).

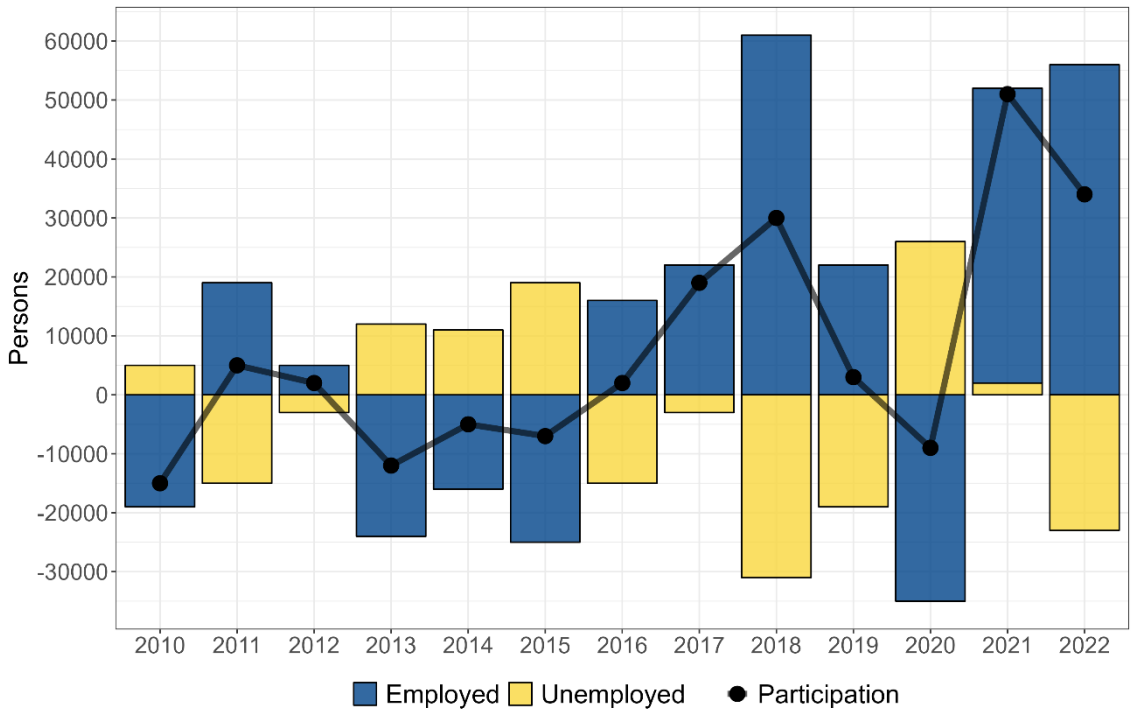



Source: Quarterly National Accounts (Statistics Finland).

The strong economic growth also encouraged people who were not participating to enter the labour market. Typically, a large share of newcomers first enter unemployment and only thereafter employment. In the recent recovery, there seems to have been a fast track directly to employment. On the other hand, when some vacancies are filled with new entrants, unemployed jobseekers are not able to benefit from the increase in labour demand to the full extent. The labour market developments in 2021 (Figure 3.1.3) seem to be in line with this kind of adjustment since there was even a small increase in unemployment despite strong employment growth. However, in these circumstances flows from and to unemployment may have been noticeable in counteracting each other. Further and deeper analysis of the recent labour market adjustments would offer useful lessons with a view to future crisis management.

While the number of employed persons surpassed the pre-pandemic level already in 2021, the number of hours worked reached the respective level only later in 2022 (Figure 3.1.4.). Headcount employment has also risen faster than hours worked in many other countries, which seems again to suggest similar post-pandemic labour market reactions.

Figure 3.1.3. Annual changes in employment, unemployment, and labour force participation 2010 – 2022, 15-64 year old population.



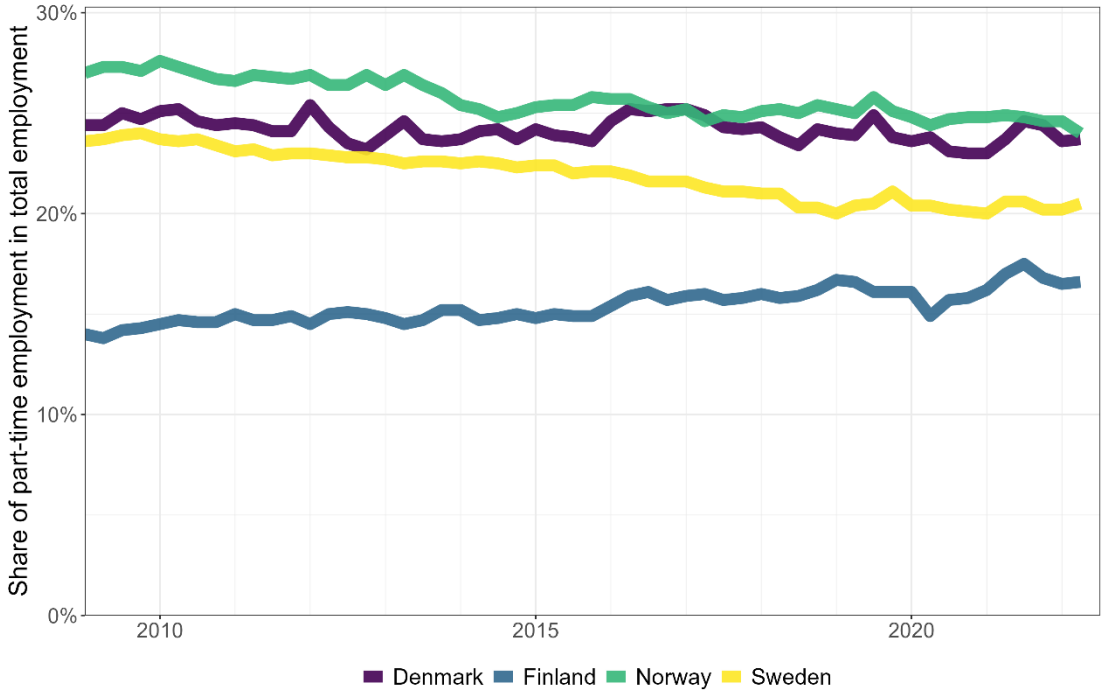

Source: Labour Force Survey (Statistics Finland).

Figure 3.1.4. Employment and hours worked 2016-2022, 2019 = 100.


Source: Labour Force Survey (Statistics Finland).

The recovery has been strongest in services, which are often characterised by more flexible use of labour. This also helps to explain the increase in the share of part-time employment in total employment in Finland. This has brought the Finnish labour market closer to its Nordic neighbours (Figure 3.1.5).

Figure 3.1.5. Share of part-time employment has increased in Finland and is approaching the levels of other Nordic countries.



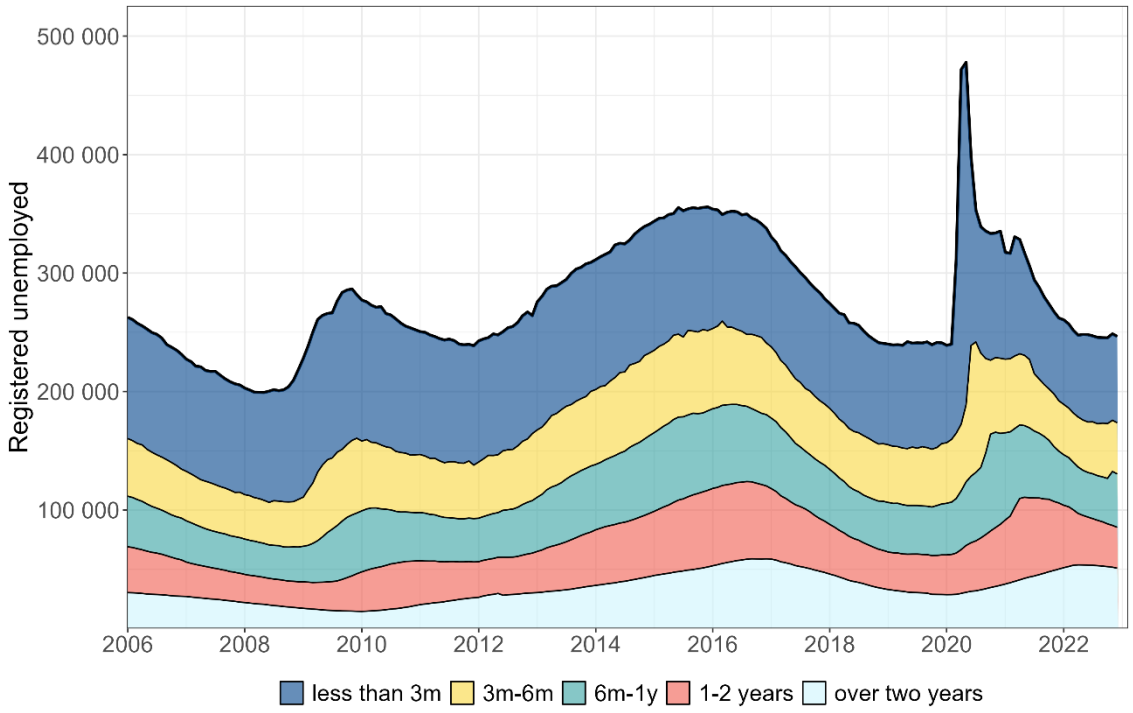

Source: Labour force survey, Eurostat.

However, it is important to determine whether increased part-time working is voluntary or whether employees would prefer full-time jobs. According to the same Labour Force Survey referenced in Figure 3.1.5., the rise in the share of part-time employment is not explained by a rise in persons working part-time who wish to work additional hours (underemployed part-time workers). Rather, based on this indicator it seems that most of the rise in part-time working is voluntary.

One of the most persistent challenges in the Finnish labour market is long-term unemployment. As can be seen from Figure 3.1.6, long-term unemployment decreased for a period from 2017 to 2020. It is long-term unemployment that has reacted most slowly to the recovery from the shock of the pandemic. It is predicted to decrease in 2022 and 2023, but this decline is expected to come to an end in 2024 (MEAE 2022a). This would leave long-

term unemployment somewhat higher than the pre-pandemic level. Thus, while hysteresis in unemployment was mainly avoided in the Covid-19 crisis, it could still have a negative effect on long-term unemployment.

Figure 3.1.6. Unemployment by duration 2006M01-2022M12.




Source: Ministry of the Economic Affairs and Employment (seasonally adjusted by EPC).

The long-term unemployed are typically a heterogenous group with specific needs to be targeted through employment policies. That is why government policy intervention often necessitates e.g. tailored measures to improve the qualifications of job seekers.

## 3.2. Employment policy targets, measures, and fiscal impacts

An explicit employment policy target set in the government programme reads as follows: " … the employment rate will reach a level of 75 per cent in the 15–64 age group in 2023, given normal global and related domestic economic circumstances." In the programme, attention is paid to measures whose employment "impact will be visible only after some delay". Moreover, special emphasis is paid to effective measures to promote the employment of people with partial work capacity, those with poor employment prospects, and

immigrants. Finally, an additional motivation given for increasing the employment rate is that it is the most sustainable means to strengthen general government finances.[8]

As discussed in the previous section, when considering the recent change in Labour Force Survey statistics, the government attained its employment rate target of 75 % in autumn 2022. This is mainly thanks to the favourable economic development after the pandemic.

Initially, the government agreed on several employment policy measures to be prepared to reach the employment target set. Since then, the potential employment impacts of the measures designed have been assessed by several ministries (ex-ante). These measures were thoroughly discussed in the previous annual report of the Economic Policy Council. The Council pointed out that different methodologies had been used in the assessments and there was considerable uncertainty regarding the employment impacts. (EPC 2022)

In general, it is difficult to identify the employment impacts of policy reforms reliably (ex-post) if the policy design does not make possible a comparison of a counterfactual to the actual outcome of the reform (control vs. treatment group). As an impact assessment of employment policy is challenging, we refer here to recent Finnish empirical studies to provide insight into the evaluation of employment policy. We consider two measures decided by the current government: decentralisation of employment services to the municipalities and raising the minimum age for entitlement to additional daily unemployment security. These measures are expected to have relatively high employment impacts in comparison to other measures planned or taken by the government.

First, a policy reform involving the decentralisation of public employment services (PES) to the municipalities was initiated by the current government in its mid-term negotiations. The PES reform is expected to have a positive employment impact of about 7,000 - 10,000 persons. [9] To prepare for the considerable administrative change, the municipalities will assume their new responsibilities in the beginning of 2025. The purpose of the reform is to increase the efficiency of employment services. Municipalities may have a better understanding of the local labour market, thus contributing to

[8] Programme of Prime Minister Sanna Marin's Government 10 December 2019

[9] HE 207/2022 vp; or about 6,600 persons in EPC (2022)

increased employment. The reform also aims to increase employment incentives by changes in the funding of PES services. In a recent study, Nieminen et al (2021) investigated a large-scale temporary reform during which employment services were decentralised for specific target groups of job seekers in certain Finnish municipalities. The study shows that decentralisation of employment services had no effects on the number of months per year individuals worked in the short term. No effects on mobility were found either, even though local governments had incentives to employ jobseekers in their own jurisdiction. The activation rate was found to increase by five percentage points, and the long-term unemployment rate also fell. According to the authors, this was probably due to increased participation in activation measures. Given these results, the expected positive impact of the PES reform on employment may turn out to be optimistic. Especially in the short term, an extensive change in administration may increase the costs of bureaucracy and decrease efficiency. On the other hand, the reform also includes the well-founded element that makes the municipalities responsible for the costs of unemployment benefits during the activation period.

Second, the government decided in December 2020 to phase out access to extended unemployment benefits for older workers by 2025. This reform is expected to increase employment by 6,500-7,000 persons.[10] A previous ex-post analysis of reforming a scheme for extended unemployment benefits by Kyyrä and Pesola (2020) is helpful in evaluating the employment impacts here. The scheme used to be rather generous for older workers, who could receive extended benefits until retirement. In 2005, the scheme was reformed and access to extended unemployment insurance benefits was postponed by two years from age 55 to 57. Since then, the eligibility age limits for extended benefits have been systematically increased in recent years by past governments, as well as by the current one. In their analysis of the 2005 reform, Kyyrä and Pesola found that the two-year increase in the eligibility age increased employment by seven months between the ages of 54 and 63 among private-sector workers. The authors considered the increase large. They concluded that the extended benefit scheme must have had a large negative impact on employment in the oldest worker groups. Hence, based on the results of the study by Kyyrä and Pesola (2020) - using a reliable identification strategy based on changes in age limits - phasing out access to

[10] HE 83/2019

extended unemployment benefits for older workers is likely to have a positive impact on their employment.

Moreover, regarding the employment of the oldest worker groups, strong positive effects on employment can be achieved by pension reforms. As was shown in Figure 3.1.1, employment rates have increased most in the age group 60-64. The contribution of the 60-64 age group to the overall increase in the employment rate is about one percentage point between 2017-2021. The 2017 pension reform gave further impetus to employment increases in this age group. The retirement age increases rapidly by three months a year and in total by two years during the eight-year transition period: for those born in 1954 or earlier the lowest retirement age is 63 and for those born in 1962 it is 65 years. Thereafter, the retirement age will be adjusted to changes in life expectancy, but annual increases will be limited to a maximum of two months. It is difficult to disentangle the exact effects of the pension reforms from other contributing factors, like health and education effects. However, it is safe to say that the 2017 pension reform has also played an important role in the rise in the overall employment rate.[11]

Furthermore, employment and productivity developments are essential for the long-term sustainable growth of the economy. Productivity can be increased e.g. by improving the education of workers. The government's decision to extend compulsory education supports this goal in terms of developing the skills of the low-income segment of the population in particular (see e.g. Seuri et al. 2018).

It should be borne in mind that some of the measures decided by the current government are not going to be implemented before the parliamentary term ends in spring 2023. Therefore, the estimated employment impacts of some of the measures designed are not going to materialise soon.

### 3.2.1. Employment rate targets and public finances

The government programme places special emphasis on employment policy as a tool for balancing public finances. It is typically assumed that

[11] The pension reform was agreed upon in the autumn of 2014, i.e. long before the term of the current and previous governments. In 2019, the EPC (2019) considered the pension reform implemented in 2017 to be probably the largest long-term employment-increasing policy change that had taken place in the government term by then. Moreover, Nivalainen et al. (2023) supports the view that the 2017 pension reform has succeeded in postponing retirement and extending working lives.

employment policy enhances growth if any frictions in the labour market can be alleviated by (optimal) government policy intervention. For example, better education and improved skills may result in a higher employment rate. Increased employment leads to increased growth, higher tax revenues and lower social expenditures such as unemployment benefits or other social assistance. However, the impact of increasing employment on improving public finances depends on the quality of jobs created - and the costs of the public policies.[12]

When considering the fiscal impacts of increased employment, a distinction must be made between part-time employment and full-time employment. Moreover, it matters for public finances whether the new employees come from unemployment or non-participation. Of course, the wages of the newly employed determine their disposable income, and hence their contribution to tax revenues and need for social assistance. Obviously, those previously unemployed who become employed full-time on high wages have the strongest positive impact on public finances. At the other extreme, jobs created by active labour market measures involving considerable fiscal costs (such as pay subsidies) may ultimately have a negative impact on the fiscal balance.

Finally, active labour market policies often reach out to jobseekers with specific challenges. Many of the policy measures decided by the government are targeted at unemployed persons in the most vulnerable position in the labour market. Accordingly, these employment-enhancing measures contribute mainly to overall targets of improving the well-being and social inclusion of all citizens.

All in all, it is too early to evaluate ex-post the overall employment and fiscal impacts of the policies implemented by the current government. Most of the employment policy measures were taken in 2020. The pace of implementing new measures has slowed down thereafter. Therefore, it is important to acknowledge the government's pledge of knowledge-based policymaking and its commitment to a systematic impact assessment in the preparation of all legislation. As emphasised in the government programme, the design of policy

[12] See Seuri (2020) for a discussion on and alternative modelling approaches to evaluate the fiscal effects of employment growth.

measures requires deeper cooperation with the scientific community, for example, to make reliable ex-post assessments possible.[13]

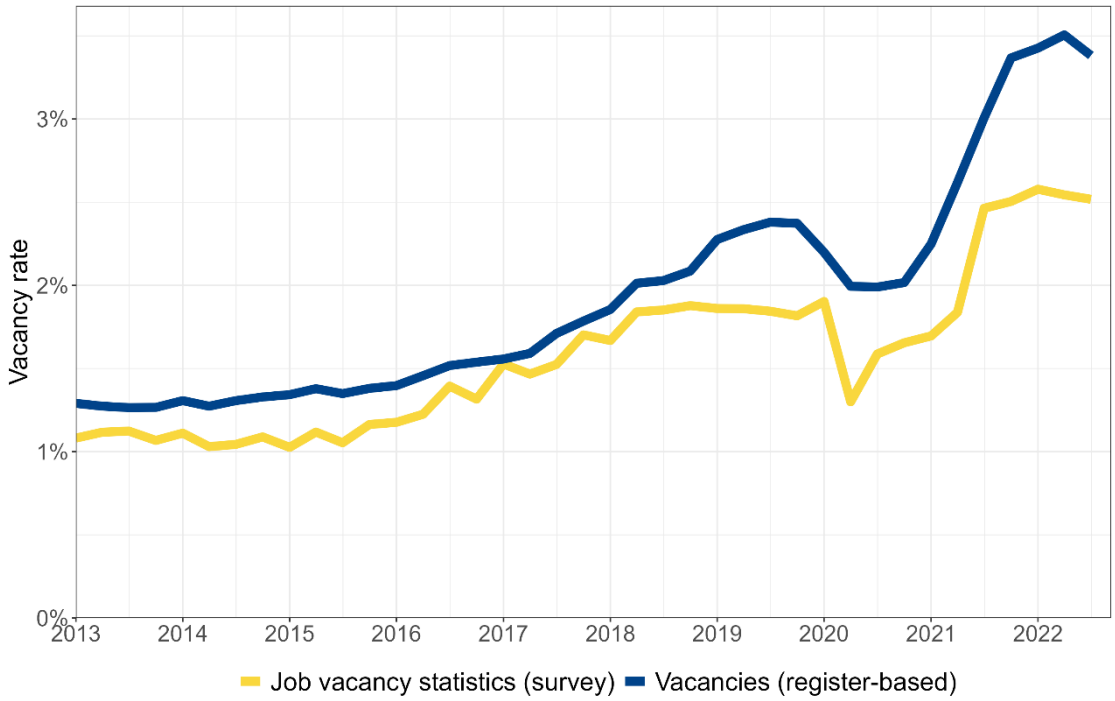
## 3.3. Labour market mismatch

At the same time as employment was increasing in 2022, there were increasing difficulties in recruiting workers in the labour market. One measure for evaluating the efficiency of labour markets is the Beveridge curve. The curve features a negative relation between unemployment and vacancies. This means that unemployment and vacancies cannot be simultaneously reduced, but less unemployment requires more vacancies and fewer vacancies create more unemployment. Over the business cycle, unemployment and vacancy rates move along the Beveridge curve. However, the Beveridge curve is not necessarily stable for long periods but shifts outwards or inwards if there are changes in the matching efficiency. It is an empirical question whether structural changes in the economy and in efficiency can be detected and identified reliably in time-series data (see Box 3.1).

Here we use, where possible, survey-based measures of vacancies and unemployment available from statistical agencies rather than register-based measures. However, internally consistent survey-based measures of vacancies are available only from 2013 onwards. Therefore, the vacancy rate for earlier years is based on data on register-based vacancies. It should be noted that the survey-based and register-based measures of vacancies have diverged from each other recently (see Figure 3.3.1).

[13] Programme of Prime Minister Sanna Marin's Government 10 December 2019, p. 11.

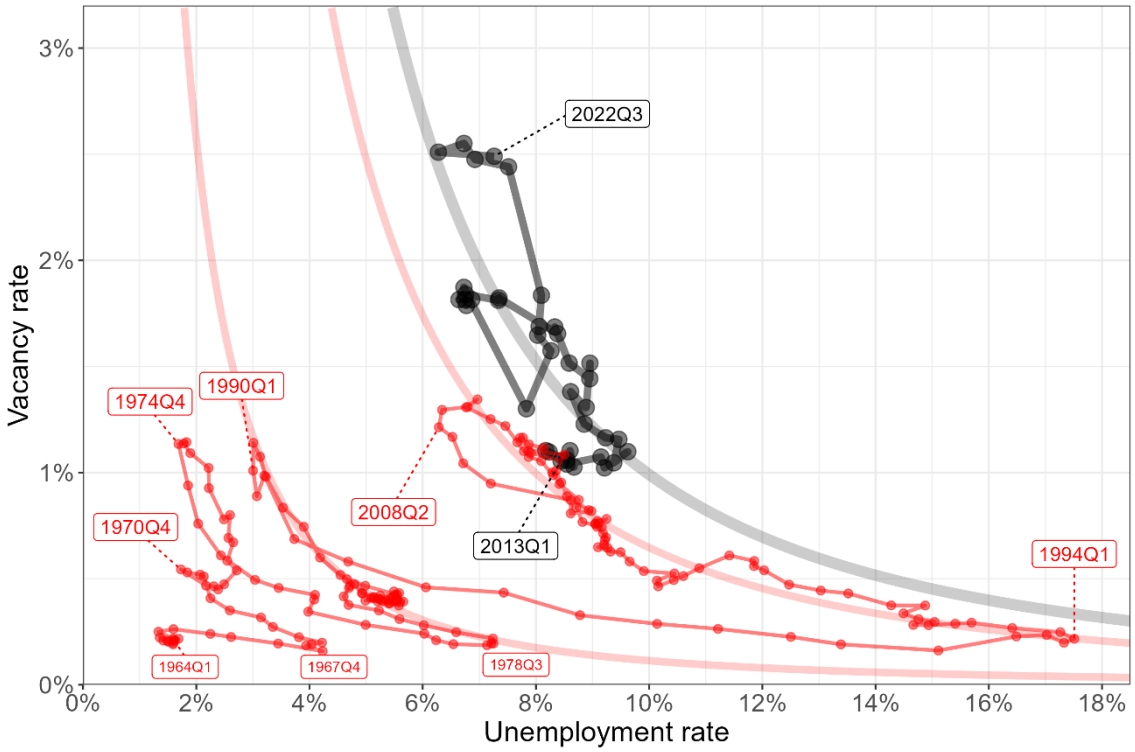
Figure 3.3.1. Survey-based and register-based measures of vacancies 2013Q1-2022Q3.




Sources: Job vacancy statistics survey, seasonally adjusted vacancies (Eurostat, NACE Rev. 2 A-S). Vacancies from employment service statistics (Ministry of Economic Affairs and Employment, seasonally adjusted by OECD). Note: Both series have been divided by the seasonally adjusted number of active persons in the Labour Force Survey (15-74 year old population) to calculate the vacancy rate.

The Beveridge curve appears in a scatterplot of the unemployment and vacancy rates in Figure 3.3.2. Empirically, the Finnish Beveridge curve seems to have been rather stable in recent times. The average relation between vacancies and unemployment is estimated with more recent survey-based data (2013Q1-2022Q3) and plotted as the grey curve. Red points are used for the earlier period, which utilises alternative sources of data, notably register-based vacancies. Using the same curve but at the average location for 1994-2012 seems to fit the observations all the way back to around 1994, when unemployment reached its highest levels ever. Prior to that there was a large shift in the Beveridge curve during the 1990s depression. Notably, the vacancy rate was at its historical peak in 2022.

Figure 3.3.2. Beveridge curve.




Source: Gäddnäs and Keränen (2023). Note: The grey curve is fitted with 2013Q1-2022Q3 as the sample. For the red curves, the position of the Beveridge curve is shifted to reflect the average positions for 1994-2012 and 1978-1990.

Figure 3.3.2 shows relatively high vacancy and unemployment *rates* in 2022. Interestingly, the number of open vacancies was also at a record high in 2022 at the same time as the number of unemployed persons remained high as well. Consequently, employers have increasingly reported difficulties in recruiting the workers they need. The shape of the Beveridge curve might help reconcile this notion. If the shape of the curve in Figure 3.3.2 is correct, then the trade-off between vacancies and unemployment gets more costly at lower rates of unemployment as the curve is steeper and ever higher rates of vacancies are needed to bring unemployment to lower levels.

As mentioned before, movements of the Beveridge curve may indicate changes in matching efficiency. Given that the empirical Beveridge curve seems to be relatively stable over time since the mid-1990s (Figure 3.3.2) with only a relatively small shift outwards around the early 2010s, according to this measure there seems to be no indication of any major shifts in the

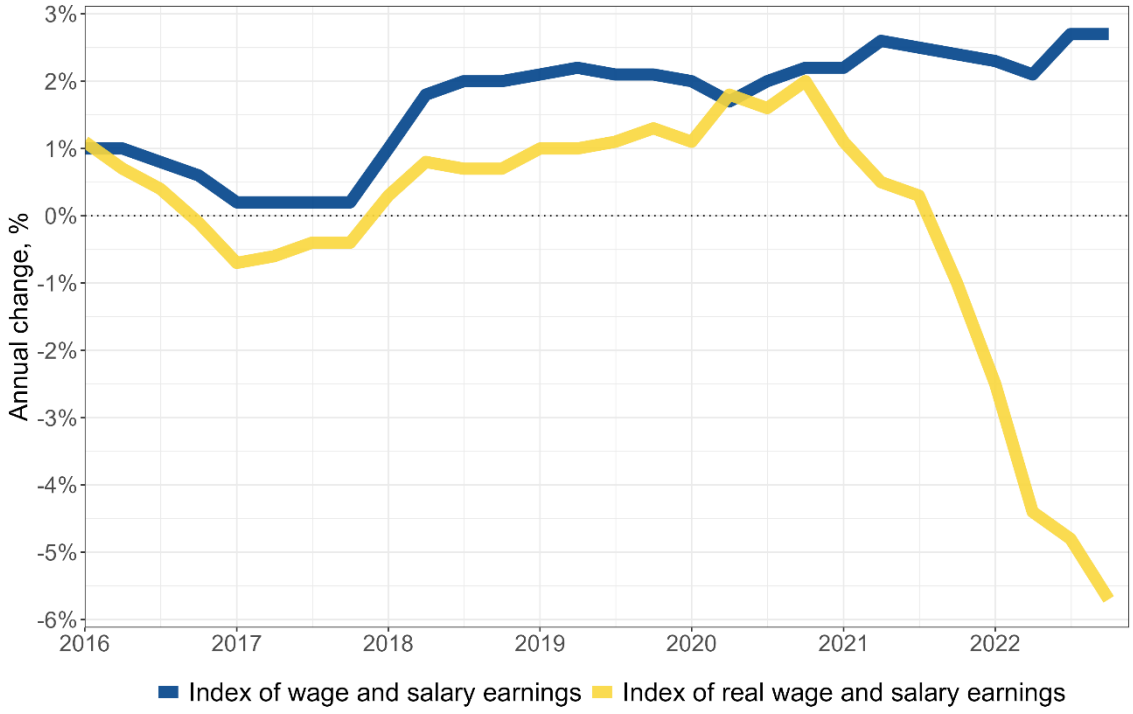
efficiency of matching. Of course, not all points fit the average curve, but movements around the curve may also be driven by cyclical factors rather than movements in the curve: when entering a downturn, vacancies are able to adjust rapidly whereas unemployment often builds up with some lag in an upturn, and vacancies often rise more quickly than unemployment goes down. Determining shifts in the Beveridge curve is not straightforward.

One alternative approach to evaluating labour market mismatch is given by Şahin et al. (2014), who develop an index for mismatch. The idea behind the index is that labour markets are in fact segmented into multiple distinct markets along regional and occupational lines. Some markets might have a considerable number of vacancies in relation to jobseekers, while in others the situation might be the opposite. In theory, mismatches between jobs and jobseekers could be alleviated by allocating unemployed workers differently. The mismatch index of Şahin et al. (2014) builds on this notion. Alasalmi (2022) calculates these mismatch indices at regional and occupational levels for the Finnish labour market using data from the Ministry of Economic Affairs and Employment. His results seem to suggest that the level of mismatch has been decreasing rather than increasing over the last 10 years or so. This measure does not, however, consider mismatch within these labour markets that might be influenced by changes in search behaviour or by other factors.

It is important to disentangle situations where there is an absolute labour shortage (too few potential employees in relation to recruitment needs) from a mismatch problem where both vacancies and jobseekers exist but do not meet each other. According to the Ministry for Employment and Economic Affairs, there are specific sectoral factors behind the mismatch problem as the economic sectors differ in the severity and root causes of the problem (MEAE 2022b). First, the sudden and unforeseen changes related to the pandemic have temporarily increased labour bottlenecks. Second, there are more persistent factors including the nature of job offers, i.e. short hours or contracts or low pay. Finally, an insufficient number of places available in training and education institutions has contributed to a permanent undersupply of skilled labour. Sustained problems, e.g. in the health and care sectors and also in ICT sectors, are examples of these situations. Labour migration is likely to offer a partial solution, but the possibilities afforded by this vary remarkably from sector to sector.

The tightness of the labour market can also be analysed by considering changes in the price of labour. Despite the reported recruitment problems and rising inflation, nominal wage increases (both contract wages and wage drift) have remained modest in 2021 and 2022. This combined with high inflation is leading to a record-high decrease in real wages (over 4 %) in 2022.

Figure 3.3.3. Nominal and real annual changes in earnings index (%).




Source: Wages and salaries, Statistics Finland.

According to the OECD, the link between prices and wage growth is typically less tight than it was e.g. after the global oil shock in 1973 (OECD 2022).[14] The linkages are weaker because direct indexation mechanisms have been removed and collective bargaining has declined significantly. Globally, these factors are likely to reduce the risk of price-wage spirals. In Finland, the wage negotiations in winter 2023 are of great importance in this respect. The negotiations will take place in a situation where there is no consensus between the social partners about the need for and the model of co-ordination of wage increases in different sectors. This in turn poses a risk to well-managed cost competitiveness in the current situation and wage co-ordination would also be needed in the future crises.

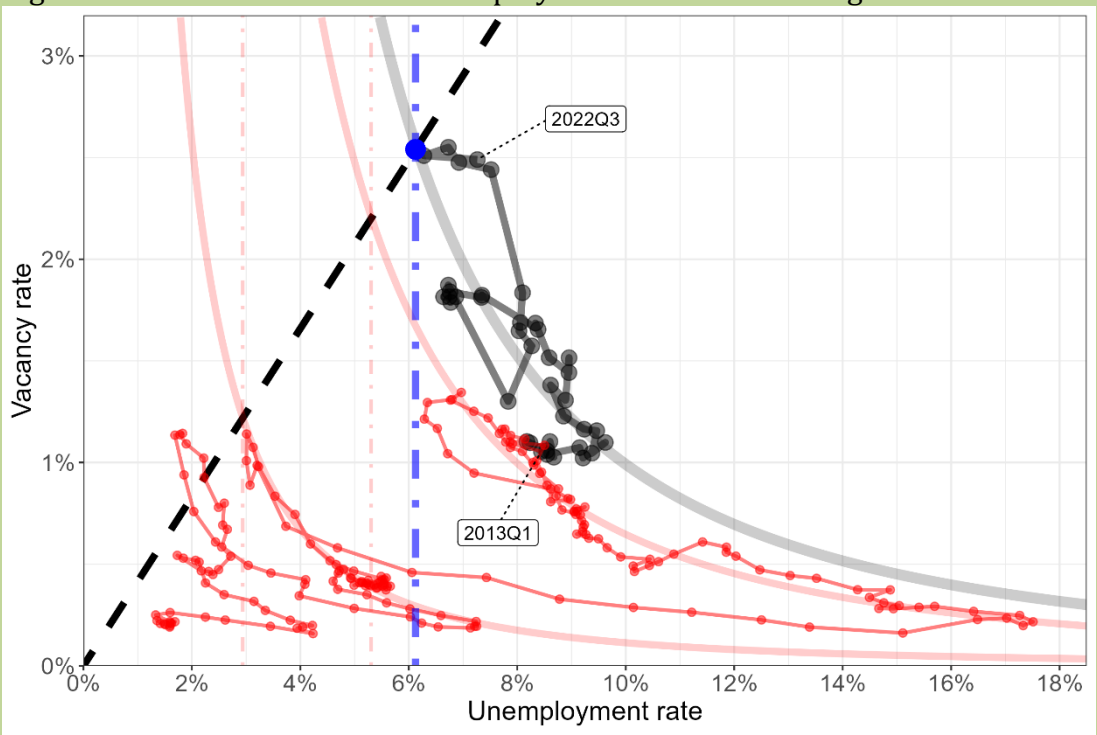
[14] See also Alvarez et al (2022).

**Box 3.1. Beveridgean unemployment gap**

Gäddnäs and Keränen (2023) study the efficiency of the Finnish labour market. Their analysis is based on the work of Michaillat and Saez (2021), who derive a sufficient statistics formula that solves for the optimal trade-off between job vacancies and unemployment. This formula gives the socially efficient rate of unemployment given certain assumptions on the social costs of vacancy creation and unemployment combined with the empirical relation between the two --- the Beveridge curve.

The basic idea behind the efficient trade-off solution is that both vacancies and unemployment create social costs. Posting more vacancies creates costs as more resources are devoted to recruiting rather than producing. At the same time, unemployment also means that people are not in market production, and unemployment may also have other welfare consequences. The socially efficient outcome balances these two costs along the Beveridge curve. Michaillat and Saez (2021) set the values for these costs based on estimates in the academic literature.

Figure B3.1.1. Efficient rate of unemployment and the Beveridge curve.

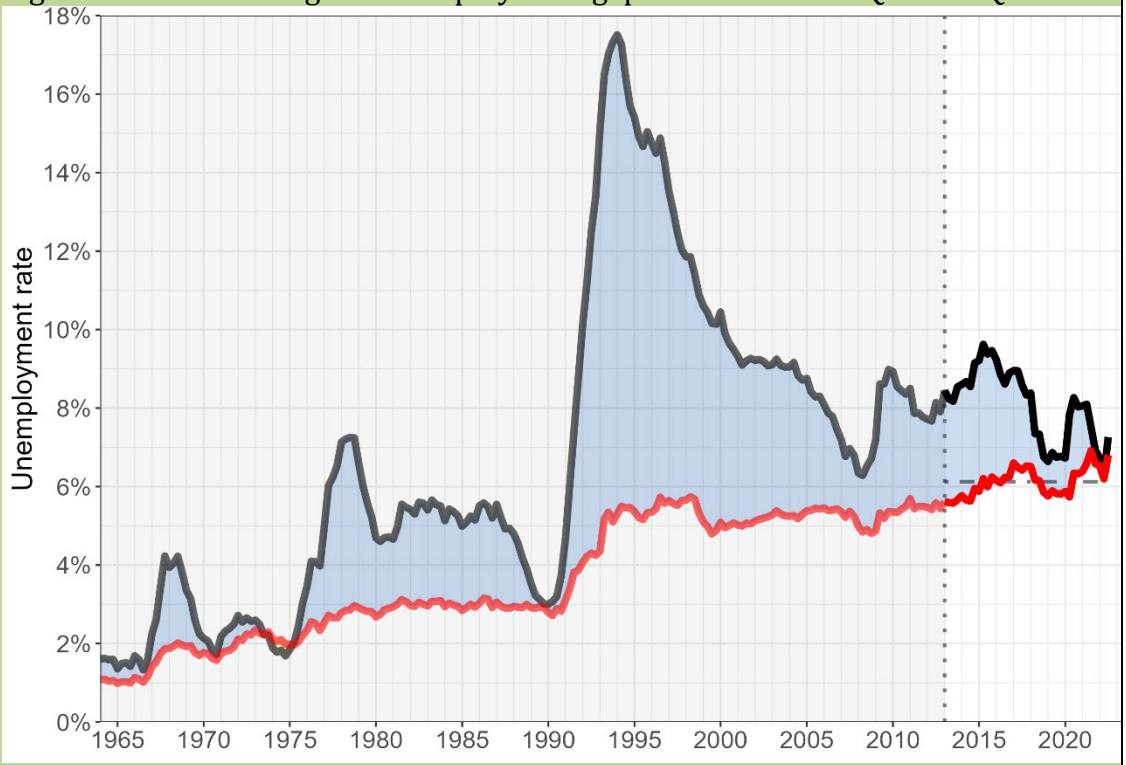



Source: Gäddnäs and Keränen (2023) Note: On the dashed line labour market tightness is efficient. The blue dot where the black dashed line and the grey curve cross, gives the efficient unemployment and vacancy rates on that Beveridge curve.

Figure B3.1.1 has the same underlying data as Figure 3.3.2 but illustrates the solution for the efficient rate of unemployment. In this figure, the upward-sloping dashed line gives the efficient labour market tightness (vacancies per unemployment) that is the result of the optimal trade-off between the two. Combined with the average Beveridge curve for Finland in 2013Q1-2022Q3 (grey line), the efficient point along the Beveridge curve is found where these two lines cross each other (blue dot). For Finland, the analysis suggests that the efficient rate of unemployment is close to 6%.

The main finding of Gäddnäs and Keränen (2023) is that the Finnish labour market is chronically too slack, meaning that there are too few vacancies and too much unemployment along the Beveridge curve. Figure B3.1.2 plots the realised (black line) and efficient unemployment rates (red line) between 1964Q1-2022Q3.

Figure B3.1.2. Beveridgean unemployment gap in Finland 1964Q1-2022Q3.




Source: Gäddnäs & Keränen (2023) Note: The black line is the seasonally adjusted unemployment rate. The red line is the efficient unemployment rate. The shaded area between these lines is blue whenever the labour market is inefficiently slack and yellow when it is inefficiently tight. The dotted vertical line represents the data break in 2013Q1. On the right-hand side of this line the average efficient unemployment rate between 2013Q1-2022Q3 is given by the dot-dashed horizontal line.

There are only a few periods when the Finnish labour market has been too tight, while most of the time there is considerable slack. They similarly find that since 2009 the Swedish labour market is inefficiently slack most of time while Germany and the Netherlands have also seen periods of overly tight labour markets. On average, however, the labour markets have been too slack since 2009 in these two countries as well.

## 3.4. Council views

The employment target set by the current government was reached in 2022 in practical terms. Given the harsh economic circumstances, this was a better achievement than what was expected during the pandemic. A rapid economic recovery helped workers to return to their jobs and permanent damage was mostly avoided in the labour market. However, there is still the risk that Covid-19 may have a negative and more sustained effect on long-term unemployment.

The post-pandemic labour market outcomes in Finland are in line with other EU countries. In addition to the rapid recovery, these common features include labour bottlenecks and labour input increasing faster when measured in headcount employment rather than in hours worked. Accordingly, crisis dynamics and crisis management are important in understanding the employment changes in addition to direct employment policies.

Employment policy measures typically take time to materialise in the labour market because of their transition periods and various lags. Recently, the 2017 pension reform has also had a major effect on the overall employment rate. Similarly, some of the most important measures decided by the current government will contribute mainly to future developments in the labour market. These include the decentralisation of public employment services to the municipalities, the phasing-out of extended unemployment benefit entitlements and the extension of compulsory education.

Achieving the employment target does not a guarantee that its expected positive fiscal effects are reached. The fiscal effect is diminished if a large share of the additional employment is part-time, or unemployment does not decrease in line with the increase in employment, or if the fiscal costs of the measures are large. While employment targets are well motivated also in the future since there are many good reasons (fiscal reasons, social reasons, as a cure for permanent labour shortages), one needs to be cautious with respect to their fiscal effects. One should also bear in mind that the many lower-hanging fruits have been picked and further increases in employment rates may be harder to achieve.

Job vacancies started their rapid increase in 2021 and employers have repeatedly reported difficulties in recruiting workers. Some of the problems may be temporary, but they also have more permanent element. From a

policy perspective, sectors differ in the severity and the basic causes of the mismatch problem. In some sectors the main reason is the nature of the job offers (short hours or contracts or low pay), but in other sectors it is a permanent undersupply of labour due to missing initial intakes in the education system. Clearly, the cure to the problem needs to reflect this differing nature of it.

# 4. Fiscal policy

In the beginning of the parliamentary term in 2019, the government set its main targets for economic policy to be reached by 2023. One of the most important of these was an employment target, with the government seeking to raise the employment rate to 75%. In addition, general government finances should be in balance by the end of the government's term in 2023. The government would also pursue policies aiming to decrease inequality, narrow income gaps, and put Finland on a path towards achieving carbon neutrality by 2035. These targets were conditioned on a normal economic environment, in Finland and elsewhere. In reality, mostly due to unprecedented events, the parliamentary term saw not only the Finnish government but also governments around the world operating under exceptional circumstances and designing crisis responses under considerable uncertainty.

First of all the Covid-19 crisis changed both the economic and fiscal outlook drastically. The deficit-financed fiscal support measures and decreases in revenue in 2020 and 2021 enabled economic recovery already in the latter half of 2021. Fairly rapid growth continued in the first half of 2022. However, the war launched by Russia against Ukraine in February 2022 and the ensuing increase in uncertainty, realisation of severe adverse supply shocks and restrictions on international trade posed new challenges for public finances in Finland. The war and the associated international sanctions and countersanctions in trade between the western countries and Russia have resulted in a sharp increase in inflation. Consequently, public revenues increased in nominal terms. Security-related expenditure, in particular, also increased by roughly EUR 2 billion in 2022. Hence the war has made it more difficult for the government to find the appropriate growth and consolidation measures required to meet the medium-term fiscal objectives set in 2019.

Secondly, already during the Covid-19 crisis the government revoked the central government expenditure ceiling framework for 2020 to be able to

increase spending in order to support public health and the economy. In the following years, the government continued spending on the fallout of the crisis. At a later stage, increased spending was motivated by the war and the reform of the social and healthcare system, with the introduction of new wellbeing services counties from the beginning of 2023. Hence, instead of returning to the previous spending limits decided in 2019, the government changed its fiscal policy line to a gradual decrease in central government spending. In practice, central government expenditure for 2022-2023 was increased.

As the consequences of the Russia's war against Ukraine keep weighing on energy and food prices, future inflation is expected to remain elevated for some time. But uncertainty is at a high level. Growth in the Finnish economy fell in the latter half of 2022 and low growth is predicted to continue. Fiscal expansion is facing limitations, because central banks may have to maintain high or even increase major policy rates. Conflicts between fiscal and monetary policy may emerge. These should be avoided as far as possible.

Another aspect of fiscal policy concerns the support measures decided by the government to counteract the adverse effects on households of sharply increased energy and food prices. Some energy support measures do not seem to be optimal, because they are not well targeted at the poorest and most vulnerable households. Also, the support system may generate incentive problems if households find it unnecessary to take actions to save energy. Furthermore, some of the power companies have enjoyed windfall revenues and profits from greatly increased prices. The government is implementing a windfall tax on excess profits in 2023 to finance its support to households to cut their energy bills.[15]

In this chapter we will discuss the fiscal policy decisions taken in the parliamentary term 2019-2023. We assess the fiscal policy stance over the cycle by considering the paths of the structural primary balance and output gap used by the EU in the evaluation of budgetary processes. The sustainability gap is discussed in Section 4.3. Moreover, the EU is reforming its fiscal rules and economic governance framework.[16] The proposed framework focuses on country-specific medium-term *debt targets as an anchor* and an *expenditure rule as the operational target*. The proposed debt

**15** HE 320/2022 vp

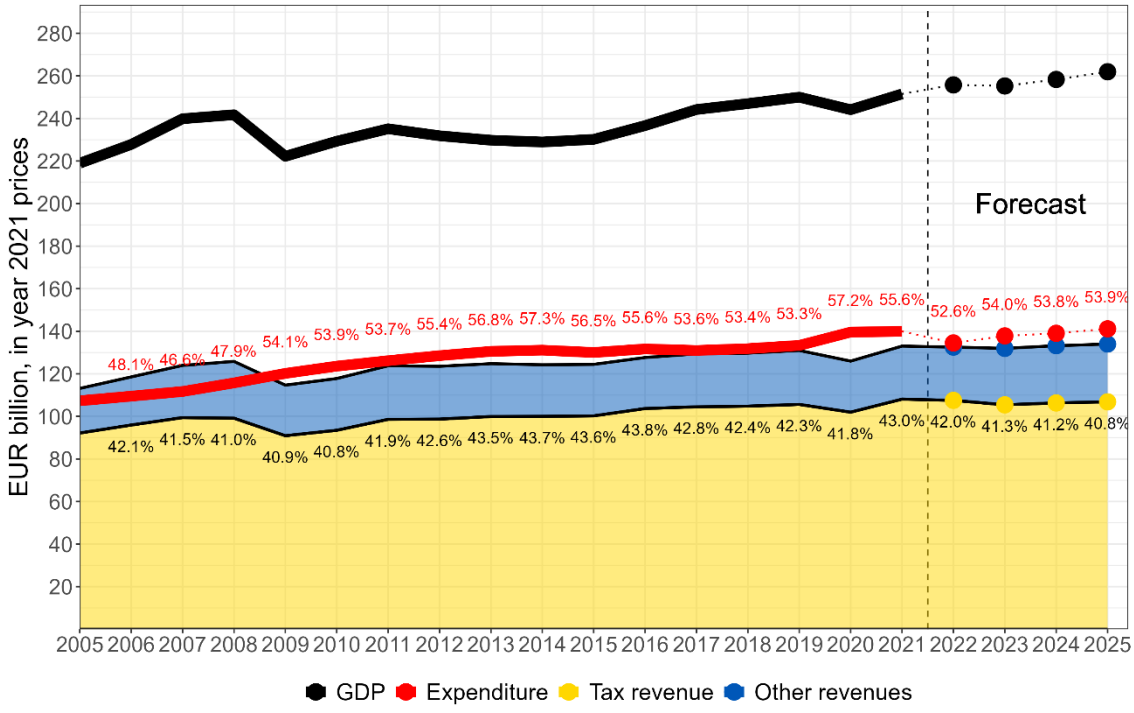
16 COM(2022)583 final

feedback mechanism and debt sustainability are discussed in the final Section 4.4.

## 4.1. Public sector finances

Figure 4.1.1 gives an overview of general government finances in Finland in 2005-2025. Before the financial crisis of 2008, public finances had a surplus amounting to over EUR 8 billion or more than 4% of GDP. During most of the post-financial crisis period the public sector has in practice been in constant deficit.

Figure 4.1.1. General government total expenditure and revenue 2005-2025*.



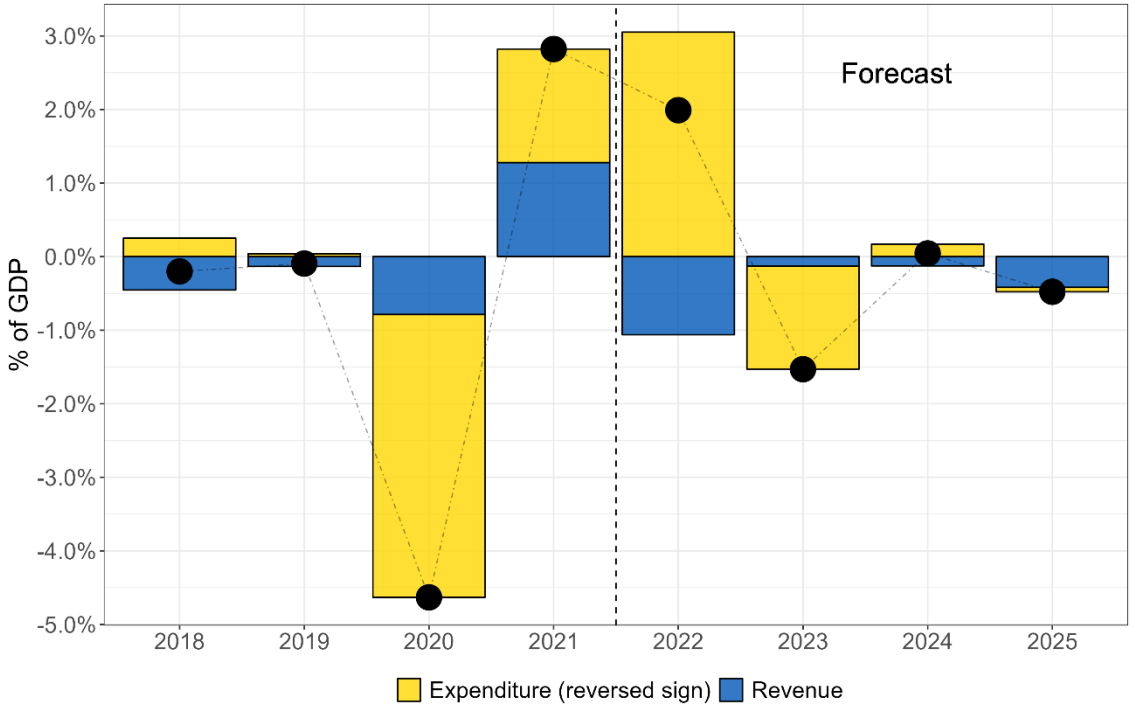

Sources: Statistics Finland, Ministry of Finance Forecast December 2022* and EPC.

The public sector deficit emerged at the same time as GDP dropped considerably in 2009. Thereafter, the recovery of the Finnish economy was painfully slow, or the economy was practically stagnant until 2015. From the deficit perspective some relief took place after the economy picked up in 2016 and continued to grow till 2019. The Covid-19 crisis marked an end to growth and, due to large Covid-19-related fiscal expenditures, pushed the public sector into a larger deficit. In cumulative terms, discretionary measures related to Covid-19 were noticeable even in 2021 but fell in 2022 and will fall

in 2023. Expenditures related to security policy increased in 2022 and will increase further in 2023. Overall, public expenditure and revenue as a share of GDP are expected to remain fairly stable between 2023-2025.

Figure 4.1.2 plots changes in expenditures and revenues as a share of GDP over 2018-2025 and their combined effect on the general government budget balance. In 2020, the government deficit increased as expenditures as a share of GDP, and revenues decreased due to the Covid-19 pandemic. In 2021 and 2022, the general government balance improved as the economy recovered and pandemic-related expenses declined. However, a worsening deficit is forecast for 2023, mainly due to rising government expenditures as a share of GDP. In 2024, the budget balance relative to GDP is forecast to almost stay the same with both expenditures and revenues slightly declining as a share of GDP. In 2025 the budget balance is forecast to worsen due to a decline in revenues as a share of GDP.

Figure 4.1.2. Effect of changes in expenditures and revenues on the general government budget balance as a share of GDP in 2018-2025*.

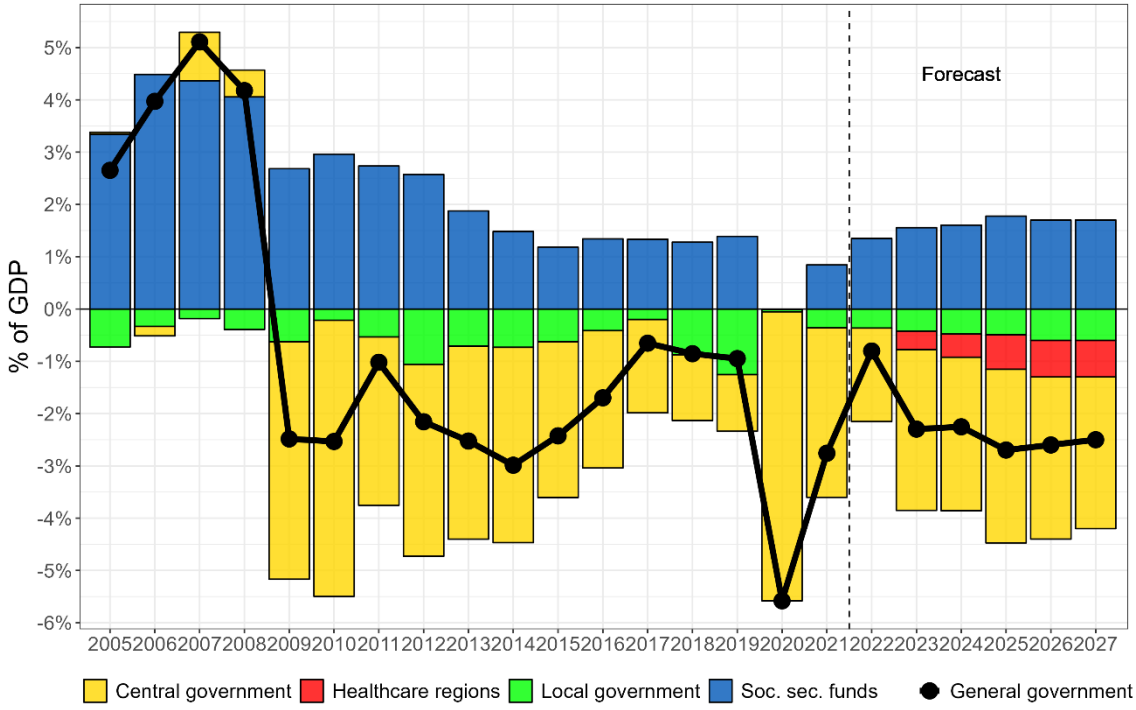



Sources: Statistics Finland, Ministry of Finance Forecast (December 2022) (*) and EPC calculations. Dots show the combined effect on the budget balance.

Figure 4.1.3 breaks down general government net lending by government sector in 2005-2026. Before 2009 general government was a net lender. Just

before the financial crisis the central government sector momentarily had a modest surplus but has been in deficit since 2009. This has turned the whole general government from a net lender to a borrower.

Figure 4.1.3. Net lending by government sector 2005-2027*.



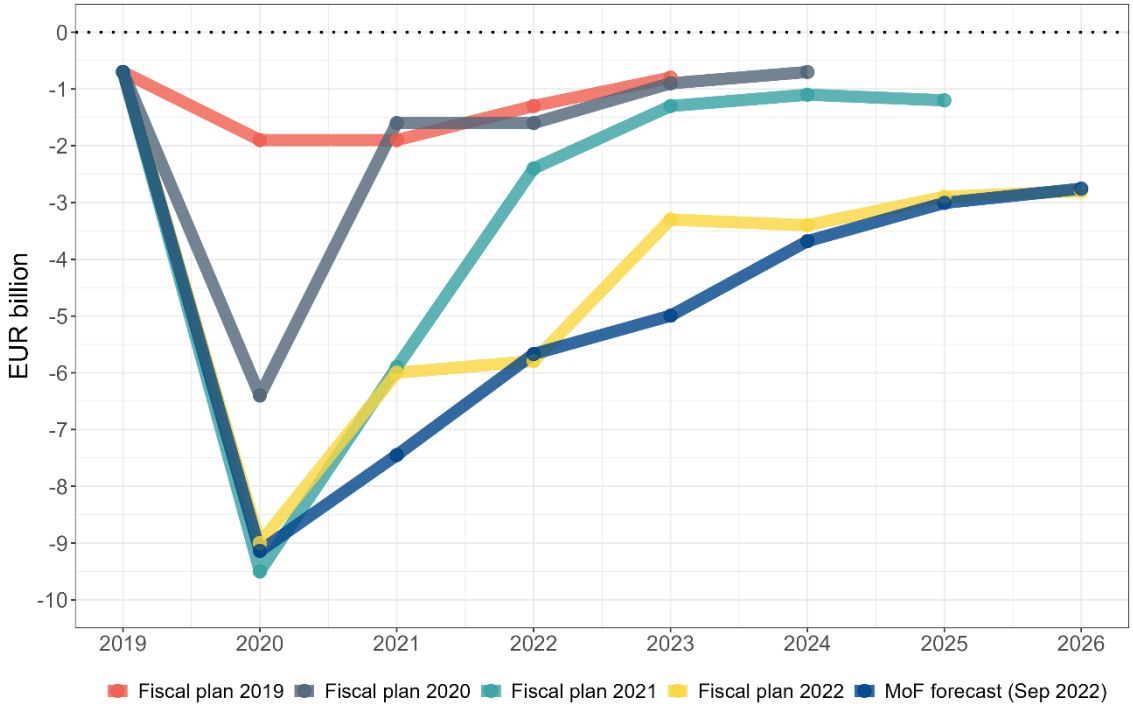

Sources: Statistics Finland, Ministry of Finance Forecast (December 2022) (*) and EPC calculations. Note: Healthcare regions refers to Wellbeing services counties.

Local governments have been in deficit for the whole period shown in the figure. In particular, the wellbeing services counties will start in 2023 with a budgeted deficit. Deficits are forecast for the coming years as well. The social security funds are the only government sector that has consistently been in surplus over the years.

## 4.2. Discretionary measures and fiscal stance

During the current parliamentary term, the government has adjusted its annual fiscal plans for various crisis management measures. Figure 4.2.1 plots the effect of discretionary fiscal measures on the general government budget balance over the parliamentary term 2019-2023. The figure shows how the deviations from the initial, technical fiscal plan (set in spring 2019) due to the discretionary measures show up in the consecutive fiscal plans. Fiscal plan 2019 in the figure (red line) refers to the fiscal plan of autumn 2019. The deviation increases plan after plan, and the latest general government fiscal plan for 2023-2026 prepared in 2022 suggests that discretionary measures have a net effect on the deficit of EUR 3 billion in 2026. This indicates that some of the discretionary measures are in fact permanent in their nature.

Figure 4.2.1. The effect of discretionary fiscal measures on general government budget balance (EUR billion) compared to a path with no new policy measures.



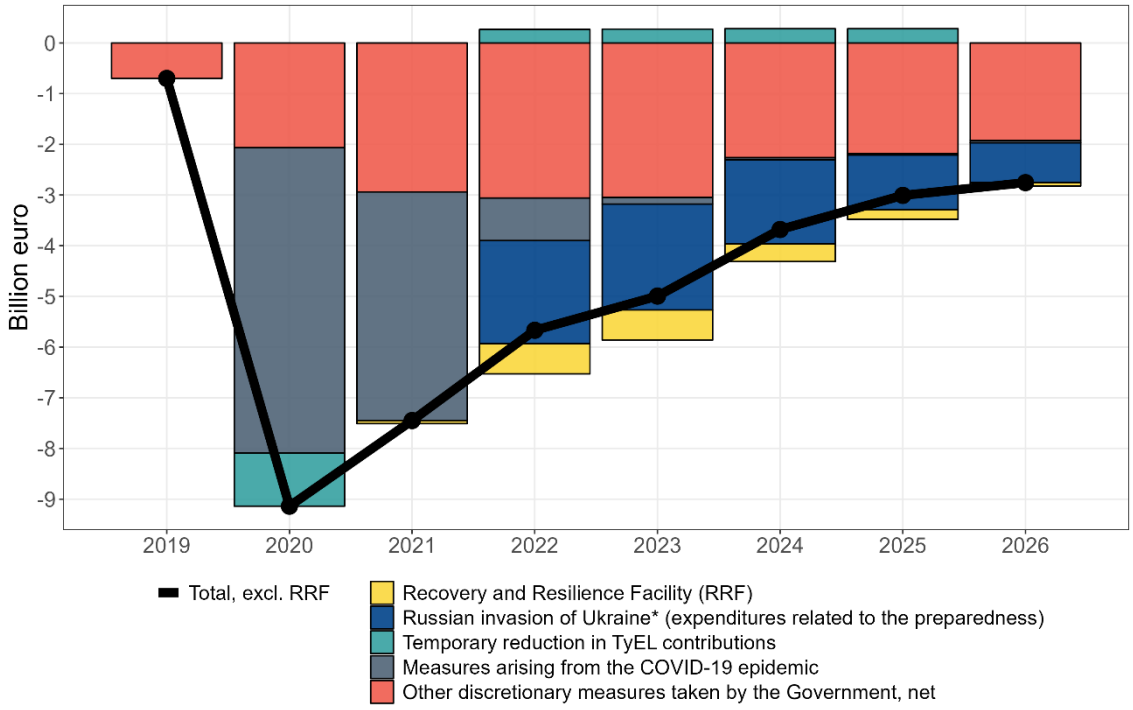

Sources: General government fiscal plans 2019-2022 and the Ministry of Finance Autumn 2022 forecast. Note: the baseline is the technical fiscal plan of spring 2019.

Of course, in 2020-2021 much of the discretionary fiscal measures were a consequence of the Covid-19 pandemic. The spending increases were large in scale compared to the measures agreed in 2019. The increased spending was not covered by raising public revenues. The resulting increase in the deficit

was discretionary and justified by the exceptional measures required to contain the pandemic.

Figure 4.2.2 plots other discretionary fiscal measures in addition to those related to the pandemic for 2019–2026. Several billions of spending measures were agreed for security policy reasons following Russia's invasion of Ukraine in 2022. These measures amount to around EUR 2 billion per year in 2022 and 2023. Increased spending on security, border control and the Ukrainian refugee crisis will continue in 2024-2026.

Figure 4.2.2. General government discretionary measures (by item).




Sources: Ministry of Finance Autumn 2022 forecast and General government fiscal plan 2023-2026.

A major part of the funding provided by the Recovery and Resilience Facility (RFF) is allocated for 2022 and 2023. Moreover, there was a temporary reduction in employer's pension insurance (TyEL) contributions in 2020, followed by increases in 2022-2025.

In addition to the itemised discretionary measures in Figure 4.2.2, the item of other discretionary measures still amounts to about EUR 2-3 billion annually since 2020. Part of this item includes measures related to the European energy crisis. To alleviate the impacts of rising energy prices in 2021 and 2022, the Finnish government introduced changes in energy taxation. Electricity tax was lowered for a number of sectors and firms already in 2021.[17] In 2022, the government introduced a general VAT reduction for electricity as well as a household tax deduction based on electricity bills.

However, the effectiveness of electricity tax reductions and deductions can be criticised on several grounds.[18] Consumers could instead be compensated with lump-sum transfers that avoid distortions to relative prices, thus preventing allocative inefficiencies from emerging. As tax cuts make electricity relatively cheaper, incentives to reduce energy consumption are dampened. This does not allow demand to adjust to supply constraints, which could exacerbate shortages and sustain future inflation. The household tax deduction based on the *current* electricity bill instead of that for the previous year can also be criticised for hindering incentives to save energy. Since the measures chosen are not targeted, they may accrue disproportionately to large electricity consumers, who often have higher incomes.[19] Furthermore, they are likely to place a larger burden on the government's budget compared to more targeted instruments. Finally, any reductions in carbon and energy taxes undermine the credibility of these policy instruments at a time when the transition to a decarbonised economy should be accelerated.

In general, most EU governments have taken measures to reduce the impact of higher energy prices on households and businesses. The measures and the costs of compensation policies vary by country. In October 2022, the total amount was estimated to be EUR 573 billion in the EU, of which EUR 264 billion was earmarked by Germany alone.[20] The funding for this corresponds

[17] Refunds for energy-intensive firms will be gradually phased out during 2021-2024, but refunds for agriculture will continue. From 2022, electricity used by heat pumps, electric boilers and geothermal heating plants' circulating water pumps is taxed by the lower electricity tax category II. The lower electricity tax class II was also expanded to small data centres. A price floor was introduced for the taxation of fuel peat, but the scope of tax-free use of fuel peat was expanded for the years 2022-2029. See Clarke (2023).

[18] See Clarke (2023) for an analysis of Finland's climate and energy policy instruments and measures.

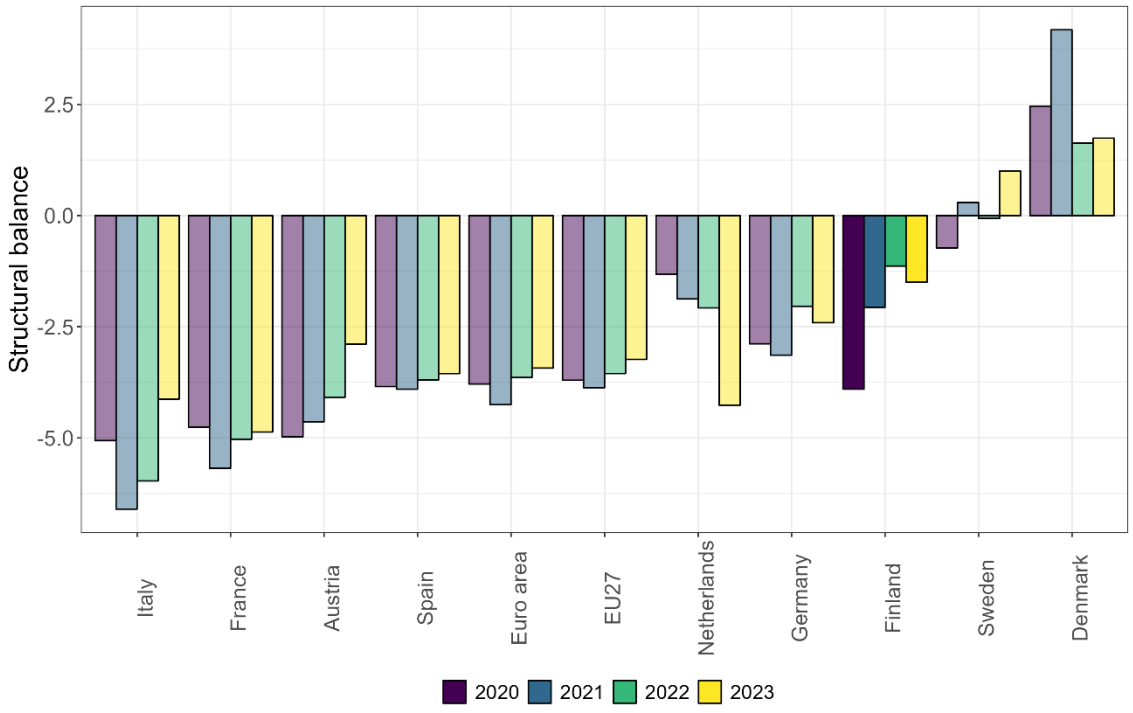
[19] See the analysis by Dataroom, VATT (2022)

[20] The Bruegel think-tank keeps a record of national fiscal policy responses to the energy crisis. See Sgaravatti et al (2021).

to as much as about 7% of Germany's GDP. This is explained by the fact that Germany is one of the countries that has been hit hardest by the energy crisis. In comparison, funding allocated for compensation measures are estimated to amount to roughly EUR 1.1 billion or 0.4% of GDP in Finland, and about EUR 1.6 billion or 0.3% of GDP in Sweden. It should be noted that electricity prices have not increased in the Nordic countries as much as elsewhere in Europe (see Section 2.2).

However, national economies in the EU were in different fiscal positions to respond to the energy crisis with discretionary measures. Figure 4.2.3 shows the development of structural balances in selected European countries as estimated by the Commission.

Figure 4.2.3. Structural balance in selected European economies 2020-2023.




Source: European Commission (AMECO database). Note: 2022 and 2023 are predictions.

The figure shows how strikingly Finland differs from its Nordic counterparts Denmark and Sweden, which stand out with their structural surpluses projected for 2023. Why do Sweden and Denmark stand out? Since the financial crisis in Sweden in the early 1990s, fiscal and budget discipline has been strong, and the country has been focusing its fiscal policy on a surplus target for several years. The surplus target is a target for general government net lending. According to the target, net lending should average one third of a

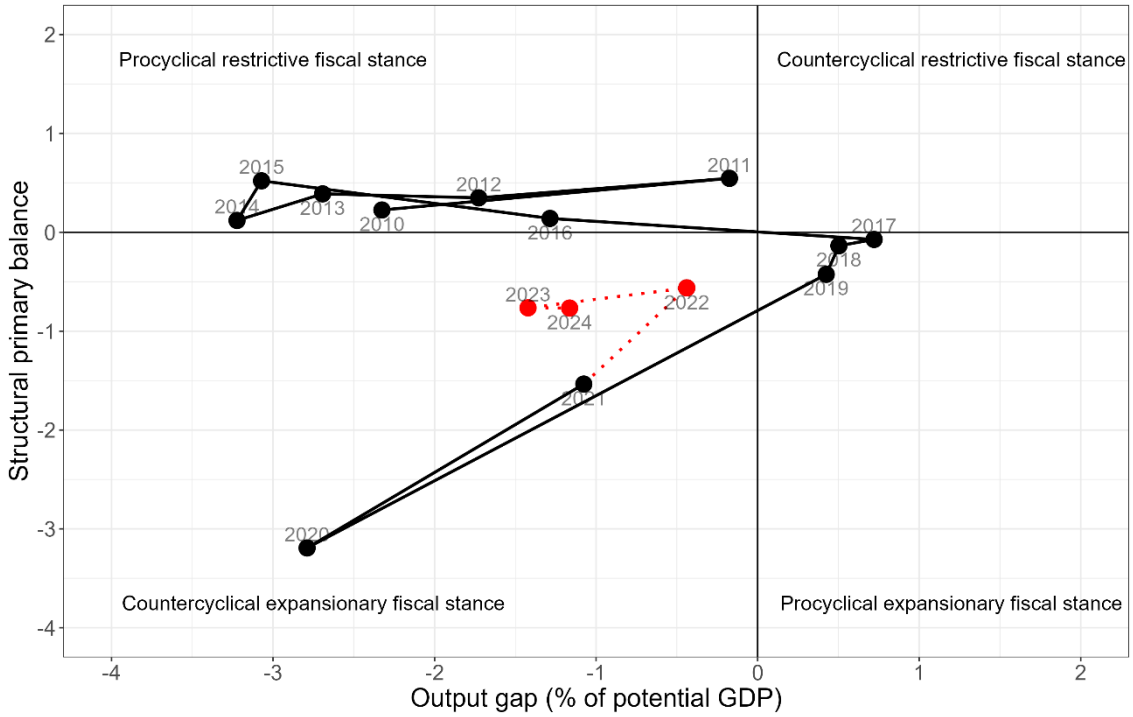
per cent of GDP over a business cycle. Still, as in most countries, the consequences of the pandemic have put a considerable strain on the budget over the last two years, and the situation has deteriorated somewhat. In Denmark, budget policy is guided by fiscal norms restricting the actual budget deficit, public debt, and the planned structural budget balance. These norms are part of EU rules and Danish budget law. With exceptions for the pandemic year, fiscal policy has satisfied these norms, and Denmark's public finances are in good shape. The government is running a budget surplus, and overall debt levels are low by EU standards.[21]

Figure 4.2.4 plots the structural primary balance and the output gap in Finland over the period 2010-2023 based on estimates and forecasts from the European Commission. The output gap measures the difference between total output and potential output, i.e. the business cycle. The structural primary balance measures the government balance net of cyclical factors and interest payments. Countercyclical fiscal policy aims to decrease the fiscal balance in response to negative changes in the output gap in order to stabilise output. With the output gap on the horizontal axis and the structural primary balance on the vertical axis, a countercyclical fiscal policy would therefore approximately show up as points aligned around a line with a positive slope as a more negative output gap would mean larger structural deficits.

The European Commission estimates that the structural primary balance in Finland did not react much to changes in the output gap in the 2010s. According to the measure of the structural primary balance, fiscal policy was not particularly expansionary or countercyclical. Notably, the structural primary balance has for the most part also been positive in the 2010s. Entering the 2020s, the Covid-19 pandemic caused a major shock to the economy. At the same time, fiscal policy reacted strongly, and the deficit was deliberately increased. This increase in the structural deficit appears countercyclical as it coincided with a negative output gap. In 2022-2024 both the structural primary balance and the output gap are forecast to remain negative although fiscal policy seems less accommodative than it was in 2020 or 2021.

[21] SGI Sustainable Governance Indicators 2022 https://www.sgi-network.org/2022/Denmark/Economic_Policies

Figure 4.2.4. Structural primary balance and the output gap 2010-2024*.




Source: European Commission (AMECO database). Note: Red dots are forecasts (*).

Certain caveats must be borne in mind in interpreting Figure 4.2.4. Although there is a benefit in using cyclically adjusted fiscal metrics, there is considerable uncertainty around estimates available in real time. In particular, the usefulness of the output gap as a metric has been questioned in the context of fiscal policymaking (e.g. EFB 2022). Therefore, the European Fiscal Board also suggests that alternative indicators measuring economic activity should be considered as well.

As discussed in the previous chapter, the record high vacancy rate suggests that economic activity was running at a very high level in 2022. After quickly recovering from the pandemic, the Finnish economy may have been in 'good times' territory on the right of the vertical axis in Figure 4.2.4. Accordingly, fiscal policy should not necessarily have been as expansionary as it was in 2021 and 2022. Discretionary measures were taken due to the security and energy crises, but these measures should have been funded, at least partly, by cutting expenditures elsewhere or by raising taxes.

## 4.3. Sustainability gap indicator (S2 indicator)

Persistent and possibly increasing government budget deficits pose a risk to the sustainability of public finances in the long run. Therefore, identification of the underlying pressures on the sustainability of public finances is a crucial input to economic policymaking. Consequently, analyses of long-term sustainability serve the purpose of quantifying challenges for policies in due time to make a political prioritisation possible. (Andersen, 2012)

A standard approach for assessing fiscal sustainability is to make projections for future public expenditures and revenues in combination with demographic trends and population forecasts. An indicator that quantifies the size of current and future budgetary imbalances is the so-called sustainability gap. To measure the sustainability gap, the European Commission uses the S2 sustainability indicator. It is based on the infinite horizon version of the government budget constraint. The S2 indicator shows "the immediate and permanent adjustment to the current structural primary balance – subsequently kept constant at the adjusted value forever - that is required to stabilise debt over the infinite horizon." The higher the values of the S2 sustainability indicator are, the greater the fiscal sustainability risk and thus the required fiscal adjustment.[22]

The fiscal sustainability challenge measured by the S2 indicator can be broken down into two main parts. One part is the initial budgetary position captured by the level of debt and initial structural primary balance. Another part quantifies the budgetary pressures due to demographics and the costs of ageing that include the contribution from healthcare and long-term care spending and pension spending.

According to the most recent estimate of the Ministry of Finance, the sustainability gap will be approximately 3% of GDP (about EUR 9 billion) at the 2026 level for Finland. In particular, total ageing costs are estimated to increase between 2019 and 2070.[23] The projected growth of the general government debt ratio also increases the risks to general government finances.[24]

[22] See Fiscal Sustainability Report 2021 (Vol1). For analysis of alternative indicators for measuring fiscal sustainability, see e.g. Benz and Fetzer (2006).

[23] 2021 Ageing Report: Economic and Budgetary Projections for the EU Member States (2019-2070)

[24] Ministry of Finance Autumn 2022 Forecast, page 98

According to the Ministry of Finance, the sustainability gap describes how extensively general government finances should be strengthened over the next four years in order to ensure long-term balance in general government finances.[25] To see how the sustainability gap reported by the Ministry has changed over the parliamentary term, Table 4.3.1 shows a decomposition of the S2 sustainability indicator calculated in 2019 and 2022.

Table 4.3.1. Decomposition of the S2 sustainability indicator (pp of GDP).

| **Contributing factors by year** | **2019** | **2022** |
|---|---|---|
| Present value of interest expenditure on initial debt | 0.4 | 0.4 |
| Primary deficit in base year | 0.7 | 0.8 |
| Change in capital income | -0.1 | 0.4 |
| Changes in age-related expenditure | 3.7 | 1.3 |
| **S2 sustainability gap** | 4.7 | 2.9 |

Sources: Background material for the Ministry of Finance Autumn 2022 Forecast and the Ministry of Finance Winter Forecast 2019 (EPC 2020).

The estimated level of the sustainability gap has decreased by almost two percentage points (pp) in calculations made in 2022 compared to those in 2019. The decrease is explained by changes made in the calculations of how much the main factors contribute to the indicator. In both years, the sustainability gap is driven by the projected increase in ageing costs contributing as much as 3.7 pp of GDP in 2019 calculation and only 1.3 pp of GDP in the 2022 calculation. [26] The second-largest change between the years is that the change in capital income widens the sustainability gap in the 2022 S2 indicator (by 0.4 pp), whereas capital income decreased the gap in the 2019 S2 indicator (by -0.1 pp). The contribution of the primary deficit is estimated to increase only slightly to 0.8 pp of GDP in 2022 (compared to 0.7 pp of GDP in 2019).

Basically, the S2 indicator is a mechanical measure showing the upfront and permanent fiscal adjustment required to stabilise the debt-to GDP ratio over

[25] See "Sustainability gap calculations of the Ministry of Finance - description of methods", Memo 9.11.2021

[26] Ageing costs are primarily related to the projected increase in long-term care spending and, to a lesser extent, healthcare and public pension expenditure, partially offset by other items, including education. See Fiscal Sustainability Report 2021 (pp. 156-157). According to the Ministry of Finance, the increase in age-related expenditure has slowed from the 2019 calculation mainly because of the 2017 pension reform (increasing retirement age) and a slower growth rate in social and healthcare expenditure. Of course, the expected increases in the 2019 calculation have already materialised in the 2022 calculation, in other words the base years are different as well. For the modelling and data updates, see "Sustainability of Finland's public finances", Publications of the Ministry of Finance 2020:59 (in Finnish).

an infinite period, including the costs of ageing. It can be interpreted as an indicator of the need for reforms. In practice, the concerns of predicted demographic changes, the consequences of increasing demand for public (healthcare) services or a decline in working hours, productivity etc. can be addressed by analysing the sustainability gap. For example, if ageing costs are expected to widen the sustainability gap, structural reforms (e.g. pensions, retirement age) can be implemented to curb long-term ageing-related expenditure trends. Given the future prospects for the Finnish economy, attempts to increase labour supply and to improve the productivity of the social and healthcare system are examples of policies that should be promoted further to alleviate the long-term sustainability issues.

It should be underlined that there are shortcomings related to the sustainability gap indicator when inferring policy implications from the metric. It is expressed in terms of the permanent budget improvement to obtain an easily interpretable quantitative measure. One cannot readily infer from the quantitative expression what an optimal reform should be. Furthermore, there is no consideration of any harmful impacts of the adjustment or positive impacts of structural reforms on economic growth. Finally, the adjustment implied by the S2 indicator might lead to debt stabilising at relatively high or low levels. The sustainability gap calculation does not set an optimal timetable for the adjustment process.

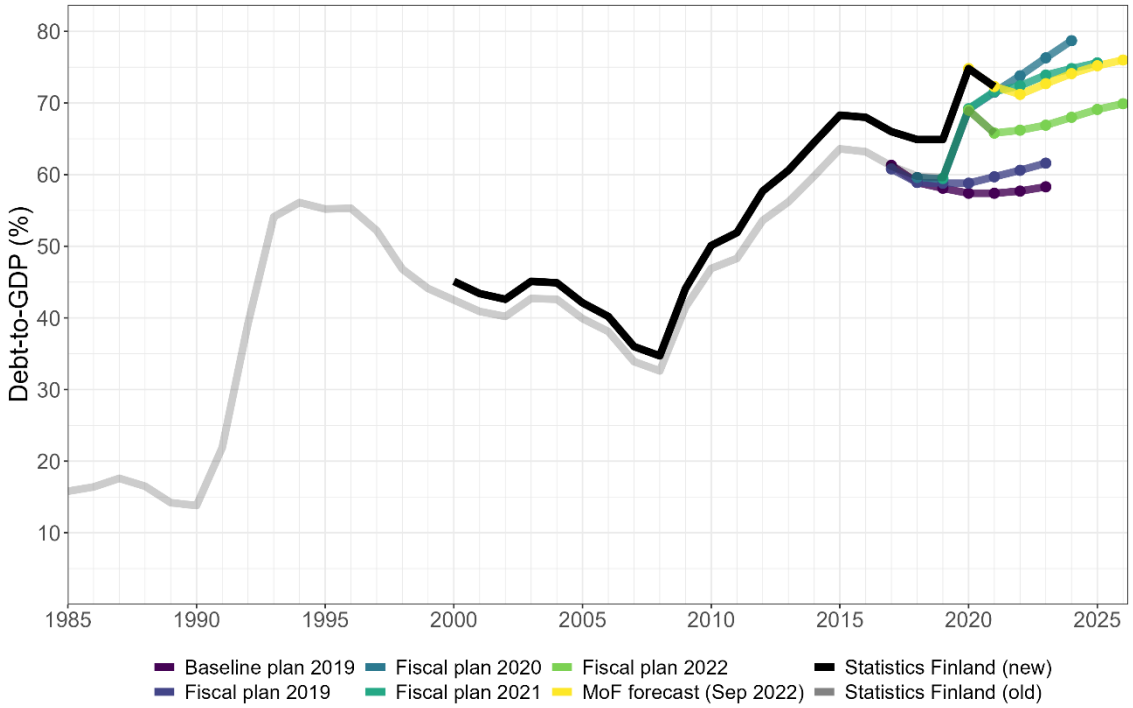
Given the shortcomings of the indicator measuring the sustainability gap, it is important to consider several alternatives and scenarios for economic policymaking. In the next section, we discuss public debt and alternative consolidation trajectories.

## 4.4. Public debt and long-term fiscal framework

As was shown in Figure 4.1.3, the government sector has constantly run fiscal deficits since 2008. Recurrent deficits lead to increases in public debt and raise concerns about the sustainability of public finances over a longer period. However, it is not the nominal amount of debt that is critical for sustainability, rather debt must be assessed in comparison to GDP. Nominal GDP growth resulting from real growth and inflation diminishes the burden of past debt, or fast GDP growth makes deficits more sustainable. In other words, it is the debt-to-GDP ratio that matters in the long run.

Figure 4.4.1 illustrates the evolution of the Finnish debt-to-GDP ratio according to the fiscal plans for the years 2019-2022. At the beginning of the current parliamentary term, the debt-to-GDP ratio was projected to be around 60% over the medium-term (Fiscal plan 2019).

Figure 4.4.1. Debt-to-GDP ratio 1985-2026.




Sources: General government fiscal plans, Statistics Finland, and Ministry of Finance Autumn forecast (September 2022). Note: Baseline plan 2019 = Technical fiscal plan 2019.

However, these projections were revised sharply upwards due to the shock caused by the Covid-19 pandemic. Government deficits were forecast to increase and total output to shrink from previous estimates (Fiscal plan 2020). The most pessimistic scenario did not materialise, however, and the debt ratio increased by about 10% points between 2019 and 2020. This was a result of Covid-19 and the substantial measures taken to contain the pandemic, and a decrease in GDP of about 2.4%.

According to the Ministry of Finance forecast from September 2022, the debt-to-GDP ratio will approach about 75% by 2026. Hence, if the debt ratio increases as planned, it will be at a considerably higher level than what was initially planned by the government in 2019. The higher ratio is partly explained by a revision made by Statistics Finland in their methodology for

measuring public debt. This technical revision was made in 2022 by including certain interest subsidy loans in public debt instead of public guarantees as was the practice before.[27] In the reform, these loans were added to the assets of the public sector, keeping the net position unchanged. The black curve in Figure 4.4.1 shows the evolution of the debt-to-GDP ratio derived using the new methodology. In practice, the ratio increased by about 6 percentage points. Given the recent large budget deficits and also the methodological change in measuring public debt, it is unlikely that debt is going to be stabilised in the middle of the decade as was initially planned in 2019. Instead, it will continue to increase if no additional consolidation measures are taken in the next parliamentary terms.

There is no universal criterion for assessing public debt sustainability. The stability of the debt-to-GDP ratio as a criterion is appropriate in the sense that it is consistent with a corresponding debt-stabilising deficit. However, the observed debt-to-GDP ratios may not correspond to optimal long-run levels. (Bénassy-Quéré et al. 2019)

The European Commission is currently revising the EU's fiscal framework that the Member States should adhere to.[28] The need for a reform of the governance framework has been partly motivated by a lack of compliance of Member States in reducing their debt ratios. The proposal aims to link the medium-term budgetary objective to the debt target to ensure that debt ratios are brought on to or kept on a downward trajectory. The Commission's proposal is summarised in Box 4.1.[29]

In the Commission's proposal, the Maastricht Treaty reference values of a GDP budget deficit below 3% and a debt-to-GDP ratio of 60% remain unchanged. A special emphasis is placed on an appropriate and credible debt reduction path towards 60% of GDP *while* enhancing sustainable and inclusive growth. In addition, the purpose of the reformed framework is to recognise the challenges of the sustainability of public finances and sustainable growth facing the EU due to e.g. demographics and an ageing population and the climate crisis.

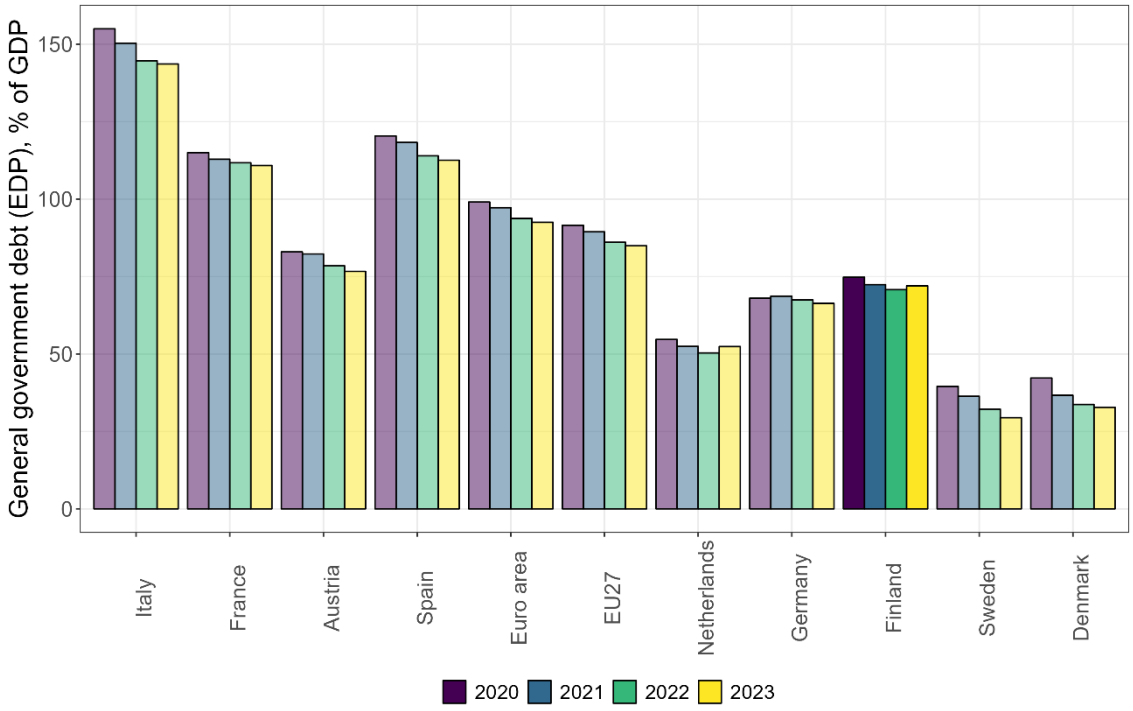
[27] Interest subsidy loans are provided by the Housing Finance and Development Centre of Finland (ARA). For the exact revision made in the financial-accounts statistics, see Statistics Finland (2022).

[28] COM(2022) 583 final November 9, 2022

[29] See Puonti (2022) for a discussion of the process of and proposals for reforming the EU fiscal rules.

The point of departure for the proposed EU fiscal surveillance is the objective of debt sustainability. The purpose is "…to prevent so-called 'gross errors' in the conduct of fiscal policy, as those can have negative spillovers to other Member States and to the currency union as a whole"[30]. At the same time, the Commission recognises that debt-to-GDP ratios and debt developments differ widely across the Member States. That is why adjustment efforts cannot be the same in all Member States, but they should be tailored according to prevailing economic circumstances, debt position and fiscal risks. In practice, the proposal describes the debt position of the Member States by the debt-to-GDP ratio in the following way: very high debt exceeding 90% of GDP, debt lower than 60% of GDP, and an intermediate situation with debt between 60% and 90% of GDP.

Figure 4.4.2. Debt ratios in selected countries.




Source: European Commission (Ameco database). Note: Predictions for 2022 and 2023.

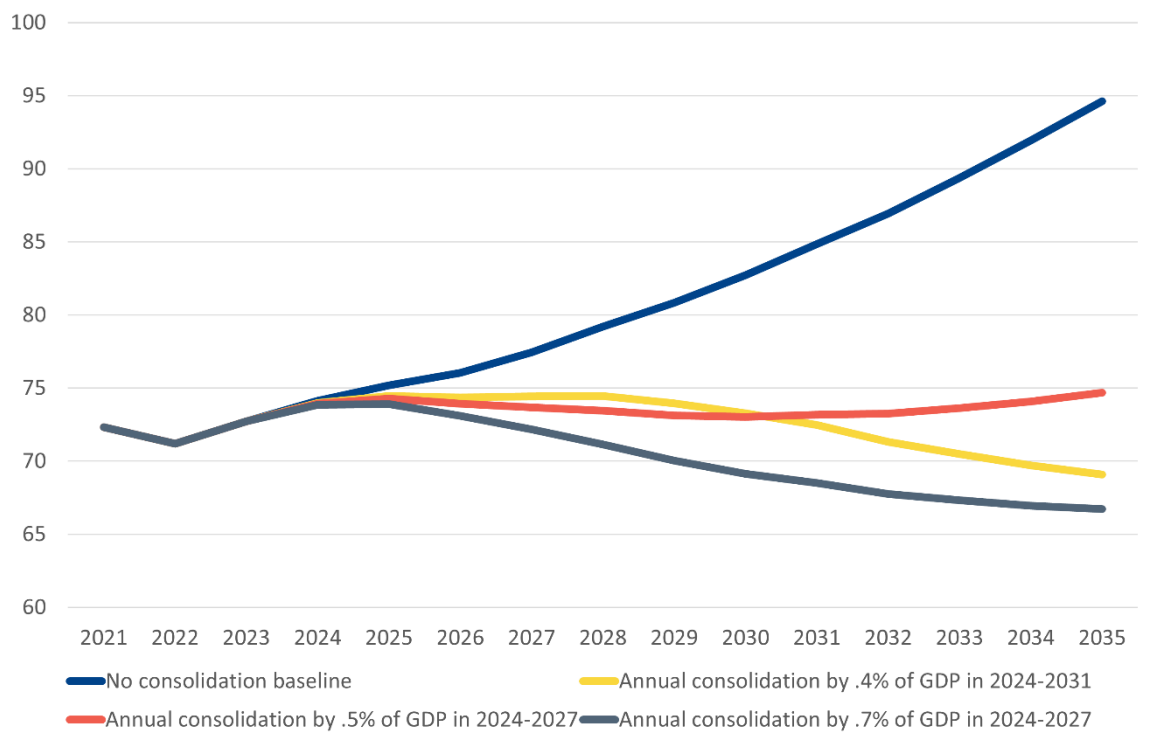
Figure 4.4.2 depicts the debt-to-GDP ratios for selected European economies that can be considered relevant for Finland. Denmark and Sweden are important benchmarks as they are similar Nordic welfare states with high taxation providing extensive publicly funded services. In contrast to Finland, they have been able to keep public debt at a considerably lower level, and

[30] COM(2022) 583 final p. 7

even to decrease the debt-to-GDP ratio. Moreover, Finland lags the other two Northern European countries, as well as Germany, and the Netherlands, in public debt discipline.

For long-term fiscal sustainability, Finland is expected to bring debt on to a path approaching a debt-to-GDP ratio of 60%, which is considered a sustainable target in the Commission's proposal. Figure 4.4.3 presents a baseline and alternative scenarios with different timeframes for fiscal consolidation to reach a declining path for the debt-to-GDP ratio. Last year, a similar illustration was presented in the annual report of the Economic Policy Council (EPC 2022). Then, the debt-to-GDP ratio was expected to be around 73% in 2035 in the baseline scenario. The scenarios in Figure 4.4.3 have been updated for the changes in public finances in 2022, i.e. for increases in the budget deficit and an additional increase in the debt level due to the change in the compilation of debt statistics[31].

Figure 4.4.3. Alternative scenarios for debt-to-GDP ratios.




Sources: EPC calculations based on the sustainability assessment of the Ministry of Finance in August 2022 and the Ministry of Finance Autumn 2022 Forecast.

[31] Due to a change in methodology applied by Statistics Finland, the debt level increased about 6 percentage points. In practice, certain contingent liabilities or interest subsidy loans granted for social housing production are now made visible in general government debt accounting.

The baseline scenario reflecting no consolidation (blue curve) shows that the debt-to-GDP ratio is on an increasing path, reaching almost 95% by 2035, which is about 23 percentage points higher than what was projected last year (EPC 2022). In other words, it is increasingly difficult to turn the current trajectory of accumulating debt on to a decreasing trajectory.

It is useful to clearly list the assumptions behind the analysis. The scenarios assume that age-related expenditures increase over time according to the population forecast, that interest expenditure on debt and revenue from financial wealth evolves according to the stock of debt and financial wealth, and that the GDP shares of other revenue and expenditure remain constant after 2026.[32] These modelling choices imply that growth per se is not very helpful in lowering the debt-to-GDP ratio in the calculation. The real effective interest rate is assumed to turn positive and to converge to 2 per cent. Fiscal consolidation is assumed to have a negative impact on GDP growth over the period when consolidation takes place but not in subsequent periods. This implies, however, that the reduction in GDP is permanent. The magnitude of the GDP reduction - in other words the multiplier - is set at 0.85 and assumed to be the same for expenditure cuts and tax increases. We further discuss some of the assumptions below.

Figure 4.4.3 presents three alternative scenarios where consolidation measures are taken to prevent the debt-to-GDP ratio from increasing as much as in the baseline. The main yardstick we use when assessing them is whether the extent of the fiscal adjustment is sufficient to turn the debt-to-GDP ratio on to a declining trajectory over the medium term.

In scenario A (red curve), the debt-to-GDP ratio reaches almost 75% by 2035 after annual consolidation of 0.5% of GDP in the next parliamentary term, or 2024-2027. The corresponding amount of consolidation is EUR 6 billion in total or roughly EUR 1.5 billion per year. This means that a sizeable fiscal adjustment that is relatively short-lived is not sufficient to permanently turn the gradient of public debt. Either greater or more long-lasting adjustments are needed.

[32] Moreover, debt is assumed to increase by EUR 5 billion in 2026-2030, due to the acquisition of fighter jets, and by EUR 6.6 billion in 2028-2058, due to the repayment of debt accumulated for the EU's Recovery and Resilience Facility (RRF).

To examine this issue, we present two additional scenarios: Scenario B, a path with even greater consolidation (0.7%) for four years and Scenario C, with milder consolidation but for a longer period.

In Scenario B, the debt-to-GDP ratio is brought on to a declining path with an annual consolidation of 0.7% of GDP in 2024-2027 (grey curve). This corresponds to a consolidation of about EUR 2.1 billion per annum. However, the debt-to-GDP ratio starts to increase due to the projected increase in age-related expenditures in the 2030s and thereafter.

In Scenario C, a consolidation of 0.4% of GDP is distributed across a longer period, or the following two parliamentary terms in 2024-2031 (yellow curve). The debt-to-GDP ratio declines to roughly 69% in 2035. The total consolidation required over the two terms would be about EUR 10 billion.

The scenarios above are projected several decades into the future. Changes in the assumptions made in the calculations may change the scenario outcomes. For example, the outcomes depend on the assumptions regarding the growth rate of the economy. In the scenarios above, it was assumed that the economy would grow annually by an average of about 1.4% and that the resulting debt-to-GDP ratio would be almost 95% in 2035. Assuming that the economy grows 0.5 percentage points faster (or slower) per annum, the debt-to-GDP ratio will be about 91% (or 99%) in 2035. The assumptions behind the calculations are reflected in these relatively small effects of economic growth: expenditures (other than age- and interest-related) also increases in relation to the growth rate.[33]

It should also be noted that from the point of view of timing the turning point of the debt ratio there is a trade-off between the length of the consolidation period and the annual amount of consolidation. The maximum debt ratio is shifted forward in time for more gradual consolidation over longer consolidation periods, whereas the maximum debt ratio is brought forward in time for shorter consolidation periods and more drastic consolidation measures.

Another aspect of consolidation measures relates to the sequencing of these measures. One could argue that frontloading consolidation measures is a

[33] Note that expenditure and revenues are given as percentages of GDP in the calculation. If the link between expenditure and GDP growth were less than one-to-one, GDP growth would have a larger impact on debt relative to GDP.

good idea if, in particular, the growth outlook of the economy is more favourable, say, in 2024 and later. This would mean that larger consolidating measures in public finances would be implemented early on followed by smaller and more gradual measures thereafter. An important point in this context concerns the commitment by future governments to such a consolidation strategy. In the scenario with 0.4% of consolidation for 8 years, debt relative to GDP would still increase during the next government term. This could be avoided with a somewhat larger adjustment in the beginning.

Finally, debt servicing costs relate to the amount of public debt accumulated. To illustrate the magnitude of these costs, we can compare the expected interest payments as a share of GDP in 2035 in the sustainability gap calculations carried out by the Ministry of Finance in autumn 2021 and 2022. In 2021 (2022), interest payments were expected to be about 2% (3%) of GDP in 2035. The slight increase in the share of GDP reflects the changes in public debt and in the assumed development path for the level of interest rates over time. Of course, long-term assumptions about interest rates could prove wrong. Changes in the interest rate assumptions in the sustainability calculation have previously had a significant impact on the sustainability gap estimate (see Jalasjoki and Kivistö 2022a).

It is impossible to predict with any accuracy the future long-term development of the economy. The purpose of the alternative consolidation scenarios is to show how accumulated debt adjusts to a lower level. The pace of adjustment is slow if, for example, the growth of the economy is modest, or debt servicing costs increase with increasing interest rates. Given future demographic developments, a slow growth scenario can be considered likely.

Regarding the long-term sustainability of public finances, the Ministry of Finance published a proposal of their own for steering general government finances and implementing fiscal rules in practice (see Box 4.2). In the core of the proposal, it is suggested that a binding expenditure ceiling should be expressed as a nominal amount in the government programme. The government should then adhere to this monetary target irrespective of economic cycles.[34] It would be desirable that fiscal rules strike a balance between encouraging sustainability and allowing counter-cyclical fiscal policy. It would also be useful that they take into account both expenditure-

[34] See "Developing the steering of general government finances: Summary of the final report and proposal for the Government Programme's policy text", Publications of the Ministry of Finance 2022:71.

and revenue-side measures. The domestic proposal by the Ministry of Finance appears to us as rigid and it does not treat symmetrically taxes and spending.

Moreover, the Ministry of Finance reviewed economic and governance policy for the upcoming parliamentary term in their outlook in autumn 2022.[35] Among other things, a fiscal consolidation path over the next two parliamentary terms was suggested. A similar analysis has been carried out by the Bank of Finland (Jalasjoki and Kivistö 2022b).

Let us now return to the assumptions regarding the extent to which fiscal consolidation influences the overall economic activity negatively. The impact of fiscal policy on the overall economy has often been summarised as the Keynesian multiplier. Ramey (2019) offers a review of the recent literature on the GDP impacts of fiscal policy. She concludes that spending multipliers range from 0.6 to 1, implying that reductions in public spending would lead to lower GDP, but part of the impact would be offset by increases in private economic activity. She also points out that multipliers associated with tax increases are larger (amounting to 2 to 3) when estimated using the so-called narrative approach. In such an approach, researchers try to separate out those tax changes that are not driven by business cycle conditions by a careful analysis of descriptions of policy changes to alleviate the endogeneity problem in examining the linkages between GDP growth and fiscal policy empirically.

The finding that tax increases are more harmful to growth than expenditure cuts is supported by the evidence in Alesina et al. (2019), Beetsma et al. (2021), and Yang et al. (2015). One potential driver could be the response in private-sector investment, which appears to react more negatively to tax increases than to expenditure cuts. Monetary policy reactions do not appear to explain the difference in the economic costs of adjustments. (Alesina et al. 2019)

Identifying macroeconomic consequences is a very difficult task. In comparison to the quasi-experimental set-ups in applied microeconometric work, it is challenging to arrive at similar comparisons between treated and untreated states of the world in macroeconomics, where policies almost by definition pertain to the entire economy. On the other hand, some of the macro-level responses are ignored in micro work, for example the fact that

[35] See "An innovative and sustainable Finland Outlook review by officials at the Ministry of Finance", Publications of the Ministry of Finance 2022:77.

firms and households not subject to direct interventions may also be affected indirectly via general equilibrium effects. Nakamura and Steinsson (2018), in their review of various approaches in macroeconomic identification, note that the narrative approach is clearly valuable, but it may also suffer from certain weaknesses. For example, classifying business cycle-related and other tax changes may be somewhat arbitrary. This worry is mitigated if the data and methods used are openly reported and available for replication, as is the case with the work by Alesina et al. (2021).

Because of an insufficient number of fiscal consolidations conducted using different tax instruments, the research above cannot really be used in identifying the relative GDP impacts of increases in different types of tax instruments. Here, one needs to resort to other types of evidence. Property taxation, taxation of harmful activities (tobacco, alcohol, polluting fuels), and raising lowered VAT rates are unlikely to hurt growth to the same extent as raising some other taxes, such as corporate income tax (Arnold et al 2011). Another option, although not necessarily one bringing large revenues, would be to limit the dividend tax exemptions of closely held corporations, as has been suggested by experts' groups for long.[36] It will therefore be useful to review the current state of the Finnish tax system to evaluate the scope of tax increases, as the Ministry of Finance is also planning to do.

Finally, population growth is projected to be low for the foreseeable future in Finland. Therefore, growth-enhancing policies should be considered as well. The adoption of new technology and technological development typically require research and development investments (e.g. Einiö, 2014). Considering that both private and public intangible investments have been moderate for a long time, additional public R&D investments would be justified.[37]

The government has been planning the introduction of a new R&D tax incentive, which in the end progressed as a parliamentary proposal.[38] The new tax incentive is designed as a hybrid measure: it contains a general tax allowance covering 50% of R&D labour costs and purchased services as well

[36] See, for instance, the final report of the working group on developing the Finnish tax system, Ministry of Finance, 2010.

[37] See the parliamentary decision on the financing of government research and development activities, HE 211/2022 vp and 1092/2022.

[38] LA 69/2022 vp and 1298/2022.

as an incremental part, which depends on the increase in these expenditures relative to the previous year. The incremental part amounts to 45% of the eligible costs. In the general part, there is a lower threshold of EUR 5000 and an upper limit of EUR 500,000, whereas in the incremental part only the upper limit applies.

In a previous report, the Economic Policy Council took a cautiously optimistic view on introducing R&D tax incentives in Finland, but it did not comment on the specific design of the policy (EPC 2022). The new proposal is relatively sizeable, although the intensity of the support is smaller for firms that require substantial capital investments in innovation, because the base of the policy is R&D labour costs and purchased services. The existence of the upper limit implies that for the largest companies the policy is inframarginal, and does not change their incentives for additional R&D. Loss-making companies can only benefit from the incentive after turning profitable, which may limit its usefulness for start-ups. It will be important to closely monitor the take-up and ultimately the impacts of the new policy instrument and, if needed, plan corrective action.

All in all, economic policy should address the challenges related to long-term sustainable growth and fiscal stability. As an integral part of the proposal for a renewed fiscal framework, the European Commission emphasises prudent fiscal strategies and investment and reforms that enhance sustainable growth, ensure fiscal sustainability, and enable the green and digital transition towards a resilient economy. In strategies aiming to make European countries more resilient, climate policy and the green transition play an important role. This is discussed in the next chapter.

**Box 4.1. Commission's communication on a reform of fiscal rules**

In November 2022, the European Commission released its orientations for a reform of the EU fiscal framework (European Commission 2022b) aiming to ensure public debt sustainability and resulting in a simpler system of fiscal rules. The treaty reference values (3% of GDP for public deficit and 60% of GDP for public debt) remain in place but the starting point for a Member State's fiscal planning would be a debt sustainability analysis conducted by the Commission.

The process would start with the Commission conducting debt sustainability analysis (DSA) based on dividing the Member States into three groups depending on their public debt challenges. However, details such as the definition of substantial or moderate public debt challenges were left unspecified in the Commission's orientations. Each group would have a different schedule for reducing debt as well as different conditions for opening an Excessive Deficit Procedure. This is a major departure from the current set-up because the country-specific plans would essentially lead to country-specific debt ratios.

Countries with a substantial public debt challenge would need to ensure that the 10-year debt trajectory with unchanged policies is on a plausibly and continuously declining path on a 4-year planning horizon. Countries with a moderate challenge would have three additional years to ensure that the debt ratio is declining. There are also requirements to keep the deficit below the 3% of GDP reference value. The Commission would then prepare a reference adjustment path for each country that would form the basis for bilateral negotiations. The medium-term fiscal structural plan would be set in terms of net primary expenditure, which would be translated into corresponding annual spending ceilings. Countries with a low public debt challenge would only be required to keep their deficit below 3%.

Using net primary expenditure as a single indicator for monitoring progress would simplify the framework. The Commission defines this as expenditure net of discretionary revenue measures and excluding interest expenditure and cyclical unemployment expenditure (no formula is provided yet). Since it would allow automatic stabilisers to operate, deviations from the path due to cyclical conditions would not be allowed. The debt reduction benchmark, the requirement for structural balance adjustment and the

related matrix as well as the significant deviation procedure would cease to exist.

Member States committing to structural reforms and growth-boosting investments could apply for a more gradual adjustment path with an extension of three years. Although monitoring of progress would still take place annually, the plans would be fixed for their entire duration, instead of being yearly updated as they currently are. This would improve the medium-term focus of the fiscal planning system. In practice the fiscal-structural plans would merge the current Stability and Convergence Programmes with the National Reform Programmes, and the plans would be implemented in annual budgets.

The process is inspired by the Recovery and Resilience Planning process so that the details of the plan would be negotiated by the Commission and the Member State. In this way the process would become more bilateral and the current multilateral approach, where all Member States are involved in the process, would be weakened.

The Commission also suggests novel enforcement mechanisms to better incentivise compliance. The rules for opening the Excessive Deficit Procedure (EDP) in case a country exceeds the treaty's 3% deficit value would be maintained. In addition, the EDP would be opened by default if a country with a substantial public debt challenge deviates from the agreed adjustment plan. If a country with a moderate public debt challenge deviates, the EDP could be opened if the Commission deemed the deviation as a "gross error".

Imposing financial sanctions is also made easier by lowering the amounts of these. The Commission also proposes so-called reputational sanctions, which could mean that Members States' ministers in the EDP would have to present the measures they intend to undertake to the European Parliament.

Finally, independent fiscal institutions would be given new tasks. They would assess the assumptions and adequacy of the plans and monitor compliance. A bigger role for the national fiscal institutions is expected to lead to greater debate at the national level and hence a higher degree of political commitment.

See Puonti (2022) for discussion on the Commission's proposal.

**Box 4.2. A framework for steering general government finances – proposal by the Ministry of Finance**

In November 2022, the Ministry of Finance published a report making suggestions on how to improve the steering of public finances in Finland. *) The report outlines a fiscal framework that aims at ensuring longer-term debt sustainability. The main elements of the framework are not new, but the purpose is to strengthen the link between various fiscal targets at different levels of general government.

The framework consists of a "top-down" approach so that lower-level targets are consistently derived from the highest-level target. The process consists of the following main steps. First, the government determines a longer-term target for the public debt ratio to be reached over more than one government's term of office. Based on that, the government sets a target for the nominal general government financial position (as a percentage of GDP) and its subsectors at the end of its term in office. The targeted fiscal position is then compared to an independent forecast, and the difference between the two gives the monetary amount of fiscal consolidation needed to obtain the targeted fiscal position.

The Ministry of Finance suggests that the government makes a commitment to undertake measures leading to the targeted fiscal position, i.e. makes decisions on fiscal consolidation and structural reforms. The resulting general government fiscal trajectory is then taken as a basis for the government's tax policy during the term in office as well as for the budgetary expenditure ceilings. Monitoring of progress would take place annually and additional measures would be undertaken if needed to obtain the targeted general government financial position at the end of the planning horizon.

*) See Puonti (2022) and 'Developing the steering of general government finances' Publications of the Ministry of Finance 2022:71.

## 4.5. Council views

Fiscal policy in 2022 had to be adjusted because of the onset of the war in Ukraine. Additional spending on military and other security-related uses has most likely been necessary, whereas certain measures to boost purchasing power such as additional child benefit have not. Given the persistent deficit in public finances, part of the additional defence and other discretionary spending should have been financed by cutting public expenditure elsewhere or by tax increases.

It has also been appropriate to shelter those households that have been most exposed to the large increases in energy prices via the provision of electricity subsidies. However, the temporary VAT cut on electricity is an untargeted measure and and does not efficiently serve the purpose of reaching those households most in need of the subsidy. In general, currently non-existent policy instruments that allow targeted, income-based, one-off payments should have been designed on time to be ready for use when decisions on relief measures are taken.

The Parliament implemented an R&D tax incentive in 2022. In its 2021 report, the EPC took a positive attitude towards introducing such a measure, albeit with some caveats in mind. The take-up and impact of the new R&D tax incentive need to be monitored closely.

While the output gap estimates for 2023 are still negative, suggesting that an accommodative fiscal policy would be appropriate, there would be good reasons to cautiously execute tighter fiscal policy in 2023. The reasons include resource constraints and bottlenecks in the labour market, implying the presence of only very limited slack in economic capacity, and supply-side phenomena (especially the energy crisis) being behind low growth and high inflation. One should refrain from adding to the inflationary pressures via fiscal policy; rather the goal should be to ease supply constraints, if possible. The long-run sustainability problems also favour setting a tighter fiscal policy stance already in 2023.

The next government term should start with a credible, transparent, and ambitious fiscal adjustment plan. Given the size of the deficit, a gradual and sustained adjustment should be implemented. The goal should be fiscal adjustment in the range of 0.4-0.6% annually, varying across the time period, leading to a declining path for the debt-to-GDP ratio over the medium term. It

is important to secure fiscal space in the future since Finland will likely face negative economic shocks over such a long period. That is why it is essential to start, under normal economic conditions, with sizeable, front-loaded adjustment, rather than postpone consolidation to the end of the government term.

The required scale of consolidation is ambitious, and that is why both expenditure and revenue measures are likely to be needed. There is very little scope for tax cuts in the coming years without even more drastic spending cuts. Potential tax increases should be designed well, since inappropriately targeted tax increases may undermine incentives and lead to slower growth. Tax increases may be sought, e.g. by discontinuing taxing certain goods at lower VAT rates, limiting dividend tax exemptions for closely held corporations, and by increasing property taxation. Since expenditure cuts and tax increases have different distributional impacts, ultimately the choice between them is a political one. Structural reforms, meant to help in reducing the deficit, would have to be clearly formulated and it would have to possible to evaluate their impact in a credible manner.

Given the current challenges facing the Finnish economy, it would be important to go through the tax system in a systematic way, to assess how tax changes can contribute to the required consolidation while safeguarding key development in the Finnish economy, such as technological development, conversion to green growth and globalisation. Public expenditures would need to be reviewed in a similar manner. To do so, we propose that the governments set up a committee that considers how tax and spending policies can contribute to redistribution and to consider effects on the economy in general.

The new European Commission proposal regarding fiscal rules in Europe is a move in the right direction, as it simplifies the regulatory framework. It would be desirable that fiscal rules strike a balance between encouraging sustainability and allowing counter-cyclical fiscal policy. It would also be useful that they take into account both expenditure- and revenue-side measures. The domestic proposal by the Ministry of Finance appears to us as rigid and it does not treat symmetrically taxes and spending.

# 5. Climate policy

The Intergovernmental Panel on Climate Change (IPCC) warns that global temperatures are likely to rise by $3.2^0$C by the end of century. This is well above the $1.5^0$C temperature increase that is the upper limit agreed in the 2015 international climate negotiations that resulted in the Paris Agreement. Despite increasing evidence of the devastating impacts of global warming on the wellbeing of humans and ecosystems, global greenhouse gas (GHG) emissions continue to increase. The IPCC calls for immediate climate actions to substantially reduce emissions and accelerate a just transition towards sustainable development. In practice, this means addressing everything from public policies and prevailing technologies to individual lifestyles and social norms. Governance arrangements and institutions will also have to be addressed, which involves political economy implications. (IPCC 2022a, 2022b)

Combating climate change is a major political challenge because of its distinct feature as a *global externality*. Both the causes and consequences of climate change are global. The impacts of climate change are long-term and persistent. The atmospheric concentration of CO2 has a long lifetime, and the full costs of global warming will materialise in the decades to come.

Climate-related hazards have already been experienced in many parts of the world in recent years: heatwaves, wildfires, floods, and tropical storms. Still, bold climate actions are held up because mitigation is a costly public good. Inaction increases uncertainty about the future economic impacts and the risks of major irreversible changes, or tipping points, such as large-scale loss of permafrost, melting of large masses of ice in the Arctic Sea and Antarctic Sea, and the conversion of large areas of the Amazon rainforest into a savanna (Steffen et al 2018). Taking a precautionary approach globally is necessary to succeed in mitigating climate change. (Bolton et al 2020, OECD 2021a, Stern 2007)

In Europe, climate policy is coordinated by the European Union (EU). The European Climate Law sets a legally binding target of net zero greenhouse gas emissions by 2050. Nationally, Finland has set a target of becoming carbon neutral already by 2035.[39] Fiscal policies at the national and sectoral level could play a critical role in achieving these objectives in Finland. (Parry and Wingender 2021)

Climate policy challenges relate to mitigation and adaptation. Adaptation refers to the adjustment of societies in response to the risks of climate change. Here, we focus on Finland's climate policy goals in the context of EU policy and international climate agreements. We evaluate the design and pre-assessment of *mitigation policies* that are aimed at containing GHG emissions. The appropriateness of the economic policy instruments chosen for reaching the climate targets is discussed. We also assess the quality of the assessment methods used in climate policy planning. Despite the focus here on mitigation, national policymakers could use insights from economics in the design of adaptation policy as well.

## 5.1. On the economic impacts of climate change

Climate change poses risks to the welfare of people and natural systems and to the functioning of economies. There are several channels through which climate change can affect economic outcomes. Figure 5.1.1 presents some examples of the macroeconomic risks deriving from climate change[40].

The *physical risks* of climate change include the effects of rising sea levels, changing agricultural production patterns, and the increasing severity and frequency of extreme weather events (floods, cyclones, heatwaves). Unchecked, climate change will cause severe impacts related, for example, to changes in labour and agricultural productivity, health effects, loss of capital assets, displacement of people and changes to ecosystems. Global warming could reduce the growth potential of the economy by reducing labour

[39] See EU 2021/1119 and Climate Change Act 423/2022

[40] The conceptual framework classifying the impact of climate-related risk factors on economies was first outlined by Mark Carney, then Governor of the Bank of England, in 2015 (Demekas and Grippa 2021). The impacts of climate change on financial systems and the liabilities of the insurance sector had become a concern for some central banks and regulatory agencies in Europe. Currently, cooperation is coordinated by e.g. the Central Banks and Supervisors Network for Greening the Financial System (NGFS) and the Coalition of Finance Ministers for Climate Action.

productivity and diverting investments from productive capital to climate change adaptation.[41]

For example, Park et al (2020) demonstrate that heat inhibits learning, and that school air conditioning may mitigate this effect. In general, Heal and Park (2016) find evidence of the causal impact of cumulative heat exposure on human capital accumulation, health, labour supply, and industrial production. According to Kahn et al (2021), income losses are sizable even in cold climates, either because they are warming up much faster than temperate or hot regions or because climate variability is becoming more pronounced in line with faster temperature increases. Avoiding the negative economic impacts demands more forceful policy responses to the threat of climate change, but more ambitious mitigation efforts may inflict transition risks.

*Transition risks* are the economic effects of policies to mitigate global warming, such as changes in regulation, and increases in carbon pricing. The added costs of mitigation can increase the prices of energy and products in which energy is embodied, cause the productivity of capital to decline, and affect international trade and financial markets. A large decline in the value of fossil capital may lead to stranded assets (Rozenberg et al 2020, Sen and von Schickfus 2020)

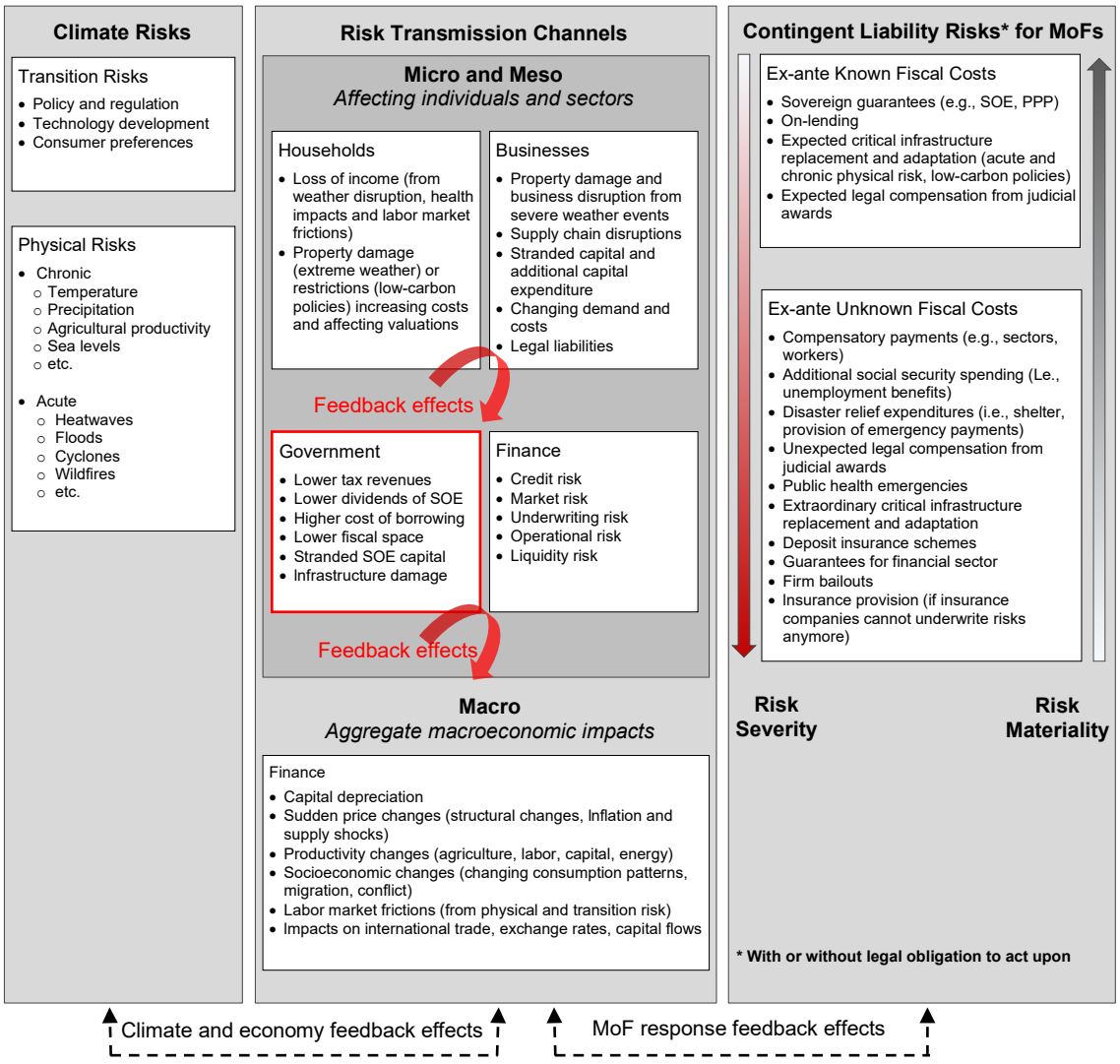
Transition risks relate to the energy supply and the rate of adoption of clean energy technologies. This transition may also have positive impacts on productivity by accelerating the take-up of new technologies, and stimulating investments in retrofitting homes, renewable energies, and transport infrastructure. If innovations lead to the accumulation of capital and substitution of energy, material, and labour, these may deliver mitigation benefits.

As shown in Figure 5.1.1, the uncertainty and the wide scope of climate-related risks affect government by having direct fiscal impacts, but also by triggering contingent liabilities. For instance, state-owned enterprises (SOE) are typically large-scale infrastructure providers or carbon-intensive companies that can be exposed to both the physical and transition risks of climate change. In the current geopolitical situation, European governments are protecting their energy companies (both nuclear and fossil) from the energy crisis and turmoil caused by Russia's war in Ukraine. Moreover, lower

[41] For a review of the economic impacts of climate change, see e.g. Tol (2018) with supplementary material on methods to estimate the total impact and studies that estimate the social cost of carbon.

dividend income and (tax) revenue streams, higher expenditures, and potentially higher borrowing costs pose substantial macro-fiscal risks and threats for ministries of finance. (Dunz and Power 2021)

Figure 5.1.1. Climate-related risk transmission channels and ministries of finance.




Source: Dunz and Power (2021) adapted from NGFS (2020).

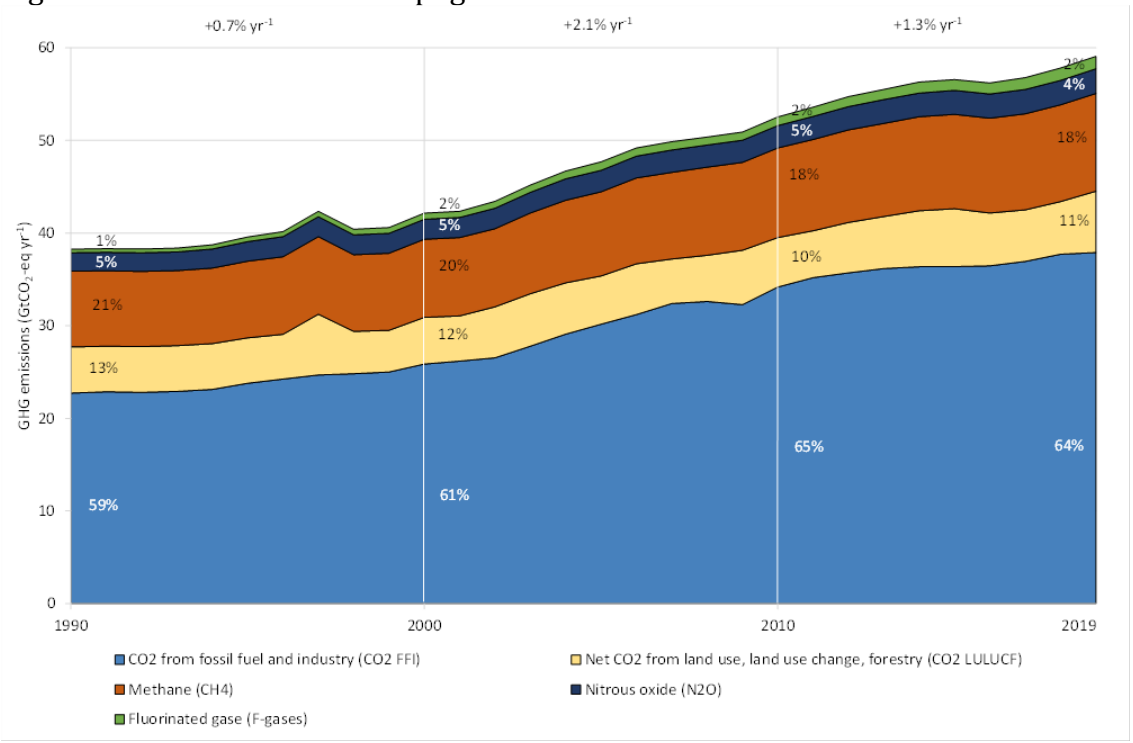
Climate-related risks require considerable mitigation measures to reduce the likelihood of negative impacts. An orderly low-carbon transition is possible only with coordinated efforts across the public and private, financial, and economic sectors. However, global externalities cannot be mitigated by efforts taken in individual countries alone but instead necessitate international policy coordination, which is discussed next.

## 5.2. International climate change agreements

Tackling the problem of global climate change requires international cooperation. Coordination of climate policies has been carried out within the United Nations Framework Convention on Climate Change since 1994. de Silva and Tenreyro (2021) have studied three international treaties with the overarching aim of reducing GHG emissions. The first was the Kyoto Protocol (coming into force in 2005 with targets for 2012), the second was the Copenhagen Accord (2009-2020), and the latest is the Paris Agreement (2016-2030).

Finland has signed all three treaties as part of the EU, which has allocated emission reduction targets to each EU Member State. However, not all countries have committed to the international agreements on reducing emissions. Overall, GHG emissions have continued to grow (see Figure 5.2.1). The world is not on track to limit warming to 1.5$^0$C, which was agreed upon by the signatories of the Paris Agreement and the following national pledges of emission reductions (IPCC 2022b).

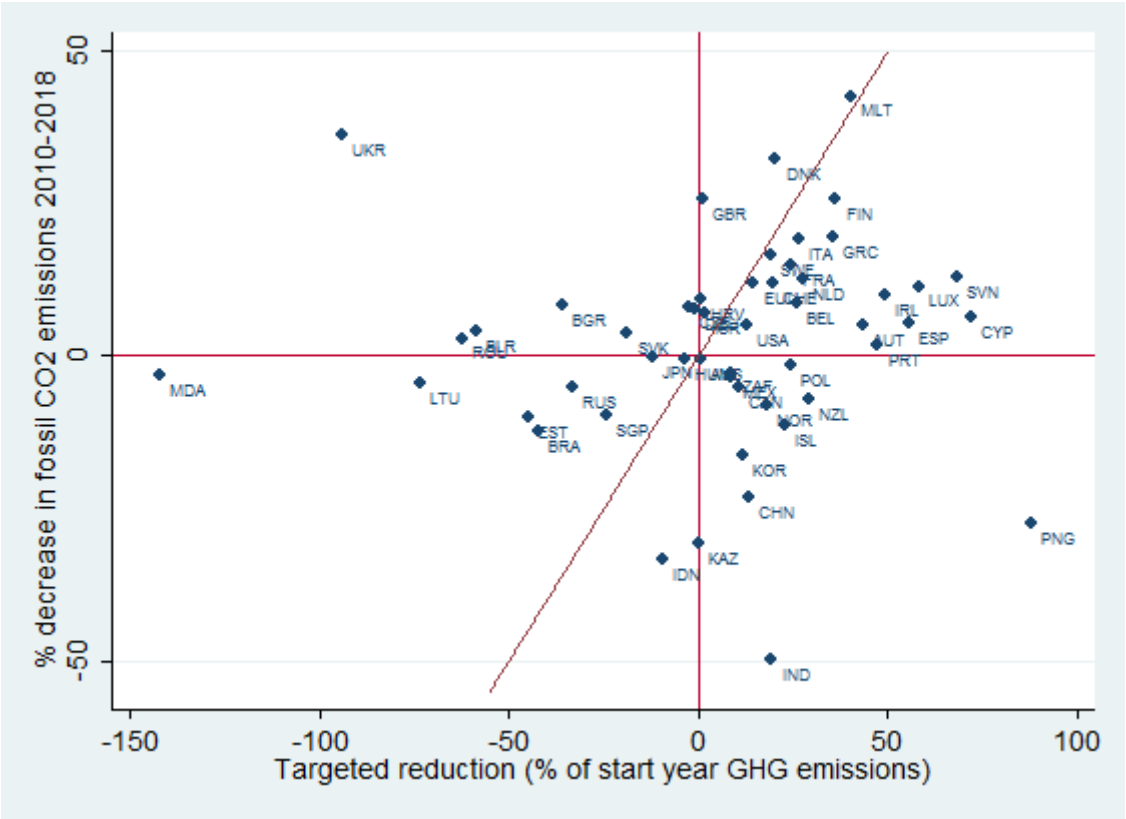
Figure 5.2.1. Global net anthropogenic GHG emissions 1990-2019.




Source: IPCC (2022b).

de Silva and Tenreyro (2021) investigated signatory countries' compliance with the targets pledged and the impacts of international agreements on GHG emissions and economic outcomes by 2018[42]. Their main finding is that compliance has been very heterogeneous, and many countries have undershot their targets. Signing the Kyoto Protocol and the Copenhagen Accord has led to significant reductions in emissions when compared with non-signatories, whereas it seems too early to detect any reductions materialising from the Paris Agreement (with targets for 2030).

Figure 5.2.2. Progress made under the Copenhagen Accord.




Source: de Silva and Tenreyro (2021), figure courtesy of the authors. Note: The figure plots the decrease in fossil $CO_2$ emissions from the starting year of 2010 to 2018 (as a percentage of the 2010 emissions level) against the targeted unconditional GHG emission reduction as a percentage of GHG emissions in the start year of the Copenhagen Accord. The red line is the Y=X line.

de Silva and Tenreyro (2021) show where Finland stands against the other signatory countries for the latest, already expired agreement, the Copenhagen Accord. Figure 5.2.2 contrasts targeted unconditional emission reductions with emission reductions recorded by 2018. Countries to the left of the $45^0$

[42] Their sample finishes in 2018.

line (in red) represent the countries that met their target, and countries to the right of the $45^0$ line are those that failed to achieve their targeted emission reduction.

In Figure 5.2.2, Finland (FIN) is located slightly to the right of the $45^0$ line, i.e. reasonably close to achieving its target. In comparison to the other signatory countries, Finland fares relatively well given that the vast majority of those 21 countries that had already achieved their targets by 2018 had specified an *increase* in emissions from 2010 (negative values on the X-axis). Among the Nordic countries, Denmark (DNK) stands out by having reduced its emissions the most and having exceeded its reduction target.

Regarding specific climate actions and policy instruments, de Silva and Tenreyro (2021) find that carbon taxes and emissions trading schemes (ETS) have in general led to material reductions in emissions. The potential spillovers of climate pledges and actions to GDP growth and inflation are largely insignificant. Nor have Metcalf and Stock (2020) found any significant negative impact of carbon taxes on GDP growth. In contrast, Känzig (2022) finds in an event study that a tighter carbon pricing regime leads to an increase in energy prices, a persistent fall in emissions and an uptick in green innovation at the expense of a temporary fall in economic activity and increasing inequality.

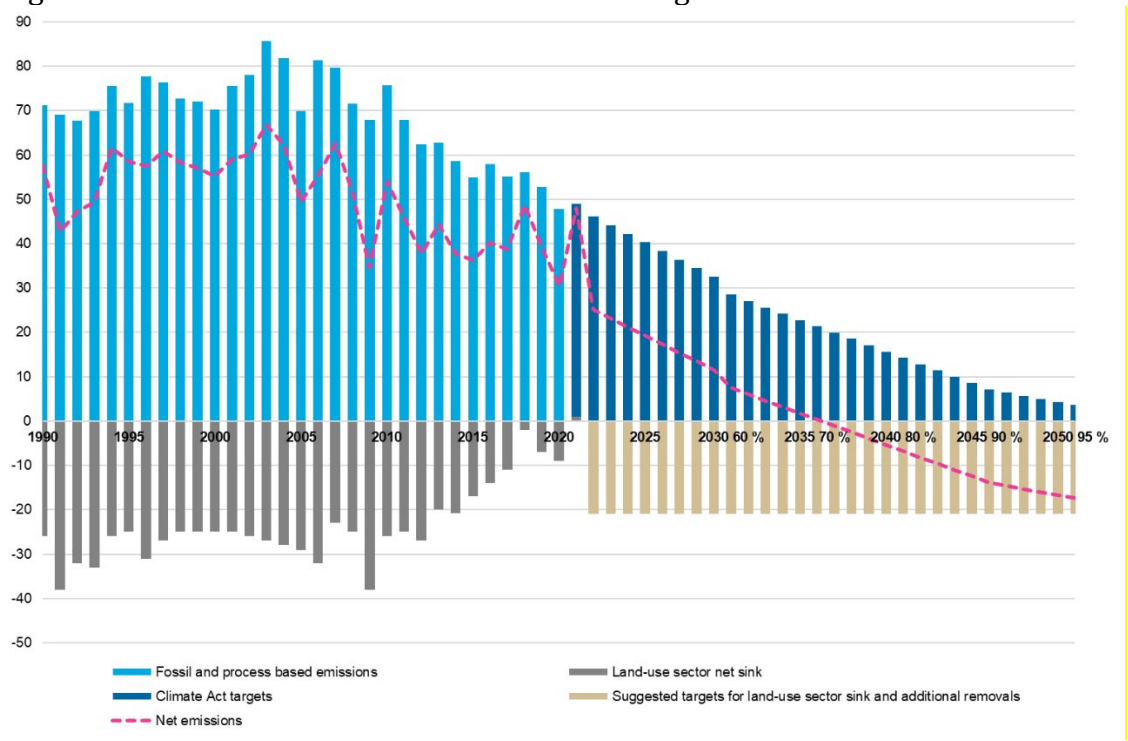
Overall, the impacts of carbon pricing on e.g. carbon leakage, competitiveness or income distribution have been extensively studied using both ex-ante modelling and ex-post case studies and cross-country analyses. The results vary depending on the specific national policies considered but also on the methods of analysis, modelling assumptions etc. (see e.g. Joltreau and Sommerfeld 2019, Verde 2020, Köppl and Schratzenstaller 2021). Impact assessments are useful for the design of climate policy, especially in small open economies. Finland's climate policy instruments are discussed in more detail in section 5.6.

The EU aims at net zero greenhouse gas emissions by 2050. As an intermediate target carbon emissions will be reduced by at least 55% from the 1990 level by 2030. Finland has set milestones for its reduction targets in the future that are more ambitious than the overall EU targets. This will be discussed next.

## 5.3. Finland's climate policy plan and targets

The current Finnish target for reducing carbon emissions is to be carbon neutral by 2035. Carbon neutrality is to be met by Finnish territorial emissions declining over time and being at least 70% lower in 2035 than in 1990, with the remaining carbon emissions offset by annual absorption from carbon sinks. Moreover, there is a sectoral target specifying that Finland should reduce emissions by 50% from 2005 levels by 2030 in the effort-sharing sector (or "non-emissions trading sector"), which includes construction, heating of buildings, housing, agriculture, transport, waste management and fluorinated gases from industrial processes. Figure 5.3.1 illustrates Finland's emissions until 2021; thereafter, the projections are depicted assuming a linear pathway for the national targets and milestones.[43]

Figure 5.3.1. Finland's emissions and net sink: targets and evolution 1990-2050.




Sources: Figure courtesy of Ollikainen (2022); updated by EPC for revision of net sink calculations given in Luke (2022). (Million tons)

The Government has prepared a Medium-Term Climate Change Policy Plan (MoE 2022) to implement climate actions and measures. The impacts of the measures included in the plan on the different sectors, industries, people, and

[43] See Climate-Change Act 423/2022 and the EU Climate Law (Regulation (EU) 2021/1119) - EU 'Fit for 55' July 2022; See also VNS 4/2022 vp Medium-Term Climate Change Policy Plan - Towards a carbon-neutral society in 2035.

the environment have been assessed in a research project, HIISI, coordinated by the Technical Research Centre of Finland VTT.[44] The impact assessments have been carried out as scenario analyses using the TIMES-VTT-energy system model (Lehtilä et al.) and the FINAGE computable general equilibrium model (Honkatukia 2021).

The analysis of a policy scenario WAM ("with additional measures") shows that climate measures lead to significant reductions in CO2 emissions. Still, measures additional to WAM are needed in the non-emissions-trading sector to remove a further 1.8 Mt CO2 equivalent to reach the Finnish milestone target for 2030. Moreover, depending on the materialisation of investments in low-carbon technologies in the steel and other carbon-intense industries, additional measures with reductions of 2-4 Mt CO2 equivalent may be required to meet the carbon neutrality target for 2035. (Koljonen et al 2022)

Scenario analysis shows that the impacts of climate policy measures on growth in the Finnish economy are going to be slightly negative. The policy scenario WAM leads to a 0.5 percent reduction in GDP in 2035 compared to a reference scenario using current policy ("with existing measures"). Most of the effects on the economy stem from investments in new, carbon-free technologies in the energy sector, industry, and the transport sector. In the projections, these investments dominate economic activity up to the 2040s. They increase productivity and create growth potential, but also entail current account deficits. Moreover, as electrification and reductions in emissions narrow the tax base, the contribution of indirect taxes to GDP growth is negative.

However, a comprehensive analysis of the effects of economic measures (taxes, subsidies) was *not* carried out by the FINAGE modelling since the exact policy measures were still being designed during the HIISI project. Hence, all investments in the modelling were market-driven and based on *assumed* energy and carbon price developments. (Honkatukia 2021, Koljonen et al 2022) To learn from the stringency of the Finnish climate targets, it would have been useful to report the shadow prices (dual variables) associated with carbon emissions in the modelling. Shadow prices reflect the marginal costs of abatement that are important for cost-effective policy design (see Nordhaus 2019).

[44] For HIISI project see www.hiisi2035.fi

The Government's Climate Change Policy Plan has been evaluated by the Finnish Climate Change Panel as well. In line with the findings of Koljonen et al (2022), the panel concludes that additional climate actions and policy measures are needed, or otherwise Finland will fall short of the climate targets the Government has committed to in the Climate Change Act. Reducing carbon emissions in the effort-sharing sector, particularly in agriculture and transport, may prove challenging for Finland. Moreover, carbon sinks are crucial for the achievement of the Finnish goal of carbon neutrality. The sinks remove GHGs from the atmosphere or decrease emissions by halting the loss of carbon stocks. The sinks are affected by human activities through land use, land use change and forestry (LULUCF). The functioning of the LULUCF sector as a carbon sink, and not as a source, is critical for Finland, as reductions in emissions elsewhere in the economy are very expensive.

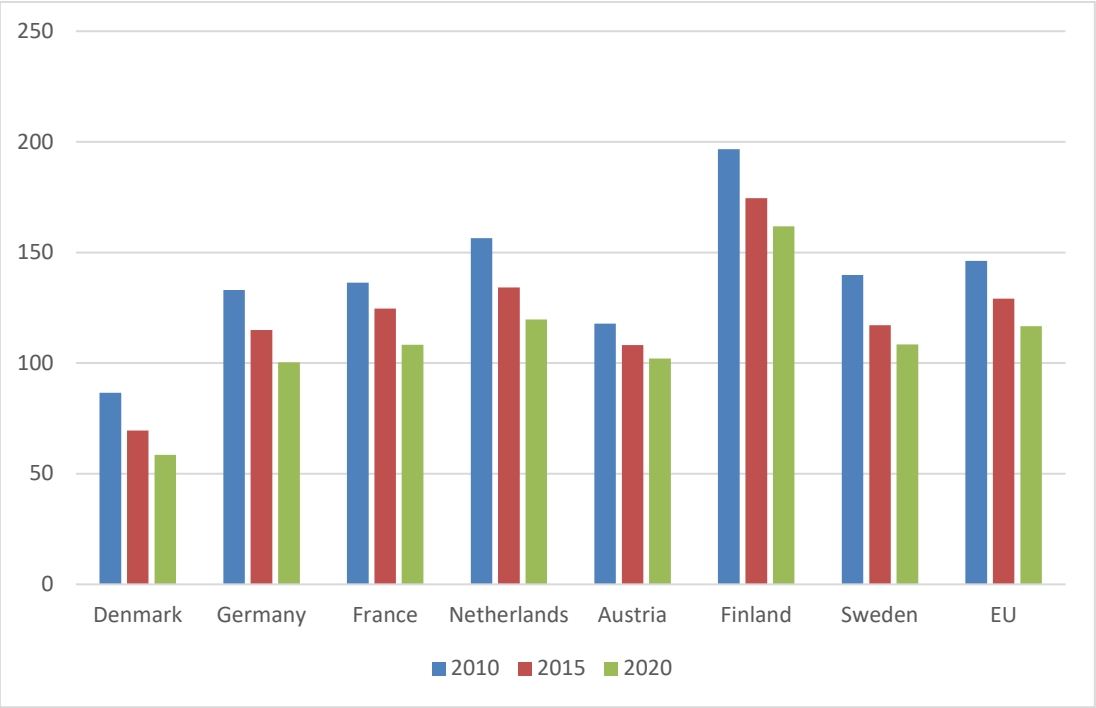
Furthermore, energy consumption, energy-efficient investment and pro-environmental actions involve consumer decision-making and behaviour. The panel remarks that there are urgent needs concerning the design of policy interventions that target energy demand, and assessment of the responsiveness of consumer behaviour to these interventions in the areas of energy, mobility, and consumption. (Finnish Climate Change Panel 2022a, 2022b; Ollikainen 2022)

## 5.4. Energy efficiency and security of supply

Finnish energy consumption per capita is one of the highest among the EU countries. The high energy intensity is partly explained by the cold climate and high demand for traffic and transport due to low population density and long distances in rural areas. Additionally, significant amounts of energy are used in manufacturing, especially in the paper industry and metallurgy.

Figure 5.4.1 illustrates the energy intensity (total energy supply per GDP) of selected European economies. Finnish energy intensity has decreased over time but is still well above the EU average. The contribution of energy to the Finnish economy can be illustrated by the value added generated (GDP) per unit of energy consumed, which was EUR 1000 per barrel of oil equivalent in 2020. For comparison, value added per barrel of oil equivalent was EUR 1400 in Sweden, and EUR 1600 in Germany in the same year.

Figure 5.4.1. Energy intensity of the economy in selected European countries in 2010, 2015 and 2020.




Source: Eurostat. Total energy supply (kilograms of oil equivalent, KGOE) per GDP unit (1000 euro). GDP in chain linked volumes (2010).

Substantial amounts of energy are used to generate electricity. Finnish electricity demand has grown considerably because of a tendency within industry to switch from other fuels to electricity, and increased use of electricity for heating. GDP per unit of electricity consumed was EUR 3000 per MWh in Finland in 2020. This is strikingly low compared to several European countries.[45]

One of the main energy policy goals in Finland has been to secure inexpensive energy for manufacturing and other industries. Recently, Hawkins-Pierot and Wagner (2022) have studied energy efficiency in US manufacturing. They show that (low) initial electricity prices paid by manufacturing plants in their first year of operation have persistent effects on their lifetime (high) energy intensity. The existence and magnitude of technology lock-in suggests implications for climate policy. Delayed action on carbon pricing may come at the expense of significant lost energy efficiency gains.

[45] For comparison, GDP per unit of electricity (MWh) in 2020 was EUR 3790 in Sweden, EUR 5450 in France, EUR 6760 in Germany, EUR 9860 in Denmark, with the EU27 average being EUR 5430.

About 80% of Finnish GHG emissions originate from energy production and consumption. To reduce emissions, the link between the energy intensity of the economy and carbon intensity should be broken by cutting the use of fossil fuels. Consequently, energy and climate policies are closely intertwined in a manner similar to the way in which security and adequacy of energy supply are integrated in the Finnish Climate and Energy Strategy[46].

The Russian invasion of Ukraine has lent a new sense of urgency to the task of transitioning away from coal, oil, and gas in the whole of Europe. As a response, the EU plans to reduce its dependence on Russian fossil fuels and bring forward the green transition. The plan, REPowerEU, emphasises measures such as energy savings, diversification of energy supplies, and accelerated roll-out of renewable energy.[47] The existing Recovery and Resilience Facility (RFF) will be used to finance these measures, including investments in national infrastructures.[48]

Security of energy supply is important for the Finnish economy. As recognized in the Climate and Energy Strategy, Finnish energy supplies are already relatively diversified. Fossil energy sources and peat accounted for 37% of total energy consumption in 2020, whereas the share of bioenergy (such as woodchips, forest residues, and black liquor, a by-product of paper manufacturing) was 28%. The share of natural gas of total energy consumption was relatively small compared to many other European countries, about 5%.

In the short run, replacing natural gas imported from Russia is the most obvious challenge, but this only concerns specific industries and a relatively small share of companies and district heating plants. More importantly, a clear concern for the Finnish economy is the future supply of base-load electricity. A large nuclear power plant investment (Fennovoima) – under construction since 2014 – was halted by the Government for security reasons in spring 2022, because of its partial Russian financing and ownership.

In the 2022 Climate and Energy Strategy - and in the previous strategies - electricity supply has been projected to increase steadily (see Figure 5.4.2). In

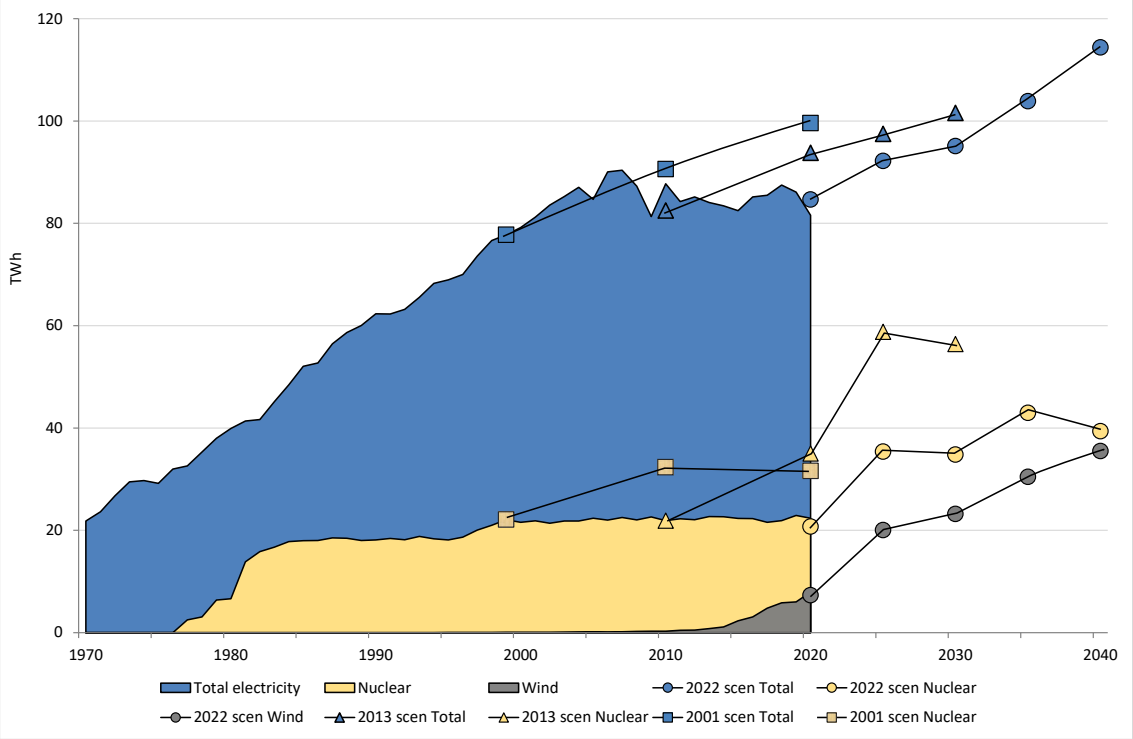
[46] VN/11385/2020 Carbon-neutral Finland 2035 – National Climate and Energy Strategy

[47] COM (2022) 230 final

[48] RFF funding will be amended with grants from emission trading revenues. About EUR 20 billion will be allocated to the Innovation Fund from a specific sale of EU Emission Trading System (ETS) allowances from the Market Stability Reserve.

practice, this increase has not materialised in the past 15 years. This is mainly because the prominent role of nuclear power in domestic electricity supply has not materialised, and there have been major delays in the construction of new capacity (Olkiluoto 3). The high costs of and long delays in large-scale nuclear investments are likely to be a future concern as well.

Figure 5.4.2. Supply of electricity 1970-2020 and scenario projections up to 2040.




Sources: Statistics Finland, Climate Strategy 2001, National Energy and Climate Strategy 2013, Carbon Neutral Finland 2035 – National Climate and Energy Strategy; Koljonen et al. (2022).

Increasing electricity output further while cutting fossil fuels will require considerable growth in renewables, especially wind and solar, along with energy storage. Increased wind generation materialised over the past five years and has only become visible in the current strategy (2022 scen Wind in Figure 5.4.2). Development of storage technology for intermittent production (wind, solar) is crucial for energy security. In addition, investments in electricity transmission systems are needed (grid, ultra-high voltage power lines). Extreme weather conditions require adaptation measures for secure energy distribution and operating reliability from diverse sources of energy.

The government's role in promoting infrastructure investment is more in planning and coordination rather than financing investment. The Finnish

state is a majority owner of a transmission system operator Fingrid. Interestingly, there is also a separate Climate Fund that is a Finnish state-owned special-assignment company.

Furthermore, a steady supply of carbon-free electricity is required to make extensive use of hydrogen-based production possible in industrial processes in the future. Hydrogen-based technologies have been intensively researched and developed internationally but are not expected to reach commercial maturity in the short term.[49] There are high expectations for Finnish innovations in low-carbon technologies in the Climate and Energy Strategy.

Regarding a just transition to a low-carbon economy, the EU has recognised alleviation of energy poverty as a policy goal. According to the Climate and Energy Strategy, energy poverty has not been considered a major problem in Finland, but affordability could be a concern for low-income households with high energy costs for housing and transport. In the strategy, the Finnish social security system is seen as an appropriate support mechanism to compensate for high living costs. From the point of view of economic efficiency, international climate policy should increasingly be based on carbon pricing (carbon taxes etc). Consequently, inequality concerns will become more pronounced as well.[50]

## 5.5. The EU policy framework

Carbon pricing is the most direct and efficient way to achieve the emission reductions that are necessary to mitigate climate change. Pricing can take the form of a carbon tax or an emissions trading system, and the revenues generated can be used to finance compensatory measures such as transfers to affected households or green infrastructure spending. Acemoglu et al (2016) show in theory that optimal regulation involves both carbon taxes and research subsidies that can redirect innovation to clean technologies before there is extensive environmental damage. Hart (2019) argues that emission taxes are far more important than research subsidies in (second-best) climate policy when the marginal damage is in proportion to gross production.

However, carbon pricing is typically objected to due to concerns about industrial competitiveness and distributional impacts (Vandyck et al 2021). A

[49] See e.g. IEA (2019), Madeddu et al (2021), Gaure and Golombek (2022).

[50] See e.g. Pizer and Sexton (2019) and Douenne (2022).

major challenge for implementing efficient climate policy is that worldwide there are considerable environmentally *harmful* subsidies for *fossil fuels* or carbon. (Parry et al 2021) In fact, there is also an environmental bias in trade policy in that import tariffs and non-tariff barriers are substantially lower on dirty (carbon-intense) than clean industries in most countries (Shapiro 2021).

Under current international law, there is no legal mechanism by which nations could be obliged to establish policies that raise the price of $CO_2$ and other GHG emissions. But to reach climate targets cost-effectively, the marginal costs of emissions should be equal, and the same level of carbon prices should be applied wherever carbon is released into the atmosphere. According to the Stern-Stiglitz High-Level Commission on Carbon Prices (2017), explicit carbon prices should be in the range of USD 50-100 per ton of $CO_2$ by 2030, and still additional complementary policies would be needed to achieve the Paris Agreement goals. However, it seems unlikely that any level of common global carbon price could be agreed upon in the foreseeable future. This means that climate policy is designed in a second-best environment.

In practice, the EU negotiates and coordinates climate policy for the Member States, including Finland. The framework of the policy consists of three parts: an emissions trading system for energy-intensive activities (EU Emissions Trading System, EU ETS), a system with emission quotas for the Member States' other emissions (Effort Sharing Regulation, ESR) and a system that regulates Member States' storage of carbon in forests and land (Land Use, Land-use Change and Forestry, LULUCF). The EU ETS establishes a union-wide price for emissions. The allowance price can be expected to encourage energy-intensive companies towards a cost-effective allocation of efforts to reduce emissions within the EU ETS. As regards the ESR and LULUCF, it is up to the governments of the Member States to design a policy so that the requirements are met.

To fulfill its pledge to the Paris Agreement, the EU is tightening its climate policy. In 2021, the European Commission therefore presented a reform proposal, the 'Fit for 55' package.[51] The 'Fit for 55' proposal means major changes in practically all parts of the EU's climate policy. The changes include, among other things, a greatly reduced supply of emission allowances within

[51] COM (2021) 550 final. Large parts of the package are still in the trilogue negotiations.

the EU ETS, the phasing-out of the free allocation of emission allowances and the introduction of carbon dioxide tariffs on the import of certain goods, the introduction of emissions trading for buildings and transport, reduced national emission quotas for Member States' ESR sectors and stricter requirements on Member States' net absorption of carbon dioxide in the land use sector.

Moreover, achieving the overall goal of net-zero greenhouse gas emissions in the EU by 2050 requires an expansion of investment in rebuilding the energy system and transport infrastructure. A significant part of this additional investment will have to be funded by the public sector. According to Darvas and Wolff (2021), the additional public investment required to meet the EU's climate goals is 0.5-1% of GDP annually during this decade. The share of public funding is expected to be more limited in northern European countries than elsewhere, but still on average around 20%-30% of the necessary funding for investments in clean and efficient energy use and transport.

The tightening of EU-wide climate policy could affect Finland in several ways. For example, the cost of carbon dioxide emissions within the EU ETS and the land use sector – including agriculture and forestry - can be expected to increase. The reforms will also affect Finland's national climate policy measures. The economic impacts of implementing the EU's 'Fit for 55' on Finland should be analysed carefully using appropriate methods and modelling tools to consider the behavioural and distributional impacts, the macroeconomic effects, and international trade, among other things.[52]

Finally, the European energy crisis, with extremely high (peak) prices, has shown that there may be conflicting interests between countries, between energy producers and consumers, and between households. Therefore, carbon pricing and tax and support policies must be coordinated. For example, windfall taxes or taxes on excess profits are appropriate as temporary measures to extract the producer surplus to finance subsidies in order to protect consumers.

[52] Commission has carried out impact assessments for the whole of EU. However, Finland should analyse the Commission assessments for cost-efficiency of measures suggested and for impacts on the Finnish economy, including distributional impacts (rigorous impact assessments necessitate using micro and macro modelling tools, register data etc).

## 5.6. Finland's climate policy

Finland's climate policy instruments are thoroughly discussed by Clarke (2023) in her background report for the Economic Policy Council. In general, there seems to be room for improvement in the Finnish policy design, in the cost-efficiency of the measures chosen as well as in the ex-post evaluation of emission reductions achieved by public funding. Some of the major findings are discussed here.

Finland was one of the first countries in the world to implement carbon taxes in 1990. A carbon tax was introduced as a component of energy taxation. Finland has also participated in the EU's Emissions Trading System (ETS) from an early stage (since 2005). However, carbon pricing has not covered the whole economy as selected economic sectors have been exempted from regulation.

The policy instruments for carbon pricing - EU ETS allowances and national carbon taxes – and the social and fiscal impacts of Finnish climate policy are summarised in Table 5.5.1. It should be emphasised that the monetary estimates of the impacts should be interpreted as attempts to demonstrate the macroeconomic dimension of mitigation policies for Finland. There is a considerable uncertainty regarding, for example, how the damage caused by $CO_2$ emissions should be valued. In Table 5.5.1, the estimates of the social cost of carbon (SCC) are used to monetarise the damage that can result from Finland's carbon emissions. [53] Table 5.5.1 shows actual carbon prices and emissions for the years 2016 and 2021. Alternative projections are presented for 2035, when Finland should be carbon neutral as stipulated in the Climate Change Act. The fiscal impacts include revenues from the increased level and wider scope of carbon pricing as free allowances will be phased out from the EU ETS. Tax revenue from fossil fuels is expected to decrease due to lower demand in the transport sector. Moreover, public expenditure will decrease as compensation and fossil fuel (tax) subsidies will be phased out.

[53] The US Government Interagency Working Group on the Social Cost of Greenhouse Gases regularly assesses the estimates of the value of GHG emissions (up to 2050) to reflect the best available science and methodologies. The government agencies consider the social cost of carbon (SCC) as a key metric informing climate policy. Rennert et al (2022) provide recent scientific evidence on the value of SCC.

*European Union Emissions Trading System (EU ETS)*

The EU ETS was introduced in 2005. The scheme has been developed over the years to increase the allowance price and to make it reflect more closely the social cost of carbon (SCC). The allowance price has stabilised to around EUR 60-80 per ton of $CO_2$ over the past year. Given the increased price, Finland's revenue from EU ETS was about EUR 410 million in 2021. However, free allowances were allocated for energy-intense industries that are potentially exposed to the risk of carbon leakage. The corresponding revenue lost was roughly EUR 750 million in 2021 (approximated by the year's average price). In addition, a compensation subsidy for the indirect costs of emissions trading was paid to energy-intense industries. The total value of this subsidy was EUR 106 million in 2021. A similar aid scheme for the electrification of energy-intensive industries will be in effect until 2025.[54]

To alleviate the threat of carbon leakage, the EU is introducing a Carbon Border Adjustment Mechanism (CBAM) (see e.g., Böhringer et al 2021, Kuusi et al 2020). CBAM imposes carbon tariffs on goods imported to the EU from countries that do not apply a carbon price. With introduction of CBAM, free allowances to exposed industries within the EU will be phased out.

*Carbon and energy taxes*

Energy taxes are excise taxes that target the use of electricity and other fuels. Energy taxation framework is largely harmonised in the EU and includes heating fuels, light and heavy fuel oil, coal, and natural gas, as well as electricity. In Finland as in many other EU countries, diesel is taxed at a lower rate than petrol. The effective 2020 carbon price in the transport sector is EUR 240 for diesel and EUR 373 for petrol. In residential heating, the effective carbon tax is EUR 120-155 depending on the fuel type.

Finland has the highest effective carbon rates for most fuels, followed by Sweden, France, and Denmark.[55] Moreover, the carbon prices or effective tax levels are higher in the Effort Sharing Regulation (ESR) than the allowance price in the EU ETS. In other words, the policy design is not cost-efficient as the prices differ by sector. The 'Fit for 55' framework will not solve the

[54] Act 493/2022

[55] See Clarke (2023) and SWD(2021) 601 final "Effective 2020 Carbon price by EU Member States".

problem as long as there continue to be separate goals and different regulation for these sectors in the future.

Table 5.5.1. Social and fiscal impacts of Finnish mitigation policies (selected impacts approximated in monetary terms).

| YEAR | 2016 | 2021 | 2035 | |
|---|---|---|---|---|
| **CARBON PRICES** | | | | |
| Social Cost of Carbon (SCC), per ton of $CO_2$[1)] | USD 40-80 | USD 40-80 | USD 51-183 | |
| EU ETS allowance price, per ton of $CO_2$[2)] | EUR 4-8 | EUR 33-85 | EUR 42-89 | |
| | | | | |
| | | | Carbon Neutrality Target | |
| **EMISSIONS, SINKS, ALLOWANCES** | | | Met in 2035 | NOT Met in 2035 |
| Total Finnish $CO_2$ emissions, mill. ton[3)] | 58 | 48 | 21 | 25 |
| Carbon sinks, mill. ton[4)] | 18 | 17 | 21 | 15 |
| EU ETS allowances auctioned, mill. ton[5)] | 13,5 | 7,8 | | |
| EU ETS allowances allocated for free, mill. ton[6)] | 18,1 | 12,7 | 0 | 0 |
| | | | | |
| **SOCIAL AND FISCAL IMPACTS** | | | | |
| Total damages, emissions X SCC, million USD | 2320-4640 | 1920-3840 | 1070-3840 | 1280-4580 |
| Value of carbon sinks, sinks X SCC million USD | 720-1440 | 680-1360 | 1070-3840 | 70-2750 |
| Total revenue from EU ETS, million EUR[7)] | 70 | 410 | 880-1870 | 1050-2230 |
| Total revenue lost from free ETS allowances, million EUR[8)] | 110 | 750 | No free allowances | No free allowances |
| Compensation subsidies (industry), million EUR[9)] | 38 | 106 | 0 | 0 |
| Total energy tax revenue, million EUR[10)] | 4407 | 4295 | Reduced | Reduced |
| - of which $CO_2$ tax revenue from passenger transport fuel consumption[11)], million EUR | 810 | 880 | Reduced | Reduced |

[1)]Stern-Stiglitz (2017) Rennert et al (2022); [2)] Energy Authority, SWD(2021) 601 final Part 1/4; [3)]For 2016 and 2021 Statistics Finland [4)]For 2016 and 2020 Statistics Finland [5)]For 2016 and 2020 Energy Authority [6)]Energy Authority [7)]For 2016 and 2020 Energy Authority [8)]Approximated from data from Energy Authority [9)]Energy Authority [10)]MoF (2020) [11)]Kimmo Palanne, personal communication; for approximation, see Clarke (2023).

Revenues from energy taxes amounted to approximately EUR 4.3 billion in 2021. The Ministry of Finance (MoF 2020) forecasts that with current legislation and no new tax changes, revenues from energy taxes will decline. Tax revenues from petrol, diesel, and their substitute biofuels and from

heating fuels are projected to decrease by about EUR 0.6 billion by 2030. Meanwhile, revenues from electricity taxation are projected to increase. However, these forecasts are subject to uncertainties, notably concerning the rate of electrification of the transport sector and the rate at which energy efficiency improves.

Moreover, the MoF (2021) forecasts that by 2025, tax revenues from transport will decrease by EUR 0.8 billion in real terms. The greatest decline will be felt in car tax revenues due to the increase in the share of electric vehicles and the increasing fuel-efficiency of other vehicles. Revenues from vehicle taxes will decline due to reductions in $CO_2$ emissions and the basic tax. In the long term, a carbon-based tax will no longer provide an opportunity to maintain the current fiscal role of transport taxation. (MoF 2020) Taxation could be reformed by shifting the emphasis from the basic tax component of the vehicle tax to fuel taxes and car taxes, and by removing harmful tax subsidies. This would improve the mitigation incentives of transport taxes without tightening transport taxation overall.[56]

As discussed in section 5.3 and according to evaluations by Koljonen et al (2022) and the Climate Change Panel, it is quite likely that the Finnish carbon neutrality target is not going to be met by 2035. The rightmost column in Table 5.5.1 illustrates the selected social and fiscal impacts of mitigation policy failing to meet the net-zero target in 2035. It assumes that carbon sinks are lower (i.e. about 15 million tons) and emissions higher (i.e. about 25 million tons) than what carbon neutrality would necessitate. This is a somewhat arbitrary scenario but illustrates the sensitivity of the impacts of policy failure.

One of the major challenges in climate policy is that meeting the target relies heavily on carbon sinks that are important for Finnish land use policy.[57] That is why it is alarming that Finland's carbon sinks turned into a carbon source in the 2022 carbon inventory. (Luke 2022) Moreover, agri-environmental policy measures have not delivered any carbon emissions reductions in agriculture. Furthermore, Finland has had political challenges in abolishing environmentally harmful (tax) subsidies. For example, peat as an input in energy production has been frequently questioned by experts. However, the

[56] See Clarke (2023) for details on expected changes in tax revenues and for discussion of the need to reform transportation taxation in Finland. See the Danish Environmental Economic Council (2021) for an analysis of a private car tax reform in Denmark, and Gillingham et al (2022).

[57] For a Finnish study see Pohjola (2010), and for Swedish climate policy and forests see NIER (2021).

carbon tax is lower on peat than on other fossil fuels. Most recently, this has been motivated by concerns about energy security.

Finally, reducing carbon emissions in industrial processes and energy production is heavily dependent on technological development, especially hydrogen-based solutions, and large-scale electrification. The energy crisis has already shown the potential vulnerability of the Finnish economy to limited electricity supplies as imports from Russia have still to be replaced by electricity from the Olkiluoto nuclear plant, which is having problems in getting reliable generation online.

In addition, there are issues with other climate policy instruments and measures. In the transport sector, the use of biofuels and the blending quota may be questioned in future because of concerns related to declining biodiversity. Subsidies for purchases of electric vehicles and vehicle scrappage subsidies may be costly and benefit high-income households. To date, energy efficiency has been promoted by voluntary agreements. However, promoting efficiency should rely on price signals as the energy crisis has shown the potential for increased energy savings by companies and households.

## 5.7. Green transition

Ill-designed climate policy measures may increase the economic burden on the most vulnerable low-income households. Therefore, the EU emphasises a 'just green transition' in its climate policy as a mechanism to facilitate access to clean, affordable, and secure energy. Pricing carbon provides incentives to reduce emissions but also makes revenue recycling possible during the green transition. Moreover, energy security goals are not necessarily in conflict with climate policy. If there is scarcity, prices increase, providing incentives for fossil-free investments and electrification.

The green transition in Finland is driven by the goal of carbon neutrality by 2035 stipulated in the Climate Change Act. According to the Ministry of Finance (MoF 2022), state budget allocations related to the green transition have increased significantly in the 2019-2023 parliamentary term. As shown in Table 5.5.2, annual allocations for promoting carbon neutrality have varied from EUR 1.5 to 2.5 billion.

Table 5.5.2. Funding the green transition in the state budget.

| Carbon neutral Finland, million euros | 2019 | 2020 | 2021 | 2022 | 2023* |
|---|---|---|---|---|---|
| Carbon neutral Finland that protects biodiversity | 395 | 762 | 722 | 749 | 917 |
| Globally influential Finland | 245 | 314 | 371 | 388 | 392 |
| Dynamic and thriving Finland | 205 | 229 | 242 | 272 | 297 |
| Transport network development and maintenance | 132 | 543 | 314 | 455 | 269 |
| Agriculture | 531 | 571 | 586 | 680 | 569 |
| TOTAL | 1508 | 2419 | 2235 | 2544 | 2444 |

*Budget proposal; Source: MoF (2022).

The distribution of expenditure is based on the strategic goals of the government programme. Most of the allocations are based on discretionary measures taken. For example, half of the funding of the EU's Recovery and Resilience Plan (RRP), i.e. more than EUR 900 million, is allocated to expenses related to the green transition. There are allocations related to the economic stimulus implemented during the Covid-19 pandemic to promote the green transition of about EUR 400 million in 2020. This includes support for public transport of about EUR 100 million. The most recent allocations for the green transition relate to security of energy supply of about EUR 80 million for 2022-2023. (MoF 2022)

The annual amounts are considerable. However, the problem is that the measures are fragmented. More importantly, there is no indication of the degree to which carbon emissions will be reduced by these measures. In essence, the share of public funding for the green transition can be reduced by appropriate government regulation, taxation policy and a higher carbon price to make green investments profitable for the private sector. If governments avoid politically unpopular carbon pricing and instead subsidise expensive investments, the fiscal costs of decarbonisation will become unnecessarily high because of the less efficient approach chosen.

The Ministry of Finance states that it has used 'sustainable development budgeting' since 2018, in which the development of allocations promoting carbon neutrality is evaluated.[58] When designing policy measures and planning budget allocations, the costs of various measures for reducing carbon emissions should be assessed to ensure that climate policy is cost-

[58] However, the OECD (2021b) does not mention Finland as a country applying 'green budgeting' defined as 'using the tools of budgetary policymaking to help achieve environmental and climate goals'.

effective. Evaluation of the expenditures and investments needed for the green transition should be carried out systematically and regularly.[59]

Carbon pricing provides households, companies and procuring authorities incentives to reduce their carbon dioxide emissions. Recently, an additional climate policy regulation that adds extra climate considerations to public procurement has been introduced. The procurement regulation is not necessarily a cost-efficient measure and may distort carbon pricing policies. If such climate considerations are introduced, they should be aimed at emissions from sectors where the general climate policy is relatively weak. Public procurement can be important, however, in promoting low-emission technology. In practice, however, it is a policy instrument that is difficult to design optimally.[60]

Finland should take advantage of the economic opportunities of the green transition to promote technologies that put less of a burden on the environment. The transition to an environmentally sustainable economy requires large investments in infrastructure, where energy production and consumption, transport services and mobility will change fundamentally. The impact of green investment on growth is uncertain. However, investment in green technology can create economic growth opportunities if, for example, new products are exported globally.

Finnish green innovation and R&D policies are thoroughly discussed by Ollikka (2023) in his background report for the Economic Policy Council. Despite a decline in R&D expenditures (as a share of GDP), the number of green patent applications per capita in Finland has been one of the largest in the OECD countries. In particular, the share of patents related to wastewater treatment, waste management, and bioenergy is relatively large in Finland. This is partly due to historical reasons (Berg et al. 2020). Somewhat unexpectedly, after rapid growth, patenting in environment-related technologies has declined in the last 10 years in Finland, but to some extent in other OECD countries as well.[61]

According to Popp et al. (2020), this development, especially in energy-related technologies, may be driven by changes in electricity markets towards

[59] The Finnish Ministry of Finance Strategy on Climate and Nature is said to clarify the Ministry's role in the preparation of climate and nature policies and the related influencing activities.

[60] See NIER (2020).

[61] OECD Statistics: https://stats.oecd.org/

more decentralised and weather-dependent energy production. New energy technologies require different smart solutions, and energy technologies have become integrated with information technologies in recent years (Kangas et al. 2021). At the same time, companies developing new energy technologies are smaller than before, which can have a negative impact on their financial costs, among other things.

Implementing change requires not only new technology and production capacity, but also human and social capital. The scale of the change is large and the measures for the green transition must be cost-efficient. To reduce the bill for the public sector, private investment must be ensured by incentives through regulation, taxation, and carbon pricing. A just climate policy would entail compensating low-income households for rising carbon and energy prices and helping businesses and workers to move from high- to low-carbon intensity activities. Potential jobs created by the green transition also require different skills than the jobs of polluting technologies. Learning new skills and tasks requires investment in competence development. (See e.g., Chen et al. 2020, Vona et al. 2018)

In addition to investing in mitigation, measures and policies investing in climate *adaptation* should be pursued. Adaptation measures aim to adjust ecological, social, and economic systems to the physical risks associated with climate change. As the frequency of extreme weather events increases, their costs will become increasingly visible.[62] Relatively low-income households are most exposed to price increases due to mitigation policy, but they are also the most vulnerable to the impacts of climate change. For example, even in Finland during heatwaves mortality increases among the elderly and those who cannot protect themselves against temperature increases in their homes or workplaces. (Kollanus and Lanki 2021)

Finland's new adaptation plan lists a considerable number of measures that can be taken by the general government to improve administration and monitoring.[63] However, the plan lacks a framework for assessing the general economic impacts of adaptation as well as the impacts of adaptation measures

[62] There is an increasing amount of literature on the implications of climate change for GDP, see e.g. Newell et al (2021) and the references therein. Especially given the increased likelihood of tipping points, previous economic cost estimates may underestimate the real cost of climate change.
[63] VNS 15/2022 vp

on public finances. Insights from economics could be used in the design of adaptation policy as well (Carleton et al 2022, Watkiss and Preinfalk, 2022).

Finland has a more ambitious schedule for its climate-neutrality target than the European Union. Finland should therefore strive to ensure that the EU's emission targets are sufficiently ambitious. The design of climate policy measures - such as those proposed in 'Fit for 55' - should be cost-efficient and as simple and transparent as possible.

## 5.8. Council views

Climate change is a global problem. Unchecked, climate change will cause severe health effects, displacement of people and changes to ecosystems, changes in labour and agricultural productivity, and loss of capital assets. Despite the devastating impacts, decisions to tackle climate change globally have proved difficult in the UN negotiation processes. It seems unlikely that any level of common global carbon price could be agreed upon in the foreseeable future.

For a small open economy, international cooperation and coordination towards common policies and regulations is necessary. For Finland, the most important forum for international policymaking is the European Union (EU).

To fulfil its pledge to the Paris Agreement, the EU is tightening its climate policy. The 'Fit for 55' reform includes a reduced supply of emission allowances within the EU Emissions Trading System, the phasing-out of the free allocation of emission allowances, carbon dioxide tariffs on the import of certain goods, emissions trading for buildings and transport, reduced national emission quotas for Member States' Effort-Sharing-Regulation sectors and stricter requirements on net absorption of carbon dioxide in the land use sector.

Tightening of EU-wide climate policy will affect Finland. The cost of carbon dioxide emissions within the EU ETS and the land use sector are expected to increase. The economic impacts of carbon tariffs, the phasing-out of free allowances and other compensation (business) subsidies remain to be seen.

Finland aims to be carbon-neutral by 2035, which is more ambitious than the overall EU target. Finnish climate and energy strategies have been built on an expected increase in the supply of low-carbon electricity, which has not materialised at the projected pace. Moreover, declining carbon sinks are becoming a major concern for Finnish land use policy.

There is room for improvement in the design of Finnish climate policy.

Agri-environmental policy has not resulted in any reductions in greenhouse gases. Forestry and land use policy have contributed to collapsing carbon sinks.

In the transport sector, transport taxation should be reformed to improve incentives to reduce emissions and to accelerate the electrification of transport.

In the energy sector, infrastructure investments are needed for the power grid, transmission lines and electricity generation capacity. Incentives for private investments should be provided by carbon pricing, regulation, and taxation.

Patenting in environment-related technologies has declined in the last 10 years. Innovation policy should reverse the trend to fulfil the high expectations for Finnish low-carbon technology innovations.

Finally, public expenditures and investments in the green transition are reported to have been considerable in recent years, but ex-ante evaluations on emissions reductions are missing.

The fiscal impacts of mitigation policy are two-sided. The phasing-out free allowances will increase revenue but tax revenue from fossil fuels will decrease due to lower demand.

It is important that the social and economic impacts of carbon emissions are assessed. Even if evaluation of the damage caused by carbon emissions is difficult, estimates of the social cost of carbon (SCC) could be used to monetarise the damage from Finland's carbon emissions. The estimates should be used in cost-benefit analyses for the appropriate design of climate-policy measures.

Decarbonisation of the economy has distributional impacts that need to be addressed in policy. Low-income households are most vulnerable to increased energy and carbon prices due to mitigation policies. Decarbonisation policies could exacerbate energy insecurity. Popular policies to promote the adoption of clean energy technologies such as tax credits, subsidies and efficiency standards may be regressive. Subsidies should be targeted at lower-income households.

Sustainable development budgeting needs further development work, including rigorous impact assessments of Finnish climate policy, considerations of cost-efficiency and distributional impacts. The application of economics to adaptation planning and policy would be needed as well.

# References


Acemoglu, D., Akcigit, U., Hanley, D. & Kerr, W.K. (2016) Transition to Clean Technology. Special Issue on Climate Change and the Economy, *Journal of Political Economy* 124, 52–104.

Alasalmi, J. (2022) Selittävätkö alueellinen ja ammatillinen kohtaanto työmarkkinoiden kohtaannon heikentymistä? Työpoliittinen aikakauskirja, 4/2022.

Alesina, A., Favero, C. & Giavazzi, F. (2019) Effects of austerity: expenditure- and tax-based approaches, *Journal of Economic Perspectives* 33 (2), 141-162.

Alvarez, J, Bluedorn, J. Hansen, N.-J., Huang, Y., Pugacheva, E. & Sollaci, A. (2022) Wage-Price Spirals: What is the Historical Evidence? IMF Working Paper 22/221, International Monetary Fund, Washington, DC.

Andersen, T. (2012) Fiscal sustainability and fiscal policy targets. Economics Working Papers 2012-15, Department of Economics and Business, Aarhus University.

Arnold, J., Brys, B., Heady, C., Johansson, Å., Schwellnus, C., & Vartia, L. (2011) Tax Policy for Economic Recovery and Growth, *The Economic Journal* 121(550), F59–F80.

Beetsma, R., Furtuna, O., Giuliodori, M. & Mumtaz, H. 2021. Revenue- versus spending-based fiscal consolidation announcements: Multipliers and follow-up, *Journal of International Economics* 131, 103455.

Bénassy-Quéré, A., Coeré, B., Jacquet, P. & Pisani-Ferry, J. (2019) *Economic Policy – Theory & Practice*, 2nd edition, Oxford University Press.

Benz, U. & Fetzer, S. (2006) Indicators for Measuring Fiscal Sustainability: A Comparison of the OECD Method and Generational Accounting, FinanzArchiv / Public Finance Analysis 62(3), 367-391.

Berg, A., Lukkarinen, J., & Ollikka, K., (2020) 'Sticky' policies—Three country cases on long-term commitment and rooting of RE policy goals. *Energies* 13(6), 1351.

Bjørnland, H.C., Jensen, M. & L.A. Thorsrud (2022) Business cycle and NPI dynamics during the Covid-19 pandemic. A Scandinavian perspective, mimeo BI Norwegian Business School

Bolton, P., Despres, M., Pereira da Silva, L. A., Samama, F. & Svartzman, R. (2020) The green swan - Central banking and financial stability in the age of climate change, Bank for International Settlements.

Böhringer, C., Schneider, J. & Asane-Otoo, E. (2021) Trade in Carbon and Carbon Tariffs, *Environmental and Resource Economics* 78, 669-708.

Carleton, T., Jina, A., Delgado, M., Greenstone, M., Houser, T., Hsiang, S., Hultgren, A., Kopp, R.E., McCusker, K.E., Nath, I., Rising, J., Rode, A., Seo, H.K., Viaene, A., Yuan, J., Zhang, A.T. (2022) Valuing the Global Mortality Consequences of Climate Change Accounting for Adaptation Costs and Benefits, *The Quarterly Journal of Economics* 137(4), 2037-2105.

Clarke, S. (2023) Carbon Pricing in Finland, Background Report for the Economic Policy Council.

Danish Environmental Economic Council (2021), *Economy and Environment, 2021. Summary and Recommendations*.

Darvas, Z. & Wolff, G. (2021) A green fiscal pact: climate investment in times of budget consolidation, *Policy Contribution* 18/2021, Bruegel

Demekas, D.G. & Grippa, P. (2021) Financial Regulation, Climate Change, and the Transition to a Low-Carbon Economy: A Survey of the Issues, *IMF Working Paper* WP/21/296, Washington DC: International Monetary Fund.

de Silva, T. & Tenreyro, S. (2021) *Presidential Address 2021* Climate-Change Pledges, Actions, and Outcomes, *Journal of the European Economic Association* 19 (6), 2958–2991.

Douenne, T. (2022) Why do citizens and economists disagree on carbon taxation? *EAERE Magazine n. 16 Spring*, 28-31.

Dunz, N. & Power, S. (2021) Climate-Related Risks for Ministries of Finance: An Overview, The Coalition of Finance Ministers for Climate Action, A product of the Helsinki Principle 5 Workstream, May 2021.

Dynan, K. (2022) High inflation and fiscal policy. Peter G. Peterson Foundation. https://www.pgpf.org/expert-views/inflation-interest-and-the-national-debt/high-inflation-and-fiscal-policy

EPC (2019) Economic Policy Council Report 2018.

EPC (2020) Economic Policy Council Report 2019.

EPC (2021) Economic Policy Council Report 2020.

EPC (2022) Economic Policy Council Report 2021.

EFB (2022) Assessment of the fiscal stance appropriate for the euro area in 2023, 22/6/2022, European Fiscal Board.

Einiö, E. (2014) R&D subsidies and company performance: Evidence from geographic variation in government funding based on the ERDF population-density rule, *Review of Economics and Statistics* 96(4), 710-728.

European Commission (2022a), European Commission Autumn Forecast 2022.

European Commission (2022b) Communication on orientations for a reform of the EU economic governance framework. COM(2022) 583 final of 9 November 2022.

Finnish Climate Change Panel (2022a) Ilmastotoimien riittävyyden arviointi vuosien 2030 ja 2035 tavoitteiden osalta, Suomen ilmastopaneelin muistio.

Finnish Climate Change Panel (2022b) Asiantuntijalausunto VN/4507/2021 Maankäyttösektorin ilmastosuunnitelman valmistelutyöryhmän ehdotus (MISU) 18/5/2022.

Fiscal Sustainability Report 2021, European Economy, Volume 1, Institutional Paper 171, April 2022, European Commission, Directorate-General for Economic and Financial Affairs.

Fiscal Sustainability Report 2021 Volume 2 – Country Analysis Institutional Paper 171, April 2022, European Commission, Directorate-General for Economic and Financial Affairs.

Gaure, S. & Golombek, R. (2022) True or not true: CO2 free electricity generation is possible, *Energy* 259, 124998

Gillingham, K., Iskhakov, F., Munk-Nielsen, A., Rust, J. & Schjerning, B. (2022) Equilibrium Trade in Automobiles, *Journal of Political Economy* 130 (10), 2534-2593.

Gäddnäs, N. & Keränen, H. (2023) Beveridgean unemployment gap in Finland, Background Report for the Economic Policy Council.

Hale, T., Angrist, N., Goldszmidt, R. *et al.* (2021) A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker). *Nat Hum Behav* **5**, 529–538.

Hart, R. (2019) To Everything There Is a Season: Carbon Pricing, Research Subsidies, and the Transition to Fossil-Free Energy, *Journal of the Association of Environmental and Resource Economists* 6(2), 349-389.

Hawkins-Pierot, J.T. & Wagner, K.R.H. (2022) Technology Lock-In and Optimal Carbon Pricing, *CESifo Working Paper* No 9762.

Heal, G. & Park, J. (2016) Reflections—Temperature Stress and the Direct Impact of Climate Change: A Review of an Emerging Literature, *Review of Environmental Economics and Policy* 10, 347-362.

Honkatukia, J. (2021) Kansantalouden skenaariot. Hiilineutraali Suomi 2035 – ilmasto- ja energiapolitiikan toimet ja vaikutukset. Valtioneuvoston selvitys- ja tutkimustoiminnan julkaisusarja 65/2021.

IEA (2019) The future of Hydrogen, Seizing today's opportunities, International Energy Agency.

IMF (2022) IMF Fiscal Monitor, October 2022, International Monetary Fund.

IPCC (2022a) *Climate Change 2022: Impacts, Adaptation and Vulnerability*, Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. Cambridge University Press, Cambridge, UK and New York, NY, USA, 3056 pp., doi:10.1017/9781009325844.

IPCC (2022b) *Climate Change 2022: Mitigation of Climate Change*, Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926

Isotalo, E., Kyyrä, T., Lähdemäki, S., Pesola, H., Ravaska, T., Suhonen, T., & Villanen, J. (2022). Koronakriisin taloudellisten vaikutusten kohdentuminen, Valtioneuvoston selvitys- ja tutkimustoiminnan julkaisusarja 2022:56.

Jalasjoki, P. & Kivistö, J. (2022a) Long-term sustainability of the public finances, Bank of Finland Bulletin, Articles on the Economy 2/2/2022.

Jalasjoki, P. & Kivistö, J. (2022b) Suomen julkisen velan kestävyys ja julkisen talouden sopeutustarpeet, Euro ja talous 16/12/2022.

Joltreau, E. & Sommerfeld, K. (2019) Why does emissions trading under the EU Emissions Trading System (ETS) not affect firms' competitiveness? Empirical findings from the literature, *Climate Policy* 19(4), 453-471.

Joskow, P. L. (2021) Facilitating Transmission Expansion to Support Efficient Decarbonization of the Electricity Sector, *Economics of Energy & Environmental Policy* 10(2), 57-91.

Kahn, M.E., Mohaddes, K., Ng, R.N.C., Pesaran, M.C., Raissi, M., Yang, J.-C. (2021) Long-term macroeconomic effects of climate change: A cross-country analysis, *Energy Economics* 104

Kangas, H.L., Ollikka, K., Ahola, J., Kim, Y., (2021) Digitalisation in wind and solar power technologies. *Renewable and Sustainable Energy Reviews* 150, 111356.

Koljonen, T., Lehtilä, A., Honkatukia, J. & Markkanen, J. (2022) Pääministeri Sanna Marinin hallituksen ilmasto- ja energiapoliittisten toimien vaikutusarviot Hiilineutraali Suomi 2035 (HIISI) -jatkoselvitys. VTT Technology 402.

Kollanus, V. & Lanki, T. (2021) Helteen terveyshaitat ja niiden ehkäisy Suomessa [Heat-related health risks and prevention of adverse effects in

Finland]. Discussion Paper 14/2021 (online publication), Finnish institute for health and welfare (THL).

Kuusi, T., Björklund, M., Kaitila, V., Kokko, K., Lehmus, M., Mehling, M., Oikarinen, T., Pohjola, J., Soimakallio, S. & Wang, M. (2020) Carbon Border Adjustment Mechanisms and Their Economic Impact on Finland and the EU, Publications of the Government's analysis, assessment, and research activities 2020:48, Prime Minister's Office, Helsinki.

Kyyrä, T. & Pesola, H. (2020) Long-term effects of extended unemployment benefits for older workers, *Labour Economics* 62, 101777.

Känzig, D. (2022) The unequal economic consequences of carbon pricing, manuscript (job market paper)

Köppl, A. & Schratzenstaller, M. (2021) Effects of Environmental and Carbon Taxation, A Literature Review, *WIFO Working Papers* 619/2021.

Lehtilä, A., Koljonen, T., Laurikko J., Markkanen, J. & Vainio, T. (2021) Energiajärjestelmän ja kasvihuonekaasujen kehitykset. Hiilineutraali Suomi 2035 - ilmasto- ja energiapolitiikan toimet ja vaikutukset. Valtioneuvoston selvitys- ja tutkimustoiminnan julkaisusarja 67/2021.

Luke (2022) Suomen LULUCF-sektorin 2021–2025 velvoitteen toteutuminen, Memo 21/12/2022, Natural Resources Institute Finland.

Madeddu, S., Ueckerdt, F., Pehl, M., Peterseim, J., Lord, M., Ajith Kumar, K., Krüger, C. & Luderer, G. (2020) The $CO_2$ reduction potential for the European industry via direct electrification of heat supply (power-to-heat), *Environmental Research Letters* 15, 124004.

MEAE (2021) Koronakriisin aikaisten yritystukien arviointi, Työ- ja elinkeinoministeriön julkaisuja 2021:26, Ministry of Economic Affairs and Employment.

MEAE (2022a) Työ- ja elinkeinoministeriön lyhyen aikavälin työmarkkinaennuste, TEM-analyyseja 111/2022, Ministry of Economic Affairs and Employment.

MEAE (2022b) Työvoimatiekartat https://tem.fi/tyovoimatiekartat (accessed 3/10/2022), Ministry of Economic Affairs and Employment.

Metcalf, G.E. (2014) The Economics of Energy Security, *Annual Review of Resource Economics* 6(1), 155-174.

Metcalf, G.E. & Stock, J.H. (2020) Measuring the Macroeconomic Impact of Carbon Taxes, *AEA Papers and Proceedings* 110, 101-06.

Michaillat, P., & Saez, E. (2021) Beveridgean unemployment gap, *Journal of Public Economics Plus*, *2*, 100009.

MoE (2022) Keskipitkän aikavälin ilmastopolitiikan suunnitelma. Kohti hiilineutraalia yhteiskuntaa 2035. Ympäristöministeriön julkaisuja 2022:12, Ministry of the Environment.

Moessner, R. (2022) Effects of Carbon Pricing on Inflation, CESifo *Working Paper No. 9563.*

MoF (2020) Energiaverotuksen uudistamista selvittävän työryhmän raportti ehdotukseksi hallitusohjelman kirjausten ja tavoitteiden toteuttamisesta sekä energiaverotuksen muusta kehittämisestä, *Valtiovarainministeriön julkaisuja,* no. 2020:62, Ministry of Finance.

MoF (2021) Liikenteen verotuksen uudistamista selvittävän työryhmän loppuraportti 2021, *Valtiovarainministeriön julkaisuja*, 2021:26, Ministry of Finance.

MoF (2022) Vihreän siirtymän rahoitus valtion talousarviosta, Memo 14/9/2022, Ministry of Finance.

Nakamura, E., & Steinsson, J. (2018) Identification in Macroeconomics, *Journal of Economic Perspectives* 32, 59-86.

NAOF (2021) Koronaepidemian johdosta myönnetyt suorat yritystuet – Tukien kohdentuminen ja hallinnointi epidemian alkuvaiheessa, Valtion talouden tarkastusviraston tarkastuskertomukset 13/2021, National Audit Office of Finland.

Newell, R.G., Prest, B.C. & Sexton, S.E. (2021) The GDP-Temperature relationship: Implications for climate change damages*, Journal of Environmental Economics and Management* 108, 102445.

NGFS (2020) Climate Scenarios for Central Banks and Supervisors. Network for Greening the Financial System.

Nieminen, J., Kanninen, O. & Karhunen, H. (2021) Behavior and Effectiveness of Decentralized Employment Offices, Labore WP 332, 2021.

NIER (2020) Upphandling med klimathänsyn, Årlig rapport - Miljö, ekonomi och politik 2020, Konjunkturinstitutet, National Institute of Economic Research.

NIER (2021) Skogen, klimatet och Politiken, Årlig rapport - Miljö, ekonomi och politik 2021, Konjunkturinstitutet, National Institute of Economic Research.

Nivalainen, S., Ilmakunnas, I., & Laaksonen, M. (2023) Tutkimuksia vanhuus- ja työkyvyttömyyseläkkeelle siirtymisen muutoksista vuoden 2017 eläkeuudistuksen jälkeen, Eläketurvakeskuksen tutkimuksia 01/2023 (online publication), Finnish Centre for Pensions.

Nordhaus, W. (2019) Climate Change: The Ultimate Challenge for Economics, *American Economic Review* 109(6), 1991–2014.

OECD (2021a) Managing Climate Risks, Facing up to Losses and Damages, OECD Publishing, Paris.

OECD (2021b) Green Budgeting in OECD Countries, OECD Publishing, Paris

OECD (2022) OECD Economic Outlook, Volume 2022 Issue 1.

Ollikainen, M. (2022) Presentation at the EPC meeting, April 28, 2022.

Ollikka, K. (2023) Green innovations, Background Report for the Finnish Economic Policy Council.

Park, R. J., Goodman, J., Hurwitz, M., Smith, J. (2020) Heat and Learning, *American Economic Journal: Economic Policy* 12 (2), 306-39.

Parry, I. & Wingender, P. (2021) Fiscal Policies for Achieving Finland's Emission Neutrality Target, *IMF Working Paper* WP/21/171, Washington DC: International Monetary Fund.

Parry, I., Black, S. & Vernon, N. (2021) Still Not Getting Energy Prices Right: A Global and Country Update of Fossil Fuel Subsidies, *IMF Working Paper* WP/21/236, Washington DC: International Monetary Fund.

Pizer, W. A. & Sexton, S. (2019) The Distributional Impacts of Energy Taxes, *Review of Environmental Economics and Policy* 13 (1), 104-123.

Pohjola, J. (2010) Carbon Sinks in Mitigating Climate Change: Evaluation with Models of Varying Scope, Acta Universitatis Oeconomicae Helsingiensis A-362, Aalto University School of Economics.

Popp, D., Pless, J., Haščič, I., & Johnstone, N., (2020) Innovation and entrepreneurship in the energy sector, National Bureau of Economic Research, NBER Working Paper 27145.

Puonti, P. (2022) EU's Fiscal Framework – identified shortcomings and proposed remedies, Background report for the Finnish Economic Policy Council.

Ramey, V. A. (2019) Ten years after the financial crisis: What have we learned from the renaissance in fiscal research? *Journal of Economic Perspectives* 33(2), 89-114.

Rennert, K., Errickson, F., Prest, B.C., Rennels, L., Newell, R.G., Pizer, W., Kingdon, C., Wingenroth, J., Cooke, R., Parthum, B., Smith, D., Cromar, K., Diaz, D., Moore, F.C., Muller, U.K., Plevin, R.J., Raftery, A.E., Servcikova, H., Sheets, H., Stock, J.H., Tan, T., Watson, M., Wong, T.E., & Anthoff, D. (2022) Comprehensive evidence implies a higher social cost of CO2, *Nature* 610, 27 October 2022, 687-692.

Rozenberg, J., Vogt-Schilb, A., Hallegatte, S. (2020) Instrument choice and stranded assets in the transition to clean capital, *Journal of Environmental Economics and Management* 100, 102183.

Şahin, A., Song, J., Topa, G., & Violante, G. L. (2014) Mismatch unemployment. *American Economic Review*, 104(11), 3529-64.

Saxell, T., Toikka, M., Toivanen, O. & Valkonen, A. (2022) Sota Ukrainassa: Vaikutus Venäjän-kauppaa käyneisiin suomalaisyrityksiin, Datahuone-raportti 1/2022, VATT Institute for Economic Research.

Sen, S. & von Schickfus, M.-T. (2020) Climate policy, stranded assets, and investors' expectations, *Journal of Environmental Economics and Management* 100, 102277.

Seuri, A. (2020) Fiscal effects of employment growth, Background Memo for Economic Policy Council 29/1/2020.

Seuri, A., Uusitalo, R., & Virtanen, H. (2018) Pitäisikö oppivelvollisuusikä nostaa 18 vuoteen? Background report for the Economic Policy Council 17/1/2018.

Sgaravatti, G., Tagliapietra,S. & Zachmann, G. (2021) National policies to shield consumers from rising energy prices', Bruegel Datasets, first published 4 November 2021, available at https://www.bruegel.org/dataset/national-policies-shield-consumers-rising-energy-prices

Shapiro, J.S. (2021) The Environmental Bias of Trade Policy, *The Quarterly Journal of Economics* 136 (2), 831–886.

Statistics Finland (2022) An exceptional revision in the financial accounts statistics. An exceptional revision in the financial accounts statistics in the releases of 28 June 2022. The reason is the methodological change made to the treatment of ARA interest subsidy loans. - Statistics Finland

Steffen, W., Rockström, J., Richardson, K., Lenton, T.M., Folke, C., Liverman, D., Summerhayes, C.P. et al. (2018) Trajectories of the Earth System in the Anthropocene, *Proceedings of the National Academy of Sciences of the United States of America* 115 (33), 8252–59.

Stern, N. (2007) *The Economics of Climate Change: The Stern Review*. Cambridge and New York: Cambridge University Press.

Stern-Stiglitz High-Level Commission on Carbon Prices (2017) *Report of the High-Level Commission on Carbon Prices*, Washington, DC: World Bank. License: Creative Commons Attribution CC BY 3.0 IGO.

SWD (2021) 601 final, Commission Staff Working Document, Impact Assessment Report, Effective 2020 carbon price by EU Member States .

Søndergaard Møller et al. (2022). The Nordics during the first phases of COVID-19. Statistical Agencies of Denmark, Finland, Iceland, Norway, and Sweden.
https://stat.fi/static/media/uploads/ajk/uutiset/2022/the nordics and covid-19.pdf

The 2021 Ageing Report: Economic and Budgetary Projections for the EU Member States (2019-2070) Institutional Paper 148. May 2021. Brussels.

Tol, R.S.J. (2018) The Economic Impacts of Climate Change, *Review of Environmental Economics and Policy* 12 (1), 4-25.

Vandyck, T., Weitzel, M., Wojtowicz, K., Los santos, L.R., Maftei, A., Riscado, S. (2021) Cimate policy design, competitiveness, and income distribution: A macro-micro assessment for 11 EU countries, *Energy Economics* 103, 105538.

VATT (2022) Suurituloisimmat kotitaloudet käyttävät monikertaisesti enemmän sähköä kuin pienituloiset, Dataroom 17/12/2022, VATT Institute for Economic Research. https://vatt.fi/-/datahuone-suurituloisimmat-kotitaloudet-kayttavat-moninkertaisesti-enemman-sahkoa-kuin-pienituloiset

Veistämö, T. (2022) Konkurssiaaltoa ei tullut, mutta lopettaneiden yritysten määrä kasvoi korona-aikana yli kymmenellä tuhannella, Tieto & Trendit 28/6/2022.

Verde, S.F. (2020) The Impact of the EU Emissions Trading System on Competitiveness and Carbon Leakage: The Econometric Evidence, *Journal of Economic Surveys* 34, 320-343.

Watkiss, P. & Preinfalk, E. (2022) The economics of climate adaptation in the EU: new evidence from recent research, *EAERE Magazine n. 16 Spring*, 18-25.

Yang, W., Fidrmuc, J. & Ghosh, S. (2015) Macroeconomic effects of fiscal adjustment: A tale of two approaches, *Journal of International Money and Finance* 57, 31-60.