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Foreword

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

The economic situation and policies of Finland were reviewed by the Committee on 2 November 2022. The draft report was then revised in light of the discussions and given final approval as the agreed report of the whole Committee on 6 December 2022.

The Secretariat's draft report was prepared for the Committee by David Carey and Naomitsu Yashiro, with contributions from Axel Purwin, under the supervision of Vincent Koen. Research assistance was provided by Axel Purwin, editorial support by Michelle Ortiz, Karimatou Diallo and Gemma Martinez and communication assistance by Nathalie Bienvenu. The thematic chapter, Rebooting the Innovation Ecosystems, was authored by Naomitsu Yashiro.

The previous Survey of Finland was issued in December 2020.

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

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Glossary of acronyms

FDI	Foreign direct investment
CAP	Common agriculture policy
CCP	Climate Change Panel
CCyB	Countercyclical Capital Buffer
DLI	Designated learning institution
DSTI	Debt-service-to income
ECB	European Central Bank
ECEC	Early childhood education and care
EPO	European Patent Office
ETS	Emissions trading scheme
EV	Electric vehicle
FATF	Financial Action Task Force
FCCA	Finnish Competition and Consumer Authority
FIN-FSA	Finnish Financial Supervisory Authority
GHG	Greenhouse gas
HICP	Harmonised index of consumer prices
HTS	Germany's High Tech Strategy
ICT	Information and communications technology
ICU	Intensive care-unit
LNG	Liquefied natural gas
LTI	Loan-to-income
LTV	Loan-to-value
MNE	Multinational enterprise
MOIPs	Mission-oriented innovation policies
MTO	Medium-term objective
NFCs	Non-financial corporations
NPL	Non-performing loan
O-SII	Other systematically important
PAYG	Pay-as-you-go
PGWP	Post-graduation work permit
PPP	Purchasing power parity
R&D	Research and development
RIC	Research and innovation council
RRF	Recovery and Resilience Facility
RRP	Recovery and Resilience Plan
STEM	Science, technology, engineering and mathematics
SyRB	Systematic risk buffer
UAS	Universities of applied sciences
VET	Vocational education and training
VTT	Technical Research Centre of Finland

Basic statistics of Finland, 2021

Numbers in parentheses refer to the OECD average1

LAND, PEOPLE AND ELECTORAL CYCLE					
Population (million)	5.5		Population density per km²	18.2	(38.7)
Under 15 (%)	15.6	(17.6)	Life expectancy at birth (years, 2020)	82.1	(79.7)
Over 65 (%)	23.0	(17.7)	Men (2020)	79.4	(77.0)
International migrant stock (% of population, 2019)	6.9	(13.2)	Women (2020)	85.0	(82.5)
Latest 5-year average growth (%)	0.2	(0.5)	Latest general election	April 2019	
ECONOMY					
Gross domestic product (GDP)			Value added shares (%)		
In current prices (billion USD)	297.4		Agriculture, forestry and fishing	2.7	(2.6)
In current prices (billion EUR)	251.4		Industry including construction	28.6	(27.7)
Latest 5-year average real growth (%)	1.2	(1.5)	Services	68.7	(69.7)
Per capita (000 USD PPP)	54.7	(50.7)			
GENERAL GOVERNMENT (Per cent of GDP)					
Expenditure (OECD: 2020)	55.5	(48.4)	Gross financial debt (OECD: 2020)	85.0	(129.8)
Revenue (OECD: 2020)	52.8	(38.1)	Net financial debt (OECD: 2020)	-72.4	(81.1)
EXTERNAL ACCOUNTS					
Exchange rate (EUR per USD)	0.85		Main exports (% of total merchandise exports)		
PPP exchange rate (USA = 1)	0.83		Machinery and transport equipment	31.3	
In per cent of GDP			Manufactured goods	24.9	
Exports of goods and services	39.4	(29.7)	Crude materials, inedible, except fuels	11.7	
Imports of goods and services	39.2	(29.8)	Main imports (% of total merchandise imports)		
Current account balance	0.6	(0.1)	Machinery and transport equipment	32.4	
Net international investment position	-1.4		Manufactured goods	11.8	
			Mineral fuels, lubricants and related materials	11.7	
LABOUR MARKET, SKILLS AND INNOVATION					
Employment rate (aged 15 and over, %)	55.8	(56.2)	Unemployment rate, LFS (aged 15 and over, %)	7.6	(6.1)
Men	59.1	(64.1)	Youth (aged 15-24, %)	16.7	(12.8)
Women	52.7	(48.7)	Long-term unemployed (1 year and over, %)	1.7	(2.0)
Participation rate (aged 15 and over, %)	67.5	(60.3)	Tertiary educational attainment (aged 25-64, %)	42.3	(39.9)
Average hours worked per year	1,518	(1,716)	Gross domestic expenditure on R&D (% of GDP, 2020)	2.9	(3.0)
ENVIRONMENT					
Total primary energy supply per capita (toe)	6.0	(3.8)	CO_2 emissions from fuel combustion per capita (tonnes, 2019)	7.5	(8.3)
Renewables (%)	38.8	(11.6)	Water abstractions per capita (1 000 m³, 2014)	1.2	
Exposure to air pollution (more than 10 µg/m³ of PM 2.5, % of population, 2019)	0.0	(61.7)	Municipal waste per capita (tonnes, 2020)	0.6	(0.5)
SOCIETY					
Income inequality (Gini coefficient, 2020, OECD: latest available)	0.265	(0.315)	Education outcomes (PISA score, 2018)		
Relative poverty rate (%, 2020, OECD: 2018)	5.7	(11.7)	Reading	520	(486)
Median disposable household income (000 USD PPP, 2020, OECD: 2018)	29.8	(25.5)	Mathematics	507	(488)
Public and private spending (% of GDP)			Science	522	(487)
Health care (2020)	9.5	(9.7)	Share of women in parliament (%)	46.0	(32.4)
Pensions (2017)	13.4	(8.6)	Net official development assistance (% of GNI, 2017)	0.4	(0.4)
Education (% of GNI, 2020)	5.8	(4.4)			

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

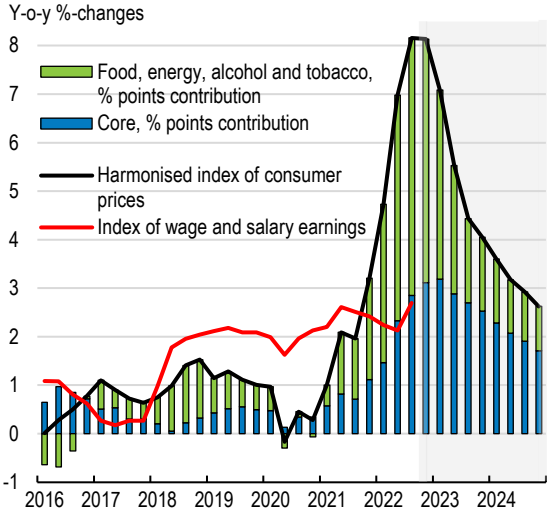
Executive summary

The economy recovered from the COVID-19 shock but now faces deteriorating global conditions

Finland recovered rapidly from the COVID-19 shock but growth stalled following Russia's war of aggression against Ukraine. Soaring inflation has reduced household disposable income in Finland and its trading partners, slowing the economy. Finland has been able to replace most of the lost Russian energy supplies.

Output had returned to the pre-COVID-19 level by the second quarter of 2021 and the output gap to the pre-pandemic level by the first quarter of 2022. A new upsurge in serious COVID-19 cases had only minor economic effects and receded quickly.

Figure 1. Inflation has soared



Source: Statistics Finland; OECD (2022) Economic Outlook (database).

StatLink https://stat.link/lf9u5h

Following Finland's application in May 2022 to join NATO, Russia terminated gas and electricity exports to Finland. While most gas was imported from Russia, gas only represents 5% of total energy consumption and plans are advanced for sourcing most of it elsewhere, in LNG form. Nevertheless, replacing gas in industrial uses is proving more difficult. The new nuclear power plant will supply 14% of Finland's electricity when it reaches normal production this winter, more than compensating for lost Russian electricity imports.

Russia's war of aggression against Ukraine accentuated increases in energy prices that began in late 2021, pushing up inflation to 8.2% by the third quarter both directly and indirectly as higher energy and food prices fed into core inflation (Figure 1). Wage increases have lagged far behind inflation, reducing household real disposable income and portending future weakness in private consumption expenditure.

Finland enjoyed a strong labour market recovery from the COVID-19 shock until the second quarter of 2022. The employment and unemployment rates regained pre-pandemic levels by mid-2021 and early 2022, respectively, and have now posted their best performances since 1987 and 2008, respectively. Labour market tightness has increased markedly and the job vacancy rate is now higher for any given unemployment rate than in the past. Given the fast recovery and rapid increase in employment, part of the mismatch may be temporary, reflecting rigidities in filling jobs. Nevertheless, shortages in non-cyclical professions, such as healthcare and long-term care, are the most pronounced and are likely to persist. Reducing such mismatches requires training of workers and/or relaxation of skill requirements in jobs as well as stronger incentives for workers, unions and firms to compromise to improve match acceptance rates.

To rein in inflation, the European Central Bank has begun tightening monetary policy and is expected to continue doing so through 2023. Fiscal policy in Finland became expansionary in 2022 largely owing to expenditures related to Russia's war in Ukraine and will be again in 2023 but will be neutral in 2024.

The economy will stall in 2023 but growth will recover to 1.1% in 2024. Consumption will weaken in response to falling real wages but subsequently recover as wages rise. Export growth will decline with export markets, which are being hit by the reduction in gas supplies from Russia, but will pick up as alternative energy sources are found. Business investment will remain weak through 2023 owing to the economic downturn and more uncertain economic outlook caused by Russia's war in Ukraine but strengthen in 2024 as the global outlook improves. The unemployment rate should peak at around 8% and only fall slightly by end-2024. Inflation will fall to 3.1% in 2024, when the energy shock will have passed.

The downturn would be deeper if Russia were soon to cut off gas supplies to more EU countries, thereby preventing the rebuilding of gas stocks during summer 2023. Another downside risk is that tightening global

financial conditions could affect the housing market and consumption and investment more than foreseen.

Table 1. Economic growth will slow

(Annual growth rates, %, unless specified)

	2021	2022	2023	2024
Gross domestic product	3.0	2.2	-0.3	1.1
Private consumption	3.7	2.3	-0.6	1.4
Gross fixed capital formation	1.5	3.0	-0.7	0.2
Exports	5.4	-0.5	1.9	3.1
Imports	6.0	9.0	1.2	2.3
Unemployment rate (%)	7.6	7.0	7.9	7.8
Harmonised index of consumer prices	2.1	7.0	5.3	3.1
Current account balance (% of GDP)	0.6	-2.6	-2.2	-1.9
Government fiscal balance (% of GDP)	-2.7	-2.5	-3.9	-3.6
Government gross debt (% of GDP)	85.0	84.9	87.2	88.8

Source: OECD (2022), Economic Outlook (database).

Macroprudential policies are strengthening financial stability

Finnish financial institutions' greatest vulnerability is too high household debt. The authorities have taken steps to limit the risk it poses to financial institutions but more needs to be done. Exposures to Russia are minor.

Household debt is 150% of disposable income, mostly for housing loans. Households are vulnerable to rising housing loan interest rates as they are typically revised annually.

To curb rising household indebtedness, the Board of the Finnish Financial Supervisory Authority (FIN-FSA) has returned loan-to-value restrictions to the pre-pandemic level and issued a recommendation on a debt servicing-to-income limit for mortgage lending. The Government has put forward a proposal to limit the maximum maturity of housing loans and housing company loans to 30 years, reduce the maximum amount housing companies can borrow for new construction and require amortisation of such loans to begin during the first five years. However, it has not given the FIN-FSA power to impose debt-servicing-to-income restrictions, out of concern about the effects on first-home buyers.

Fiscal consolidation is needed to stabilise debt

On current policies, the structural budget balance would need to rise by 2.5% of GDP for the debt-to-GDP ratio to stabilise. Age-related expenditures are projected to rise by 4.5% of GDP by 2070, driven by health and long-term care. Pension- and labour market reforms limit the projected increase in pension expenditures.

The government is committed to reducing the structural budget deficit mainly by increasing employment. The Ministry of Finance estimates that the employment measures taken to date or at an advanced stage could increase employment by 40 000 and reduce the structural deficit by 0.2% of GDP, far short of what is needed to stabilise the debt-to-GDP ratio. Closing the unemployment tunnel route to early retirement makes a large contribution to these gains but there is a risk of leakages into the disability benefit route.

On unchanged policies, the OECD projects that gross general government debt as a share of GDP will increase from 72% in 2021 to 131% in 2070. Reform fostering work-based immigration and improvements in the innovation system could limit the increase, with debt rising less, to 114% of GDP.

The health- and social-care reform, which transfers responsibilities for the delivery of health and social services from municipalities to counties, is expected to yield improvements in efficiency and slow growth in health and long-term care costs in the long run. However, there is a risk that the steering and financing model does not lead to more efficient outcomes as the new organisations have weak incentives to implement measures that would lead to efficiency gains.

Regular, comprehensive expenditure reviews, as in the Netherlands, could help to identify consolidation measures. In this context, there may well be scope to reduce aid and tax expenditures to companies that do not boost long-term productivity and to replace reduced VAT rates by more targeted measures.

Reforms to strengthen innovation would increase productivity growth

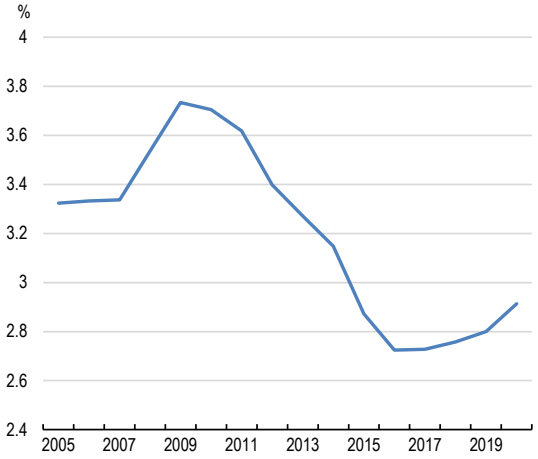
Productivity slowed down considerably during the 2010s, due to weaker innovation, less efficient resource allocation and less capital deepening. Additional reforms are needed to reboot the innovation ecosystems and strengthen productivity growth.

The government aims to boost Finland's gross domestic R&D spending to 4% of GDP by 2030 (Figure 2) and will introduce legislation that authorises an increase in government R&D spending to 1.2% of GDP by 2030. The revamped innovation support should continue to provide ample support to

basic research while directing applied research toward solving the most pressing socio-economic challenges through a mission-oriented innovation policy framework. At present, innovation support lacks clear orientation and is spread across numerous measures. Coordination of innovation activities between public and private sectors as well as among various innovation actors has weakened, holding back more effective innovation collaborations between firms, higher education institutions and research institutions.

Figure 2. Spending on innovation weakened during the 2010s

Gross domestic R&D spending, % of GDP



Source: OECD, Main Science and Technology Indicators (database).

StatLink https://stat.link/xk0bfl

The government will introduce a new R&D tax allowance to stimulate stronger business-based R&D spending. Finland's previous R&D tax incentives have not been taken up by many firms due to the narrow scope of eligible activities. They were also not well targeted to smaller firms that respond most to tax incentives.

Despite a favourable business environment, more can be done to enhance investment and improve resource allocation. For instance, stringent employment protection and wide coverage of collective wage agreements with limited opt-outs discourage innovative firms from scaling up by hiring more people and investing.

Severe skills shortages are a major bottleneck to more intensive investment and innovation activities. The government has implemented a university admission reform to improve the allocation of university places and accelerate the transition to tertiary education but has neither increased flexibility by field of study to address acute skills shortages nor committed to funding the increase in places needed to achieve its tertiary education attainment target.

Reforms are needed to reduce greenhouse gas emissions efficiently

Finland is broadly on track to meet its gross greenhouse gas abatement targets for 2030 and 2035 but not the forestry and other land-use targets. There is scope to increase the efficiency of abatement measures.

The marginal abatement cost of the national biofuel mandate, which contributes to meeting the EU effort-sharing target, is estimated to be EUR 500 per tonne of CO_2-eq. and the annual cost of the mandate to the national economy to be EUR 1.1 billion, rising to EUR 1.5 billion by 2030. The carbon price used to calculate carbon tax rates on heating fuels is lower than for transport fuels and peat is subject to a lower tax rate for heat production than other fossil fuels. Abatement costs could be reduced by eliminating these tax differences. Measures to reduce car dependency in cities, such as improving public transport in the capital region, and to support the diffusion of low-carbon vehicles in other localities would also contribute to cost-efficient abatement

Net emissions from the forestry and other land-use sector need to fall from 2 Mt CO_2-eq. currently to minus 17 Mt CO_2-eq. in 2030 and minus 21 Mt CO_2-eq. in 2035 to meet Finland's share of the EU target for this sector and the net zero target stipulated in the Climate Change Act, respectively. There is considerable scope to increase this sector's net sink role by reducing emissions from peatland cultivation (8Mt CO_2-eq.). This could be done by creating instruments to guide the cultivation of peatlands towards paludiculture (*i.e.,* cultivation of wetted peatlands), as in Sweden, or allowing these lands to revert to a wooded state. Subjecting forestry to carbon pricing, as in New Zealand where the sector is included in the New Zealand Emissions Trading Scheme, would also help to increase the forestry and other land-use net sink.

MAIN FINDINGS	KEY RECOMMENDATIONS
Ensuring fiscal sustainability and financial stability	
The fiscal stance became expansionary in 2022 largely owing to Russia's war against Ukraine and will be again in 2023 but will be neutral in 2024. Increases in energy and food prices have put pressure on budgets of households not receiving social-security benefits, which are indexed to inflation.	Provide targeted assistance to vulnerable households not deriving their income from social-security benefits while ensuring that the structural budget position does not deteriorate unless the outlook materially worsens.
The Ministry of Finance estimates that the fiscal sustainability gap and the structural budget deficit in 2026 will be 3.0% and 2.4% of potential GDP, respectively. Fiscal buffers to cope flexibly with adverse shocks are diminished. Almost half of state aid to companies does not directly promote productivity.	Implement consolidation measures to achieve Finland's medium-term structural budget deficit objective (0.5% of GDP) by the end of the decade. Undertake a comprehensive spending review to identify consolidation measures and make such reviews regular. Reduce state aid to companies that does not enhance productivity.
The healthcare and social-care reform is expected to reduce growth in expenditures in the long run and to deliver better services across the country. There is a risk, however, that incentives are too weak for the new counties to increase efficiency.	Monitor the healthcare and social-care reform and strengthen incentives to increase efficiency if they prove to be too weak.
Interest rates on most housing loans are revised annually. Highly indebted households may have difficulty servicing debts when interest rates rise to more normal levels.	Empower the Board of the Finnish Financial Supervisory Authority (FIN-FSA) to impose debt-service-to-income limits on mortgage lending.
Boosting productivity and innovation and increasing employment	
The government will introduce an R&D tax incentive with an upper limit, making it insignificant for large companies.	When sufficient data are available, evaluate the effects of the R&D tax incentive and adjust it accordingly.
Chronic shortages of study places in higher education institutions are resulting in high rejection rates and low tertiary educational attainment among young adults. These in turn contribute importantly to the severe skills shortage that constrains innovation.	Commit to a credible plan to increase study places in universities and universities of applied sciences and funding for additional study places while enhancing flexibility in the allocation of study places across study fields to address structural skills shortages.
The employment rate of migrants with high educational attainment is low. The employment and career prospects of foreign highly skilled workers in Finland are worse than in many other OECD countries.	Promote the recognition of qualifications held by foreign skilled workers and provide effective training to fill the gap between their qualifications and the skills required at their workplace.
Firms that are not members of the employer association that negotiated the sectoral wage agreement are by law forbidden from using the enterprise-bargaining flexibility clauses. This weighs on the productivity and profits of these mostly small firms.	To support employment and productivity, high-level agreements should set broad framework conditions in wage bargaining but allow for more flexibility in all firm-level contracts.
To realise the employment potential of phasing out extended unemployment benefit (the unemployment tunnel to early retirement), it will be important to limit early retirement leakage into disability benefit.	No longer take non-medical factors for the award of disability benefits into consideration for applicants aged 60 or over, as for other applicants.
The generous homecare allowance discourages work by mothers with young children. Long absences from the labour force negatively affect their career prospects and earnings mobility.	Reduce the homecare allowance to increase incentives for mothers of young children to work.
Reducing greenhouse gas emissions efficiently	
The marginal abatement cost of the national renewable fuel blending (i.e., biofuel) distribution mandate is high (EUR 500 per tonne of CO_2 eq.). The carbon price used to calculate carbon tax rates on heating fuels is lower than for transport fuels, increasing abatement costs.	Reduce the share of biofuels mandated to the minimum level required by the European Union. To compensate, align the carbon price used to calculate carbon tax rates on heating fuels with that used for transport fuels and, if necessary, increase this carbon price. Alleviate the burden of the energy transition on vulnerable households not compensated by social benefit indexation.
Heat production is subject to a much lower tax rate when using peat than when using other fossil fuels. Carbon emissions from peat-fired power plants are greater than from coal-fired power plants.	Subject heat production using peat to the same tax regime as for other fossil fuels. Announce a clear phase-out date for peat extraction to provide certainty for stakeholders.
The marginal abatement cost of electric vehicles is elevated (almost EUR 300 per tonne of CO_2 eq.), albeit declining quickly. Car dependency in cities remains high.	Strengthen policies to reverse car dependency in cities, including enhanced provision of public transport in the capital region, while focusing funding for low-carbon private cars in other localities.
Further measures are needed to increase the forestry and other land use net sink to meet Finland's share of the 2030 EU target for this sector and to achieve the net zero emissions target by 2035.	Create instruments to guide the cultivation of peatlands towards paludiculture (i.e., cultivation of wetted peatlands). Subject forestry to carbon pricing.

1 Key policy insights

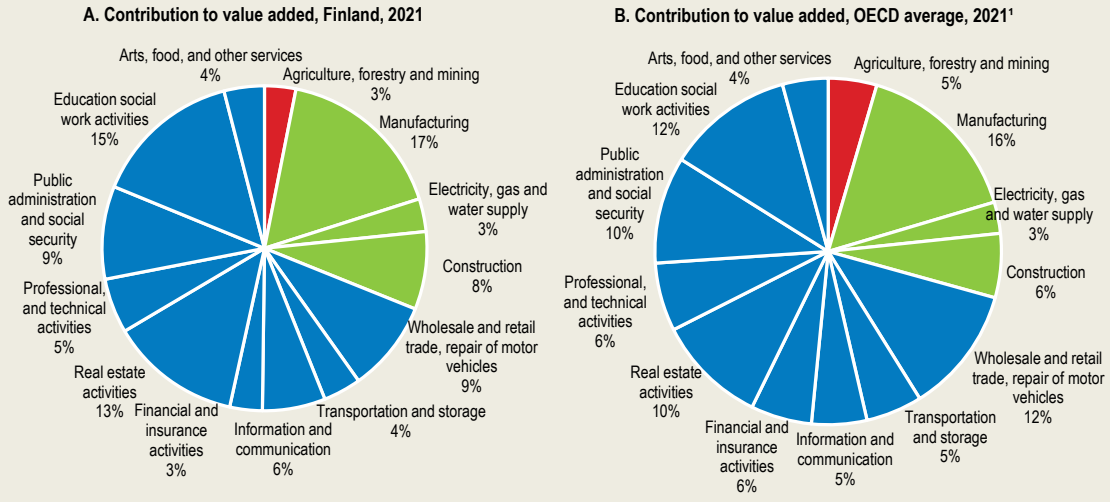
The Finnish economy recovered rapidly from the pandemic but now faces deteriorating global conditions, especially since Russia's war of aggression against Ukraine. Inflation has soared, reducing disposable incomes, exports have weakened and the investment environment has become less favourable. Finland is well placed to cope with the loss of energy supplies from Russia, although replacing gas in industrial uses with other energy sources will take time. Monetary conditions are becoming less accommodative and the structural budget deficit has increased, mainly owing to expenditures related to the Russia's war against Ukraine. Fiscal consolidation is required to meet Finland's medium-term objective and to stabilise the debt-to-GDP ratio over the longer run. To close the gap in living standards with the other Nordics, reforms are needed to boost productivity growth, especially to strengthen innovation, and to raise the employment rate. Finland is on track to meet its gross greenhouse gas emissions abatement objectives, but not the forestry and other land-use sink targets needed to meet the 2030 EU effort-sharing target for this sector and the 2035 net zero emissions target stipulated in the Climate Change Act. There is considerable scope to increase the efficiency of greenhouse gas emissions abatement measures.

Finland had recovered from the COVID-19 shock by the second quarter of 2021 and was enjoying solid economic growth before Russia's war of aggression against Ukraine. However, rising energy prices from late 2021 as the global recovery from the COVID shock gathered pace began to weigh on the recovery in Finland and other energy importers. Russia's war against Ukraine caused energy and other commodity prices to soar, slowing the economies in Finland and its main trading partners (Box 1.1). Finland has taken a greater hit from shrinking exports to Russia than most other EU countries, despite such exports having already fallen to a small share of total exports before the war began, following years of sanctions since Russia annexed Crimea in 2014. Output is expected to remain well below its potential level in 2024.

Box 1.1. Key features of the Finnish economy

Finland has a small population (5.5 million) but a land mass (338 000 square kilometres) that is almost as big as Germany's. It shares a 1 340-kilometre land border with Russia. Services account for 70% of value added, close to the OECD average (Figure 1.1). The largest service sectors are education and social work activities, real estate activities and wholesale and retail trade. In manufacturing, which accounts for the same share of value added as the OECD average, the largest sectors are wood and paper products, and manufacture of computer, electronic and optical products. Finland's largest categories of exports are machinery and electrical equipment, and steel, iron and other basic manufactures (Figure 1.2, Panel A). Finland is highly dependent on European export markets – almost two-thirds of exports are to EU countries, with the largest shares going to Sweden and Germany (Figure 1.2, Panel B). Russia only accounts for a small share of Finnish exports. The export ratio (38%) in Finland is lower than in the other Nordics and similar-sized European countries (Figure 1.3), partly reflecting trade sanctions on Russia and low inward foreign direct investment (OECD, 2017). Finland is well integrated in global value chains in terms of the use of imported inputs in its exports (Figure 1.4, Panel A), but not so much as a provider of inputs to other countries' production to meet final demand (Figure 1.4, Panel B), which may be an advantage in the short run even though it holds back productivity in the long run.

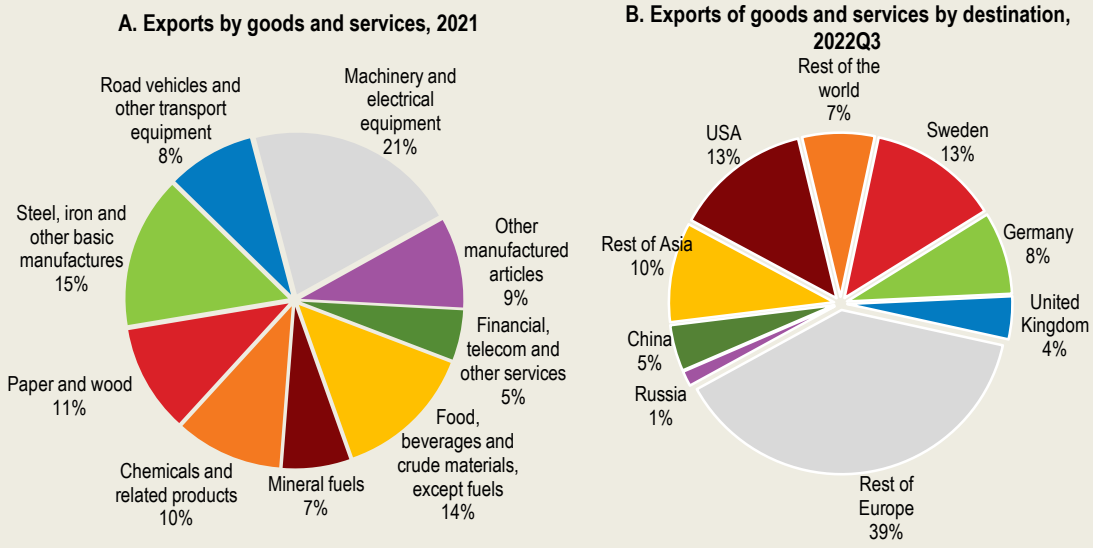
Figure 1.1. The structure of the Finnish economy is similar to the OECD average



1. 2020 data for Canada, Chile, Iceland, Japan, Korea, Lithuania, Mexico, Netherlands, New Zealand, Poland, Portugal, Spain, Sweden, Switzerland and United Kingdom.
Note: Shares may not add up to 100% owing to rounding. Service sectors are shown in blue.
Source: OECD (2022), *National Accounts* (database).

StatLink https://stat.link/v5e3dk

Figure 1.2. The largest export categories are machinery and basic manufactures and EU countries the largest export markets



Source: Finnish Customs; and Statistics Finland.

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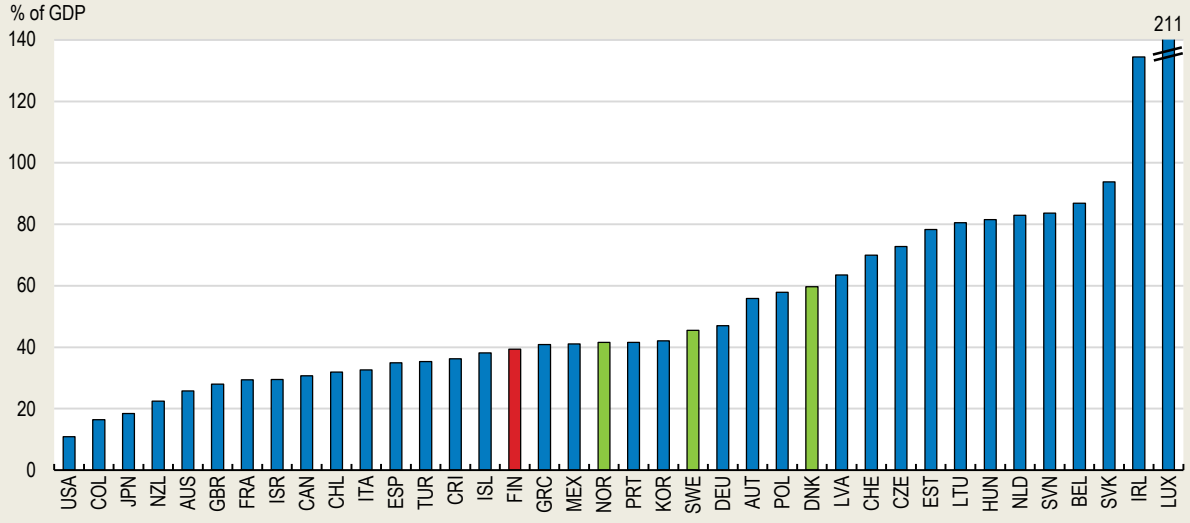
Figure 1.3. Finland's export intensity is low for a small EU country

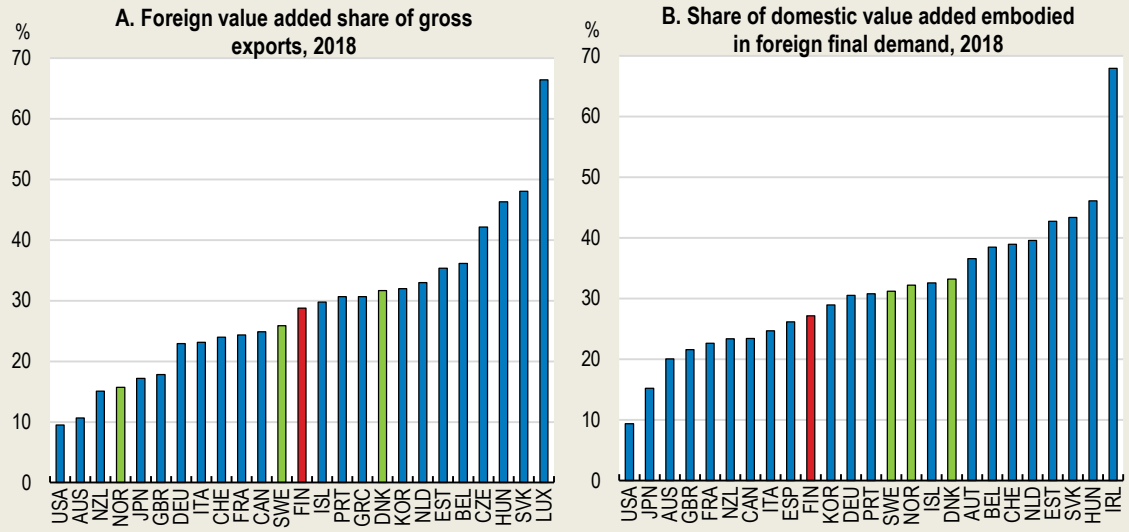
Exports of goods and services, 2021



Source: Source: OECD (2022), Trade in goods and services (indicator). doi: 10.1787/0fe445d9-en, 2022.

StatLink https://stat.link/625bdj

Figure 1.4. Finland is not highly integrated in global value chains



Source: OECD (2021), Trade in Value Added (database).

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Following Finland's application in May 2022 to join NATO, Russia terminated gas and electricity exports to Finland. While most gas was imported from Russia, gas only represents 5% of total energy consumption (Box 1.2) and plans are advanced for sourcing it elsewhere, in LNG form. Additional electricity from local sources and from Sweden and Baltic countries has replaced imports of electricity from Russia, which represented 10% of electricity consumption. The new nuclear power plant will supply 14% of Finland's electricity when it reaches normal operating capacity in winter 2022-23. Oil imports from Russia fell sharply following the beginning of the war and ended in July. Finland is well advanced on the transition away from fossil fuels, with renewables already a larger source of energy.

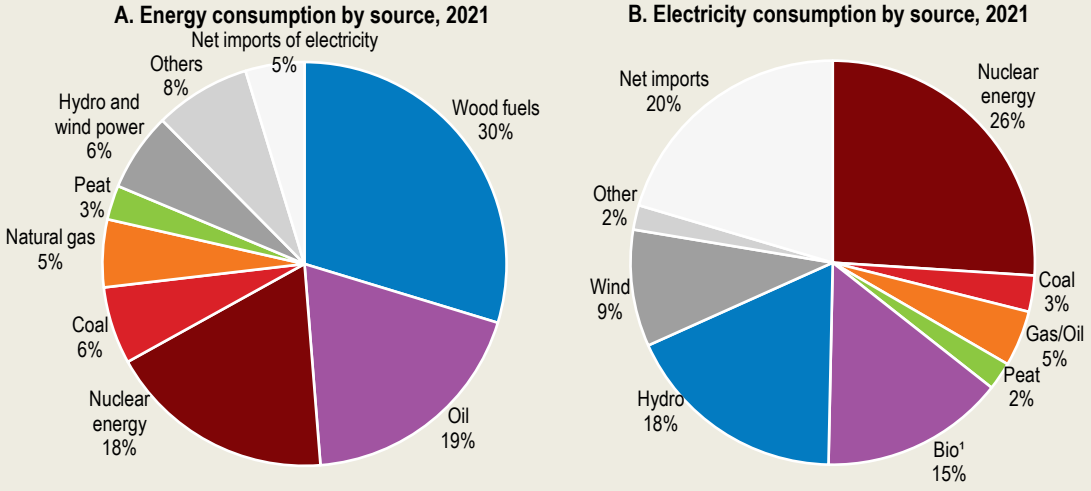
Box 1.2. Energy sources and security in Finland

The largest energy sources in Finland are wood fuels, oil and nuclear (Figure 1.5, Panel A). The use of wood fuels in heat and power plants is mainly based on the use of by-products from the forest industry. These products account for more than 70% of renewable energy production. Renewable energy sources accounted for 42% of total energy consumed in 2021, exceeding fossil and peat sources (34%) for the first time. Natural gas only accounts for 5% of energy consumption, much less than in most other European countries. It is mainly used in industry and district heating production, not in property-specific heating as in most other European countries. Coal is declining as an energy source and will be banned by law after the winter of 2029.

Finland's electricity supply is diverse in terms of both energy sources and production technology. About 85% of electricity production is emissions-free (Figure 1.5, Panel B). In 2021, more than half of Finland's electricity production was generated with renewable energy sources with nuclear power accounting for a further 32%. Fossil fuels and peat accounted for 14% of electricity production. The share of electricity imports has been quite high (around 20% on average) in recent years. Electricity is imported (on a net basis) from the Nordic countries and, until May, was also imported from Russia. The bringing on stream of the Olkiluoto 3 nuclear power plant (it has been functioning on a trial basis since March 2022 with steadily rising production), which will account for 14% of Finland's electricity consumption when it

reaches full operating capacity in winter 2022-23, and additional construction of wind power, which is competitive despite not being subsidised, will drastically reduce the share of imports.

Figure 1.5. Renewables are a larger energy source than fossil fuels



1. Bio includes black liquor, other wood fuels and other renewables.
Source: Statistics Finland.

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Breaking away from Russian energy

The European Council has called for an end to dependence on imports of Russian gas, oil and coal as soon as possible. It prohibited coal imports from Russia from August 2022 and set deadlines for ending oil and gas imports of end-2022 and 2027, respectively. To meet these deadlines and in addition to the European Green Deal and the Fit for 55 legislative package (European Commission, 2022[1]), the European Commission has published the REPowerEU Plan, setting out the EU's strategy to move away from Russian fossil fuels, become more self-sufficient in energy and speed up the clean energy transition. The REPowerEU Plan is based on three pillars: diversification of natural gas supplies and common purchases of natural gas, LNG and later hydrogen via the EU Energy Platform; boosting energy efficiency and energy savings; and accelerating the deployment of renewables. Member states are expected to include in their updated Recovery and Resilience Plans a new REPowerEU chapter that will include reforms and investments to help achieve the REPowerEU objectives. Russia has accelerated the phasing out of EU gas imports by cutting off supplies to a growing number of countries and severely restricting supplies to others.

Oil and coal are global fuels with multiple sources of supply. Several Finnish companies have announced that they are rapidly changing their sources of supply. There are mandatory storage arrangements for oil and natural gas.

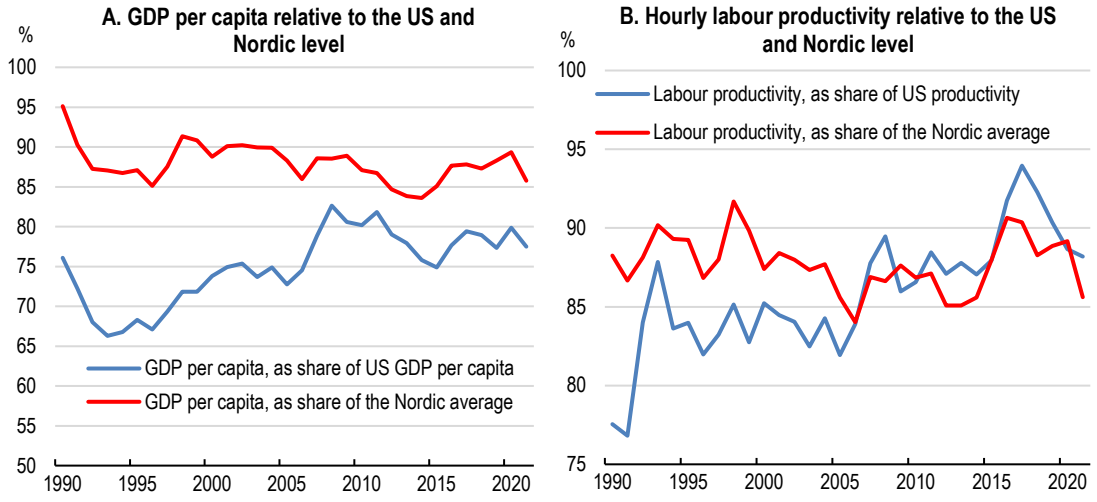
Regarding natural gas, the situation is still challenging, even though natural gas accounts for only 5% of Finland's total energy consumption. The Balticconnector pipeline, which was opened two years ago, will provide an alternative source of gas supply through the Baltics. The liquefied natural gas (LNG) infrastructure is being expanded: Gasgrid Finland Oy and US-based Excelerate Energy, Inc. signed a ten-year lease agreement for the LNG terminal ship Exemplar (with a capacity of 151 000 cubic metres of LNG) in May 2022, which will be operational by end-2022. Moreover, this infrastructure can be used more efficiently. However, these sources do not cover the entire demand for natural gas. While the

manufacturing sector has made progress in replacing natural gas with other materials, replacing all natural gas used by industry is challenging in the short term.

The cessation of electricity imports from Russia in May 2022 has increased the price of electricity in Finland by approximately 4-5 EUR / MWh; the imported Russian electricity was relatively cheap, being produced in coal-fired power stations not subject to emissions pricing.

Following a sharp fall in the early 1990s, GDP per capita (at PPP exchange rates) increased to around 80% of the US level (a proxy for the population-weighted upper half of the OECD) in the late 2000s, where it remains today (Figure 1.6 and Figure 1.7). This increase was entirely explained by faster productivity growth in Finland than the United States, which lifted Finnish productivity to a little over 90% of the US level in recent years. GDP per capita and labour productivity have remained around 10% below the Nordic (Denmark, Finland, Norway and Sweden here and in the rest of the *Survey*) average in recent decades. High skills shortages, low investment and resource misallocation have prevented Finland from closing this productivity gap. Annual hours per worker and the share of the working-age population in the total population are higher in Finland than the Nordic average, pushing up GDP per capita relative the Nordic average, but the employment rate is lower, with the opposite effect (Figure 1.8). Key reforms and policy announcements since the 2020 *Survey* are dominated by labour market reforms aimed at reducing unemployment and increasing the employment rate (Box 1.3).

Figure 1.6. GDP per capita and labour productivity have increased relative to the US level but not relative to the Nordic average



1. At current PPP exchange rates.
2. The Nordic average is population weighted.
Source: OECD (2022), Economic Outlook (database).

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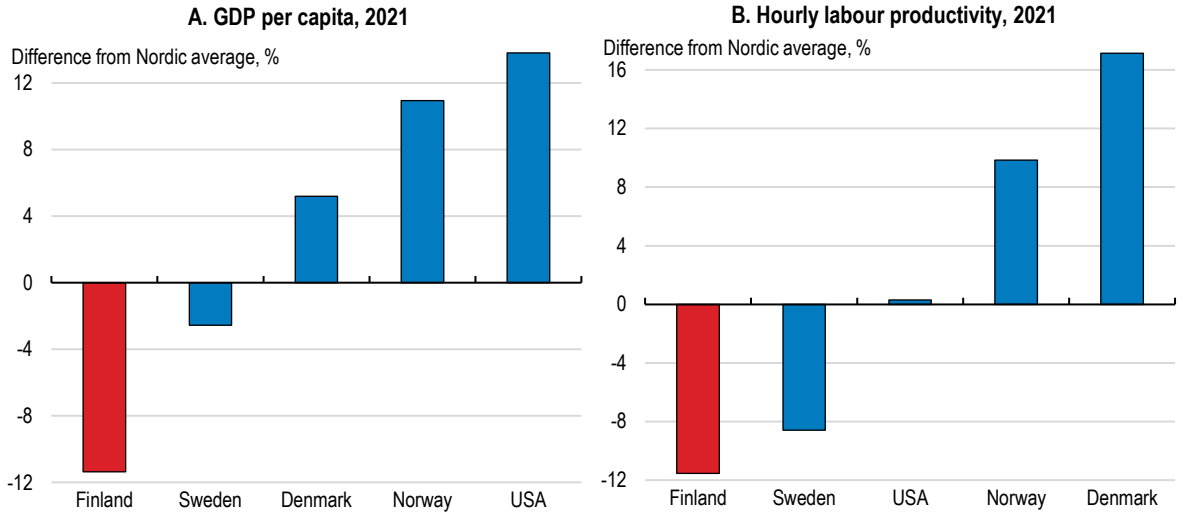
Figure 1.7. GDP per capita and labour productivity are below the Nordic average



Source: OECD (2022), National Accounts (database).

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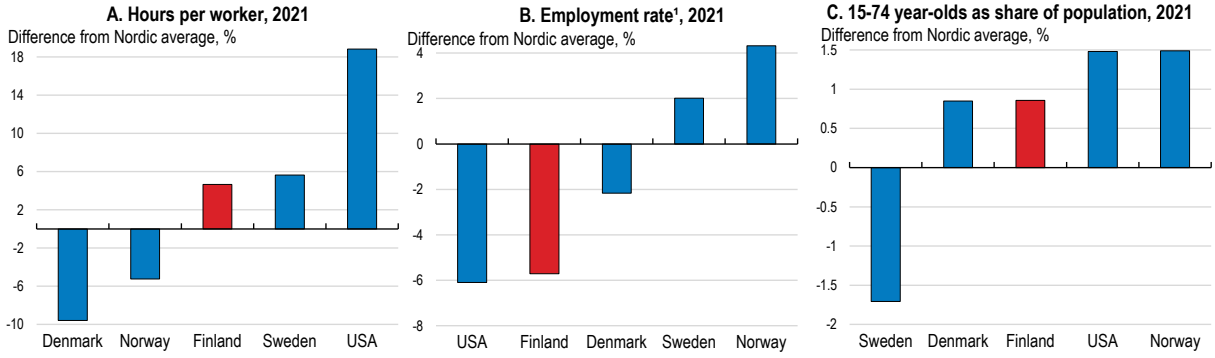
Population ageing weighs on long-term growth prospects. In the OECD's latest long-term projection, the combined effects of slowing growth in the employment rate and a falling working-age-to-population ratio reduce the growth in potential output per capita from around 1.3% in the mid-2030s to 1.1% from the late 2040s onwards (Figure 1.9). These rates are close to those projected by the Bank of Finland (in the baseline scenario, falling from 1.3% in the mid-2030s to 1.0% in the 2050s) but lower than projected by the Ministry of Finance (rising from 1.4% in the 2030s to 1.6% in the 2050s), which assumes higher labour productivity growth than either the OECD or the Bank of Finland.

Figure 1.8. Hours per worker are higher than the Nordic average and demographics are more favourable, but the employment rate is lower



1. Population aged 15-74 years.

Source: OECD (2022), Economic Outlook (database).

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Finland has reduced gross greenhouse gas (GHG) emissions by 33% since 1990 compared with an OECD average of 6%, to per capita levels that are 18% below the OECD average, and further substantial reductions are in prospect (Figure 1.10). It achieved its 2020 EU effort-sharing abatement target (covering non-EU Emission-Trading-Scheme sectors and excluding the forestry and other land use sectors) of 16% of 2005 emissions but faces more ambitious abatement targets over coming decades. A new Climate Change Act came into force in 2022 that stipulates that Finland must meet its international abatement

obligations – currently, a 50% reduction in EU effort-sharing sector emissions from the 2005 level by 2030, which corresponds to a 39% reduction from the 2020 level (28 Mt CO_2-eq.), to which will soon be added Finland's share (17 Mt CO_2-eq.) of the EU forestry and other land-use sink to be reached by 2030 - and its carbon neutral target (i.e., net zero emissions) by 2035. While Finland is almost on track to meet the 2030 gross emissions effort-sharing target - the Climate Change Panel (CCP) judges that only modest further measures (1 Mt CO_2-eq.) are needed to meet this target – substantial increases in Finland's forestry and other land-use sink from the current level (minus 2 Mt CO_2-eq.) will be needed to meet its targets. There is scope to reduce abatement costs in effort-sharing sectors by reducing the biofuels mandate to the minimum level required by the European Union and compensating by aligning the carbon price used to calculate carbon tax rates on heating fuels with that used for transport, subjecting heat combustion using peat to the same tax regime as other fossil fuels and, if necessary, increasing the carbon price used to calculate carbon tax rates. Russia's war against Ukraine and the ensuing energy crisis have made the energy transition from fossil fuels to renewables and nuclear power that is necessary to meet GHG emissions abatement objectives an imperative for energy security.

Box 1.3. Key reforms and policy announcements since the 2020 *Survey*

Labour market

- The government has implemented and announced numerous reforms that contribute towards achieving its goal of increasing employment by 80 000 by the end of the decade and, in the process, reducing unemployment and the structural budget deficit. The most important such reforms are:
  - Increasing the age of eligibility to extended unemployment benefits for unemployed older workers (known as the 'unemployment tunnel' to early retirement) from 61 to 62 for persons born in 1962 or later.
  - Closing entry to extended unemployment benefits by 2025, which will entail abolition of the scheme by 2027 when the last entrants reach 65, the maximum age for receiving the benefit.
  - Introduction of the Nordic labour services model in May 2022. It provides job seekers with intensive public employment service contact from the beginning of their unemployment spell and gives them more support for job search than under the former system.
  - Transferring employment and economic development services to municipalities in 2024 to improve the quality of these services and accelerate employment of job seekers. The new funding model will encourage municipalities to develop and offer efficient services.
- Parental leave has been reformed, with effect from September 2022, to encourage fathers to take a greater share of parental leave, thereby reducing the career development penalty for mothers and hence the gender wage gap.
- The extension of compulsory education to 18 years of age was implemented in 2021.

Innovation

- The government has announced its intention to increase R&D spending to 4% of GDP by 2030, of which one third would be public R&D spending.
- It has also announced a scheme to accelerate immigration of high-skilled workers in certain professions.

COVID-19

- In September 2021, the Government adopted a revised hybrid strategy that aims to lift restrictions imposed due to the pandemic, while ensuring that the healthcare system does not

become overburdened and that the epidemic does not become uncontrolled. Although restrictions on hospitality and leisure were maintained during the surge of the Omicron variant, all remaining restrictions on businesses were lifted in March.

National defence and Russia's war against Ukraine

- As a result of Russia's war against Ukraine, Finland applied to join NATO in May 2022.
- In 2021, the government ordered new F35A fighter jets for EUR 10 billion. These purchases will increase the budget deficit from 2025 to 2030, when the planes are delivered.
- Measures taken since the war began to strengthen defence and assist Ukrainian refugees increase annual government expenditure by 0.1-0.3% of GDP; in all, measures taken in response to the war contribute 0.8% of GDP to the structural deficit this year and next.

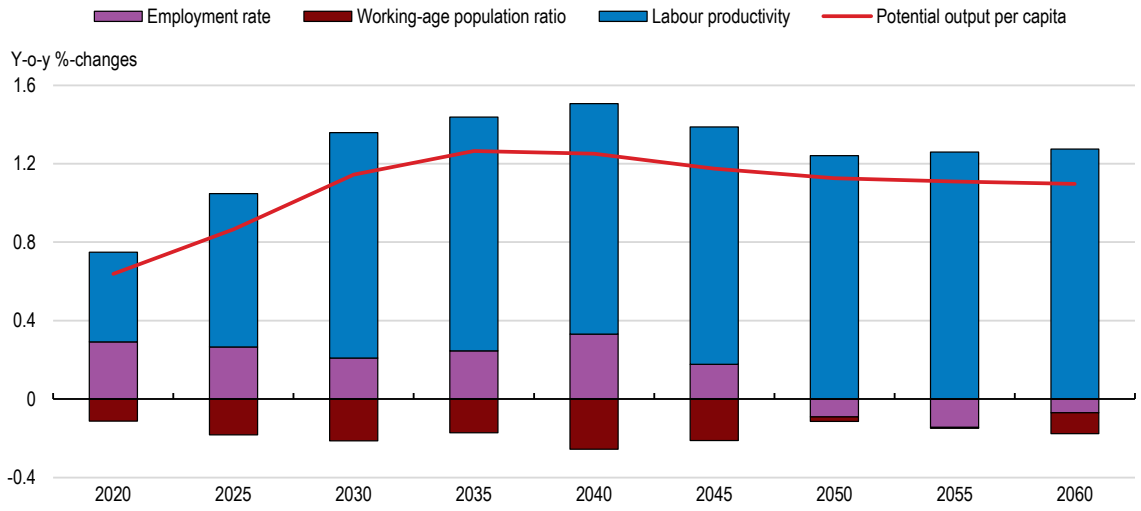
Macroprudential policy

- To curb rising household indebtedness, the Board of the Finnish Financial Supervisory Authority (FIN-FSA) returned loan-to-value restrictions for non-first home buyers to the pre-pandemic level (85%) in October 2021 (the limit for first home buyers remains at 95%). In June 2022, the government announced its intention to limit the maximum maturity of housing and housing company loans to 30 years, reduce the maximum amount housing companies can borrow for new construction to 60% of the unencumbered price of the flats to be sold and to require amortisation of such loans to begin during the first five years, all with effect from July 2023. Moreover, the Board of the FIN-FSA increased the macroprudential buffer requirements by 0.5 percentage point for the two largest other systematically important (O-SII) credit institutions in June 2021.

Climate change

- A new Climate Change Act came into force in July 2022. It stipulates that Finland must meet its international abatement obligations and its carbon neutral target (net zero emissions) for 2035. In addition to the net zero target, the Act includes abatement targets for 2030, 2040 and 2050, a land-use-sector strategy and targets to increase carbon sinks.

Figure 1.9. Population ageing will slow growth in GDP per capita from the 2030s



Note: Five-year averages.
Source: OECD, Economic Outlook 109, Long-term projections.

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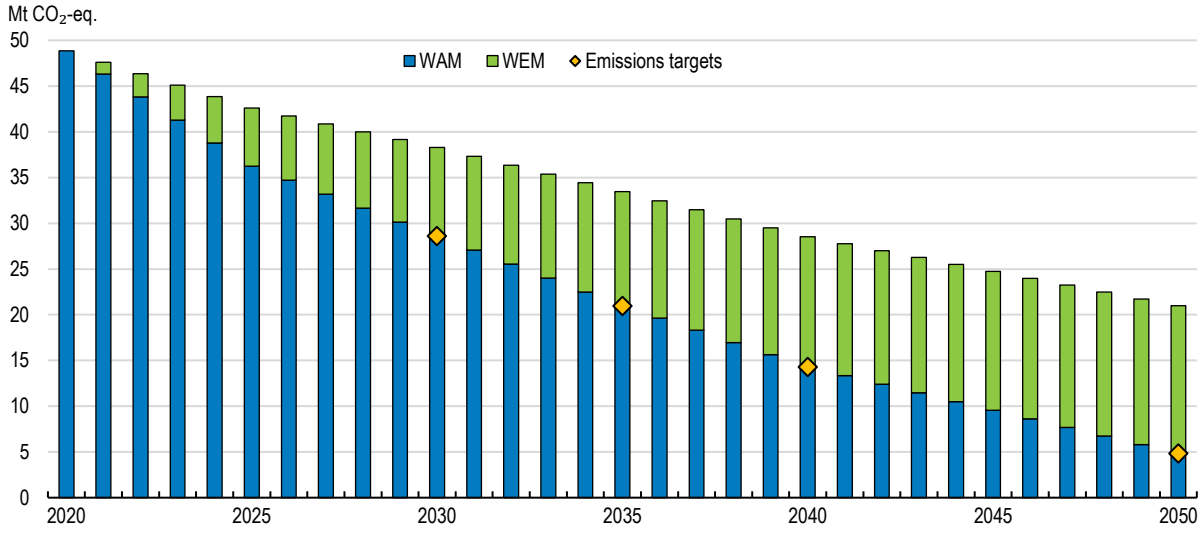
Figure 1.10. Greenhouse gas emissions are projected to decline substantially

Gross greenhouse gas emissions with existing (WEM) and additional (WAM) measures



Note: The 'with existing measures' (WEM) scenario includes climate and energy measures implemented by 31 December 2019. Measures approved by the government after 1 January 2020 are included in the 'with additional measures' (WAM) scenario. For more details on the two scenarios, see (Honkatukia et al., 2021[2]).
Source: (Honkatukia et al., 2021[2]).

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Against this background, the key messages of this *Economic Survey* are that:

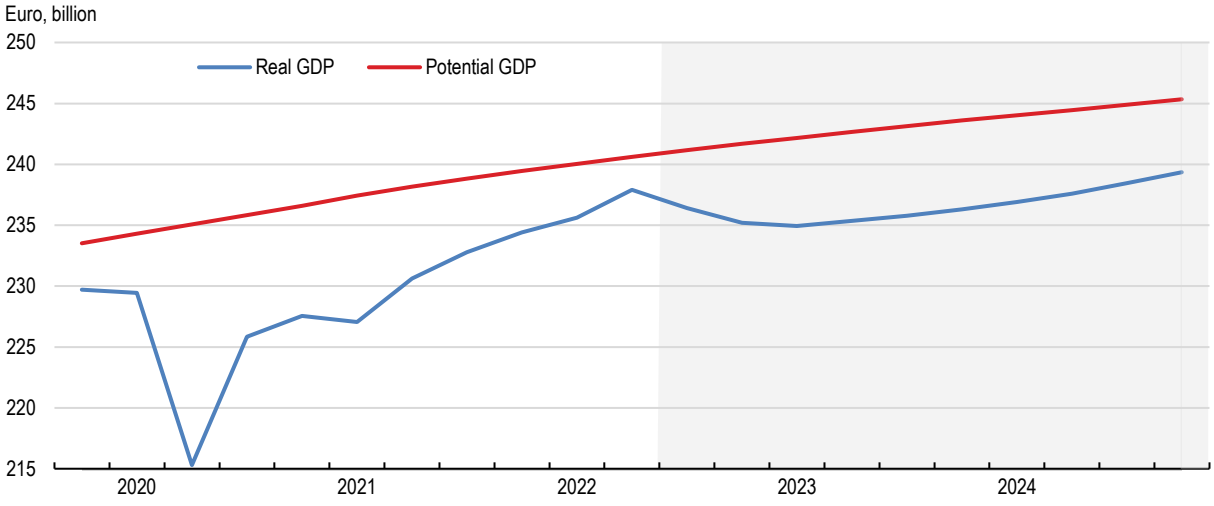
- To close the gap in GDP per capita with the other Nordic countries, productivity growth must increase, especially by boosting innovation, and the employment rate rise, notably for older workers. Addressing the structural shortage of skilled workers through tertiary education and migration reforms is critical for strengthening productivity growth.
- Fiscal consolidation is required to stabilise the government debt-to-GDP ratio in the long run. Regular comprehensive expenditure reviews would help to identify savings. The healthcare and long-term-care reform will contribute to putting public finances on a sustainable path if counties' incentives to improve efficiency are strong enough.
- Further measures are needed to improve the efficiency with which Finland's greenhouse gas emissions abatement objectives are achieved and to increase the forestry and other land-use sink.

The Finnish economy recovered quickly from the COVID-19 shock, but now faces deteriorating global conditions

Finland enjoyed a quick recovery in 2020-21 from the COVID-19 shock. Output and the output gap had returned to the pre-COVID level by the second quarter of 2021 and the first quarter of 2022, respectively (Figure 1.11). With a rapidly increasing share of the population vaccinated (Figure 1.12, Panel A), mobility strongly rebounded during the second quarter of 2021 (Figure 1.13), regaining pre-pandemic levels. A substantial easing in the stringency of containment measures also began at this time (Box 1.4). These developments paved the way for private consumption expenditure to recover, especially in service sectors that had been most adversely affected by the pandemic, notably hospitality and leisure. With similar

developments in Finland's export markets, exports also rebounded. However, with the rest of the world also emerging from the pandemic, energy prices began to rise markedly in late 2021, aggravating the increases in inflation through 2021 caused by strong demand but still disrupted supply, notably of services and of goods that depend on global supply chains (Figure 1.14).

Figure 1.11. The economy recovered quickly from the COVID-19 shock but since has been weighed down by deteriorating global conditions



Source: OECD (2022), Economic Outlook (database).

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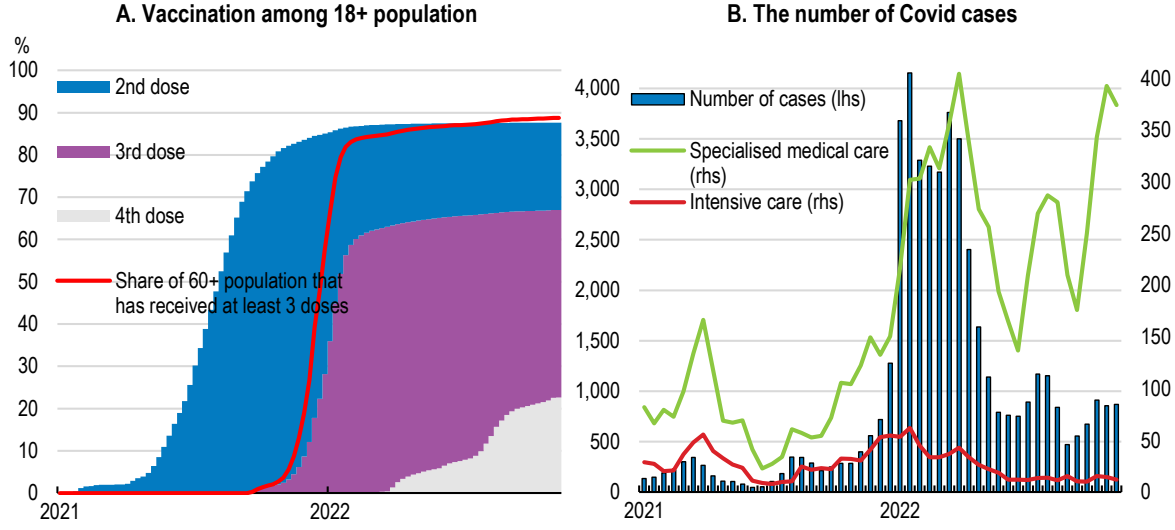
Figure 1.12. Vaccinations and less virulent COVID-19 variants have limited serious case numbers



Source: Finnish Institute for Health and Welfare; Statistics Finland.

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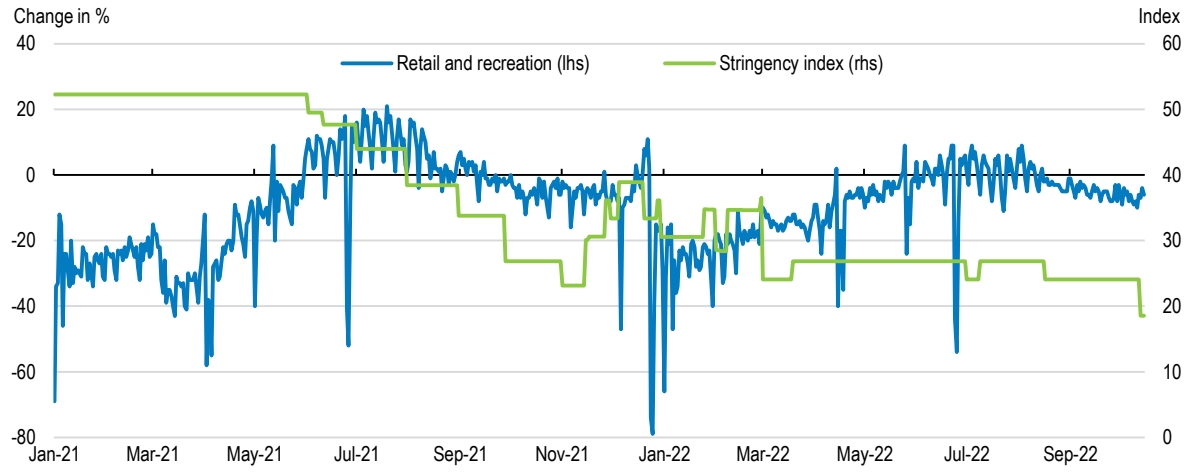
Figure 1.13. Mobility was not much affected by the Omicron variant in early 2022



Note: The Oxford Government Response Stringency Index captures the strictness of 'lockdown style' policies that primarily restrict people's behaviour. It is a composite measure based on nine response indicators including school closures, workplace closures, and travel bans, rescaled to a value from 0 to 100 (100 = strictest response). For more information, see: https://www.bsg.ox.ac.uk/research/research-projects/coronavirusgovernment-response-tracker#data. Mobility change is a comparison relative to a baseline day before the pandemic outbreak. Baseline days represent a normal value for that day of the week, given as median value over the five-week period from January 3rd to February 6th, 2020.
Source: Google LLC, Google COVID-19 Community Mobility Reports, https://www.google.com/covid19/mobility/; Hale, T., S. Webster, A. Petherick, T. Phillips and B. Kira (2020), Oxford COVID-19 Government Response Tracker, Blavatnik School of Government.

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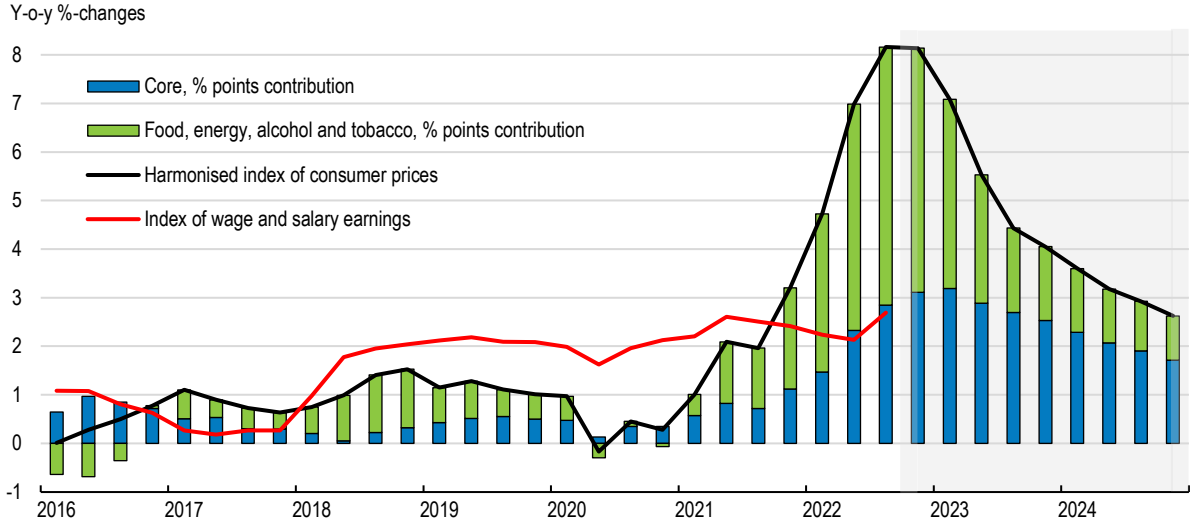
Figure 1.14. Inflation has soared



Source: Statistics Finland; OECD (2022), Economic Outlook (database).

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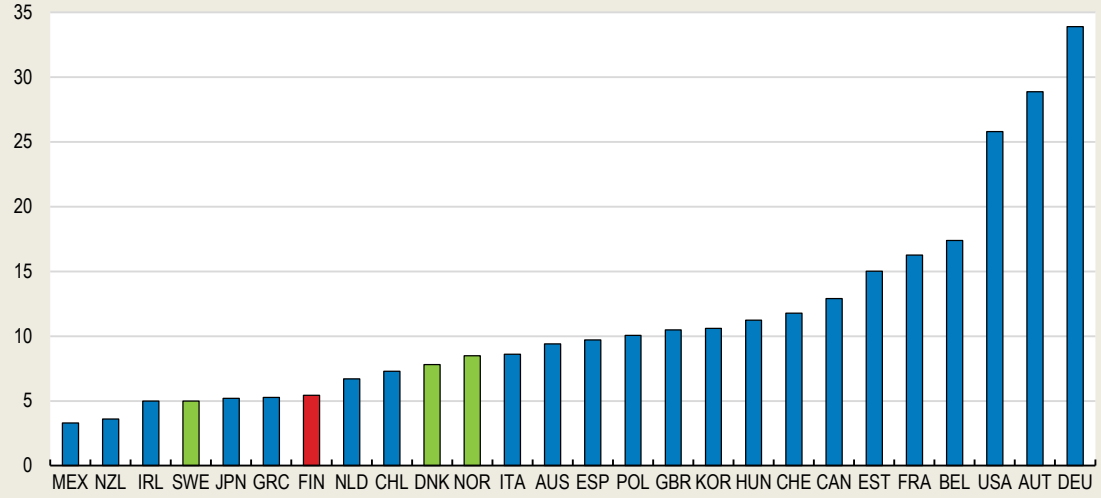
Box 1.4. Finland's COVID-19 strategy

Finland's strategy in response to the Covid-19 pandemic can be divided into four phases:

- *Early strategy*: in the first stage of the pandemic, policy measures were based on a precautionary principle owing to the enormous uncertainties surrounding the virus. The objective was to reduce pressure on the healthcare system and gain time to be able to properly assess future scenarios. To this end, Finland undertook unprecedented control measures to limit social contact.
- *Pre-vaccination intermediate strategy*: after the immediate onset of the pandemic, the strategic objective shifted slightly. Minimizing the number of severe cases and deaths remained the overarching objective, but at the same time society was allowed to function more normally than in the initial phase. This strategy hinged on the effective use of epidemiological data, which allowed for flexible control measures.
- *Vaccination scale-up intermediate strategy*: with vaccines developed, Finland proceeded to vaccinating its population as quickly as possible. The vaccination order was based on age and underlying health condition. Restrictions on social contact remained until vaccination coverage was so high that control measures could be gradually phased out.
- *Strategy since March 2022*: with vaccinations progressing steadily, the final restrictions were lifted in the summer of 2022. The aim now is to keep society as open as possible and to support the post-pandemic economic recovery. New restrictions are to be avoided, and if re-imposed, they should be as limited and local as possible. At the same time, the Ministry of Social Affairs and Health is monitoring the pandemic closely and the distribution of a fourth vaccination dose has been expanded to mitigate a potential resurgence in the winter season. The government has also submitted legislative proposals that would make it possible to swiftly re-impose restrictions if need be. Improving the resilience of the healthcare system is key to avoid new widespread restrictions in the future.

Figure 1.15. Finland had relatively few ICU beds before the pandemic

ICU beds per 100 000 population



Note: 2014 data for Canada and Denmark, 2016 data for Ireland, 2017 data for Chile, Germany, Mexico and Spain, 2018 data for Austria, France, Hungary, Netherlands, Norway, Switzerland and the United States, 2019 data for Australia, Belgium, Finland, Greece, Japan, Korea, New Zealand and Poland and 2020 data for Italy, Sweden and the UK (England).
Source: OECD (2020); Berger et al. (2021).

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Despite a low COVID-related death toll compared with other OECD countries and high vaccination coverage (87% of the adult population had received at least two doses by November 2022), the pandemic highlighted vulnerabilities in the Finnish hospital system. In the early stages of the pandemic, non-urgent social welfare and healthcare services had to be reduced owing to staff shortages. As the pandemic dragged on, the lack of psychiatrists, psychologists, nurses and home care-personnel hampered the availability of mental care and home-care services. The relatively slow start to Finland's vaccine rollout can also in part be explained by lack of vaccination personnel in primary health care. The pandemic also put strain on intensive care-unit (ICU) beds, the supply of which was relatively low by OECD comparison (Figure 1.15). To increase ICU capacity, hospitals had to convert operation theatres and recovery areas. Finland's fragmented healthcare system, where services are in large part financed and organised by municipalities, might also have made managing the pandemic more complicated. The healthcare- and social-care reform should help to address this problem by streamlining the healthcare system. Healthcare, social care and rescue services will be transferred from municipalities to 21 larger wellbeing services counties from the beginning of 2023. The counties will be allowed to collect patient fees, but the funding will mainly be needs-based and come from central government.

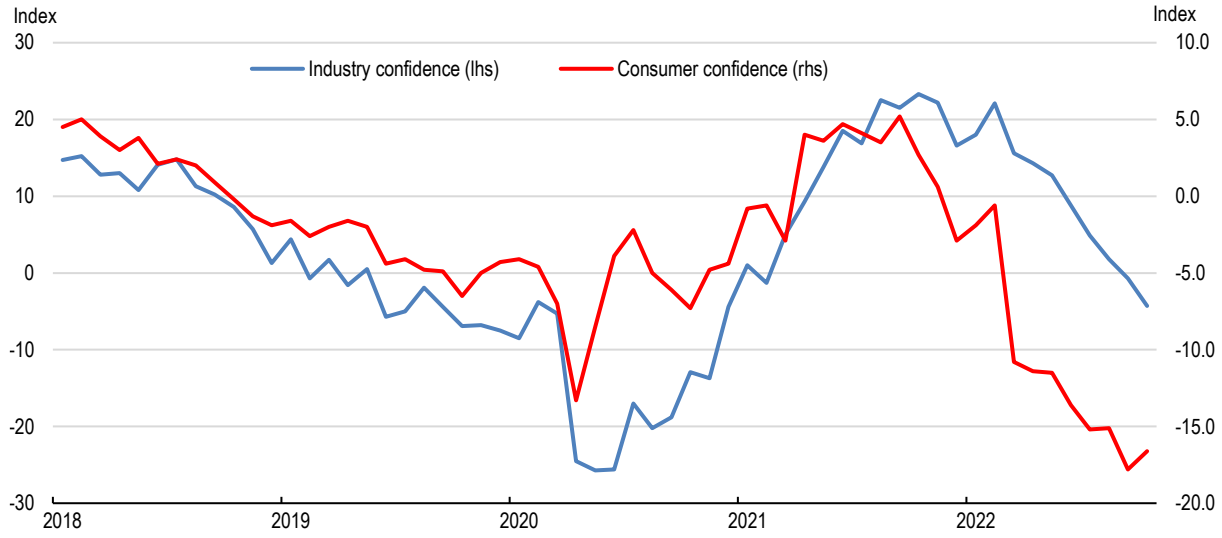
There was an upsurge in serious COVID-19 cases in early 2022 but it had only minor economic effects and receded swiftly in April (Figure 1.12, Panel B). COVID-19 is not expected to be a significant drag on the economy this year. Although restrictions on hospitality and leisure were maintained during the surge of the Omicron variant, all remaining restrictions on businesses were lifted in March. However, there is a risk that restrictions may be imposed again if the number of COVID-19 cases surges and consequently threatens to overburden the healthcare system.

Russia's war against Ukraine caused further large increases in energy and food prices, which rose by 32% and 13%, respectively, in the year to the third quarter of 2022 and together accounted for around one half of HICP inflation of 8.2% in this period (Figure 1.14), the highest rate since the first quarter of 1991, when this series began. Core HICP inflation increased to 4.2% in the year to the third quarter of 2022 as higher energy and food prices fed into other HICP components. Despite falling real wages (Figure 1.14), private consumption increased sharply during the first half of 2022, underpinning strong economic growth, as households drew down savings accumulated during the pandemic. Wage growth is projected to rise to an annual rate of 4% in 2023-24, which would still entail a significant decline in real wage rates since 2021, as is to be expected in a country that has experienced a fall in its terms of trade. Russia's war against Ukraine has also eroded consumer confidence, which has fallen to the lowest level since the series began in 1995, and business confidence, portending further weakness in consumption and investment expenditure (Figure 1.16). Exports fell sharply in the first half of 2022, reflecting normalisation following a major ship delivery in late 2021, a decline in telecommunications, data processing and information services exports, a downturn in Finland's main export markets and a fall in exports to Russia.

Finland enjoyed a strong labour market recovery from the COVID-19 shock until the second quarter of 2022. The employment- and unemployment rates regained pre-pandemic levels by mid-2021 and early 2022, respectively (Figure 1.17, Panel A), posting their best performances since 1987 and 2008, respectively. The 2017 pension reform (see below) has also contributed significantly to the increases in the employment- and participation rates by encouraging older workers to delay retirement. The participation- and employment rates of the population aged 55-64 years increased by around 5 percentage points from mid-2020 to mid-2022, reaching 76% and 70%, respectively, far above pre-pandemic readings. The long-term unemployment rate began to fall in late 2021 but, at 1.6% in mid-2022, remains higher than before the pandemic. The large increase following the pandemic partly reflects the greater impact it had on sectors (such as hospitality) that are relatively intensive in workers (low skilled, young) who typically experience greater labour-market difficulties than others. The increase (in terms of registrations) was much greater for foreign-born workers (120%) than for the native born (66%). As is usual during a labour market

recovery, the decline in long-term unemployment lags that in unemployment. The temporary layoff (i.e., furlough) scheme, which entails a temporary interruption of work and payment of wages while other aspects of the employment contract remain in force, attenuated the labour market impact of the pandemic and laid the ground for a rapid return to normal by limiting hysteresis effects. By late 2022, the number of furloughed workers (classified as being employed in labour market statistics) had fallen to pre-pandemic levels, far below the levels reached in 2020 (Figure 1.17, Panel B).

Figure 1.16. Consumer and business confidence have fallen



Source: European Commission.

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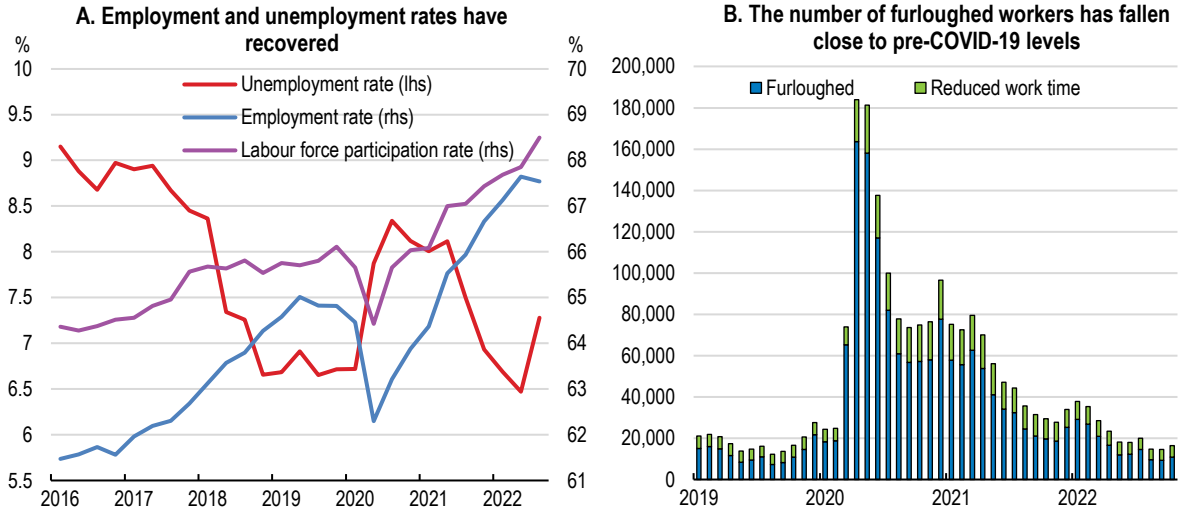
Figure 1.17. The labour market has recovered swiftly

Employment- and unemployment rates for the population aged 15-74, seasonally adjusted



Source: Statistics Finland; Eurostat; OECD (2022), Economic Outlook (database).

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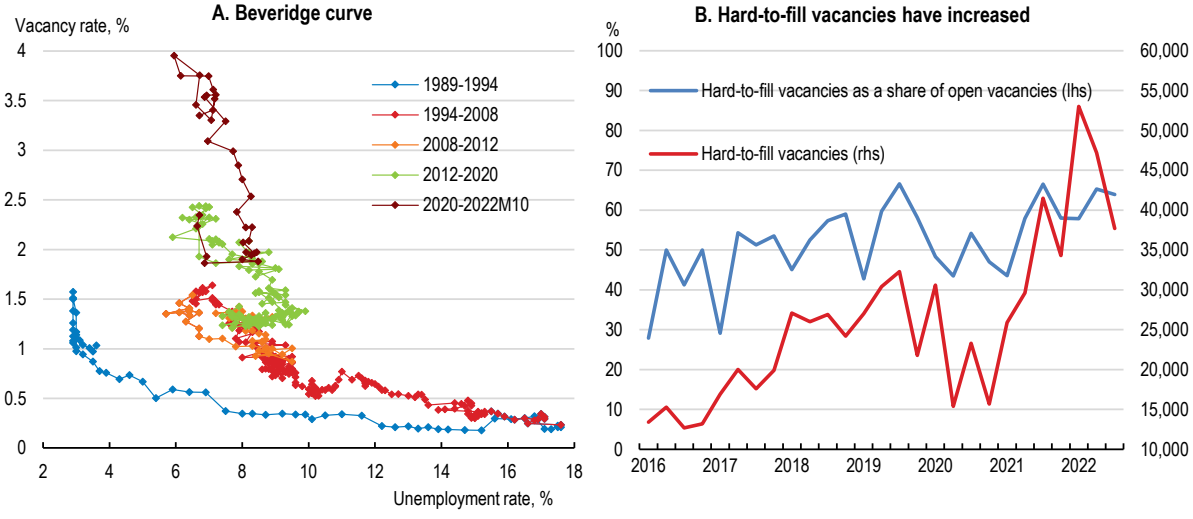
Labour market tightness (vacancies relative to unemployment) has increased markedly recently and there appears to have been an upward shift in the Beveridge curve (Figure 1.18, Panel A). These developments are consistent with firm surveys that report a lack of qualified labour and difficulties to fill open vacancies (Figure 1.18, Panel B). Given the fast recovery and rapid increase in employment, part of the mismatch may be temporary, reflecting frictions in filling jobs. Such mismatch should diminish as growth in labour demand slows. Nevertheless, the upward shift in the Beveridge curve over many years suggests that mismatches are largely structural. Labour shortages are most apparent in public administration, education, human health and social work activities, with shortages having grown most for human health and social work activities. These shortages of qualified labour in non-cyclical professions are likely to persist even as the economy slows. Reducing such mismatch is likely to require training of workers and/or relaxation of skill requirements in jobs as well as stronger incentives for workers, unions and firms to compromise (to improve match acceptance rates). Despite tight labour market conditions, nominal wage growth has remained subdued to date, lagging far behind inflation (see Figure 1.14). Collective agreements concluded to date point to wage increases of around 2.6% in 2022, slightly higher than in 2021. However, municipal workers and nurses recently negotiated a premium over private-sector wage increases ('the general line'), which could weaken wage coordination in the Finnish system, which is already less formal than in Nordic peers, resulting in higher future wage increases.

The economy is set to stall in 2023 but GDP growth is projected to recover to 1.1% in 2024, with the negative output gap widening to 2.7% of potential GDP by 2024 (Table 1.1). Consumption will weaken in response to falling real wages but subsequently recover as wages rise. Export growth will decline markedly with export markets, which are being hit by the large reduction in gas supplies from Russia, but pick up as these energy sources are replaced and export markets recover. Despite support from the EU Recovery and Resilience Facility (RRF) (Box 1.5), business investment is projected to remain weak through 2023 owing to the economic downturn and more uncertain economic outlook caused by Russia's war against Ukraine but to strengthen in 2024 as the global outlook improves. The unemployment rate should peak at around 8% and only fall slightly by the end of 2024. Inflation will fall to 3.1% in 2024, when the energy shock will have passed.

Figure 1.18. Job matching has deteriorated and vacancies have become more difficult to fill



Note: Due to a methodology change in the Labour Force Survey (LFS), data on the active population only go back to 2009. For 1989-2008, data from the old LFS have been used to calculate the vacancy rate. Hard-to-fill vacancies are open job vacancies during the reference period that the employer finds hard to fill.
Source: Statistics Finland; OECD, Short-Term Labour Market Statistics (database).

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Box 1.5. The Recovery and Resilience Facility is financing environmental, human capital and digital investments

To support the post-pandemic economic recovery in Europe, the European Union launched the Next Generation EU recovery package. The largest part of the package is the Recovery and Resilience Facility (RRF), which consists of loans and grants amounting to EUR 723.8 billion. RRF funding is allocated based on member countries' population, GDP and unemployment rate, as well as on how hard the economy was hit by the pandemic. Finland's share of RRF funding was originally estimated to EUR 2.1 billion but has since been lowered to EUR 1.8 billion as the Finnish economy has fared better than forecast. Finland has included most of its RRF revenue and expenditure in the budgets for 2021-23. When preparing its Recovery and Resilience Plan, Finland concentrated on a few major packages rather than on distributing resources to many minor projects with smaller impact. The Recovery and Resilience Plan is centred on four key elements:

- *Green transition*: EUR 695 million has been earmarked for investments that will help Finland reach its target of carbon neutrality in 2035. The investments focus on producing and distributing clean energy, such as solar power, offshore wind power, biogas and waste heat recovery, but there is also support for industrial circular economy solutions and for green innovation, for example in hydrogen technology. There are also efforts to reduce the climate impact in the construction sector.
- *Digitalisation*: investments in digitalisation include the Digirail project, expanding high-speed internet connection to areas not served by market actors and support for cutting-edge technologies in AI, 6G networks, quantum computing and microelectronics. The Digirail project seeks to make rail transport safer and more flexible by leveraging digital technology. Making travel and goods transport by rail more attractive will also support climate objectives. Improving digital infrastructure and boosting the development of new technologies will benefit citizens and businesses alike, as it generates new job opportunities and facilitates remote work.
- *Employment and skills*: Investments aim to increase the number of student places at higher education institutions and to enhance digital learning, enabling location-independent study. Public employment services will be digitalised, work- and education-based immigration encouraged and services directed at youth and those with impaired capacity for work. Funding has also been targeted at the tourism and cultural sectors, which were hit hard by the pandemic. More specifically, financial support will be available for measures enhancing export opportunities and thus resilience to future crises.
- *Healthcare and social services*: Several challenges related to the availability and cost effectiveness of the fragmented social welfare and healthcare services are addressed. The objective is to enhance access to health and social services across the country and remove the backlog in the provision of services related to the COVID-19 pandemic. RRP will contribute to the implementation of the seven-day care guarantee from the current three-month deadline. A wide range of digital innovations in the social and healthcare sector are promoted to increase resource efficiency, support preventive services, enable the sharing of expertise between regions and service providers and strengthen the role of customers.

Source: Ministry of Finance.

Table 1.1. Macroeconomic indicators and projections

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

	2018	2019	2020	2021	2022	2023	2024
	Current prices (EUR billion)						
GDP at market prices	**233.5**	**1.2**	**-2.2**	**3.0**	**2.2**	**-0.3**	**1.1**
Private consumption	123.9	0.7	-4.0	3.7	2.3	-0.6	1.4
Government consumption	53.5	2.0	0.3	2.9	2.8	-0.3	0.1
Gross fixed capital formation	56.2	-1.5	-0.9	1.5	3.0	-0.7	0.2
Final domestic demand	233.6	0.5	-2.3	2.9	2.6	-0.6	0.8
Stockbuilding[1]	0.5	-0.9	0.2	-0.1	3.7	0.0	0.0
Total domestic demand	236.4	-0.3	-1.9	3.0	6.3	-0.6	0.7
Exports of goods and services	89.8	6.7	-6.8	5.4	-0.5	1.9	3.1
Imports of goods and services	92.7	2.4	-6.0	6.0	9.0	1.2	2.3
Net exports[1]	-1.6	1.6	-0.3	-0.2	-3.7	0.3	0.3
Other indicators (growth rates, unless specified)							
Potential GDP		1.2	1.3	1.3	1.0	0.8	0.7
Output gap[2]		-1.2	-4.6	-3.0	-1.9	-3.0	-2.7
Employment		1.1	-1.5	2.3	2.3	-0.6	0.2
Employment rate (% of population aged 15-74)		64.8	63.5	65.6	67.4	67.2	67.6
Unemployment rate (% of labour force, 15-74)		6.7	7.8	7.6	7.0	7.9	7.8
GDP deflator		1.5	1.5	2.5	6.0	4.7	3.1
Terms of trade		-0.5	1.1	0.5	2.2	0.1	0.0
Harmonised index of consumer prices		1.1	0.4	2.1	7.0	5.3	3.1
Harmonised index of core inflation[3]		0.7	0.5	1.2	3.6	4.3	3.1
Household saving ratio, net (% of disposable income)		0.4	4.7	2.0	-1.4	-1.2	-1.3
General government financial balance (% of GDP)		-0.9	-5.5	-2.7	-2.5	-3.9	-3.6
General government cyclically-adjusted balance[2]		-0.2	-2.6	-0.8	-1.4	-2.1	-1.9
General government underlying primary balance[2]		-0.1	-2.5	-0.9	-1.6	-2.3	-2.2
General government gross debt (% of GDP)[4]		78.4	90.8	85.0	84.9	87.2	88.8
General government net debt (% of GDP)		-62.7	-64.1	-72.4	-72.6	-70.3	-68.6
General government debt, Maastricht definition (% of GDP)		64.9	74.8	72.4	72.2	74.5	76.2
Current account balance (% of GDP)		-0.3	0.7	0.6	-2.6	-2.2	-1.9
Short-term interest rate		-0.4	-0.4	-0.5	0.5	3.8	3.9
Long-term interest rate		0.1	-0.2	-0.1	1.9	5.1	5.0

1. Contribution to changes in real GDP; 2. As a percentage of potential GDP; 3. Harmonised index of consumer prices excluding food, energy, alcohol and tobacco; 4. National Accounts basis excluding unfunded liabilities of government employee pension funds.
Source: OECD (2022), Economic Outlook (database).

Key downside risks are that Russia's war against Ukraine is more protracted than expected and that Russia cuts off gas supplies to more EU countries by end-2022, which would prevent the rebuilding of European gas stocks during summer 2023 and result in shortages during the winter of 2023-24 (tail-risk events that could entail major changes to the outlook are summarised in Table 1.2). These developments would increase energy prices and inflation and reduce industrial production in Finland's main trading partners, notably Germany, with adverse ramifications for economic activity and employment in Finland. A more protracted war would increase uncertainty about the economic outlook, reducing business investment. Foreign investors could demand a premium on returns on Finnish investments to compensate for risks arising from Finland's geographical proximity to Russia. There is also the risk that tightening global financial conditions could depress the housing market and consumption and investment. Banks' high dependence on wholesale funding and high exposure to real estate lending could aggravate the problem. On the upside, private investments catalysed by the RRF could be higher than projected.

Table 1.2. Events that could entail major changes to the outlook

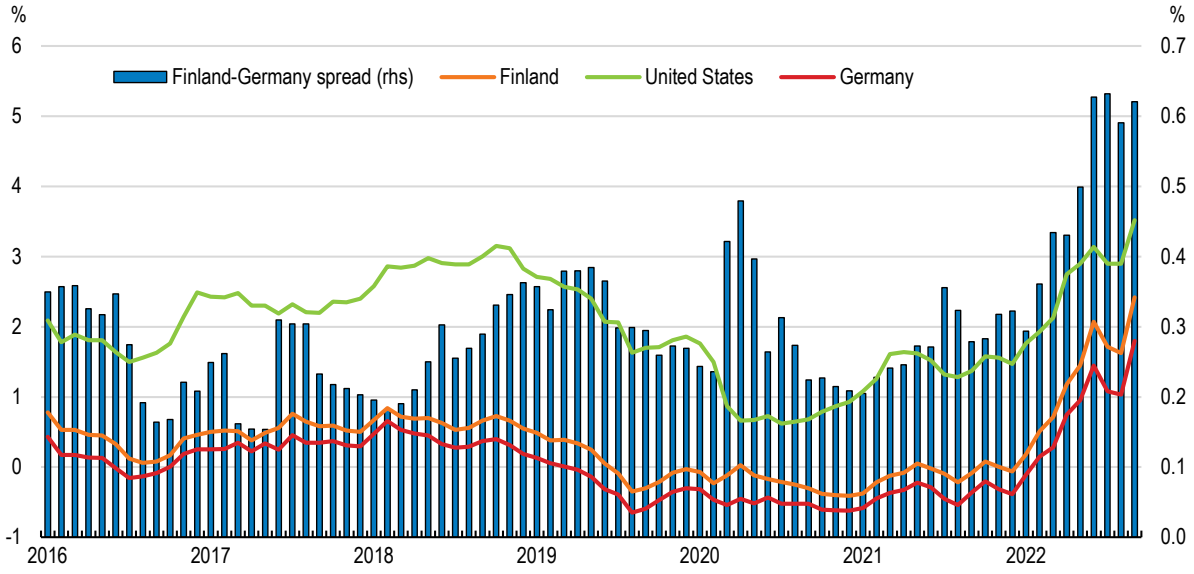
Shock	Possible impact
Russia escalates its war against Ukraine, leading to a more protracted conflict.	A deeper, more drawn-out conflict would heighten the pressure on those of Finland's trade partners that have not been able to adapt their energy infrastructure.
Geopolitical tensions rise, resulting in sanctions and countersanctions that drastically reduce trade between China and the EU and North America.	The global economy would fall into a recession and would face severe supply chain disruptions, depressing economic activity and increasing inflation in Finland and other advanced economies.
A new, more virulent coronavirus variant arrives that is resistant to existing vaccines.	Economic activity would fall as people avoid activities that put them at risk and/or are restricted by containment measures to avoid intensive care facilities becoming overwhelmed.

Macroeconomic policies are becoming less expansionary

Monetary policy is becoming less accommodative

Monetary conditions have been highly accommodative in recent years. European Central Bank (ECB) policy rates on the main refinancing operations, the marginal lending facility and the deposit facility were cut to 0.00%, 0.25% and -0.50% in September 2019 and remained at these levels until July 2022, when the ECB increased them by 50 basis points. The ECB increased these rates by a further 75 basis points in both September and November 2022 and indicated that it expects to raise rates further over the coming several meetings of the Governing Council to dampen demand and guard against the risk of a persistent upward shift in inflation expectations. Quantitative easing helped to depress Finnish long-term government bond yields, which were negative most of the time in 2020-21. Long-term government bond rates have increased markedly since late 2021, mainly reflecting the increase in global rates but also Russia's war against Ukraine and the flight to safe havens during uncertain times, which have increased the risk premium (spread) over German rates (Figure 1.19).

Figure 1.19. Long-term government bond rates and the spread over German rates have increased



Source: OECD, Monthly Monetary and Financial Statistics (database).

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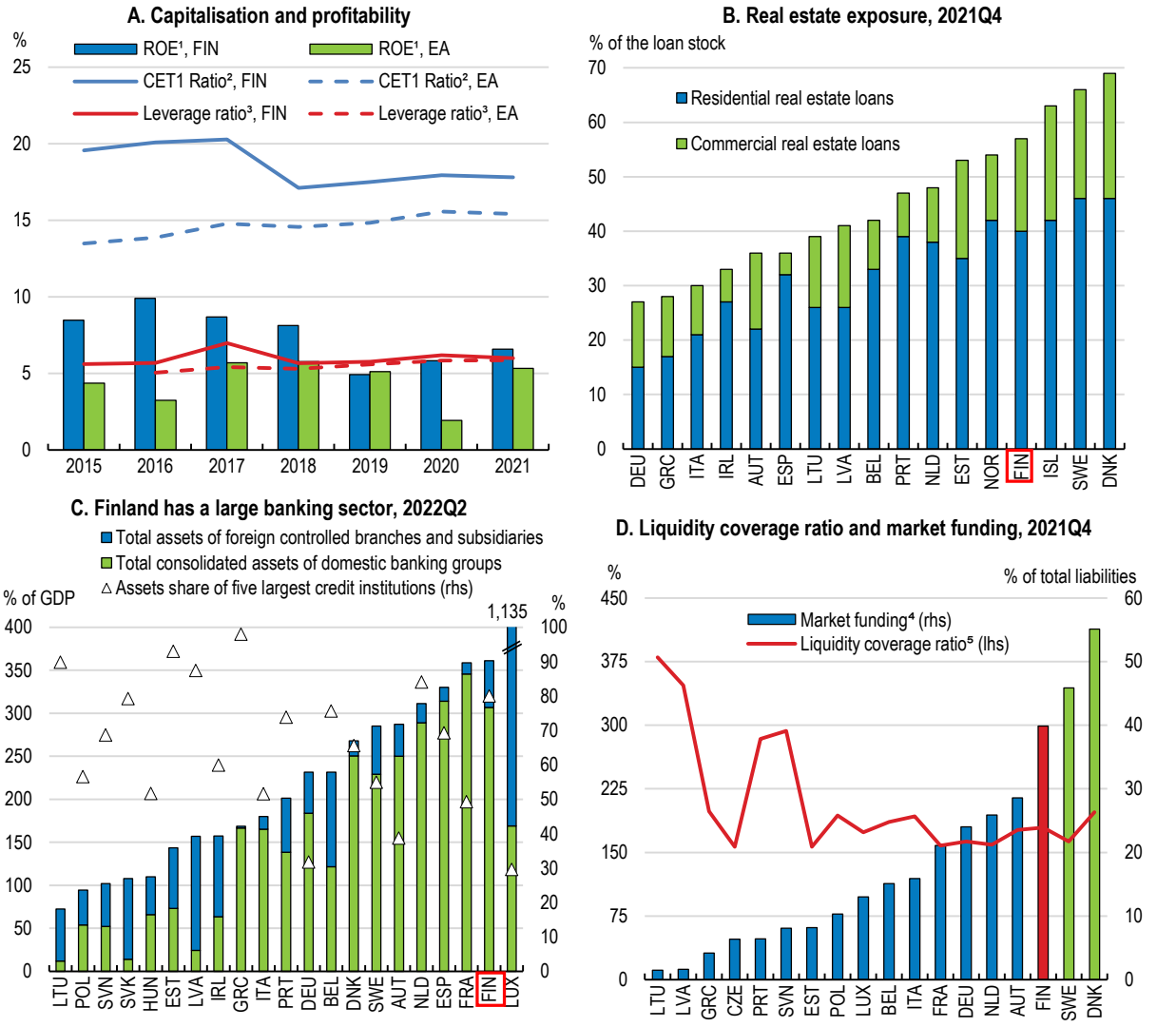
Macroprudential and financial policies should be tightened to contain financial stability risks

Russia's war against Ukraine has had little direct effect on Finnish financial institutions. They had low exposures to Russia at the onset of the war - claims on Russian entities only amounted to 0.1%, 0.3% and 0.4%, respectively, of banks', insurance companies' and investment funds' assets and have continued to decrease – and indirect exposures were moderate - about one quarter of loans to non-financial corporations (NFCs) were to vulnerable sectors that were energy intensive or had strong connections to Russia via trade links (i.e., more than a 5% share of exports or imports). The stock and bond prices of a number of large firms with significant exposure to Russia – fell sharply at the onset of the war, increasing funding costs, but have since been relatively stable. Fortum (BBB, 51% government owned), which had a EUR 5.5 billion exposure to Russia before the war (reduced to EUR 3.3 billion by 30 September 2022) and held a 76% stake in Uniper, the German company developing the North Stream II gas pipeline, experienced large falls in its share price until Uniper's divestment to the German government in September 2022. Increased collateral requirements on energy derivatives contracts have dramatically increased liquidity requirements for energy companies, including Fortum. To ease this liquidity stress, the Finnish and Swedish governments have committed to provide significant liquidity support to energy companies.

In addition to increasing the risk of loans to companies in vulnerable sectors, Russia's war against Ukraine has adversely affected the operating environment for Finnish financial institutions by increasing commodity prices and disrupting energy supplies in Finland and its main trading partners, reducing economic growth, and increasing Finland country risk (see above) and the risk of cyber-attacks. To minimise potential disruption from cyber-attacks, a national backup system for the payments infrastructure has been created.

Finnish financial institutions are well capitalised (Figure 1.20, Panel A), increasing their resilience to cope with structural vulnerabilities, notably high household indebtedness (three quarters of which is housing loans including housing company loans) (Figure 1.21, Panel A) and large housing loans with long maturities; housing company loans on behalf of households grew by 75% in the five years to 2022 Q1 and account for 80% of total housing company loans. Households are vulnerable to rising interest rates as over 90% of housing loan rates are linked to Euribor, typically for one year, although 28% of new loans by value in recent years have been hedged against interest-rate risk. On the other hand, housing affordability has not deteriorated over the past decade (Figure 1.21, Panel B) and households' interest expenditure has fallen as a share of net disposable income (Figure 1.21, Panel C). Housing loans account for 40% of loans granted to households and non-monetary corporations resident in Finland. Finnish financial institutions also have large residential- and commercial real estate loan exposures in the other three Nordics. In all, residential- and commercial real-estate loans comprise 40% and 28%, respectively, of the loan stock, which is high by international comparison (Figure 1.20, Panel B). Other vulnerabilities are the banking system's substantial size (Figure 1.20, Panel C), concentration and interconnectedness and the high reliance on wholesale market funding (Figure 1.20, Panel D), making it vulnerable to market disruptions. Progressively introducing limits on wholesale funding as a share of total funding, as in New Zealand, would help to increase bank resilience to funding shocks.

Figure 1.20. The banking system is well capitalised but with structural vulnerabilities



1. Return on equity. 2. Common equity tier 1 (CET1) capital relative to risk-weighted assets. 3. Tier 1 capital relative to assets. 4. Deposits and debt securities relative to total liabilities. 5. Liquidity buffer relative to net liquidity outflows over a 30-calendar day stress period.
Note: First quarter data for Norway in Panel B. In Panel D, market funding data are from 2020 Q4.
Source: European Central Bank and European Banking Authority.

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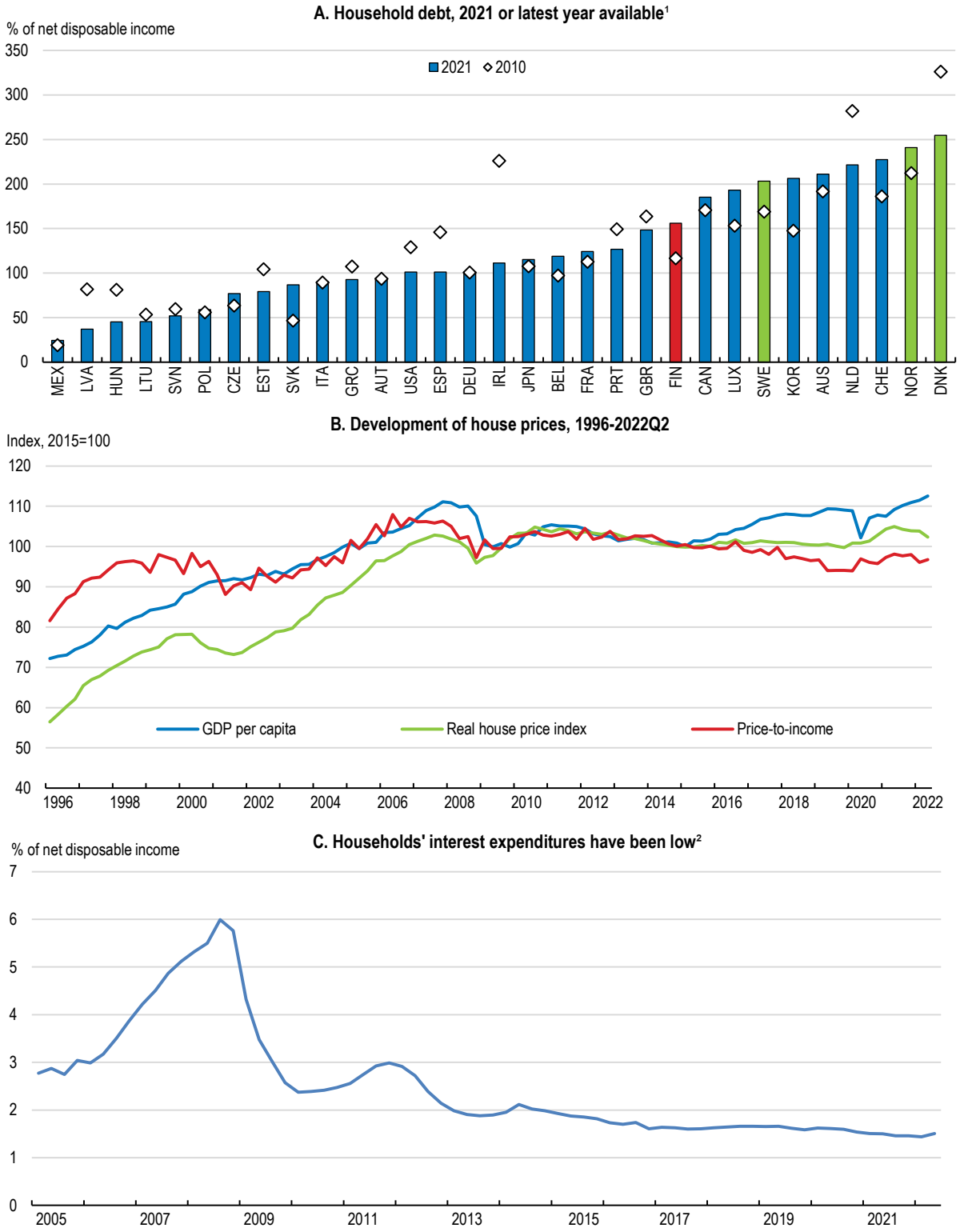
Figure 1.21. Household indebtedness is high but interest expenditures are low and housing affordability has not deteriorated



1. 2020 data for Japan, Mexico and the United States. Households include non-profit institutions serving households.
2. Households excluding non-profit institutions serving households. The interest-to-income ratio has been calculated as total interest expenditure before FISIM allocation over a four-quarter moving average of net disposable income. No adjustment has been made for interest deduction.
Source: OECD (2022), Economic Outlook (database); Statistics Finland.

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To curb rising household indebtedness, the Board of the Finnish Financial Supervisory Authority (FIN-FSA) returned loan-to-value (LTV) restrictions for non-first home buyers to the pre-pandemic level (85%) in October 2021 (the limit for first-home buyers remains at 95%). In June 2022, the government put forward its legal proposal to limit the maximum maturity of housing- and housing company loans to 30 years, reduce the maximum amount housing companies can borrow for new construction to 60% of the unencumbered price of the flats to be sold and to require amortisation of such loans to begin during the first five years, all with effect from July 2023. These measures, which reduce the risk of bank losses, should be complemented by debt-service-to-income (DSTI) or loan-to-income (LTI) restrictions, which reduce the risk of households not being able to service their mortgages. Fifteen OECD countries have de jure debt-servicing restrictions and a further three have de jure loan-to-income restrictions (van Hoenselaar et al., 2021[3]). Empirical evidence suggests that DSTI restrictions may be more effective than LTV restrictions in curbing credit growth (Cerutti, Claessens and Laeven, 2017[4]) (Claessens, Ghosh and Mihet, 2013[5]) (Poghosyan, 2020[6]). Hoenselaar et al. (2021[3]) document empirical studies that find that LTV and DSTI restrictions combined are effective in limiting the build-up in household credit. Nevertheless, the government chose not to give the FIN-FSA the power to introduce DSTI restrictions, contrary to the advice of the FIN-FSA, the Bank of Finland and the recommendation in the 2020 *Survey* (Table 1.3), owing to concerns that it may disproportionately affect first-home buyers. Such concerns could be eased by setting a higher DSTI cap for first-home buyers, as is already done for LTV restrictions in Finland. Even so, first-home buyers would still likely be the most affected. On the other hand, their risk of default and the associated high personal costs would also be diminished. The Board of the FIN-FSA issued a non-binding recommendation on debt-servicing-to-income limits in June 2022 and will assess the need for a sectoral capital risk buffer for mortgages with high debt-to-income or debt-servicing-to-income ratios.

Table 1.3. Past recommendations on macroprudential policy and actions taken

Past OECD policy recommendations (key ones in bold)	Policy actions since the 2020 Economic Survey of Finland (December 2020)
Introduce a maximum debt-to-income ratio for household loans and a maturity limit for housing loans.	The government introduced a 30-year maturity limit for housing loans that will take effect from July 2023. The Board of the Finnish Financial Supervisory Authority (FIN-FSA) issued a non-binding recommendation on debt-servicing-to-income limits in June 2022 and will assess the need for a sectoral capital risk buffer for mortgages with high debt-to-income or debt-servicing-to-income ratios. In June 2022, the government chose not to introduce a debt-to-income or debt-servicing-to-income restriction out of concern that it could disproportionately affect first-home buyers.
The prudential supervisors should monitor the effects of looser capital adequacy, regulations and criteria for non-performing loans (NPLs) and collateral eligibility and tighten them as the economy recovers.	The FIN-FSA monitors these effects. The loosening in capital adequacy requirements and regulations and criteria for NPLs and collateral eligibility are still in force. A return to normal pillar 2 guidance and capital buffer requirements is expected by end-2022 at the earliest.

Preferential tax treatment of owner-occupied housing and of rental housing financed by housing company loans also encourage the accumulation of housing debt. For owner-occupied housing, mortgage interest payments have been tax deductible and neither imputed rents nor capital gains are taxable. These tax advantages are capitalised into property prices, increasing the size of loans needed to buy property. This tax treatment will become less favourable from 2023, when mortgage interest will no longer be tax deductible. The government should consider going further by taxing capital gains on the principal residence unless they are re-invested in another principal residence within a certain time, as in the United States; the re-investment option avoids lock-in effects, which would be harmful to labour mobility and efficient resource allocation, but not eventual payment of the tax. For rental housing financed by housing company loans, the tax advantage over direct financing is that taxation can be deferred until shares in the housing company are sold. Housing companies take out loans for renovation and new construction using their real estate as collateral and then charge shareholders, who have occupancy rights to individual residential units in the company property, a monthly fee for all running costs and the amortisation of each owner's share of loan

repayments. These arrangements encourage investors in rental properties to purchase them through a housing company as the fee, which includes principal repayments, can be deducted from rental income whereas principal repayments on other loans cannot. If the deduction is taken against rental income, it cannot be taken again against capital gains when shares in the housing company are sold. Hence, the tax advantage is the ability to defer taxation until the shares are sold, the value of which will depend on interest rates. This tax advantage should be terminated, as recommended in the 2020 *Survey* (Table 1.4). Tax on transfers of shares in a housing company (2%) is also lower than on direct property transactions (4%). As property transfer taxes impose substantial welfare costs by distorting housing- and labour market decisions (Eerola et al., 2021[7]), these taxes should be replaced by taxes with lower efficiency costs, such as annual real estate taxes.

Table 1.4. Past recommendations on tax reform and actions taken

Past OECD policy recommendations (key ones in bold)	Policy actions since the 2020 Economic Survey of Finland (December 2020)
Reduce the tax burden on labour.	No action taken. The tax burden on labour has increased since the government came into office in 2019.
Increase minimum- and maximum rates on recurrent taxes on immovable property, and better align the tax base with market valuations.	No action taken.
Broaden the consumption tax base and phase out reduced VAT rates.	No action taken.
Lower the normal interest rate used in the calculation of the unincorporated business taxation equity allowance.	No action taken.
Remove the preferential tax treatment on capital repayments of housing company loans for investors and align the stamp duty rate on direct property transactions with that on transfers of shares in housing companies.	No action taken.

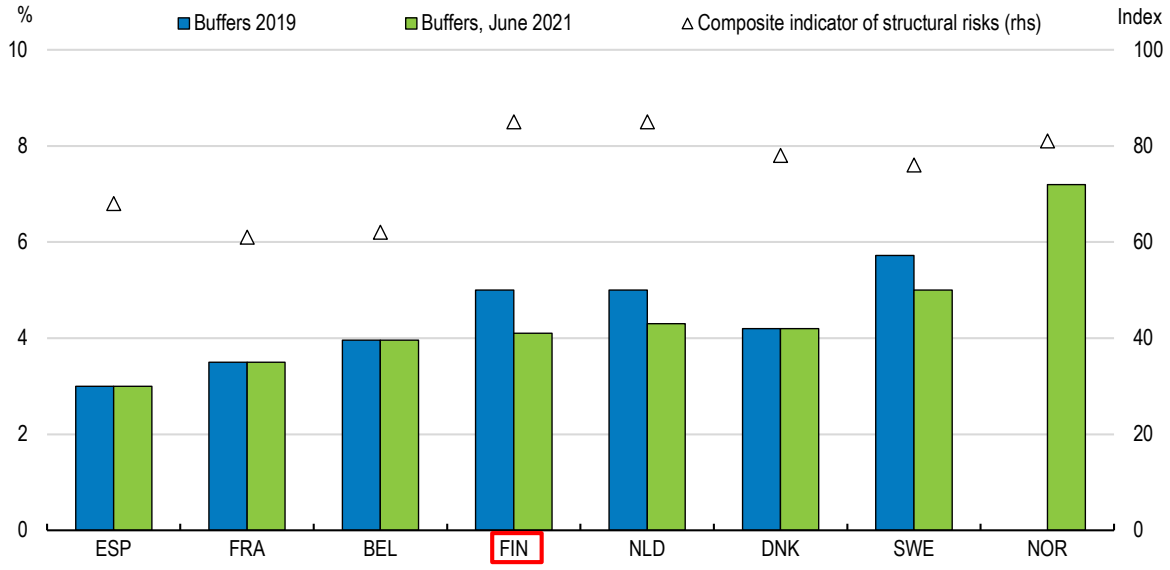
Housing company loans are also associated with mispriced risks resulting from the cross-subsidisation of high-risk shareholders by others. This problem arises because such loans are mutually guaranteed by all shareholders: fee payment defaults by some shareholders must be paid by others should the company be unable to recover the fees in default by other means (such as selling the shares concerned or letting the defaulting shareholder's apartment), a fact that many shareholders are unaware of or not able to price. One solution could be to make insurance cover compulsory for unrecoverable fees in default – insurance companies would levy higher premiums on high-risk shareholders than others (much as banks charge higher interest rates on loans to high-risk borrowers than on loans to others).

A useful additional element in the Finnish system to be launched in 2024 is the positive credit register. The register gathers information on the credits issued to Finnish individuals as well as their current income. The register will have very wide coverage on the type of exposures: it will include mortgages, student loans, consumption loans, credit cards and bank accounts with a credit limit, vehicle loans, loans for an investment purpose, part payments and leasing contracts. In the second stage, at the end of 2025, loans granted for an individual's business operations will also be reported to the register. The positive credit register will improve lenders' ability to test the creditworthiness of loan applicants, provide a source of reliable information on the credit market and create new ways to monitor the financial market for the macroprudential authorities.

The Board of the FIN-FSA announced in June 2022 that the structural macroprudential buffer requirements for the two largest other systematically important credit institutions (O-SII) will be increased by 0.5 percentage point from 1 January 2023. This increase will strengthen these institutions' loss-absorption capacity, thereby reducing the probability of financial crises and their negative impacts on the real economy and on the operation of the financial system. So as not to distort competition, buffer requirements should be set with regard to structural vulnerabilities. Kiviniemi (2022[8]) measures these by risk indicators capturing: the size of the banking sector; its concentration; the extent of cross-border activities; the concentration and financing structure of banks' credit portfolios; and household indebtedness. Finland has similar structural risk levels as the other Nordics and the Netherlands but somewhat lower structural

macroprudential buffers (Figure 1.22). The increase in buffer requirements will close the gap between Finland, on the one hand, and Denmark and the Netherlands, on the other, but not with Sweden and Norway. While the need to strengthen the resilience of the banking system remains, the gloomy and uncertain outlook for the economy and the financial system suggests any increases in the systematic risk buffer (SyRB) should be delayed so as not to have pro-cyclical effects.

Figure 1.22. Structural macroprudential buffers are smaller in Finland than in countries with similar structural risk levels



Note: For details on how the buffers and the composite indicator were constructed, see Bank of Finland Bulletin, 1/2022.
Source: (Bank of Finland, 2022[9]).

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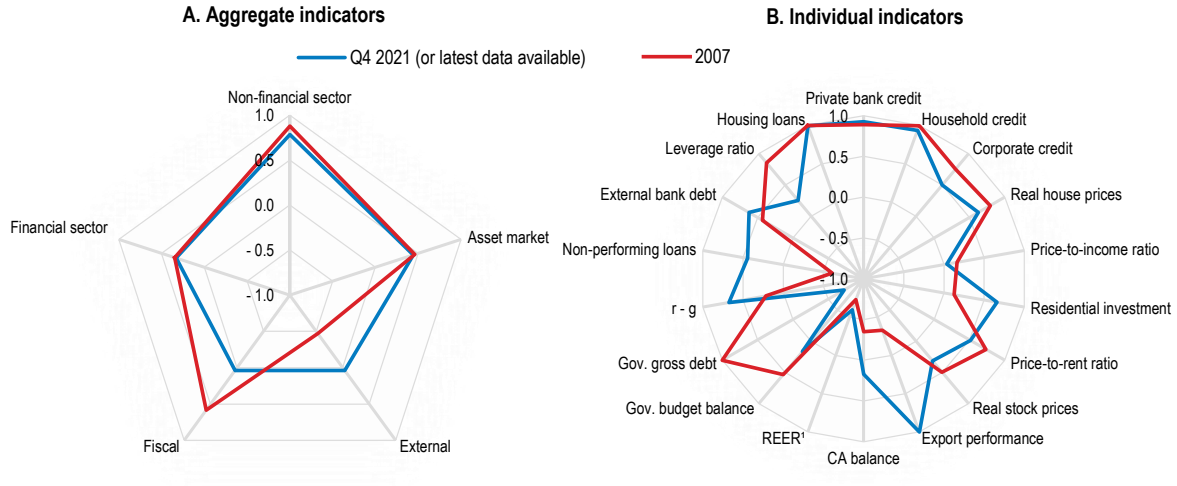
Legislation should also be changed to allow a positive neutral Countercyclical Capital Buffer (CCyB). As demonstrated by Covid-19 pandemic as well as more recently by Russia's war against Ukraine, large shocks outside the financial system may have cyclical effects on credit markets. In other words, there can be unexpected negative credit-cycle developments that are not preceded by a credit boom. The possibility of setting a positive rate for the CCyB even in the neutral credit market phase would allow macroprudential policymakers to address such developments.

The greatest macro-financial vulnerability is in the non-financial sector (Figure 1.23, Panel A), reflecting high levels of private bank- and household credit, both of which are far above the long-term average and are around 2007 levels (Figure 1.23, Panel B). Asset market vulnerability is also above the long-term average, albeit less so than non-financial sector vulnerability. The main factors contributing to asset market vulnerability are high real house prices, residential investment and house price-to-rent ratios. Financial-sector vulnerability is also above the long-term average, albeit less so than non-financial sector and asset market vulnerabilities, mainly owing to high housing loans, external bank debt and non-performing loans, all of which are equal to or greater than in 2007.

Figure 1.23. High levels of private bank- and household credit are a major macro-financial risk

Index scale of -1 to 1 from lowest to greatest potential vulnerability, where 0 refers to long-term average



Note: Each aggregate macro-financial vulnerability indicator is calculated by aggregating (simple average) normalised individual indicators. Non-financial includes: private bank credit, household credit and corporate credit. Asset market includes real house prices, price-to-income ratio, price-to-rent ratio, residential investment and real stock prices. External position includes the current account (CA) balance as a percentage of GDP, export performance and real effective exchange rate based on relative unit labour costs. Fiscal includes the difference between the interest rate on the government bonds and expected growth rate (r-g), government budget balance and government gross debt, both expressed as a percentage of GDP. Financial includes the share of non-performing loans in total loans, external bank debt as percentage of total banks' liabilities, banks' assets as share of GDP, and capital and reserves as a proportion of total liabilities (leverage ratio).
Source: OECD Resilience Database.

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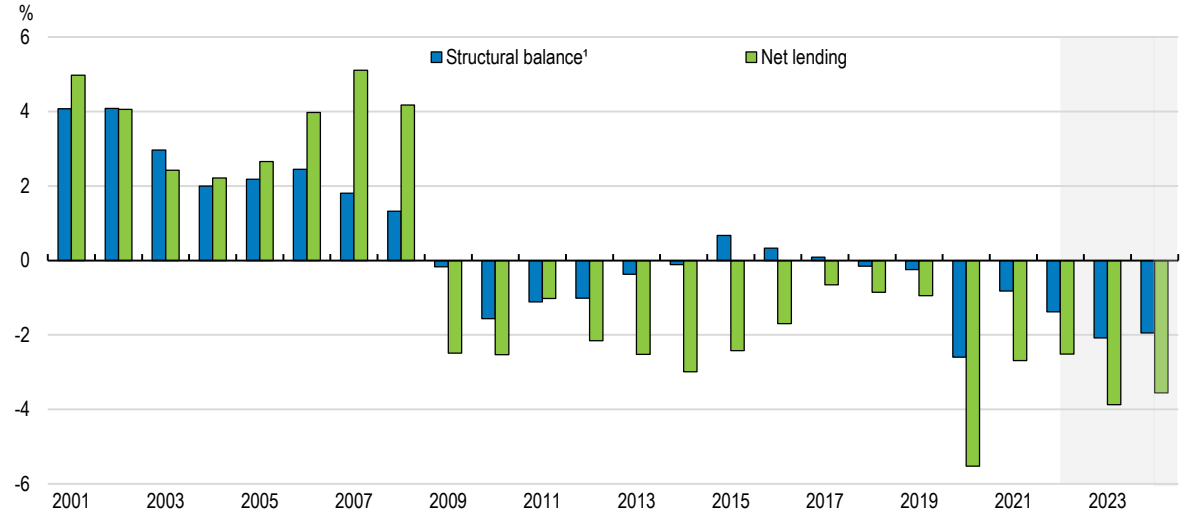
Fiscal policy will be expansionary in 2023 but neutral in 2024

Following a marked fall in 2021 as the extent of COVID-19 support declined, the general government structural budget deficit is estimated to have increased by 0.6 percentage point to 1.4% of GDP in 2022, despite the termination of most remaining COVID-19 support measures, and is projected to rise to around 2% of GDP in 2023 and 2024 (Figure 1.24), with central and lower levels of government running structural deficits but pension funds a structural surplus of around 1% of GDP. Additional expenditures related to Russia's war against Ukraine contribute 0.8% of GDP to the structural deficit in 2022 and 2023 and somewhat less in 2024. These include increases in defence expenditure and refugee-related expenditures (0.1-0.3% of GDP annually); the government estimates that there will be 60 000 (1.1% of the total population) applications for temporary protection in 2022 from people fleeing Ukraine. The government has also announced budget measures amounting to EUR 1.7 billion (0.6% of GDP) to cushion the impact of higher energy prices, including a temporary reduction in the VAT rate on electricity from 24% to 10% over December 2022-April 2023 (EUR 209 million), targeted assistance to households over this period (EUR 600) and targeted measures focused on transport (EUR 900 million), including a temporary reduction in VAT on passenger transport services, that expire at the end of 2023. These measures, most of which are targeted and warranted, largely account for the expansionary fiscal stance in 2023. All war-related expenditure increases as well as investments that boost energy production and help harness new technologies replacing fossil fuels are excluded from the government's spending limits. The structural budget deficit over the projection period is around 1.8% of potential GDP higher than before the pandemic. General government gross debt (Maastricht definition) is projected to continue increasing, from 72% of GDP in 2021 to 76% in 2024.

Figure 1.24. The structural budget deficit remains relatively large

General government, % of GDP



1. Cyclically-adjusted net lending, per cent of potential GDP.
Source: OECD (2022), Economic Outlook (database).

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Table 1.5. Past recommendations on fiscal policy and actions taken

Past OECD policy recommendations (key ones in bold)	Policy actions since the 2020 Economic Survey of Finland (December 2020)
Stand ready to provide further fiscal stimulus in case the economic recovery is delayed.	This has occurred, largely through additional expenditures related to the COVID-19 pandemic and Russia's war against Ukraine.
Once the economic recovery is underway, implement consolidation measures, mainly by reducing expenditure, including on subsidies and tax expenditures, and also by increasing taxes that do not impose large economic distortions, such as VAT (broadening the standard-rate base) and recurrent real estate taxes.	Measures to reduce the structural budget deficit have largely focused on increasing employment and thereby increasing revenue and reducing transfers expenditure. No action has been taken on reducing subsidies and tax expenditures or on increasing taxes that do not impose large economic distortions.
Strengthen budget buffers.	No action taken.

Real public investment is projected to grow strongly in 2022 (8.5%) and 2023 (6.1%) and average around 4.5% of GDP (in current prices), which is much higher than the EU average (Ministry of Finance, 2022[10]). In 2022, public investment will be boosted by efforts to improve Finland's security and to implement the green transition and to a lesser extent by projects financed by the EU's Recovery and Resilience Facility, partly offset by local government disposals of hospitals. Weakening local government finances and sharp price increases could, however, hamper civil engineering investments this year and next. In 2023, continued strong growth will be driven by central government measures to develop cybersecurity, national defence and border control but somewhat attenuated by the completion of transport infrastructure investments, the slowing of hospital construction and the ending of infrastructure subsidies. Civil engineering investments and other construction investments both account for close to 30% of public investments. Research and development investments account for just over 25% and machinery and equipment investments for just over 10% of the total. Public investment in housing construction has declined over the past decade, contributing to deteriorating rental housing affordability (OECD Directorate of Employment, Labour and Social Affairs, 2021[11]).

General government contingent liabilities grew strongly in the past decade to 27.1% of GDP in 2020, the highest level in the European Union. Concentration of loan guarantees in a small number of sectors and enterprises increases risks for government finances. One half of the guarantees are for the shipbuilding

industry and their riskiness is likely to have increased owing to the pandemic. The Finnish Audit Office (2018[12])notes that risk levels of contingent liabilities vary greatly and rightly stresses the need to limit the overall risk to which they expose government finances rather than to set numerical stock ceilings by instrument category. To control risks, the Audit Office considers that there must be good justification for increasing contingent liabilities, a comprehensive risk assessment should be made before making any commitments, regular reports on the risk position should be submitted, and that limitations of risk permitted would reduce total risk.

Restoring public finance sustainability

Age-related expenditures are projected to rise by only 4.5% of GDP between 2019 and 2070 (Table 1.6). Pension expenditures are projected to decline as a share of GDP until 2050 despite the age-dependency ratio increasing from 36.0% to 48.6% thanks to reforms that have greatly reduced the effects of rising life expectancy on expenditures (Box 1.6). However, pension expenditures will rise as a share of GDP in the subsequent two decades as a fall in fertility rates during the 2010s (Figure 1.26) filters through the population age structure, reducing the working-age population sooner than the population eligible for old-age pensions (on the assumption that the fertility rate remains at 1.5 over the projection period). Increases in contribution rates (currently 24.4%) to Finland's (earnings-related) pension system, which is financed from both assets accumulated in pension funds (for one-fifth of private-sector pension expenditure) and pay-as-you-go (PAYG) contributions, would be required from the 2040s to ensure that the pension system remains sustainable. Education expenditures will initially fall as a share of GDP owing to smaller cohorts of youth but are assumed to rise subsequently to prevent a decline in the stock of human capital while healthcare- and long-term-care expenditures rise markedly reflecting both population ageing and, for healthcare expenditure, excess cost growth (i.e., long-term growth in healthcare expenditures relative to GDP that is not related to demographics) (Table 1.7).

Table 1.6. Pension reforms limit growth in age-related expenditures

	2019	2030	2040	2050	2060	2070	2019 to 2070
Age-related expenditure	**% GDP unless otherwise stated**						
Pensions	13.3	13.3	12.4	12.2	13.0	13.8	0.5
Healthcare	6.8	7.1	7.3	7.4	7.6	7.7	0.9
Long-term care	2.0	2.7	3.5	4.0	4.5	5.3	3.3
Education	5.6	5.3	4.9	5.1	5.3	5.5	-0.1
Total	**27.8**	**28.4**	**28.2**	**28.7**	**30.3**	**32.3**	**4.5**
Participation rate[2]	66.5	66.3	69.1	71.3	70.5	69.5	3.0
Old-age dependency ratio[3]	36.0	42.9	45.1	48.6	54.1	59.2	21.7

1. Baseline scenario. Data for 2019 and projections thereafter. Inflation is 2% from 2028 onwards.
2. For the population aged 15-74.
3. Population aged 65 and over relative to the population aged 15-64, in per cent.
Source: (Bank of Finland, 2021[13]).

Table 1.7. Key assumptions underlying debt-ratio projections

Annual growth rates, %	2020-29	2030-39	2040-49	2050-59	2060-70
Potential output	1.2	1.2	0.5	0.5	0.5
Labour productivity	1.1	1.3	0.8	1.0	1.0
Hours worked	0.1	-0.1	-0.3	-0.5	-0.5
Human capital	1.3	0.6	0.1	0.0	0.0
Fixed capital	1.3	1.7	0.9	0.9	0.9
Implicit nominal interest rate on public debt	1.3	2.9	3.0	3.0	3.0
Non-interest property receipts (% of non-interest-bearing financial assets).	2.3	2.3	2.3	2.3	2.3
Real growth rate of non-interest property receipts	2.3	2.3	2.3	2.3	2.3
Government interest-bearing financial assets (% of GDP)	49	49	49	49	49

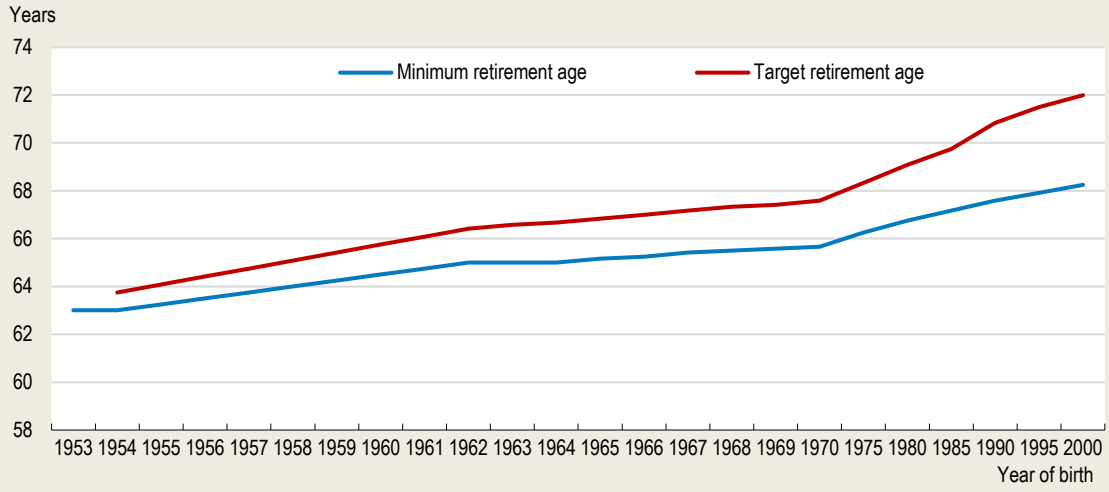
1. Baseline scenario. Data until 2021 and projections thereafter. Inflation is 2% from 2028 onwards.
2. Non-interest-bearing financial assets are shares and investments in mutual funds. Receipts from these investments were 2.3% of the value of such investments in 2021, compared with an average of 2.9% since 2000.
3. It is assumed that dividends grow at a real rate of 2.3% per year. This gives an approximate real return on equity investments of 4.6% and, with the risk-free real rate assumed to be 1%, an equity risk premium of 3.6% in the long run.

Source: (Bank of Finland, 2021[14]); OECD projections for implicit interest rates, return on equity investments (dividend yield and growth in dividends) and government financial assets.

Box 1.6. Pension reforms have reduced the effects of growing life expectancy on expenditures

The 2005 reform introduced the life-expectancy coefficient, which reduces pensions for each cohort born after 1947 such that growing life expectancy does not increase the present value of pensions at age 62 from the level in 2009. This reform also changed the income base for calculating pensions from the last 10 years of each employment contract to incomes over the entire work history. The 2017 reform raises the minimum retirement age gradually from 63 to 65 by 2025 and will link it to life expectancy from 2030 in such a way that the share of adult life spent in retirement remains constant. To help people make informed decisions about the timing of their retirement, a target retirement age is calculated for each cohort that corresponds to the age at which the pension increment from delaying retirement offsets the reduction from the life expectancy coefficient (Figure 1.25). However, people born after 1985 will not be able to avoid lower pensions because their target retirement age exceeds 70, the age limit for pension contributions. To give these people the opportunity of contributing longer to avoid these pension reductions, this age limit should be indexed to the target retirement age beyond 70; this would not affect the pension system's solvability as the extra contributions would offset the additional pension liabilities.

Figure 1.25. Target retirement ages are rising faster than minimum retirement ages



Source: Finnish Centre for Pensions.

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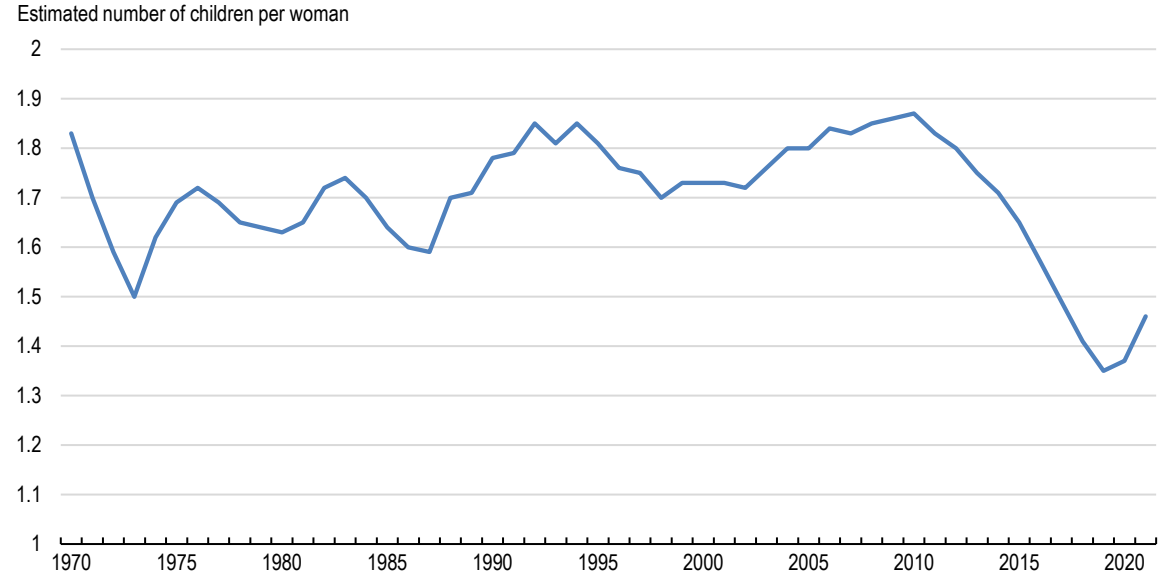
On unchanged policies (baseline scenario) and assuming that age-related expenditures grow in line with the projections in Table 1.6, the OECD projects that gross general government debt will increase from 72% of GDP in 2021 to 131% by 2070 and continue rising thereafter (Figure 1.27). This debt trajectory assumes that education expenditure volume per student increases from its present level to the level seen in the early 1990s. As a result, human capital stagnates from the late 2040s instead of declining (Table 1.7). With population ageing causing hours worked to decrease from the 2030s onwards, potential output growth is entirely driven by fixed capital, which is assumed to grow until the fixed capital to human capital ratio is the same as in the early 1990s. Potential growth stabilises at 0.5% from the 2040s onwards. In the reform scenario, where the innovation system becomes more effective and work-based immigration increases, gross general government debt rises to 114 **%** of GDP by 2070. If Finland reduces its structural budget deficit to the medium-term objective (MTO) of -0.5% of GDP by 2030, which is a legal obligation although not necessarily by 2030, and continuously takes consolidation measures to keep the structural deficit at this level, the debt ratio would increase from 72% of GDP currently to 99% by 2070. A more ambitious structural deficit objective would be required for long-term fiscal sustainability. Possible consolidation measures are discussed below.

Figure 1.26. The fertility rate[1] fell sharply over the past decade



1. The total fertility rate in a specific year is defined as the total number of children that would be born to each woman if she were to live to the end of her child-bearing years and give birth to children in alignment with the prevailing age-specific fertility rates. It is calculated by totalling the age-specific fertility rates in a given year.
Source: Statistics Finland.

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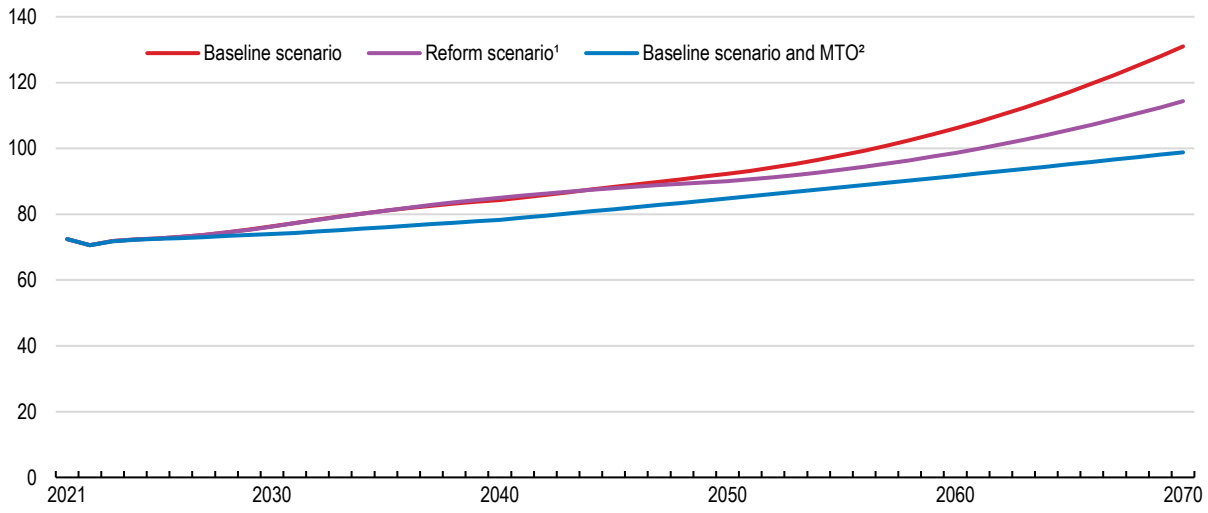
The government is committed to reducing the structural budget deficit mainly by increasing employment, which will reduce transfers expenditure and increase government revenue. It has set a target of increasing employment by 80 000 by the end of the decade. The Ministry of Finance estimates that the employment measures taken to date or planned could increase employment by around 40 000 (see below) and reduce the structural deficit by EUR 450 million (EUR 1 billion before taking into account associated increases in expenditure), far short of the EUR 1-2 billion (0.4-0.8% of GDP) assumed by the government. Taking into account these measures, the effects of the war and the measures taken in response and good employment outcomes, the Ministry of Finance estimates that the sustainability gap (an EU measure (S2 indicator) of the amount by which the structural balance would need to increase for the debt-to-GDP ratio to be stable in the long run on unchanged policies) is approximately 2.5% of GDP (Ministry of Finance, 2022[10]), 0.5 percentage point less than at the time of the last *Survey*. The government has proposed further reforms to increase employment (see below) but for the time being there are no credible estimates of their effects.

Figure 1.27. Government debt would increase substantially under unchanged policies

Gross general government debt, % GDP



1. In the reform scenario, improvements in the innovation system increase the level of GDP by 3% over the baseline by 2050 and work-based immigration rises gradually from the current level (1 500 per annum) in 2030 to 7 500 per annum in 2050-70. In addition, fixed capital is assumed to grow faster (at 2% per year throughout the projection) than in the baseline scenario (0.9% per year from 2040 onwards). Higher growth in the fixed capital-to-labour ratio is the main factor increasing growth in labour productivity (to 1.4%) and output (to 1.1%) in the reform scenario.
2. In the MTO scenario, Finland continuously meets its medium-term budgetary objective of a structural financial balance of minus 0.5% of GDP from 2030.
Source: OECD.

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The healthcare and social-care reform that will come into effect in January 2023 is expected to yield improvements in efficiency and slow growth in healthcare- and long-term care costs in the long run. The reform transfers responsibilities for the delivery of healthcare and social services, which amounted to EUR 19.2 billion (8% of GDP) in 2019, from municipalities to counties, as recommended in the 2020 OECD *Economic Survey* (Table 1.8). It is expected to increase efficiency by strengthening service coordination, providing scope for rationalisation of services and enhanced purchasing power and to improve equality of access to quality services. New funding arrangements provide incentives, albeit weak, for efficacy improvements. Apart from customer payments and fees, financing will be provided by central government to each county based on various factors, the most important of which is a county's estimated healthcare and social service needs. Starting in 2025, only 80% of the estimated increase in service needs will be compensated in advance, with all counties subsequently receiving the same percentage difference between imputed and realised costs at the national level. Counties unable to remain within their budget run the risk of being forced to merge with others.

Table 1.8. Past recommendations on social and healthcare reform and actions taken

Past OECD policy recommendations (key ones in bold)	Policy actions since the 2020 Economic Survey of Finland (December 2020)
Enact the social and healthcare reform before Parliament. Set numerical targets for fiscal savings to be achieved from these reforms to help the government plan reforms that maximise cost efficiency while ensuring equal access to quality services.	The social- and healthcare reform comes into effect from the beginning of 2023. While there are no numerical targets for fiscal savings, the reform is expected to generate them in the long term.
Rationalise the organisation of healthcare services to achieve a better balance between primary and specialised care.	This is an objective of the social care- and healthcare reform.

This reform is expected to slow growth in healthcare- and long-term care expenditures in the long run. In the short term, however, it creates additional costs. The Ministry of Social Affairs and Health projects that the net effect of the reform will be to increase annual budget costs relative to the baseline until 2030, with the largest increase (EUR 600 million, 0.2% of GDP) occurring in 2023, and to reduce them beyond 2031, with annual savings growing by EUR 200 million (in constant 2020 prices, 1% of annual expenditure) until 2035, the end of the projection period. Nevertheless, there is a risk that the steering and financing model does not lead to more efficient outcomes because the new organisations do not have strong incentives to implement measures that would lead to efficiency gains. Decentralising spending alone could lead to soft budget constraints and overspending by counties owing to the vertical fiscal imbalances in the system (Kortelainen and Lapointe, 2019[15]). Already, the counties claim that an additional EUR 1.5 billion of central government funding is needed for 2023, in part owing to the recently negotiated pay agreement with municipal workers and nurses that resulted in a sustained premium over wage increases in the private sector. In the short run, the situation requires close monitoring, and in the longer run incentives for counties to improve efficiency will need to be increased if they prove to be insufficient to meet reform objectives. The Ministry of Finance has incorporated the short-term budget effects of the reform but not the long-term effects as they are highly uncertain. The reform should be taken further by implementing payment models (accountable-care organisations and bundled payment models) that reward integrated service delivery and high-quality outcomes. Increases in productivity growth in this sector could have a major effect on the sustainability gap – the Ministry of Finance estimates that a 0.5% productivity growth rate would reduce the sustainability gap by 1.9% of GDP (Ministry of Finance, 2022[10]).

Finland last undertook a comprehensive spending review in 2015 that helped identify consolidation measures that would reduce public expenditures and increase revenues (tax expenditures are reviewed annually, as required by the EU). It should undertake another comprehensive spending review to identify consolidation measures to reduce the structural budget deficit to the MTO. Moreover, these spending reviews should be made regular and strengthened; Tryggvadottir (2022[16]) outlines OECD best practices for spending reviews and the Netherlands and the United Kingdom provide some good-practice examples (Box 1.7). In this context, there may well be scope to reduce aid to companies that does not increase long-term productivity. Experts estimate that only just over 40% of direct state aid for companies directly promotes long-term productivity (Table 1.9). They also consider that most current tax benefits for companies do not promote long-term productivity. Of the 100 tax reliefs for companies considered in their study, only three were thought to have a positive effect on productivity. Broadening the consumption tax base and phasing out reduced VAT rates and increasing minimum- and maximum tax rates on immovable property and better aligning the tax base with market values, as recommended in past *Surveys* (Table 1.4), would also help to reduce the structural budget deficit to the MTO objective.

Box 1.7. Spending reviews help OECD governments identify efficiency gains

Spending reviews provide governments with means to support the sustainability of public finances through systematic analysis of existing expenditure. Governments utilise spending reviews to reallocate fiscal resources and help prioritise and control government expenditure. As such, they have become an increasingly important tool for budgetary governance in OECD countries

Spending reviews in the Netherlands and the United Kingdom

In the Netherlands, spending reviews are conducted both annually and periodically. The Ministry of Finance selects topics for the annual reviews, which often cover areas that face financial problems or are relevant to government priorities. Topics range from ministry-specific (e.g., healthcare innovation) to interdepartmental (such as social housing) or government-wide (e.g., subsidies). Prior to each electoral term, the Netherlands also conducts comprehensive reviews, which examine a broader share of the budget and cover substantial policy topics across major areas of spending. Comprehensive reviews are planned and conducted such that findings and recommendations are in place when a new

government takes over at the start of the subsequent electoral term. The spending reviews are carried out by non-political working groups consisting of high-level civil servants and external experts and are headed by an independent chairman. To promote fresh thinking, the working groups operate on a "non-veto principle", meaning that working group members may not block ideas from other members.

In the United Kingdom, spending reviews normally take place every two to four years, as part of the budget process. The spending reviews focus on the part of the department budget (roughly 50%) that is formally planned and not on recurrent demand-driven costs, such as pensions, welfare benefits and debt interest, although departments often look for ways to cut down on these expenditures to finance other programmes. The last spending review was launched in the autumn of 2021 and set departmental budgets for the period 2022/23 to 2024/25. Before drawing up the spending review, Treasury asked government departments to identify areas where they could achieve efficiency savings of 5%, which were then reviewed by Treasury before being included in the spending review.

The UK National Audit Office has identified the following factors as keys to finding and realizing efficiency gains in spending reviews:

- Going from annual to multi-year spending reviews has helped departments stick to plans stretching over more than one year, as the option of revisiting the budget for years two and three in the next spending review is no longer there. A longer time horizon also means a wider range of policy options for the government to consider, as some efficiency-enhancing measures could increase costs in the short term and require more than one year to be realized. Conversely, short-sighted efficiency gains might carry costs down the road.
- Departments should carefully consider what consequences efficiency plans could have for future resilience. Enhancing efficiency by cutting down on spare capacity, or the number of employees, could mean a greater risk of failing to meet objectives in unplanned or crisis situations, as made clear by the pandemic.
- Overoptimistic targets could lead not only to failure to deliver but also to lower service quality and the need for later funding injections. It is therefore important that departments estimate costs and benefits using data from similar projects and that efficiency plans are challenged by Treasury, especially the assumptions on potential savings accruing for other parts of government.
- Measuring and managing performance requires access to good data. Efficiency targets should be set up in a way that makes it clear when the outcome is achieved. Departments should also outline a counterfactual of what would happen without the launched programme and set up milestones, with clear thresholds for intervention, including the option to halt the programme.
- Spending reviews should also be an opportunity for departments to suggest measures, such as leadership incentives and staff training, which lead to continuous, incremental efficiency gains, and factor that into spending plans. If departments' efficiency plans depend on transformation programmes, it is imperative that the programme is not an aim in itself and that departments stop the programme if it becomes apparent that it fails to achieve greater efficiency.

Source: (UK National Audit Office, 2021[17]), (Tryggvadottir, 2022[18]).

Table 1.9. Most direct aid for companies does not increase long-term productivity

EUR millions, 2021

Sector	Promotes long-term productivity directly	Promotes long-term productivity indirectly	Does not promote long-term productivity	Total
Energy	164.2	5.6	415.3	585.1
RD&I, internationalisation and entrepreneurship	416.9	14.0	0.0	430.9
Employment and regional policy	0.0	3.0	180.8	183.8
Traffic and communication	50.2	13.0	99.7	162.9
Housing construction	0.0	0.0	146.3	146.3
Agriculture and forestry (article 107)	5.8	5.7	33.7	45.2
Environmental protection	0.0	1.5	13.7	15.2
Total	637.1	42.9	889.5	1569.4
% of total	40.6	2.7	56.7	100.0

Source: Ministry of Economic Affairs and Employment, Ministry of Finance and Ministry of the Environment (forthcoming).

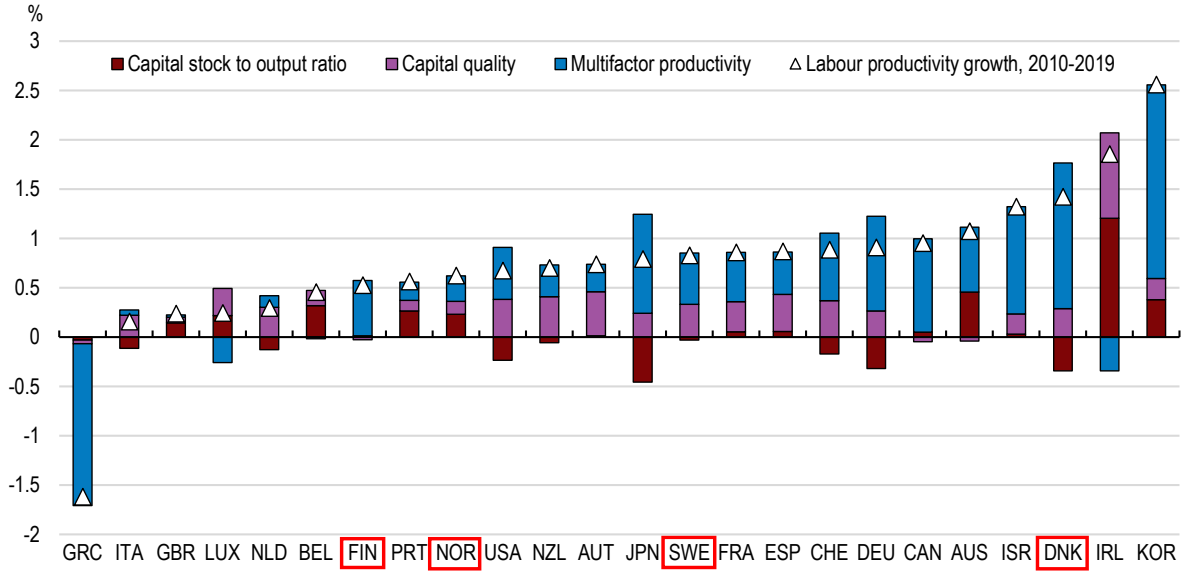
Towards stronger and more sustainable economic growth

Enhancing productivity growth and improving resource allocation

Finland experienced fast productivity growth until the late 2000s, underpinned by the rapid expansion of the electronics sector, a strong innovation ecosystem and tertiary education reforms that boosted skills. This came to an end as the electronics sector underwent a significant adjustment triggered by the decline of Nokia's mobile phone business. Between 2010 and 2019, Finland's hourly labour productivity grew by only 0.5% per year – less than in many other OECD economies, notably Sweden and Denmark (Figure 1.28). Multifactor productivity, which reflects innovation and improvement in resource allocation, grew by 0.6% per year during this period, as opposed to 0.7% in Sweden or 1.2% in Denmark. The sluggish growth rate is attributable to Finland's weakened innovation ecosystem (Chapter 2) and deteriorating resource allocation as the weight of the economy shifted toward less productive sectors, namely services. In particular, labour productivity declined in services that use digital technologies intensively (Finnish Productivity Board, 2021[19]), which is striking given Finland's status as the front runner in the adoption of digital technologies (European Commission, 2022[20]).The lack of contributions from capital deepening and improvements in capital quality also weighed on labour productivity growth (Figure 1.28). Weak capital investment undermines Finland's competitiveness by reducing the scope for Finnish firms to deploy advanced technologies embodied in new equipment, for instance more energy efficient or less polluting production technologies that help the green transition. Finland's investment in ICT and intangible capital has also been subdued, preventing Finland from reaping the full benefits of its extensive digital adoption (Chapter 2).

Figure 1.28. Weak innovation and capital investment held back productivity growth

Average annual labour productivity growth, %, 2010-2019



Note: 2020 is excluded to abstract from the impact of the COVID-19 pandemic on the long-run estimates of productivity growth.
Source: OECD (2021), Compendium of Productivity Indicators.

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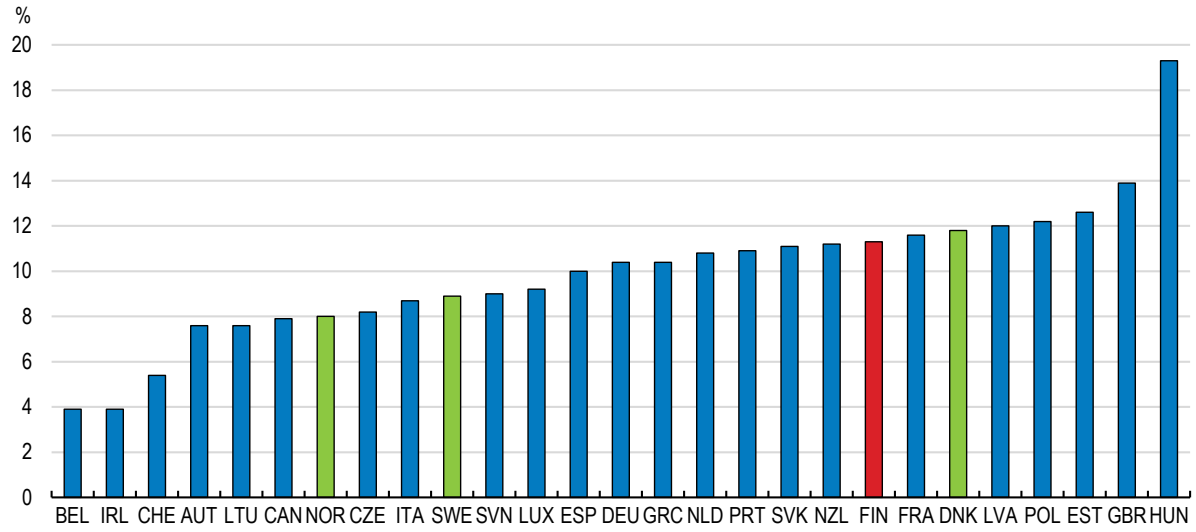
Between 1998 and 2015, Finland's economy was characterised by low entry and exit rates compared with other advanced economies, with large firms employing a larger share of workers and start-ups and young firms comprising a relatively low share of microenterprises (OECD, 2020[21]). More recently, Finland has enjoyed relatively vigorous entrepreneurship (Figure 1.29). Finland also has a strong up or out dynamic, with microenterprises that survive more than five years achieving higher growth than in comparable economies (Economic Policy Council, 2022[22]). It also has been observed in the past that one half of new jobs were created by "gazelles", firms that account for only 6% of Finnish firms but grow by more than 20% annually in employment size (Virén, Vanhala and Nurmi, 2016[23]). The venture capital market is larger than in many OECD countries aside from the few countries with exceptionally large venture capital markets (the United States, Israel and Canada). Finland boasts a strong ecosystem of start-up finance supported by Slush, a company offering networking services matching entrepreneurs and investors, and Tesi, a state-owned investment company that boosted its investment in tech companies experiencing delays in fundraising during the pandemic through its Venture Bridge programme. According to the Finnish Venture Capital Association, investment in Finnish start-ups doubled in 2020 to EUR 921 million, and went on to reach EUR 1.2 billion in 2021. The large increases were driven by substantial inflows of foreign capital.

Rigorous competition enhances productivity growth through reallocation of labour and capital toward more productive firms. Although Finland's product markets are more concentrated than in comparable economies, Finnish firms are not extracting higher mark-ups (Economic Policy Council, 2022[22]). High market concentration is also not the result of a handful of very productive firms capturing most of the markets. Productivity dispersion is actually smaller in Finland than in comparable economies and the extent to which more productive firms capture a larger market share (*i.e.,* allocative efficiency) is lower (Economic Policy Council, 2022[22]). These observations, together with the vigorous market entry and growth of young firms seen above, suggest that Finland enjoys a healthy degree of competition. However, some regulatory barriers and skills bottlenecks are preventing productive Finnish firms from becoming even more productive and larger by investing more and attracting resources.

Figure 1.29. Entrepreneurship is relatively vigorous

Birth rate of enterprises with at least one employee[1], %, 2019



1. The birth rate is given by dividing the number of enterprise births in 2019 by the number of enterprises active in 2019.
Note: Data refer to 2018 for Ireland and the United Kingdom.
Source: OECD SDBS Business Demography Indicators (database).

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As described in the 2020 *Survey* (OECD, 2020[24]), product market regulations overall are conducive to competition. Moreover, recent regulatory reforms in network sectors will enhance competition. For instance, the unbundling of the natural gas transmission network and the wholesale and retail trading of gas in 2020 opened the market to competition and created opportunities for Finnish gas companies to diversify their gas procurement away from Russia. Rail passenger transport, which was a state monopoly, has been opened to competition since 2021 in compliance with the 2016 EU-wide railways regulations package. Data management reform was undertaken in the electricity market in 2022, promoting competition (Table 1.10). Nevertheless, regulations continue to hinder competition in some sectors. For instance, the Finnish Competition and Consumer Authority (FCCA) found that restrictive regulations on the number of pharmacies in a given geographic area, the ownership of pharmacies and the number of pharmacies that can be owned by a single person or entity contributed to pharmacies' relatively high profit margins (Anttinen et al., 2020[25]). The FCCA proposed a range of reforms including simplifying the licensing process for pharmacies and allowing the sales of non-prescription medicines outside pharmacies. While the financial regulatory framework enhances financial stability and investor protection, it may also hinder the development of new forms of finance for innovative and fast-growing companies.

Some labour market regulations in Finland are holding back resource reallocation toward productive firms. In Finland, it is relatively easy to lay off workers for economic reasons such as a decline in production (although they must be rehired first when the employer is once again recruiting, even in a different line of business), but much more difficult to do so for individual reasons. This often discourages productive firms from scaling up their operations as they cannot incur the risk of hiring personnel who lack the specific skillset required for their businesses and not being able to let them go. Such risk is also considered a barrier to investing in Finland by multinational enterprises (OECD, 2021[26]). As noted in the previous OECD Economic Survey of Finland (OECD, 2020[24]), extensive coverage of collective wage agreements with limited scope for firms to opt out results in a compressed distribution of wages that fails to align with productivity levels and contributes to resource misallocation. This issue is most pronounced for firms that are not members of the employer association that negotiated the sectoral agreement, mostly small firms, as by law they are not allowed to use the enterprise-bargaining flexibility clauses in the agreement. The government envisaged repealing this legal restriction before the pandemic (OECD, 2020[24]), but has put the reform on hold.

Table 1.10. Past recommendations on productivity-enhancing reforms

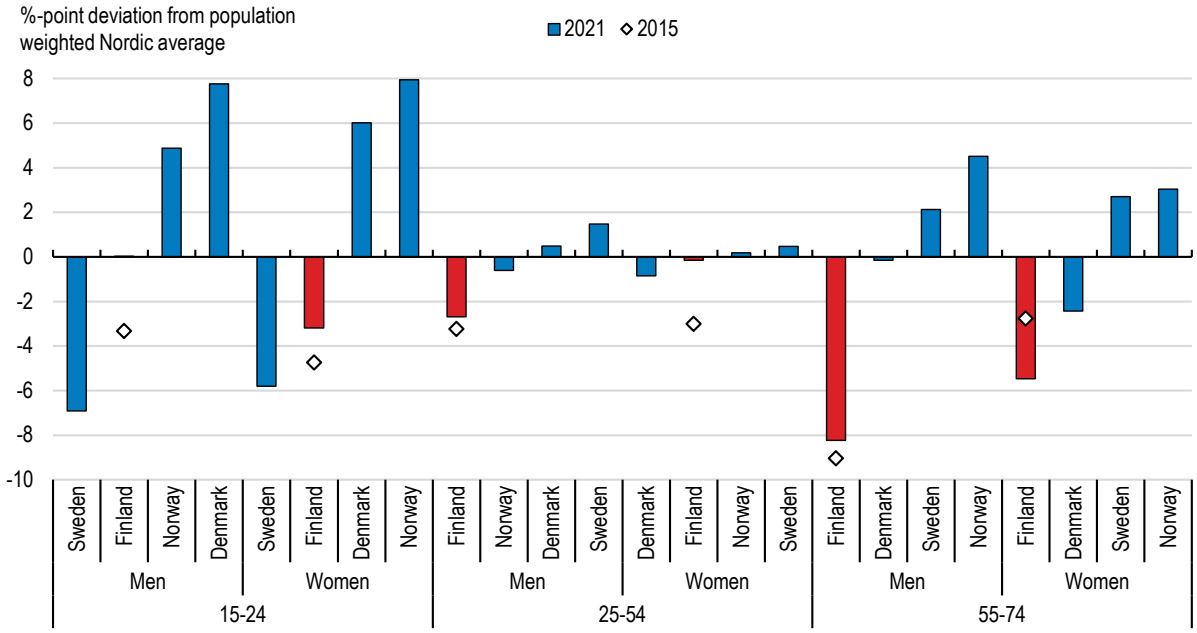
Past OECD policy recommendations (key ones in bold)	Policy actions since the 2020 Economic Survey of Finland (December 2020)
Reduce barriers to competition in transport, energy, and retail.	Rail passenger transport was opened to competition in 2021 in compliance with the 2016 EU-wide railways regulations package. Network development plans for the distribution system were introduced in 2021 to support the integration of electricity generation from renewable energy sources as well as to facilitate the development of energy storage facilities. New requirements for network operators to reduce costs of transmission and distribution services were introduced. A centralised information exchange system (Datahub) was introduced in 2022, bringing together all electricity consumption data held by 77 distribution system operators and 64 retail electricity suppliers. Access to these centralised data promotes the use of smart grids and meters and innovative new services. It also facilitates decentralised electricity generation and increases competition in the retail market.
Ensure that the financial regulatory framework supports the development of new forms of financing for innovative and fast-growing companies, while guaranteeing financial stability and investor protection.	No action taken.
Design public procurement in a way that encourages innovation.	The Ministry of Economic Affairs and Employment is preparing an action plan to implement the government's objectives for the sustainable and innovative public procurement and innovation objectives of the National Public Procurement Strategy.
Ease the transition from secondary to tertiary education by reforming the highly selective tertiary education admission system and increasing the number of available study places.	From 2020, admissions to just over one half of study places in higher education institutions shifted to certificate-based admission, which is based on the grades of the matriculation examination at upper secondary schools and initial vocational qualifications from vocational institutes.
Use funding criteria for higher education institutions or R&D vouchers to reinforce co-operation between companies, particularly start-ups, and universities.	The Academy of Finland's Flagship Programme has been expanded in the fourth supplementary budget of 2020, allocating EUR 25 million to fund new Flagships. The Academy is also prepared to fund new Flagships with an additional EUR 20 million in coming years. Business Finland has developed a new model of private-public partnership for long-term R&D and innovation collaboration between firms, research institutes and universities. Pilot projects began in 2020, with results feeding into further development of the model in 2021-23.

Increasing employment and reducing the gender wage gap

The government has implemented numerous labour market reforms and plans further reforms aimed at increasing employment by 80 000 by the end of the decade and narrowing the employment-rate gap relative to the Nordic average (Table 1.11; Figure 1.8). The Ministry of Finance estimates that reforms already implemented or planned could increase employment by around 40 000, pointing to the need for further reforms to achieve the government's objectives.

A major focus of reforms since the last *Survey* has been to increase the employment rate of older workers, which lags well behind the Nordic average despite increases in recent years resulting from the 2005 and 2017 pension reforms (Figure 1.30 and Figure 1.31; Box 1.6). In December 2020, the government announced a package of measures to increase employment of older workers (55 and over), the most important of which is the phasing out of access to extended unemployment benefit by 2025, as recommended in the 2020 *Survey* (Table 1.13). Other measures include: increasing the cap on the earned income tax deduction, a new model of redundancy pay and a training obligation, and a new 70% wage subsidy. The Ministry of Finance estimates that phasing out extended unemployment benefit will increase employment by 9 100 by the end of the decade (Table 1.11). To achieve this increase, it will be important to limit leakage of early retirement flows into disability benefit, the main alternative to the unemployment tunnel. In this regard, non-medical factors for the award of disability benefits should no longer be taken into consideration for applicants aged 60 or over, like for other applicants (Box 1.8).

Figure 1.30. Employment rates by age and sex



Source: OECD staff calculations based on OECD Labour Force Statistics database.

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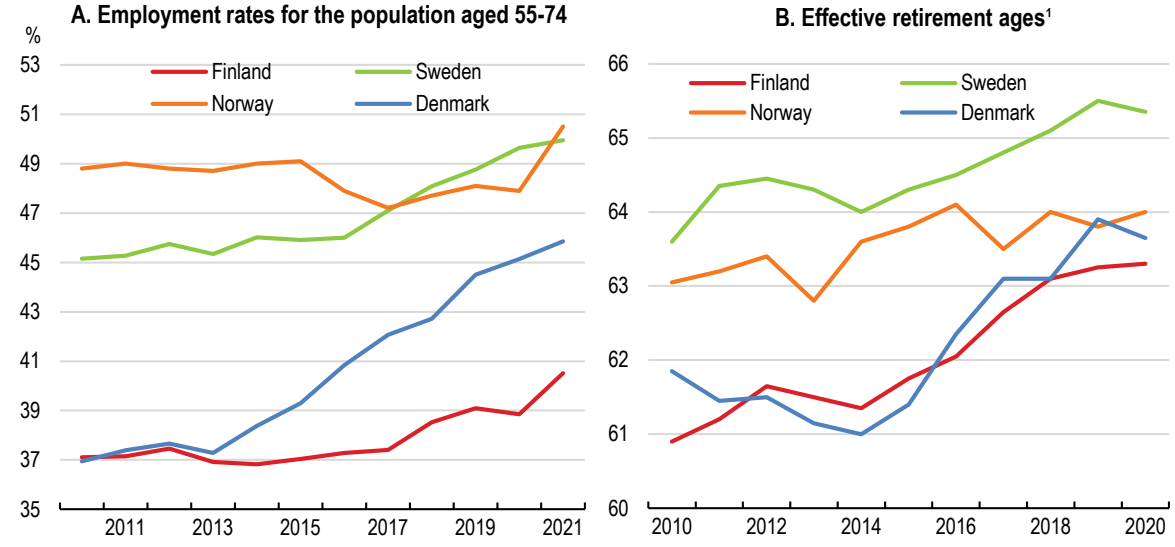
Figure 1.31. Employment- and effective retirement rates for older workers have been increasing



1. Average of effective retirement age for men and women.
Source: Statistics Denmark; Statistics Finland; Statistics Norway; Statistics Sweden; OECD, Pensions at a Glance (database).

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Table 1.11. Estimates of employment effects of government decisions and proposals by 2030

	Positive effect		Negative effect		No credible estimates
	Minimum	Maximum	Minimum	Maximum	
Measures implemented					
Nordic labour services model	9500	9500			
Raising minimum age for extended unemployment benefit from 61 to 62	6500	7000			
Reduction in early childhood education and care fees	2500	3600			
Reform of adult education allowance	200	200			
Extension of compulsory education[1]					x
Changes in taxation and social security relative to legislation in 2019[2]			2900	8600	
Partial abolition of the activation model[3]			2000	4900	
Measures proposed to Parliament or past the planning stage					
Phasing out the unemployment tunnel and other reforms to increase employment of over 55s	9100	9100			
Simplification of the wage subsidy system	500	1000			
Linear model for partial disability pensions	200	200			
Measures in the planning stage					
Transfer of employment services to municipalities	6600	6600			
Increase employment of the partially disabled through municipality public procurement	2000	2000			
Specific mission company to employ partially disabled persons	1000	1000			
Increasing work-related immigration					x
Improving the integration of immigrants					x
Prevention of disability pensions and sickness absenteeism	2500	2500			
Lifelong learning reform					x

1. This reform is likely to have a significant effect in the long run, but not by the end of this decade.
2. EPC calculations based on the Ollonqvist et al. (2021) methodology.
3. Allowing for displacement effects.
Source: Economic Policy Council Report 2021 (2022).

Box 1.8. GDP and fiscal impacts of this Survey's key recommendations

This box summarises the potential long-term impacts of selected key recommendations in this Survey on GDP and the fiscal balance (Table 1.12). Because it is often impossible to estimate the impacts of the exact reforms recommended due to the lack of suitable theoretical or empirical models, the quantification is based on scenarios that only capture some aspects of these reforms. The quantified impacts are merely illustrative and are subject to large uncertainties. The estimated fiscal impacts describe only the direct impacts and do not include indirect impacts on fiscal revenue and spending stemming from households and firms' responses to policy changes.

Table 1.12. GDP and fiscal cumulative impacts of selected key recommendations

Key recommendation	Assumed scenario	GDP impact (GDP level gains, percentage points)	Net fiscal impact (% of GDP)
Target the R&D tax credit at SMEs.	Business-based R&D will increase from 2.0% to 2.7% of GDP, thereby helping the government achieve its gross domestic R&D expenditure target (4% of GDP) (Chapter 2).	3.1[1]	-0.4
Increase the number of study places in universities and universities of applied sciences.	Human capital per labour input grows by 1.2% in 2020-29 and by 0.7% in 2030-39 as education expenditure per student is increased gradually to the level prevailing in the 1990s.	3[2]	+0.8
Tighten the criteria for awarding disability benefits.	The reform will lengthen the working lives of older workers by 3.4 months at the age of 63, as was the case with the 2004 reforms of the Individual Early Retirement scheme (Kyyrä, 2015[27]).	0.3	0.0

1. The impact has been estimated for a long time horizon (by 2050) and is based on the framework laid out in Égert and Gal (2017[28]).
2. The impact is calculated by comparing Bank of Finland's long-term projections for a baseline scenario and a no-policy-change scenario. In addition to increased expenditure on education, the baseline scenario entails higher growth rates for fixed capital. The impact has been estimated for a time horizon of 10-15 years. The fiscal impact has been calculated using long-term projections that differ from those published by the Bank of Finland, in that they do not allow central government to adjust taxes.

Source: OECD simulation based on the framework by Égert and Gal (2017[28]), Kyyrä (2015[27]) and Bank of Finland (2021[14]).

Table 1.13. Past recommendations on labour market reform and actions taken

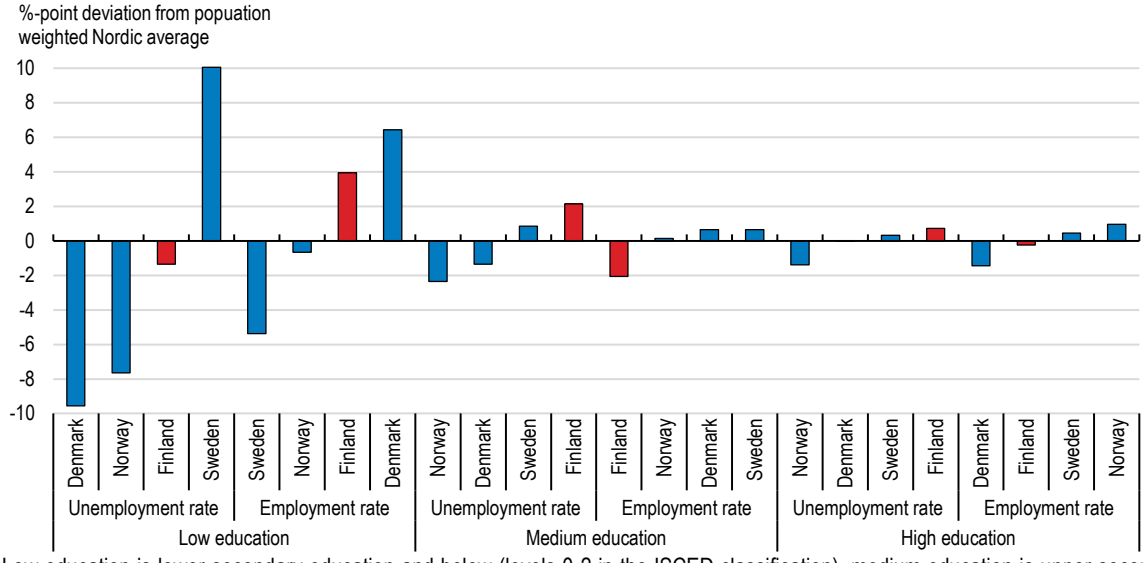
Past OECD policy recommendations (key ones in bold)	Policy actions since the 2020 Economic Survey of Finland (December 2020)
Phase out extended unemployment benefit by progressively increasing the eligibility age to 65 by 2029, the maximum age for receiving the benefit, and then abolish it. Extend the non-accrual of pension rights to the whole period of extended unemployment benefit receipt, to enhance work incentives.	Access to extended unemployment benefit will end by 2025. The rapid phasing out of extended unemployment benefit makes this recommendation redundant.
Apply activation requirements for the older unemployed with the same vigour as for other unemployed persons.	No action taken. Instead, the government has taken measures that will enter into force progressively from 2023 to improve working capacity and wellbeing at work among older people, strengthen skills and reinforce protection in the event of restructuring.
Align the conditions for awarding disability benefit to persons aged 60 or over with those for other applicants, notably by no longer taking into consideration non-medical factors.	No action taken.
Increase the Public Employment Services (PES) budget and enhance efficiency in service delivery to meet the rise in demand for services.	The PES budget was increased substantially in 2020 and 2021. The demand for services increased markedly following the outbreak of the pandemic in 2020, but declined in 2021 to such an extent that there was more money available than needed. The Nordic labour market services model, which should be more efficient, entered into force in May 2022.
Abolish public-sector wage subsidies.	Wage subsidy reform, not abolition, is scheduled to occur in 2023. The goal of the reform is to decrease bureaucracy and increase subsidized jobs in enterprises. Wage subsidies will decline for the unemployed who are municipalities' target groups but increase for target groups of enterprises.
Strengthen lifelong training targeted at unskilled workers.	The Service Centre for Continuous Learning and Employment, which promotes the competence development of working-age people and the availability of skilled labour, has been established. Some temporary funding for training unskilled workers and some VET funding targeted on unskilled workers has been made available.

Require employers to contribute to the unemployment benefit costs of hours not worked (in addition to employers' unemployment benefit contributions).	No action taken.
Create a government unemployment insurance fund into which either all workers or those who are not members of another fund are automatically enrolled.	No action taken.
Repeal the legal restriction that prevents some employers from using the enterprise-bargaining flexibility clauses in their sector collective agreement, as planned.	No action taken.
Reduce the homecare allowance to increase incentives for mothers of young children to work. Compensate the income loss with alternative transfers that are not conditional on homecare.	No action taken.
Improve access to ECEC services by ensuring that those municipalities that do not provide sufficient places in convenient locations with suitable opening hours do so.	No action taken.

Finland has the lowest employment rate among the Nordics for people with a medium level of education, and relatively high unemployment rates for people with medium- and high education attainment (Figure 1.32). These outcomes cannot be explained by high participation tax rates (*i.e.*, effective tax rates, including additional income taxes and social contributions and lost benefits) on extra income from moving into employment as they are around the Nordic average for most household types (Table 1.14). The better outcomes in the other Nordics point to other factors that counter these adverse effects. In Denmark, an important such factor is the flexicurity model, which combines generous out-of-work benefits with labour flexibility and strong measures to ensure a rapid return to employment (Box 1.9). This model contributes to Denmark having better labour market outcomes than Finland despite higher participation tax rates. This is not to say that Finland should not seek to reduce high participation tax rates. Progress on this front, for example by reducing the homecare allowance and further increasing early childhood education and care subsidies (in 2021, income thresholds for subsidies were raised by 31% and subsidies for second and subsequent children were increased from 50% to 60%), would complement other reforms to increase employment.

Figure 1.32. Employment and unemployment rates by educational attainment

2021



Note: Low education is lower secondary education and below (levels 0-2 in the ISCED classification), medium education is upper secondary and post-secondary non-tertiary education (levels 3 and 4) and high education is tertiary education (levels 5-8).
Source: Eurostat.

StatLink https://stat.link/y0zkvs

Table 1.14. Participation tax rates in Finland are similar to those in Norway and Sweden and lower than in Denmark

Effective tax rate on additional household gross income from an unemployed adult taking a job

	Short-term unemployment						Long-term unemployment					
	2 children aged less than 4 years[1]			2 children aged over 4 years[1]			2 children aged less than 4 years[1]			2 children aged over 4 years[1]		
	Adult 1, employed, Adult 2 unemployed takes a new job											
Current, previous and new jobs pay	67% AW	100% AW	150% AW	67% AW	100% AW	150% AW	67% AW	100% AW	150% AW	67% AW	100% AW	150% AW
Denmark	99	80	68	88	73	64	99	80	68	88	73	64
Finland	**85**	**82**	**75**	**72**	**71**	**68**	**69**	**60**	**57**	**55**	**49**	**50**
Norway	88	81	68	77	73	63	36	35	38	24	28	33
Sweden	84	74	66	78	71	63	74	67	61	68	64	59
Average	**89**	**79**	**69**	**79**	**72**	**65**	**69**	**61**	**56**	**59**	**53**	**51**
	Adults 1 and 2, unemployed, Adult 1 takes a new job											
Denmark	74	67	61	74	67	61	74	67	61	74	67	61
Finland	**59**	**54**	**50**	**59**	**49**	**45**	**75**	**70**	**64**	**75**	**70**	**64**
Norway	41	28	33	42	29	34	93	74	64	94	74	64
Sweden	37	32	38	38	33	38	46	39	43	47	40	43
Average	**53**	**45**	**46**	**53**	**44**	**45**	**72**	**63**	**58**	**73**	**63**	**58**
	Single unemployed takes a new job											
Denmark	88	79	75	85	73	68	88	79	75	85	73	68
Finland	**80**	**88**	**81**	**80**	**82**	**73**	**66**	**74**	**70**	**66**	**69**	**62**
Norway	88	85	71	87	78	66	70	70	61	70	63	56
Sweden	86	78	69	82	74	66	79	73	66	75	69	63
Average	**86**	**83**	**74**	**84**	**77**	**68**	**76**	**74**	**68**	**74**	**69**	**62**

	No children					
	Adults 1 and 2, unemployed and take new jobs					
	Short-term unemployment			Long-term unemployment		
	67% AW	100% AW	150% AW	67% AW	100% AW	150% AW
Denmark	88	71	64	88	71	64
Finland	**67**	**68**	**66**	**46**	**46**	**47**
Norway	75	72	63	24	28	33
Sweden	78	71	63	68	64	59
Average	**77**	**71**	**64**	**57**	**52**	**51**

1. When both parents work, they are eligible for childcare subsidies if their children are aged less than four years. When one parent does not work, the family is not eligible for childcare subsidies but may be eligible for home-care subsidies.
2. When the second adult of a couple is out of work, it is assumed that they have exhausted any own insurance-based entitlements.
3. Housing costs are assumed to be 30% of the average wage for couples and singles with children earning at least 100% of the average wage and 25% for households with children earning less.
Source: Own calculations based on output from the OECD tax-benefit model. Model version 2.4.0.

Box 1.9. The flexicurity model contributes to good labour market outcomes in Denmark.

Members of unemployment insurance funds receive unemployment benefits (up to 90% of the previous wage for low-income workers) for two years. To be eligible for unemployment benefits, the unemployed must actively search for a new job. That means registering a CV at the state-run Jobcentre, applying for jobs every week and accepting job offers from the Jobcentre or the unemployment fund with one day's notice. Moreover, jobseekers need to participate in job training proposed by the unemployment insurance fund and widen their search, both geographically and in terms of job type, as time in

unemployment goes on. If these job-search and participation requirements are not met, unemployment benefits are temporarily withdrawn. An individual who fails to comply with the requirements twice within 12 months loses the right to benefits. Only after three consecutive months of paid work is the right to unemployment benefits re-established.

The flexicurity model has resulted in a dynamic labour market with relatively low skills mismatches and high job turnover, with annual job vacancies amounting to 27% of the labour force. Denmark also has a high employment rate and one of the lowest rates of long-term unemployment in the OECD. The system does, however, also entail high government spending on labour market programmes.

Source: (Confederation of Danish Employers, Danish Trade Union Confederation and Ministry of Employment., 2021[29]); (OECD, 2016[30]).

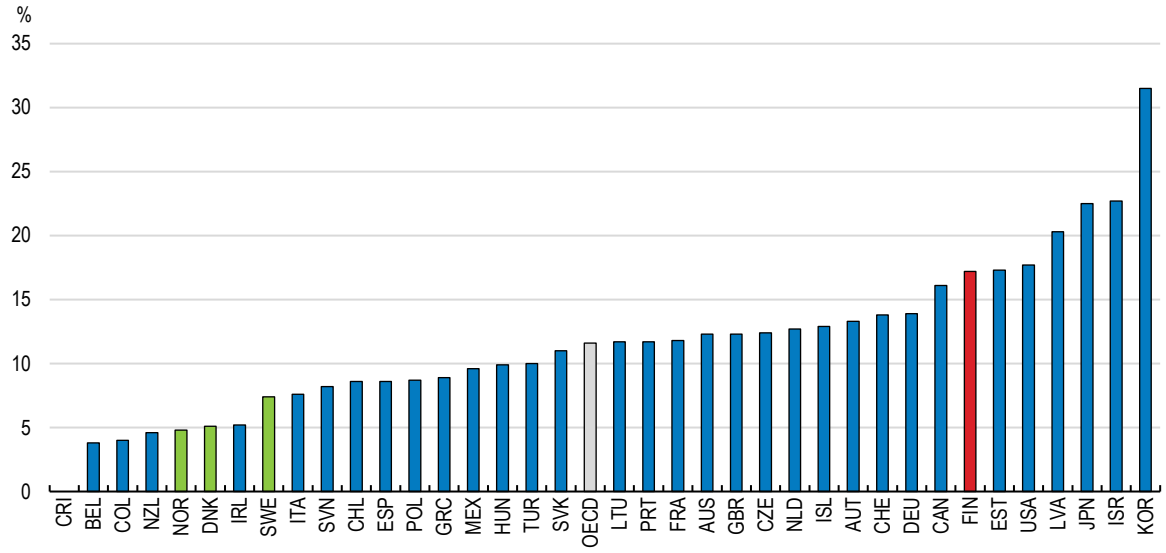
Partly inspired by Denmark's flexicurity model, Finland introduced the Nordic labour services model in May 2022. It provides job seekers with intensive public employment service contact from the beginning of their unemployment spell. They are given more support for job search than under the former system but have more responsibility for their search, which they report via an Internet service. The reform is intended to increase fourfold the number of interviews of unemployed persons, which has necessitated the recruitment of an additional 1 200 public employment service officials. This will increase expenditure on public employment services per unemployed person markedly, albeit still not to the levels in the other Nordics. The Economic Policy Council estimates that the Nordic labour services model will increase employment by 9 500 by 2025 and beyond, although it also estimates that the partial abolition of the similar activation model reduced employment by 2 000 to 4 900 (Table 1.11). The authorities should investigate the potential benefits of adopting the other plank of Denmark's flexicurity model, namely less restrictive employment protection legislation concerning individual dismissals (Denmark scores 1.53 and Finland 2.56 on a 0-6 scale in 2019 (the OECD average was 2.06) where a higher value indicates stricter regulation) to reduce hiring risks for employers. Increased flexibility could be particularly beneficial for improving labour market outcomes of low-skilled workers.

A complementary reform to the introduction of the Nordic employment services model that is planned is the transfer of employment and economic development services to municipalities in 2024. A key part of the reform is to create a funding model for municipalities that encourages them to develop and offer efficient services. Currently, municipalities are only responsible for financing the long-term flat-rate unemployment benefit (known as labour market support). They can reduce these costs by activation, which entails simply referring the unemployed person to the public employment service. Under the new model, municipalities will also be responsible for funding the basic allowance (the flat-rate unemployment benefit paid to the unemployed without unemployment insurance) and the basic component (the same as the basic allowance) part of earnings-related unemployment benefits right from the beginning of the unemployment spell. In addition, activation will no longer have any effect on a municipality's funding responsibilities for unemployment benefits. Under the new model, a municipality that reduces periods of unemployment would benefit more financially than at present when a local resident finds work. The Ministry of Finance estimates that the incentives in the new funding model will increase employment by 6 600 (Table 1.11).

Another aspect of labour market performance where Finland has room for improvement is the gender wage gap, which is greater than in most other OECD countries, including the Nordics (Figure 1.33). The homecare allowance to look after a child up to three years of age (with extra payments for pre-school age siblings) at home reduces labour market attachment among mothers – 70% of children under three are cared for at home with childcare allowance (Hiilamo, Merikukka and Haataja, 2018[31]) -, undermining their career prospects and earnings mobility. This is because mothers miss crucial in-work transitions early in their careers, which promote stronger career advancement and income growth (OECD, 2018[32]). To reduce gender wage inequality, homecare allowance should be phased out, as recommended in the 2020 OECD *Economic Survey*, and other transfers not conditional on homecare increased or introduced to compensate income losses for families close to the poverty line.

Figure 1.33. The gender full-time wage gap is large in Finland

2020 or latest



Note: Data for Belgium, Colombia, Costa Rica, Denmark, Finland, Germany, Ireland and Italy refer to 2019. Data for Estonia, France, Iceland, Israel, Latvia, Lithuania, Netherland, Slovenia, Spain and Türkiye refer to 2018.
Source: OECD, Social Protection and Well-being (database).

StatLink https://stat.link/3yjsio

The reform of the family leave model, which came into effect in August 2022, should help to reduce the gender wage gap. Family leave provides financial support for parents to stay at home (but not at the same time) to look after new-born children after maternity leave expires and is lost if not taken before the child turns two. In contrast to the old model, both parents now receive the same number (143) of leave allowance days and the maximum number of days that can be shifted to the other parent has been reduced to 63 days. These changes encourage fathers to take a larger share of family leave, reducing mothers' time away from work and hence lost opportunities for career development.

Reducing greenhouse gas emissions efficiently

Russia's war against Ukraine and the energy crisis that has followed has added energy security to the environmental benefits of making the transition away from fossil fuels to renewables and nuclear that is necessary to achieve Finland's greenhouse gas emissions abatement objectives. As noted above, Finland is broadly on track to meet its 2030 EU gross greenhouse gas emissions abatement objective for effort-sharing sectors (*i.e.,* sectors not covered by the EU emissions trading scheme (ETS) other than the forestry and land-use sector)– the Finnish Climate Change Panel (2022[33]) estimates that additional measures amounting only to 1 Mt CO_2-eq. may be needed - but not the forestry and other land-use sink objectives to meet Finland's share (17 Mt CO_2-eq.) of the EU 2030 target and the 2035 net zero emissions target (21 Mt CO_2-eq.). Meeting the forestry and other land-use sink objectives will be very challenging given the starting point – this sector became a net emitter (2.1 Mt CO_2-eq.) for the first time in 2021.

According to Finland's Medium-Term Climate Change Policy Plan (Finnland Ympäristöministeriö, 2022[34]), the transport sector, which accounts for around 40% of effort-sharing sector emissions, is to contribute around one half of the abatement needed by 2030 to meet the EU gross emissions effort-sharing target. The most important existing and additional (i.e., already legislated) measures to reduce road transport emissions are high fuel taxes and the national renewable fuel blending (i.e., biofuel) distribution mandate, which is to increase with additional measures from 18 % of the total energy content of fuels used in road transportation in 2021 to 34 % by 2030, 10 percentage points higher than required by the European Union. The other major means of abatement is the move to low-emissions power sources for vehicles. The electric

vehicle (EV) fleet is growing quickly: EVs were 14% of new car registrations over January-July 2022 and now stand at 0.8**%** of the total car fleet, which is around the EU average. Limited efforts are also being made to reduce car dependency in cities. Many municipalities are investing in improving rail-based public transport and, with government support, have taken measures to encourage cycling and walking. Improving the public transport infrastructure in the capital region would provide a viable alternative means of transport for commuters who live outside Helsinki. Other key measures that should be taken to reduce car dependency in cities are street redesign, spatial planning focused on increasing proximity and support for shared mobility (OECD, 2021[35]). Considering the elevated, albeit rapidly declining, abatement costs of EVs (the Ministry of Finance estimates these costs to be less than EUR 300 per tonne of CO_2-eq.), support for their diffusion should be focussed on localities with limited economic options for public transport.

Agricultural emissions, which account for around 20% of effort-sharing sector gross emissions, are to decline by around 10% by 2030 through both EU common agriculture policy (CAP) and national measures. Measures include control of peatland emissions, such as by requiring the cultivation of peatlands on elevated water levels, the increase of carbon sequestration in mineral lands, precision farming and the reduction of methane production by dairy cows. These measures will also affect emissions of the forestry and other land-use sector.

The remaining effort-sharing sectors include industry, construction and other use of energy and heating categories. Reducing emissions in these sectors will in most cases also help to enhance energy security. Increases in energy taxation, including an increase in the energy content tax on heating fuels by EUR 2.7 per megawatt hour from the beginning of 2021 and the phasing out of the tax rebate for energy-intensive companies by 2025, will reduce emissions of industrial plants and small district heating plants in the effort-sharing sector (as well as plants in the emissions trading sector) by increasing the price of carbon emissions for these entities. Other policy measures to reduce industrial emissions are the same as in the emissions trading sector, notably the use of energy subsidies for new energy technologies, increasing energy efficiency and the use of renewable energy. Emissions from separately heated residential and commercial buildings will be reduced by supporting the move away from oil heating to low-emissions solutions, such as geothermal heat pumps, and by increasing the share of biofuels used.

While Finland is broadly on track to meet its effort-sharing target, there is considerable scope to reduce the costs of doing so. One of the most inefficient instruments being used to reduce emissions is the biofuel mandate. The Ministry of Finance estimates that the tax-free price of biofuel used in Finland is currently EUR 1.30 per litre higher than for fossil diesel and that the marginal abatement cost of the general biofuels mandate is EUR 500 per tonne of CO_2-eq. In addition to the general mandate, fuel distributors must also meet an advanced biofuels mandate, albeit small. The Ministry of Finance estimates that the marginal abatement cost of this mandate is EUR 900-1000 per tonne of CO_2-eq. In all, the Ministry of Finance estimates that the biofuels mandate costs around EUR 1.1 billion per year, rising to EUR 1.5 billion by 2030. In view of the high abatement costs of the biofuels mandate, it should be reduced to the minimum level required by the European Union. If the mandate were to be reduced by 20 percentage points in 2023, the Ministry of Finance estimates that gross emissions in the effort-sharing sector would be 2.5 Mt CO_2-eq. higher (the global net increase would be much smaller owing to carbon leakage), abatement costs EUR 1 billion lower, tax revenues EUR 190 million higher and the consumer prices of gasoline and diesel 22 and 25 cents lower, respectively. Moreover, burden-sharing quotas over 2026-29 would be reduced because they partly depend on outcomes over 2021-23, saving another EUR 690 million if there were a corresponding reduction in the biofuels mandate. Other abatement inefficiencies include a lower carbon price being used to calculate carbon tax rates on heating fuels than on transport fuels and a lower energy tax rate on peat combustion (12% of Finland's greenhouse gas emissions) than on combustion of other fossil fuels, despite being even more carbon emissions intensive than coal combustion; indeed, incentives to use peat in industrial plants and small district heating plants have been strengthened by a temporary increase in the ceiling for tax-free use of peat until 2030, contrary to the recommendations in the 2020 *Survey* (Table 1.15).

Table 1.15. Past recommendations on green growth and actions taken

Past OECD policy recommendations (key ones in bold)	Policy actions since the 2020 Economic Survey of Finland (December 2020)
Reduce GHG emissions in the effort-sharing sectors using the most cost-effective abatement measures, including making full use of available flexibility mechanisms.	The government has allocated EU Recovery and Resilience Facility financing to low carbon investments in the energy- and industrial sectors.
Subject heat production using peat to the same tax regime as for other fossil fuels used for heating.	No action taken. The peat energy tax has been maintained at a lower level than other fossil fuels to incentivise combined heat and power plants to choose domestic peat over imported coal. Unfortunately, peat-fired power plants emit more carbon than coal-fired power plants.
To reduce greenhouse gas emissions further, phase out environmentally harmful subsidies and better align the tax rate on emissions across sectors.	The tax refund for energy-intensive enterprises will be phased out by 2025 and the tax reduction for paraffinic diesel by 2023.
Progressively replace national agricultural subsidies by subsidies for environmental benefits.	In the new CAP strategic plan, which will be in force from 2023 onwards, the baseline of environmental and climate requirements will be reinforced as well as the more targeted EU environmental measures.

Abatement efficiency in the effort-sharing sector could be increased by lowering the biofuels mandate to the minimum required by the European Union and compensating by increasing the carbon price used to calculate carbon tax rates on heating fuels to the rate used for transport fuels, subjecting heat combustion using peat to the same tax regime as other fossil fuels and, if necessary, increasing the carbon price used to calculate carbon tax rates. Making maximum permitted use of flexibility (2% of 2005 effort-sharing emissions annually) to substitute emission permits from EU Emissions Trading System (ETS) for domestic abatement will also limit effort-sharing abatement costs as marginal abatement costs in Finland's effort-sharing sectors (EUR 120-150 per tonne) are much higher than in the EU ETS sectors (EUR 80-120 per tonne).

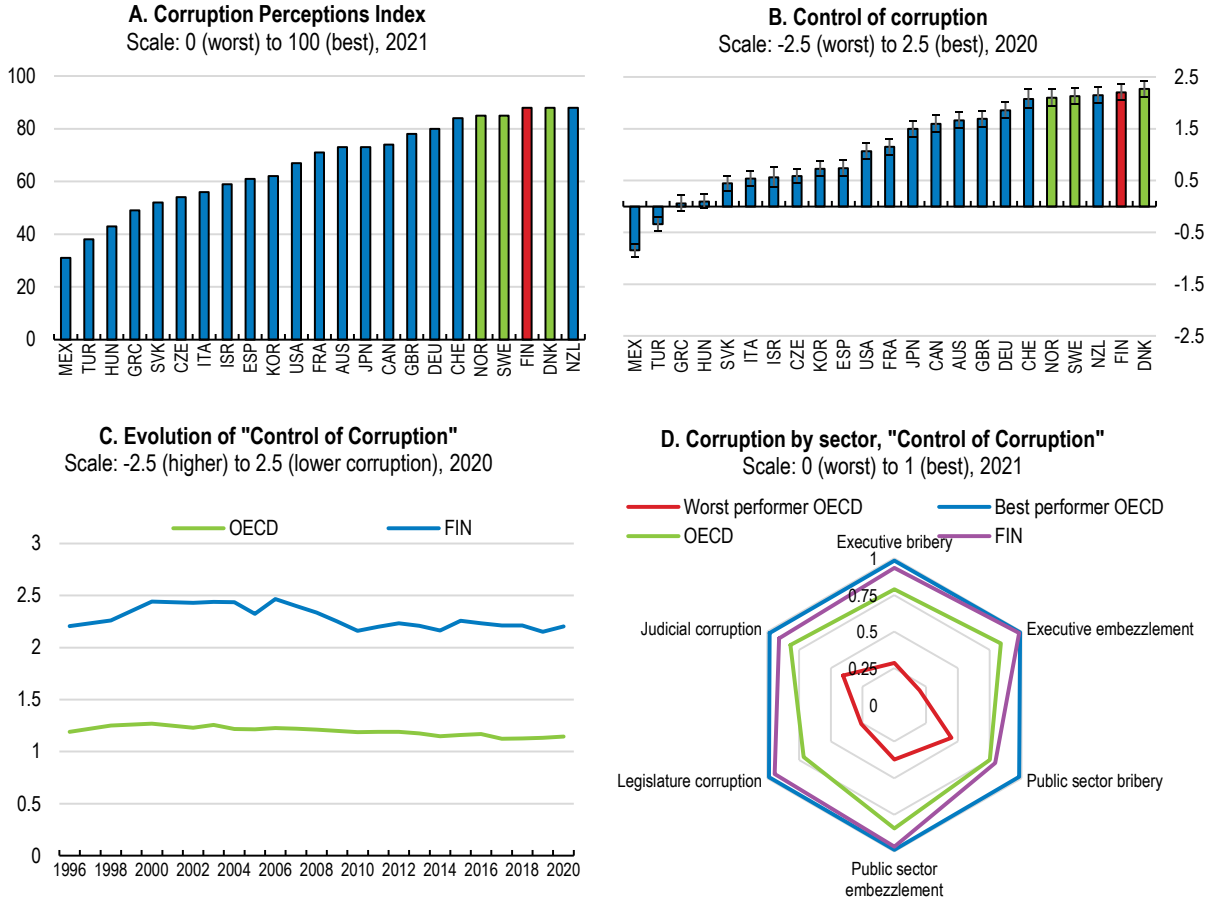
Agriculture provides considerable scope to increase the forestry and other land-use net sink, notably in peatland cultivation, which emits 8Mt CO_2-eq.; emissions from peat in all forms, including urban heating, amounted to half of total gross emissions (48 Mt CO_2-eq.) in 2020. Cultivation of peatlands typically involves felling the trees on these lands and draining them, which releases a lot of greenhouse gases. The Climate Change Panel (2022[33]) considers that instruments are needed to guide the cultivation of peatlands, as in Sweden. If the lands are to be cultivated, it would be better to practice paludiculture (*i.e.,* cultivation of wetted peatlands). The Climate Change Panel also recommends that the planned public procurement of 30 000 hectares for this purpose should be increased to 50 000. Another issue in agriculture is that there are high subsidies to maintain animal-based agriculture in northern areas. Progressively replacing these and other national subsidies by subsidies for environmental benefits, as recommended in the 2020 OECD *Economic Survey*, would also help to reduce agricultural emissions. Given the importance of the sector in Finland and its impact on net emissions, forestry should be subject to carbon pricing, as New Zealand does by including forestry in the New Zealand Emissions Trading Scheme. This would boost the return to forest growth relative to felling, increasing the forestry and other land-use sink.

Keeping corruption low

Finland shares first place in Transparency International's corruption perception index for 2021 (Figure 1.34, Panel A) and is a top performer also in controlling corruption (Figure 1.34, Panels B, C and D). Street-level corruption (i.e., when police, customs officials, doctors, teachers or other professionals demand bribes to perform their duties or work) is very rare, and the government has instead focused its efforts on structural corruption. The construction industry, public procurement and community planning have been identified as being at higher risk of corruption than other activities, and the Ministry of Justice has organised training sessions targeted at these areas. The National Active Corruption Strategy 2021-2023 emphasises

improved cooperation between authorities, more accurate methods to identify corruption and increased transparency as key measures to fight corruption. To increase transparency, the government has proposed a law compelling organisations to register their lobbying activities in a public register twice a year. What is more, Finland is in the process of enacting an EU directive stipulating that companies with more than 50 employees set up reporting channels for whistle-blowers. The legal framework is also being amended to include trading in influence alongside corruption and bribery offences. The Ministry of Justice is expected to submit its legislative proposal criminalising trading in influence for public consultation by the end of this year. In coming years, Finland is also looking to make greater use of AI in identifying suspicious money transactions. However, the lack of enforcement of the foreign bribery offence in Finland is concerning in light of the corruption risks faced by Finnish companies operating abroad. The Ministry of Justice has arranged training sessions for investigators and prosecutors working on foreign bribery and recently published a report with suggestions on how to improve legislation going forward.

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

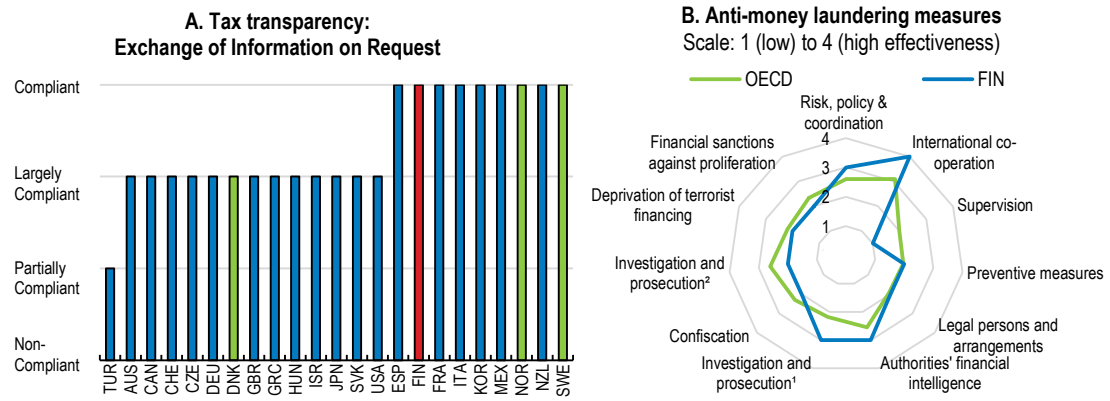


Note: Panel B shows the point estimate and the margin of error. Panel D shows sector-based subcomponents of the "Control of Corruption" indicator by the Varieties of Democracy Project.
Source: Panel A: Transparency International; Panels B & C: World Bank, Worldwide Governance Indicators; Panel D: Varieties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

StatLink https://stat.link/mcsqpe

Peer reviews by the Global Forum on Transparency and Exchange of Information for Tax Purposes and the Financial Action Task Force (FATF) suggest that Finland's tax transparency is high but that anti-money laundering measures could improve. Following up on its 2019 evaluation of Finnish anti-money laundering measures, FATF notes that Finland has addressed deficiencies relating to the lack of anti-money laundering guidance from relevant authorities. Finland is, however, still not fully compliant with FATF recommendations on monitoring non-profit organisations and beneficial ownership information.

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



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

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Main findings	Recommendations (key recommendations in bold)
Ensuring fiscal sustainability and financial stability amidst Russia's war against Ukraine	
The fiscal stance became expansionary in 2022 largely owing to the response to Russia's war against Ukraine and will be again in 2023 but will be neutral in 2024. Increases in energy and food prices have put pressure on budgets of households not receiving social-security benefits, which are indexed to inflation.	**Provide targeted assistance to vulnerable households not deriving their income from social-security benefits while ensuring that the structural budget position does not deteriorate unless the outlook materially worsens.**
The Ministry of Finance estimates that the fiscal sustainability gap and the structural budget deficit in 2026 will be 3.0% and 2.4% of potential GDP, respectively. Fiscal buffers to cope flexibly with adverse shocks are diminished. Almost half of state aid to companies does not directly promote productivity.	**Implement consolidation measures to achieve Finland's medium-term structural budget deficit objective (0.5% of GDP) by the end of the decade.** **Undertake a comprehensive spending review to identify consolidation measures and make such reviews regular.** **Reduce state aid to companies that does not enhance productivity.**
General government contingent liabilities are high and concentrated in a small number of sectors and enterprises.	To limit risks to government finances, require a good justification for any increases in contingent liabilities, a comprehensive risk assessment before making any commitments and regular reports on the overall risk position.
The healthcare and social-care reform is expected to slow growth in expenditures in the long run and to deliver better services across the country. There is a risk that incentives are too weak for the new counties to increase efficiency.	**Monitor the healthcare and social-care reform and strengthen incentives to improve efficiency if they prove to be too weak.** Implement payment models (accountable- care organisations and bundled payment models) that reward integrated service delivery and high-quality outcomes.
Interest rates on housing loans are revised annually. Highly indebted households may have difficulty servicing debts when interest rates rise to more normal levels.	**Empower the Board of the Finnish Financial Supervisory Authority (FIN-FSA) to impose debt-service-to-income limits on mortgage lending.**
Structural macroprudential buffer capital requirements strengthen credit institutions' loss-absorption capacity. They are lower in Finland than in the other countries with similar structural vulnerabilities and risk levels.	Increase structural macroprudential buffer capital requirements to around the levels in the other countries with similar structural vulnerabilities and structural risk levels.
Preferential tax treatment of owner-occupied housing increases the prices of houses and the size of loans needed to buy them. Investors buying rental property through a housing company can reduce the present value of taxes to be paid by deducting capital repayments from rental income at the expense of increasing the capital gain when shares in the housing company are sold. Property transfer taxes reduce welfare by distorting the housing market and discouraging labour mobility.	Phase out the capital gains tax exemption for owner-occupied housing but allow tax deferral if the gains are reinvested in a principal residence within a certain time to avoid lock-in effects. Terminate deductibility of capital repayments on housing company loans against rental income. Replace property transfer taxes by taxes with lower efficiency costs, such as annual real estate taxes.

Boosting productivity and increasing employment	
Heavy regulations on retail sales of pharmaceuticals are hampering competition.	Ease entry regulations for pharmacies and allow non-prescription medicines to be sold in places other than pharmacies.
Firms that are not members of the employer association that negotiated the sectoral wage agreement are by law forbidden from using the enterprise bargaining flexibility clauses. This weighs on the productivity and profits of these mostly small firms.	**To support employment and productivity, high-level agreements should set broad framework conditions in wage bargaining but allow for more flexibility in all firm-level contracts.**
To realise the employment potential of phasing out extended unemployment benefit (the unemployment tunnel to early retirement), it will be important to limit early retirement leakage into disability benefit.	**No longer take non-medical factors for the award of disability benefits into consideration for applicants aged 60 or over, as for other applicants.**
People born after 1985 will not be able to avoid lower pensions because their target retirement age, at which the pension increment from delaying retirement offsets the reduction from the life expectancy coefficient, exceeds 70, the age limit for pension contributions.	Index the age limit for pension contributions to the target retirement age beyond 70.
Many proposed reforms (see Table 1.11) aimed at increasing employment and thereby reducing the budget deficit are still at a development stage.	Refine these reforms and develop credible estimates of their employment and budget effects.
The generous homecare allowance discourages work by mothers with young children, long absences from the labour force negatively affect their career prospects and earnings mobility.	**Reduce the homecare allowance to increase incentives for mothers of young children to work.**
Reducing greenhouse gas emissions	
The marginal abatement cost of the national renewable fuel blending (i.e., biofuel) distribution mandate is high (EUR 500 per tonne of CO_2 eq.). The carbon price used to calculate carbon tax rates on heating fuels is lower than for transport fuels, increasing abatement costs.	**Reduce the share of biofuels mandated to the minimum level required by the European Union. To compensate, align the carbon price used to calculate carbon tax rates on heating fuels with that used for transport fuels and, if necessary, increase this carbon price.** **Alleviate the burden of the energy transition on vulnerable households not compensated by social benefit indexation.**
Heat production is subject to a much lower tax rate when using peat than when using other fossil fuels. Carbon emissions from peat-fired power plants are greater than from coal-fired power plants.	**Subject heat production using peat to the same tax regime as for other fossil fuels. Announce a clear phase-out date for peat extraction to provide certainty for stakeholders.**
The marginal abatement cost of electric vehicles is elevated (almost EUR 300 per tonne of CO_2 eq.), albeit declining quickly. Car dependency in cities remains high.	**Strengthen policies to reverse car dependency in cities, including enhanced provision of public transport in the capital region, while focusing funding for low-carbon private cars in other localities.**
Further measures are needed to increase the forestry and other land use net sink to meet Finland's share of the 2030 EU target for this sector and to achieve the net zero emissions target by 2035.	**Create instruments to guide the cultivation of peatlands towards paludiculture (i.e., cultivation of wetted peatlands). Subject forestry to carbon pricing.**
Keeping corruption low	
In October 2021, the Financial Action Task Force noted that while Finland had taken action to mitigate money laundering risks in the non-profit organisations, there was still work to be done.	Address deficiencies relating to supervision and monitoring of non-profit organisations at risk of money laundering or terrorist financing abuse.

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2 Rebooting the innovation ecosystems

Naomitsu Yashiro

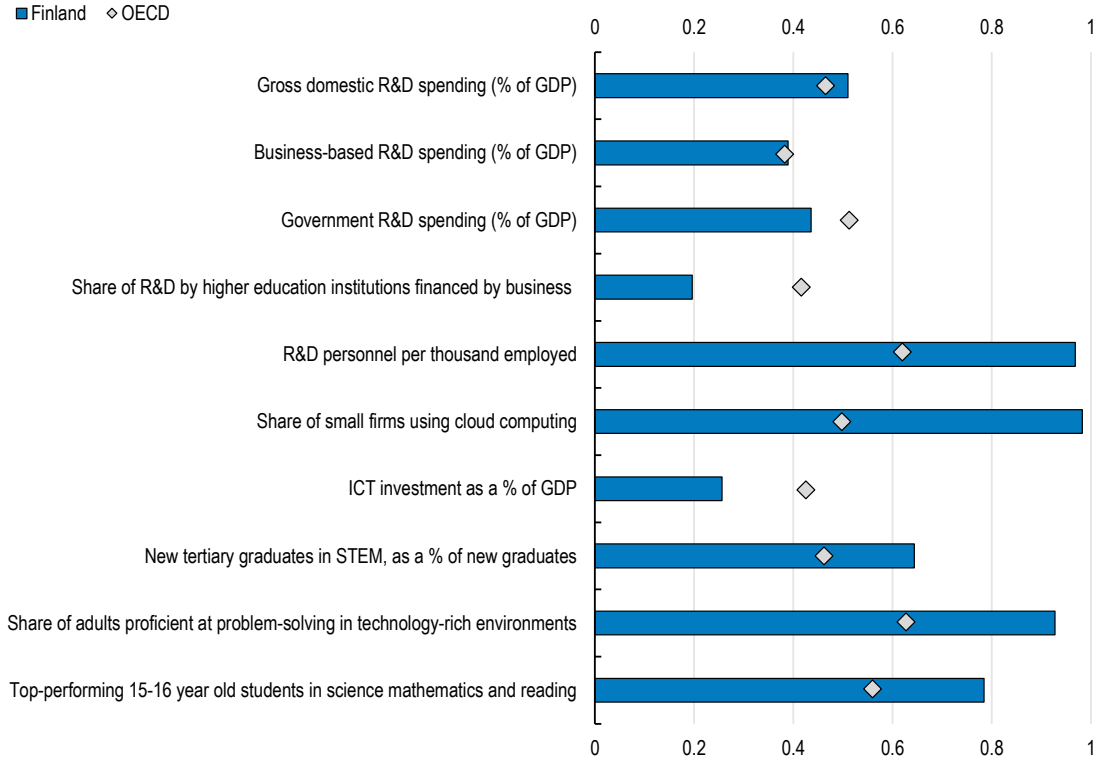
Finland is stepping up its efforts to reboot its innovation ecosystems, which weakened during the long economic stagnation that followed Nokia's withdrawal from the mobile handset business. The government aims to increase Finland's R&D spending to 4% of GDP by 2030 and will introduce legislation that commits to large and stable government R&D spending. However, rebooting Finland's innovation system requires far more than revamping innovation support. Finland needs a clear mission-oriented innovation policy that directs applied research and innovation activities toward solving the most pressing socio-economic challenges. It will also need to strengthen innovation collaboration between the public and private sectors. In particular, concerted efforts toward a more diversified innovation ecosystem that is resilient to firm- and sector specific shocks are essential. To allow for more intensive innovation, the government must increase higher education study places and attract foreign skilled workers to meet the ever-growing demand for skilled workers. It should also help more Finnish firms capture foreign markets, enabling them to reap larger returns from their innovation.

Introduction

Finland is an innovative economy and outperforms many OECD countries on several dimensions of innovation activities and framework conditions (Figure 2.1). At 2.9% of GDP, its gross spending on research and development (R&D) exceeds the OECD average. The number of R&D personnel per thousand employees is among the highest in the OECD. The use of digital technologies is also widespread. For instance, 71% of Finnish firms with 10 to 49 employees use cloud computing services, as opposed to 38% in Germany or 26% in France. Finland boasts a highly skilled workforce, with high shares of adults with excellent problem-solving skills and tertiary education graduates in the fields of natural science and engineering. There are, however, areas where Finland is lagging, such as government R&D spending, innovation collaboration between businesses and higher education institutes, and investment in ICT capital.

Figure 2.1. Finland is an innovative economy

Finland's innovation performance compared to OECD countries, 2021 or latest



Note: Indicators normalised to 0-1, 1 = top OECD country and 0 = bottom OECD country.
Source: OECD Going Digital Toolkit, https://goingdigital.oecd.org/.

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An innovation ecosystem is a network of actors from the private sector, the government and research institutions who work together to develop new technologies, products or services that address shared specific goals (Box 2.1). Finland's innovation ecosystems flourished in the 1990s and 2000s, on the back of strong public support for innovation, vigorous investment in tertiary education, and the development of export industries like electronics, forestry and metal (OECD, 2017[1]). However, they weakened during the long period of economic stagnation following the global financial crisis, as innovation support was withdrawn owing to fiscal consolidation needs and the competitiveness of the export sector, notably that of Nokia's mobile handset business, waned.

Box 2.1. What is an innovation ecosystem?

An innovation ecosystem is a complex network of innovation actors contributing their human and financial resources and expertise to collaboration in research, development and commercialisation of new technologies that address shared priorities such as industrial competitiveness or climate change mitigation. These actors include business firms, higher education and research institutions, government agencies and innovation support organisations, as well as investors.

Innovation ecosystems can be geographically concentrated as clusters of interconnected firms and institutions in specific industries or research domains providing a related group of products or services. The key component of innovation ecosystems is innovation collaborations (Granstrand and Holgersson, 2020[2]), which are often coordinated and funded by government agencies. This contrasts with business ecosystems or (global) value chains, which foster innovation mainly through competition and are governed by the dominant firms that seek to appropriate the value of innovation by the participants (Jacobides, Knudsen and Augier, 2006[3]). The large externalities generated by innovation collaboration justify public support for innovation ecosystems.

The innovation ecosystems in Finland

Finland's innovation ecosystems are often driven by large R&D-intensive firms like Nokia, Neste and Sandvik as well as the multitude of innovative start-ups, highly innovative universities like Aalto university, research institutes for applied research like the Technical Research Centre of Finland (VTT), public innovation funding agencies namely the Academy of Finland and Business Finland (Box 2.7), venture capital investors that include public investment funds like Tesi and Sitra, and Slush, the platform connecting start-ups and tech firms with investors (Chapter 1).

Policymakers in Finland have acknowledged the need for steady funding for innovation to deliver stronger productivity growth, which, in turn, is needed to sustain economic growth and the welfare state. The government has an objective to boost Finland's gross domestic R&D spending to 4% of GDP by 2030. To meet this target, it recently reached a political agreement to increase overall public R&D spending to 1.33% of GDP (one-third of the 4% target) by 2030 and will introduce legislation that commits to increasing government R&D spending to 1.2% of GDP (90% of the overall public R&D spending). The government will also introduce a new R&D tax incentive, which is expected to broaden the scope of firms engaging in business-based R&D. However, boosting R&D and investment in complementary intangible capital such as data or organisational changes requires good access to highly qualified personnel. Policy reforms to reboot Finland's innovation ecosystems thus need to go beyond revamping public innovation support. They need to alleviate Finland's severe skills shortage, which is acting as an important bottleneck for more intensive innovation. They also should help Finnish firms reap higher returns on innovation so that more firms will invest in R&D despite the large upfront costs and high uncertainties. Against this background, this chapter highlights the following reform priorities:

- Revamping innovation support in a way that maximises value for public money and helps Finland's innovation ecosystems become more diverse and resilient;
- Addressing the structural shortage of skilled workers through tertiary education and migration reforms;
- Encouraging more Finnish firms to internationalise through exports or foreign direct investment.

Finland boasts favourable framework conditions for innovation, namely high technological capabilities and educational attainment, as well as business friendly regulatory settings and good access to credit (Chapter 1). Enhancing the innovation ecosystems by addressing bottlenecks is therefore crucial to boost Finland's innovation performance and productivity growth.

The next section describes some important features of Finland's innovation ecosystems and stresses the need for a more diversified one that is resilient to firm- or sector-specific shocks. Section 2.3 reviews the latest policy efforts to reboot Finland's innovation ecosystems including the government's R&D spending target and highlights policy reforms to enhance the effectiveness of revamped innovation support. Section 2.4 discusses the latest reforms in tertiary education and migration and their implications for the severe skill shortages. Section 2.5 explores the link between the internationalisation of Finnish firms and their propensity to innovate, showing that there is room to improve the current export and foreign direct investment promotion policies. Section 2.6 concludes.

Finland needs more diversified, resilient innovation ecosystems

Finland's R&D spending declined in the 2010s

Finland's R&D spending increased rapidly in the second half of the 1990s and throughout the 2000s, reaching 3.7% of GDP in 2009 (Figure 2.2, Panel A). Vigorous business-based R&D spending improved the productivity and export competitiveness of Finnish firms, which in turn boosted the demand for innovation (OECD, 2017[1]). This positive feedback loop was largely driven by the ICT sector, in particular Nokia, which represented 37% of Finland's gross domestic R&D spending in 2008 (Ali-Yrkkö, 2010[4]). The extremely large role played by Nokia exposed Finland's innovation ecosystems to firm- and sector specific risks, which materialised with the downfall of Nokia's mobile phone business (Box 2.2). Finland's R&D spending plunged to 2.6% of GDP by 2016, driven by an almost 30% fall in business-based R&D from its 2009 peak (Figure 2.2, Panel B). The large fall in business-based R&D contrasted with the increases among Finland's competitors. However, the large decline of R&D spending in the electronics sector masked the increases in R&D spending in some knowledge-intensive sectors like pharmaceuticals (where R&D grew by 31% between 2009 and 2016) or information and communication (where R&D grew by 54%). Government R&D spending also declined from 2011 until 2016 (Figure 2.2, Panel C). In particular, public funding for innovation collaboration between firms, universities and research institutes was withdrawn quickly, weakening Finland's innovation ecosystems (Section 2.3). While Finland's R&D spending started to rise anew in 2016, business-based and government R&D spending remain at about 20% and 28%, respectively, below the 2009 levels (Figure 2.2, Panels B and C).

The main lesson from the 2000s is that Finland's innovation ecosystems need to be driven by a more diverse set of firms, industries and technologies (Box 2.2). Diversification of the innovation base and portfolio is key to the resilience of Finland's innovation ecosystems and can help Finland expand its comparative advantage beyond its traditional exporting industries.

Box 2.2. Nokia's role in Finland's innovation

Nokia was a dominant player in Finland's innovation both quantitatively and qualitatively. At its peak in the mid-2000s, Nokia accounted for nearly half of Finland's business-based R&D spending and 43% of patent applications filed to the European Patent Office (EPO). Nokia also employed a large share of Finland's R&D workforce and led large networks of domestic suppliers comprising about 300 Tier 1 supplier firms. As the result of its rapid global expansion, Nokia eventually shifted a large part of its R&D activities abroad and offshored the production to large Asian electronics manufacturing services providers.

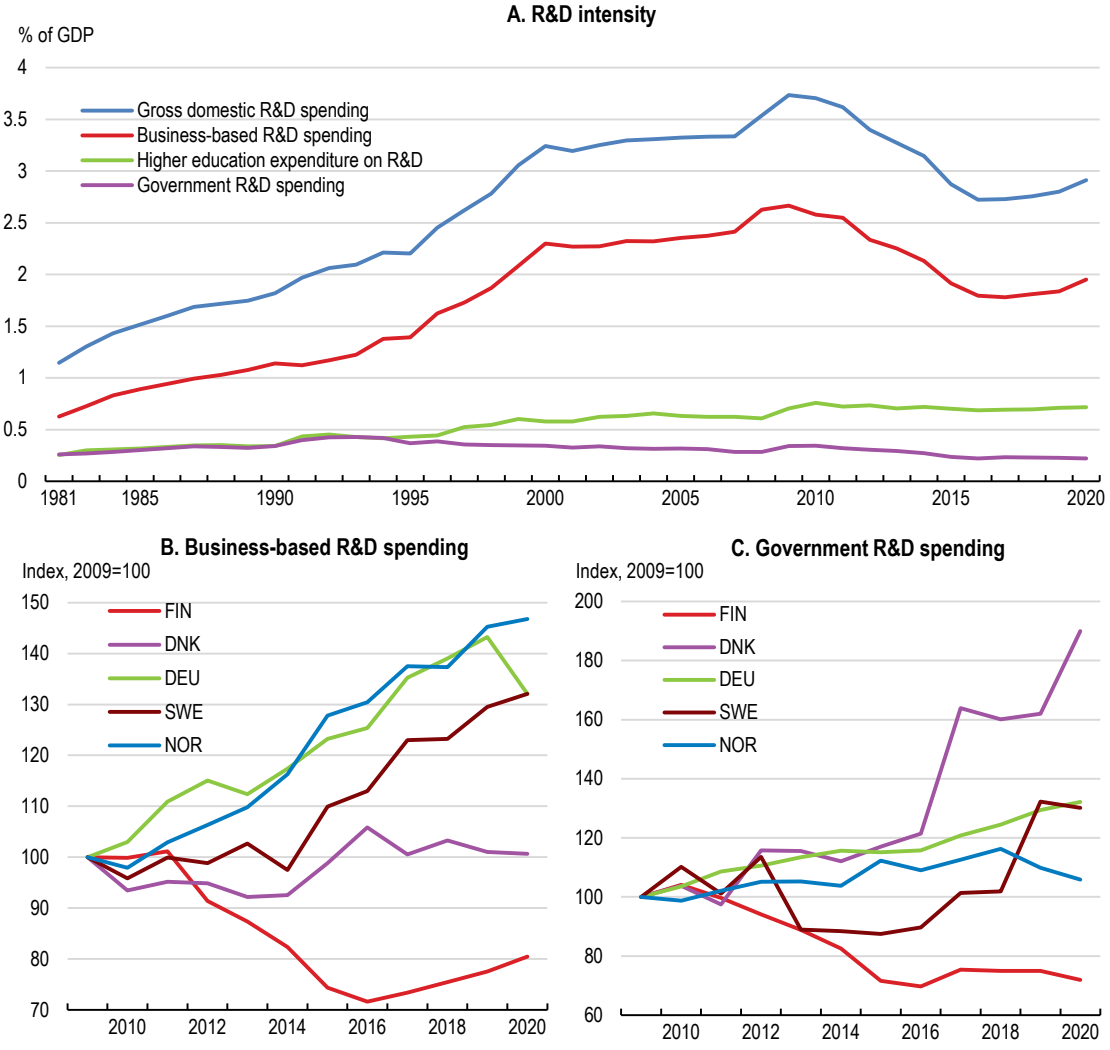
Nokia played an important role in technology diffusion from the global frontier to Finnish firms. It engaged in active R&D collaboration with universities and suppliers co-funded by Tekes (the National Agency for Technology and Innovation) on the latest technologies. Nokia also lobbied for an increase in university study places in the fields of electronics, telecommunications, and information technology.

This contributed to the high share of STEM graduates seen today. Nokia recruited a large number of STEM graduates, offered them experience and later supported their spin-offs.

There are other examples of a handful of large firms playing a more than proportionate role in a country's innovation. For instance, Philips accounted for a bit over 40% of the Netherlands' patent applications to the EPO during 2000-06. However, Finland's innovation was highly dependent on a single firm specialised in telecommunication, exposing it to large firm- and sector specific risks. Nokia's weight in business-based R&D shrank to 17% after the takeover of its mobile handset activities by Microsoft in 2013. The downfall of Nokia's mobile handset business led to knock-on effects that weakened Finland's entire innovation. For instance, major software providers cut back on R&D spending and large telecommunications firms like Telia Sonera withdrew product development activities from Finland. Business funding for research collaboration between universities and research institutes like VTT (Technical Research Centre of Finland) shrank considerably. Nevertheless, many of Nokia's former employees have founded new companies or joined them. Nokia's Bridge Programme in 2011-14, the comprehensive plan for supporting the job transition of its employees, led to the creation of some 400 companies in Finland

Source: Ali-Yrkkö and Hermans (2002[5]), Ali-Yrkkö (2010[4]), OECD (2017[11]).

Figure 2.2. Finland's R&D spending has begun to increase but remains below earlier peaks



Source: OECD, Main Science and Technology Indicators (database).

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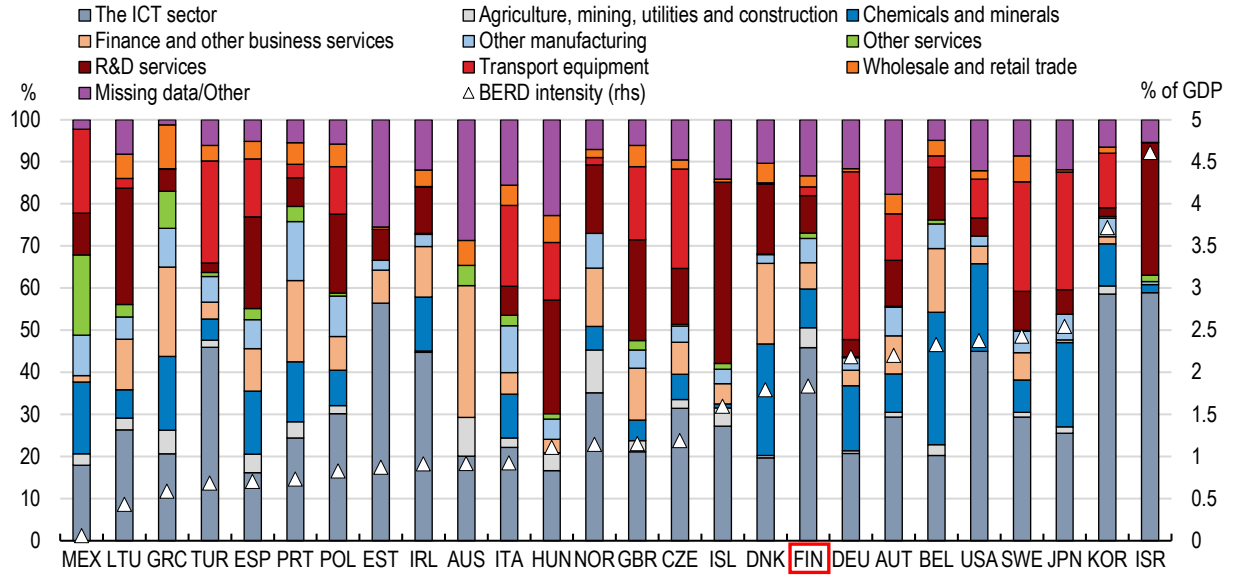
There is room to diversify the base of business-based R&D

Finland's business-based R&D is dominated by high-technology industries, namely the ICT sector (Figure 2.3). In 2019, ICT equipment manufacturing and information and communication services accounted for 40% of business-based R&D spending. The weights of other service industries, for instance wholesale and retail or transportation, are smaller than in other OECD countries. Higher R&D in those industries could unlock large productivity gains, especially if resources are reallocated toward innovative firms. The retail sector in the United States experienced fast productivity growth in the 1990s mainly due to the entry of more productive establishments that capitalised on the latest technologies like e-commerce and advanced inventory management and the exit of less productive establishments (Foster, Haltiwanger and Krizan, 2002[6]).

Figure 2.3. Business-based R&D is concentrated in the ICT sector

Industry composition of Business-based R&D (BERD) spending



Note: The ICT sector refers to ICT equipment, electrical equipment and machinery, and information and communication services.
Source: OECD Research and Development Statistics (database).

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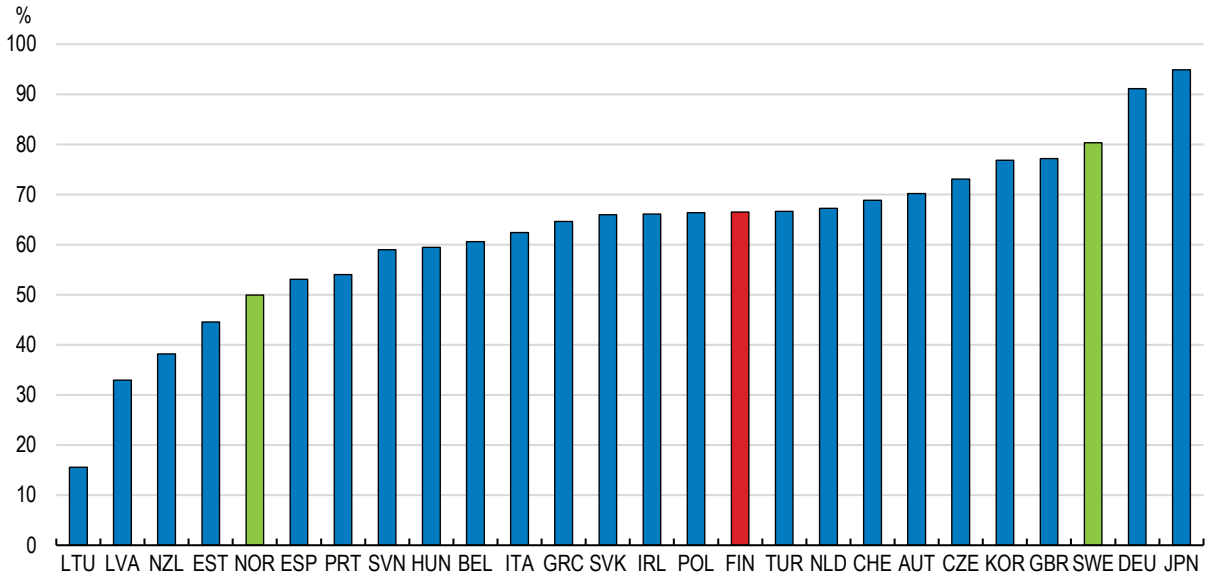
As in many OECD countries, SMEs are under-represented in innovation, especially in applied research. Business-based R&D in Finland is concentrated in large firms, although not as much as in Sweden or other technologically advanced economies (Figure 2.4). The large fixed costs and considerable uncertainties associated with R&D often deter firms with small production scales or small internal funds from investing. In 2020, more than 60% of business-based R&D spending in Finland was undertaken by firms with 250 or more employees, most of them being very large firms with more than 500 employees (Figure 2.5). The weights of large firms are particularly pronounced in applied research, a crucial phase in successful innovation that bridges basic research and experimental development toward the commercialisation of innovation. Broadening the base of business-based R&D spending by increasing the weight of SMEs would strengthen the resilience of Finland's innovation ecosystems. Participation in applied research involves intensive collaboration with higher education and research institutions, which would enable SMEs to strengthen technological capabilities and acquire new knowledge in their relevant sectors.

Figure 2.4. Business-based R&D is driven by large firms as in many other OECD countries

The share of firms with more than 250 employees in business-based R&D, 2019



Source: OECD Research and Development Statistics (database).

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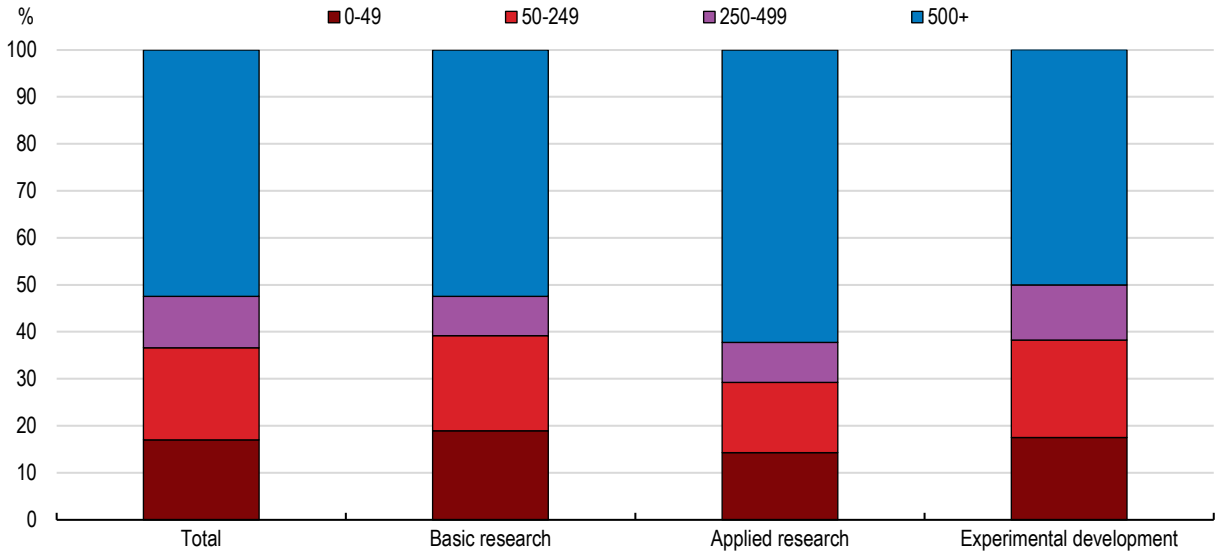
Figure 2.5. The weight of SMEs in business-based R&D is small, particularly in applied research

The composition of Finland's business-based R&D spending by firms' size (number of employees), 2020



Note: Basic research is defined by Statistics Finland to be experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view. Applied research is an original investigation undertaken to acquire new knowledge. It is, however, directed primarily towards a specific, practical aim or objective. Experimental development is systematic work, drawing on knowledge gained from research and practical experience and producing additional knowledge, which is directed to producing new products or processes or to improving existing products or processes.
Source: Statistics Finland.

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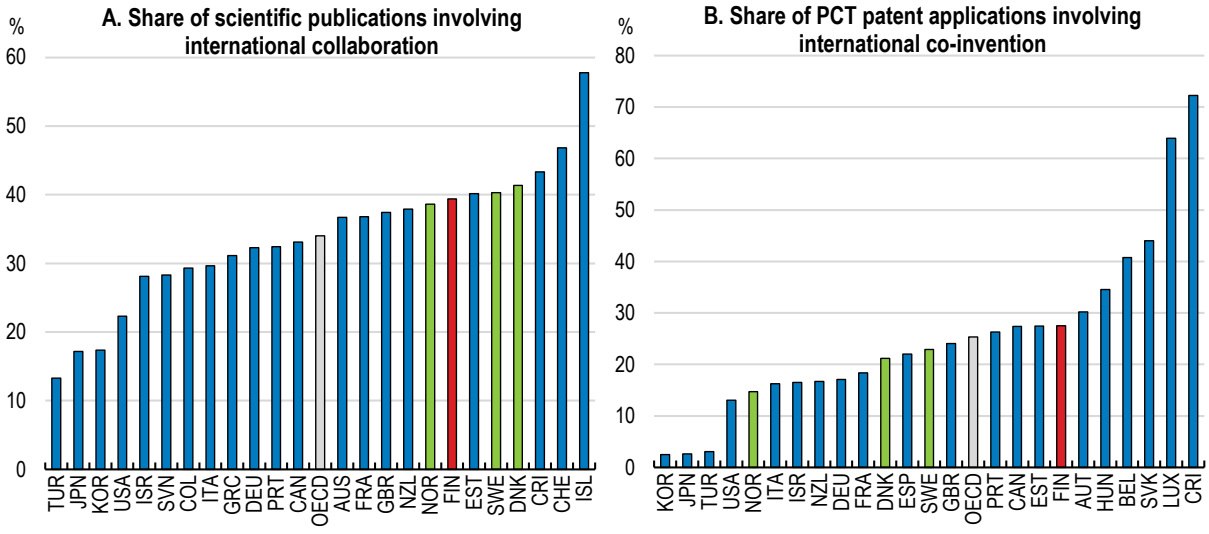
Innovation collaboration is common but can be strengthened further

Innovation collaboration is an important channel through which advanced technologies and knowledge are transferred from research institutions or frontier firms to less technologically advanced firms. In particular, international collaboration provides opportunities for Finnish researchers and firms to absorb the latest technologies and scientific knowledge from the global frontier. Innovation collaboration seems rather common in Finland. For instance, Finland has a higher share of scientific publications involving international collaboration than many other OECD countries, albeit slightly lower than Sweden or Denmark (Figure 2.6, Panel A). The share of patents application involving international co-invention is also high, even compared to Scandinavian peers (Figure 2.6, Panel B). According to the European Commission's Community Innovation Survey, 47% of surveyed Finnish firms undertaking some kinds of innovation collaborated with other firms, research institutions or foreign partners in 2018, a share that is higher than in most EU economies. However, Finland lags behind many other OECD countries in university-industry collaboration (Figure 2.7), which is an integral part of applied research. Indeed, the share of higher education R&D financed by business is highest among the economies with very strong innovation performance such as Korea, Germany and Switzerland.

Figure 2.6. Finland engages intensively in international innovation collaboration



Source: OECD Science Technology and Industry Outlook (database).

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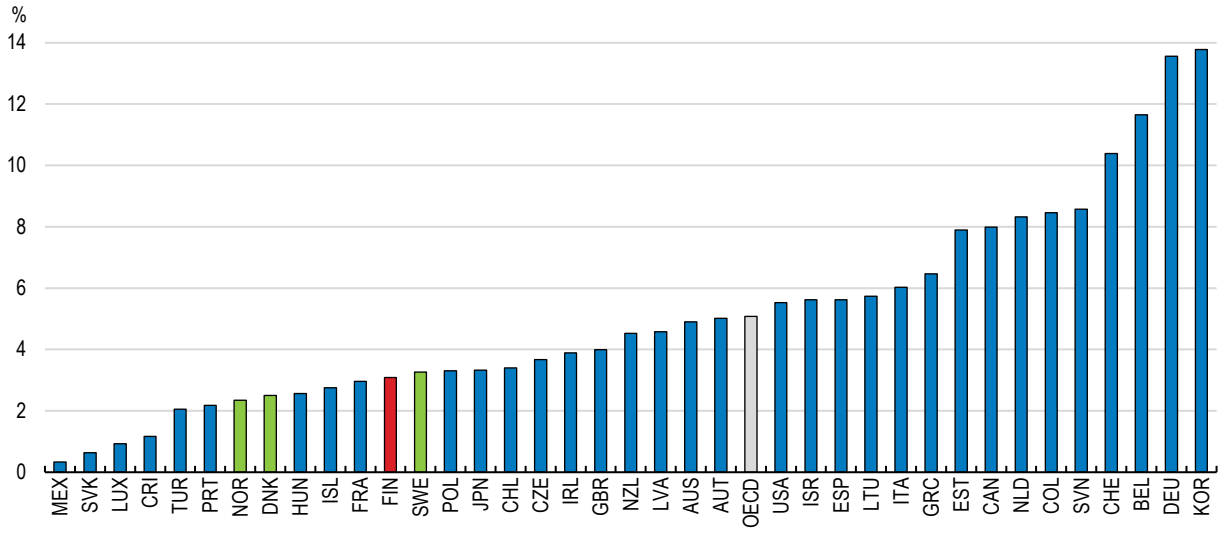
Figure 2.7. University-Industry R&D collaboration is low

Percentage of higher education expenditure on R&D financed by the business sector, 2020 or latest



Source: OECD, Main Science and Technology Indicators (database).

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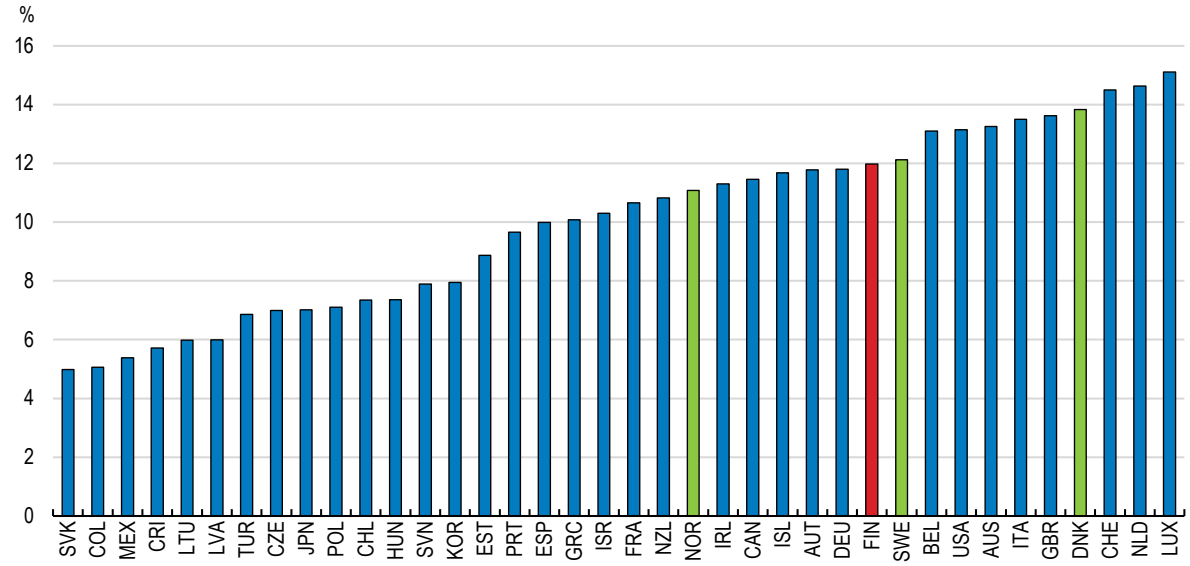
Research quality is high

The high quality of research in Finland can be seen for instance in its relatively high share of scientific publications belonging to the world's top 10% of most cited publications (Figure 2.8). The quality of research can be improved further by addressing the fragmented research base in higher education institutions. For instance, the need for small universities to provide a full set of degree programmes prevented them from building larger, more specialised internationally competitive research groups (OECD, 2017[1]). Steps were taken to strengthen research quality, for instance through consolidation. For example, three universities leading in the areas of Science and Technology, Art and Design, Business and Economics were merged into Aalto University in 2010, which ranks high internationally in research and innovation collaboration. The government also facilitated collaboration among groups of researchers, for instance through centres of excellence run by the Academy of Finland.

Business-based R&D in Finland has been resulting in patent applications with international significance, attesting to the high quality of Finland's industrial innovation. The number of patent applications under the Patent Cooperation Treaty (PCT) relative to business-based R&D spending is among the highest across OECD countries (Figure 2.9). Nevertheless, innovation in Finland's main industries has been more incremental in nature, where continuous refining of existing core technologies is reflected in new products (OECD, 2017[1]). According to Statistics Finland's Innovation Survey, some 48% of surveyed Finnish firms introduced new products that improved upon the existing products in 2020, while 36% introduced products that were new to their markets (Statistics Finland, 2022[7]). Finland's innovation ecosystems should better support radical innovation by promoting multidisciplinary innovation collaboration. Radical innovation can deliver strong productivity gains by opening up the possibilities of new technology adoption and new industrial applications.

Figure 2.8. The quality of scientific research is relatively high

The share of scientific publications belonging to the world's top 10% of most cited publications, 2020



Note: OECD calculations based on Scopus Custom Data, Elsevier, Version 5.2021, September 2021; and Scimago Journal Rankings.
Source: OECD Science, Technology and Innovation Scoreboard.

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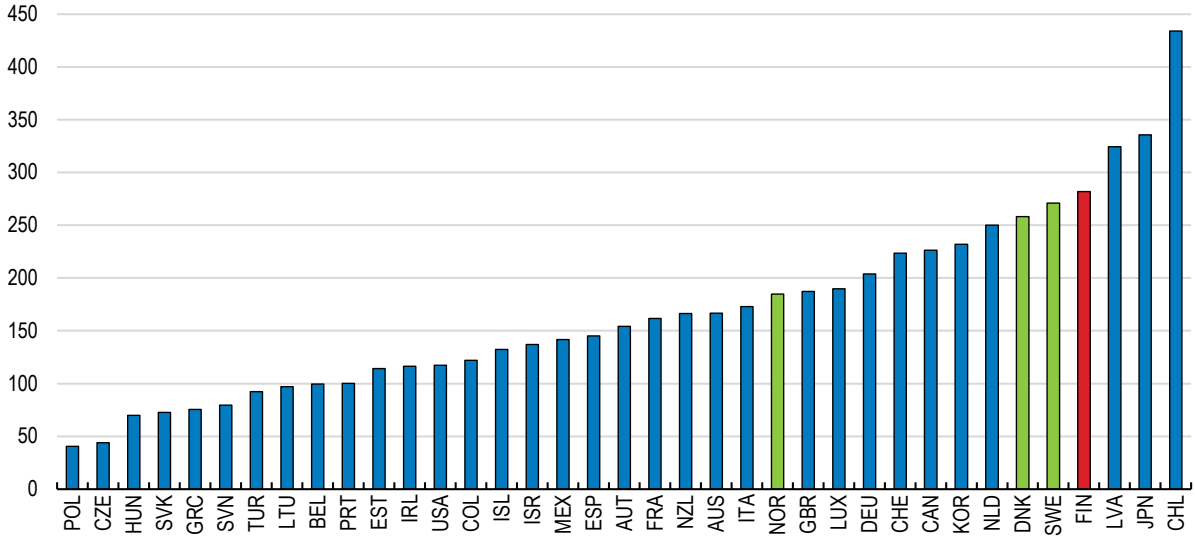
Figure 2.9. Business R&D is resulting in a high number of patent applications

Number of patent applications under the Patent Cooperation Treaty per USD one billion of business-based R&D spending, 2019



Note: Business-based R&D spending is converted to USD using PPPs and is in 2015 prices.
Source: OECD computation based on the OECD Main Science and Technology Indicators.

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Finland needs more investment in intangible capital

Innovation and productivity growth are increasingly driven by intangible capital, which includes not only R&D but also data and software, design and copyrights, as well as organisational structure and firm-specific skills (Box 2.3). Intangible capital plays a central role in successful commercialisation of new technologies, thereby translating innovation into productivity growth (Corrado and Hulten, 2010[8]). In many OECD countries, investment in intangible capital has increased faster than investment in physical capital and it significantly exceeds physical capital investment in some countries (Corrado et al., 2021[9]). Finland's investment in intangible capital as a share of value added is relatively high compared with other OECD countries, albeit with some room to catch up to Scandinavian peers (Figure 2.10). However, it has been decreasing gradually since the early 2000s (Figure 2.11) and remained consistently lower than investment in physical capital.

Box 2.3. Intangible capital as a driver of innovation and productivity growth

Corrado and Hulten (2010[8]) classified intangible capital as the following expenditure on knowledge-based activities:

- **Computerised information**: software and databases
- **Innovative property**: R&D, patents, copyrights, designs, trademarks, etc.
- **Economic competencies**: brand equity, firm-specific human capital, and organisational capital that generates competitive advantage and increases efficiency

Although these expenditures are usually treated as intermediate inputs in the System of National Accounts (except R&D, which has been capitalised in the 2008 System of National Accounts), they often contribute to production for more than a fiscal year, thereby meeting the accounting-convention definition of capital investment (OECD, 2013[10]).

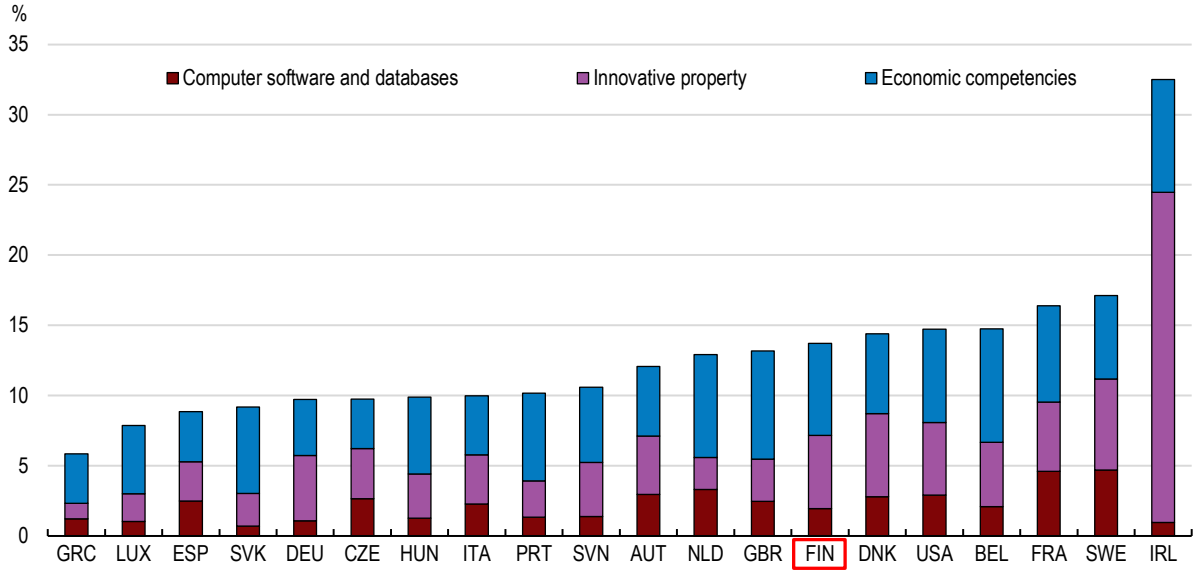
Intangible capital plays an essential role in innovation. For instance, the automotive industry spends an increasingly large share of the cost of developing new vehicles on software, with high-end vehicles relying on millions of lines of computer code. Intangible capital is also an important source of productivity growth partly because several types of intangible capital can be duplicated at very low cost, generating large economies of scale. Corrado et al. (2016[11]) estimated that business investment in intangible capital accounted for 34% of annual average labour productivity growth in the United States and 20% in 14 advanced European economies during 2000-13. In Finland, it accounted for 25% of average labour productivity growth during the same period. Intangible capital continued to contribute positively to Finland's labour productivity growth in the aftermath of the global financial crisis, even as overall productivity growth turned negative.

Stronger investment in intangible capital is essential for Finland's strong innovation to result in significant productivity growth. It also helps Finland reap larger benefits from its vigorous adoption of digital technologies (see below). The extent of productivity gains firms enjoy from adopting digital tools is defined by their stock of intangible capital, such as valuable (big) data or sophisticated work organisation that is more conducive to the digitalisation of workflows (Brynjolfsson, Rock and Syverson, 2021[12]). However, Finland may not be making the most effective use of digital technologies due to insufficient investment in intangible capital that complements digital technologies. Indeed, there is room for more investment in software and datasets, which weights in Finland's intangible investment are lower than in Sweden or Denmark (Figure 2.12). It has also been observed that diffusion of new technologies is held back by a shortfall in organisational capital like managerial skills, which holds back Finnish firms from translating their innovation into competitive new products (OECD, 2017[1]). Smaller firms, in general, lack the capabilities to reorganise work to reap the efficiency gains digital tools offer. The digitalisation of economic activities can then widen the productivity dispersion among Finnish firms, as only a handful of firms with a large

stock of complementary intangible capital would enjoy large productivity gains (Corrado et al., 2021[9]). Therefore, Finland's innovation ecosystems should foster stronger investment in intangible capital that helps more Finnish firms to capitalise on digital technologies.

Figure 2.10. Finland's investment in intangible capital is relatively high

Investment in intangible capital as the share of gross value added, %, 2017



Note: 2016 data for USA.
Source: OECD computation based on INTAN-invest data, April 2020.

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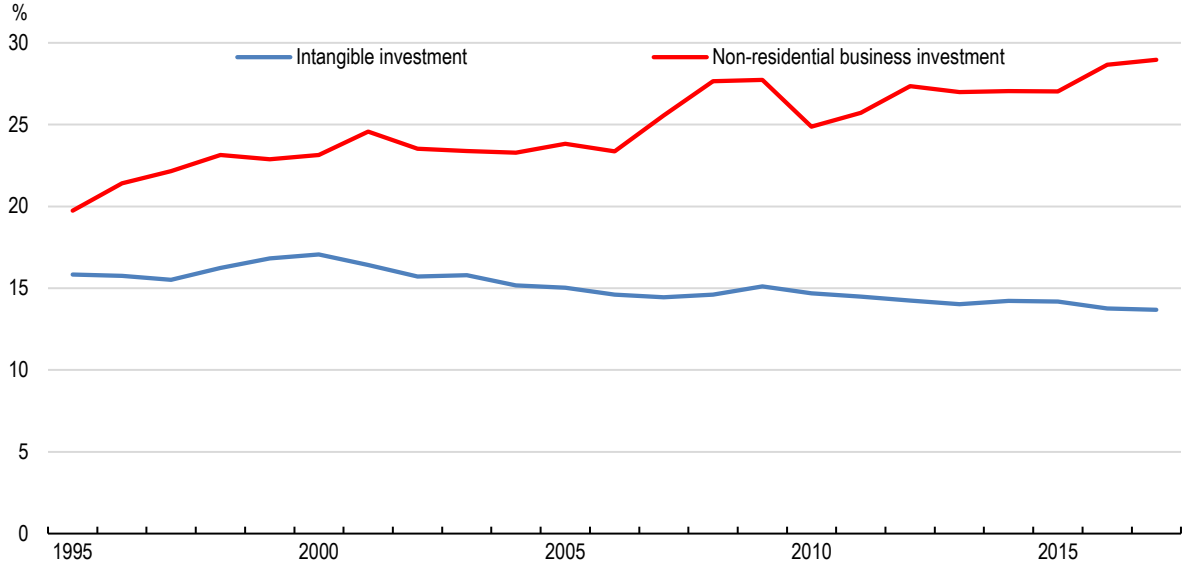
Figure 2.11. Finland's investment in intangible capital has been declining

Investment in intangible capital as a share of gross industrial value added, %



Source: OECD computation based on INTAN-invest data, April 2020.

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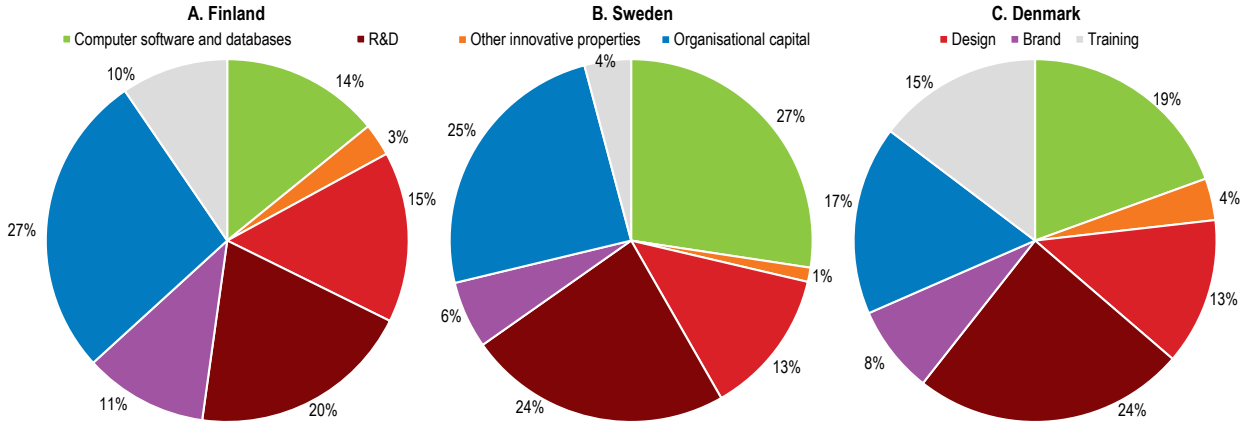
Figure 2.12. Finland invested less in software and data than its peers

Composition of intangible capital investment, 2017



Source: OECD computation based on INTAN-invest data, April 2020.

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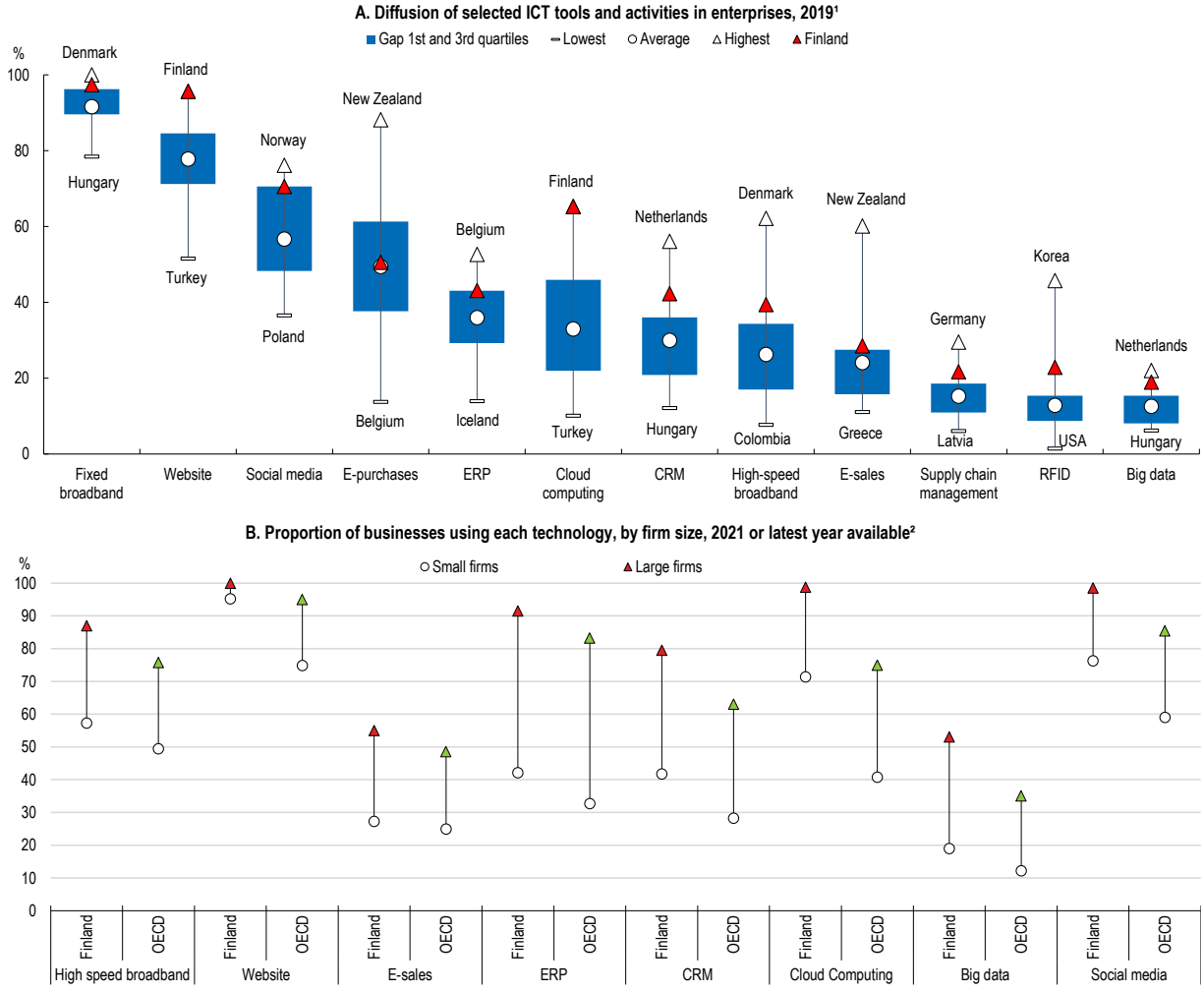
Low ICT investment holds back the gains from advanced digital adoption

Investment in information and communication technologies (ICT) is crucial for seizing the opportunities for higher productivity growth presented by digital technologies (OECD, 2020[13]). Finland is considered the front runner in the adoption of digital technologies among EU countries (European Commission, 2022[14]). Indeed, a higher share of firms have adopted advanced digital technologies like Cloud Computing or Big Data Analysis in Finland than in many other OECD countries (Figure 2.13, Panel A). As in other OECD countries, the adoption of digital technologies is slower among smaller firms, but Finland outperforms the OECD average in the share of small firms adopting digital technologies (Figure 2.13, Panel B).

Despite the vigorous digital adoption, the average contribution from ICT capital deepening to labour productivity growth has been smaller in Finland than in many other OECD countries, particularly Sweden and Denmark (Figure 2.14). This owes to Finland's slower deepening of ICT capital compared to many OECD countries (Figure 2.1), and the smaller weight of ICT capital in production for instance than in Sweden. There is thus substantial room for Finland to boost productivity through higher ICT investment and more intensive use of ICT capital in production.

Figure 2.13. Finland's uptake of digital technologies is high even among small firms

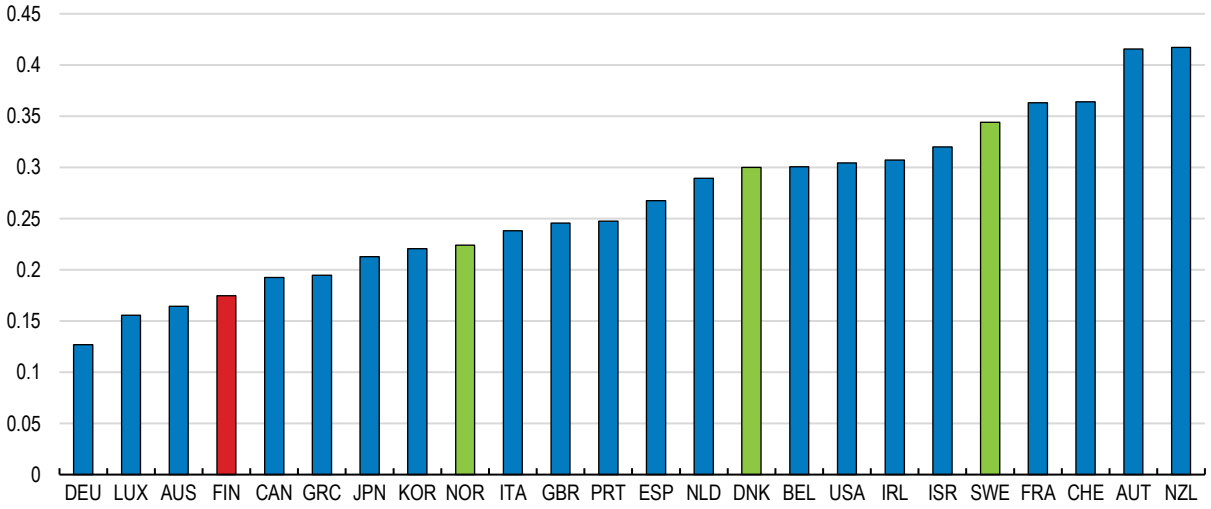


1. CRM stands for customer relationship management. Enterprise resource planning (ERP) systems are software-based tools that can integrate the management of internal and external information flows, from material and human resources to finance, accounting and customer relations. Here, only sharing of information within the firm is considered. Cloud computing refers to ICT services used over the Internet as a set of computing resources to access software, computing power, storage capacity, etc. Supply chain management refers to the use of automated data exchange applications. Big data analysis refers to the use of techniques, technologies and software tools for analysing big data. This, in turn, relates to the huge amount of data generated from activities that are carried out electronically and from machine-to-machine communications. Social media refer to applications based on Internet technology or communication platforms for connecting, creating and exchanging content online with customers, suppliers or partners, or within the enterprise. Radio frequency identification (RFID) is a technology that enables contactless transmission of information via radio waves.
2. Small firms are defined as firms with 10 to 49 employees, whereas large firms are defined as those with more than 250 employees.
Source: Eurostat (2019), Digital Economy and Society Statistics (database) and OECD (2022), ICT Access and Usage by Businesses (database).

StatLink https://stat.link/iwj8ef

Figure 2.14. The contribution of ICT capital to labour productivity growth has been small

Average annual contribution of ICT capital deepening to labour productivity growth, 2010-2020, percentage points



Note: Data for Greece, Israel, Norway and Spain refer to the average over 2010-2019.
Source: The OECD Productivity Database.

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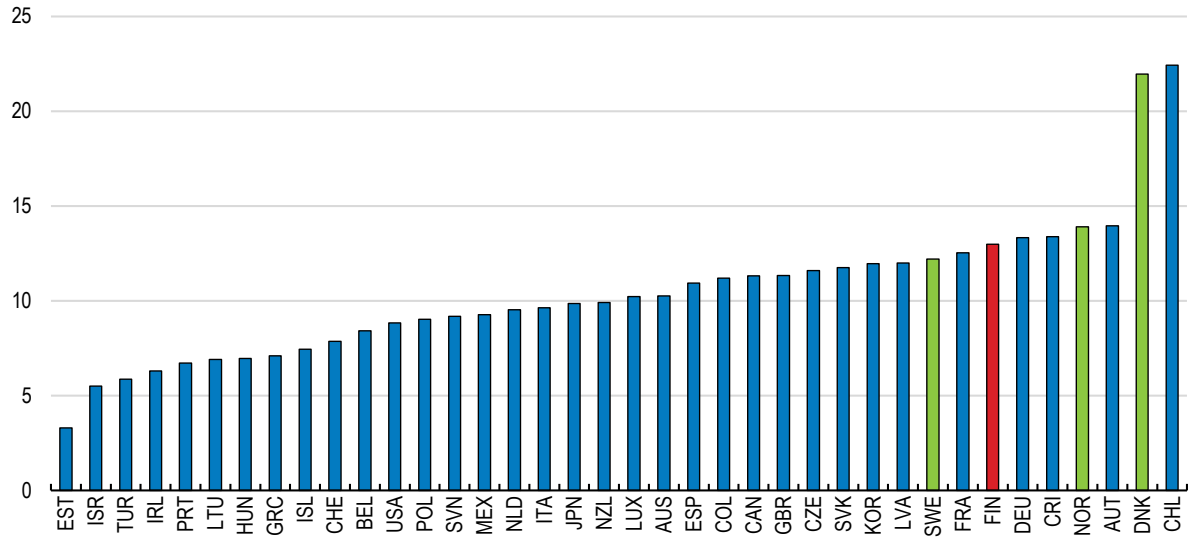
Finland has a competitive edge in green innovation

Finnish firms have invested heavily in climate change mitigation and other environmental management technologies. For instance, 13% of patent applications concern environment-related technologies, a share that is higher than in many other OECD countries (Figure 2.15). In particular, Finland is leading in circular economy and bioeconomy innovation. Green innovation in Finland has been driven mainly by the business sector, motivated by environmental regulations and growing demand by customers for environment-friendly products. Finland has been a pioneer in implementing the EU environmental policies, which gave Finnish firms a first-mover advantage in the development of cleantech products (OECD, 2021[15]). As a result, Finland's share in the global cleantech market, at over 1%, is twice as large as its contribution to global GDP. About 70% of firms in the cleantech industry are microenterprises and SMEs, illustrating the importance of entrepreneurship in this sector. Yet, their insufficient managerial skills are constraining the growth of these innovative firms and thereby the diffusion of novel technologies (European Commission, 2019[16]).

Figure 2.15. Finland is among the leading countries in green innovation

Patent applications on environment technologies, % of all patent applications, 2019



Source: OECD Environment Statistics.

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Making the most of the revamped innovation support

Innovation support was withdrawn quickly in the aftermath of the global financial crisis

Finland's innovation ecosystems enjoyed broad-based policy support until 2010, underpinned by the government's initiatives and a policy consensus that continuous investment in innovation was key to Finland's long-run prosperity. Innovation collaboration between enterprises, universities and public research institutes was promoted through various funding schemes by Tekes (the National Technology Agency, currently Business Finland), which successfully strengthened the technological capabilities of Finnish firms and boosted business-based R&D spending (OECD, 2017[1]).

Public support for innovation waned during the long economic stagnation of the 2010s (see above) and underwent significant restructuring. Public funding for applied research was cut back, as the government reduced its R&D funding for Tekes by 24% in 2016. The government also consolidated the 20 public research institutes into 12 and cut their research funding by 37% during 2013-16. The Strategic Centres for Science, Technology and Innovation, aimed at establishing new types of public-private innovation partnerships similar to the Competence Centres in other OECD countries, were terminated abruptly in 2015 after issues of effectiveness and governance were raised (OECD, 2017[1]). The rapid withdrawal of public funding for applied research and innovation collaboration weakened Finland's innovation ecosystems, especially by making it difficult for firms and universities to share the risks associated with the commercialisation of radical innovation.

The government's stance towards innovation policy took a welcome turn in 2017 when it stressed the need to redress the decline in R&D spending to secure long-run innovation-based growth. Business Finland, a new organisation merging Tekes and the export promotion agency Finpro, was set up in 2018 to disburse innovation funding and promote trade, tourism and investment. The Research and Innovation Council (RIC), an effective platform that formed national strategic consensus and monitored Finland's innovation ecosystems in the 1990s and 2000s (see below), was reconvened. It formulated at the time a vision that aims to turn Finland into the world's most attractive and competent environment for experimentation and innovation by 2030 (Research and Innovation Council, 2017[17]). The government followed up in April 2020 with a National Roadmap for Research, Development and Innovation, which laid out policy priorities for

achieving the government's target on R&D spending (see below) as well as boosting business-based R&D and strengthening the innovation ecosystems (Box 2.4). On the back of renewed innovation support and the economy exiting the long stagnation, Finland's business and government R&D spending grew in nominal terms by 19% and 9%, respectively, between 2016 and 2020 but their shares of GDP have not increased notably.

Box 2.4. Finland's National Roadmap for Research, Development and Innovation

The National Roadmap for Research, Development and Innovation was put forth in April 2020 and updated in December 2021. It presents the strategy for attaining the R&D target and stresses the need to achieve a more diverse economic structure and stronger productivity growth. It highlights the need for more extensive innovation activities involving a wider range of industries and smaller firms and new models of public-private innovation partnership. The roadmap classifies policy measures across the following three pillars:

Competence

To increase the supply of qualified experts and R&D personnel, the government aims to lift the share of the 25-34 age group with tertiary educational attainment to 50% by 2030. It would also increase the number of foreign students threefold to 15 000 by 2030 and raise the share of foreign students graduated from Finnish universities who are employed in Finland to 75%. Adult education will be more aligned with industries' need for research and innovation competence.

Public-private partnership

Responsible ministries and funding agencies, namely the Academy of Finland and Business Finland, and other stakeholders will develop a flexible public-private partnership for long-term research, development and innovation cooperation and its funding instruments. The use of EU funding and other international funding will be enhanced through better coordination within the government and new approaches developed jointly among universities, research institutes and firms.

Innovative public sector

The government will foster demand for innovation and leverage the latest technologies and innovation. It will increase innovative public procurement, make regulation more conducive to the commercialisation of innovation, and share public resources like data for innovation.

Source: Ministry of Economic Affairs and Employment; Ministry of Education and Culture (2020[18]; 2021[19]).

The government established an ambitious goal to boost R&D spending

The government has a target to increase gross domestic R&D spending to 4% of GDP by 2030. Finland has been setting national targets for R&D intensity since the 1970s and long had a good track record in achieving them (Deschryvere, Husso and Suominen, 2021[20]). The 4% target was first set in 2005 when Finland's actual R&D spending reached 3.7% of GDP, buoyed by innovation in the ICT sector spearheaded by Nokia. However, this target was never reached and eventually dropped out of the government's programme. It was reinstated in 2019 and promoted by the current government. R&D intensity targets are commonly found across OECD countries and some innovation-oriented non-OECD economies like China (OECD, 2021[21]). Finland's target level of 4% is relatively high, a level shared only by Japan, Sweden and Iceland. Only Israel and Korea exceed this level of R&D spending. It will be challenging to achieve this target since it requires sustaining very large increases in R&D spending (Box 2.5). Moreover, such rapid expansion in R&D will not be feasible without addressing existing bottlenecks, notably severe skill shortages (see Section 2.4).

Box 2.5. How much of an increase in R&D spending is needed to meet the government's 4% target?

This box provides a simple estimate of the growth rate in R&D spending needed to achieve the government's R&D spending target. The main assumption is that Finland's real GDP and inflation will follow the projection by the General Government Fiscal Plan for 2023-2026 (Ministry of Finance, 2022[22]) until 2026, and then the Bank of Finland's central scenario between 2027 and 2030. This would bring nominal GDP to EUR 345 billion in 2030.

Gross domestic R&D spending equivalent to 4% of GDP would be EUR 13.8 billion. Given that the level of R&D spending was EUR 6.9 billion in 2020, it would require 7% annual growth in gross R&D spending to reach the target.

Similar computations imply that achieving the target for government R&D spending (1.2% of GDP by 2030) requires government R&D spending to grow by 6.4% (or around EUR 191 million) annually from 2020, on average. Government R&D spending decreased slightly in 2021 but increased by EUR 272 million in 2022. It is expected to decline by EUR 100 million in 2023. However, the government envisages an annual increase in its R&D spending by EUR 260 million between 2024 and 2026. Overall, these budget measures until 2026 roughly meet the cumulative increases needed to keep public R&D spending on track to achieve the 1.2% target.

In addition to these increases in public R&D spending, the government expects the introduction of the new R&D tax incentive (see below) to reduce fiscal revenue by about EUR 100 million every year from 2023.

Source: OECD computation based on the Ministry of Finance (2022[22]) and Bank of Finland (2021[23]).

In December 2021, Finland reached a political agreement to boost public sector's R&D spending to 1.33% of GDP by 2030, which corresponds to a third of the overall R&D spending target of 4% of GDP. This agreement is motivated by the fact that historically public R&D has comprised one-third of Finland's domestic gross R&D spending (for example, it was around 1% of GDP in 2020 while overall R&D amounted to 2.9%). Each additional euro in public R&D spending will need to be matched by two additional euros of business-based R&D. The government needs to commit to stable innovation support to induce such R&D spending by the business sector, given its history of swift and abrupt withdrawal of innovation support. Legislation (the R&D Finance Act) mandating the government to boost its R&D spending to 1.2% of GDP by 2030 is foreseen to enter into force in January 2023. The 1.2% target for government R&D spending is motivated by the fact that government R&D spending historically comprised 90% of the public sector R&D spending. The government will also introduce a long-term R&D funding plan that specifies the orientations of R&D policy and provides guidelines for the allocation of government R&D spending.

Two elements would define the effectiveness of the new framework for public R&D spending. First, the government should work closely with the private sector in achieving the R&D spending target. The government should not only monitor the development of business-based R&D but also work together with the private sector on designing policy measures to boost R&D spending by private enterprises, especially SMEs. This includes reflecting private-sector needs in the long-term orientation of government R&D funding. The R&D Finance Act foresees a monitoring role by the State Council, but it is unclear to what extent the private sector will be involved in its monitoring exercise. Second, while innovation support needs to be stable to provide a clear prospect of lasting innovation collaboration, it should not be rigid. The legislation should allow for some flexibility in annual government R&D spending, enabling future governments to accommodate fiscal revenue shocks or finance exceptionally large expenditures. This would make it easier for future governments to abide by the Act. The unused budget for R&D spending should be allowed to be carried over to avoid having to disburse all innovation support within a fiscal year, which risks compromising the quality of research projects and lowering the value for public money.

Innovation support must balance between basic research, which is driven by excellence and underpins Finland's competitiveness as the innovation hub, and applied research, which is more targeted and oriented toward specific missions. While ensuring ample funding for basic research, Finland's long-term R&D funding plan needs to set clear objectives and directions for research and innovation support to ensure that the large increase in government R&D spending strengthens Finland's innovation ecosystems in the most cost-effective way. Finland's innovation support is thinly spread across regions, measures and agencies, often lacking sufficient scale to reach a critical mass (OECD, 2017[1]). The government also does not target specific sectors or technologies in their efforts to reach the R&D intensity target. However, the limited size of policy resources and of the domestic market implies that Finland needs a more strategic innovation policy, like ones adopted by many OECD countries that orient public R&D spending toward specific missions to solve the most pressing societal challenges (Box 2.6). Such innovation policies involve picking the "problem" as opposed to picking the "winners", while allowing innovation actors to propose the best technology solutions to address it (Larrue, 2021[24]). This trend in public R&D policy is likely to strengthen after the COVID-19 pandemic (Paunov and Planes-Satorra, 2021[25]).

Finland's updated National Roadmap for Research, Development and Innovation mentions "a new challenge- and mission-based approach to implementing and funding research and innovation", but the envisaged innovation strategy is unclear (Ministry of Economic Affairs and Employment; Ministry of Education and Culture, 2021[19]). There are also existing schemes like the Flagship Programmes by the Academy of Finland and the Growth Engines platforms by Business Finland, which are powerful policy instruments to mobilise a wide set of actors towards commonly developed strategic agendas. Although these initiatives do not fulfil all the design principles of the mission-oriented innovation policy, they have supported significant learning and cultural change in terms of governance and policy framework, upon which a fully-fledged and wider scope mission-oriented innovation policy could build. While the large coordination costs is a common drawback of mission-oriented policy (Box 2.6), OECD countries addressed this issue by enhancing the efficiency of the project governance through building trusts among the participants and adapting the governance system through learning.

Finland also needs stronger high-level coordination on innovation policy, given that its budget for innovation support is distributed across several ministries. It has had a highly effective coordination body that ensured systemically coherent research and innovation policies. The Research and Innovation Council (RIC) created in 1987 acted as an arena for debating innovation policy priorities from a holistic perspective and forming a national strategic consensus. While The RIC was an advisory body, it monitored the state of Finland's innovation system and supported strong coordination and high-level decisions (Deschryvere, Husso and Suominen, 2021[20]; Arnold et al., 2022[26]). Unfortunately, the RIC was significantly downsized in 2016, and stripped of its secretariat and information gathering function. Although it has launched key innovation policy initiatives like the National Roadmap for Research, Development and Innovation, its functions are not as broad or independent as they used to be (Deschryvere, Husso and Suominen, 2021[20]). There is a case for restoring the RIC's original capabilities, especially the strong coordination power. The rejuvenated RIC can be a suitable body for overall planning, implementing and monitoring mission-oriented innovation policies, given that mission-oriented innovation support should be subject to rigorous impact assessments and resulting reallocation of policy resources. The RIC can also help ensure that private sector needs are adequately taken into account in government R&D funding and support measures (see above).

Box 2.6. Mission-oriented innovation policies in OECD countries

What are mission-oriented innovation policies?

Mission-oriented innovation policies (MOIPs) are a coordinated package of policy and regulatory measures aimed at mobilising actors in science, technology and innovation to address well-defined societal challenges such as ageing or climate change within a defined timeframe. They emerged as governments across OECD economies needed to overcome limitations in traditional innovation policies, such as weak directionality, lack of holistic coordination and fragmentation of policy measures. MOIPs often involve a newly established coordination body at the level of each mission that determines and implements the direction of innovation activities toward the collectively developed objectives and a tailor-made bundle of instruments to meet these objectives. Public R&D spending plays a large role in MOIPs, as well as mission-oriented government procurement, such as green procurement that incorporates environmental requirements into their tenders or procurement of solutions to specific societal challenges.

Examples of mission-oriented innovation policies

Germany's High Tech Strategy (HTS) 2025

The HTS 2025 adopted in 2018 is a comprehensive, inter-ministerial strategy that aims to raise Germany's gross domestic R&D spending to 3.5% of GDP in 2025. It has set 12 mission areas to guide joint efforts of science, industry, and policy makers across ministries, which include healthcare, plastic pollution, reduction of greenhouse gas (GHG) emissions and artificial intelligence. For example, the GHG reduction mission aims to use research and innovation funding for new technologies that enable industry to contribute to the long-term carbon neutrality goal while securing Germany's competitiveness as an industrial location. Challenges associated with the HTS include high coordination costs and the lack of common R&D funding resulting in fragmented funding across government agencies.

The Netherlands' Top Sector Policy

The Top Sector Policy started in 2011 as an industrial policy for boosting the competitiveness of the Netherlands' key sectors, such as agriculture, logistics, high-tech systems and materials, referred to as Top Sectors. Since 2018, it aims to achieve 25 missions in four societal challenges including energy transition, agriculture and healthcare. For each of these societal challenges, the public sector (led by the Ministry of Economic Affairs and involving authorities across various policy areas) and Top Sector partners (namely corporate enterprises) jointly draft and implement the Integral Knowledge and Innovation Agenda (IKIA), which specifies mission targets and the timeframe for achieving them. The IKIA is revised every four years. Challenges associated with the Top Sector Policy scheme include a large number of missions, an overly hierarchical governance system (currently being reformed) and the over-representation of incumbent actors experienced in collaborating with the government.

Source: Larrue (2021[24]), OECD (2020[27]).

The R&D intensity target is effective in signalling the political commitment to boosting innovation given that it is based on a straightforward indicator that is internationally comparable. Nevertheless, it fails to capture several important aspects of innovation, in particular investment in intangible capital, the quality of research, and the extent of knowledge spillovers. Furthermore, the R&D target does not capture R&D spending by innovative start-ups and other small firms with less than 10 employees. This is because these firms are not covered in Finland's innovation survey nor in the innovation surveys of other EU countries, following the common sampling instruction by the European Commission (Deschryvere, Husso and Suominen, 2021[20]). The government should thus complement this target with other targets, for instance on research outcomes like the number of patent applications or the share of top scientific publications.

This would allow more comprehensive monitoring of the progress toward the competitive innovation ecosystems envisaged in the Research and Innovation roadmap. Indeed, the National Roadmap for Research, Development and Innovation specifies eight indicators aside from R&D intensity to be monitored in the assessment of progress toward its policy goal, even though it does not assign any target levels for those indicators. The government should also consider collecting basic information on R&D expenditures by start-ups and micro enterprises, for instance by including the R&D spending in the list of information to be collected for its structural business and financial statement statistics, which surveys turnover and spending on inputs of all Finnish firms.

The new R&D tax credit should balance wide accessibility and efficiency

In addition to the large increase in government R&D spending that will revamp direct funding of business-based R&D, the government will also introduce a new R&D tax incentive. Both measures stimulate business-based R&D by subsidising the costs of R&D activities but differ importantly in their abilities to target some types of innovation and the scope of firms they can reach out to. For instance, the government can tailor direct support measures like R&D grants to guide innovation to specific societal challenges. However, only a limited number of firms with sufficient capacity to participate in these government-funded programmes would benefit from those grants. In contrast, R&D tax credits can be claimed by all eligible firms, but it is administratively difficult to target them to specific research themes. This trade-off between the extent to which the government can target the R&D support and the scope of firms it can reach out to implies that the government needs to deploy both direct support and tax credits to promote more diversified and competitive innovation ecosystems.

The government envisages introducing a tax allowance on 50% of the labour costs and expenditure on services purchased dedicated to R&D activities. Until recently, Finland was one of the few OECD economies that does not offer R&D tax incentives (Figure 2.16). While a temporary tax allowance introduced in 2013 allowed firms to deduct the wage expense of their R&D activities, it was removed at the end of 2014 following very low take-up (Kuusi et al., 2016[28]). In 2021, the government started offering a 50% deduction for the costs of R&D conducted jointly with higher education institutions or research institutes as a temporary measure until 2027. The deduction rate was boosted to 150% in 2022. Nevertheless, only firms with capacity to collaborate with higher education or research institutions benefit from this provision. The new tax incentive will cover more general R&D spending in line with the tax incentives offered by other OECD economies. It is expected to help broaden Finland's R&D base by encouraging a larger mass of Finnish firms from a broader range of industries to innovate.

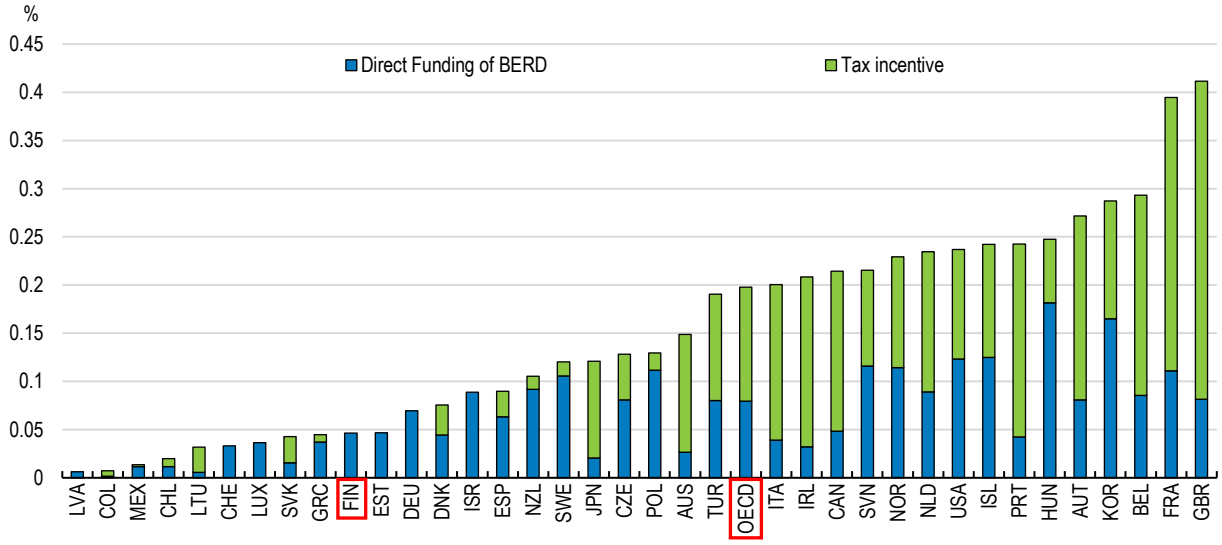
The new R&D tax incentive should be easily accessible to start-ups and other Finnish firms that would respond most to the scheme. A tax incentive in its purest form only covers firms that are profitable and pay taxes, thereby excluding firms that have not generated taxable profits. However, in many OECD countries, unused tax incentives can be carried forward. The period over which tax incentive claims can be carried forward varies widely across the OECD, ranging from three years in the Czech Republic to 20 years in the United States (OECD, 2021[29]). The government envisages allowing the new R&D tax incentive to be carried forward in line with corporate operational losses, which can be carried over for 10 consecutive years.

It is also common across OECD countries that R&D tax incentives are made refundable, transferring the excess credit that cannot be used to reduce tax liability in the form of a cash payment to the firms. Alternatively, the excess credit can be deducted from other corporate taxes or employer's social security contributions. These features turning R&D tax incentives into de facto subsidies are particularly effective in providing cash flow to innovative firms in their early stage when they need to finance investment or product development. The R&D tax incentive can be also made "incremental," covering the R&D spending exceeding a pre-defined baseline amount. Such baseline amount can for instance be 50% of the firm's average R&D spending over the past three years, as in the United States. Some countries like Korea,

Spain or Portugal offer hybrids of a volume-based R&D tax incentive topped by an incremental one. Koski and Fornaro (2022[30]) find that business-based R&D spending is larger in countries implementing either an incremental R&D tax incentive or a hybrid scheme. The government indeed envisages offering an incremental tax allowance on top of the 50% allowance mentioned above.

Figure 2.16. Finland was until recently one of the few OECD countries not offering R&D tax incentives

Direct government funding and tax support for business-based R&D, % of GDP, 2019



Source: OECD R&D Tax Incentives (database).

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Across OECD countries, R&D tax incentives often target some firms and activities to induce larger R&D investment for a given tax expenditure (OECD, 2021[29]). For instance, the R&D tax incentives can target SMEs, given that the R&D investment by large firms is less responsive to tax incentives. An OECD empirical study based on firm-level data on R&D found that across 20 OECD countries, one euro of R&D tax credit induces 1.4 euros of R&D by firms with less than 50 employees whereas it induces only about 0.4 euros of R&D by firms with 250 or more employees (Appelt et al., 2020[31]). Instead of limiting the tax credits to smaller firms, many OECD countries set an upper bound on the amount of R&D spending that qualifies for R&D tax incentives. However, this was observed to result in pure income transfer to firms with R&D spending exceeding the upper bound. For instance, Finland's temporary tax allowance in 2013-14 did not induce any additional R&D by firms with R&D spending larger than the upper bound of EUR 400 000 but allowed these firms to deduct EUR 400 000 from their corporate tax base (Takalo and Toivanen, 2017[32]).

The types of spending or activities eligible for the R&D tax incentives should be sufficiently broad for them to be relevant for many firms but need to be specified so they do not risk financing generic activities. In many OECD countries, R&D tax incentives often cover the labour costs of R&D personnel but the acquisition of capital assets to be used for R&D activities is less typically supported, as assets may be subsequently disposed of or used for other purposes (OECD, 2021[29]). Providing a clear definition of eligible activities would reduce uncertainties for firms embarking on innovation projects, especially those involving software development or other service-based activities that are on the boundaries between R&D and investment in intangible capital (OECD, 2021[33]). For instance, the United Kingdom offers detailed guidelines on the conditions under which software development qualify for the R&D tax allowance (HMRC, 2018[34]).

Direct R&D support should foster a strong public private partnership in innovation

As the government revamps direct R&D support, it should aim to build a strong public private partnership that links basic research with applied research and commercialisation of new technologies. This partnership should be driven by stronger interactions between research institutions and SMEs. The Academy of Finland and Business Finland promote industry-research collaboration through their support measures (Box 2.7). The two organisations should endeavour to attract innovative small firms into their innovation collaboration programmes. Innovation collaboration with universities and research institutions can be particularly beneficial for Midcap and small firms in developing novel environment-related technologies and commercialising them (OECD, 2021[15]). Small firms need a clear prospect of innovation outcomes to justify committing their time and scarce resources to these programmes. A fair governance system that reflects the concerns of SMEs as well as transparent communication of the project contents and burden sharing are key. It is also important to ensure that participation in those programmes does not penalise SMEs financially, for instance by preventing them from using the R&D tax incentive. For instance, the temporary tax allowance in 2013-14 (see above) was unavailable for firms receiving direct R&D support (OECD, 2017[1]).

The government should ensure the stability of support measures to encourage firms and research institutions to invest substantial resources in applied research and innovation collaboration. At the same time, both the Academy of Finland and Business Finland should streamline or consolidate support measures so that revamped innovation support will not be spread thinly across numerous potentially duplicative support measures. Furthermore, there has not been a notable synergy between their schemes. Deeper collaboration between the two organisations, such as launching co-funded projects is warranted, as this would bring grant recipients closer, facilitating the diffusion of knowledge and innovative ideas. At the same time, severe resource constraint has prevented the Academy of Finland from conducting rigorous impact assessments and reforms of its support measures (Arnold et al., 2022[26]). The government should ensure that sufficient resources are allocated to the Academy of Finland and Business Finland so that they can fulfil their essential functions.

While direct R&D support has been effective in inducing R&D investment in Finland, its contribution to the productivity of Finnish firms is less clear. For instance, Fornaro et al. (2020[35]) estimated that R&D support by Tekes (current Business Finland) boosted Finnish firms' R&D spending per euro of sales by 30%. However, Koski and Parajanen (2015[36]) found that direct R&D support by Tekes has not resulted in significant labour productivity improvement of recipient firms, neither in the short run nor in the long run. These findings suggest some room for better targeting the R&D support like R&D grants or loans to firms with higher innovation capabilities and growth potential. Einiö et al. (2022[37]) show through a simulation that R&D support is most effective in boosting productivity when it can target firms with high innovation capabilities. In this case, R&D support promotes the reallocation of scarce resources (such as skilled workers) toward more innovative firms as it strengthens their competitiveness, displacing less innovative firms. Conversely, R&D support is less effective when it cannot exclude unproductive firms as it would delay their exit, hampering resource reallocation (Fornaro et al., 2020[35]).

Box 2.7. Direct R&D support in Finland

Most direct R&D support in Finland is disbursed by the Academy of Finland, which allocates grants to basic research, and Business Finland (formerly Tekes), which provides grants and subsidised loans to applied research.

The Academy of Finland

Over the period 2011-20, the Academy of Finland allocated on average about half of its budget to bottom-up research support, which includes research grants to projects proposed by academic researchers and various fellowship programmes. The other half of the budget was allocated to thematic funding, including the Strategic Research Council programmes aimed at establishing extensive multidisciplinary research consortia around four themes (Urban, Health, Work and Security), and the funding for Centres of Excellences and research infrastructure.

The Academy of Finland's budget decreased in the early 2010s as public spending on innovation was cut back but increased after 2014, as funds for public research institutes like VTT were reallocated to the Academy of Finland to fulfil new responsibilities, such as the Strategic Research Council programmes. Nevertheless, the Academy of Finland is subject to significant resource constraints, which is contributing to low success rates in its bottom-up research grants. For instance, far less than 20% of applications for research grants and fellowship positions have been met with funding during 2011-20, which is very low by international comparison (Arnold et al., 2022[26]).

Business Finland

Business Finland offers loans for firms' product development and piloting projects, covering 50 to 70% of project costs at a fixed interest rate (currently 1%) without collateral. Should a project fail to produce commercial revenue, a fraction of the loan will not be collected. Business Finland also offers grants to R&D projects covering up to 80% of costs. In 2021, it allocated 59% of its R&D support to grants, 21% to subsidised loans and 20% to its specific research programmes. The grants and loans are available to both large firms and SMEs. Roughly 70% of innovation support was directed to SMEs until 2020. SMEs also enjoy a 10% higher coverage of their project costs by R&D grants than midcap and large firms. Large firms are required to outsource at least 15% of project costs to SMEs or research institutions to receive subsidised loans. The weight of large firms in the R&D support increased to nearly half in 2020, as Business Finland launched the Challenge Competitions scheme (below).

Challenge Competitions scheme

In 2020 and 2021, Business Finland launched Challenge Competitions, which granted about EUR 180 million of R&D support to large leading firms (such as Nokia, Neste and Sandvik) to address major future challenges and increase their innovation investment in Finland. The scheme is expected to strengthen the innovation ecosystem, as 67% of this R&D support to leading firms was used to subcontract SMEs and research institutions (Business Finland, 2022[38]). In return for the R&D support, the leading firms have committed to boosting their R&D and other innovation investments by EUR 870 million, contributing to the government's 4% R&D target.

Business Finland also funds other co-innovation efforts by groups of firms and research institutions collaborating on creating new international businesses or increasing the export competitiveness of Finnish firms.

Source: Academy of Finland homepage; Arnold et al. (2022[26]); Business Finland homepage.

Supporting investment in intangible capital

Intangible capital plays an integral role in translating innovation into productivity growth (see above). Yet, like R&D, investment in intangible capital is costly and time-consuming, as well as risky and requiring trial-and-error, which likely results in an under-investment (OECD, 2013[10]). Policies to reboot Finland's innovation ecosystems should thus go beyond R&D to stimulate investment in a wide range of intangible capital. However, while public support to R&D is based primarily on the presumption that R&D generates large positive externalities that cannot be fully appropriated by the investor, this may not necessarily apply to intangible capital. For instance, some types of intangible capital like design or software are protected by intellectual property rights. Other types of intangible capital, like organisational structures, are highly firm-specific and cannot be replicated easily by competitors. Many forms of intangible capital are also often closely related to the commercialisation of innovation (Corrado and Hulten, 2010[8]), which brings investors more tangible financial returns than basic or applied research. These characteristics of intangible capital investment indicate that conventional policy support for R&D like tax credits may not be an appropriate tool for fostering intangible investment.

The experiences from OECD countries suggest that the schemes in line with the Centres of Excellence or Competence Centres are effective in supporting intangible investment. For example, Germany has 26 *Mittelstand* 4.0 Centres of Excellence that offer a wide range of services helping SMEs develop organisational changes to leverage digital technologies effectively. These services include demonstration factories and managerial consultations that help SMEs develop their own solutions to exploit digital technologies. The government could consider setting up a platform similar to the Strategic Centres for Science, Technology and Innovation (SHOKs) while addressing the shortcomings identified in the past evaluation exercise (see above).

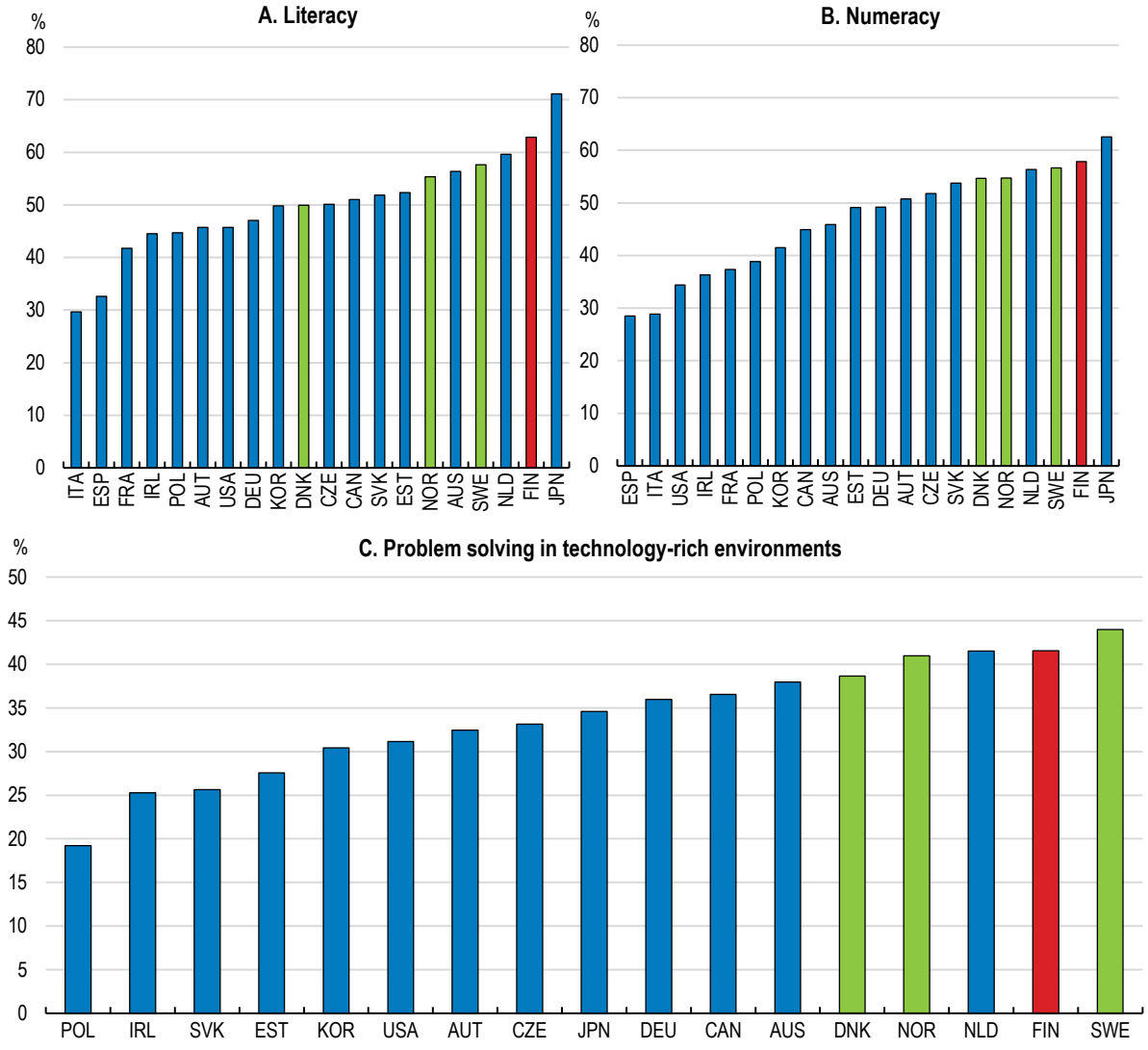
Removing the skills bottleneck to unleash innovation

Skills shortages are more serious in Finland than elsewhere

Finland boasts one of the most skilled workforces in the OECD economies. For instance, the shares of working-age adults excelling in literacy, numeracy and problem solving in technology-rich environments are all among the highest in the OECD countries (Figure 2.17). A relatively high share of graduates from tertiary education hold degrees in natural science, mathematics, ICT and engineering fields (Figure 2.18). Yet, Finland is suffering severe skills shortages. On the one hand, the fast pace of innovation and digitalisation is generating high demand for skilled workers (Hirvonen, Stenhammar and Tuhkuri, 2022[39]). For instance, the Finnish Federation of Technology Industries (Technology Finland) estimated that Finland's high-tech industries will need to hire 130 000 experts over the next ten years, a 41% increase over their current employment (Technology Finland, 2021[40]). Finland's public employment service also foresees persistent shortages of skilled workers required to exploit new technologies in various sectors including Medicare (in occupations like Medical Practitioners and various laboratory and equipment technicians as well as Nursing Professionals), ICT (Software and Application Developers, Application Programmers) and Construction (Civil Engineers). On the other hand, Finland's skills supply is constrained by low tertiary educational attainment among young adults and a small inflow of skilled immigrants (see below). A massive increase in skills supply is needed just to prevent population ageing from reducing Finland's skilled workforce and inevitably its growth potential: half of the required increases in experts foreseen by Technology Finland is due to the retirement of older skilled workers.

Figure 2.17. Finland's workforce boasts high skills

Percentage of surveyed adults with high proficiency levels, 2012



Note: For literacy and numeracy, high proficiency corresponds to Level 3 and above. For problem solving in technology-rich environments, high proficiency corresponds to Level 2 and above. See the OECD Survey of Adult Skills for details.
Source: OECD Survey of Adult Skills.

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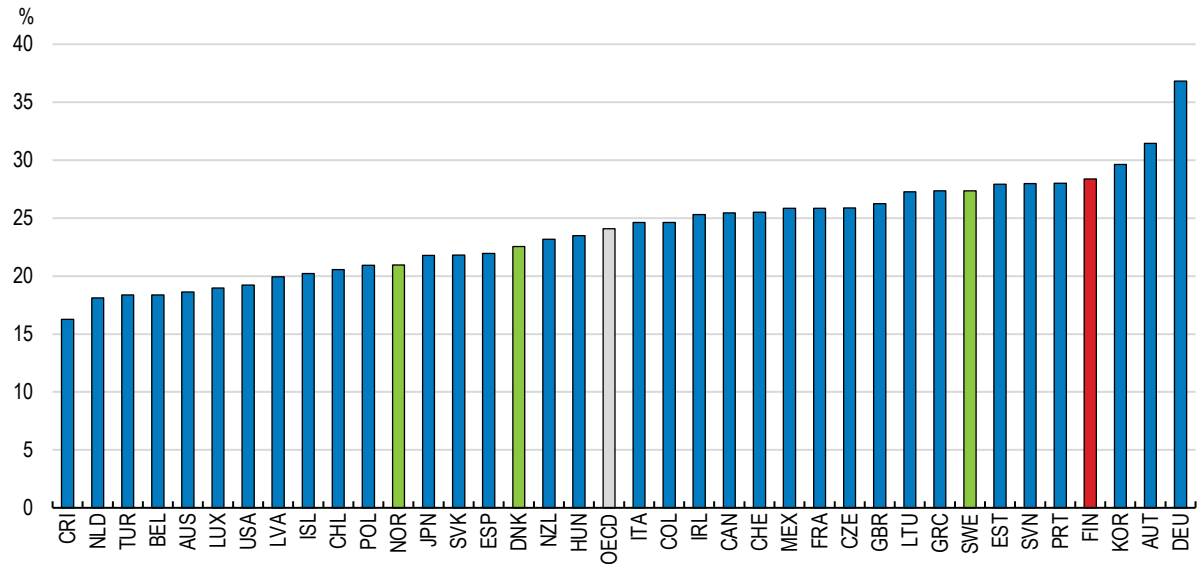
Skills shortages are a more significant bottleneck for innovation in Finland than in other OECD economies for two reasons. First, the shortages of highly skilled workers in Finland are severe compared with many other OECD countries. For instance, more than nine out of ten jobs experiencing labour shortages in Finland were in high-skill occupations, such as managerial or professional occupations, which is the highest share across OECD countries where on average five out of ten jobs in shortage were in high-skill occupations (OECD, 2018[41]). Second, Finland's good framework conditions for innovation including the business-friendly regulatory settings and good access to capital (see Chapter 1) make the skills shortages the most important bottleneck. The shortage of qualified personnel holds back innovative firms from expanding R&D and collaborating with research institutions. It also makes it difficult for innovative firms to scale up for instance through exports, thereby limiting the return to innovation (see Section 2.5).

Figure 2.18. Finland's share of STEM graduates is high

The share of tertiary education graduates in fields of natural science, mathematics, ICT and engineering, 2019



Note: The share of tertiary education graduates in the following fields: Natural Science, Mathematics and Statistics; Information and Communication Technologies; and Engineering, Manufacturing and Construction.
Source: OECD, Education at a Glance database.

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Low tertiary educational attainment among youth has been a long-standing issue

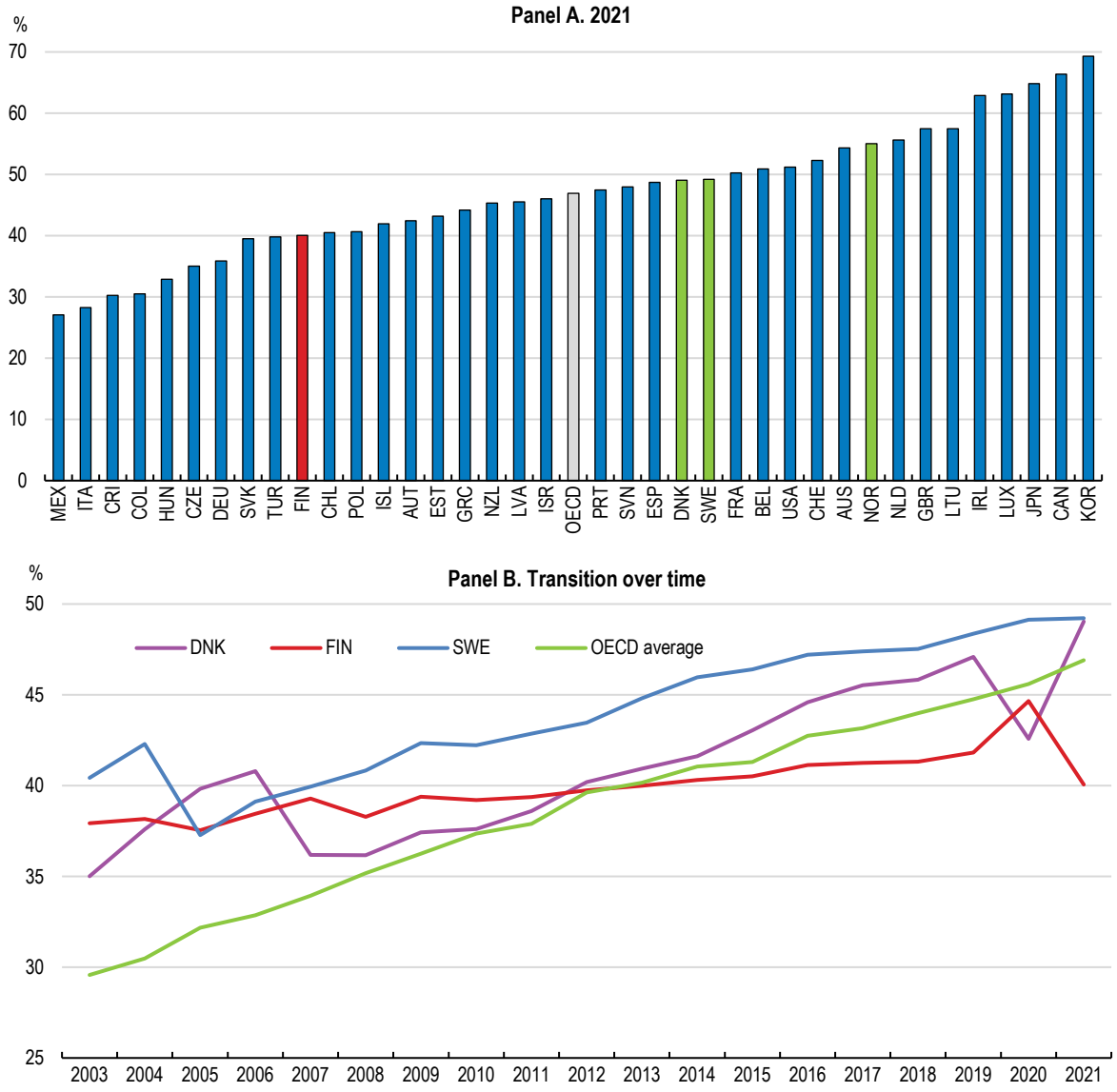
Young adults' tertiary educational attainment is low in Finland compared with many other advanced OECD economies including Scandinavian peers (Figure 2.19, Panel A). The attainment rate improved little since the early 2000s, in contrast to many OECD countries including Sweden and Denmark (Figure 2.19, Panel B). This owes to severe shortages of study places in universities relative to demand, which results in high application rejection rates. During 2015-20, universities in Finland accepted only 30% of applicants while universities of applied sciences (UAS) accepted 33%, the lowest rates among the 14 OECD countries reporting admission rates (OECD, 2021[42]). The long study time at universities also contributes to low tertiary educational attainment among youth: university students most commonly take six years to complete their degrees while UAS students take five years (OECD, 2021[42]). The challenging transition from upper secondary education to tertiary education and long study time result in individuals graduating from tertiary education for the first time on the average age of 27.3, about two years older than the OECD average (25.4). Only 77.2% of the first-time graduates with bachelor's degree are younger than 30, the share that is among the lowest in the 29 OECD countries with comparable statistics, constraining the supply of young, qualified workers.

The government has been tackling the shortfall in study places for many years. The Vision for Higher Education and Research in 2030, published in 2017, included a commitment to increase the share of higher education graduates to at least 50% of the 25-34 years-olds by 2030 (it was 44% in 2020). This would require increasing the number of graduates in that age group by 34 500 from 2019 to 2030 (OECD, 2021[42]). The current government's policy priorities for higher education include ensuring that the number of available student places at universities and UAS meets the needs of society, taking into account regional employment needs (The government of Finland, 2019[43]). The government funded an additional 4 248 study places in 2020 and has committed to funding 5 954 additional study places during 2021-22. Nevertheless, these increases fall short of the pace needed to generate additional graduates needed to

attain the 50% target (OECD, 2021[42]). The government has not yet provided a clear long-term plan laying out the number of study places to be increased and a commitment to greater funding to meet the target. A clear budgetary commitment is essential since the increases in study places will have to be funded mostly by the government, given that Finland does not charge tuition fees for tertiary education except for foreign students from outside the European Union.

Figure 2.19. Tertiary educational attainment among young adults is relatively low and has improved little

Percentage of 25-34 year-olds having completed tertiary education



Note: Panel A data refer to 2020 for Chile. The OECD average in panel B is calculated based on countries which data are available.
Source: OECD (2022), Education at a Glance 2022.

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Allocation of study places should become more flexible and responsive to labour market demand

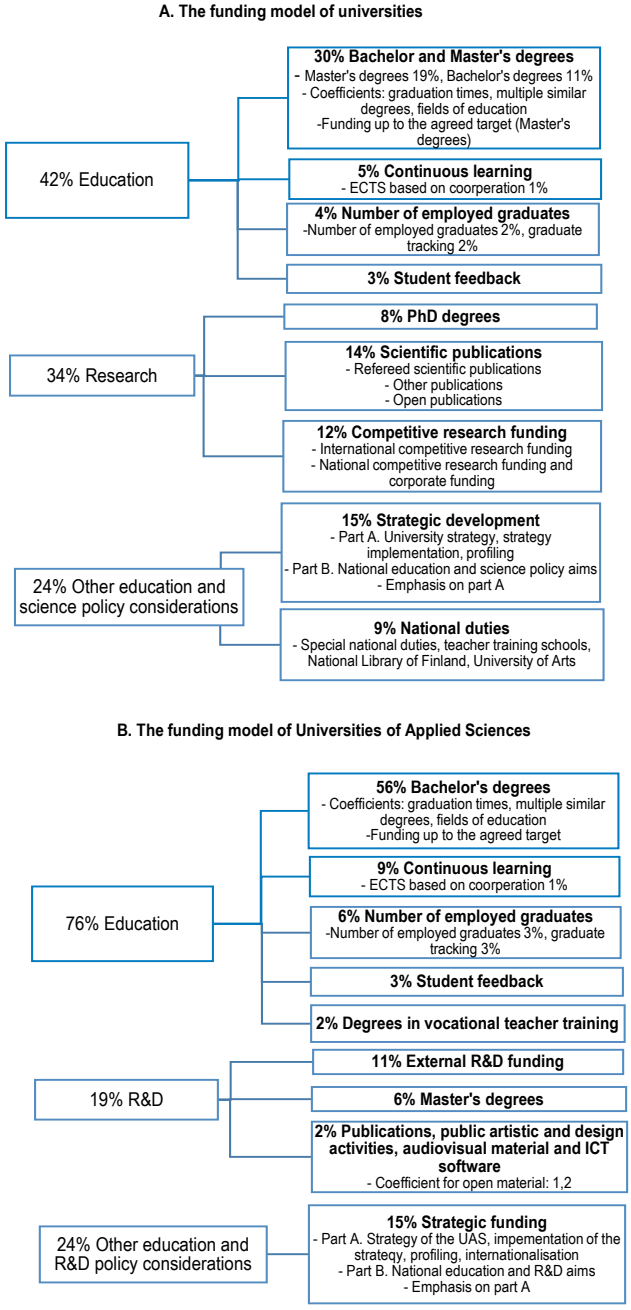
The government's financial efforts to increase study places need to be matched by reforms to increase flexibility in the allocation of study places across study fields. In Finland, study places in UAS and universities are allocated by study field, as the result of consultation between the Ministry of Education and Culture and higher education institutions, informed by forecasts on labour market demand. In practice, additional study places are allocated across higher education institutions based on each institution's willingness and capacity to accommodate additional students (OECD, 2021[42]). The allocation of study places is therefore highly rigid and may not reflect labour market demand well in the end. The highly supply-side driven allocation of study places contrasts with other countries charging tuition fees for tertiary education, where the allocation of study places is primarily driven by students' demand.

The funding models of universities and UAS, together with the strong autonomy of these institutions in managing their financial resources, limit the capacity of the government to direct higher education institutions to increase the enrolment of students in fields of study with strong labour market demand (OECD, 2021[42]). For instance, the weight of the provision of bachelor's degree programmes in the funding for universities is only 11%, lower than the weight of scientific publications (14%) or competitive research funding (12%) (Figure 2.20, Panel A). This weight may be reduced, as universities will be receiving larger research funds as the government expands its R&D spending to meet the 4% R&D target (see above). Similar tend would apply to UAS, which weight of bachelor's programmes is nevertheless much larger than that of universities (56%) (Figure 2.20, Panel B).

It is important to tighten the government's control over higher education institutions' bachelor's degree programmes. The Ministry and higher education institutions agree on graduation numbers in each field of study during the budgetary cycle. However, these numbers are base assumptions for computing the budget disbursed to each higher education institution and is not statutory targets the institution is required to meet. The only statutory targets the government imposes to higher education institutions are the caps on the numbers of enrolment into study fields with weak labour market demand (OECD, 2021[42]), which do not involve significant financial penalties when institutions do not respect them. The government should introduce statutory targets on the minimum number of enrolment and graduates to be attained by each higher education institutions.

An increase in the number of study places should be flanked by additional academic and/or pastoral support for students to maintain the high quality of education and the levels of graduation rates. In 2019, 42% of students aged under 30 graduated from the tertiary education for the first time, a share that is about the OECD average. As many university students in Finland work part time during the long study period (see above), some of them may choose to leave universities without completing degrees to work full time, especially if faced with strong financial needs. In the academic year 2019/20, 6.2% of UAS students and 4.8% of university students discontinued their education, which would have led to a qualification. Without a formal degree, these individuals can face difficulties in upgrading their skills later in their careers and may have to return to universities as adult learners. Measures to prevent non-completion should be put in place and target students from disadvantaged socio-economic backgrounds, who face higher opportunity costs from spending five to six years of their prime working ages in tertiary study.

Figure 2.20. Undergraduate study has only a small weight in universities' funding model



Source: Ministry of Education and Culture.

Further reforms in admission processes complement the study places reform

The government has complemented its efforts to increase the number of study places with reforms of admission processes in higher education institutions. For instance, UAS have adopted a common standardised test for assessing applicants' aptitude in most study fields in 2019. However, universities have preferred to select applicants through 180 distinct entrance examinations each highly specific to the subject of study, adding significant burdens to applicants (OECD, 2021[42]). From 2020, admissions to just over a half of study places in higher education institutions have shifted to certificate-based admission, which is based on the grades of the matriculation examination at upper secondary schools and initial vocational qualifications from vocational institutes.

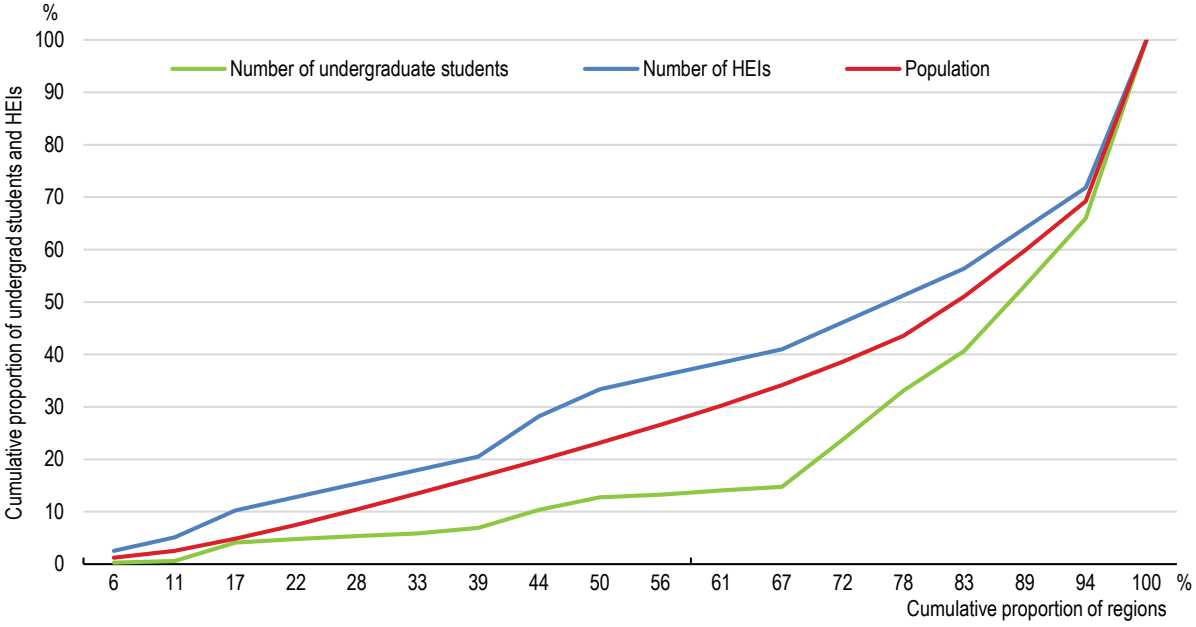
Applicants whose grades did not reach the required levels of certificate-based admissions still have to take entrance examinations to compete for the rest of the study places. However, the matriculation examination grades only become available shortly before mid-May, when the first entrance examinations for universities start. It is essential to secure more time between certificate-based admissions and entrance examinations to allow applicants sufficient preparation, even though universities are required after 2018 to ensure that their entrance examinations do not require lengthy preparation. Due to an overall increase in the number of study places, the number of places based on entrance examinations will increase even though its share in total study places will decline. This underscores the importance of a reasonable admission process to ensure a smooth transition from upper secondary schools to higher education institutions.

The regional allocation of additional study places should reflect real demand

Finland has promoted good access to higher education in each of its counties as a part of its longstanding policy commitment to support sparsely populated rural communities. At the same time, the university system has been consolidated to pursue efficiency in public spending and to create higher education institutions with sufficient scale to compete globally. Policy makers have boosted the provision of UAS, as well as university networks of satellite campuses and centres in rural areas to ensure good access to higher education. As the result, the distribution of number of higher education institutions across regions is not aligned with the distribution of the population, and even less with the distribution of the number of undergraduates (Figure 2.21). This indicates some room to enhance the efficiency in tertiary education by reallocating the resources toward regions with stronger demand for higher education while ensuring access to higher education in rural areas for instance through a variety of online courses.

Figure 2.21. Higher education institutions are evenly distributed across regions

Cumulative distribution of the number of higher education institutions and undergraduate students



Note: This chart describes the cumulative distribution of the number of undergraduate students and higher education institutions (HEIs) against the cumulative distribution of population of the NUTS 3 level regions in Finland.
Source: OECD (2021[42]).

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The mismatch in the allocation of study places across regions remains large, with more populated regions facing severe shortages. For example, while 25% of university study places are allocated to the capital region of Uusimaa, it houses 35% of university applicants (European Commission, 2020[44]). Youth in the Uusimaa region often leave Finland for their tertiary studies instead of applying to higher education institutions in rural areas where competition for study places is less fierce. Around 60% of Finnish students starting their higher education abroad are from the Uusimaa region (European Commission, 2020[44]). The regional allocation of additional study places to achieve the 50% target in the tertiary educational attainment among young adults should primarily reflect demand for study places, which is underpinned by the size of the youth population and employment opportunities.

New arrangements for adult learning are needed

The shortage of study places is exacerbated by the enrolments by adults already holding a tertiary degree in regular bachelor's or master's degree programmes seeking to acquire additional learning free of charge or for very low fees. In particular, UAS, with their strong work orientation, consider adult learners as an important target group. In 2020, some 29% of applicants to university study places (22% of applicants to UAS) already held post-secondary, tertiary or higher degrees. There are legitimate needs for adults to acquire new qualifications. For instance, some workers whose tasks are prone to automation risks have to acquire qualifications for new tasks that complement new technologies. However, pursuing a new degree for up to five years is not an efficient way to keep up with changing skill needs. There is a need to develop alternative adult learning arrangements that do not crowd out initial tertiary learning opportunities and are more effective in updating skills alongside work and family obligations.

Steps were taken to increase modularised courses for adult learners at universities and UAS. For instance, universities and UAS offer Open Studies, modularised online courses with a flexible schedule that includes evenings and weekends. While Open Studies do not lead to formal qualifications, their courses are based on the same curricula as regular degree programmes, and individuals that acquired required amount of credits (typically 60 credits for UAS) under Open Studies can apply for regular degree programmes. Open Studies are a promising avenue for adult learners to complement their prior degrees and acquire new competencies at low costs (the tuition is at most EUR 15 per course). However, financial support for adult education has been more readily available for those enrolled in regular degree programmes (OECD, 2020[45]). For instance, the Adult Education Allowance, income support to adults with an employment history of at least eight years taking up educational leave, was only fully accessible for those pursuing full-time education. The allowance was reformed in August 2020 to allow recipients to work alongside their study, facilitating access by adults pursuing part-time learning or non-formal learning. To further alter the balance of incentives, the government should introduce tuition in regular degree programmes for adult learners already holding a tertiary degree. Moreover, it is important to boost employers' recognitions on these modularised courses and other adult learning and training opportunities that do not result in formal qualifications.

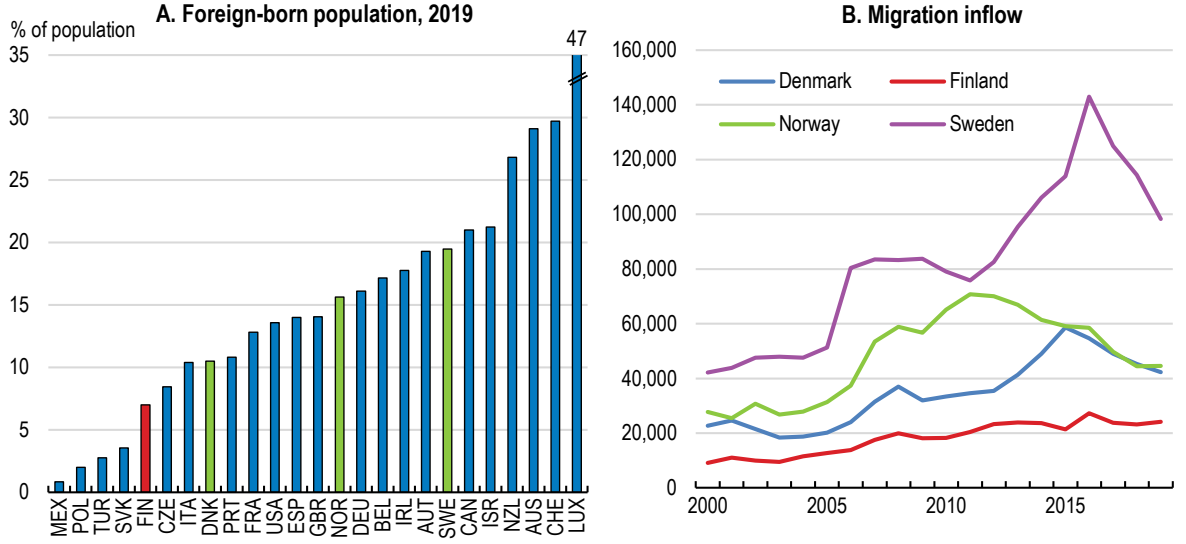
Non-formal adult learning is underdeveloped in Finland, mainly due to the free or low-cost provision of formal learning, which makes it difficult for the providers of non-formal learning to earn sufficient profits. Nevertheless, there are training needs that are not met by courses offered by universities or UAS. Indeed, some non-formal learning opportunities have been developed in cooperation with employers for working adults with higher education degrees. For example, the Specialisation Studies scheme provides learning opportunities on very sector-specific topics not taught in higher educational institutions. More should be done to provide adult learners with labour market relevant non-formal training opportunities as an alternative to regular degree programmes. Strong involvement of employers and employees is essential to ensure these non-formal learning schemes are well designed and funded, as well as quality controlled and resulting in skills recognition. As emphasised in the 2020 *Economic Survey of Finland*, Finland has some room to enhance the role of employers in adult education and should take forward-looking measures to update workers' competencies throughout their working lives (OECD, 2020[46]).

Attracting and retaining foreign talent

Finland is benefiting little from foreign talent

Attracting highly skilled foreign workers, investors and inventors is crucial for strengthening the global linkages and competitiveness of Finland's innovation system (OECD, 2017). Larger inflows of highly skilled foreign workers not only alleviate the skills shortages but also channel the diffusion of advanced technologies and knowledge embodied in these workers. Foreign students who have graduated from Finland's higher educational institutions are a promising pool of skilled employees for Finnish firms. Yet, until recently, Finland has not been actively promoting immigration to address its labour shortages. The weight of immigrants in Finland's population is considerably lower than in Scandinavian countries (Figure 2.22, Panel A), and migrant inflows remain relatively low despite a steady increase since the early 2000s (Figure 2.22, Panel B).

Figure 2.22. Immigration to Finland has been low



Note: 2017 data for Canada and 2018 data for New Zealand and Türkiye.
Source: OECD, International Migration (database).

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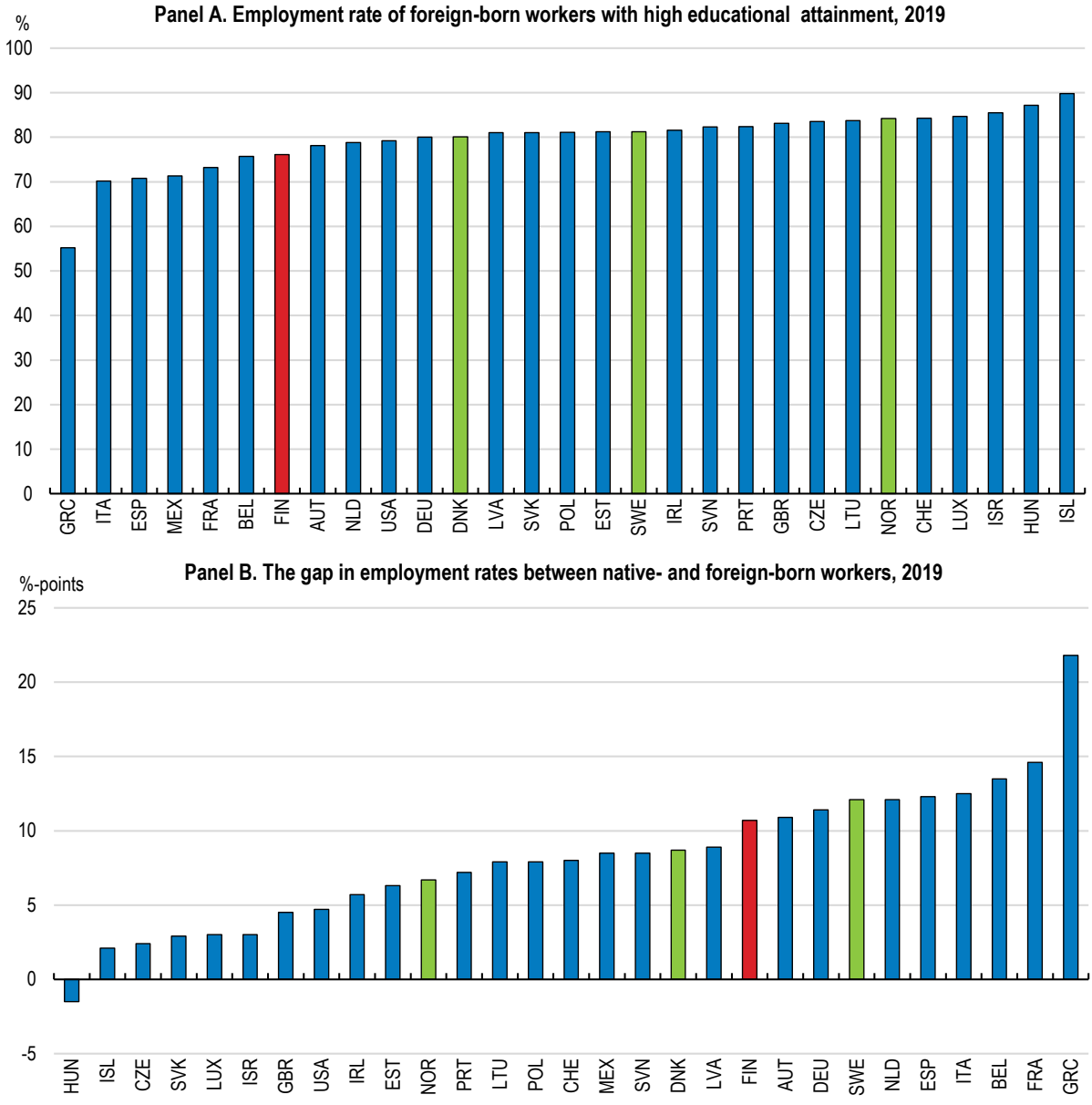
Migration policy took a turn in 2017 when the government launched the Talent Boost programme to attract international talent. This initiated the introduction of policy measures facilitating the immigration of foreign highly skilled workers like the special residence permit for start-ups introduced in 2018. The second phase of the Talent Boost programme was launched in 2020 and its key initiatives included streamlining the residence permit processes for workers and students and promoting the employment of international students and researchers in Finland. The current government aims to increase annual work-based immigration by at least 50 000, to a level that is at least twice the current size, by 2030 and to increase it further by at least 10 000 after 2030.

A notable challenge for Finland is the low employment rate of migrants with high educational attainment relative to many other OECD countries (Figure 2.23, Panel A). The gap in the employment rate between the native- and foreign-born workers is relatively large, albeit smaller than in some major European economies (Figure 2.23, Panel B). Overall, Finland is not making the most of foreign talent, possibly due to various barriers to their employment (see below). Indeed, the OECD Indicators of Talent Attractiveness

rank Finland around the mid-range of the OECD countries in terms of the capacity to attract foreign highly skilled workers, far behind Scandinavian countries (OECD, 2019[47]). This also contrasts with Finland's high attractiveness as a destination for university students and entrepreneurs. The main factor dragging down Finland's attractiveness for foreign highly skilled workers is poor labour market opportunities, which reflects the high unemployment and incidence of over-qualification at jobs by highly skilled foreign workers (Tuccio, 2019[48]). Achieving the government's target on work-based immigration requires improving significantly the career prospects of foreign highly skilled workers in Finland.

Figure 2.23. Finland is not making the best of skilled migrants

Employment rates of foreign- and native-born workers with high educational attainment, 2019



Source: OECD, International Migration (database).

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Attracting and integrating foreign highly skilled workers into the labour market

The government recently bolstered its efforts to facilitate the immigration of skilled workers. In June 2022, it shortened the time for issuing its decision on residence permit applications by experts, entrepreneurs with global expansion plans, as well as their family members to 14 days. Aside from this fast-track decision for skilled workers, the government is aiming to shorten the average processing time for all work-based and education-based residence permits to 30 days. The government also introduced the D Visa, which allows these skilled workers and their family to enter Finland as soon as they receive a positive response to their residence permit applications, without waiting for the issuance of residence permit cards. The D Visa is to be extended to foreign researchers and students from April 2023. These measures are a notable improvement over the previous residence permit procedure that took longer than in Finland's peer economies, holding back the inflow of highly skilled workers as well as foreign direct investment (OECD, 2021[49]).

Various measures to promote the employment of foreign workers are in place, including advocacy events promoting the benefits of diverse workplaces and websites matching Finnish employers with foreign jobseekers. Business Finland's Talent Explorer scheme subsidises Finnish firms for hiring foreign experts by covering half of their hiring costs up to 40 thousand euros. Business Finland's direct R&D grants can be used to hire foreign researchers. Nevertheless, no measure has been taken so far to help employers develop capabilities to exploit foreign talents effectively for their business strategy and innovation activities. Measures to diffuse advanced practices in managing foreign talents among employers can facilitate the hiring of highly skilled foreign workers and improve career opportunities for them.

Further efforts are needed to promote the recognition of qualifications held by foreign workers and provide necessary training to fill gaps with the skills required at their workplace. In Finland, the recognition procedure for foreign qualifications is fragmented across regulated professions. The Finnish National Agency for Education decides the recognition for 20 out of the 81 regulated professions as well as the eligibility for positions requiring a higher education degree. Fourteen other authorities evaluate foreign qualifications in their area of competence, such as Valvira, the largest organisation responsible for recognising qualifications in healthcare professions (OECD, 2018[50]). Little assistance is provided to foreign workers in finding the right recognition body and navigating through the complex process. In its roadmap for education and work-based migration (Ministry of Education and Culture, 2021[51]), the government envisages establishing a faster and more effective recognition framework. This framework should include a systematic referral of foreign workers to the corresponding recognition authority and a one-stop shop offering information and services related to the assessment and recognition of foreign qualifications.

Vocational training for immigrants is offered mostly in Finnish and its pre-requisite level is often prohibitive. Therefore, many migrants fail to transition from the integration training on language skills to vocational training, compromising their employment prospects (OECD, 2018[50]). The government should increase the provision of vocational education and training offered in foreign languages while strengthening language training beyond the initial integration phase. Finnish employers often require native-level language proficiency from foreign workers. While this is understandable for jobs requiring intensive interactions with end consumers, the government should encourage firms to adopt more measured language requirements in others job categories. Language training for immigrants in Finland has been biased toward formal education curricula, with little relation to actual language needs in workplaces (OECD, 2018[50]). The government plans to increase opportunities for foreign workers to learn Finnish/Swedish in workplaces and to encourage employers to offer language training.

Reforms to accelerate the recognition of foreign qualifications and enhance the effectiveness of vocational training for foreign workers should be high on the government's agenda, for they would contribute to the swift employment of Ukrainian refugees with skills corresponding to the sectors with high labour shortages like healthcare.

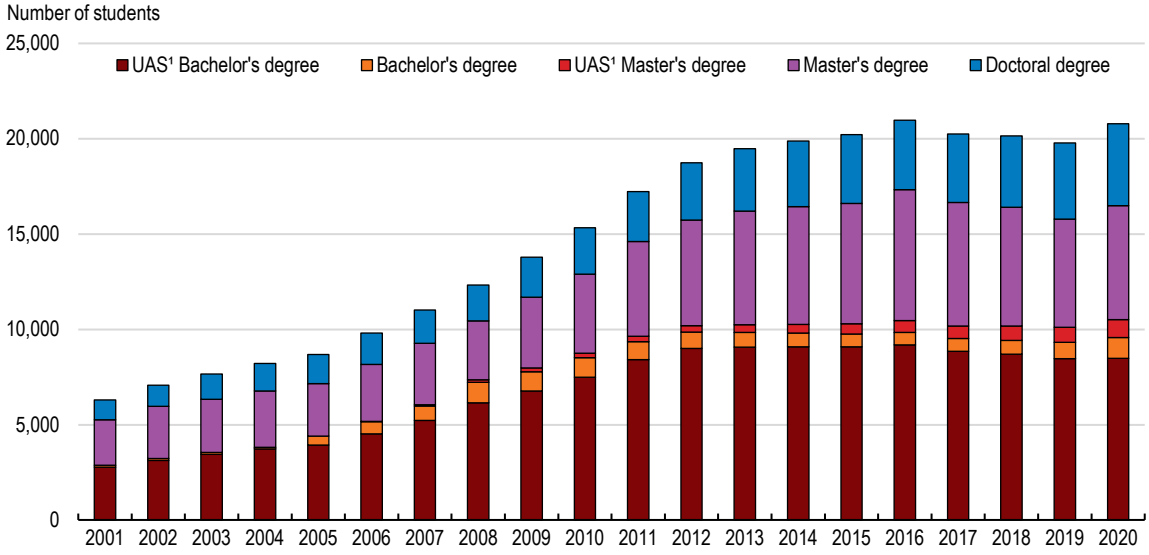
Attracting foreign students and promoting their employment in Finland

The government has set a goal of tripling the number of foreign students enrolling in Finland's tertiary education from around 5 000 in 2020 to 15 000 by 2030. It also committed EUR 46.2 million in 2021-24 to promote the internationalisation of higher education institutions and education-based immigration. Furthermore, it aims to raise the share of foreign students being employed in Finland upon graduation to 75% by 2030. The number of foreign students increased rapidly in the latter half of the 2000s and in the early 2010s but seems to have plateaued after 2016 after the introduction of tuition fees for non-European foreign students (Figure 2.24). The increase has been driven mainly by foreign students enrolling in the University of Applied Science bachelor's degree and university graduate programmes (Master's and PhD), while the contribution of university bachelor's degree programmes has been limited due to the shortages of study places that results in high rejection rates. The government's goal on increasing foreign students is unlikely to be met without successful reforms in boosting study places (see above).

To achieve its targets, the government needs to capitalise on strong demand for Finland's tertiary education by non-European students. In 2021, the acceptance rate for study places for foreign students from EU/EEA countries was 29%, slightly lower than that of Finnish students (31%), whereas that of other foreign students was only 22% (OECD, 2021[42]). At the same time, there were 20 736 applicants from non-EU/EEA countries, four times more than the number of applicants from EU/EEA countries. In 2019, around half of non-EU/EEA foreign students were employed in Finland one year after their graduation, whereas a little less than 40% of students from EU/ EEA countries were (OECD, 2021[42]). The large number of applications by non-EU/EEA students and their higher propensity to remain in Finland indicate that there is further room to boost the number of foreign students and their employment by enrolling more non-EU/EEA students. Since these students already comprise two-thirds of foreign students in Finland, this would inevitably reduce the share of EU/EEA students. Nevertheless, it would be difficult to triple the number of foreign students as the government aims to do without capturing the large education demand by non-EU/EEA students.

Figure 2.24. The number of foreign students increased rapidly but has plateaued in recent years

The number of foreign students enrolled in Finland's higher education institutions in 2001–2020



1. University of applied sciences.
Source: Vipunen - Education Statistics Finland.

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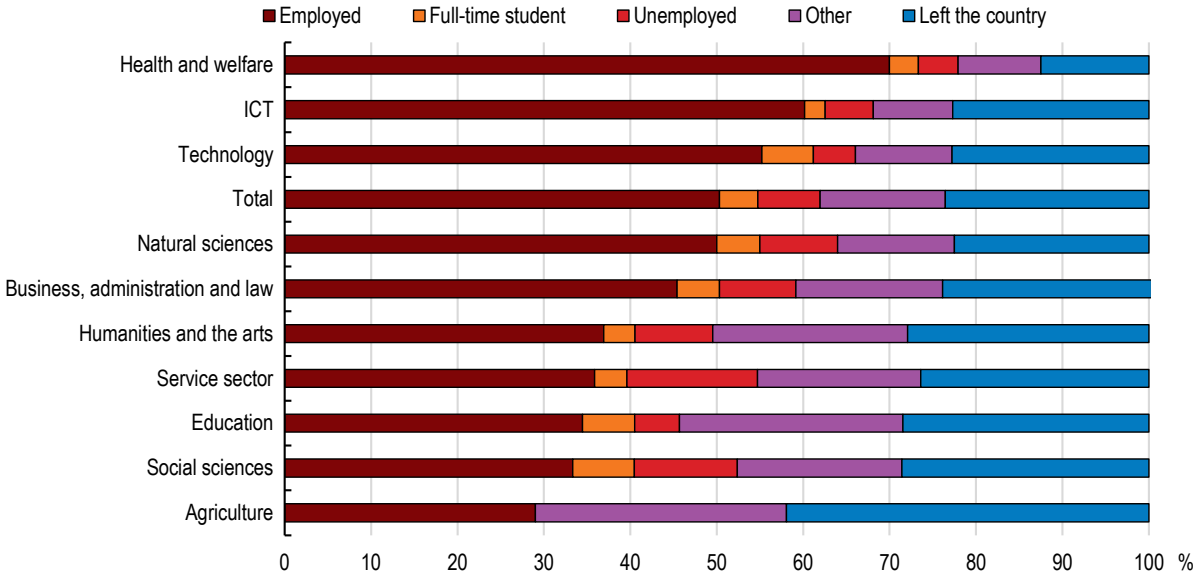
Foreign students' most popular fields of study are economics, technology and ICT (Ministry of Education and Culture, 2021[51]). Half of the foreign students who graduated from a higher education institution found a job in Finland one year later (Figure 2.25), whereas nearly one quarter of all graduates left Finland. Foreign students in some study fields need more time to find a job following completion of their degree. While 70% of foreign graduates in health and welfare were employed after a year, only one third of the graduates in social sciences and humanities were.

The government substantially alleviated the administrative burdens faced by foreign students seeking to work in Finland after their graduation. Previously, foreign students were subject to a relatively lengthy process for acquiring a residence permit for studying in Finland and often had to renew the permit during their study. Upon their graduation, they were allowed to stay only for a year to look for jobs under the so-called jobseeker's permit. As the result, many of them left Finland despite the desire to stay. A new law entered into force in April 2022 granting residential permits to foreign students for the entire duration of their studies and extending the jobseeker's permit to two years. Nevertheless, those who find a job must undergo a lengthy process to obtain a work-based residence permit. The government should consider granting a post-graduation work permit as is done in Canada (Box 2.8). In the short run, it should apply the fast track processing of work-based residence permits for highly skilled foreign workers (see above) to foreign graduates who find a job.

Figure 2.25. The chance of swift employment varies by field of study

Foreign students' labour market outcome one year after their graduation, 2020



Source: Vipunen - Education Statistics Finland.

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Box 2.8. The post-graduation work permit in Canada

Canada grants a temporary post-graduation work permit (PGWP) to foreign students who studied full time and graduated with a degree from a designated learning institution (DLI), which are post-secondary education institutions including universities authorised by a provincial or territorial government to host international students.

Foreign students can apply for PGWP within 180 days following graduation. The PGWP is valid for up to three years depending on the length of the programme completed at a DLI, which cannot be shorter than eight months. Students should have a valid study permit to apply for a PGWP but even those with an expired study permit can still apply within 90 days of the expiration by paying an extra charge. The PGWP cannot be renewed.

Source: Government of Canada Post-Graduation Work Permit Program homepage.

Encouraging the return of highly skilled Finnish workers

Increasing circular and return migration of highly skilled Finnish workers is also high on the government's agenda (Ministry of Education and Culture, 2021[51]). Finnish students, especially those from the capital region where the shortages of study places are most severe, often leave Finland for their tertiary study (see above). This adds to skills shortages in Finland as these students often remain abroad to work due to higher earnings there than in Finland, where the wage distribution is compressed. In addition, foreign degrees are not well recognised by Finnish employers, which is a significant barrier to the employment of returning students. The government should follow the example of Australia, Germany and Denmark by providing employers with access to comprehensive databases about international education systems and courses to help employers understand the value of foreign qualifications (OECD, 2018[50]), which would also facilitate the employment of foreign skilled workers. Preferential income tax treatment is an important measures for attracting foreign talents in many OECD countries (OECD, 2011[52]). Foreign experts starting to work in Finland enjoy a 32% flat income tax rate for at most two years. However, this treatment does not apply to Finnish nationals returning from abroad. The government could consider extending this treatment to returning Finnish highly skilled workers, as is done in France.

Reaping higher returns to innovation through internationalisation

More Finnish firms should export

As in many small open economies, Finland's business-based R&D and innovation activities have been driven importantly by the export performance of Finnish firms (Deschryvere, Husso and Suominen, 2021[20]). Exporting stimulates innovation, because it allows firms to reach a production scale at which R&D and other investment in innovation pay off (Box 2.9). Exports have also been an important channel for Finnish firms to learn about advanced technologies from foreign buyers and feed such knowledge into innovation (Ali-Yrkkö, 2010[4]). Furthermore, participation in global value chains has strengthened the innovation capabilities of Finnish firms in part by making use of sophisticated imported intermediate inputs.

Box 2.9. Why do exporting firms innovate more?

Across OECD countries, exporting firms are found to innovate more than non-exporting firms (for instance, Baldwin and Gu (2004[53]) for Canada; Damijan, Kostevc and Polanec (2008[54]) for Slovenia; Sin et al. (2014[55]) for New Zealand; and Peters, Roberts and Vuong (2020[56]) for Germany).

R&D and other innovation activities are often associated with large fixed costs that cannot be recovered. Firms therefore engage in innovation activities only if they expect a considerable returns covering these large sunk costs. Firms that export can capture the returns to innovation, such as larger sales in both domestic and foreign markets. Therefore, they have a stronger incentive to innovate than non-exporting firms, especially in countries with small domestic markets (Bustos, 2011[57]; Lileeva and Trefler, 2010[58]). Exporting firms also have a better chance to succeed in innovation because exporting provides a chance to absorb the diffusion of technology and knowledge from the global frontier (Peters, Roberts and Vuong, 2020[56]). As innovation translates into higher productivity and thus stronger export competitiveness, there is a positive feedback loop between exporting and innovation (Damijan, Kostevc and Polanec, 2008[54]).

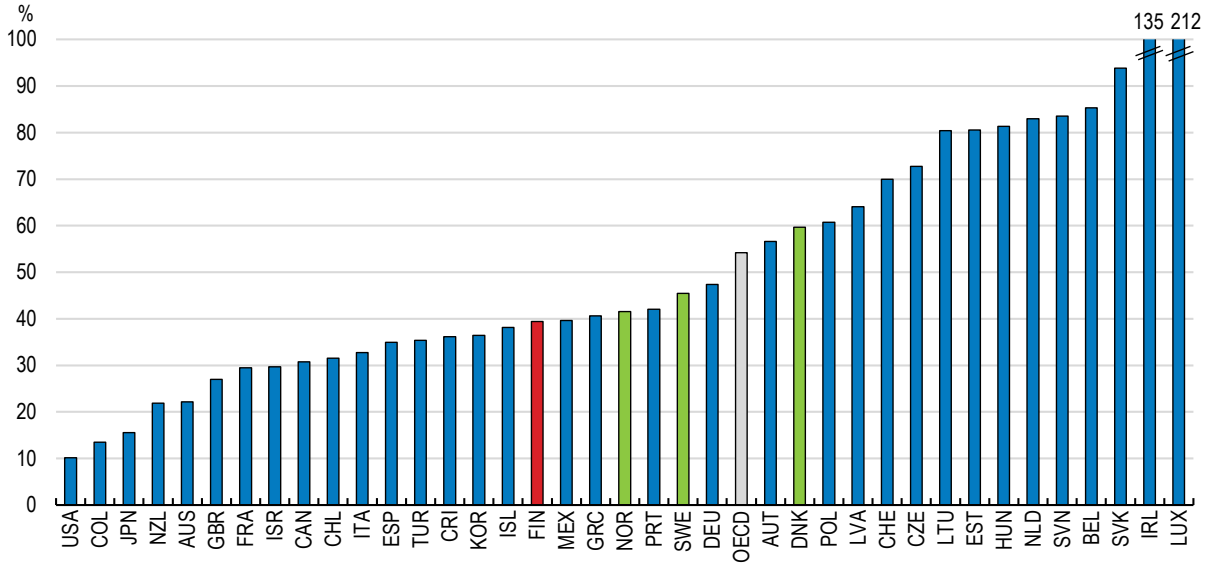
In some cases, decisions to innovate and export are made in tandem. For instance, firms that are not sufficiently competitive in foreign markets have an incentive to innovate and boost their competitiveness so that they can penetrate foreign markets (Lileeva and Trefler, 2010[58]).

Finland has ample room to enhance export participation among a wider range of Finnish firms. Finland's export intensity is low compared to other small open economies, including Scandinavian ones (Figure 2.26). A little less than 10% of Finnish firms export, a share that is smaller than in Denmark and some other small open economies (Figure 2.27). At the same time, 74% of large Finnish firms export, indicating that the low share of exporting firms reflects a large mass of midcap firms and SMEs that do not export. Finland's exports are also highly concentrated in a handful of large firms: in 2019, its largest 100 exporters comprised close to 60% of Finland's exports, a share that is higher than for Scandinavian peers (Figure 2.28). In contrast, the weight of SMEs in exports and participation in global value chains in Finland is low compared to the OECD average (OECD, 2021[59]). It is desirable that a larger mass of firms participate in Finland's exports, not least because the high concentration of exports to among a handful of firms exposes Finland's exports to firm- and sector specific shocks. Diversification of the export base and comparative advantage would not only improve the resilience of Finland's export performance to these shocks but also of its innovation ecosystems, considering the experience in the 2000s when innovation performance deteriorated rapidly driven by the downfall of the key export industry (Box 2.2). Finland needs to strengthen its export competitiveness in a broad range of sectors by promoting the positive feedback loop between exporting and innovation (Box 2.9), especially among smaller firms.

Finland's SMEs and midcap firms often struggle to enter and survive in export markets, which limits the returns they can reap from innovation (Box 2.9). The common issues include lack of managerial capabilities and know-how in formulating competitive export strategies, as well as insufficient investment in marketing and development of new products tailored to foreign customers' tastes (Koski et al., 2020[60]).

Figure 2.26. Export intensity is lower than for many other small open economies

Exports as % of GDP, 2021 or latest



Source: OECD (2022), Trade in goods and services (indicator).

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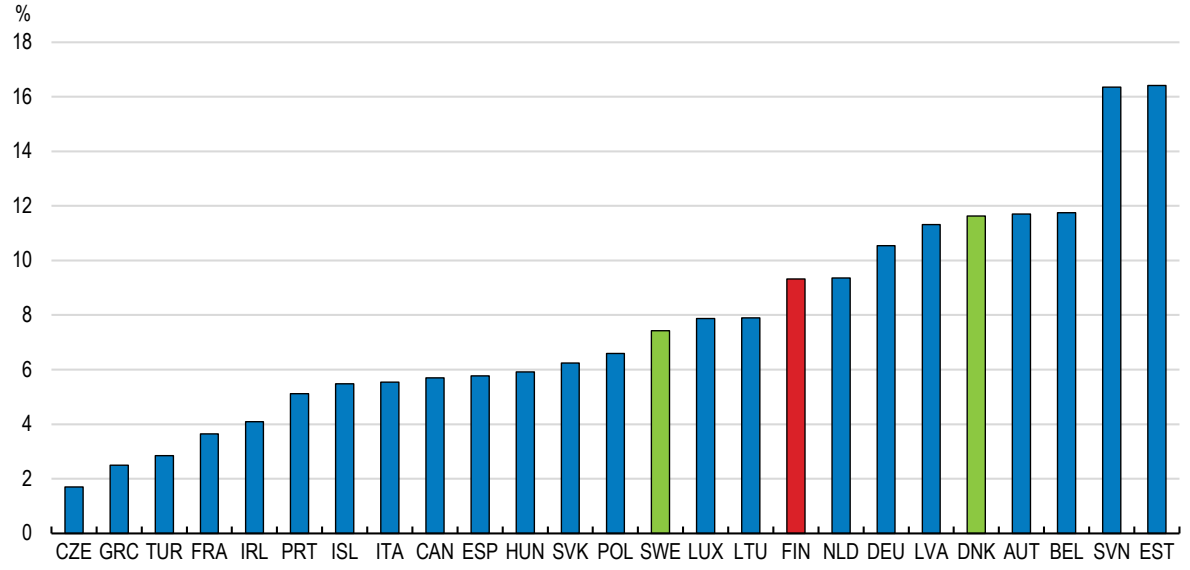
Figure 2.27. The share of exporting firms is low compared to other small open economies

The share of exporting firms in the total number of firms, 2019



Source: OECD, Structural and Demographic Business Statistics.

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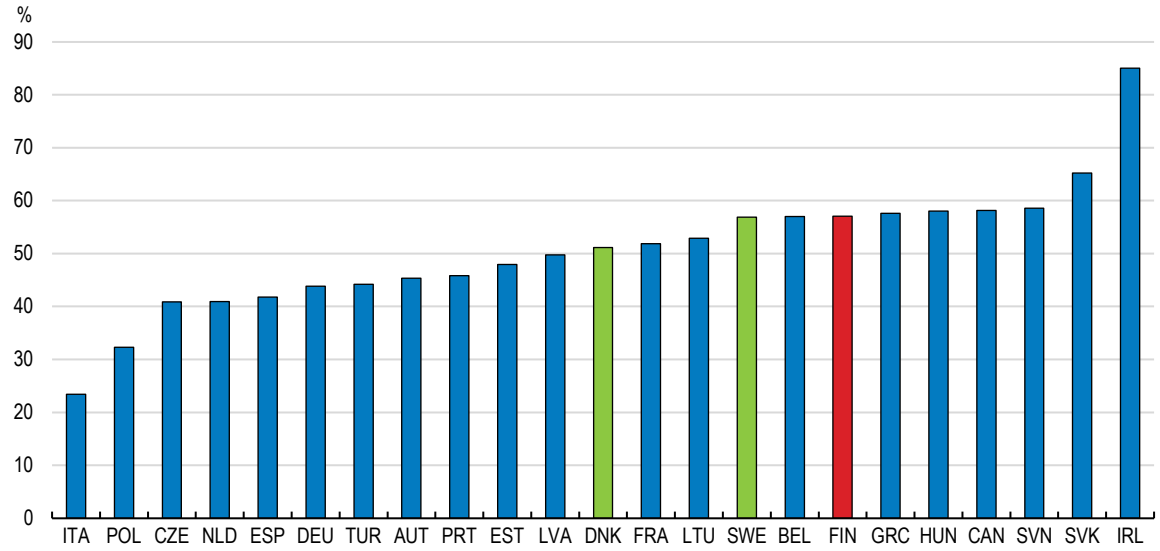
Figure 2.28. Finland's exports are relatively concentrated in the largest exporters

The share of the largest 100 exporting firms in total exports, %, 2019



Source: OECD, Trade by Enterprise Characteristics (database).

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Export promotion and innovation support should be integrated further

Business Finland offers extensive services to Finnish firms seeking to export, including the provision of market information and consulting services, matching with foreign buyers and investors, and partial finance of firms' efforts to strengthen their capacity to export. For instance, its Tempo funding covers 75% of the costs firms incur to prepare export strategies, up to EUR 50 000. It funds activities like the piloting of new products, marketing, and managerial and organisational reforms. A fund is also available for hiring external experts for conducting a market survey assessing export opportunities or participation in a trade fair in foreign countries. Furthermore, Business Finland targets its R&D support (Box 2.7) to SMEs and midcap firms seeking significant growth in export markets through innovation. However, an empirical evaluation (Koski et al., 2020[60]) found that these export promotion and R&D support measures have not resulted in a significant increase in exports by recipient firms. Nevertheless, these measures increased their sales, suggesting that they helped firms boost competitiveness.

The effectiveness of export promotion services can be enhanced further. The consulting services for firms seeking to export were made free of charge in 2014. This induced many firms with very low export capabilities to apply for the services, overburdening the capacity of Business Finland and its overseas offices (Koski et al., 2020[60]). Introducing a small fee for the consulting and matching services can ensure that only firms with readiness to export use those services. Export promotion services can focus more on promoting export entry of midcap firms and SMEs with high technological capabilities but insufficient knowledge of foreign business. Capitalising on these low hanging fruit while offering more introductory services to a broader range of firms online would enhance the efficiency of public spending on export promotion. The resources for export promotion services were revamped in 2020, bringing the number of experts in the overseas offices to 150. Yet, each overseas office consists of only a few experts and cannot follow up on diverse industries. Stronger collaboration with the export promotion offices of other European countries, especially Nordic countries, is thus essential to boost their capacity. A successful example of such collaboration is the Nordic Innovation House, funded by the Nordic government agencies and Nordic Innovation (an organisation under the Nordic Council of Ministers), which helps firms to grow their export business by providing co-working places and networking opportunities, mentorship, and innovation programmes in five innovation hubs around the world. A similar collaboration scheme can be explored more widely, for instance to facilitate the penetration of midcap firms and SMEs into the markets of large emerging economies.

There are several ways to exploit a stronger synergy between innovation support and export promotion, which was the rationale for the merger of Tekes and Finpro into Business Finland. Stakeholders in Finland's innovation ecosystem have voiced mixed views on the extent of such synergy, some expressing a concern that the merger biased the innovation support toward the later stages of innovation, where new technologies can be more easily commercialised and exported (Deschryvere, Husso and Suominen, 2021[20]). While ensuring balanced support at each stage of innovation, the innovation support by Business Finland could bring in export promotion considerations earlier on in the process. For instance, this involves identifying unmet needs in the global market at a very early stage and formulating export strategies at the commercialisation stage of innovation. Business Finland could also extend its innovation support toward non-R&D innovation activities aimed at capturing export markets, such as new product development targeting foreign customers or organisational changes that strengthen cost competitiveness and increase capabilities to handle global business operations.

Benefiting more from foreign direct investment

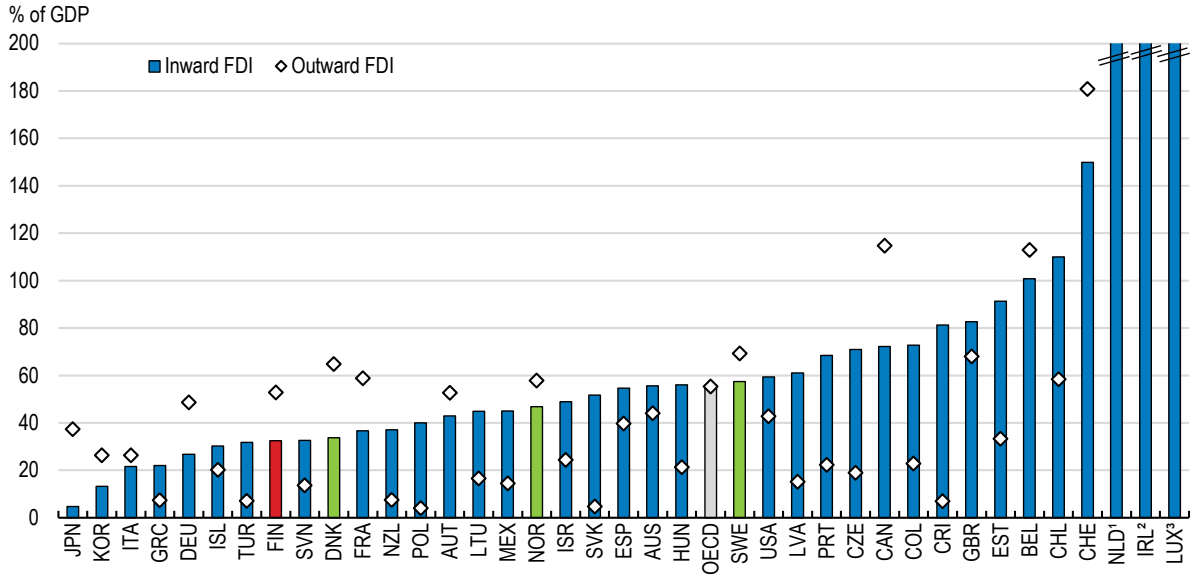
Finland should leverage more inward foreign direct investment (FDI) as a driver of innovation and an opportunity for the internationalisation of innovative Finnish firms. Finland has received smaller FDI relative to GDP than many other OECD countries, especially other Nordic or small open economies (Figure 2.29), in contrast to its relatively large outward FDI. FDI generates knowledge spillovers to local firms as they observe the advanced products and management practices of multinational enterprises (MNEs). Such demonstration effects can indeed stimulate innovation by local firms competing in the same industry (Ito et al., 2012[61]). However, these firms can also lose their market shares against the technologically advanced MNEs, making the net benefits of FDI ambiguous. Clearer benefits of FDI are observed among local firms in upstream or downstream industries, which benefit from the use of advanced intermediate goods supplied by MNEs or technology transfer from MNEs associated with a buyer-supplier relationship (Javorcik, 2004[62]).

Local firms that receive FDI (foreign affiliates) often display higher productivity, better innovation performance and managerial practices than domestic firms, partly because they enjoy technology and knowledge transfer from their parent MNEs (Bloom, Sadun and Van Reenen, 2012[63]). At the same time, such an advantage may be driven mainly by the fact that MNEs target exceptional local firms that are more innovative and productive to begin with (Arnold and Javorcik, 2009[64]). Indeed, the primary reason for foreign investors to invest in Finnish firms is to access their technology and skills (OECD, 2021[49]). It is also common for innovative Finnish firms to be acquired by foreign firms. The benefits of receiving FDI thus depend on the investing MNEs being more technologically advanced than the receiving Finnish firms (Berghäll, 2017[65]). FDI also provides opportunities for the receiving firms to penetrate the home market of the parent MNEs or participate in the global value chains they operate. Indeed, foreign affiliates account for about 40% of Finland's exports (OECD, 2021[49])

While Finland's regulatory barriers to FDI is low, the scope of sectors and activities that might fall under the scope of the screening mechanisms is not clearly defined (OECD, 2021[49]). While this legal uncertainty is addressed to some extent by preliminary discussions often held between authorities and foreign investors, more could be done to increase the predictability of FDI screening processes, for instance by publishing guidelines for the screening process that foreign investors can refer to. Invest in Finland, the sub-organisation of Business Finland, has been providing an array of measures to attract and facilitate FDI. It has recently introduced innovative measures including a customized, company-specific "virtual visit" to Finland as response to the travel constraints imposed by the pandemic and aftercare services for foreign investors to facilitate the business expansion by foreign affiliates in Finland. Such supporting measures can include promotion of R&D investment by foreign affiliates and their participation in Finland's innovation ecosystems.

Figure 2.29. Inward FDI is relatively low

Stock of inward FDI as % of GDP, 2020



Note: The observations for the Netherlands, Ireland, and Luxembourg are the following: 1. The Netherlands: outward FDI: 254, inward FDI: 330. 2. Ireland: outward FDI: 276, inward FDI: 291. 3. Luxembourg: outward FDI: 1169, inward FDI: 1468.
Source: OECD, FDI statistics (database).

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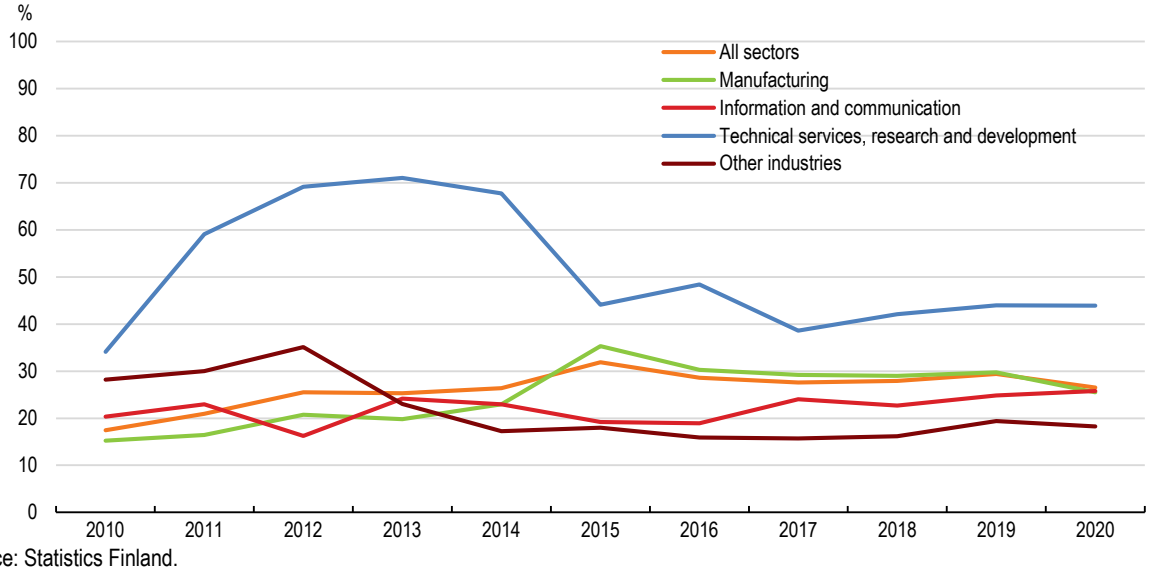
Participation of foreign firms in Finland's innovation ecosystems can facilitate the transfer of cutting-edge technologies invented elsewhere and strengthen the international linkages of Finland's innovation ecosystems. The weight of foreign enterprises in Finland's business-based R&D spending increased during the early half of the 2010s, most notably in technology services, but has moderated since (Figure 2.30). In 2020, foreign enterprises accounted for 26.5% of Finland's business-based R&D. While this share cannot be easily compared to those in other OECD countries due to limited data availability, the 2017 estimate by the OECD (2017[66]) suggests that it is relatively low, especially compared with Sweden (42%) and Norway (32%).

Figure 2.30. The weight of foreign affiliates in business-based R&D has not increased

The share of foreign affiliates in Finland's business-based R&D spending



Source: Statistics Finland.

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Innovation support should be made readily accessible to foreign affiliates to induce more intensive innovation activities by these firms in Finland. The innovation support measures provided by Business Finland are already accessible to foreign affiliates. Foreign affiliates that pay tax in Finland should also be allowed to claim the forthcoming R&D tax allowance for their R&D conducted in Finland. Efforts to attract foreign affiliates in the innovation ecosystems support programmes funded by the Academy of Finland and Business Finland (Section 2.3) are warranted, provided that they are willing to build an innovation ecosystem engaging Finnish firms. An example of an innovation ecosystem created by a foreign affiliate is Silicon Vallila in the Helsinki region established by GE Healthcare in 2014, which hosts start-ups to promote partnership in research and product development.

The government should promote partnerships between MNEs and innovative Finnish firms geared toward exports, for instance through buyer-supplier linkages. Business Finland offers extensive services to foreign investors, notably providing data and information to assist their decision to invest in Finland, matching them with Finnish firms to form a business partnership and supporting their administrative work for setting up a business. However, it does not provide significant support to Finnish firms seeking to tap into foreign demand through a partnership with MNEs. Business Finland's internationalisation support for Finnish firms is oriented more toward exporting than establishing domestic transactions with MNEs or foreign affiliates. It could for instance advise Finnish SMEs seeking to supply MNEs and provide them with financial support for their efforts in building a capacity to meet the product quality or specifications required by MNEs. It is important that these support measures also enable SMEs to diversify their partners so that they are not locked into a monopsonistic relationship with specific MNEs.

Main findings	Recommendations (key recommendations in bold)
Revamping innovation support in more effectively	
The government reached a political agreement to boost public sector R&D spending to 1.33% of GDP by 2030 (one third of the 4% R&D target by 2030) and will introduce legislation mandating a long-term R&D funding plan providing guidelines on the allocation of government R&D spending.	While ensuring ample support to basic research, set clear mission-oriented objectives and directions for support measures for applied research that respond to the most pressing societal challenges in the long-term R&D funding plan. Work closely with the private sector in determining the orientation of long-term R&D funding and designing innovation support schemes. Complement the R&D spending target with targets for other indicators that enable more comprehensive monitoring of progress toward better innovation ecosystems. Collect information on R&D spending by innovative start-ups and micro-enterprises.
The government will introduce an R&D tax incentive with an upper limit, making it insignificant for large companies.	**When sufficient data are available, evaluate the effects of this tax incentive and adjust it accordingly.** Provide guidelines specifying the scope of activities covered by the tax incentive.
Business-based R&D spending is concentrated among large firms and the weight of SMEs is particularly small in applied research. The contribution of foreign affiliates to business-based R&D is low compared with Sweden or Norway. Direct R&D support has been effective in boosting R&D spending by Finnish firms but not their productivity.	Promote stronger collaboration between the Academy of Finland and Business Finland in their innovation ecosystems support. Attract small firms into innovation collaboration programmes. Ensure that innovation support is readily accessible to foreign affiliates. Better target R&D grants and loans at firms with high innovation capabilities.
Removing the skills bottleneck to unleash innovation	
Chronic shortages of study places in higher education institutions are resulting in high rejection rates and low tertiary educational attainment among young adults. These in turn contribute importantly to the severe skills shortage that constrains innovation.	**Commit to a credible plan to increase study places in universities and universities of applied sciences and funding for additional study places while enhancing flexibility in the allocation of study places across study fields.** Allocate additional study places across regions and fields of study with a primary purpose of alleviating the skills shortage and meeting labour market demand.
The funding models for universities and universities of applied science (UAS) do not provide sufficient incentives to increase enrolment of students in the fields of study with strong labour market demand.	Increase the weight of bachelor's degrees in universities' funding model. Introduce targets for the number of enrolments and graduates in fields of study with severe foreseen skills shortages. Include in the funding models financial penalties that apply when these targets are unmet.

The employment rate of migrants with high educational attainment is low. The employment and career prospects of foreign highly skilled workers in Finland are worse than in many other OECD countries.	**Promote the recognition of qualifications held by foreign skilled workers and provide effective training to fill the gap between their qualifications and the skills required at their workplace.**
Foreign students graduating from Finnish universities must undergo a lengthy process to obtain a work-based residence permit if they want to work in Finland.	Consider granting foreign graduates a post-graduation work permit. In the short run, apply the fast track to their work-based residence permit applications.
Reaping higher return to innovation through internationalisation	
The export promotion measures have not increased the exports of Finnish firms significantly. The synergy between export promotion and innovation support is limited.	Focus export promotion services on export entry by midcap firms and SMEs with high technological capabilities. Enhance cooperation with overseas offices of export promotion agencies in other Nordic countries. Integrate export promotion at earlier stages of innovation support.
FDI penetration is relatively low and foreign affiliates play a relatively small role in innovation activities. Support for Finnish firms trying to establish domestic transactions with multinational enterprises or foreign affiliates is thin.	Enhance predictability in the FDI screening process. Strengthen the FDI promotion including facilitating the business expansion and innovation activities by foreign affiliates. Provide consulting services to SMEs seeking to collaborate with MNEs. Offer financial support to their efforts in developing the capacity to meet MNEs' product quality standards or product specifications.

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FINLAND

Russia's war of aggression against Ukraine has darkened the short-term economic outlook for Finland and increased the urgency of transitioning away from fossil energy. The Finnish economy is likely to contract over coming quarters, weighed down by high inflation, tightening monetary conditions and curtailment of Russian gas supplies to trading partner economies, but to recover in 2024 as these headwinds pass. The war has also worsened public finances, delaying needed consolidation measures to rebuild buffers to cope with future shocks and put public finances on a sustainable path. While Finland is on track to meet its gross greenhouse gas emissions abatement objectives, there is scope to reduce abatement costs, notably by replacing inefficient measures by a comprehensive carbon tax in the effort-sharing sector. New measures will also be needed to meet the forestry and other land-use targets, which are very challenging. Rebooting innovation ecosystems would help to increase Finland's low productivity growth. This will entail not only increasing R&D spending, but also establishing a mission-oriented innovation policy and a more diversified innovation ecosystem, strengthening synergies between export promotion and innovation, and above all, increasing the supply of skilled workers.

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