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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 Lithuania were reviewed by the Committee on 13 June 2022. The draft report was then revised in light of the discussion and given final approval as the agreed report of the whole Committee on12 July 2022.

The Secretariat's draft report was prepared for the Committee by Hansjörg Blöchliger and Vassiliki Koutsogeorgopoulou, under the supervision of Vincent Koen. Research assistance was provided by Natia Mosiashvili, and editorial support by Michelle Ortiz.

The previous Survey of Lithuania was issued in November 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.

Table of contents

Foreword 3

Executive Summary 9

1. Key Policy Insights 14
- Introduction 15
- The economy was booming until recently 18
  - The war in Ukraine exposes Lithuania's vulnerability 18
  - The labour market is recovering, but structural unemployment remains an issue 21
  - External positions are sound 24
- The financial system looks sound 27
  - Banks seem well funded, but market concentration remains an issue 27
  - The housing market has been booming before the war 29
  - The Fintech sector is expanding fast 30
- Fiscal policy: prospects for consolidation 31
  - Reforming the fiscal framework could strengthen sustainability 32
  - The fiscal costs of an ageing population will rise 33
  - Spending quality has room to improve 36
  - The tax base should be broadened 38
  - Fostering decentralisation and local investment 39
- Reforms to improve the business climate 41
  - Making public enterprises more productive 42
  - Transport regulation should improve further 43
  - Trust, corruption and quality of institutions 43
- Improving education to raise skills and productivity 45
  - PISA outcomes are improving but remain below the OECD average 45
  - Bringing vocational education and training closer to the labour market 46
  - Universities need more excellence 48
- Reducing social and regional disparities 49
  - Poverty remains a challenge 49
  - Disparities are being addressed by strengthening regional institutions 50
- Decarbonising the economy 51

References 54

2. Unleashing the productive potential of digitalisation 57
- Lithuania has scope for further digitalisation and productivity gains 58
- Promoting investment in innovation to speed up the digital transition 61
  - Support for business R&D could do more to encourage private investment 62
  - Enhancing technology transfer through stronger collaborative research 66
  - The ongoing reform of the innovation system is a step in the right direction 70
- Fostering the digital transformation of firms, especially smaller ones 71
  - Digital connectivity needs to improve 75
  - Framework conditions are business-friendly but can improve further 77

Broadening the range of financing sources for firms 79
Information on digital tools and management competencies also need to improve 82
A well-developed digital government is key to successful digital transition 84
Accelerating progress towards digital government 84
Digital security is high but there is scope to strengthen it further 88
Harnessing skills for a digital economy 90
The education system needs to adapt to digital changes 91
The digital transformation heightens the need for lifelong learning 97
References 103

Tables

Table 1. Growth is slowing 10
Table 1.1. Macroeconomic indicators and projections 20
Table 1.2. Events that could entail major changes to the outlook 20
Table 1.3. Illustrative fiscal impact of recommended reforms 36
Table 1.4. Past recommendations and actions taken in financial and fiscal policies 36
Table 1.5. Composition of government spending and revenue, 2010 and 2020 37
Table 1.6. Potential impact of structural reforms on per capita income 42
Table 1.7. Past OECD recommendations on structural policies 42
Table 1.8. Findings and recommendations to foster sustainable and inclusive growth 53
Table 2.1. Recommendations for unleashing the productive potential of digitalisation 102

Figures

Figure 1. Inflation has reached new heights 10
Figure 2. The population is ageing fast 11
Figure 3. PISA scores are below average 11
Figure 4. Digital integration lags behind 12
Figure 1.1. Baltic tiger rising 15
Figure 1.2. Productivity has started to accelerate but remains below the OECD average 17
Figure 1.3. Income inequality and regional disparities are relatively high 17
Figure 1.4. The war in Ukraine has undermined an otherwise strong recovery 19
Figure 1.5. The labour market is recovering 21
Figure 1.6. Competitiveness is declining 23
Figure 1.7. Productivity differs widely across sectors, but wages less so 24
Figure 1.8. External positions are sound 25
Figure 1.9. The composition of exports and their destination are evolving 26
Figure 1.10. Credit growth has largely returned to trend and bankruptcies have been low 27
Figure 1.11. Banks are well capitalised 28
Figure 1.12. The banking sector is highly concentrated 29
Figure 1.13. The housing market has been booming 30
Figure 1.14. The fintech sector is rising fast 31
Figure 1.15. The fiscal position improved until the end of 2021 32
Figure 1.16. Lithuania is ageing rapidly, putting pressure on pension spending 33
Figure 1.17. Very low pension replacement rates could undermine inclusiveness 35
Figure 1.18. Ageing cost could make debt unsustainable 35
Figure 1.19. Public investment is rising, while public wage growth has stabilised 37
Figure 1.20. Taxation is low and geared towards labour 38
Figure 1.21. Limited funding possibilities could explain low local public investment 40
Figure 1.22. The business climate is friendly, yet the state is active in many sectors 41
Figure 1.23. Trust in government and institutional quality are low 43
Figure 1.24. Corruption seems on a downward trend 44
Figure 1.25. Skills mismatch is considerable 45
Figure 1.26. Compulsory education is improving but outcomes depend on school size 46
Figure 1.27. VET has little significance, and work-based VET even less so 47
Figure 1.28. The tertiary sector performs poorly, yet university studies pay off 48
Figure 1.29. The share of international students is low 49

Figure 1.30. Poverty is high but declining 50
Figure 1.31. Productivity differences are trending down as people are moving to agglomerations 51
Figure 1.32. Decarbonisation needs to accelerate 52
Figure 2.1. Digital transformation has accelerated, but more can be done 58
Figure 2.2. There is scope to boost productivity 59
Figure 2.3. Innovation performance improved, but some critical indicators lag behind 60
Figure 2.4. Lithuania has scope to increase investment in R&D 62
Figure 2.5. R&D tax incentives are generous but business investment in R&D lags behind 63
Figure 2.6. Overall support to R&D is comparatively low, despite generous tax incentives 64
Figure 2.7. Smaller firms have scope to improve innovation outcomes 65
Figure 2.8. Business-research collaboration can be strengthened 67
Figure 2.9. International research linkages remain weak 70
Figure 2.10. There is scope for greater uptake of digital technologies, especially by smaller firms 71
Figure 2.11. Smaller firms lag behind in productivity 72
Figure 2.12. The pandemic-related crisis has accelerated the use of digital tools 73
Figure 2.13. A range of policies can support productivity through digital adoption in Lithuania 74
Figure 2.14. The Lithuanian manufacturing sector lags behind in terms of digitalisation 75
Figure 2.15. Digital connectivity increased, but high-speed broadband could be used more by firms 76
Figure 2.16. Broadband coverage is lower in rural areas 77
Figure 2.17. The regulatory framework is business-friendly but could improve further 78
Figure 2.18. SMEs in Lithuania rely more on bank lending than equity financing 79
Figure 2.19. The debt-bias in the Lithuanian corporate tax system could be reduced 80
Figure 2.20. Reliance on venture capital could increase 81
Figure 2.21. Managerial skills can be improved 84
Figure 2.22. E-government indicators compare well internationally 85
Figure 2.23. There is scope to move to higher levels of digital government maturity 86
Figure 2.24. Cybersecurity incidences for businesses are relatively high 88
Figure 2.25. Awareness about cybercrime and risk assessment by firms need to be strengthened 89
Figure 2.26. Lithuania faces high risks of job automation in international comparison 90
Figure 2.27. There is scope to strengthen digital and foundational skills 91
Figure 2.28. Lithuanian schools can further increase ICT capacity 93
Figure 2.29. Lithuania faces large and rising shortages in ICT skills 94
Figure 2.30. Relatively few STEM graduates have an ICT specialisation 95
Figure 2.31. Other important skills for the digital era also need to be developed further 96
Figure 2.32. Participation in adult learning remains low especially among the vulnerable groups 98
Figure 2.33. There are multiple barriers to participation in adult training 99
Figure 2.34. There is scope to foster online learning 101

Boxes

Box 1.1. The impact on Lithuania of the war in Ukraine 16
Box 1.2. Linking the retirement age to life expectancy: country experiences 34
Box 1.3. Quantifying fiscal policy recommendations 36
Box 1.4. Tax incentives in Lithuania's corporate tax system 39
Box 1.5. Encouraging local public investment: the cases of Ireland and Finland 40
Box 1.6. Quantification of structural reform 41
Box 1.7. Reforming work-based education in Central and Eastern Europe 47
Box 2.1. Lithuania's Digitalisation Strategy: main features 61
Box 2.2. Tax incentives to support business R&D and innovation in Lithuania: main features 64
Box 2.3. Enhancing business-research collaboration: some international practices 68
Box 2.4. Fostering technology-based innovation in the financial sector 72
Box 2.5. Crowdfunding: an alternative source for financing SMEs with high-innovative potential 82
Box 2.6. Supporting the digital advancement of SMEs: international experience 83
Box 2.7. Digitising government services: the case of Estonia 86
Box 2.8. Modernising Lithuania's public sector through digitalisation 87
Box 2.9. Financial incentives to encourage participation in adult learning: international trends 100

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BASIC STATISTICS OF LITHUANIA, 2021[1]
(Numbers in parentheses refer to the OECD average) [2]

LAND, PEOPLE AND ELECTORAL CYCLE					
Population (million)	2.8		Population density per km²	44.6	(38.7)
Under 15 (%)	15.6	(17.6)	Life expectancy at birth (years, 2020)	74.9	(79.7)
Over 65 (%)	21.1	(17.7)	Men (2020)	70.1	(77.0)
International migrant stock (% of population, 2019)	4.2	(13.2)	Women (2020)	80.0	(82.5)
Latest 5-year average growth (%)	-0.5	(0.5)	Latest general election	October 2020	
ECONOMY					
Gross domestic product (GDP)			Value added shares (%)		
In current prices (billion USD)	65.5		Agriculture, forestry and fishing	3.7	(2.6)
In current prices (billion EUR)	55.4		Industry including construction	28.7	(27.7)
Latest 5-year average real growth (%)	3.5	(1.5)	Services	67.6	(69.7)
Per capita (thousand USD PPP)	42.7	(50.6)			
GENERAL GOVERNMENT Per cent of GDP					
Expenditure (OECD: 2020)	38.7	(48.4)	Gross financial debt (OECD: 2020)	51.4	(133.3)
Revenue (OECD: 2020)	37.7	(38.1)	Net financial debt (OECD: 2020)	17.4	(81.1)
EXTERNAL ACCOUNTS					
Exchange rate (EUR per USD)	0.85		Main exports (% of total merchandise exports)		
PPP exchange rate (USA = 1)	0.46		Chemicals and related products, n.e.s.	19.3	
In per cent of GDP			Machinery and transport equipment	19.0	
Exports of goods and services	80.4	(54.5)	Miscellaneous manufactured articles	16.3	
Imports of goods and services	76.2	(51.2)	Main imports (% of total merchandise imports)		
Current account balance	1.2	(0.1)	Machinery and transport equipment	26.2	
Net international investment position	-4.0		Mineral fuels, lubricants and related materials	16.3	
			Chemicals and related products, n.e.s.	15.9	
LABOUR MARKET, SKILLS AND INNOVATION					
Employment rate (aged 15 and over, %)	57.9	(56.2)	Unemployment rate, Labour Force Survey (aged 15 and over, %)	7.1	(6.1)
Men	62.9	(64.1)	Youth (aged 15-24, %)	14.4	(12.8)
Women	53.6	(48.7)	Long-term unemployed (1 year and over, %)	2.6	(2.0)
Participation rate (aged 15 and over, %)	62.3	(60.3)	Tertiary educational attainment (aged 25-64, %)	45.3	(39.9)
Average hours worked per year	1,620	(1,716)	Gross domestic expenditure on R&D (% of GDP, 2020)	1.2	(3.0)
ENVIRONMENT					
Total primary energy supply per capita (toe)	2.8	(3.8)	CO_2 emissions from fuel combustion per capita (tonnes, 2019)	4.0	(8.3)
Renewables (%)	23.4	(11.6)	Water abstractions per capita (1 000 m³, 2020)	0.1	
Exposure to air pollution (more than 10 µg/m³ of PM 2.5, % of population, 2019)	52.2	(61.7)	Municipal waste per capita (tonnes, 2020)	0.5	(0.5)
SOCIETY					
Income inequality (Gini coefficient, 2019, OECD: latest available)	0.357	(0.316)	Education outcomes (PISA score, 2018)		
Relative poverty rate (%, 2019, OECD: 2018)	15.4	(11.8)	Reading	476	(486)
Median disposable household income (thousand USD PPP, 2019, OECD: 2018)	18.8	(25.5)	Mathematics	481	(488)
Public and private spending (% of GDP)			Science	482	(487)
Health care (OECD: 2020)	7.9	(9.7)	Share of women in parliament (%)	27.7	(32.4)
Pensions (2017)	6.4	(8.6)	Net official development assistance (% of GNI, 2017)	0.1	(0.4)
Education (% of GNI, 2020)	3.7	(4.4)			

1: The year is indicated in parenthesis if it deviates from the year in the main title of this table.
2: 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

Executive Summary

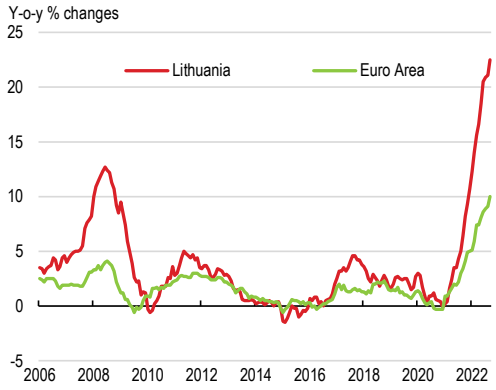
The rebound has been strong but economic resilience will be tested

The recovery from the pandemic has been rapid. Strong exports and a resolute government support programme allowed GDP to reach the pre-pandemic level in early 2021. The war in Ukraine has begun to affect the economy.

Inflation is record-high. Lithuania is facing one of the highest inflation rates in the euro area, exceeding 22% in September, pushed up by the prices of energy and, to a lesser extent, food and housing (Figure 1). The strong impact of higher energy prices reflects high energy intensity of the economy and an excessive share of oil and gas in the energy mix. While nominal wages continue to climb fast, real wages have been on a downward trend since end 2021.

Figure 1. Inflation has reached new heights

Harmonised index of consumer prices



Note: Inflation data for September are provisional.
Source: OECD, Consumer Price Indices database.

StatLink https://stat.link/bci91k

Energy and trade expose Lithuania's vulnerabilities. Russia's share in Lithuanian oil and gas imports was 73% and 42% respectively in 2020. Lithuania stopped importing Russian energy in April-May 2022 but Russia remains one of Lithuania's largest trading partners, potentially affected by the war and sanctions. In early April the government presented a fiscal package to support household incomes and increase energy independence.

Economic projections are subject to substantial uncertainty. GDP growth is projected to slow to 1.6% in 2022, hit by declining exports and increased uncertainty, and to 1.3% in 2023 (Table 1). Investment is set to gather pace, supported by an inflow of EU-funds. The continuing war in Ukraine and an abrupt contraction in energy supply could hurt the economy further.

Table 1. Growth is slowing

Annual growth, unless specified	2020	2021	2022	2023
GDP at market prices	**0.0**	**6.0**	**1.6**	**1.3**
Unemployment rate	8.5	7.1	5.8	6.5
Harmonised index of core inflation[1]	2.6	3.4	9.8	7.8
General government gross debt (% of GDP)	55.5	51.4	52.8	55.1

1. Excludes food, energy, alcohol and tobacco.
Source: OECD Economic Outlook 111 database (updated).

Policy should help bolster resilience

Financial and fiscal policies have supported the economy through the pandemic and are supporting households and firms to cope with rising energy prices. Fiscal space needs to be rebuilt gradually, subject to targeted support to cushion the impact of the war, while preparing for the rising costs of ageing.

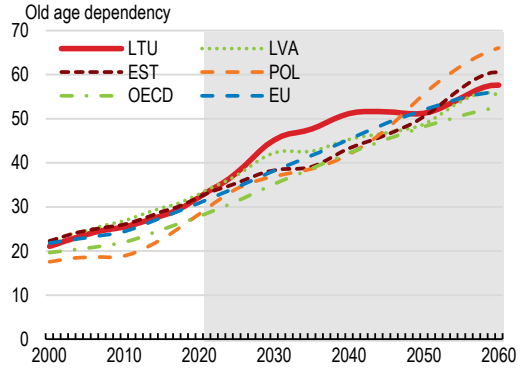
The financial system seems profitable, well capitalized and liquid. Ample liquidity support helped households and firms through the pandemic. Household credit continued to grow almost unabated, and corporate balance sheets look healthy. The central bank has started to tighten macro-prudential policies somewhat in the face of signs of overheating in the housing market.

A revised draft budget plans to spend 1.4% of GDP in 2022 to help households and firms weather the energy crisis and 0.6% to help Ukrainian refugees. The fiscal stance was highly expansionary in 2020, contractionary in 2021 and is projected to be highly expansionary again in 2022. The government plans to return to the medium-term objective by 2024. Pandemic-related support, in particular the well-funded short-term work scheme, has been deployed and withdrawn timely.

Ageing costs are rising. Lithuania's population is ageing fast (Figure 2). Emigration of the young and low immigration contribute to ageing pressures. Despite a built-in sustainability factor in the pension system, the government projects ageing costs to rise by over 2 percentage points of GDP by 2060. Establishing an automatic link between retirement age and life expectancy after 2026 could help maintain sustainability and adequacy of pensions.

Figure 2. The population is ageing fast

Old-age dependency ratio projections



Source: United Nations, World Population Prospects 2019.

StatLink https://stat.link/4i86gb

Public investment is expanding. European Union funding helps muster support for politically challenging reforms, especially in education and health care where reform effort has been shy so far. Consolidating the extensive school and hospital networks could help raise productivity and reduce spending pressures in the public sector.

Lithuania is highly centralised. Local tax and budget autonomy are low, with municipalities relying on budget transfers, discouraging local investment. The government plans to broaden the immovable property tax base and assign all tax revenues to the municipalities, and has started procedures to increase local capacity to borrow for investment. More own-source revenues could encourage investment, while local administrative capacity and coordination at the regional level need to improve further.

Tax incentives to foster innovation are numerous, but take-up is low. They seem to miss the trigger points of Lithuania's catching-up economy involving many small and credit-constrained start-ups. Direct, non-tax support to firms is negligible. A more balanced combination of tax incentives and direct support would be more effective in supporting innovation.

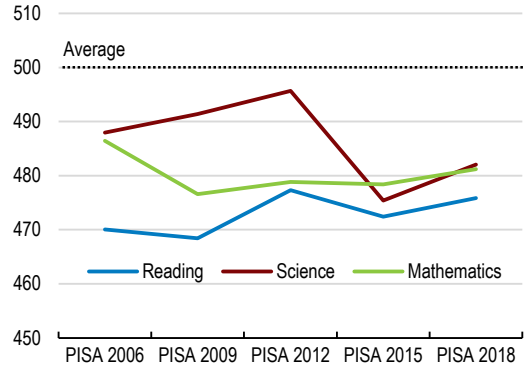
Structural reform will strengthen the economy

Reforming public firms and upgrading the education system at all levels will boost productivity and employment. Strengthening support to research and development and modernising the public sector will help reap the benefits of digitalisation.

State-owned firms are active in many sectors, and the quality of their governance can be improved further. Municipal enterprises in particular lack a transparent regulatory and governance framework, potentially distorting competition with private providers. The government continues to adapt its ownership strategy by converting several public entities into (state-owned) limited companies. Subjecting all public entities to the same legal, financial and regulatory possibilities and constraints as private firms is essential to level the playing field and ultimately raise productivity.

The quality of compulsory education is poor. PISA scores are below the OECD average (Figure 3). Reasons for underperformance include an excessive school network, low teacher competencies and an inadequate curriculum. In 2021 the government started a primary and lower secondary education reform, by developing a new teacher competency framework; increasing wages for head teachers; adapting the curriculum; and increasing minimum school and class size.

Figure 3. PISA scores are below average



Source: OECD, PISA 2018 database.

StatLink https://stat.link/btjoc6

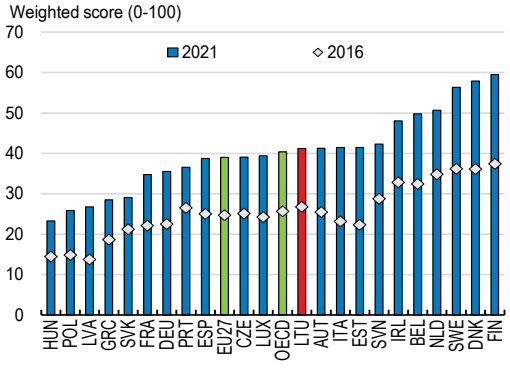
Vocational education and training (VET) should play a greater role. Firm-based learning (apprenticeships) is very limited. The government has started to make the vocational path more attractive, by providing school boards with more power and making study programmes more flexible. Further expanding firm-based learning, in particular by better adapting programmes to firms' needs, could also help improve VET's labour market relevance.

Performance of tertiary education lags behind. Excellence of Lithuanian universities is below comparable countries, and the mismatch between

study programmes and labour market needs is considerable. Students from a disadvantaged socio-economic background find it more difficult to enter university, partly because of a restrictive allocation of state-funded places. Reforms such as linking public funding to labour market performance or international student mobility could encourage universities to increase quality.

Digital technologies have advanced but uptake and use still lag behind. More effective support for business R&D and stronger research-business collaboration could boost private investment in innovation. Strengthening digital infrastructure, addressing the urban-rural "digital divide", and improving access to finance for young firms could help enhance uptake and effective use of digital technologies, especially by smaller firms.

Figure 4. Digital integration lags behind



Source: European Commission, Digital Scoreboard.

StatLink https://stat.link/ps9ixr

A modernised public sector and strong skills are important drivers for digitalisation. There is much scope to digitalise the public sector, including through more e-government processes, consolidation of information resources and enhancing IT infrastructure. Better digital services and their accessibility for vulnerable groups would increase inclusiveness. More generally, shortages in ICT and ICT-related skills remain. Additional funding could be provided to tertiary institutions for degree completions in disciplines that are important for the digitalisation process. Strong and relevant digital skills are vital to share fairly the dividends of digital transformation.

Sharing the growth dividends

Reducing poverty and regional disparities, improving trust and institutional quality, and curbing carbon emissions will help make the Lithuanian economy more inclusive and sustainable.

Although declining, poverty remains a challenge. The share of the population at-risk-of poverty remains the second highest among European OECD countries. The tax-and-transfer system does not reduce inequality and poverty much. However, over the past two years, and against the backdrop of the pandemic, the government has considerably increased social spending, notably on pensions and targeted social benefits, and raised the non-taxable income threshold for low-income earners.

Regional differences in income, productivity and employment exceed the OECD average. Internal migration towards larger agglomerations has accelerated in recent years, while differences in productivity between core and peripheral regions are trending down. The government is addressing regional disparities by empowering regional institutions and by improving policy coherence and coordination at the regional level.

Trust and institutional quality are lagging. The share of Lithuanian citizens trusting their government is below OECD average, and the responsiveness of political institutions to citizens' demands and satisfaction with the political process is comparatively weak. Corruption is above the OECD average but the gap is narrowing ostensibly. The government is addressing rampant legal inflation, improving the design of laws and regulations and fostering evidence-based policy-making, to help increase institutional quality and trust in government.

Lithuania's aim to reduce carbon emissions by 30% in 2030 is ambitious. Per-capita carbon emissions are below the OECD average but continue to rise. Transport and agriculture are important emission sources. Carbon is taxed above the OECD average, yet persisting fuel subsidies undermine effective carbon pricing. Environmental spending is low. Broadening carbon pricing and investing in low-carbon technology, especially in transport and agriculture, will help achieve climate goals. The government is taking steps towards decarbonisation and higher energy security

Main findings and key recommendations

MAIN FINDINGS	KEY RECOMMENDATIONS
Financial and fiscal policies	
Inflation has risen, driven by high energy and food prices.	Tighten fiscal policy at an appropriate pace to help mitigate inflationary pressures. Ensure that support is targeted at vulnerable households and firms affected by high energy prices. Tighten the macroprudential stance should housing market developments start posing a risk to financial stability.
The fiscal deficit is above the medium-term objective.	Ensure that the deficit returns to a sustainable level over the medium term, by following the fiscal rules and conducting further spending reviews.
The fiscal costs of an ageing population are rising. The retirement age is being increased to reach 65 by 2026.	Consider establishing an automatic link between the retirement age and life expectancy beyond the year 2026.
Own-source revenue of local governments is tiny, limiting local investment capacity.	Assign more own-source revenues to local government.
Structural policies	
Public enterprises are active in many sectors of the economy. Despite substantial progress, the quality of governance remains below the OECD average.	Subject all public enterprises, whether state- or municipally-owned, to the same legal, financial and regulatory framework as private firms.
PISA outcomes are trending upwards but remain below the OECD average with many students lacking strong foundational skills.	Consolidate the school network further. Ensure timely implementation of the new curricula for schools, including attainment targets for digital skills.
Firm-based learning (apprenticeships) is hardly taking off since it was introduced in 2017.	Strengthen firm-based learning in the manufacturing and the service sectors. Engage with international firms from countries with an established apprenticeship system. Ensure that the attractiveness of firm- and school-based learning is balanced.
Ambitious climate targets require strong and efficient policies.	Extend carbon pricing to all areas where it is not yet implemented, notably transport and agriculture. Increase public investment in targeted research and development and green infrastructure.
Trust in government and the quality of institutions are below the OECD average.	Continue to improve the quality and transparency of the policymaking process.
Unleashing the potential of digitalisation	
The take-up of R&D tax incentives for businesses is low, despite generous provisions, and a relatively large share of smaller firms does not engage in innovative activities. Direct R&D support to firms is very low.	Provide R&D support through a more balanced combination of tax-incentives and direct support to smaller innovative firms.
Despite progress, the share of households with access to fast broadband is low in international comparison, especially in rural areas.	Proceed with the implementation of the National Broadband Plan, ensuring universal access to high-speed broadband by 2027.
Venture capital is not yet well developed.	Support the development of venture capital by prioritizing public support through privately-owned funds rather than direct engagement.
Many smaller firms are not aware of the potential benefits of digital technologies and how to use such technologies.	Continue current efforts to develop a comprehensive network of advisory and mentoring services for SMEs.
University funding does not address skills mismatch and large ICT shortages. The share of foreign students is low.	Introduce labour market outcome and international mobility indicators in university funding formulas. Provide additional funding to tertiary institutions for degree completions in disciplines that are important for the labour market, including digital transformation.
Participation in adult learning remains low, especially among the less educated and elderly workers.	Proceed with the development of a national lifelong learning platform that will serve as a “one-stop shop” for adult education, complementing it with intensified information campaigns and provision of career counselling.

1. Key Policy Insights

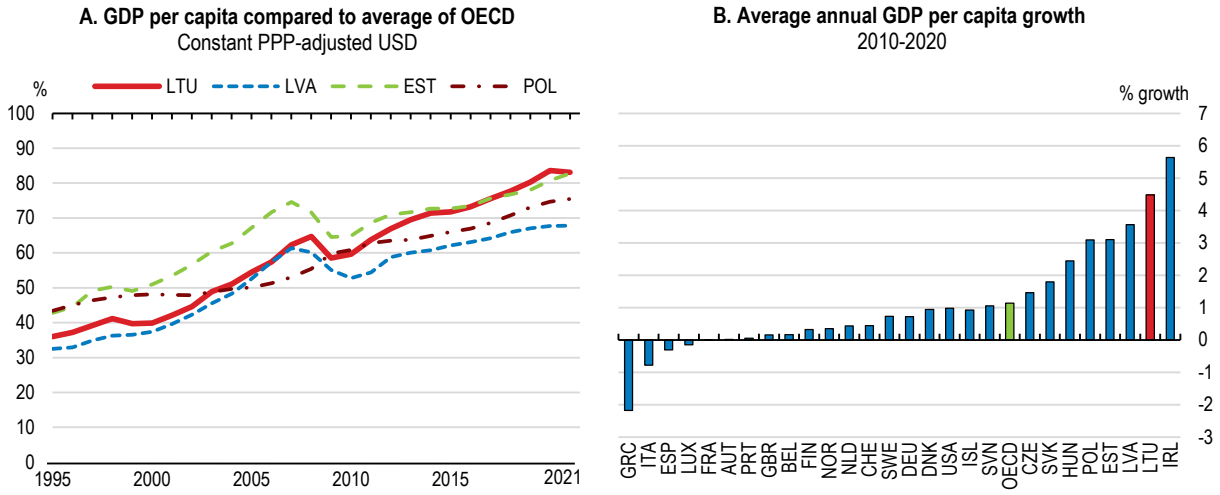
Lithuania has successfully exited the covid-19-crisis, but is now weathering the impact of Russia's invasion of Ukraine. Growth is slowing and inflation has risen to one of the highest in the Euro area, fuelled by soaring energy and food prices. Fiscal policy is tightening amid a revised budget to help households and firms weather the energy crisis and support Ukrainian refugees. Ageing costs are rising. Accelerating reform of public firms and upgrading the education system will boost productivity and employment. Reducing poverty and regional disparities, improving institutional quality, and curbing carbon emissions will help make the Lithuanian economy more inclusive and sustainable.

Introduction

The Lithuanian economy has successfully exited the covid-19-crisis, but is now weathering the impact of Russia's invasion of Ukraine. Lithuania was one of the fastest growing OECD economies of the past decade in per capita terms, buoyed by rising exports and integration into global value chains (Figure 1.1). Bold and effective policy helped households and firms through the pandemic, contributing to the mildest pandemic-induced recession of all European countries. A high vaccination rate helps protect the population against a new covid-19 wave. The government has embarked on an ambitious programme to boost investment in infrastructure, innovation, education, digitalisation and climate action, supported by the European resilience and recovery funds. A sound macroeconomic and financial framework and a friendly business climate enhance policy effectiveness. After a long period of net emigration, the migration balance turned positive in 2018.

Russia's aggression against Ukraine will considerably affect the Lithuanian economy (Box 1.1). Lithuania has one of the highest inflation rates in the euro area, fuelled by soaring energy, food and housing prices. Russia is one of Lithuania's largest trading partners, making the economy vulnerable to the impact of the war, even though much of the trade with Russia consists of transit trade. In Spring, Lithuania stopped importing oil, gas and electricity from Russia. A wave of refugees from Ukraine and Belarus could strain Lithuania's absorption capacity and require considerable humanitarian aid. Given the nature of the shock, policy responses need to be carefully weighed. In view of these developments, Lithuania updated the budget in April to spend more on short-term support for households and firms as well as on investment in energy security.

Figure 1.1. Baltic tiger rising



Note: In Panel B, growth rates are based on real GDP per capita.
Source: OECD Economic Outlook No. 111 database (updated).

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Besides the war-related crisis, Lithuania faces several challenges, mostly pertaining to productivity and employment (Figure 1.2). Productivity has accelerated over the past few years, but its level remains below the OECD average. Participation is well above the OECD average, limiting further contributions to GDP. Unemployment remains high despite strong growth, pointing at labour market imbalances, in particular considerable skills and job mismatch. Investment, both public and private, remains stubbornly low. The broad reach of state-owned enterprises and inadequate regulation in transport, Lithuania's largest service export sector, could also hold back productivity growth. Trust in government and quality of institutions is below the OECD average. The pandemic cut men's life expectancy, already among the lowest in the OECD, by 1.7 years (women 1.3 years) in 2020, the sharpest reduction in OECD Europe (OECD, 2018[1]).

Box 1.1. The impact on Lithuania of the war in Ukraine

Russia's aggression against Ukraine is first a human tragedy, but it has also consequences for the Lithuanian economy. By late August, more than 60 000 Ukrainian refugees – equivalent to 2% of the Lithuanian population – had reached Lithuanian soil, with arrivals having gradually declined to less than a hundred per day. Ukrainians already make up the largest group of non-EU foreigners living in Lithuania. Starting in March Ukrainian refugees were able to obtain refugee status with a simplified procedure, granting them full access to health and social services and the labour market. Refugees also help alleviate labour shortages. Ukrainian teachers are allowed to teach in the Ukrainian language. Procedures to hand out work permits for workers from Russia and Belarus have also been streamlined, with the stated objective of relocating skilled workers and firms from these countries to Lithuania.

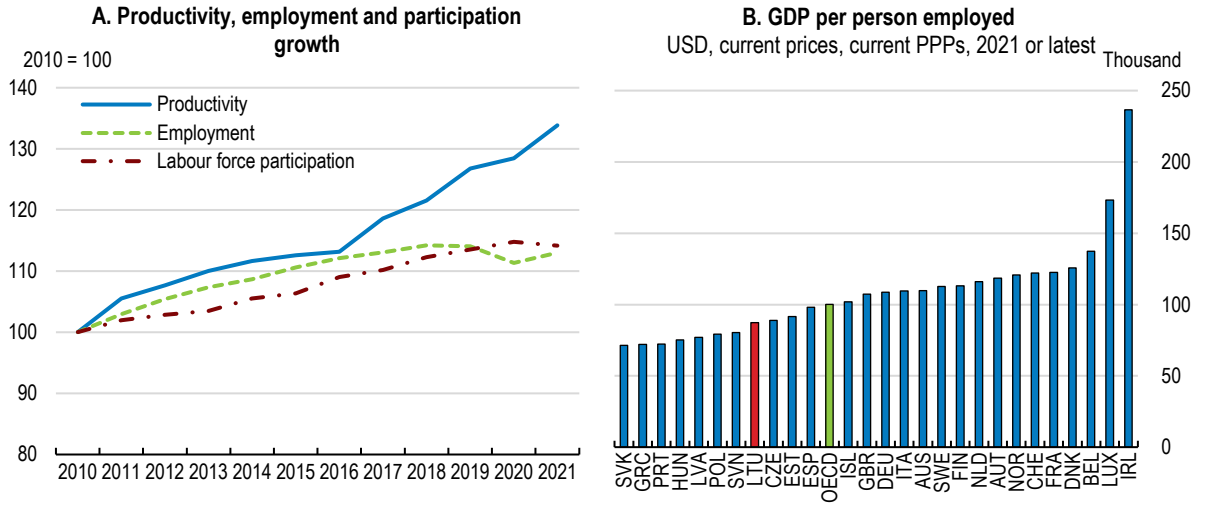
Trade with Russia, Belarus and Ukraine is collapsing. In early April, Lithuania stopped importing gas from Russia, drawing instead on the LNG terminal in Klaipeda, becoming the first EU country to cut ties with Russian gas deliveries. In May, it stopped all other energy imports from Russia. Rail transport is expected to almost halve from its 2021 level. Traffic between Russia and its Kaliningrad enclave, which passes through Lithuania, has shrunk to a fraction of its normal level, affected by ever tighter EU sanctions. Growth of service exports – mostly transport – is expected to drop from around 14% in 2021 to 4% in 2022. Oil prices have nearly doubled since December 2021, and headline inflation exceeded 22% in September. Lithuania is an agricultural exporter, so rising food prices hurt households but benefit exporters. End-March the central bank published some scenarios, with the most optimistic one projecting GDP growth at 2.7% in 2022, whereas the "severe shock" scenario projected a 1.2% contraction, assuming that all exports to Russia, Belarus and Ukraine stop entirely and imports from these countries are curtailed by one-fifth. In the best-case scenario inflation was projected at 10.5% in 2022, as against 11.5% in the severe shock scenario.

In early April the government presented a revised draft budget under the heading "Mitigating the effects of inflation and strengthening energy independence", allocating around 1.4% of GDP in 2022 to help households and firms absorb energy price shocks and increase energy efficiency, as well as to diversify energy supply. Electricity and natural gas prices are capped at 140% of pre-war levels until end 2022 for households, with energy providers being compensated for revenue losses. To help households further, pensions have been increased; income taxes for low-income earners reduced; and means-tested benefits – increased already in December 2021 - were expanded further. A notable part of investment to increase energy independence goes into renovation and rehabilitation of multi-apartment buildings and the support of public and private solar and wind energy production and electricity storage. Some of this spending was contained in earlier budgets, and around half is covered by EU funds. Another 0.6% of GDP are budgeted to support Ukrainian refugees.

Source: Various government agencies and central bank of Lithuania.

Stepping up progress with digitalisation will be a key means to boost productivity economy-wide. While the country has advanced in this area, there is scope to further increase investment in innovation and remove barriers to the adoption of advanced technologies by firms, especially smaller ones, including by addressing regional disparities in digital infrastructure and improving access to finance. Digital skills need to strengthen to ensure a solid transition towards the digital economy and a fair distribution of the digitalisation dividend. The government is developing a digitalisation strategy to reap the benefits of new digital technologies and to boost innovation and productivity.

Figure 1.2. Productivity has started to accelerate but remains below the OECD average



Note: Panel A, productivity is defined as GDP per person employed. Panel B, OECD refers to simple average of its member countries.
Source: OECD, Productivity database; OECD, Labour Force Statistics database; and OECD, National Accounts database.

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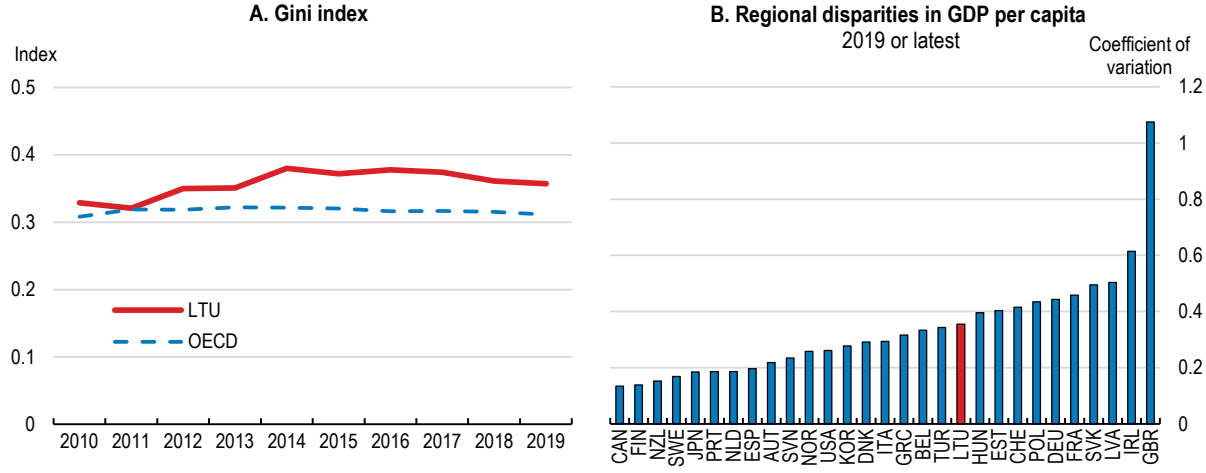
Lithuania still suffers from considerable social and regional imbalances. Income inequality remains high, as often seen in rapidly growing economies (Figure 1.3). Poverty has increased until a few years ago, although it recently started to decline. Old-age poverty is of particular concern. With the population ageing rapidly, the government will have to find ways to increase pension system adequacy while maintaining its sustainability. Differences in productivity and employment across regions are large despite the small size of the country. The government is reacting with resolve to social and regional disparities, though. The level and effectiveness of social spending are rising, and reforms of the institutional framework are underway, providing local governments with more power and resources to develop their own investment and growth policies.

Figure 1.3. Income inequality and regional disparities are relatively high



Note: In panel B, the coefficient of variation illustrates the relative dispersion of GDP per capita USD PPP at the lower regional level (TL3).
Source: OECD, Income Distribution database; and OECD, Regional Economy database.

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Against this background, the Survey's key messages are for Lithuania to:

- Taking into account the impact of Russia's aggression against Ukraine, strengthen energy independence; provide targeted support to vulnerable households and firms to help them cope with higher energy prices; and tighten fiscal policy at an appropriate pace to help adress inflationary pressures.
- Continue structural reforms to raise productivity and employment, especially in the area of education and skills; address the fiscal costs of ageing; and reduce social and regional disparities further.
- Foster digitalisation through more effective R&D support for businesses and by reducing barriers to technology adoption, especially among smaller firms, including through addressing regional gaps in digital infrastructure and improving access to finance, while accelerating progress towards digital government and strengthening digital skills.

The economy was booming until recently

The war in Ukraine exposes Lithuania's vulnerability

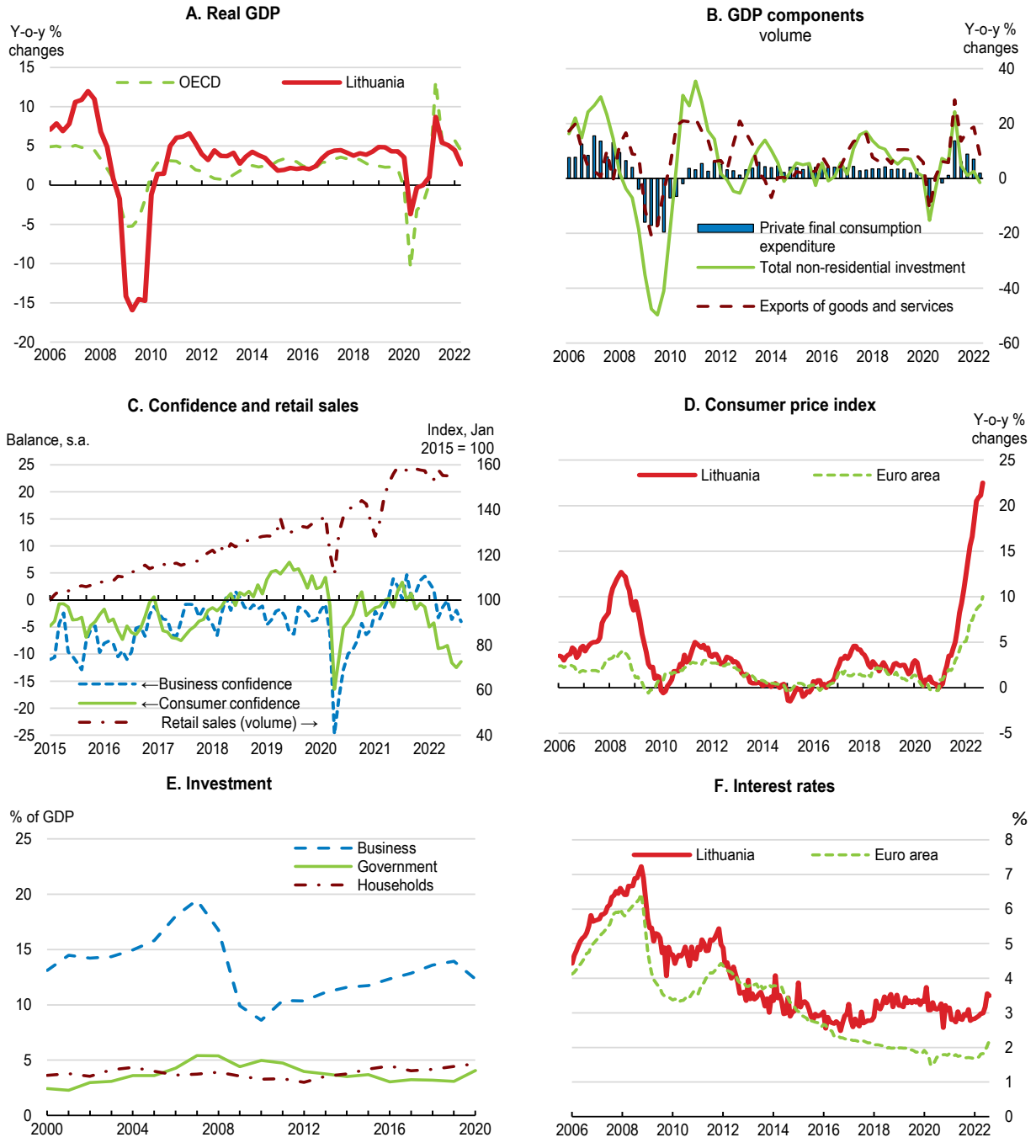
Lithuania's economy has been one of the least affected by the covid-19 pandemic thanks to effective containment measures, a well-functioning health system and high vaccination rates. It was again growing fast until before Russia's aggression in Ukraine (Figure 1.4). Output reached the pre-pandemic level already in early 2021 (Table 1.1). Economic activity remained solid in the first quarter of 2022, led by exports and housing investment and despite waning confidence and the outbreak of the war in Ukraine. Real GDP weakened however in the second quarter, contracting by 0.5% compared to previous quarter. Consumer confidence tumbled with the resurgence of COVID-19 cases in early 2022 and surging energy prices, but fast wage growth and some unwinding of savings prevented a larger contraction of private consumption. The unemployment rate had been gradually declining from a peak of around 9% in mid-2020 to 5.3 % in the second quarter of 2022, below its pre-crisis level. Fiscal policy has become expansionary, following a revised draft budget presented in April (see fiscal section).

Consumer price inflation exceeded 22% in September 2022, the second-highest in the euro area, amidst soaring energy and food prices and, to a lesser extent, housing prices. Inflation would have been even higher if the government had not put a ceiling on energy price hikes. Relatively high energy intensity of the economy, energy inefficiency particularly in the housing sector (heating costs) and an excessive reliance on oil and gas – accounting for almost 80% of total energy production – account for the outsized impact of the energy price surge on headline inflation (Blöchliger and Strumskyte, 2020[2]). The comparatively large share of food purchases in the Lithuanian consumption basket works in the same direction. Strong domestic demand has facilitated the pass-through of cost increases to the prices of consumer goods and services, pointing at intensifying underlying price pressures. Export prices are rising more slowly than those of domestic inputs, suggesting that profit margins of export-oriented firms are being squeezed. Despite strong nominal wage growth, real wages started to decline from end 2021, keeping the risk of a wage/price spiral at bay so far. Even so, the high inflation rates point to the need for fiscal measures to mitigate the effect on domestic inflation of the European monetary policy stance calibrated for the euro area as a whole.

The economy is projected to slow to 1.6% in 2022 and 1.3% in 2023, affected by declining trade and increased uncertainty as the war in Ukraine, to which Lithuania is more exposed than most other OECD countries, takes its toll (Table 1.1). Investment, however, will gather pace during the projection period, supported by an inflow of EU funds and the government's multi-year investment programme in several key areas. Lithuania will receive about 4.5% of 2020 GDP from the EU Recovery and Resilience Facility, around a third of which are expected to be spent by 2023. Headline inflation will decline but remain high due the EU embargo on Russian oil to take effect in 2023. Real wages will continue falling, albeit at a

slower pace. The unemployment rate will rise because of the slowdown, although large skills shortages will keep labour market conditions tight.

Figure 1.4. The war in Ukraine has undermined an otherwise strong recovery



Note: Panel D, inflation data for September are provisional. Panel F, annualised rate on loans of less than, or equal to, 1 million euros to non-financial corporations (excluding revolving loans and overdrafts, convenience and extended credit card debt).
Source: OECD, National Accounts database; OECD, Main Economic Indicators database; OECD, Consumer Price Indices database; and ECB, MIR – MFI Interest Rate Statistics.

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Table 1.1. Macroeconomic indicators and projections

	2018	2019	2020	2021	2022	2023
	Current prices (EUR billion)	Percentage changes, volume (2015 prices)				
GDP at market prices	**45.5**	**4.6**	**0.0**	**6.0**	**1.6**	**1.3**
Private consumption	28.0	2.7	- 2.4	8.0	2.1	2.1
Government consumption	7.5	- 0.3	- 1.4	0.9	0.7	0.3
Gross fixed capital formation	9.5	6.6	- 0.2	7.8	2.7	3.8
Final domestic demand	45.0	3.0	- 1.8	6.6	2.0	2.1
Stockbuilding[1]	- 0.3	- 1.6	- 1.8	- 0.3	- 0.2	0.0
Total domestic demand	44.7	1.5	- 3.8	7.3	2.0	2.0
Exports of goods and services	34.2	10.1	0.4	17.0	4.5	3.3
Imports of goods and services	33.4	6.0	- 4.5	19.9	5.0	4.0
Net exports[1]	0.8	3.2	3.5	- 0.3	- 0.2	- 0.6
Memorandum items						
GDP deflator	_	2.7	1.8	6.5	15.1	7.6
Harmonised index of consumer prices	_	2.2	1.1	4.6	17.6	10.4
Harmonised index of core inflation[2]	_	2.3	2.6	3.4	9.8	7.8
Unemployment rate (% of labour force)	_	6.3	8.5	7.1	5.8	6.5
Output gap (in % of potential GDP)	_	2.1	- 1.4	0.8	- 0.5	- 1.7
Household saving ratio, net (% of disposable income)	_	- 0.2	9.0	3.9	1.6	3.4
General government financial balance (% of GDP)	_	0.5	- 7.3	- 1.0	- 4.2	- 3.6
Underlying primary fiscal balance (% of potential GDP)	_	0.6	- 5.9	- 0.8	- 3.9	- 3.1
General government gross debt (% of GDP)	_	44.5	55.5	51.4	52.8	55.1
General government debt, Maastricht definition[3] (% of GDP)	_	35.8	46.6	44.3	45.8	48.1
Current account balance (% of GDP)	_	3.4	7.6	1.2	-4.5	-4.7

1. Contributions to changes in real GDP, actual amount in the first column.
2. Harmonised index of consumer prices excluding food, energy, alcohol and tobacco.
3. The Maastricht definition of general government debt includes only loans, debt securities, and currency and deposits, with debt at face value rather than market value.
Source: OECD Economic Outlook No. 111 database (updated).

The projections are subject to substantial uncertainty against the backdrop of the war in Ukraine and the sanctions on Russia (Table 1.2). Despite gradual decoupling over the past decade, Russia remains one of Lithuania's most important trading partners, with Russia accounting for 11% of total goods exports and 12% of total imports in 2021 although re-exports make up a large part of that trade. Before Lithuania stopped importing all types of energy from Russia in spring 2022, its dependence on Russian energy was considerable, with 42% of natural gas and 73% of crude oil coming from Russia in 2020. Liquefied gas imported through the liquefied natural gas (LNG) terminal in Klaipeda is expected to bridge gas shortages until the end of the year. More severe sanctions on Russia and supply disruptions could dent growth further. Against this background, it is important to remain vigilant with respect to energy security and diversification.

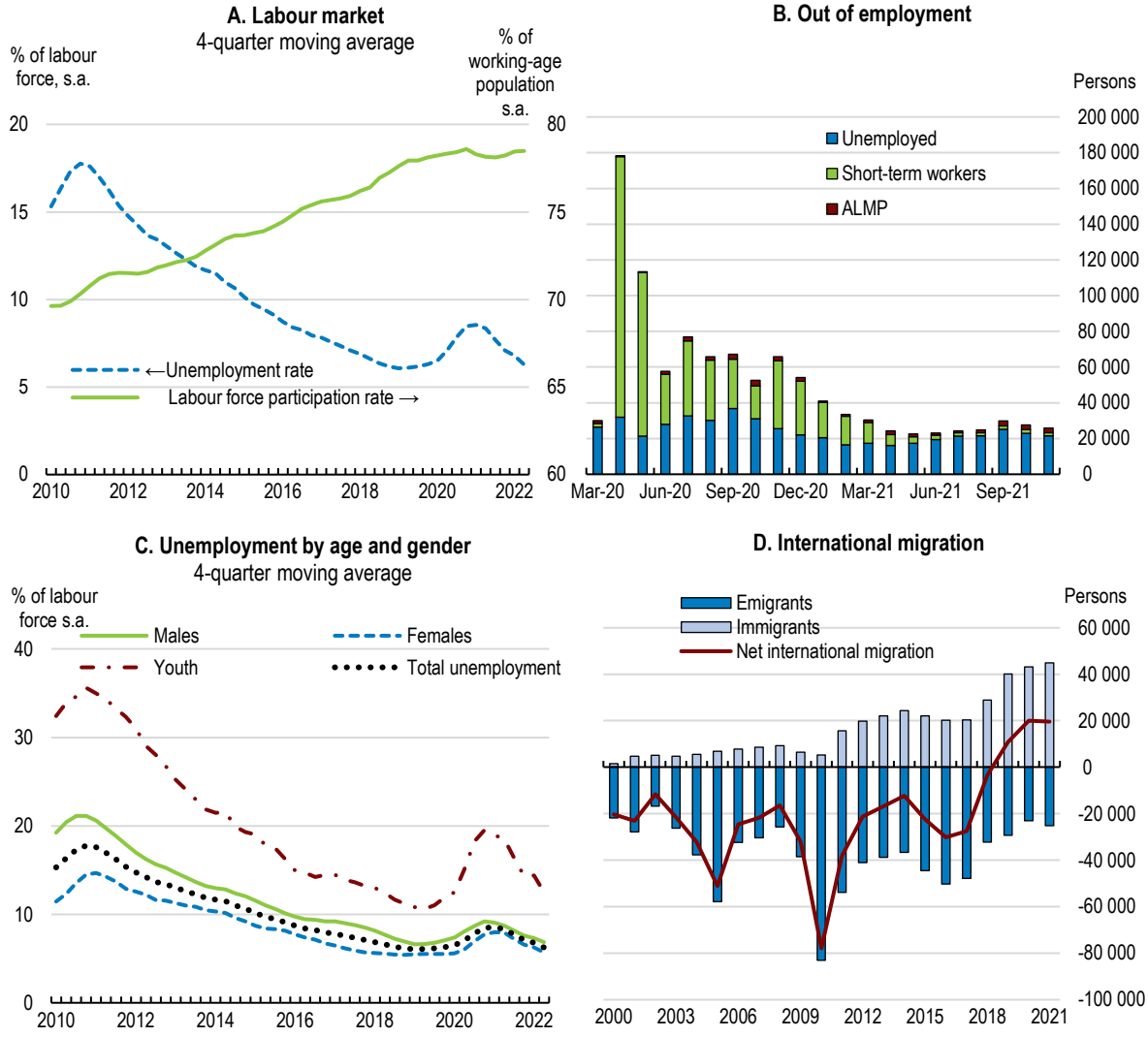
Table 1.2. Events that could entail major changes to the outlook

Shock	Potential economic impact
Global energy supply disruptions	Disruptions in global energy markets could lead to energy prices rising further, declining real household income and disruptions in energy-intensive sectors.
New pandemic wave	A new Covid-19 variant could affect the health status of the population – even if vaccinated - and hurt the economy.
Financial market turbulence	An increase in non-performing loans and a sharp correction in housing markets could cause financial duress.

The labour market is recovering, but structural unemployment remains an issue

The labour market withstood the pandemic well, partly thanks to well-targeted government support (Figure 1.5). Unemployment stood below 7% in early 2022. The unemployment gap between men and women – unemployment has been traditionally higher for men – narrowed further during the pandemic and has virtually disappeared. The young, often working in contact-intensive service sectors, were disproportionally affected by pandemic-induced unemployment, and even though the gap is declining, youth unemployment remains above average. The short-term work scheme helped sustain most firms and jobs during shutdowns and other pandemic-related measures. When it was discontinued in 2021, unemployment hardly changed, pointing to an appropriate balance between the unemployment scheme protecting people and the short-term work-scheme protecting jobs (Giupponi, Landais and Lapeyre, 2021[3]).

Figure 1.5. The labour market is recovering



Note: Panel B, ALMP stands for active labour market policy.
Source: Eurostat, Labour Force Statistics; Statistics Lithuania; and Ministry of Social Security and Labour.

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Lithuania's labour market is flexible, adapting to evolving challenges, as documented in the 2018 OECD Economic Survey (OECD, 2018[1]). Workers are transiting from old to new jobs more rapidly than in most other OECD countries, contributing to the productivity and efficiency of Lithuanian firms and to cost competitiveness (Causa, Luu and Abendschein, 2021[4]). Labour market flexibility helps workers, especially young people entering the labour market, seizing better job opportunities and reducing wage inequalities, which might prove useful during the pandemic-induced structural shifts in the economy. Labour market participation continued to expand even during the pandemic, driven by a rising retirement age and rising immigration of skilled workers, both foreigners and returning Lithuanians. The spectacular turn in net migration over the past few years has likely been driven by rapidly rising living standards in Lithuania; a more welcoming immigration policy especially for high-skilled workers; an improving social climate; and the impact of Brexit, with many emigrants returning to their home country (Figure 1.5, Panel D).

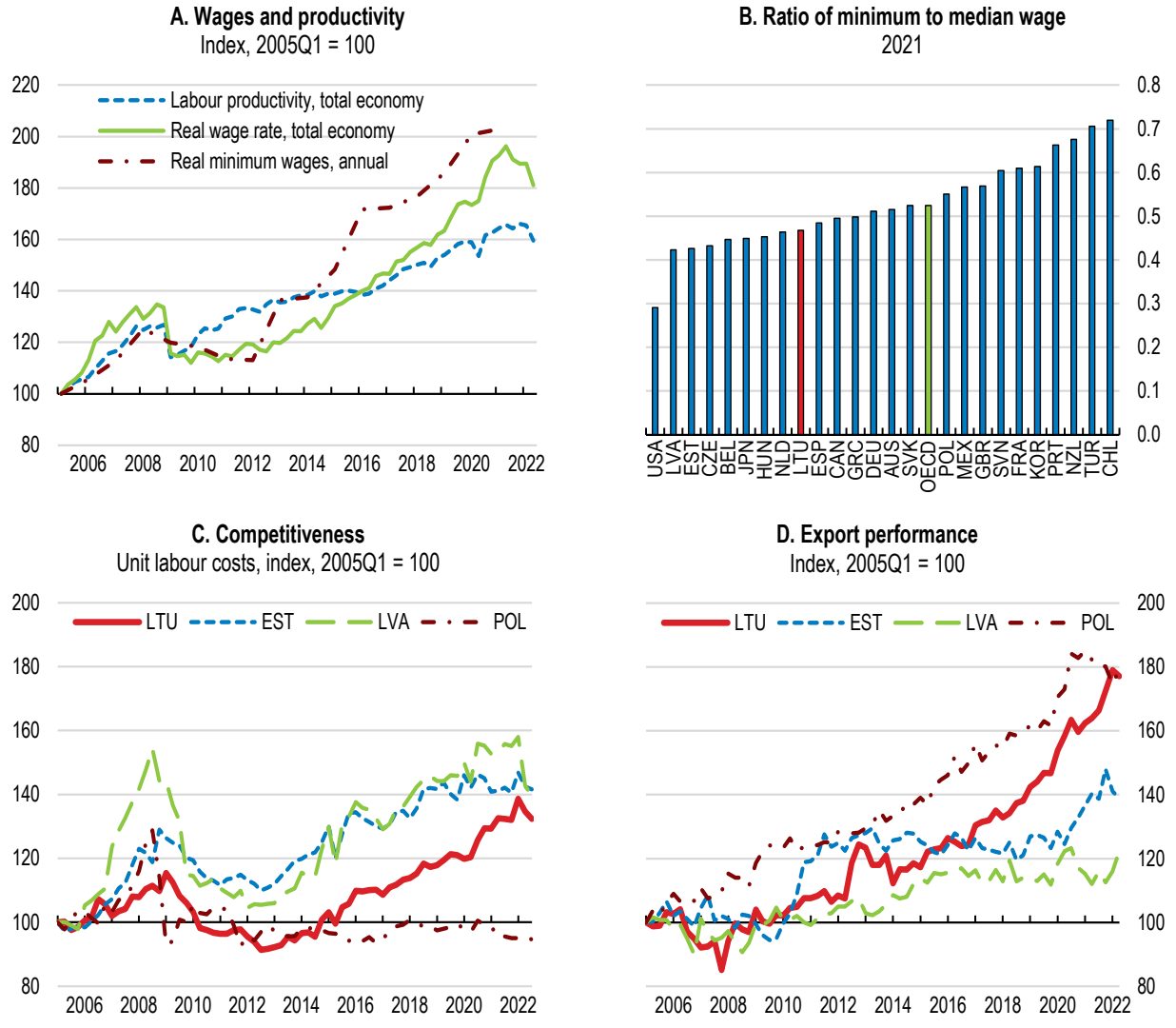
Persistently high structural unemployment remains a salient feature of Lithuania's labour market, though. Structural unemployment is estimated at around 6.5%, higher than in the surrounding countries and barely declining. According to the central bank, the relationship between vacancies and unemployment ("Beveridge curve") has worsened during the pandemic, suggesting that the mismatch between available jobs and jobseekers has become even more acute. Labour market mismatch is largely driven by high skills mismatch - with many workers either under- or overqualified - and skills shortages, with high-skilled job offers often remaining unoccupied while low-qualified workers have difficulties in finding jobs. Against this background, Lithuania's structural unemployment issues should be addressed by a framework that attracts, develops, upgrades and retains skills and brings them closer to labour market needs.

Competitiveness is declining

Lithuania's competitiveness has declined vis-à-vis the OECD average, as measured by unit labour costs, although export performance – a measure for price and quality competitiveness - has improved (Figure 1.6). Lithuania's labour productivity growth has accelerated to above the EU28 average but remains below leading European Union members or Central and Eastern European countries (National Productivity Board, 2020[5]). Aggregate real wages have consistently outpaced productivity since 2010, and the competitiveness gains achieved after the 2009 crisis are exhausted by now. Minimum wages accelerated even more, especially in the first half of the decade, with a potentially uneven impact on high- and low productivity regions in Lithuania, as shown in the 2020 OECD Economic Survey (OECD, 2020). Rising minimum wages likely helped reduce wage inequality and poverty, though. Moreover, the share of labour compensation in the total economy remains below that of the other Baltic countries.

Growing wage pressure in the wake of rising inflation could dent competitiveness further. Productivity differences across sectors are large, and wage growth has exceeded productivity growth in most sectors over the past decade (Figure 1.7). Differences are particularly marked between the tradeable and the domestic sector, albeit with exceptions. The wide differences in productivity contrast with the narrower differences in wages. This pattern is typical for a small open and converging economy where wages are largely determined by the export sector, spilling over to the domestic sector where they are absorbed by either lower profit margins or higher prices. Imbalances would emerge if wage growth started to exceed productivity in the tradeable sector. Against this background, the way forward to avoid imbalances and further losses of competitiveness is to support productivity growth in both the tradeable and non-tradeable sectors through higher public and private investment, digitalisation, and reforms in the public sector, especially in education to better match skills to labour market needs.

Figure 1.6. Competitiveness is declining



Note: Panel A, wage growth is adjusted for income tax reform in 2019. Panel C, rising unit labour cost means declining competitiveness. Panel D, export performance reflects the growth of a country's export markets compared to that of all other countries.
Source: OECD, Labour Force Statistics; OECD Economic Outlook No. 111 database (updated); and OECD, National Accounts database.

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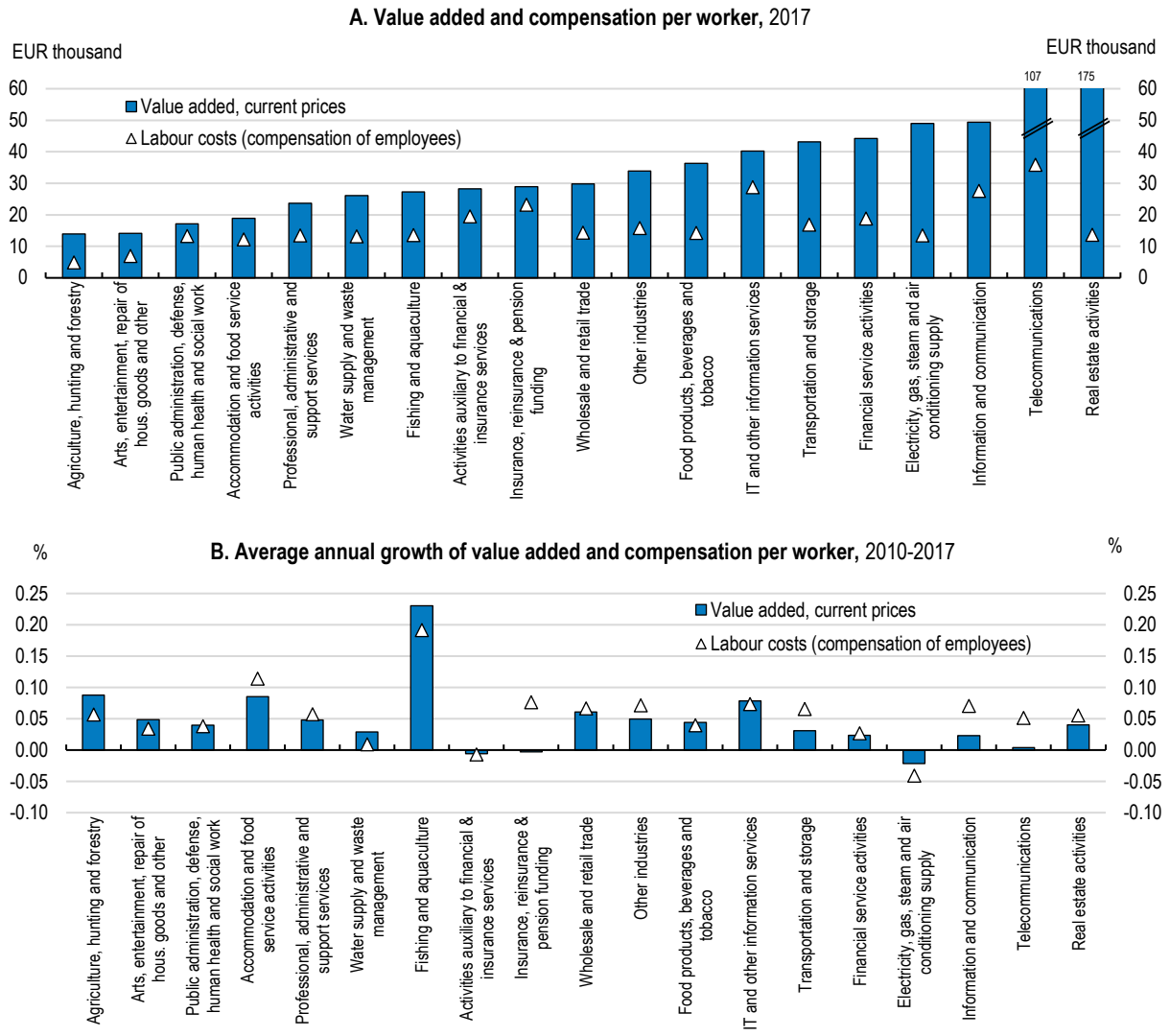
Figure 1.7. Productivity differs widely across sectors, but wages less so



Source: OECD Structural Analysis (STAN) database.

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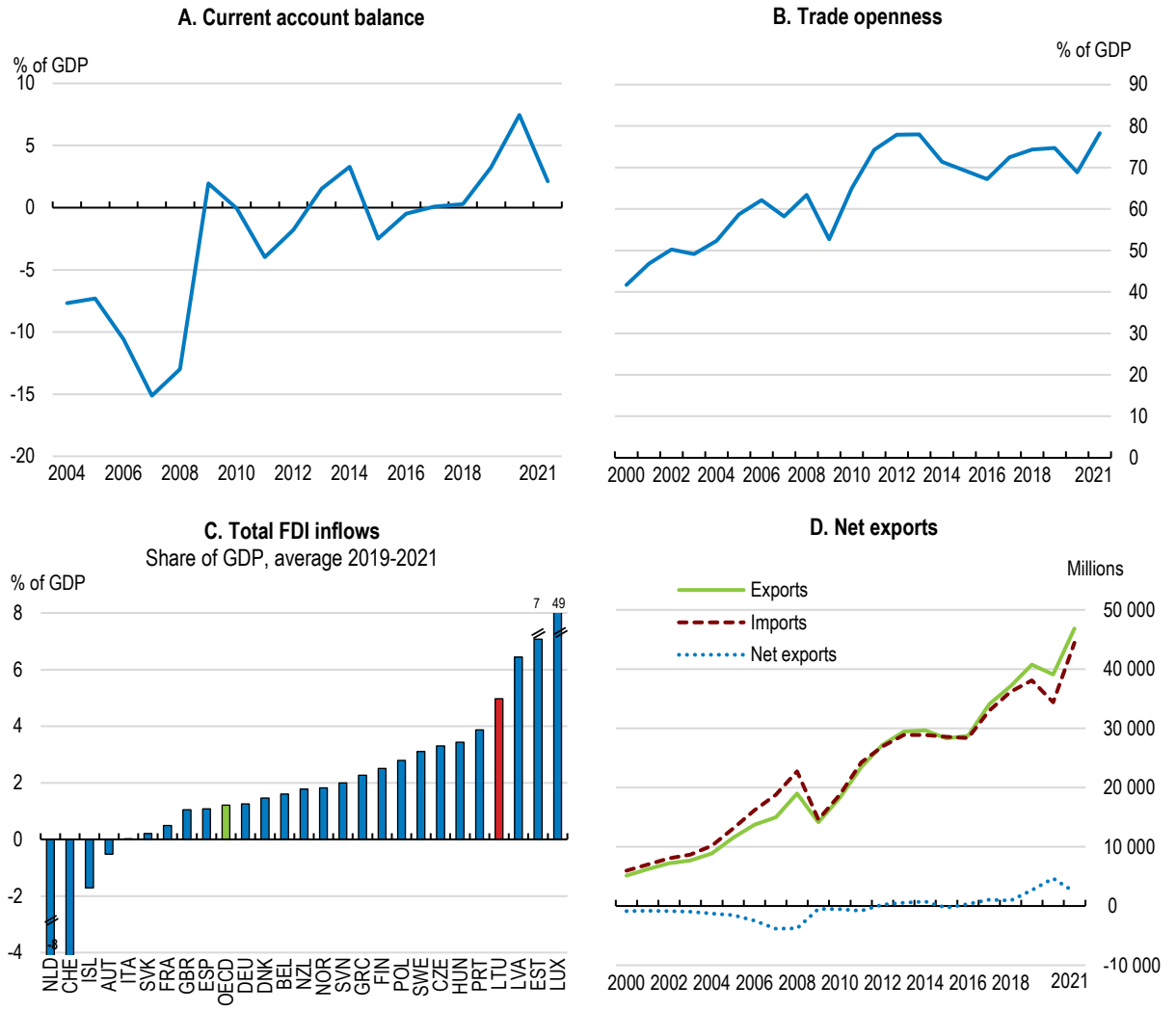
External positions are sound

The current account surplus and net exports increased in 2020 as demand for Lithuanian goods and services withstood the pandemic-related restrictions (Figure 1.8, Panel A). The only export sector that suffered severely was international tourism – although it makes up a small a part of GDP - and transport services following disruptions in trade between Eastern and Western Europe. Foreign direct investment (FDI) has been expanding rapidly over the past few years, although the FDI stock remains low compared to other Eastern European OECD countries since an important activity of international firms in the past – setting up service centers - required little capital spending (OECD, 2018[1]). While trade openness declined a bit during the pandemic, Lithuania remains highly open to the world (Panel B). The war in Ukraine will impact both exports and imports, including international transport services, thereby reducing openness.

Figure 1.8. External positions are sound



Source: OECD, Balance of Payments statistics; OECD, National Accounts database; OECD, FDI Statistics; and OECD, Main Economic Indicators database.

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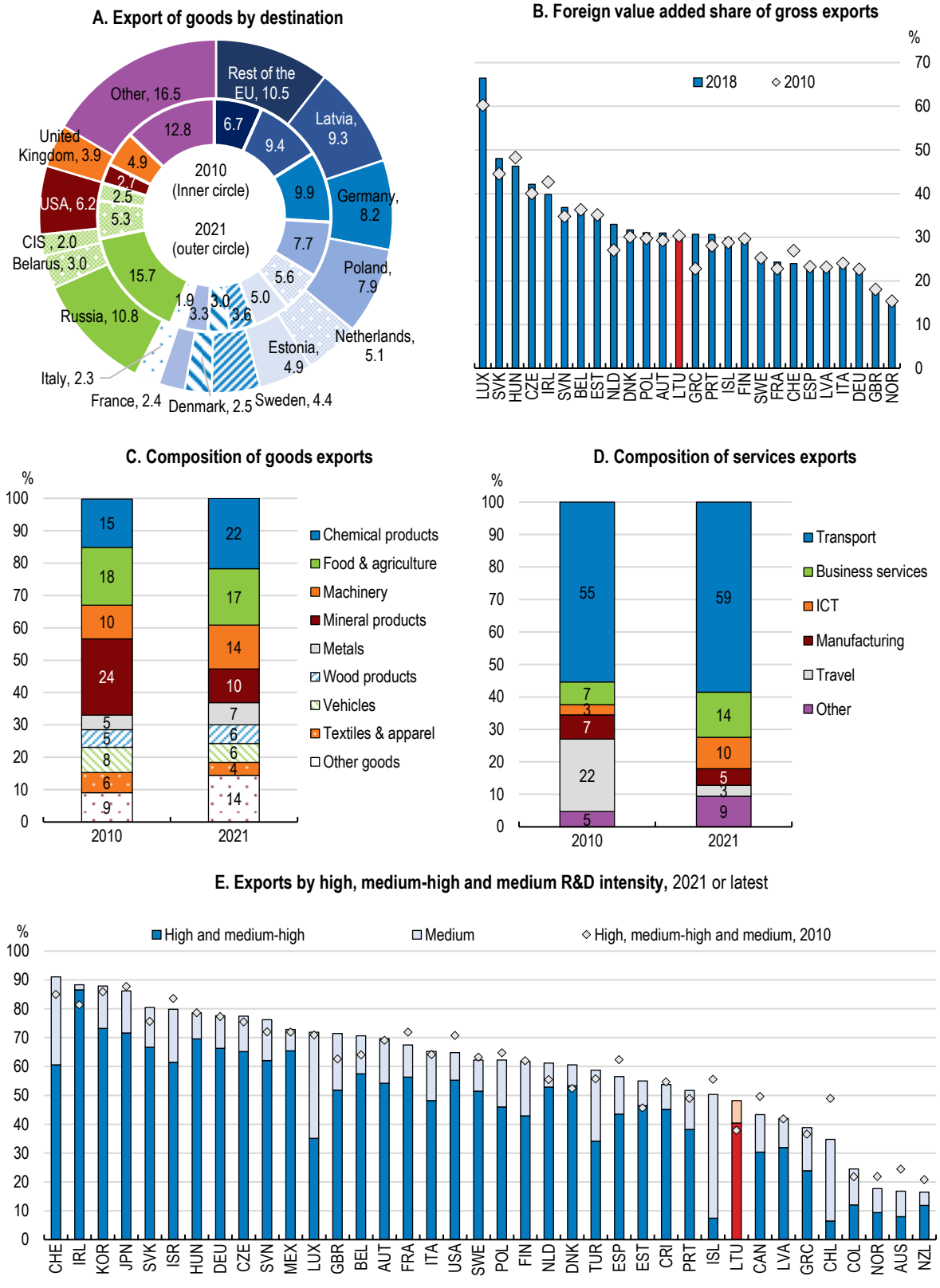
The destination of exports has changed considerably over the past decade or so, and Lithuania's integration into global value chains has deepened (Figure 1.9). While Russia and other Commonwealth of Independent States countries made up more than 27% of goods exports in 2010 (and almost 100% in 1991), their share has declined to less than 23% by 2020. At the same time, exports to the United States rose from 2.7% to 4.4%. Asia also has become more important, with mainland China's share growing from 0.7% in 2010 to 1.2% in 2020 and Chinese Taipei's from 0.1% to 0.2%. An officially undeclared embargo of China on trade with Lithuania over a name dispute involving Chinese Taipei seems to have had little impact except for switching trade flows towards alternative markets, particularly South-East Asia and the United States. Lithuania increased the share of medium- and high-technology exports by more than any other OECD country, albeit from a relatively low baseline. While the country has become a cutting-edge exporter in life science, laser technology and some ICT sectors, the large share of transport services and agricultural products still weighs on domestic value-added. Since a higher export share and integration in global value chains is associated with firms becoming more resilient and productive (see thematic chapter), policies should help improve competitiveness of all sectors including transport and agriculture.

Figure 1.9. The composition of exports and their destination are evolving



Source: Statistics Lithuania; WTO, International Trade Statistics; and OECD Structural Analysis (STAN) database.

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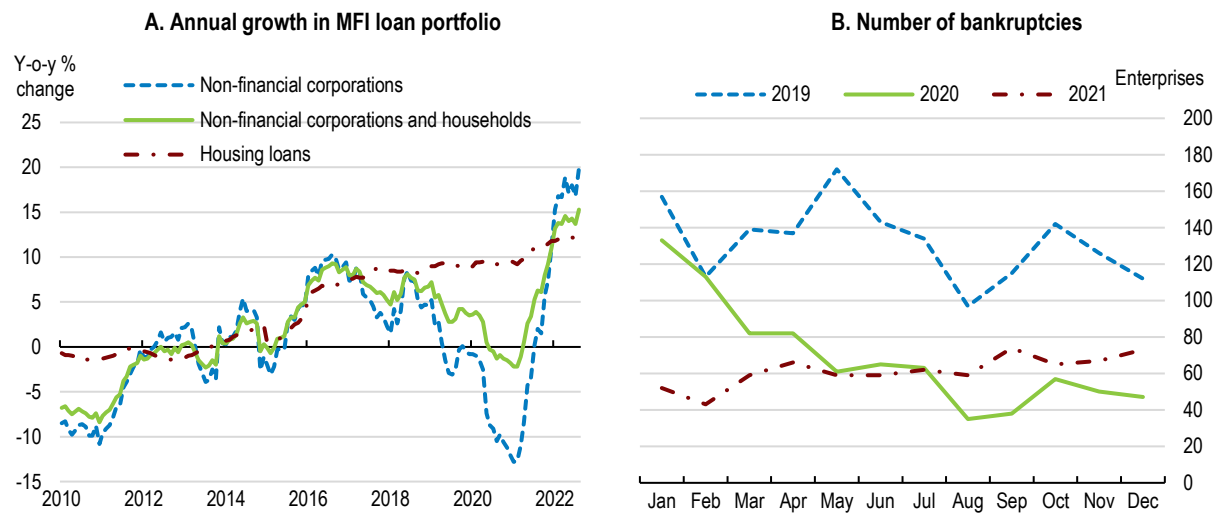
The large transport sector has economic and environmental implications. While transport is by far Lithuania's single most important service export, its technology content and value-added is relatively low. Moreover, the European Union's mobility package, putting limits on free carriage, risks affecting Lithuania's transport companies which operate mainly across Europe, rarely touching Lithuanian soil. In addition, the east-west goods corridor could be subject to severe disruptions following the war in Ukraine and the sanctions on Russia. Finally, transport is the main driver of Lithuania's high carbon emissions and air pollution. Against this background, Lithuania should strive for a rapid completion of the Rail Baltica project which will improve productivity of the transport sector, strengthen Lithuania's international transport hub position between Western and Northern Europe and help reduce carbon emissions.

The financial system looks sound

The financial system seems profitable, well capitalized and liquid. It has remained remarkably stable during the pandemic, with no apparent signs of imbalances. A robust and timely policy response helped provide liquidity to households and firms throughout the pandemic (OECD, 2020[6]). Household credit continued to grow almost unabated, while corporate credit took a hit and started to recover in the second half of 2021 only (Figure 1.10). As firms have deleveraged for years, corporate balance sheets look healthy, and insolvencies actually declined during the pandemic. Direct exposure to Russia is very small. The central bank tightened financial policies somewhat in early 2022 as the situation was normalising and some signs pointed at the housing market starting to overheat. In the absence of further pandemic-related restrictions to economic activity and given the potential emergence of financial imbalances, policies should help preserve the long-term resilience and stability of the financial system.

Figure 1.10. Credit growth has largely returned to trend and bankruptcies have been low



Source: Bank of Lithuania; and Statistics Lithuania.

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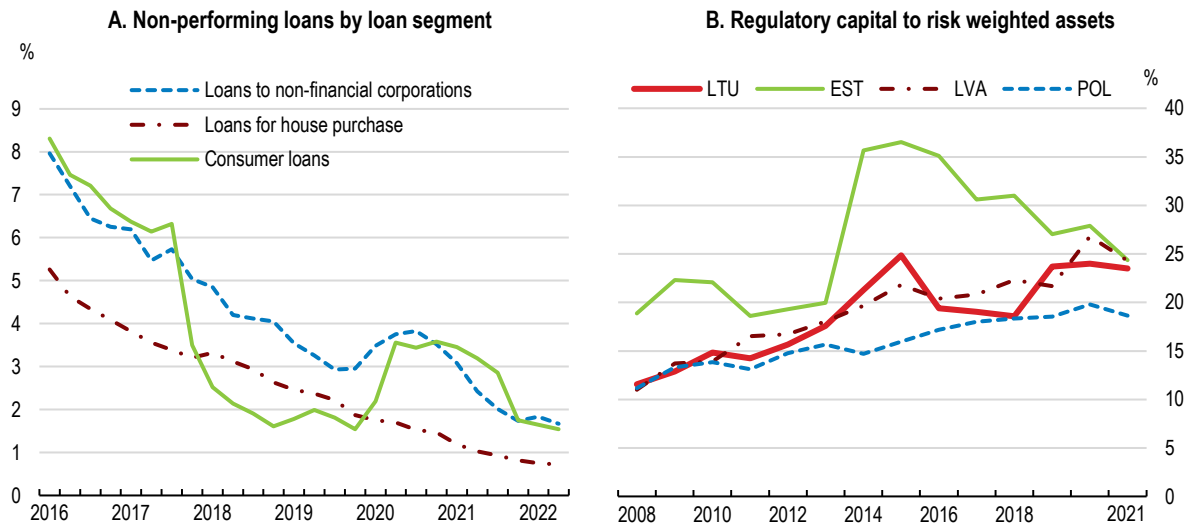
Banks seem well funded, but market concentration remains an issue

The banking sector looks financially sound. Capital adequacy ratios are well above the required minimum. The share of non-performing loans continued to decline during the pandemic despite a small surge of non-performing corporate and consumer loans. In April 2020, the central bank reduced the counter-cyclical

capital buffer from 1% to 0%, where it has remained since, but introduced a sectoral systemic risk buffer of 2% for domestic mortgage loans in early 2022. Buffers should continue to be rebuilt through targeted macro-prudential tools or a rise in the counter-cyclical capital buffer if signs of persistent imbalances in particular sectors start to emerge, or macroeconomic risks materialize. The effectiveness of such levers could be limited, however, as liquidity and capital levels are well above current requirements (International Money Fund, 2021[7]) and a large share of housing purchases is financed through savings. In addition, macro-prudential tools could have an asymmetric impact across income groups and regions within Lithuania.

Figure 1.11. Banks are well capitalised



Source: Bank of Lithuania; and IMF, Financial Soundness Indicators.

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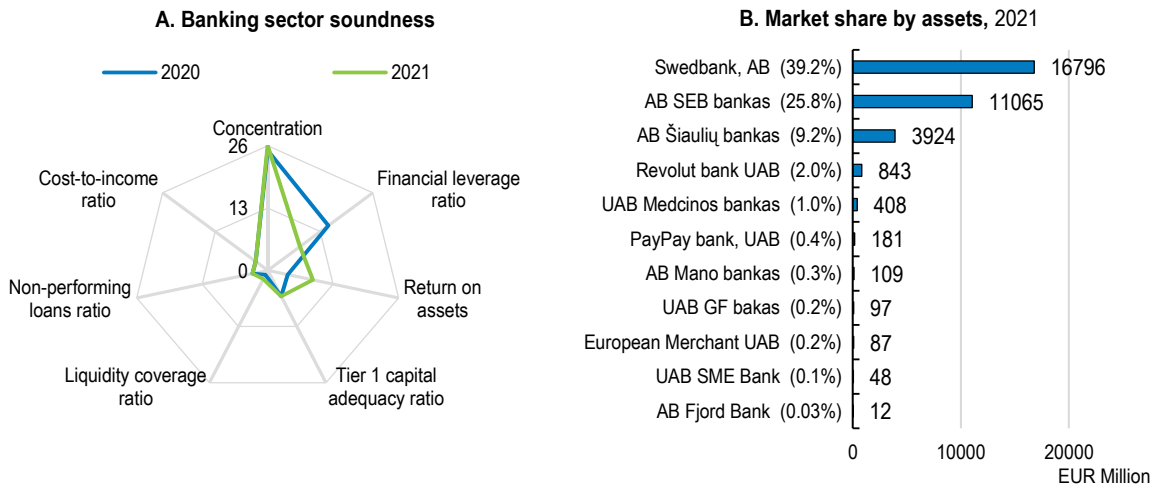
Lithuania's banking sector remains highly concentrated and foreign-owned, with the three largest banks accounting for around 75% of overall assets (Figure 1.12). However, new financial institutions have sprung up since 2018, currently making up around 4% of assets and strengthening competition especially in payments and the consumer credit segment (Bank of Lithuania, 2021[8]). Lending to SMEs has recovered and the number of rejected loan demands has declined. Moreover, the share of SME lending from the non-banking sector, including crowdfunding, is increasing, suggesting that the credit market is gradually becoming more competitive and diverse.

A national investment fund (NPI) was legislated in 2019 and is currently being set up. Its purpose is to finance sustainable investment - in both the public and private sector - thought to be strategically important for the Lithuanian economy. The NPI is to consolidate four existing public investment funds and help harmonise investment strategies, financing models and risk management, thereby increasing leverage considerably. The NPI is expected to become operational by 2023. As recommended in the previous OECD Economic Survey, a rigorous governance framework is essential to avoid risky loans and the crowding-out of private finance (OECD, 2020[6]).

The authorities continue to step up anti-money laundering and counter-terrorist financing (AML/CTF) efforts and have substantially increased resources devoted to this end. As a result, the MONEYVAL expert group has rated Lithuania "largely compliant", up from "partially compliant" (Moneyval, 2021[9]). Over the past two years, the central bank has been requiring more frequent and detailed AML/CTF data reporting

and has increased the number of inspections. In May 2021, the Centre of Excellence in Anti-Money Laundering - a public-private partnership involving several government agencies, the central bank and commercial banks - started its activities. The centre acts as a platform for information exchange, research to improve the AML/CT framework and assistance to private sector entities in conducting internal risk assessments.

Figure 1.12. The banking sector is highly concentrated



Note: In Panel A, indicators reflect the ranking position in the European Union, with lower score indicating comparatively better performance, and higher score indicating comparatively worse performance.
Source: Bank of Lithuania.

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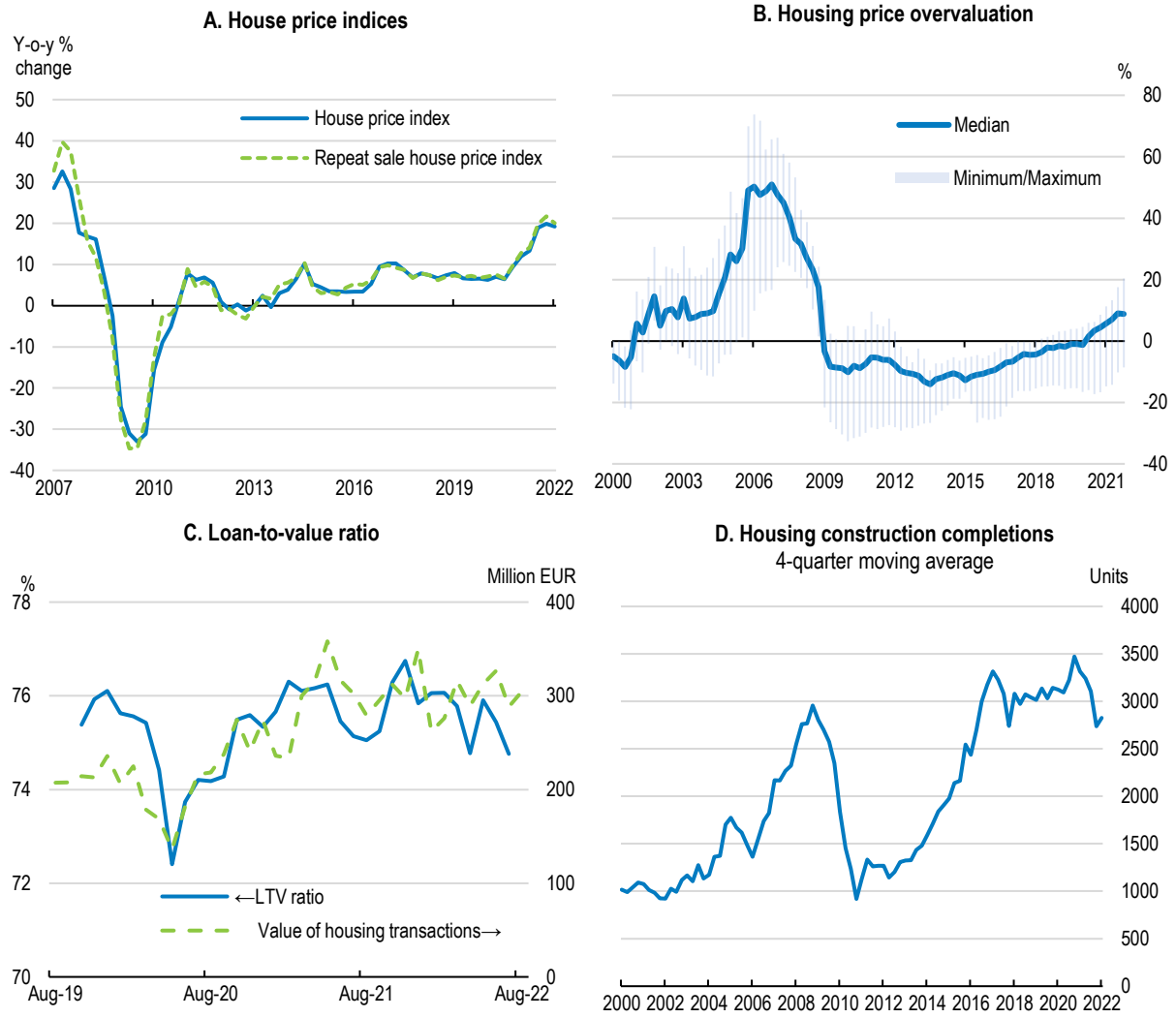
The housing market has been booming before the war

The housing market has continued to boom during the pandemic, and house prices have been rising fast before the war in Ukraine (Figure 1.13). Rapidly rising household income and credit, growing immigration including Ukrainian refugees and changing preferences for housing outside urban centres are among the reasons for high and rising housing demand. Surveys suggest that teleworking is set to endure, contributing to higher housing demand. Expectations of further house price hikes also seem to play a role. The phenomenon is broad-based, with prices rising in almost all parts of the country and for all types of housing. Construction remains strong, reflecting a relatively flexible housing market, although it recently declined in the capital area. Despite their upward trend, house prices seem to remain largely in line with fundamentals.

Against this backdrop, the central bank has taken several macro-prudential measures. The central bank has recently reduced the loan-to-value ratio for second loans from “less than 85%” to 70% and has introduced a systemic risk buffer of 2% for domestic mortgage loans. In the future, the central bank plans to address risks, if needed, with additional tools depending on the nature of developments on the housing market. Further tightening the macroprudential stance may be warranted should housing market developments start posing a risk to the financial system. To support the central bank in this area, the government could broaden the immovable property tax base, since a higher share of property tax in GDP is associated with less house price volatility (Blöchliger et al., 2015[10]).

Figure 1.13. The housing market has been booming



Note. In panel B, house price overvaluation is the median of six sub-indicators that assess sustainability of house prices: house price-to-income ratio; house price-to-rent ratio; HP-filtered nominal and real house price index; an indicator based on a disequilibrium model capturing the imbalance between fundamental and observed house prices; and a panel model estimating house prices and evaluating their deviation from market equilibrium prices. Vertical bars reflect the dispersion between minimum and maximum values of the six sub-indicators.
Source: Statistics Lithuania; and Bank of Lithuania.

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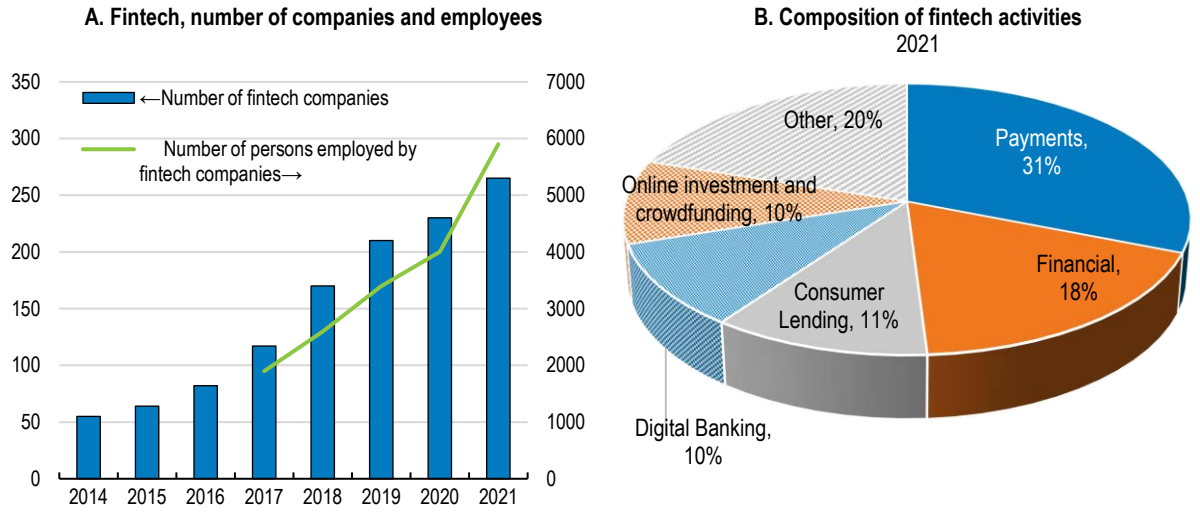
The Fintech sector is expanding fast

Lithuania's financial technology sector (fintech) has become one of the largest in the European Union, having grown by 20% annually since 2016. By the end of 2021, it counted around 265 firms – both domestic and foreign - and 5 900 employees or around 0.4% of the labour force (Figure 1.14). Fintech started to take off in 2016 when several government institutions, including the central bank and the Ministry of Finance, implemented a coordinated strategy with a view to address excessive concentration and lack of competition in banking. A supportive regulatory framework with a transparent and well-communicated toolkit – including a regulatory sandbox, a blockchain sandbox and an enabling regulatory and licencing regime – helped the sector grow beyond traditional banking, now covering digital payment systems, crowdfunding and investment platforms, peer-to-peer lending platform operators, digital currencies and fast data analysis.

Figure 1.14. The fintech sector is rising fast



Source: Bank of Lithuania, and Invest Lithuania.

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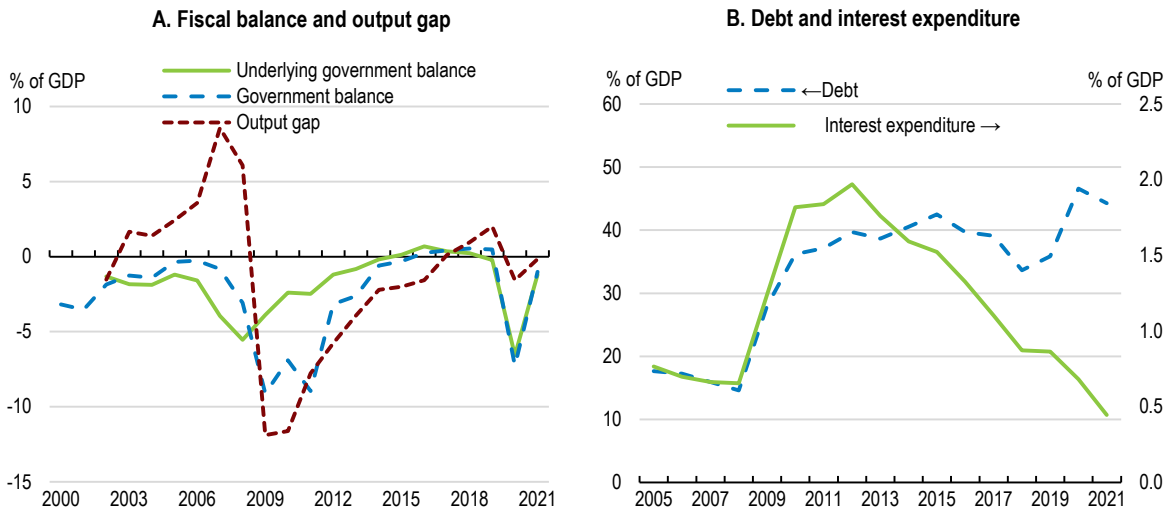
The authorities are well aware of the need for rigorous fintech supervision, including the AML/CFT framework and the promotion of cybersecurity and cyber-insurance. They have defined fintech guidelines covering four areas: ensuring fintech sector growth and maturity; promoting the use of digital financial services; promoting and using technological innovations; and strengthening risk management. The authorities seem to be well prepared for further fintech expansion. They remain aware of reputational risks and take a rigorous supervisory and enforcement approach to maintain financial stability. A potential registration of online banks with a non-resident business model will create new supervisory challenges, while the issuance of a digital collector coin will help gain experience with new fintech technologies.

To maintain fintech's edge, the sector requires adequate regulation fostering competition and access to finance. While fintech innovations such as digital platforms tend to increase productivity, their beneficial effect for the economy depends on a functioning competition framework (Costa et al., 2021[11]). Fintech has been a boon to competition so far in Lithuania, yet the inherent characteristics of the sector can also make it prone to anti-competitive behaviour. Against this background, fintech should be more closely watched from the standpoint of access and barriers to entry. The financial market development center, established in the central bank in early 2022, is dedicated to attracting new financial services in Lithuania and strengthening competition in the banking sector.

Fiscal policy: prospects for consolidation

After reaching a small surplus in 2019, the balance fell sharply to -7.4% of GDP in 2020 before recovering in 2021 (Figure 1.15). Public debt rose from around 36% of GDP in 2019 to around 46% in 2021, still lower than in most OECD and EU countries. Pandemic-related support, in particular the comprehensive and well-funded short-term work scheme, has been driving fiscal positions: netting out all discretionary covid-19 measures, the structural balance would have settled at around -1% of GDP in both 2020 and 2021, suggesting a timely and appropriate deployment and withdrawal of support measures (Ministry of Finance, 2022[12]). As such, the fiscal stance was highly expansionary in 2020 and became contractionary in 2021.

Figure 1.15. The fiscal position improved until the end of 2021



Note: Panel A, underlying government balance in percent of potential GDP.
Source: OECD Economic Outlook No. 111 database (updated).

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The fiscal stance is becoming expansionary again in 2022. In early April the government presented a revised draft budget, allocating around 1.4% of GDP to help households and firms absorb energy price shocks, to increase energy efficiency and to diversify energy supply. A further 0.6% of GDP is dedicated to help Ukrainian refugees. To help households, pensions will be increased; the threshold for when the income tax kicks in will be lifted; and the means-tested heating compensation - increased already in December 2021 - will be expanded further to around 15-20 euro per month. Energy providers receive a compensation for lost revenue following capped energy prices for households. The programme is welcome, although it would be better to unwind energy price caps - as they tend to be costly and inefficient in the face of a supply shock - and increase targeted support to vulnerable households instead.

Before the war in Ukraine, the government had planned to return to the medium-term objective (structural deficit of minus 1% of GDP) rule by 2024, implying an improvement of the primary structural balance of around 1% per year. The stability programme 2022 published in May still echoes those targets. Various EU contributions planned to climb to around 3% of GDP annually will underpin public investment. Public debt was projected to remain at around 45% in 2024. Against the background of rising inflation and a still very expansionary euro area monetary policy stance, the government should tighten fiscal policy as originally planned to reduce demand, subject to additional support to vulnerable households and firms affected by the war and high energy prices.

Reforming the fiscal framework could strengthen sustainability

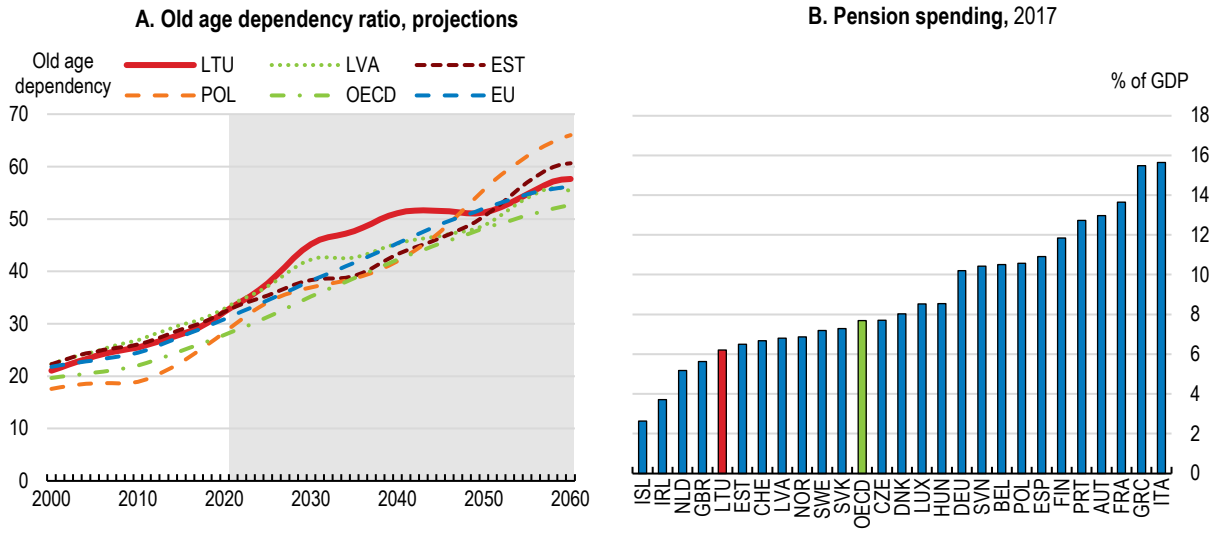
The fiscal framework has proved flexible during the covid-19 crisis, yet some institutional reforms could underpin the return to normal. The government is carrying out technical work to assess the possibility to introduce a debt target, which is welcome. Simplifying the budget balance rule – without amending its stringency - could also help make budgeting more predictable, as recommended in the previous OECD Economic Survey (OECD, 2020[6]). Finally, medium-term budget plans cover three years only, which is at the lower end of what is common in the European Union, and they should be extended to four or even five years to allow for better forward-looking fiscal policy. The government believes that amendments to the European Union's fiscal framework will affect the national rules and wants to align national reforms with supra-national changes.

Spending reviews can help improve the efficiency and impact of public spending and keep expenditure under control. Following a budget reform adopted in 2021, the government has established the framework for spending reviews, including the methodology and the unit carrying out the reviews, and plans to carry out comprehensive spending review soon. Spending reviews should become a routine part of the budget process, especially in areas like education or health care where they could considerably help improve spending effectiveness. Spending reviews are now commonly used in OECD countries as part of performance budgeting, and the government should take inspiration from best practice, e.g. in the Nordic countries, the Netherlands or the United Kingdom (OECD, 2019[13]).

The fiscal costs of an ageing population will rise

Lithuania's population is set to age rapidly (Figure 1.16). The old-age dependency ratio – the share of the population 65 years and older – is projected to almost double between 2020 and 2060. Past emigration of the young, as well as low immigration, contribute to ageing pressures, although the outlook has brightened recently with a spectacular turn in net migration. The old-age gender gap is one of the largest across the OECD: while women's life expectancy is around average, men's is among the lowest albeit rising rapidly. Older workers are well integrated into the labour market, but their incomes tend to be low and contributions to the pension system modest. The share of pension spending is one of the lowest in the OECD. The retirement age is currently rising by two months per year for men and four months for women until it will have reached 65 years for both sexes by 2026, maintaining pension sustainability so far.

Figure 1.16. Lithuania is ageing rapidly, putting pressure on pension spending



Note: The old age dependency ratio is the number of individuals aged 65 and more to the population aged between 15 and 64.
Source: United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019, Online Edition. Rev. 1; and OECD, Social Expenditure - Aggregated data.

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The government projects ageing-related fiscal costs, including for pensions, health and long-term care, to rise from 15.3% in 2019 to 17.6% of GDP in 2060 ((Ministry of Finance, 2021[14])). Spending on health and long-term care is expected to contribute around 1.3 percentage points of that increase, and pension spending another percentage point. The relatively modest rise of projected pension spending can be attributed to a commendable "sustainability indicator" – like a balanced budget rule – that limits expansion of pension benefits to the growth of the economy-wide wage bill. To maintain sustainability, especially in

the wake of several measures weakening the sustainability indicator, the government should consider establishing an automatic link between the retirement age and life expectancy beyond the year 2026, as recommended in the previous OECD Economic Survey ((OECD, 2020[6])) and as practiced in several other countries (Box 1.2). Longer -run developments in health and long-term care should also be assessed. Recently the government mandated the OECD to develop a framework to improve the sustainability and adequacy of the long-term care system.

Box 1.2. Linking the retirement age to life expectancy: country experiences

Automatically adjusting the statutory retirement age to life expectancy is arguably the most effective means to maintain both sustainability and adequacy of a pension system. An automatic - or parametric - rule tends to adjust the retirement age in a less erratic, more transparent and more equitable way across generations than discretionary or *ad-hoc* changes. Moreover, introducing automatic adjustment might come at lower political cost than discretionary pension reform. Since an automatic adjustment to life expectancy needs a broad political consensus to remain viable after a change in government, its implications must be carefully assessed and debated. Public support for an automatic rule may increase if voters perceive it to be fair.

Altogether seven OECD countries (Denmark, Estonia, Finland, Greece, Italy, Netherlands and Portugal) link the statutory retirement age to life expectancy, with somewhat different parameters. The link is fully automatic in those seven countries except in Denmark, where parliamentary approval is required to activate the adjustment. Denmark, Estonia, Greece and Italy link their statutory retirement age one-to-one to life expectancy, meaning that a one-year increase in life expectancy translates into a one-year increase in the statutory retirement age. This parameter is two-thirds in the other countries, which keeps the share of adult life that people can expect to spend in retirement roughly constant and might hence have a broader appeal. In the Netherlands 2019 Pension Agreement, social partners and the government agreed to apply a two-thirds automatic adjustment. Sweden is in the process of legislating an automatic two-thirds link.

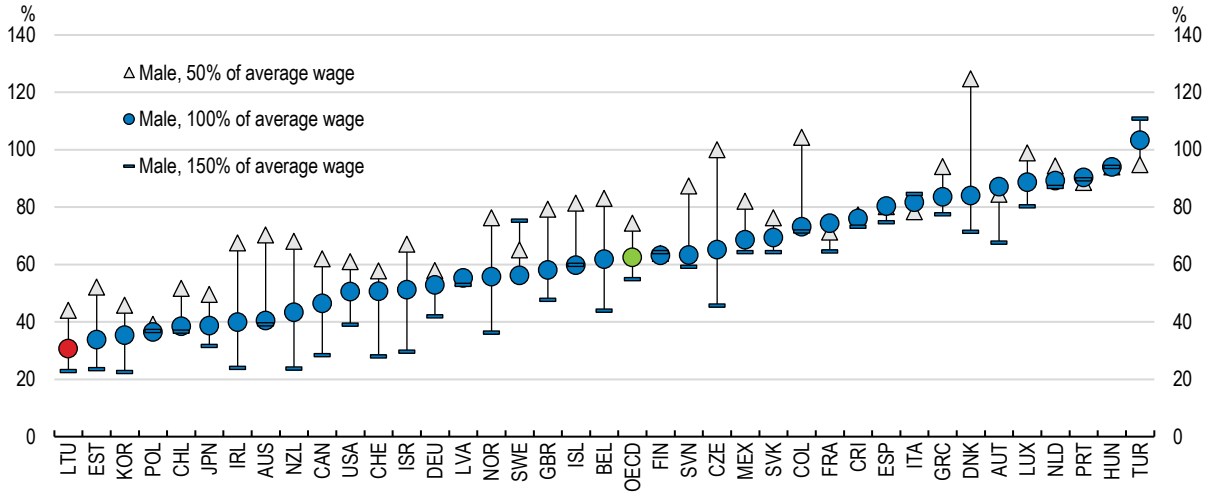
Source: (OECD, 2021[15]).

Although the pension system is quite redistributive – as replacement rates differ considerably between high- and low-income earners – it leaves many old people behind (Figure 1.17). Old-age poverty has increased over the past few years, often due to incomplete or informal work careers when Lithuania transited to a market economy, resulting in low pensions (the 2018 OECD Economic Survey provides an overview of the pension system). The government has reacted resolutely to the poverty challenge over the past two years, largely in line with the previous OECD Economic Survey recommendations (OECD, 2020[6]). First, the government raised benefits for pensioners with incomplete work careers; second, it increased social assistance pensions for those with low pensions; and third it will increase benefits for all if old-age poverty exceeds 25% and/or the current net replacement rate falls below 50%. However, options for early retirement were also extended, which weigh on the sustainability of the pension system, reduce work incentives and do little to reduce poverty. The measures, implemented from 2022, are expected to reduce the old-age poverty rate by around 2 percentage points overall.

Overall, Lithuania's long-term debt scenarios depend on the implementation of structural reform, including an automatic link between retirement age and life expectancy (Figure 1.18). In a baseline scenario with the primary balance kept at -0.5% of GDP, debt will remain roughly constant at around 50% of GDP. Ageing costs, however, will make debt unsustainable, with age-related spending rising by 3.5% points until 2060 (from 11.3% to 14.8% of GDP), against the 2.3%-point increase projected by the government. Implementing the structural reforms described in Box 1.3 would improve debt sustainability but still fail to stabilise debt in the long term. The fiscal recommendations would improve the budget balance. Reform progress in the financial and fiscal domain is shown in Table 1.3.

Figure 1.17. Very low pension replacement rates could undermine inclusiveness

Replacement ratios for different wage levels, males, 2020



Note: The net replacement rate is the individual expected net pension entitlement divided by expected net pre-retirement earnings for a person having entered the labour market in 2020, taking into account personal income taxes and social security contributions paid by workers and pensioners.
Source: OECD, Pensions at a Glance 2021.

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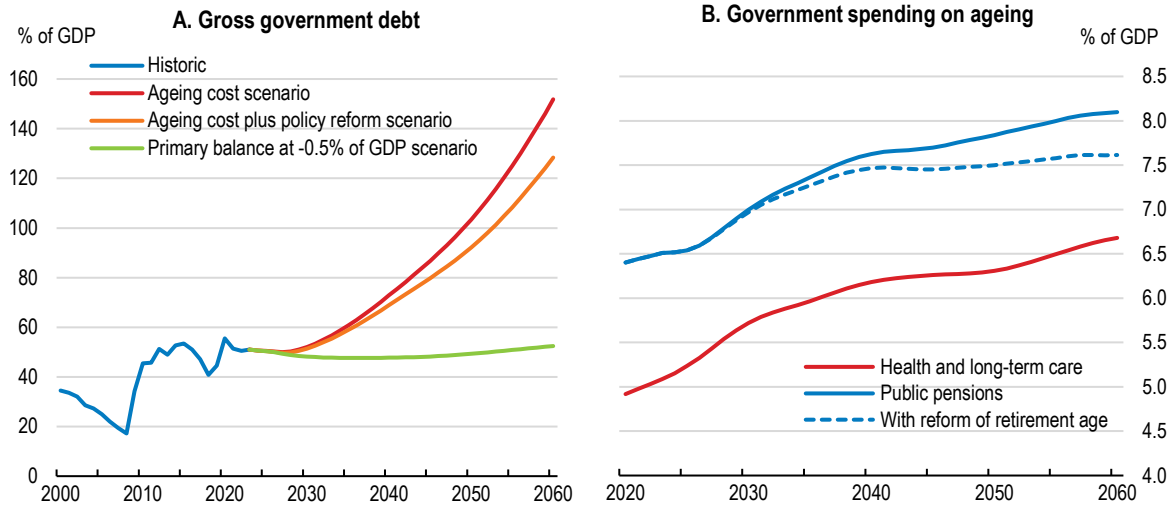
Figure 1.18. Ageing cost could make debt unsustainable



Note: Debt projections until 2026 follow the fiscal plan as published in October 2021. The baseline scenario assumes a primary balance of minus 0.5% of GDP and the age structure of the population remaining the same. The "ageing cost scenario" adds public health, long-term care and pension spending obligations on top of the baseline scenario. The "ageing cost plus policy reform scenario" reflects the positive growth effects of reforms shown in Box 1.5, subtracted from the ageing cost scenario. Based on Guillemette et al. (2017).
Source: OECD Economic Outlook No. 111 database; and OECD calculations.

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Box 1.3. Quantifying fiscal policy recommendations

The following estimates roughly quantify the fiscal impact of selected recommendations within a 5-10 year horizon, using simple and illustrative policy changes. The reported effects do not include behavioural responses and growth effects.

Table 1.3. Illustrative fiscal impact of recommended reforms

Policy measure		Impact on the fiscal balance, % of GDP
Deficit-increasing measures		
Innovation	Increase direct financial support from 0.025% to 0.1% of GDP (OECD average)	-0.1
Deficit-reducing measures		
Retirement age	Establish an automatic link between the retirement age and life expectancy beyond 2026	0.5
Value-added tax rates	Raise the VAT rate for accommodation and restaurants from 9% to the standard rate of 21%	0.3
Total fiscal impact		0.7

Table 1.4. Past recommendations and actions taken in financial and fiscal policies

Recommendations	Action taken
Simplify the fiscal framework and establish a long-term debt target.	Preliminary work to potentially establish a debt target is underway.
Increase public investment against rigorous cost-benefit analysis.	Public investment is increasing, and all national development programmes are subject to cost-benefit analysis.
Ensure appropriate design for the planned public national development institution.	A single national development institution is to be set up by 2023, by consolidating four existing sectoral development agencies.
Increase local own-source revenues, in particular property taxes and development fees.	The government plans to assign immovable property tax revenues fully to the municipalities.
Introduce a carbon tax in sectors not covered by the European emission trading system, and reimburse at least partially the proceeds to households and firms.	Legislation to include a CO_2 component in excise duties on energy products is before Parliament.
Remove environmentally damaging fuel subsidies.	Legislation to reduce or abandon damaging subsidies is before Parliament.

Spending quality has room to improve

Government spending accounts for around 43% of GDP, below the OECD average (Table 1.5). Spending increased considerably in recent years, not least because of pandemic-related support programmes, but also because of rising social benefits and public wage hikes in education and health. The Fiscal Council estimates that since 2015 public spending growth consistently exceeded growth of potential GDP, most often by a factor of two, and predicts spending obligations to continue to rise above GDP growth (Lithuanian National Audit Office, 2021[16]). Spending quality – i.e. the composition of spending across policy areas – is geared to foster more inclusive growth, with the share of spending on education slightly above the OECD average, spending on pensions and subsidies below, and social spending raising rapidly, especially on child and family benefits (OECD, 2020[6]).

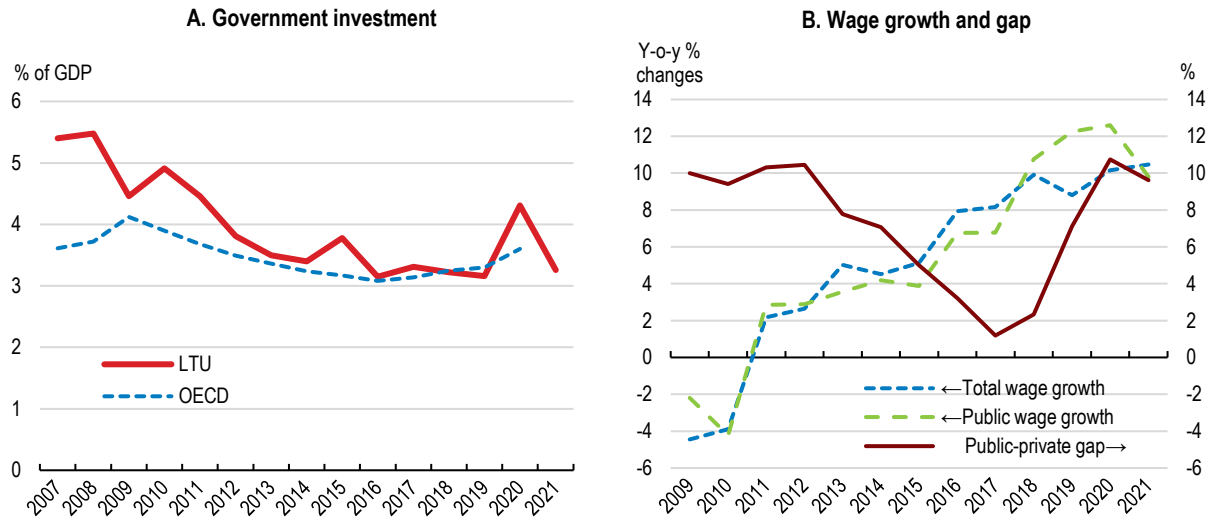
Table 1.5. Composition of government spending and revenue, 2010 and 2020

General government expenditure (% of GDP)	2010	2020	General government revenue (% of GDP)	2010	2020
Total	42.4	42.9	*Total*	28.3	31.3
General public services	5.1	3.5	Income taxes	4.6	8.8
Of which: Interest payments	1.8	0.4	Social security contributions	11.6	10.4
Public order and safety	1.8	1.5	Consumption taxes	11.7	11.7
Economic affairs	4.6	5.6	Property taxes	0.4	0.3
Health	5.4	5.9			
Education	5.9	5.2			
Social protection	15.9	16.3			
Others	3.7	4.8			

Source: Eurostat, Government Expenditure by Function dataset, and OECD, Global Revenue Statistics database.

Public investment has been stepped up after years of neglect, as recommended in the previous OECD Economic Survey (OECD, 2020[6]). The government is increasing investment in digital and green infrastructure, health, social affairs, research and innovation, education, and public governance by around 1% points of GDP between 2021 and 2026, helped by the European Union's "Next Generation" programme funds which cover around 80% of spending. These funds provide an opportunity to muster support around politically challenging structural reform, especially in education and health care where in the past rapidly rising public wages met with shy reform efforts (Figure 1.19). To improve productivity and the quality of the public finances in these sectors, the government should link investment to productivity-enhancing reforms such as the consolidation of the extensive school and hospital networks.

Figure 1.19. Public investment is rising, while public wage growth has stabilised



Note: In panel A. the wage growth is adjusted for tax reform in 2019.
Source: Statistics Lithuania; and OECD, Government at a Glance yearly database.

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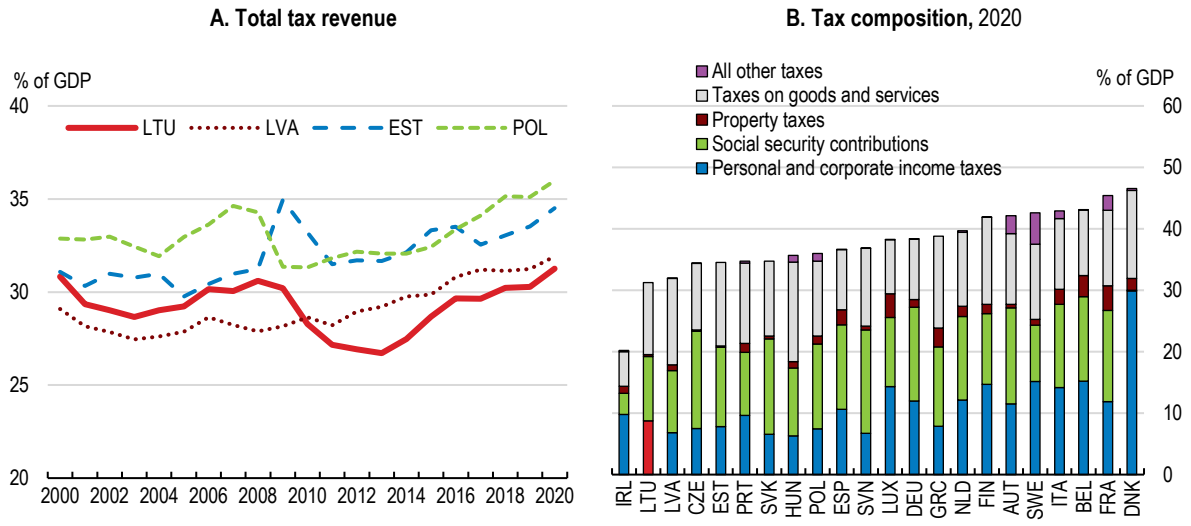
The tax base should be broadened

After several significant reforms to make taxation more efficient and equitable, the overall tax burden as well as progressivity of the tax system remain below the OECD average (Figure 1.20). Social security contributions remain high, discouraging work and encouraging informality, while income and property are taxed rather lightly. Consumption taxes are comparatively high. The VAT gap, i.e. the gap between actual and theoretical/maximum VAT collection, is declining but remains above the OECD average, reflecting both reduced VAT rates and informality.

Figure 1.20. Taxation is low and geared towards labour



Source: OECD, Global Revenue Statistics database.

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The government's plans to broaden the tax base go in the right direction. The government wants to reduce informality further by implementing 37 measures, especially digitalising the tax administration further, which is welcome. In addition, the government should again subject restaurants and accommodation to the standard VAT rate, which had been reduced during the pandemic to support this sector, as it has recovered. The government also has recently developed plans to broaden the base of the immovable property tax, currently considered a "luxury tax" yielding little revenue. To reduce the tax burden of low-income property owners, the government might consider introducing some progressivity into the system, either by introducing a progressive scale or by setting a property value threshold from which the tax kicks in. Finally, reducing social security contributions further and raising personal income taxes commensurately would help reduce the burden on labour and broaden the tax base.

Lithuania's statutory business tax rate is 15%, below the OECD average of around 23%. Various tax incentives to foster investment and innovation reduce effective tax rates, although take-up is low (see thematic chapter). More generally, while tax incentives tend to have a positive effect on innovation, they likely favour incumbent firms at the expense of small innovative, credit-constrained start-ups (Box 1.4). Also, Lithuania's policy mix is skewed: while tax incentives are generous, direct government support for innovation is tiny, with recent OECD research suggesting that a balanced policy of tax and direct support is more effective than reliance on tax incentives alone (Appelt et al., 2020[17]). Against this background, the government should thoroughly assess the effectiveness of tax incentives and consider increasing direct support for innovation, e.g. through grants or stronger collaboration with universities and schools, as in Germany, Switzerland or the Nordic countries.

Box 1.4. Tax incentives in Lithuania's corporate tax system

Lithuania's business (corporate income) tax framework provides several tax incentives to promote investment, research and development, and innovation. Incentives include enhanced deduction of R&D expenses; accelerated tax depreciation for R&D investment; a "patent box" regime; allowances for investment in "technological improvement"; free economic zones ("green channel") where companies benefit from business tax relief for 10 years; and business tax holidays for up to 20 years for companies involved in large-scale investment projects. Small businesses are also supported through various business and personal income tax incentives encouraging entrepreneurship, such as reduced business tax rates or additional tax credits.

However, the take-up rate of the various R&D tax incentives is low. As a result, Lithuania actually spends only around 0.025% of GDP on R&D tax incentives, against more than 0.1% across the OECD. The various incentives seem to miss the trigger points of Lithuania's catching-up economy involving many small, innovative start-ups. Credit-constrained innovative firms need funds as early as possible, but benefit from tax incentives only once intellectual property (IP)-related revenues materialise. Moreover, the patent box supports IP activities only if they lead to patents and copyrighted software, discouraging other forms of IP creation. Finally and unlike direct financial support, tax incentives do not address the key problem for innovative but risk-averse entrepreneurs, namely potential failure.

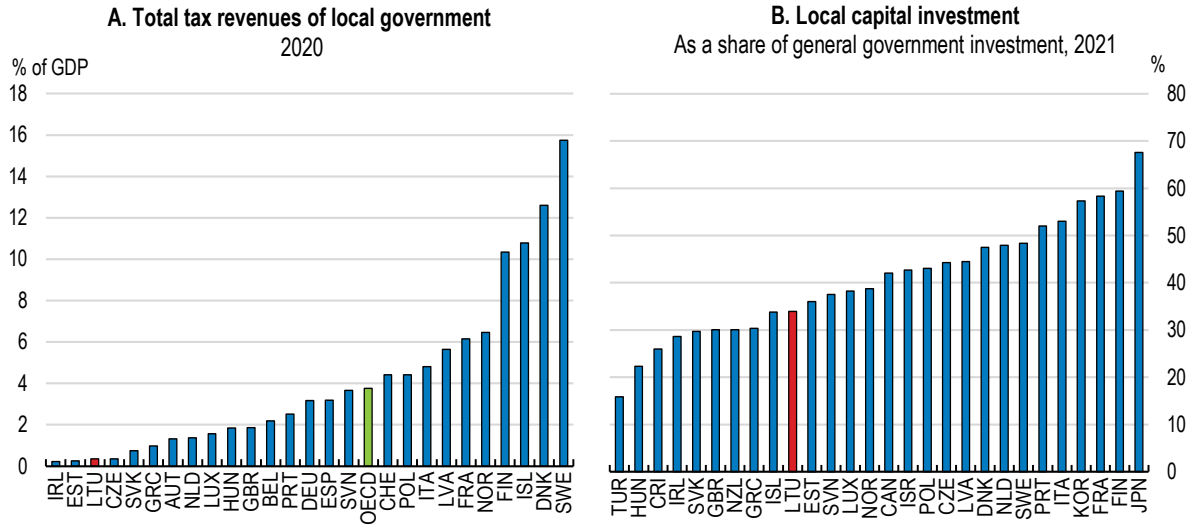
Source: Ministry of Finance.

Fostering decentralisation and local investment

Lithuania is one of the fiscally most centralised OECD countries, with local governments enjoying little tax and spending autonomy (Figure 1.21). The recurrent taxes on land and buildings are the only autonomous local taxes, yielding little revenue, although some limited autonomy is granted on the personal income tax. Municipalities rely on a fragmented system of intergovernmental grants that are conditional on narrowly defined investment purposes, thereby lowering spending effectiveness. Administrative capacity is considered weak. Coordination of investment projects between municipalities is poor, preventing economies of scale and scope. Stringent local fiscal rules limit municipalities' capacity to borrow for investment purposes (OECD, 2020[18]). As a result, local investment largely relies on central government and EU funding, despite local budgets being in surplus in recent years.

The government has started to reform the intergovernmental fiscal framework. Reforms include the full assignment of the property tax to the municipalities, and a change in budgeting allowing municipalities to keep savings on transfers rather than having to return them to the central government. Moreover, the government plans a constitutional change allowing local governments more flexibility to borrow for implementing EU-co-funded projects. These reforms are welcome, but they could go further. For instance, providing some autonomy over income taxes; or overhauling the system of intergovernmental transfers could help municipalities to implement comprehensive and efficient investment projects (Box 1.5). More tax autonomy might have to be accompanied by effective equalisation as economic fortunes across local governments vary. The recently established regional development councils could play a larger role in governing supra-local investment projects.

Figure 1.21. Limited funding possibilities could explain low local public investment



Source: OECD, Global Revenue Statistics database; and OECD, National Accounts database.

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Box 1.5. Encouraging local public investment: the cases of Ireland and Finland

Ireland and Finland provide some insights from opposite institutional angles - one centralised, the other decentralised - on how to promote local investment.

- Ireland is even more centralised than Lithuania, yet has a strong tradition of integrated local investment funding. Comprehensive multi-annual planning and strong enforcement of policy priorities is one of the cornerstones of the Irish public investment-financing framework. In 2018, Ireland established a Rural and an Urban Regeneration and Development Fund, inspired by the EU structural funds' competitive bidding process and matching requirements. Irish local governments are required to co-finance at least 25% of an investment project. Importantly, the funds are not bound by thematic or sectoral conditionality and hence allow for targeted and tailor-made local investment.
- Finland is highly decentralised, with local government tax autonomy well above the OECD average. Finland's municipalities also enjoy large discretion to borrow and spend, within a set of tightly enforced national fiscal rules. Incentives for productive local investment are high since returns accrue to the municipality in the form of higher personal or corporate income tax revenues. Cooperation between municipalities is extensive since joint projects offer mutual gains in the form of scale and scope economies. Borrowing costs are low as municipalities have strong incentives to remain solvent. Two municipally-owned financing and guarantee funds provide additional oversight on the sustainability of municipal finances.

Both Ireland's integrated funding model and Finland's high tax autonomy model may provide inspiration for Lithuania on its way towards a more effective intergovernmental fiscal framework.

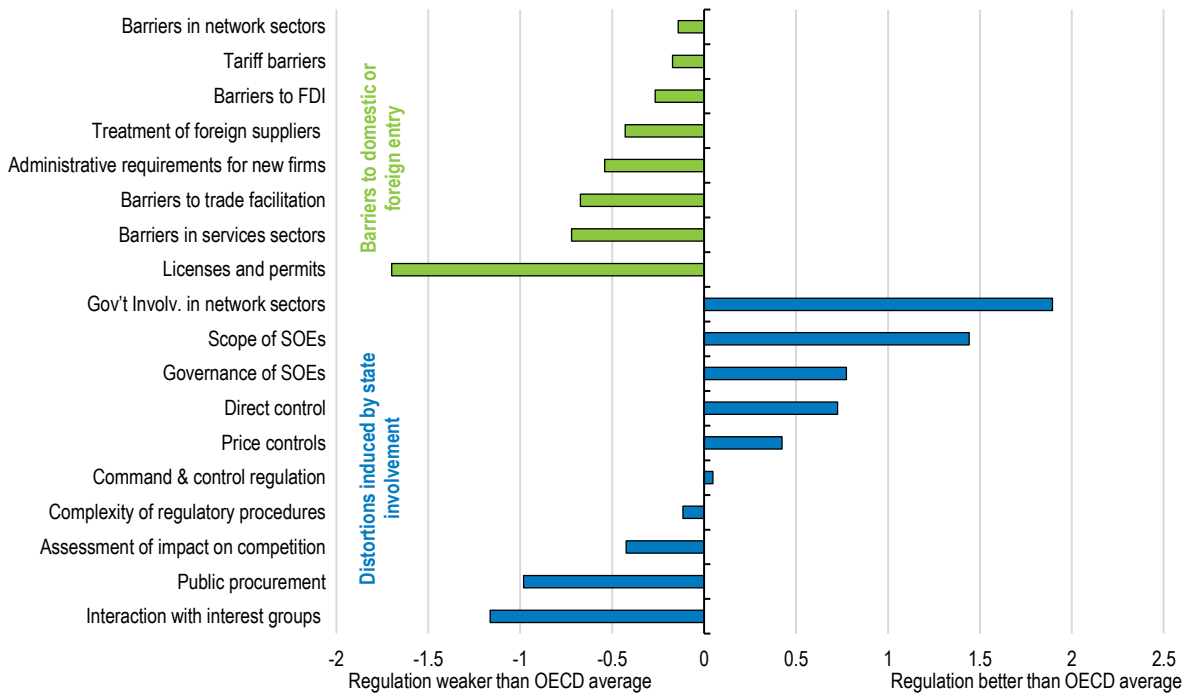
Source: (OECD, 2020[18]).

Reforms to improve the business climate

The business climate is friendly, with regulation stringency mostly below the OECD average, supporting domestic business and helping to attract foreign firms (Figure 1.22). In particular, market entry is highly facilitated, and the regulatory and administrative environment for small and innovative start-ups is favourable. Recent reforms, including a change to the Constitution, also eased restrictions to non-residents in areas such as legal services and land acquisition, although some barriers in these areas remain. Based on a "one-in, one-out" regulation principle, the government continues to aim at reducing compliance cost, facilitating the licencing procedure for businesses in sectors such as health care and reducing the number of areas where licencing is required at all. The only area with a less-than-average quality regulatory environment is that of state-owned enterprises. Reforms could help raise GDP per capita by up to 5% (Box 1.6). Reform progress is shown in Table 1.7.

Figure 1.22. The business climate is friendly, yet the state is active in many sectors

Product market regulation, gap vis-à-vis the OECD average



Note: Negative values reflect less stringent and positive values more stringent regulation. Green bars belong to the high-level indicator "Barriers to domestic and foreign entry", while blue bars belong to the high-level indicator "Distortions induced by state involvement".
Source: OECD, Product Market Regulation database.

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Box 1.6. Quantification of structural reform

Selected reforms proposed in the Survey are quantified in the table below, using simple and illustrative policy changes and based on cross-country regression analysis. Other reforms, including in the areas of education or environmental policy, are not quantifiable under available information or given the complexity of the policy design. Most estimates rely on empirical relationships between past structural reforms and productivity, employment and investment, assuming swift and full implementation, and they

do not reflect particular institutional settings in Lithuania. Hence, the estimates are merely illustrative, and results should be taken with caution.

Table 1.6. Potential impact of structural reforms on per capita income

Policy	Measure	10 year effect on GDP per capita, %	Long-run effect on productivity, %
State ownership	Reduce public ownership and improve SOE governance to reach OECD average	1.2	
Regulation	Fully separate companies owning the railway infrastructure from those operating trains	0 to 0.6	
Education and skills	Improve PISA outcomes to reach the OECD average (500)		3%-7%
Retirement age	Link retirement age one-to-one to life expectancy	1.6	
Innovation	Increase support for business innovation from 0.025% to 0.1% of GDP	0.2	
Public integrity	Improve control of corruption by 0.2 indicator points to reach the EU average	0 to 1.5	

Note: The following recommendations are included in the fiscal quantification, but their impact on GDP cannot be quantified: lower social security contributions against higher income taxes; increasing the VAT rate on accommodation and restaurants to reach the standard rate. Consolidating the school network will help rise PISA scores, in turn helping to raise long-term productivity.
Source: OECD calculations based on (Égert and Gal, 2017[19]) and (Egert, de la Maisonneuve and Turner, 2022[20]).

Table 1.7. Past OECD recommendations on structural policies

Recommendations	Action taken
Strengthen the governance of state-owned enterprises further. Sell to private investors if no compelling reasons for public ownership exist.	Several SOEs have been transformed into limited stock companies.
Facilitate access of private providers to the rail network.	Rules governing access to the rail network have been amended. One private good and passenger company is now operating.
Improve the governance of the innovation system by strengthening coordination and by consolidating agencies.	Consolidation of innovation agencies is underway.

Making public enterprises more productive

Public, or state-owned enterprises (SOE) are active in many areas, and the quality of their governance needs to improve further (Figure 1.22). Lithuanian SOEs are concentrated in the network industries such as energy and transport but are also active in agriculture, forestry and financial services. Around half of SOEs only (18 out of 33) reach the financial targets set by the supervising authorities, similar to earlier years, although the pandemic might be partly responsible for weaker results (Governance coordination centre, 2021[21]). Municipal SOEs in particular lack a transparent regulatory and governance framework, potentially distorting competition with private providers and exerting a burden on local economies (Lithuanian National Audit Office, 2021[22]). OECD-wide, the strength of SOE governance is positively associated with corporate efficiency (Égert and Wanner, 2016[23]).

Over the past few years, the government has substantially strengthened the public ownership strategy, reformed the SOE governance framework, and reduced the number of SOEs by two-thirds, which is welcome. At the end of 2021, it specified plans to convert all SOEs, including Vilnius airport, inland waterways and Klaipeda port into (state-owned) limited or public companies, thereby abandoning special legislation for these entities by 2024. The number of SOEs is planned to be reduced further, either by privatisation or mergers. The government should also turn its attention to the municipal sector, particularly in view of the planned strengthening of municipal fiscal capacity (see above). All public undertakings should be bound by the same legal, financial and regulatory framework as private firms.

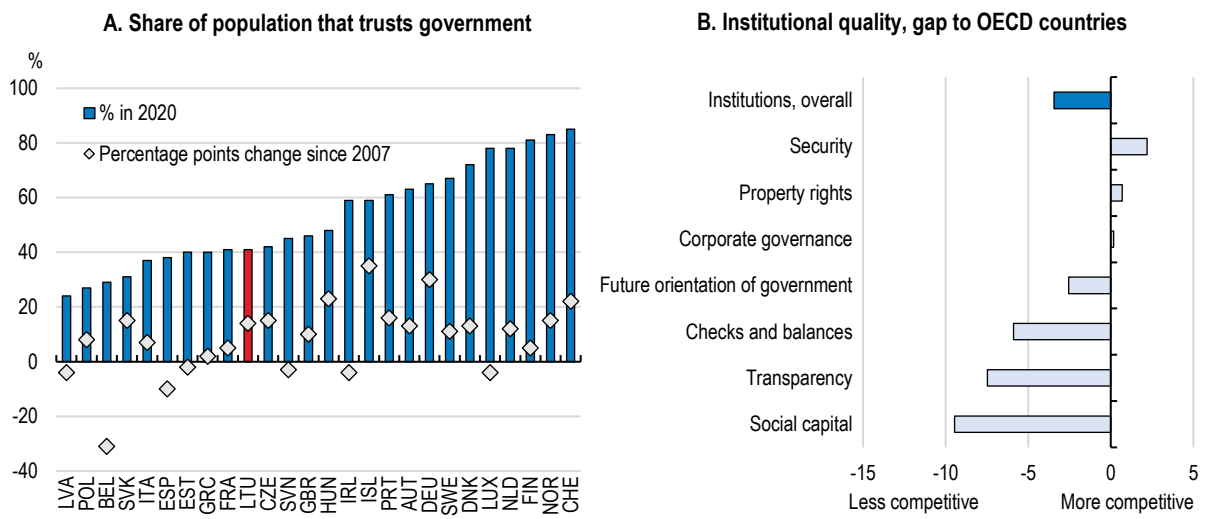
Transport regulation should improve further

The regulation of transport – by far Lithuania's largest service export - has improved, partly by addressing long-standing issues of a blatantly anti-competitive stance in the railway sector. The government has eased access for private operators on the rail network over the past two years, especially by reforming the "priority rule" which had unduly favoured the incumbent public railway company. Following the infrastructure management reform, one private company started to offer both freight and passenger transport services besides the state-owned operator. Even so, in May 2022 the competition authority raised concerns about the working of the new priority rules and urged the Ministry of Transport to grant more equal access to the rail infrastructure. The competition authority also found that the concession rules for bus companies providing regular passenger services restrict competition and impede the entry of new market participants. Given the inherent risk of anti-competitive behaviour in the network industries, the government should continue to reduce barriers to entry in the transport sector to raise productivity.

Trust, corruption and quality of institutions

Surveys and polls suggest that the share of Lithuanian citizens trusting their government is below the OECD average (Figure 1.23, Panel A). In the same vein, both the responsiveness of political institutions to citizens' demands and satisfaction with the political process is considered poor, although they remain above the Central and Eastern European average (OECD, 2021[24]). Institutional quality is below the OECD average, especially with respect to political organisation, transparency and social capital (Panel B). Lower institutional quality is associated with less trust (Prats and Meunier, 2021[25]). Low trust may reduce the effectiveness of economic policy making when success of policy reform depends on citizens' compliance, buy-in and participation. Improving communication with citizens, curbing rampant legal inflation, improving the design of laws and regulations, and fostering an evidence-based decision-making culture across government agencies could help improve institutional quality and citizens' trust in government (OECD, 2021[26]). The government has made a better policy-making process one of its priorities.

Figure 1.23. Trust in government and institutional quality are low



Source: OECD, Government at a Glance - 2021; and World Economic Forum, Government Competitiveness Index 4.0.

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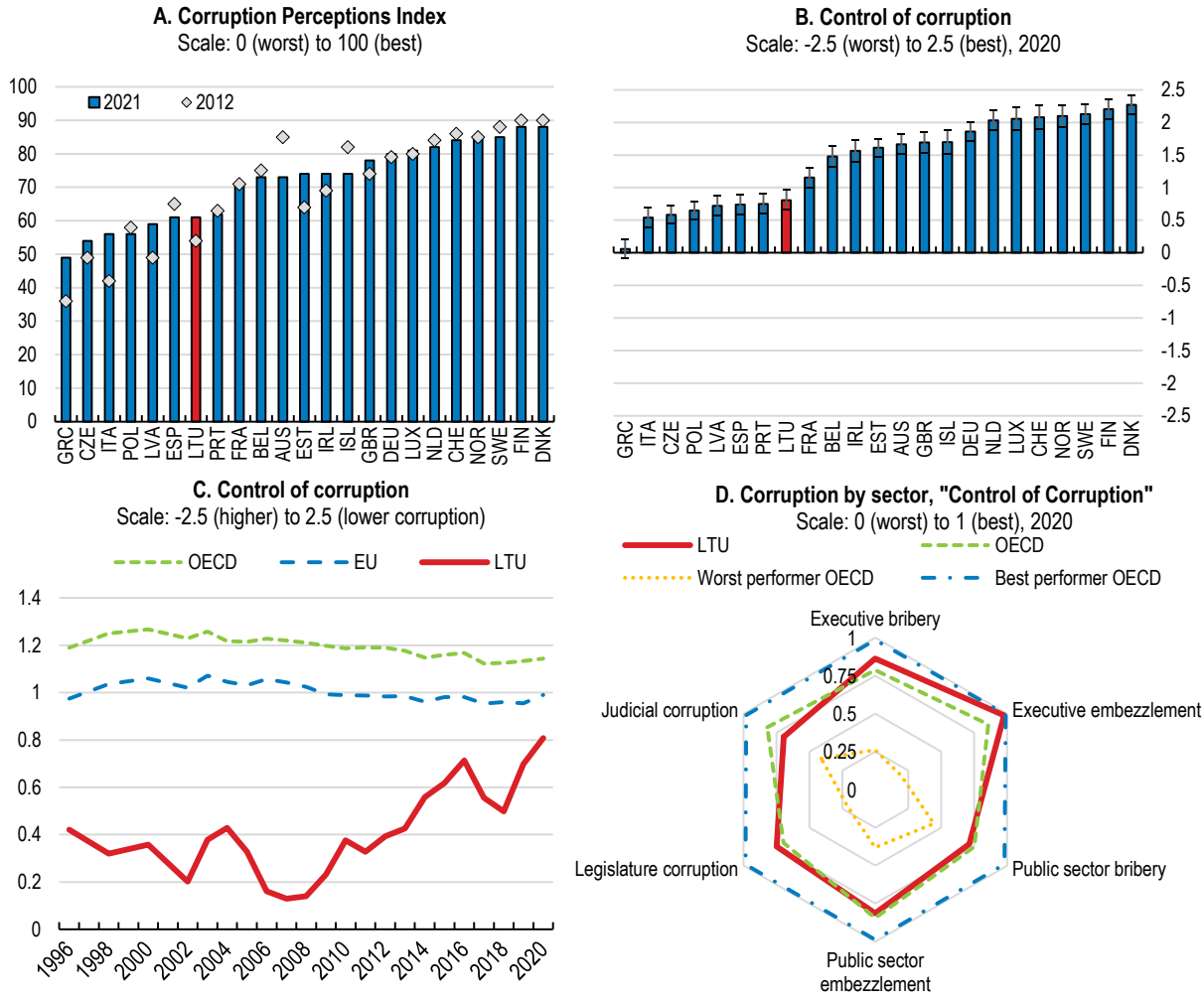
Lower trust and institutional quality tend to be associated with higher levels of corruption. Indicators of control and perceived risks of corruption suggest that Lithuania performs below the OECD average, although the gap has ostensibly been narrowing over the past 15 years (Figure 1.24). According to the authorities, personal experiences of corrupt practices – such as bribes in the health care sector or in public procurement – have become rarer, and no case of foreign bribery has been recorded since 2020. The government continues to implement measures to improve integrity. Since January 2022 amended legislation is promoting an anti-corruption environment; embracing measures to prevent corruption; raising anti-corruption awareness; and ensuring the reliability of staff. Moreover, in February 2022, an updated version of the whistle-blower protection law entered into force, establishing higher standards of protection in both the public and private sectors.

Figure 1.24. Corruption seems on a downward trend



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 Institute; University of Gothenburg; and University of Notre Dame.

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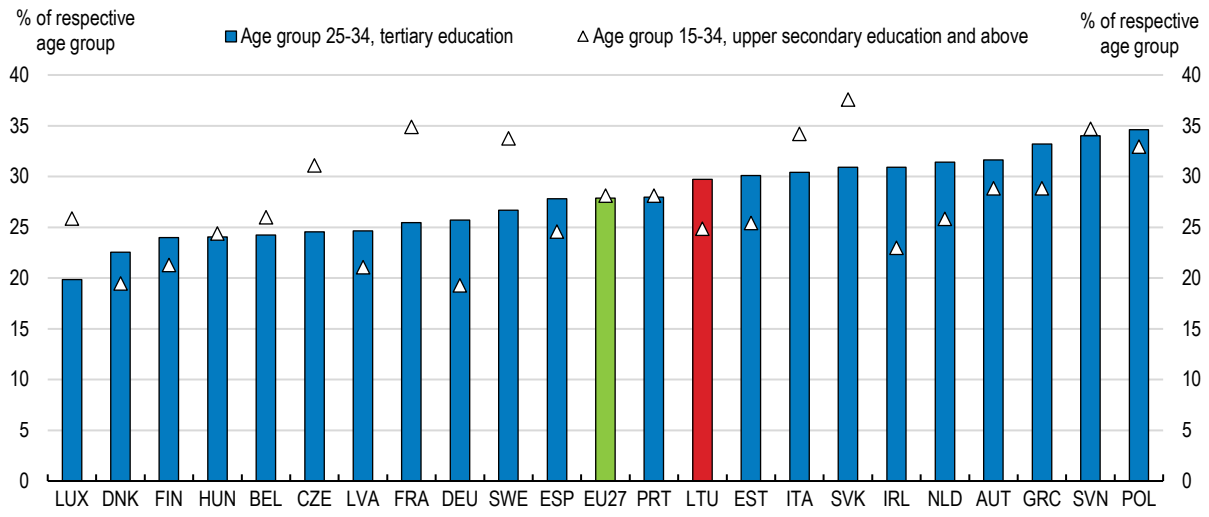
Improving education to raise skills and productivity

High-quality education can help raise human capital and productivity in the long term (Egert, de la Maisonneuve and Turner, 2022[20]). In Lithuania, education outcomes and skills are comparatively poor, and skills mismatch is considerable, although it declined over the past few years (Figure 1.25. Government spending on education is below the OECD average and skewed towards maintaining an extensive infrastructure that often fails to reach critical mass. Education is focused on the general rather than the vocational track, resulting in labour market imbalances as many graduates are not well matched to their jobs (OECD, 2021[27]).

Figure 1.25. Skills mismatch is considerable

Horizontal skills mismatch, 2020



Note: Horizontal skills mismatch is calculated as the sum of under- and overqualification of those in a job, having successfully completed the highest level of education within the past 15 years.
Source: Eurostat, Experimental Statistics database.

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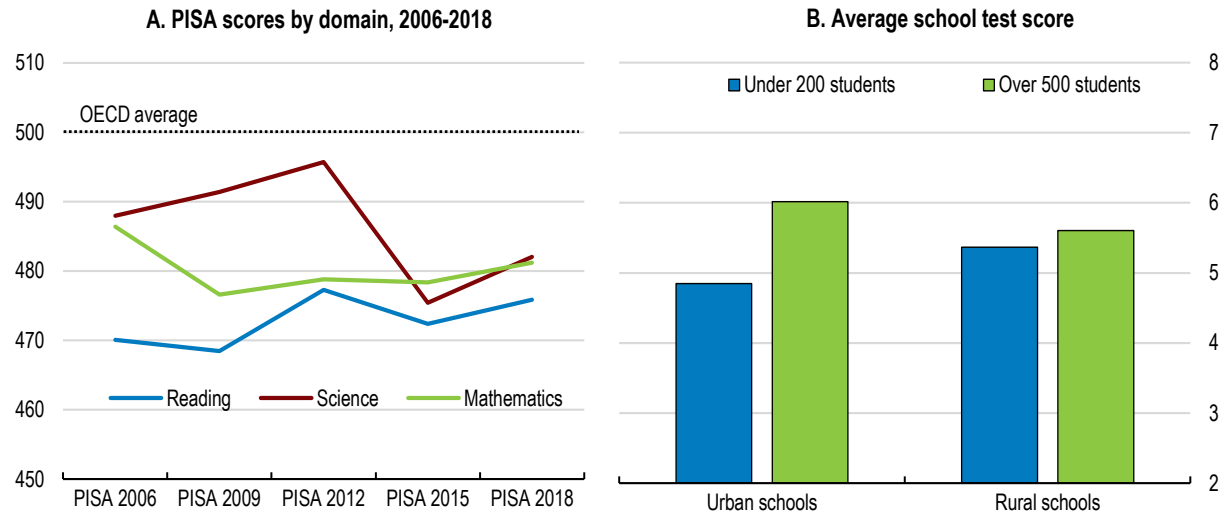
PISA outcomes are improving but remain below the OECD average

The quality of compulsory education as measured by PISA hovers below OECD averages and varies a lot across regions and schools (Figure 1.24). Reasons for weak performance include an excessive network of too many small schools; low teacher competencies with almost no remuneration for experience and excellence; and an inadequate curriculum (OECD, 2021A, 2021B). Recent OECD research suggests that PISA results are strongly associated with adult skills and productivity: persistently higher PISA scores close to the OECD average would be associated with a 3% to 7% increase in the level of multi-factor productivity, although this would take many years to materialise (Egert, de la Maisonneuve and Turner, 2022[20]).

The government has started a primary and lower secondary education reform in 2021, by developing a new teacher competency framework with better career opportunities, increasing wages for head teachers, adapting the curriculum towards more clearly defined basic skills and increasing minimum school and class size. These reforms are welcome and in line with recommendations in earlier *OECD Economic Surveys*. The government should continue reforming the school network as school size is an important factor determining the quality of education and interaction of children with peers (see also thematic chapter).

Figure 1.26. Compulsory education is improving but outcomes depend on school size



Note: Panel B: test scores are taken from standardised exams circulated to Grade 10 students and are scaled from one to 10.
Source: OECD, PISA 2018 database; Ministry of Education, Science and Innovation; OECD Economic Survey of Lithuania, 2020.

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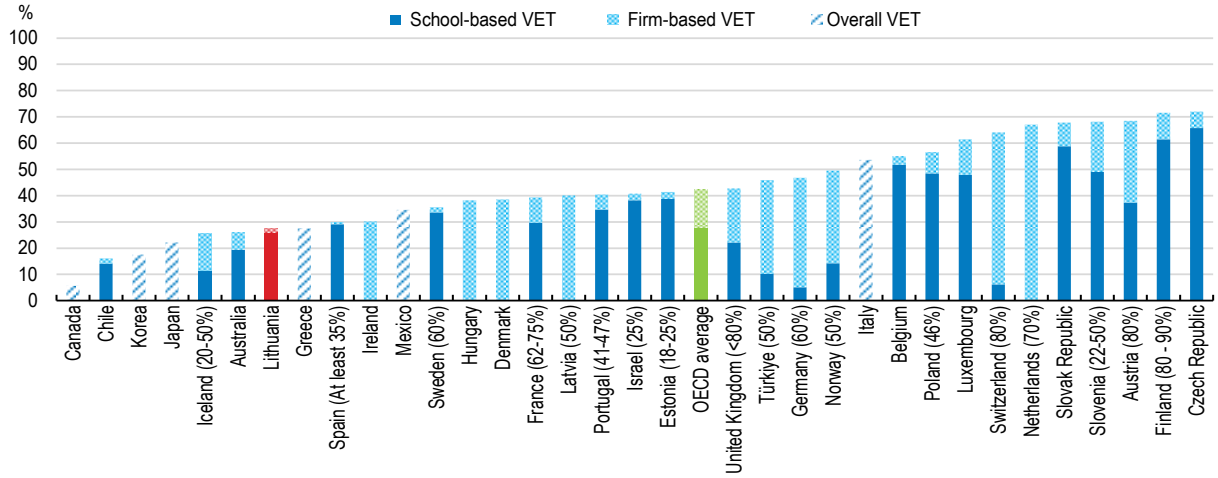
Bringing vocational education and training closer to the labour market

The significance of vocational education and training (VET) is among the lowest in the OECD (Figure 1.27). The reputation of VET is poor, even though many students go back to vocational training after graduating in the general track. The low VET share could be one responsible for the lack of trained professionals in certain areas and relatively high skills mismatch. The government has started to make the vocational path more attractive, however. Study programmes have been decentralised to the school boards composed mainly of businesses, and re-engineered to become more modular and reactive to labour market needs. Student career guidance after compulsory education has been strengthened. These initiatives are welcome. The government should continue to strengthen VET to develop, attract and retain skills, reduce youth unemployment and increase productivity, in particular by broadening pathways towards tertiary education, as is done in France, Germany and Switzerland.

Work-based learning – apprenticeships or "dual system" – is almost non-existent in Lithuania. The number of apprenticeships is only a few hundred overall and has even declined since 2017 when they became formalised in the labour code. Employers resist the dual system because they prefer students who graduated from the (cost-free) VET schools, and because they fear that trained talents would leave after completing work-based education. Collaboration between schools and employers is weak (OECD, 2021[27]) To increase employer interest in apprenticeships, the government has recently stepped-up financial support for firms that hire apprentices, by offering 70% instead of 40% of an apprentice's wage in selected cases. Firm-based professionals' (or master's) teaching costs are also partly taken over. Given the importance of work-based learning for skills and employment, the government could do more to increase labour market relevance of firm-based learning, by making the apprenticeship system more beneficial to both employers and prospective apprentices (Box 1.7).

Figure 1.27. VET has little significance, and work-based VET even less so

Students in work- and school-based learning, share in upper-secondary education, 2018



Note: Figures in parentheses refer to the most typical duration of the actual work-based component as a percentage of total programme duration. For example, in Germany, time spent at work accounts for about 60% of total programme duration, while the remainder is spent at school.
Source: OECD, Education at a Glance database. For the Czech Republic and Lithuania, data rely on European Centre for the Development of Vocational Training (CEDEFOP).

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Box 1.7. Reforming work-based education in Central and Eastern Europe

Like in most central and eastern European countries, the limited role of work-based vocational education and training in Lithuania is partly the legacy of socialist times when most vocational training schools were attached to large industrial conglomerates. The demise of the industrial fabric and the transition to a market economy severed the links between schools and firms, with the work-based element largely disappearing. Re-connecting vocational schools and new firms for workplace-based training proved difficult, and cooperation between the education system and employers remains weak. The region's many small firms often find that the cost of investing in and training apprentices outweigh the benefits.

Several Central and Eastern European countries have reformed work-based training over the past few years to make it more attractive. Hungary in 2021 introduced two separate VET tracks with two different qualification levels, to find a better balance between general and vocational skills. The share of VET graduates with work experience is higher than in any other Central or Eastern European country (OECD, 2021[28]). Latvia in 2015 introduced a work-based learning programme where at least 25% of the time is spent in a company, and financially supports firms that hire apprentices (OECD, 2019[29]). The Slovak Republic in 2016 introduced a "dual" VET model to increase work-based learning, with firms receiving some tax incentives for offering apprenticeships (OECD, 2020[30]).

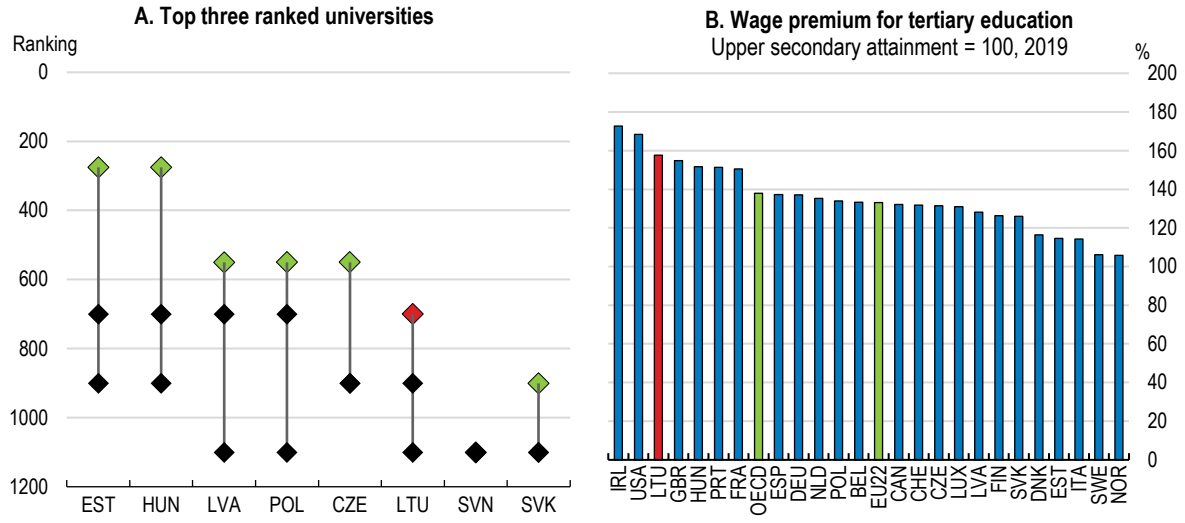
Work-based learning only works if both employers and students can gain from it. Rather than offering subsidies or other financial incentives that could generate deadweight losses, it is more effective to adjust the parameters of apprenticeships, i.e. the length of the programme, time spent with the company versus at school, or else apprentice wages (Mühlemann and Wolter, 2019[31]). Another way forward to boost the attractiveness of work-based leaning is to extend apprenticeships beyond the technical and craft sector towards service sectors such as health care or tourism. Finally, the government could encourage international firms, especially from countries with an established dual system, to offer more work-based learning opportunities, and encourage the formalisation of firm-internal training.

Source: as cited.

Universities need more excellence

Academic excellence and labour market relevance of Lithuanian universities is below comparable countries (Figure 1.28, Panel A). The widely above-average wage premium for tertiary education and a high percentage of unfilled study places in science, technology, engineering, and mathematics suggest some rationing, a mismatch between the supply of higher education programmes and actual labour market demands, or a lack of awareness on the part of students (Panel B, see also thematic chapter). With around 40 separate institutions, the network of tertiary education is scattered, featuring much overlap and duplication across campuses and lacking critical mass to reach excellence. Finally, students from disadvantaged socio-economic backgrounds find it more difficult to enter university, partly because of the restrictive allocation of state-funded places.

Figure 1.28. The tertiary sector performs poorly, yet university studies pay off



Note: Panel B, for further details refer to the Education at a Glance 2021 publication, Figure A4.4. https://doi.org/10.1787/b35a14e5-en
Source: Times Higher Education, World University Rankings 2022; and OECD, Education at a Glance database.

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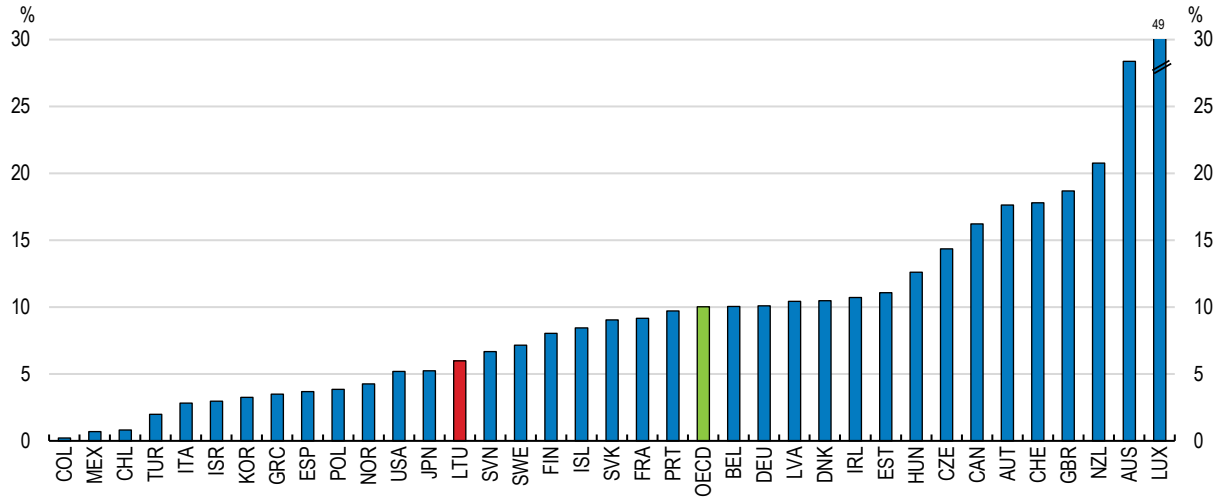
Funding and governance reforms could help increase labour market relevance of tertiary education. First, linking a part of public funding to labour market performance could encourage universities to better adapt the curriculum to demand. Countries such as Denmark, Estonia, Finland or Poland link between 3% and 7.5% of tertiary education funding to graduates' labour market performance (OECD, 2021). The government plans to allocate around 20% of funding according to performance targets agreed with higher education institutions, which is welcome. Additional funding could also help improve access for students coming from weak socio-economic backgrounds. Second, further consolidating the network of universities and colleges could help reach critical mass and avoid overlap, as recommended in the previous OECD *Economic Survey* (OECD, 2020).

Attracting more foreign students could help increase the quality of tertiary education and reduce skills mismatch in the Lithuanian labour market. The share of foreign students in total enrolment remains low at around 6% against 11% in Estonia or 10% in Latvia, although access has become easier for non-EU students since 2019 (Figure 1.29). Including indicators reflecting number and quality of the international exchange of students could help Lithuanian universities become more international and outward-looking. Both Denmark and Norway include mobility indicators in their funding models. Also, expanding the number of courses held in a language other than Lithuanian could help universities to attract and retain foreign skills.

Figure 1.29. The share of international students is low

International student enrolment as a percentage of total tertiary enrolment, 2019



Note: International students are those students who moved from their country of origin (defined as the country of prior education or of usual residence) for the purpose of study.
Source: OECD, Education at a Glance database.

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Reducing social and regional disparities

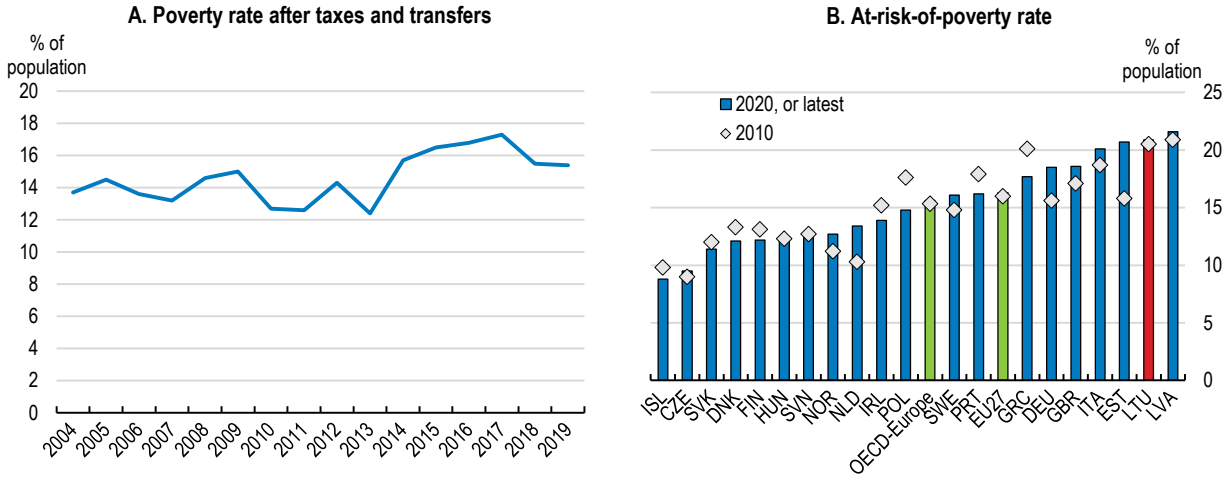
Lithuania's social and regional cleavages are declining but remain high. Although many rapidly growing economies display inequality in opportunity and outcomes, well-designed policy can help reduce them without affecting growth prospects. The government considers income inequality, poverty and regional disparities as a priority issue, and it has strengthened various programmes to foster inclusiveness.

Poverty remains a challenge

Reducing poverty remains an important challenge for Lithuania, and the covid-19 pandemic may have exacerbated social vulnerability. The share of the population living below the poverty line has started to decline only recently, and the at-risk-of poverty rate remains the second highest among European OECD countries (Figure 1.30). Some indicators such as the labour income quintile ratio suggest that the social impact of the pandemic fell disproportionately on low-wage earners, thereby increasing inequality. Unemployed, single parents and low-educated are most likely to become victims of poverty, although old people are the largest social group concerned in absolute terms. Social spending is low by international standards, and the effectiveness of the tax-transfer system in reducing inequality and poverty remains weak, as shown in the thematic chapter of the previous OECD Economic Survey (OECD, 2020[6]).

The government is addressing poverty in earnest, as recommended in the previous OECD Economic Survey (OECD, 2020[6]). Social benefits, including child and family benefits and pensions, were considerably raised and partly indexed to income developments, and the share of social spending in GDP is rising. Services such as social housing and long-term care have also improved and are becoming better tailored to needs. The government should continue to link social support to needs, especially for the elderly, while further strengthening policies that help address the underlying reasons for persistent poverty such as high unemployment or low skills, through greater activation and better education.

Figure 1.30. Poverty is high but declining



Note: Panel A, share of persons living on less than 50% of the median income. Panel B, share of persons living on less than 60% of median equivalised disposable household income after social transfers.
Source: OECD, Income Distribution database; and EU-SILC.

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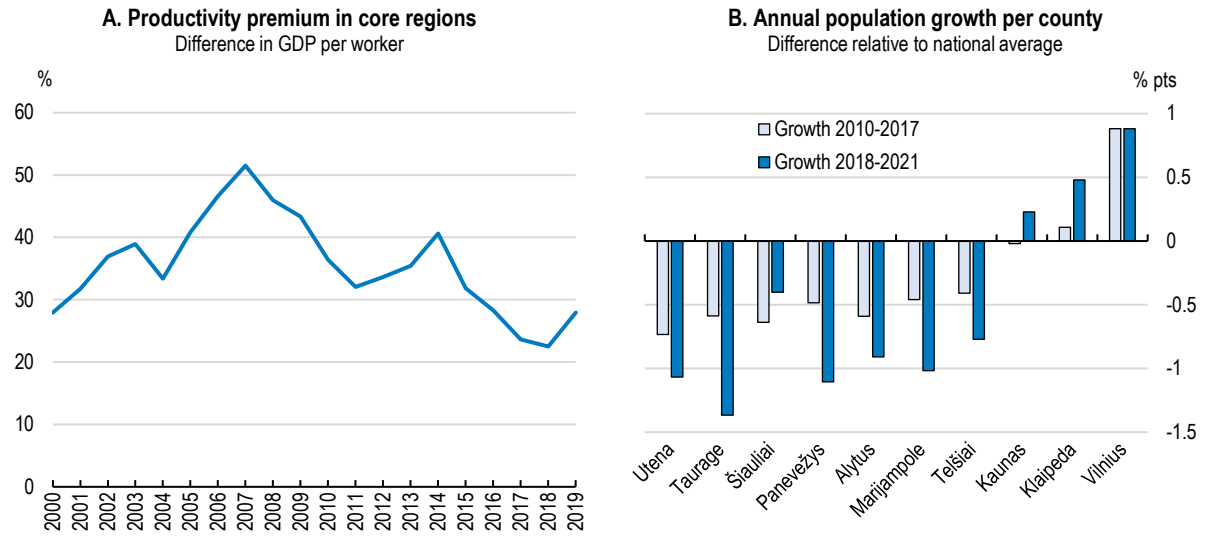
Disparities are being addressed by strengthening regional institutions

Regional differences in GDP per capita, productivity, and employment exceed the OECD average despite the country's small size. Remote and peripheral areas are ageing rapidly as the active population is migrating towards larger agglomerations. The exodus from these areas has accelerated in recent years, while the productivity difference between core and peripheral regions is trending down (Figure 1.31). Educational achievements and skills vary strongly across regions in a context of below-average education outcomes overall. The "digital divide" – as measured e.g. by fixed broadband connectivity across regions - is still wider than the OECD average albeit declining. Finally, regulatory barriers hinder the development of a flexible rental housing market in agglomerations.

The government is addressing regional disparities by strengthening regional institutions. In 2020, the government created so-called regional development councils to steer and coordinate strategic planning in the areas of regional development, transport, pre-school and vocational education and training, and potentially health care. In 2021 the government reinforced and clarified the role of the regional councils by stressing their inter-municipal character and the importance of coordinated investment, as recommended in the previous OECD Economic Survey (OECD, 2020[6]). The government considers empowering regional institutions as a key priority to foster inclusive regional development. Local and regional autonomy tends to be associated with lower regional disparities (Bartolini, Stossberg and Blöchliger, 2016[32]). Against this background, the government should continue devolving power to the regional level and ensure strategic planning is well-coordinated across policy areas.

Figure 1.31. Productivity differences are trending down as people are moving to agglomerations



Note: In panel A, the productivity premium is the difference in GDP per worker between the two core regions (Kaunas and Vilnius) and the rest of the country. In panel B, overall population in Lithuania declined by 19% between 2010 and 2017; while it declined by 0.5% between 2018 and 2021.
Source: OECD Regional database; and Statistics Lithuania.

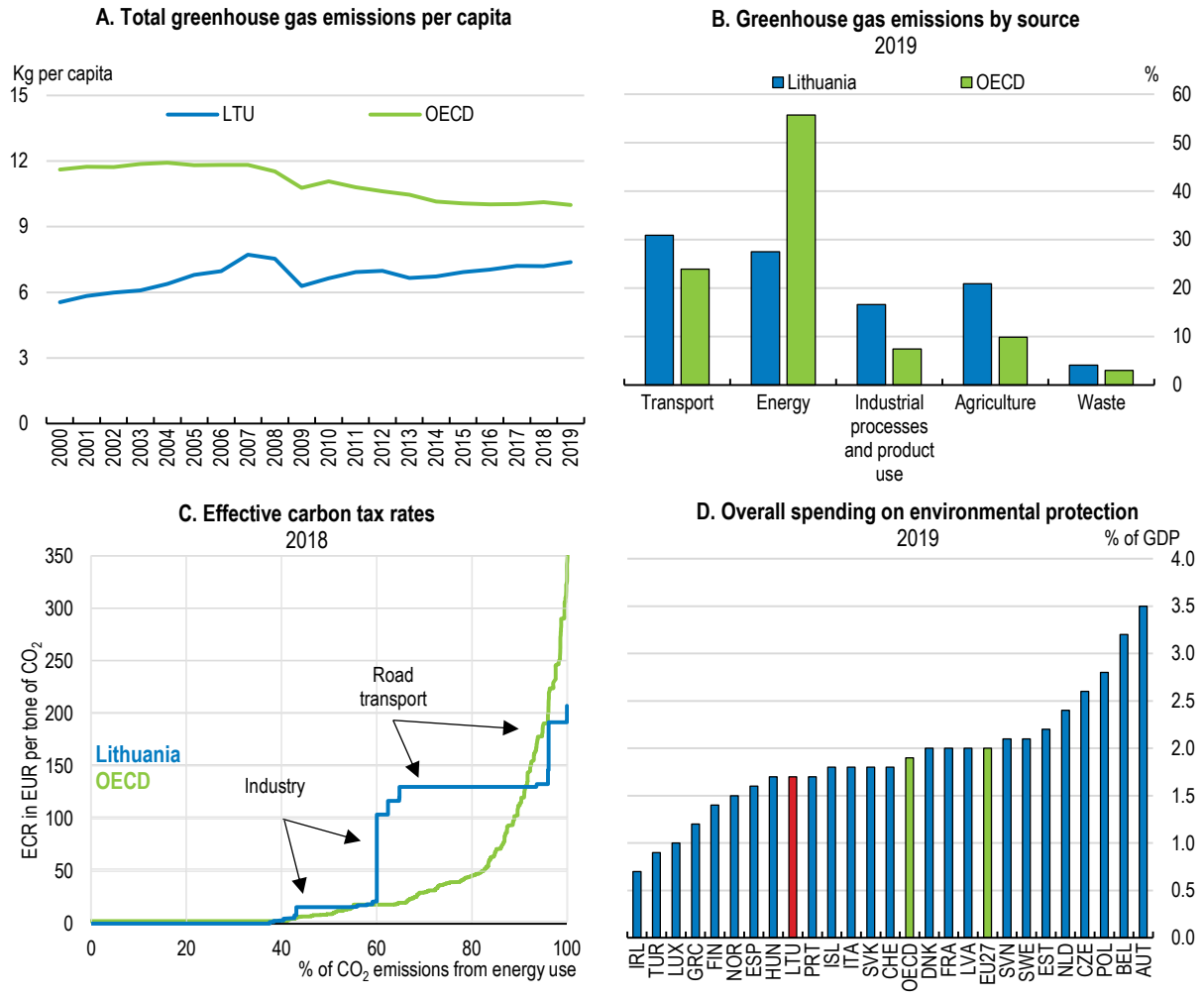
StatLink https://stat.link/q6dwgb

Decarbonising the economy

Lithuania aims at reducing carbon emissions by 30% by 2030 from its 2005 level and reaching net-zero emissions by 2050, as set out in the national climate management agenda adopted in 2021. These ambitious targets will require strong and effective policy action. Carbon emissions per capita are below the OECD average but continue to rise. Transport contributes the largest share of total carbon emissions, while agriculture – mostly producing methane – is the sector most clearly above the OECD average (Figure 1.32). Both sectors provide growing export revenue for Lithuania and are sensitive to carbon pricing. Since large industry is subject to the European Union's emission trading system (ETS), carbon is taxed above the OECD average, yet persisting fuel subsidies partly undermine effective carbon pricing. Environmental spending is low. Ambient air and water pollution is below the OECD average.

The government has taken steps towards decarbonisation, to reduce both emissions and increase energy security (Box 1.1). To meet emission targets, Lithuania is planning to update its National Energy and Climate Plan by 2023, in line with EU regulations. The EU plans to subject additional sectors such as transport and buildings to the European-wide ETS. Around a third of the EU Recovery and Resilience Funds, totalling around 0.8% of GDP per year to be disbursed over the coming years, will be invested in green transformation, in particular renovation and rehabilitation of multi-apartment buildings and the support of public and private solar and wind energy production and electricity storage. In 2020, the government introduced an emission-dependent car tax, and it plans to phase out fossil fuel subsidies and to introduce a CO_2 component in excise duties on energy products in 2025, pending parliamentary approval. Against this background, the government should broaden carbon pricing, by either introducing a carbon tax or establishing a national permit system for sectors not covered by the European ETS. While Lithuania, being a small country, should focus on the adoption of innovative technologies, the government should also invest in targeted research and development, especially in the transport sector and in agriculture. Lithuania has mandated the OECD to develop a set of actionable policies to reach climate objectives in an effective and efficient way.

Figure 1.32. Decarbonisation needs to accelerate



Note: In Panel C, The effective carbon tax rate consists of permit prices from the EU ETS, explicit carbon taxes on fossil fuels and specific taxes on energy. Lithuania did not have an explicit carbon tax.

Source: OECD, Environment Statistics database; OECD (2021), Effective Carbon Rates 2021: Pricing Carbon Emissions through Taxes and Emissions Trading, OECD Publishing, Paris, https://doi.org/10.1787/0e8e24f5-en; and Eurostat, Environmental protection expenditure accounts.

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Table 1.8. Findings and recommendations to foster sustainable and inclusive growth

Financial and fiscal policies	
Inflation has risen, driven by high energy and housing prices.	**Tighten fiscal policy at an appropriate pace to help mitigate inflationary pressures.** **Ensure that support is targeted at vulnerable households and firms affected by high energy prices.** **Tighten the macroprudential stance should housing market developments start posing a risk to financial stability**.
The fiscal deficit is above the medium-term objective.	**Ensure that the deficit returns to a sustainable level over the medium term, by following the fiscal rules and conducting further spending reviews.**
The fiscal cost of an ageing population is rising. The retirement age is being increased to reach 65 by 2026.	**Consider establishing an automatic link between the retirement age and life expectancy beyond the year 2026.**
During the pandemic value-added taxes were reduced for accommodation and restaurants.	Revert to the standard VAT rate in the accommodation and restaurant sector in due time.
Own-source revenue of local governments is tiny, limiting local investment capacity.	**Assign more own-source revenues to local government.**
Administrative capacity of local governments is low.	Strengthen administrative capacity of local governments
Structural policies	
Public enterprises are active in many sectors of the economy. Despite substantial progress, the quality of governance remains below the OECD average.	**Subject all public enterprises, whether state- or municipally-owned, to the same legal, financial and regulatory framework as private firms.**
PISA outcomes are trending upwards but remain below the OECD average.	**Consolidate the school network further.**
Firm-based learning (apprenticeships) is hardly taking off since it was introduced in 2017.	**Strengthen firm-based learning in the manufacturing and service sectors.** **Engage with international firms from countries with an established apprenticeship system.** **Ensure that the attractiveness of firm- and school-based learning is balanced.**
Poverty remains high, although it is declining.	Target social spending to those in need, and move towards addressing the root causes of poverty such as high unemployment and low skills.
Differences in GDP, productivity and employment between regions are large and rising.	Strengthen the power of regional institutions and ensure policies are well-coordinated at the regional level.
Trust in government and the quality of institutions are below the OECD average.	**Continue to improve quality and transparency of the policy making process.**
Ambitious climate targets require strong and efficient policies.	**Extend carbon pricing to all areas where it is not yet implemented, especially transport and agriculture, while compensating vulnerable households for potential cost increases.** **Increase public investment in targeted research and development and green infrastructure.**

Note: Key recommendations are in bold and feature in the executive summary.

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2. Unleashing the productive potential of digitalisation

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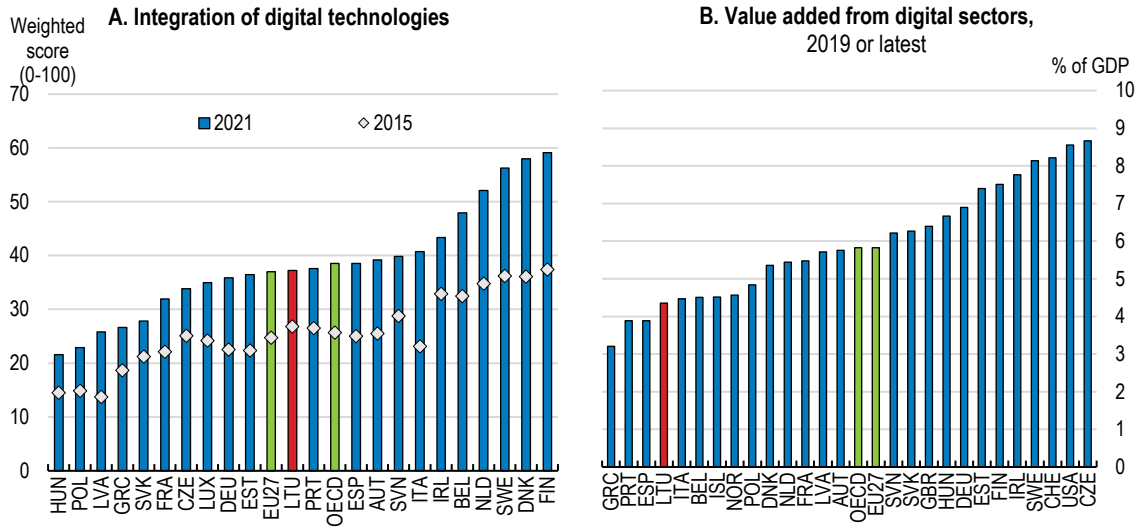
Lithuania is digitalising its economy with visible success, but much scope remains for the integration of advanced technologies. The COVID-19 crisis confirmed the importance of digitalisation to sustain activity. Increased private investment in innovation is essential to speed up digitalisation. The take-up of R&D tax incentives is low, however, despite relatively generous provisions, and many smaller firms have not been inclined to innovate. More effective public support for business R&D and stronger research-business collaboration on innovation are important. There is also a need to promote digital uptake, especially among smaller firms that lag behind. Improving access to equity finance for young innovative firms, reducing remaining gaps in digital infrastructure, along with better information on digital tools and how to use them, can help smaller firms digitalise. The public sector too has to become more digitalised. Addressing weaknesses in foundational skills through education reforms and responding more effectively to labour market needs for digital skills would enable a wider adoption of advanced technologies and higher productivity growth, while ensuring that the digitalisation dividends are distributed fairly. Increased participation in adult learning, especially among the less educated, is the way forward to adapt to increased job automation in the digital era.

Lithuania has scope for further digitalisation and productivity gains

Lithuania has made visible progress in digitalising its economy. A growing share of households have broadband connection and use the Internet, and businesses increasingly rely on digital technologies to respond to changing patterns of consumption and production (Figure 2.1, Panel A). The advantage of digital innovation is evident in certain areas, notably fintech, life sciences and laser technology, where Lithuania is becoming a fast-growing hub. As in other countries, digitalisation has accelerated since the outbreak of the pandemic.

Figure 2.1. Digital transformation has accelerated, but more can be done



Note: In Panel A, OECD refers to the average of 22 OECD countries that are members of EU. In Panel B, digital sectors refer to Manufacture of computer, electronic and optical products (Nace Rev.2 code: V26), Manufacture of electrical equipment (V27), Publishing activities (V58), Audio visual and broadcasting activities (V59_60); Telecommunications (V61), and IT and other information services (V62_63). Digital sectors are defined according to the taxonomy described in: OECD (2018), A taxonomy of digital intensive sectors https://doi.org/10.1787/f404736a-en.
Source: European Commission, Digital Scoreboard; and OECD, National Accounts database.

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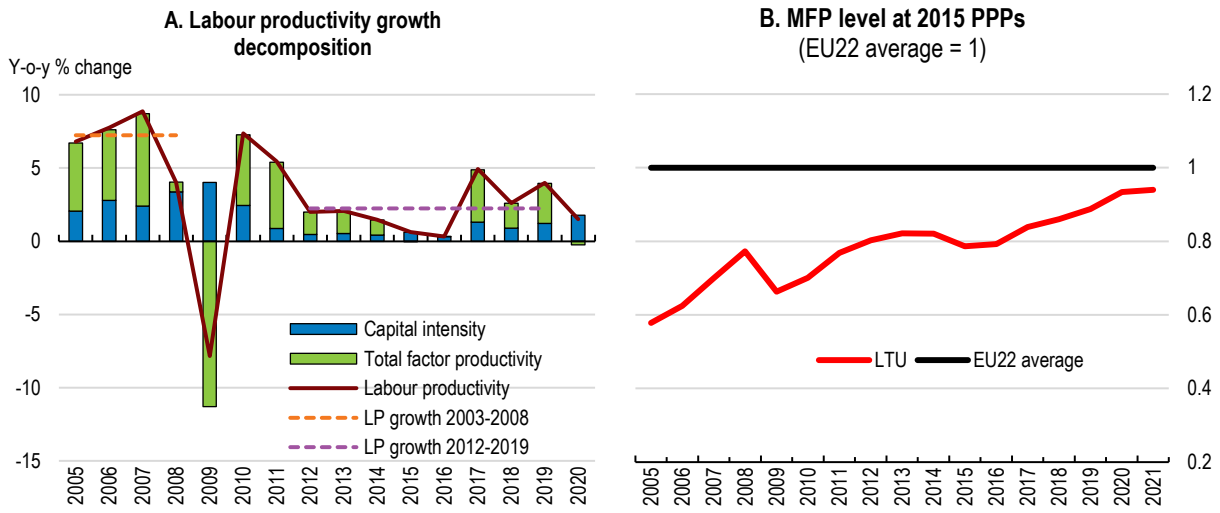
Yet, Lithuania has still much scope for further digitalisation. Despite progress, adoption of digital technologies by firms continues to lag behind the levels of leading European countries, such as Finland and Sweden (Figure 2.1, Panel A). Only 4% of growth firms (i.e. those that have experienced growth in the past three years) in Lithuania have a digitalisation strategy compared to an EU average of 22% (European Commission, 2021[1]). The digitalisation gap may be partly explained by the structure of the economy, and in particular, the prevalence of SMEs, which are less likely to implement digital technologies than larger firms. The prevalence of low added-value outsourced production in Lithuanian industry ("contract manufacturing business") and the small size of the economy may be additional factors (Lithuanian Innovation Center, 2020[2]). The digital sectors are small in terms of value added as a share of GDP by international comparison (Figure 2.1, Panel B). Lithuania is middle-ranking in terms of digital progress, according to the composite Digital Economy and Society Index of the European Commission (European Commission, 2021[3]).

Digitalisation can help boost innovation and productivity. Such potential lies, for example, in business processes innovation, automation of routine tasks and more efficient interactions between firms and customers. OECD estimates suggest, for instance, that increasing high-speed Internet connections by 10% would boost productivity by over 2% in Lithuania over a three-year horizon, while the indirect effect

from increased adoption of advanced technologies, such as cloud computing, would add another 1.6% to productivity (Sorbe et al., 2019[4]).

Labour productivity grew faster in Lithuania than the OECD average since the global financial crisis, but its level remains below average (Figure 1.2, Chapter 1). There is considerable scope for stronger innovation as multi-factor productivity falls below the average of the EU OECD members and growth has yet to return to its pre-crisis highs (Figure 2.2). Despite a large improvement in recent years, overall innovation performance remains subpar, according to the 2021 European Innovation Scoreboard ranking (Figure 2.3). Some critical innovation outcomes for the digital era, including medium- and high-tech exports and ICT patenting are well below the OECD average. Many domestic companies remain poorly integrated in global value chains, limiting the potential to attract foreign investment and scale up innovation (Ministry of Economy and Innovation, 2021[5]). Higher adoption of digital technologies by firms could boost innovative capacity, deepening integration in global value chains and boosting productivity (OECD, 2020[6]).

Figure 2.2. There is scope to boost productivity



Note: In Panel A, labour productivity is measured as GDP per person employed (National Accounts definition).
Source: OECD Economic Outlook, No. 111 database.

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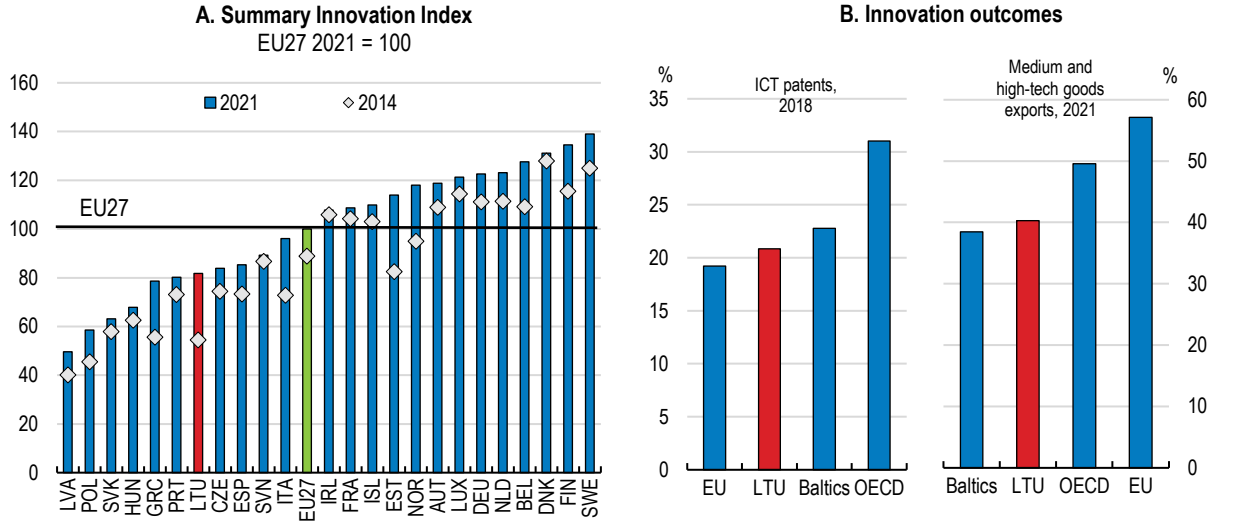
The pandemic has further highlighted the importance of digital technologies. During the pandemic increased uptake of digital technologies, mainly in the form of e-commerce and teleworking (see below), helped many firms to stay in business. The enhanced use of digital technologies also became evident in other areas, including education where distance learning has increased. Going forward, it is essential that Lithuania strengthens the enablers of digitalisation to accelerate the transition and achieves higher productivity growth. A greater take-up of digital technologies is particularly important for smaller firms that lag behind in terms of innovation and productivity. Seizing the opportunities of new technologies would pave the way for more solid, greener and inclusive growth in the post-COVID 19 era.

Figure 2.3. Innovation performance improved, but some critical indicators lag behind



Note: In Panel A, EU refers to weighted average of its 27 member countries. In Panel B, ICT patents refer to the share of ICT patents in overall patents (IP5 patent families). Data refer to the average of 2016 and 2018. Country aggregates are computed by first summing the ICT patents and total patents respectively, and then obtaining ratios for desired country groups. Data for medium and high tech goods exports refer to 2020.
Source: European Commission, European Innovation Scoreboard 2021.

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Against this background, the chapter examines broad-based policies to help Lithuania make the most of the fast-moving digital landscape. The chapter first discusses current policies to support business R&D and research-business collaboration to boost business investment in innovation, and the ongoing reforms to enhance the effectiveness of the innovation system. Stronger international cooperation in research would bring additional gains in terms of technology transfer. It will then look at policies that reduce barriers to firms' digital transition, notably reforms to strengthen digital infrastructure and reduce regional gaps, as well as measures to improve framework conditions and ensure access to finance for young innovative firms. It will also address size-related barriers smaller firms face. This is followed by a discussion of potential areas of reform to accelerate progress towards digital government. The chapter then assesses education and training policies from the perspective of building strong digital skills but also for limiting the rise in inequalities associated with the increased automation of jobs and labour market transformation, ensuring a fair distribution of the digitalisation dividend. The main findings and recommendations are summarised at the end of the chapter. The government digitalisation strategy addresses many of these challenges (Box 2.1), but reform efforts and implementation need to continue.

Box 2.1. Lithuania's Digitalisation Strategy: main features

The National Digitisation Development Programme 2021-2030 sets out the priorities and guidelines for digitalising the economy, with specific plans translating the strategy into concrete actions (Ministry of Economy and Innovation, 2021[5]). The priorities are funded from the Recovery and Resilience Plan (RRP), providing EU Structural Funds for the period 2021-27, the state budget and other available sources. Measures aiming to promote digitalisation account for 20% of the total funds (EUR 2.2 billion) allocated under the plan, with reforms to digitise the public sector making up the largest part of reform measures (European Commission, 2021[7]). Other priority areas include the digitalisation of businesses, digital infrastructure and digital skills.

In brief, the government's main priorities for Lithuania's digital transformation include:

- Consolidating state information resources, IT infrastructure and services.
- Ensuring reliable public-sector data and the possibility to share them across sectors.
- Developing advanced tools and technological solutions and integrating them into electronic services to ensure interoperability, security and accessibility of these services, especially for people with disabilities. This hinges upon creating the necessary conditions for science and businesses to develop and deploy advanced digital technologies. Advanced solutions based on artificial intelligence, data analytics and natural language processing and comprehension machine learning are among the main priorities.
- Improving digital connectivity and addressing rural-urban gaps. The aim is to ensure universal access to high-speed broadband by 2027.
- Promoting digital competencies and skills at all levels of society.

The 2020-30 Industry Digitisation Roadmap provides guidelines for the integration of digital technologies, the adoption of digital technologies by the public and private sectors, strengthening business-research collaboration on innovation and boosting the participation of manufacturing firms in international value chains (European Commission, 2021[3]). The technologies the roadmap focuses upon, including information and communication technologies (ICT) and automation and robotics are correlated with future investment on R&D in line with the Lithuania's Smart Specialisation Strategy (S3) (Lithuanian Innovation Center, 2020[2]).

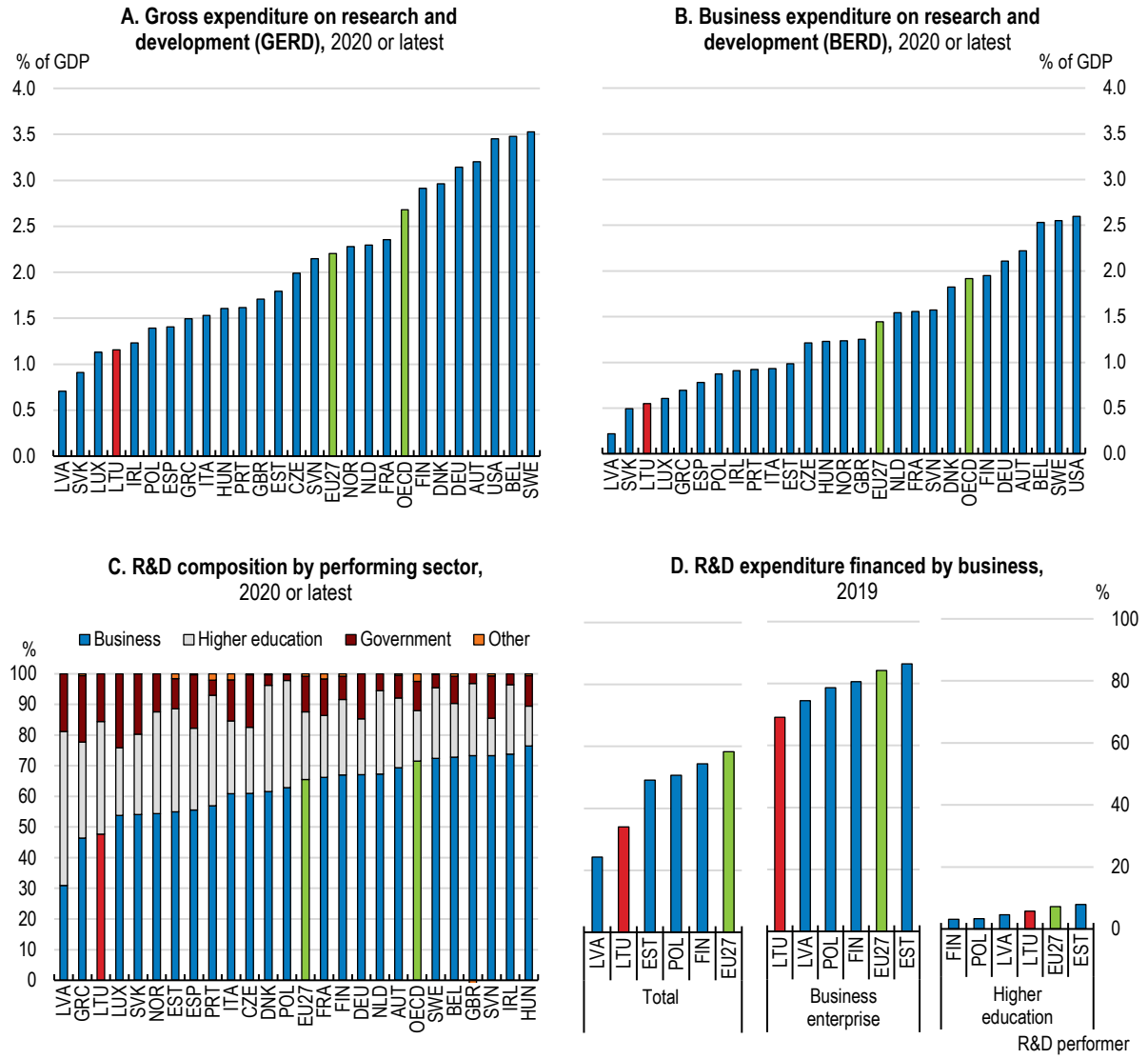
Lithuania's Smart Specialisation Strategy (S3), setting the priority areas for R&D and innovation, has digital technologies at its centre, together with new materials and related new processes with far-reaching economic and societal implications. The labour market effects of disruptive technologies are anticipated and aligned with national and regional innovation policies in order to create jobs in new sectors. A new S3 strategy, under preparation, will streamline the priority fields identified as main R&D and innovation areas from seven under the previous strategy to three with the highest potential: health technology/biotechnology; new production processes, materials and energy efficiency; and ICT technologies.

Promoting investment in innovation to speed up the digital transition

Lithuania invests comparatively little in research and development (R&D), a key driver of advancements in digital technologies, and R&D spending remains largely reliant on European funds (European Commission, 2021[7]). At 1.2% of GDP, overall R&D spending in 2020 was around half the EU average (Figure 2.4). EU funds accounted for approximately a quarter of total R&D spending in 2020. The business sector plays a relatively small role, investing around 0.5% of GDP in R&D in 2020, among the lowest shares in OECD countries. The government's strategy envisages an increase in overall R&D investment to 1.5% of GDP in

2024, bringing Lithuania closer to the EU average level, although not eliminating the gap. The Innovation Promotion Fund, in operation since 2021, is expected to contribute to this end, but effective government support for business R&D to mobilise private investment is vital, as is stronger business-university collaboration and solid framework conditions (discussed further below).

Figure 2.4. Lithuania has scope to increase investment in R&D



Note: In all panels, OECD and EU27 refer to weighted averages of the member countries.
Source: OECD, Main Science and Technology Indicators database; Ministry of the Economy and Innovation; and OECD, Research and Development Statistics database.

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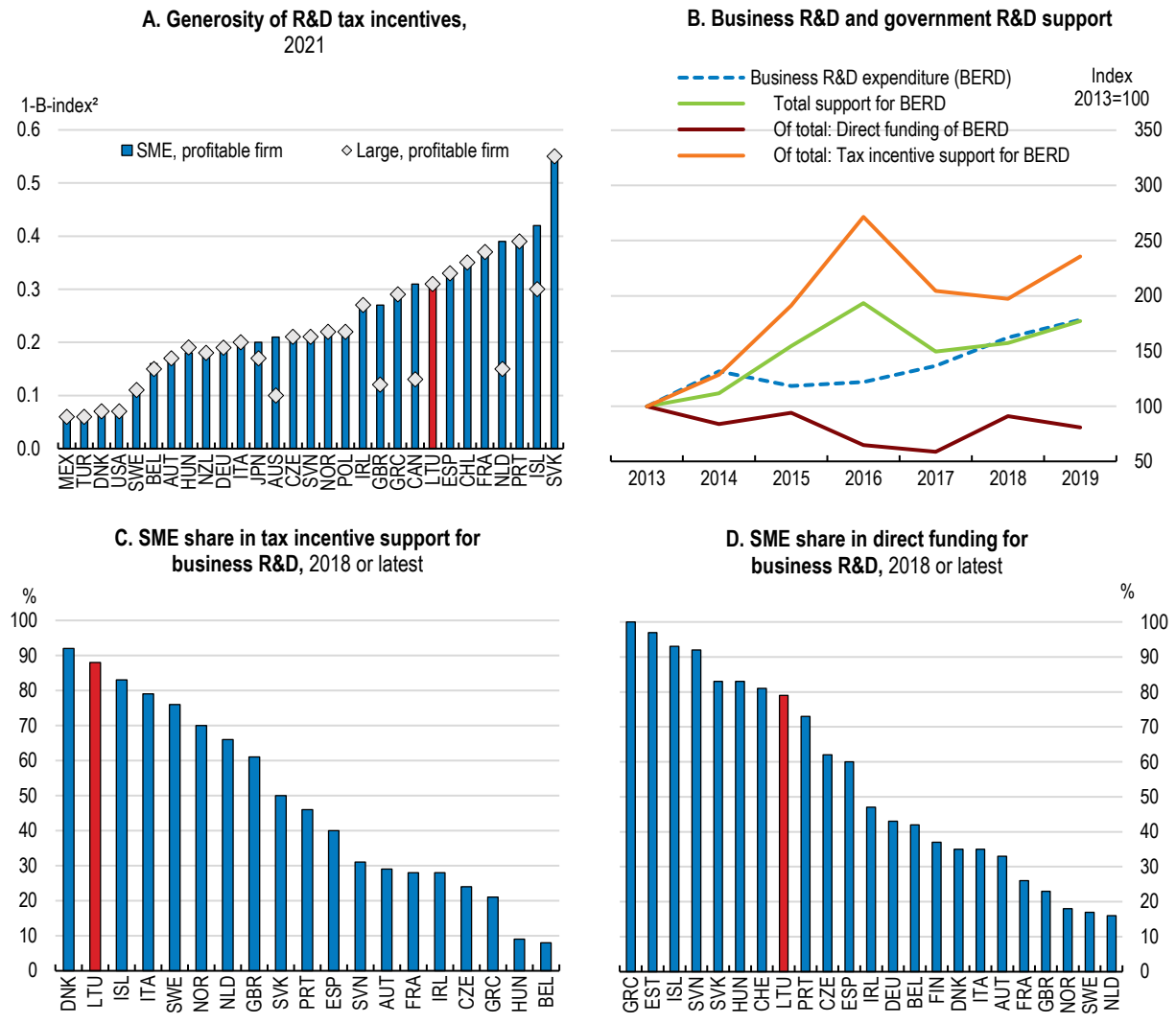
Support for business R&D could do more to encourage private investment

Lithuania's tax incentives for business R&D are generous and have increased as a share of GDP in recent years, growing faster than direct support (Figure 2.5). In particular, regulations allow for an enhanced deduction of eligible R&D expenditures from taxable income and accelerated depreciation of R&D capital assets over two years (OECD, 2021[8]) (Box 2.2). There is no threshold or ceiling on qualifying R&D

expenditure. Nonetheless, the take-up of tax incentives is modest (OECD, 2021[9]), and overall government support for business R&D is low compared to most OECD countries, at around 0.03% of GDP against 0.2% across OECD (Figure 2.6). In addition to tax relief for R&D tax expenditure, a "patent box" regime was introduced in 2018, allowing for a reduced corporate income tax rate (5% from 15%) on profits from intellectual property assets (Box 2.2).

Figure 2.5. R&D tax incentives are generous but business investment in R&D lags behind



Note: In Panel A, The B-index specifies the pre-tax income needed for a "representative" firm (typically defined for convenience as one with sufficiently large profits to be able to fully make use of earned tax credits in the reporting period) to break even on a marginal, monetary unit of R&D outlay (OECD, 2020). It is customary to present this indicator in the form of an implied subsidy rate, namely one minus the B index. In Panels C and D, further information on the yearly coverage and R&D tax incentive schemes, refer to the figure 12 in R&D tax incentives database report, 2021 edition.

Source: OECD R&D Tax Incentives database, http://oe.cd/rdtax, March 2021.

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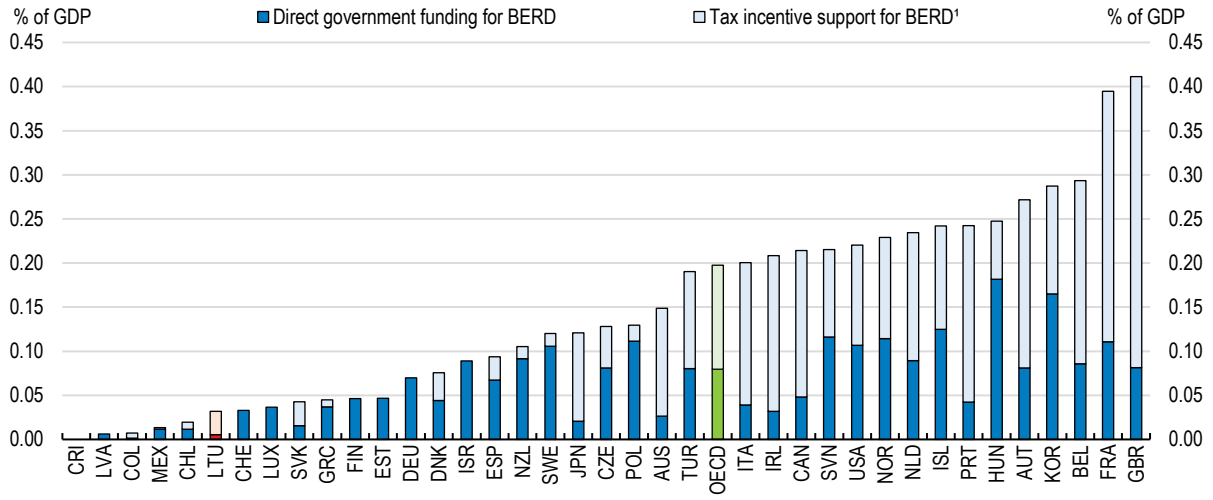
Figure 2.6. Overall support to R&D is comparatively low, despite generous tax incentives

Government support for business R&D, as share of GDP, 2019 or latest year



1. In the case of Canada, Japan and Hungary subnational tax support for BERD is included in tax support for BERD.
Source: OECD R&D Tax Incentives database. http://oe.cd/rdtax.

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Box 2.2. Tax incentives to support business R&D and innovation in Lithuania: main features

- Expenditure-based tax incentives for R&D, introduced in 2008, include: i) an R&D tax allowance that provides for an enhanced deduction at a rate of 200% of expenses incurred for R&D purposes such as wages of employees who are directly involved in scientific research and experimental development works, as well as for acquiring R&D related services; and ii) an accelerated depreciation provision for fixed assets (machinery and intangibles) used in the context of R&D projects. Under the latter scheme, a business entity is allowed to write off the acquisition cost of assets used in R&D activities within two years. There is no threshold, or ceiling, on the amount of eligible R&D expenditures or value of R&D tax relief. In the case of insufficient tax liability, unused claims can be carried-forward indefinitely.
- A "patent box" regime was introduced in 2018 allowing for a reduced corporate income tax rate (5% from 15%) on profits from intellectual property assets. The scheme is not limited to specific industries or entity types.
- A reduction of taxable profit for enterprises investing in substantial technological renewal (reduction of profits due to an ongoing investment project) was introduced in 2009 with the relevant threshold doubling in 2018. Under existing arrangements, eligible enterprises may reduce the taxable profit for the tax period up to 100% when investing, for instance, in projects for the introduction of new processes or a substantial change in an existing process.

Source: Ministry of Economy and Innovation; (OECD, 2021[8]; OECD, 2020[10]).

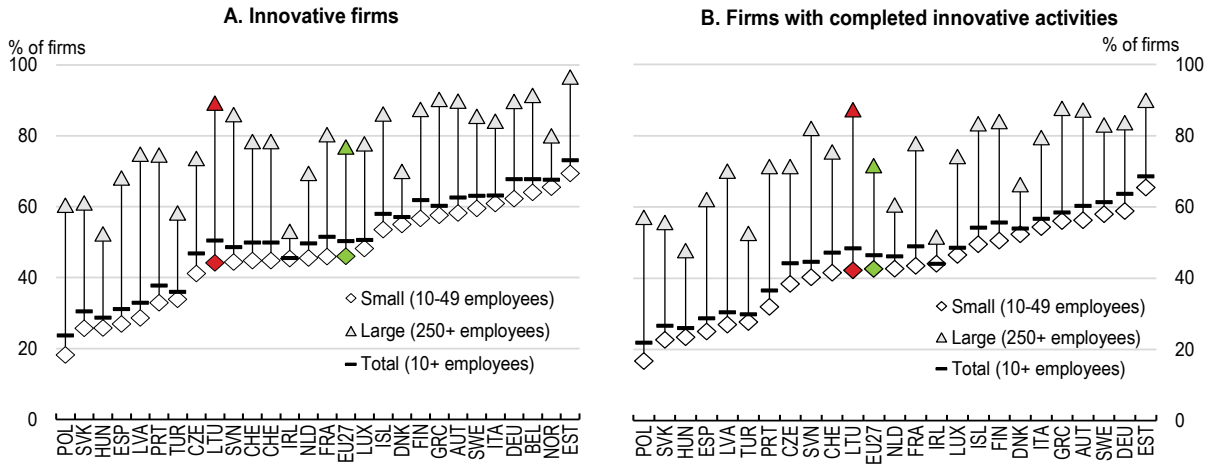
Tax incentives could become more effective. Business investment in R&D has not caught up with the rapid rise in tax incentives in recent years (Figure 2.5). Despite generous provisions, only 260 firms – out of 166 228 operating in Lithuania – received tax relief for R&D in 2019 through the R&D tax allowance (OECD, 2021[8]; OECD, 2021[9]). Uncertainty regarding the definition of eligible R&D expenditure, complex and lengthy application procedures and associated high compliance and administrative costs are among the

likely culprits (European Commission, 2019[11]; OECD, 2018[12]). Limited awareness of the scheme among firms may be another factor.

Challenges related to the complexity of R&D tax incentives scheme need to be addressed. Smaller firms lag behind their larger counterparts in terms of innovation outcomes (Figure 2.7). Whereas other factors can also influence such outcomes, ensuring effective tax support for business R&D is very important. A more balanced combination of tax incentives and direct support for R&D for small innovative firms is also essential (Figure 2.6). Compared to R&D tax incentives, direct public funding might be better suited for young firms in that they often lack the upfront funds required to start an innovative project (Appelt et al., 2016[13]). As discussed below, there is room for increasing further direct government funding for business R&D in Lithuania.

Figure 2.7. Smaller firms have scope to improve innovation outcomes

2018



Note: Panel A: an enterprise is considered as innovative if during the reference period it introduced successfully a product or process innovation, had ongoing innovation activities, abandoned innovation activities, completed but yet introduced the innovation or was engaged in in-house R&D or R&D contracted out. Panel B: firms with completed "innovation activities" are those which implement product and/or process innovation and at least one innovation activity, such as R&D and acquisition of equipment or software, during 2016-18.
Source: Eurostat, the Community Innovation Survey 2018.

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Regular evaluations of the effectiveness of R&D tax incentives are essential to inform policy choices and further reforms. Lithuania has made no changes in the design of the R&D tax scheme since its introduction in 2008, nor has it modified the relevant administrative and compliance procedures (OECD, 2021[8]) (Box 2.2). The government is currently reviewing the tax incentive scheme. The aim is to increase the flexibility of the R&D and innovation support measures and reduce bureaucracy at all stages of innovation, while also improving the communication of R&D tax incentives to firms. The ongoing evaluation is important and needs to be completed as scheduled. Developing a comprehensive R&D database, including matched R&D activity and tax relief data, in line with initiatives in some OECD countries, is vital for assessing input additionality (i.e., the extent to which public support prompts R&D over and above the amount that would be undertaken without it), as well as output additionality (i.e., the outputs from R&D activities which would have been achieved without public support) and wider economic and social impacts (Appelt et al., 2016[13]; OECD, 2021[14]).

In addition, the key parameters of the R&D tax incentive scheme need to reflect evolving conditions. A recent reform in the United Kingdom, for instance, has broadened the scope of qualifying costs incurred in the context of R&D projects to include data and cloud computing (OECD, 2020[15]). Other countries further provide explicit tax incentives to promote business-research collaboration. For example, Japan

offers a dedicated R&D tax credit for collaborative/subcontracted R&D (Open innovation activity-based R&D tax credit) where firms benefit from an enhanced credit-tax rate of 30% for joint or contracted R&D with universities and national research institutes, 25% in the case of joint or contracted R&D with R&D venture corporations, and 20% in the case of joint or contracted R&D with other entities including large corporations (OECD, 2021[16]; OECD, 2021[17]).

It is also important to monitor on a regular basis the effectiveness of tax incentives for the commercialisation of patented inventions, as patent boxes (also referred as intellectual property regimes) may not be the most effective tool to stimulate innovation, especially among innovative start-ups and SMEs. Many OECD countries have introduced intellectual property regimes to complement tax incentives for R&D, but these schemes favour patent holders and may reduce incentives to innovate through risky experimentation, which is key to digital innovation (OECD, 2015[16]; Appelt et al., 2016[13]). Moreover, large, often multinational, corporations tend to be the main beneficiaries of these schemes, rather than young firms. A careful assessment of the benefits and costs of this type of tax incentive is therefore required.

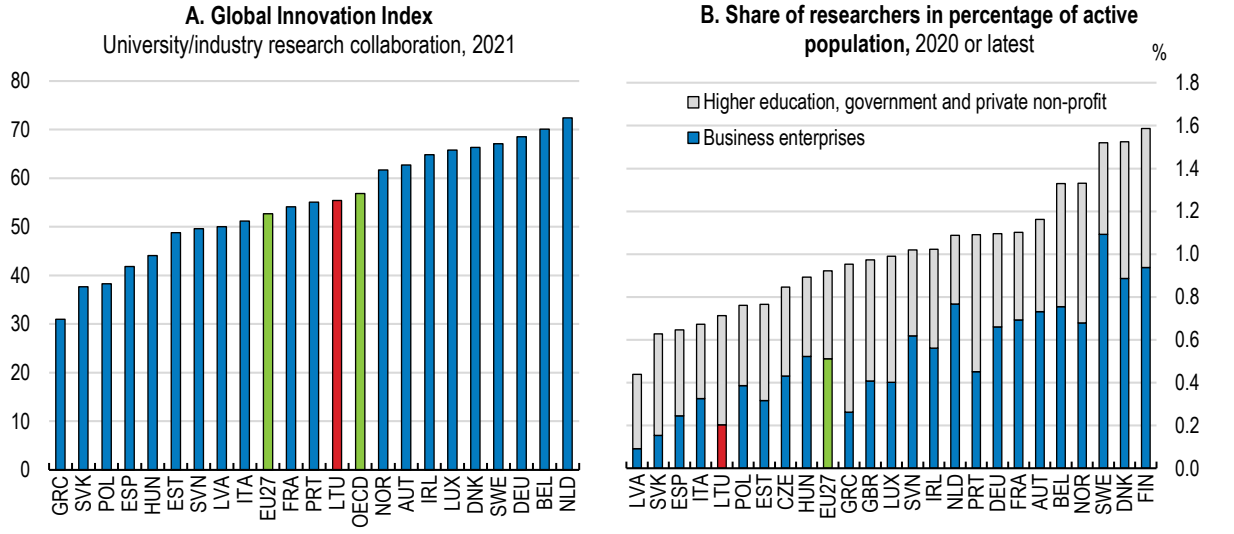
Lithuania has scope to increase direct funding for business R&D further, which is in principle particularly suited for young financially constrained firms (see above), as this support accounted for less than 20% of total in 2019, well below the corresponding EU share (Figure 2.6). Also, a large share of such support is earmarked for foreign investors. Going forward, it will be important to continue to boost direct funding for business R&D and ensure a balanced mix between tax incentives and direct funding. Cross-country evidence suggests that a combination of support is more successful in incentivising R&D investment by business, underlying their complementary (OECD, 2020[18]). As a positive step, the Innovation Promotion Fund, in operation since January 2021, supports investment in basic and applied research, as well experimental development and innovation. The new Fund is composed of allocations from the government budget, EU funds and other sources. Greater reliance on budgetary sources is welcome, given the relatively high reliance on EU funds. Support should also focus on business innovation with disruptive potential. Comprehensive evaluations of the funded projects based on rigorous cost-benefit analysis and systematic impact assessments are essential in this regard.

Moreover, it is important to set up a coherent system of support that would cover an innovation project as a whole, rather than particular steps in isolation, as is often the case under the current system, while also reducing fragmentation in the provision of support (IMF, 2017[19]; OECD, 2016[20]). The ongoing reform of the innovation system (discussed below) could help in this respect. Financial support needs to be accompanied by measures to raise awareness of the importance of R&D and innovation among firms and enhance their absorptive capacity, including though stronger business-research collaboration and improved digital skills. Initiatives, such as the Inospurtas project that provides innovation consultancy and support services through the involvement of public institutions, including the Lithuanian Innovation Centre and Science and Technology Parks, are welcome steps (OECD, 2021[21]).

Enhancing technology transfer through stronger collaborative research

Strengthening research-business collaboration remains an important challenge. Such partnerships facilitate knowledge exchange and the transmission of knowledge on advanced technologies, with high innovation and productivity potential for firms (Andrews, Criscuolo and Gal, 2015[22]; Guellec and Paunov, 2018[23]). There are many examples of well-established alliances between universities and business partners in Lithuania, even though they are limited to certain industries, especially biotechnology and laser industries (European Future Innovation Centre, 2020[24]). The level of collaboration falls below the OECD average and Nordic countries, although Lithuania fares well compared to other countries in Central and Eastern Europe (Figure 2.8). The mobility between the two sectors is also low, as indicated by the relatively low share of researchers in the business sector.

Figure 2.8. Business-research collaboration can be strengthened



Note: Panel A: country aggregates represent the unweighted averages of member countries. Panel B: EU27 stands for a weighted average of 27 EU members. Researchers are in full-time equivalent units.
Source: Global Innovation Index, 2021; and Eurostat.

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The benefits from collaboration are particularly large for small businesses, which often lack the necessary equipment and skilled personnel needed to innovate (Hewitt-Dundas, Gkypali and Roper, 2017[25]). The universities also stand to benefit through "valorisation" activities, including the commercialisation of research outcomes. However, academics consider a lack of private and public funding for collaborative research, including from universities themselves, and the focus on producing practical results by businesses as barriers to collaboration, according to opinion surveys (University-Business Cooperation in Europe, 2018[26]). The workload and bureaucracy related to collaborative research explains in part a comparatively low absorption capacity among SMEs. Firms also see the lack of researchers with business knowledge within universities and insufficient government funding for collaborative research as impediments to business-research collaboration (University-Business Cooperation in Europe, 2018[27]).

A range of measures have been introduced to improve research-business collaboration, including innovation vouchers for technical feasibility studies and for early stages of R&D projects, support for SMEs for the recruitment of researchers, and the establishment of science and technology parks for start-ups attached to a university. Knowledge transfer has also become more important with the establishment of technology transfer offices (TTO's) in universities that act as intermediaries between academia and the business sector. Moreover, a new funding formula for universities and research institutions, introduced in 2019, takes into account science-business collaboration, as well as activities related to international R&D programmes. These initiatives, along with Lithuania's Smart Specialisation strategy that sets priority areas for R&D and innovation, including promoting research-business collaboration (Box 2.1), have paved the wave for a more targeted approach to collaboration (Angelis et al., 2020[28]).

Boosting collaboration requires stimulating both interested parties. To incentivise businesses, the authorities should consider introducing specific programmes that connect SMEs with researchers, while strengthening incentives for engagement, based on the experience of other OECD countries. Australia, Canada and Korea, for instance, have developed such programmes (Box 2.3). To stimulate researchers to seek partnerships with industry, the government could introduce "engagement" criteria in the appointment and promotion arrangements for academics. Greater recognition of industry experience would also promote mobility between the research and industry sectors with large potential for facilitating knowledge flow. Industry-oriented doctoral studies currently cover only specific topics, mainly in the fields

of life science and laser, and are supported by a small number of companies in Lithuania. Further developing industry-oriented doctoral studies would be a move in the right direction. Such programmes broaden the opportunities of new research, while strengthening the innovation capacity of the firms. To enhance mobility between the business and research sectors some countries, such as Canada and the United Kingdom, provide financial support to firms to strengthen their incentives to hire students (Box 2.3).

Box 2.3. Enhancing business-research collaboration: some international practices

Several OECD countries have implemented programmes to promote business research collaboration, with a large variation in design. Specific examples include:

Programmes that connect SMEs and researchers

- Australia's Innovation Connections programme involves a network of dedicated facilitators that provides practical advice and mentorship to eligible SMEs, directing them to research expertise. It also provides financial support for collaborative projects through grants and incentives (CSIRO, 2022[29]).
- The Canadian Technology Access Centres grant programme aims to boost the innovative capacity of SMEs by helping them access specialised talent, expertise, equipment and technology in Canadian colleges (OECD, 2019[30]). It provides financial support to a network of 30 technology access centres throughout the country, which are small specialised, applied R&D centres affiliated with publicly-funded colleges located across the country.
- The Patent Commercialisation Platform in Korea employs experts that provide advice to SMEs and promotes technology transfer by matching SMEs with university technologies. It also provides follow-up financing for the commercialisation of these technologies by SMEs. The programme connects more than 8 000 SMEs with researchers from 24 universities (OECD, 2019[30]).

Policy initiatives to promote business-academia mobility of researchers

- Canada's Mitacs-Elevate programme consists of a one- to two-year research management training scheme for postdoctoral students. The programme deploys leading talent to the private sector, where they have the opportunity to lead industry research projects and gain business experience. The programme subsidises more than 80% of the salary (OECD, 2019[30]).
- The United Kingdom's Knowledge Transfer Partnerships (KTP) programme is a three-way partnership between a company, an academic or research organisation, and a suitably-qualified graduate (OECD, 2021[31]). The recruited graduate (Associate) works at the company for 12 to 36 months, depending on the project. A KTP is part-funded by a grant, while the company contributes to the salary of the Associate and the cost of the supervisor. The amount to be provided by the company depends on the scale and length of the project.

Innovation voucher programmes

- Several countries, including Lithuania (see text), offer innovation vouchers to support the purchase of services by firms from research institutions. The design of vouchers differs across countries. In terms of eligibility criteria, for instance, in countries such as Estonia, the Netherlands and Portugal the innovation voucher programmes focus on SMEs or start-ups, while in others, including Lithuania, the provision of innovation vouchers is not subject to firm size (OECD, 2019[30]). Knowledge providers need to be certified in the majority of the countries offering innovation vouchers.

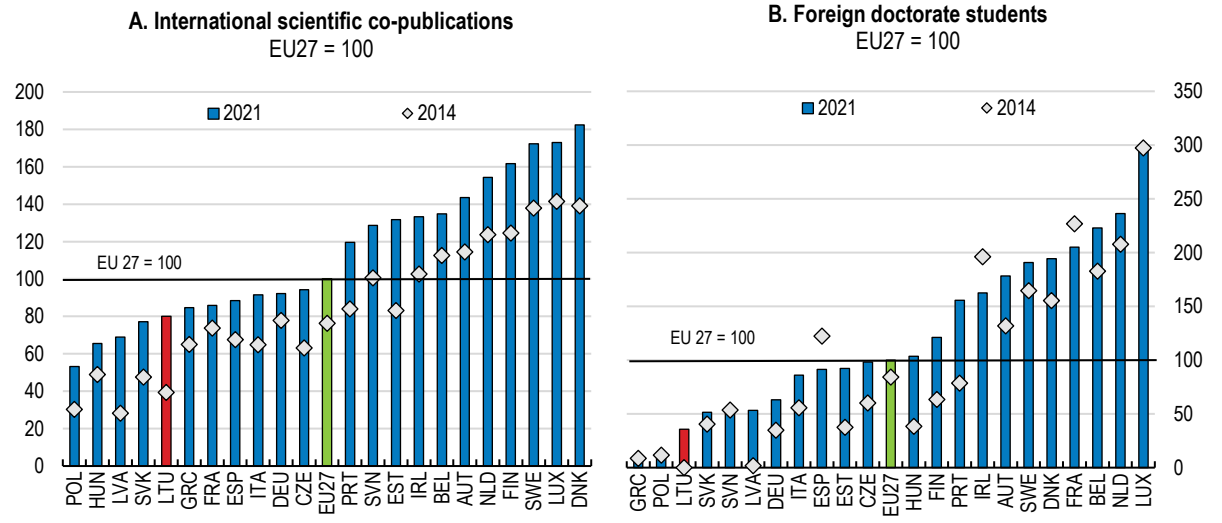
Well-functioning technological transfer offices (TTOs) can play an important role. TTOs are relatively young institutions (up to 10 years) in Lithuania, growing slowly. Therefore, it is still early to evaluate their impact on collaborative research. The digital era reinforces the need for effective intellectual property management, given the importance of data as inputs and outputs of digital innovation (Guellec and Paunov, 2018[23]). It is important, in this context, that TTOs are well resourced, and their staff has strong skills and expertise in the management of intellectual property. In view of the small size of the Lithuanian innovation system and relatively large number of universities, consideration could be given to pool the TTO expertise and resources in the country, focusing on the two or three best-positioned universities and research organisations, as recommended by the 2016 OECD *Innovation Review for Lithuania* (OECD, 2016[20]). At the same time, universities need to develop technology transfer strategies that include clear and sufficiently ambitious objectives, accompanied by a comprehensive set of indicators to monitor relevance and impact.

In this regard, there is clearly merit in the foreseen establishment of an ICT competence centre to strengthen links between business, academia and public authorities on the development of technologies, products and services and the commercialisation of outcomes. Involving researchers and businesses, as well as other system players, in the development process of science, technology and innovation (STI) policy would also have beneficial outcomes in terms of collaboration (Angelis et al., 2020[28]). As a positive step, the national Recovery and Resilience Plan envisages support for mission-based science-business cooperation (Government of the Republic of Lithuania, 2021[32]). The missions will include funding for both R&D activities and necessary infrastructure and will be implemented in the course of 2022, with the participation of business and research consortia. The topics to be covered by the missions have been identified through public consultation and submitted for approval to the Science and Innovation Council. An increasing number of countries have implemented mission-oriented innovation policies in order to address intensifying societal challenges, such as climate change (Larrue, 2021[33]). In essence, these are co-ordinated packages of policy and regulatory measures tailored specifically to mobilise science, technology and innovation in order to address these challenges, in a defined timeframe.

International collaboration in research is another important channel of knowledge flow and technology transfer. This is even so for small countries like Lithuania that need to tap into global science and innovation networks to enhance their own capacities and achieve critical mass (OECD, 2016[20]). Lithuania participates in several European cooperation programmes, such as Horizon 2020 and Erasmus+. There is still scope, however, to increase the scale of international cooperation in research. Indicators such as international co-publications and the share of foreign doctoral students are below the EU average, despite increases in recent years (Figure 2.9). Enhancing the performance of tertiary education that lags behind in international comparison (Chapter 1) is important, but stronger international linkages in research also require making internationalisation a core element in the research strategies of universities and research institutions, as recommended by the OECD *Review of Innovation Policy for Lithuania* (OECD, 2016[20]). Improving the funding conditions for joint projects between Lithuanian institutions and international research groups and reducing red tape for such projects is vital in this regard.

Figure 2.9. International research linkages remain weak

2020



Note: In Panel A, International scientific co-publications refer to the number of scientific publications with at least one co-author based abroad (where abroad is non-EU for the EU27) per million population. In Panel B, the data refer to the share of foreign doctoral students in overall doctoral students.
Source: European Commission, European Innovation Scoreboard 2021.

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The ongoing reform of the innovation system is a step in the right direction

More generally, Lithuania's innovation system suffers from a number of long-standing weaknesses that need to be addressed. They include a lack of co-ordination among government institutions, fragmentation of programmes and implementation of policies, and overall complexity. The OECD *Review of Innovation Policy for Lithuania* (OECD, 2016[20]) has called for an integral improvement of the overall governance of the innovation system, and a consolidation of agencies and support programmes, to be accompanied by a comprehensive review of innovation-related programmes. Reforms in 2018 have changed the governance of the innovation system in important ways, including defining the role of the Science, Technology and Innovation Council, but fragmentation remained high (OECD, 2021[21]).

The National Progress Plan (NPP) for 2021-30 sets the improvement of the science, technology and innovation (STI) system as a key strategic goal. The reform seeks to address unclear institutional responsibilities and the duplication and overlapping of functions, as well as providing innovation promotion instruments that cover all stages of the implementation of innovative activities (both R&D and innovation), rather than particular steps in the process, while also increasing the flexibility and effectiveness of such instruments. A core element of the reform is the establishment of a single Innovation Agency, scheduled to be in full operation in the course of 2022**,** that will consolidate the innovation promotion functions currently spread across various agencies. Moreover, the Innovation Promotion Fund (see above) is set to be expanded to ensure an effective financing of R&D and innovation activities and contribute to their development. Plans also include the establishment of a network of science offices to strengthen relevant expertise in the ministries (OECD, 2021[21]). In addition, the number of Smart Specialisation priority areas will be reduced in an attempt to make the innovation policy more focused (European Commission, 2021[7]) (Box 2.1).

The announced reforms go in the right direction and should be implemented swiftly. Yet, reform could go further to encompass more agencies based on a careful assessment. Streamlining the numerous strategic documents on innovation would help clarify the overall direction of policies and reinforce strategic orientation by reducing the risk of overlapping and, possibly, competing policy priorities. Regular monitoring

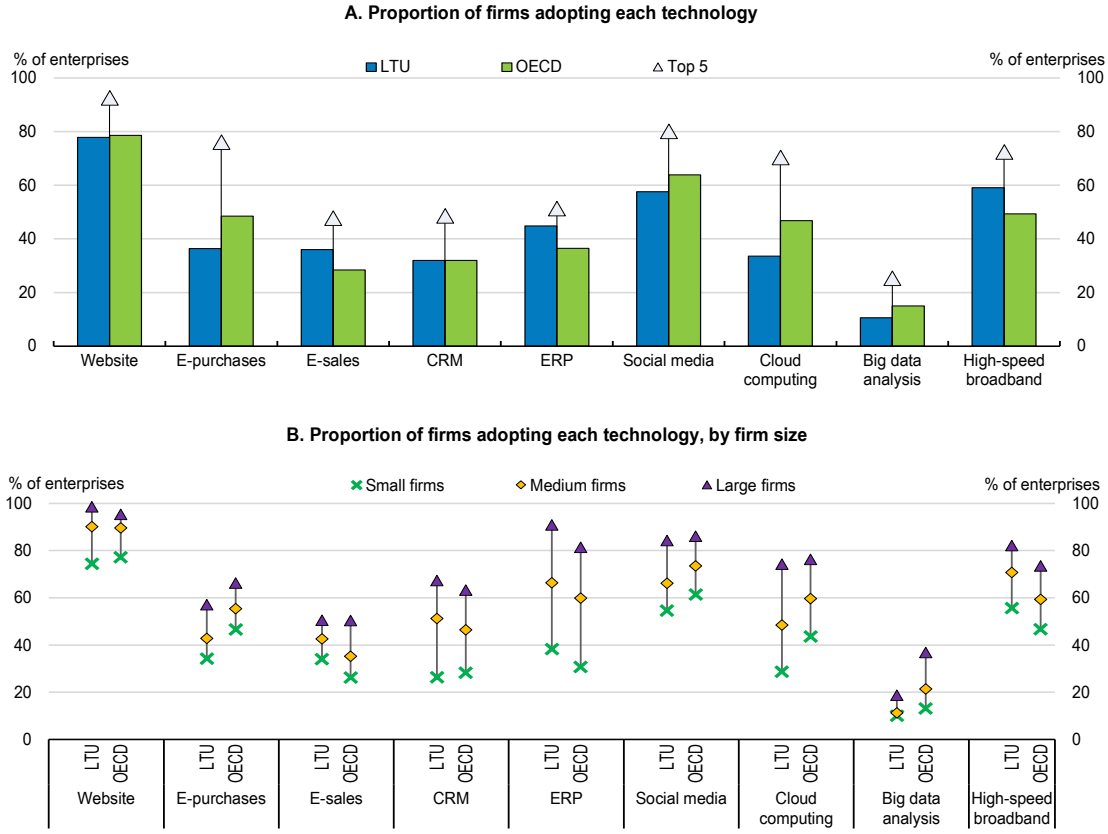
of the effectiveness of innovation-related programmes would ensure a balanced provision of such programmes and make it easier to adjust the portfolio of relevant policy instruments if outcomes are not in line with intentions. At the same time, it is essential to ensure sufficient domestic funding to safeguard the continuity of innovation reforms and support of R&D and innovation activities beyond the end of the period covered by the EU Recovery and Resilience Plan.

Fostering the digital transformation of firms, especially smaller ones

There is scope to boost the digitalisation of firms, especially the smaller ones, and make the use of advanced technologies more effective. The uptake of some digital technologies, such as e-sales and enterprise resource planning software, exceeds the OECD average, but Lithuania underperforms in terms of the adoption of digital tools such as big data analysis and cloud computing, which are important for more comprehensive digital transformation and data-driven innovation (Figure 2.10). Smaller firms, accounting for the bulk of total businesses in Lithuania, lag behind in all technologies. Translating innovations, such as big data and cloud computing, into productivity gains nevertheless requires effective use of these technologies to improve or produce new business processes and products. Many small firms in Lithuania lag behind in this regard (Figure 2.7). Disparities in the take-up and effective use of digital technologies may explain to an extent the productivity dispersion across firm size and the relatively long tail of low-productivity firms in the country (Figure 2.11). Fast progress in digitalisation can help Lithuania explore and make the most of innovation niches, while yielding productivity gains. The fintech sector is a successful example in this respect (Box 2.4).

Figure 2.10. There is scope for greater uptake of digital technologies, especially by smaller firms

2021 or latest



Note: For Lithuania, data for E-purchases refer to 2018, data for Big data analysis to 2019, and data for E-sales to 2020. “Top 5” refer to the average of the five best performers. “Small" stands for enterprises with 10-49 employees, "Medium" for enterprises with 50-249 employees and “Large” for enterprises with 250 employees and over. Total refers to the enterprises with at least 10 employees.
Source: OECD, ICT Access and Usage by Businesses database.

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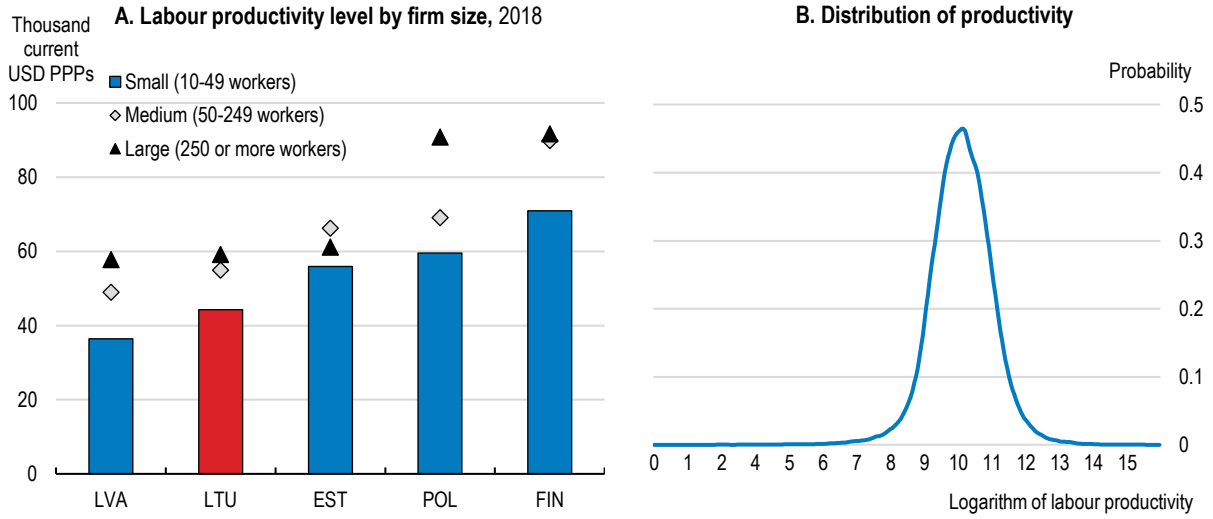
Figure 2.11. Smaller firms lag behind in productivity

Labour productivity, business economy, current PPPs, 2018



Note: In Panel A, labour productivity is measured as value added per person employed. Business economy comprises the ISIC Rev. 4 industry codes B to N, excluding financial and insurance activities. In Panel B, labour productivity is computed as the ratio of real value added and the number of employees. Agriculture, finance and insurance activities are not included. The sample includes enterprises with 10 or more employees. The estimates cover the period 2010 and 2020. The labour productivity distribution function depicts the probability for a firm to have the level of productivity (in log) shown on the horizontal axis.

Source: OECD Compendium of Productivity Indicators; and OECD estimates based on Structural Business Statistics firm-level data provided by Statistics Lithuania.

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Box 2.4. Fostering technology-based innovation in the financial sector

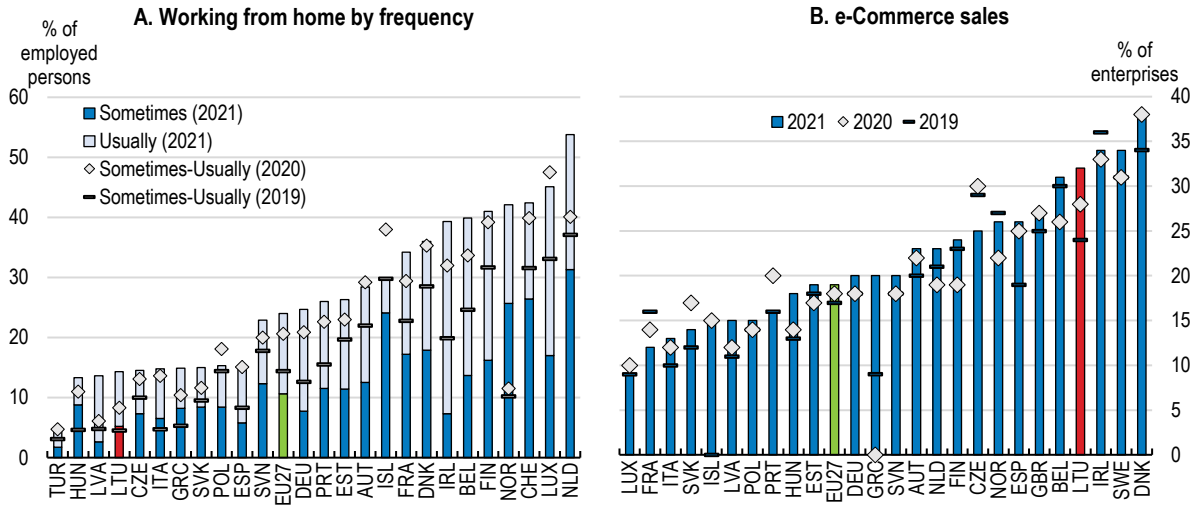
Lithuania has made notable progress in recent years in the field of financial technology (fintech). This allowed the country to develop and adopt innovative technology-based solutions for financial services. The fintech sector, encompassing currently 265 firms (both domestic and foreign), provides a wide array of services, products, and business models including payment and electronic money institutions, specialised banks, peer-to-peer lending and crowdfunding platforms, security brokers and investment management and insurance companies (ECOVIS, 2020[34]) (Figure 1.14, Chapter 1).

The development of fintech owes much to a supportive regulatory environment and payments infrastructure, and a sandbox that allows participants to test their financial innovations in a live environment under the supervision of the central bank. The sandbox has also been used in cross-border testing of climate change-related data analysis. Moreover, a blockchain-based sandbox (LBChain) combines technology and regulatory infrastructures to enable financial and fintech companies, including start-ups, to carry out blockchain-oriented research, test and adapt blockchain-based services and provide innovations to their customers (ECOVIS, 2020[34]). Non-regulatory tools include initiatives, such as the Newcomer programme, which is focused on pre-licensing support. Since 2016, more than 650 participants have entered the Newcomer programme from more than 70 countries. Innovations explored or implemented through these tools include the development of peer-to-peer insurance platforms and other financial services. The Financial Market Development Center, established in the central bank in early 2022, is dedicated to attract new market entrants and financial services in Lithuania (see below).

Lithuania is introducing new national guidelines for developing the fintech sector, with the participation of public and private stakeholders (Invest Lithuania, 2021[35]). Emphasis remains on promoting the use of digital financial services, fostering the creation of technological innovations, ensuring the future growth and maturity of the fintech sector and strengthening risk management.

As in other countries, the uptake of digital tools, such as teleworking and e-commerce, has increased since the onset of the pandemic, helping businesses to maintain and/or expand economic activity (Figure 2.12). Barriers to digitalisation, especially for small firms, nevertheless remain. Increasing the take-up of high-speed broadband, upgrading skills and a higher use of e-government (discussed further below) could boost the digital uptake, with associated productivity dividends (Sorbe et al., 2019[4])(Figure 2.13). Reducing regulatory barriers to competition and easing financing conditions of young and innovative firms are also associated with a higher use of digital technologies and productivity gains. To enhance the impact, pro-competitive regulations need to be combined with insolvency regimes that do not over-penalise entrepreneurial failure and sufficiently flexible labour market regulations, with particularly large benefits for smaller firms (OECD, 2019[36]; Sorbe et al., 2019[4]). For smaller firms going digital, however, it is also vital to address several additional size-related barriers in terms of awareness, knowledge on what digital tools they need and how to integrate and use them effectively, as well as managerial competence.

Figure 2.12. The pandemic-related crisis has accelerated the use of digital tools



Source: European Labour Force Survey data following Ker, D., P. Montagnier and V. Spiezia (2021), "Measuring telework in the COVID-19 pandemic", OECD Digital Economy Papers, No. 314, OECD Publishing, Paris, https://doi.org/10.1787/0a76109f-en; and Eurostat.

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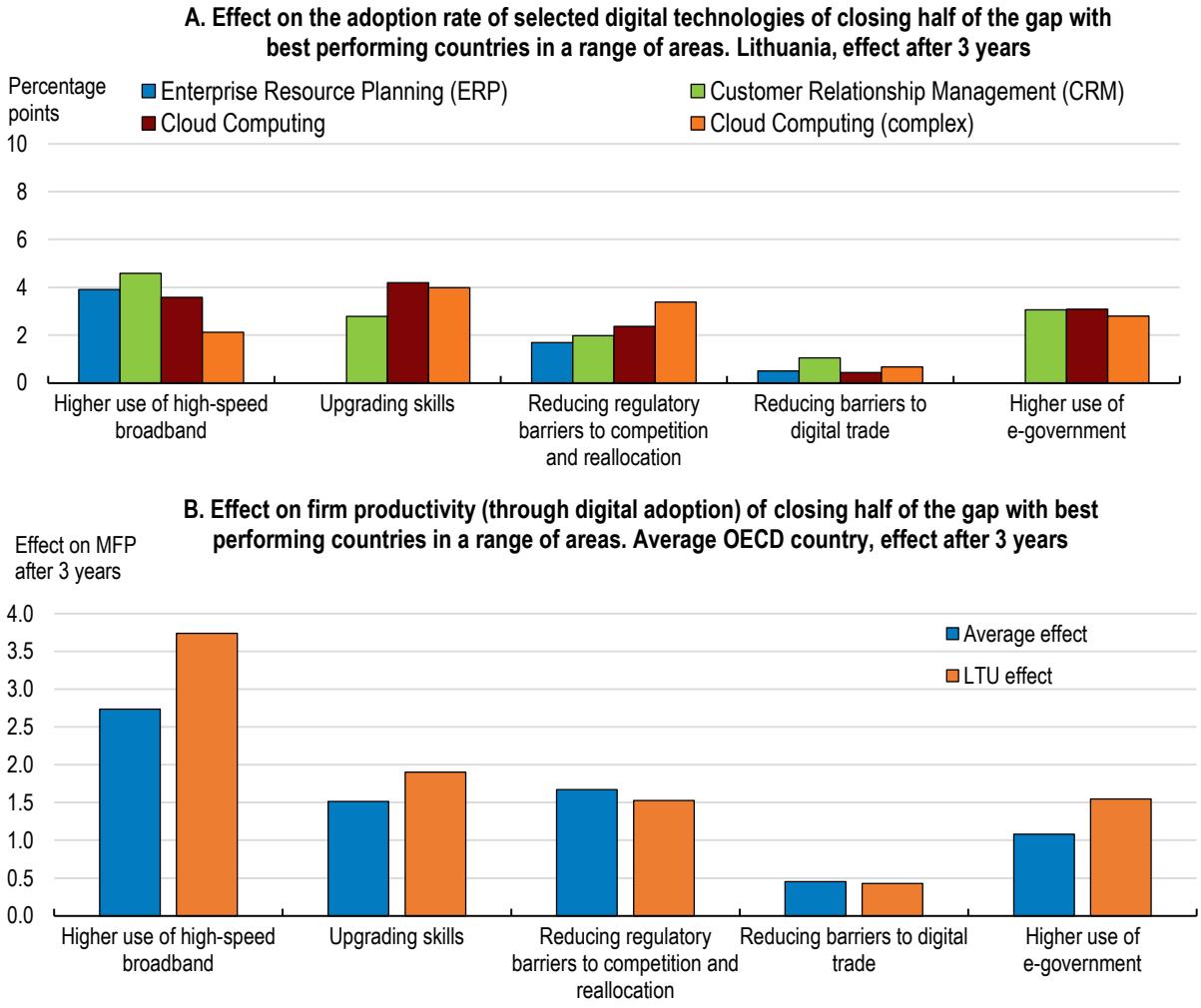
Figure 2.13. A range of policies can support productivity through digital adoption in Lithuania



Note: Estimated effect on the average digital adoption rate (Panel A) and the multi-factor productivity (MFP) of the average firm (Panel B) of a range of policy and structural factors. The effect of "Higher use of high-speed broadband" on productivity combines the direct and indirect effects. "Upgrading skills" covers quality of management schools. "Reducing regulatory barriers to competition and reallocation" includes lowering administrative barriers to start-ups and relaxing labour protection on regular contracts. For each of the underlying indicators, it is assumed that half of the gap to the best performing country in the sample is closed. It is also assumed that policy factors in each group are largely independent from each other. Results are presented for the average OECD country.
Source: Sorbe et al., 2019.

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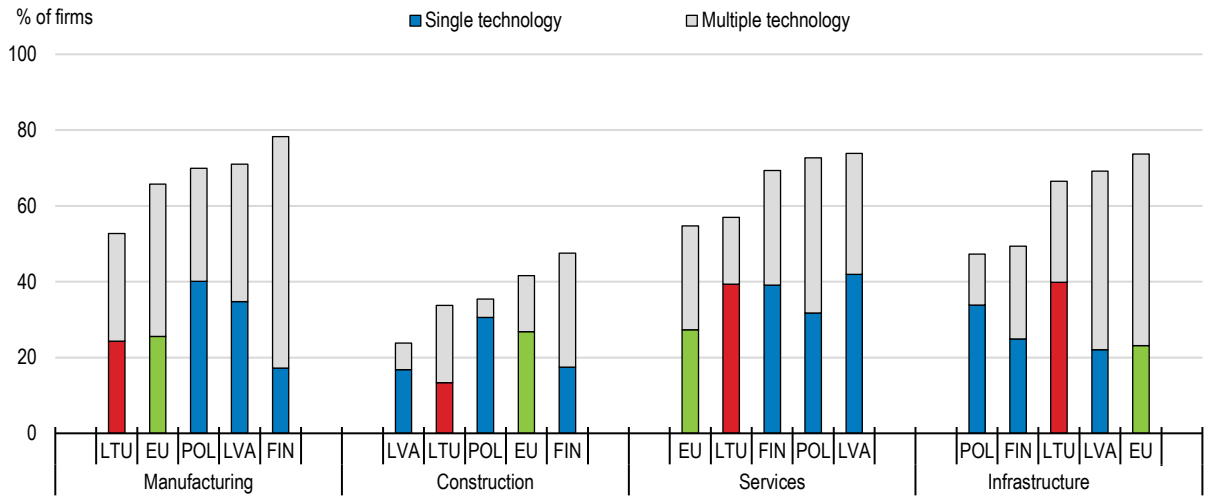
The prevalence of SMEs in Lithuania makes it very important that this segment of the economy is encouraged to switch to digital technologies to reduce the productivity gap between small and large firms and address structural challenges after the pandemic. This would also help with the digitalisation of manufacturing, which is the largest sector of the Lithuanian economy, and it still lags behind the EU average in terms of digitalisation and productivity (Figure 2.14) (Lithuanian Innovation Center, 2020[2]). Smaller enterprises account for the bulk of total enterprises in manufacturing, but only a quarter of such firms reported plans to digitise within the next two to three years, according to 2020-2030 Industry Digitisation Plan, raising important concerns (Lithuanian Innovation Center, 2020[2]). The sections below discuss policy enablers for the successful digital transition of firms.

Figure 2.14. The Lithuanian manufacturing sector lags behind in terms of digitalisation

Adoption of digital technologies by sector, 2021



Note: A firm is identified as "digital, single technology" if one digital technology is implemented in parts of the business and/or if the entire business is organised around one digital technology. A firm is identified as "digital, multiple technologies" if at least two digital technologies are implemented in parts of the business and/or if the entire business is organised around at least two digital technologies. Different digital technologies are chosen depending on the sector. In manufacturing sector, firms are surveyed about the use of (a) 3D printing; (b) robotics; (c) the internet of things; and (d) big data/artificial intelligence. Firms in construction sector are surveyed about the use of (a) 3D printing; (b) drones; (c) the internet of things; and (d) virtual reality. Firms in services sector are surveyed about the use of (a) virtual reality; (b) platforms; (c) the internet of things; and (d) big data/artificial intelligence. Firms in infrastructure sector are surveyed about the use of (a) 3D printing; (b) platforms; (c) the internet of things; and (d) big data/artificial intelligence.
Source: European Investment Bank, Investment Survey data.

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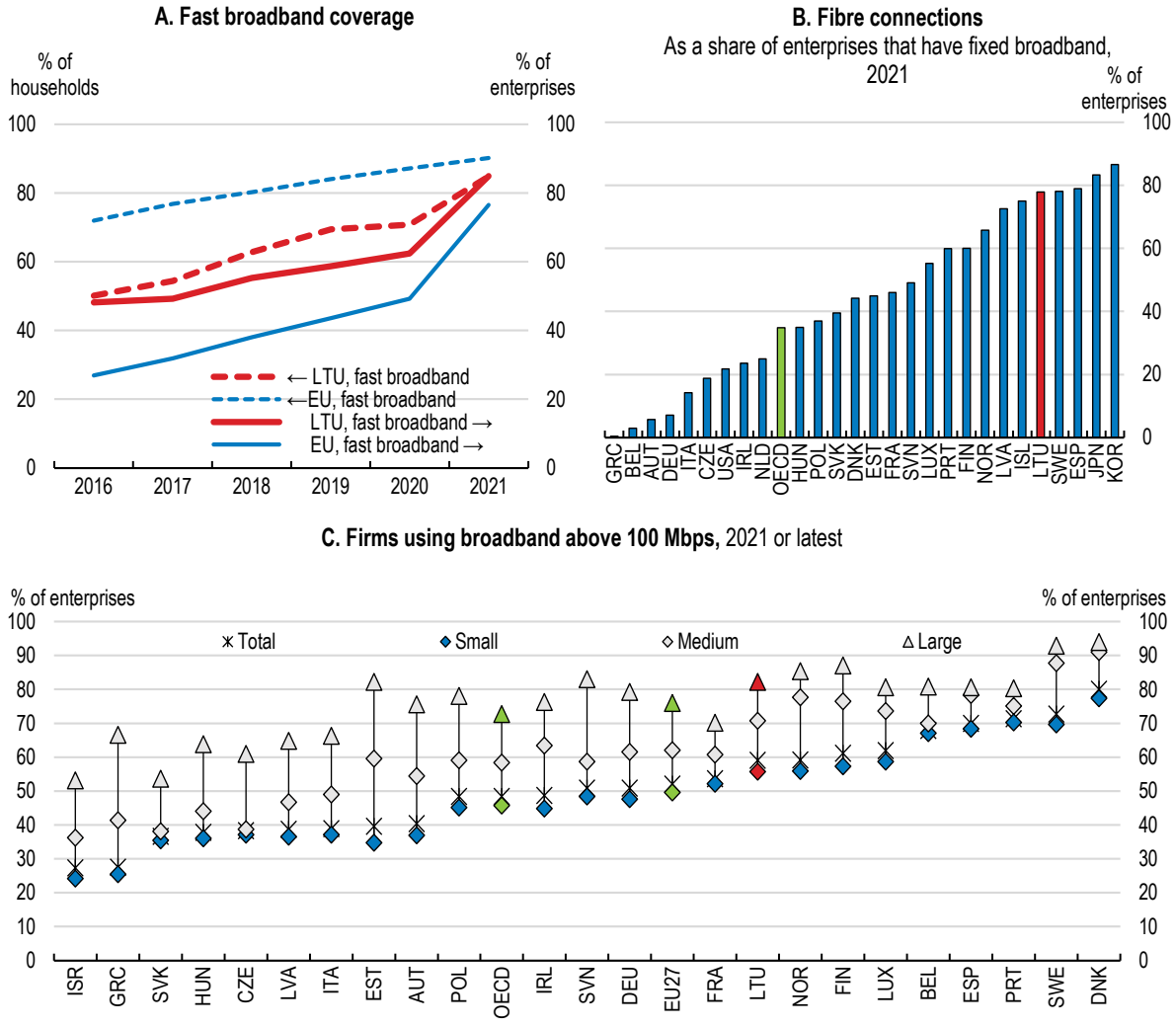
Digital connectivity needs to improve

Lithuania has made progress towards improving digital connectivity. Around 85% of households were covered by fast broadband in 2021, up from 50% in 2016, and most firms have broadband connection (Figure 2.15). The share of fibre connections in total fixed broadband is close to the levels of top performing countries, supporting fast data transmission required for the adoption of advanced technologies. 4G coverage is almost universal. There is scope, however, to increase further the share of firms with high-speed broadband connections (at least 100 Mbps), especially among smaller firms. Recent OECD estimates reveal productivity gains from higher take-up of high-speed broadband (Sorbe et al., 2019[4]) (Figure 2.13).

Figure 2.15. Digital connectivity increased, but high-speed broadband could be used more by firms



Note: Panel A: there has been a methodological change in the definition of the share of enterprises that have a fast broadband (at least 30 Mbps) in 2021, Nace Rev.2 sector 75 (research and development activities) have been included.
Source: European Commission, Digital Economy and Society Index Report 2022, DESI | Shaping Europe's digital future (europa.eu); OECD, ICT Access and Use by Businesses database; and OECD, Broadband Portal, http://www.oecd.org/sti/broadband/broadband-statistics/ retrieved 24 February 2022.

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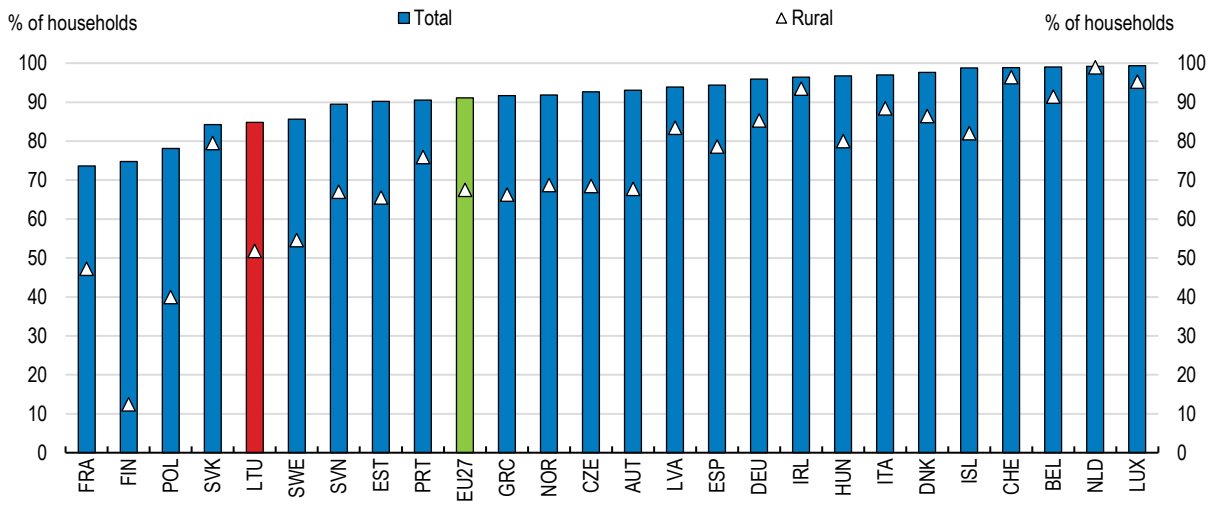
Despite progress, gaps in digital connectivity remain. The share of households with access to fast broadband lags behind the EU average, especially in rural areas (Figure 2.15, Panel A and Figure 2.16). As in other countries, rural and remote areas tend to be less attractive for private investment in ICT infrastructure in view of the higher deployment costs, thereby requiring additional public investment (OECD, 2021[37]). Ongoing efforts focus on further improving digital connectivity and addressing the urban-rural digital divide, including through the renewed National Broadband Plan 2021-2027 (Box 2.1). It is essential to continue applying cost-benefit analyses to identify, at a minimum, priorities regarding the expansion of the network over time. Further use of high-speed broadband and the deployment and a take-up of 5G will allow businesses to face increasing data demand in the near future (OECD, 2019[38]).

Figure 2.16. Broadband coverage is lower in rural areas

Households in areas where fixed broadband with a speed of 30 Mbps or more is available, as a percentage of households in the total and rural categories, June 2021



Note: Following the methodology of OECD (2019), Measuring the Digital Transformation https://doi.org/10.1787/9789264311992-en, coverage of NGA technologies (VDSL, FTTP, DOCSIS 3.0) capable of delivering at least 30 Mbps download was used to estimate the coverage.
Source: European Commission, Broadband Coverage in Europe in 2021.

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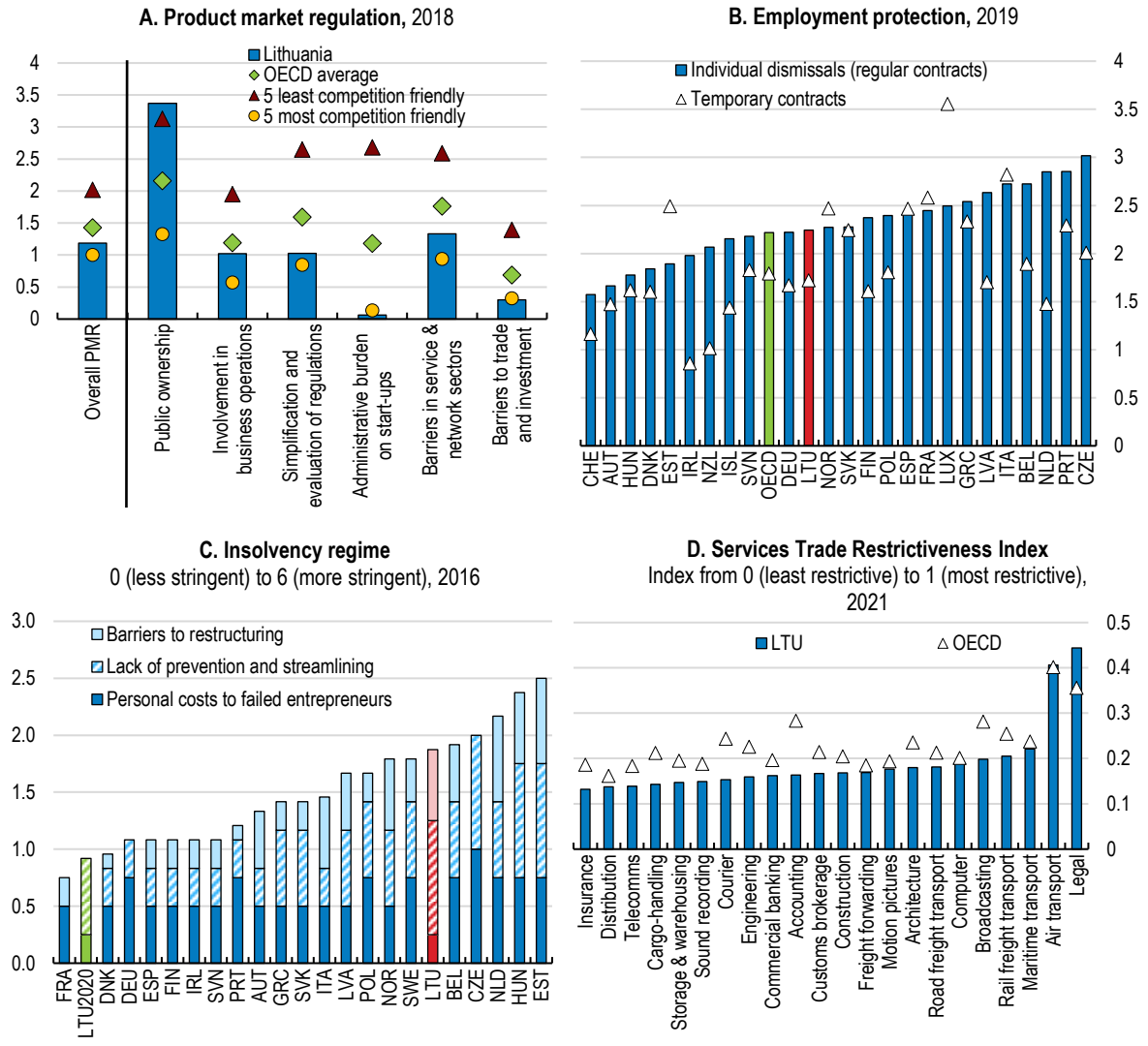
Framework conditions are business-friendly but can improve further

Lithuania's regulatory framework is business-friendly. Barriers to market entry are well below the OECD average, and the administrative burden for setting up a new business is among the lowest among OECD countries (Figure 2.17). Since 2014, Lithuania has been applying a "one-in, one-out" rule for the administrative burden faced by businesses with biannual plans for selected sectors. Lean regulations for product markets are combined with relatively flexible labour market regulations. Reforms in 2017, under the new Labour Code, relaxed stringent dismissal rules, while strengthening social protection (OECD, 2018[12]).

Insolvency procedures were eased markedly in 2020 (Figure 2.17, Panel C). The new regime has accelerated timely initiation and resolution of personal and corporate insolvency proceedings, while providing business with more options for restructuring, rather than exit, and accelerates court procedures (OECD, 2020[39]). A restructuring plan can be currently approved without the consent of the shareholders of the legal entity or the creditors, thereby increasing the opportunities for approval. By facilitating the restructuring of companies, the new insolvency regime has the potential to enhance incentives for disruptive innovation and increase the uptake of digital technologies.

As a further step towards improving the regulatory framework, the government plans to review overly complex licensing mechanisms in priority sectors, with the aim of replacing, where possible, licensing by business oversight or possibly move to a lighter declarative licensing model. A licensing review for the health care sector is under way. The reform is appropriate and needs to be implemented swiftly in all priority sectors. Simplifying the licence procedures for firms helps to make the regulatory environment even more business-friendly, thereby stimulating entry of young firms -- a vital part of the digital innovation landscape.

Figure 2.17. The regulatory framework is business-friendly but could improve further



Note: In Panel C, the figure shows values for 2016, except Lithuania for which the pre-reform 2016 and post-reform 2020 values are presented.
Source: OECD, Product Market Regulations Statistics database; OECD, Strictness of Employment Protection database; "The design of insolvency regimes across countries", OECD Economics Department Working Paper, No. 1504, 2018; and OECD, Services Trade Restrictiveness Index database.

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Removing remaining regulatory barriers to foreign direct investment would accelerate digitalisation and boost productivity by bringing know-how to the country and enhancing innovation activity. New provisions enacted in 2021 simplified the conditions for investors from non-EU countries to transfer their employees to Lithuania. Notably, it is no longer required that the qualifications or work experience of such employees be assessed by the Public Employment Services, which represents an important easing of the regulation underlying the migration of firm-specific human capital from non-EU countries, encouraging the relocation of non-EU firms to Lithuania. In addition, the 2021 provisions eased the migration procedures for computer specialists from countries outside the European Union, helping businesses to expand given that such skills are in short-supply in Lithuania. Some barriers for foreigners to do business in Lithuania nevertheless remain in some important sectors, notably legal services, reflecting burdensome requirements of recognition of foreign qualifications (Figure 2.17, Panel D) (OECD, 2021[40]). Moreover, stringent economy-

wide regulations impose limitations on the acquisition of real estate by foreigners, except nationals from European Economic Area and OECD countries, while a minimum amount of capital must be deposited for the registration of a limited liability company.

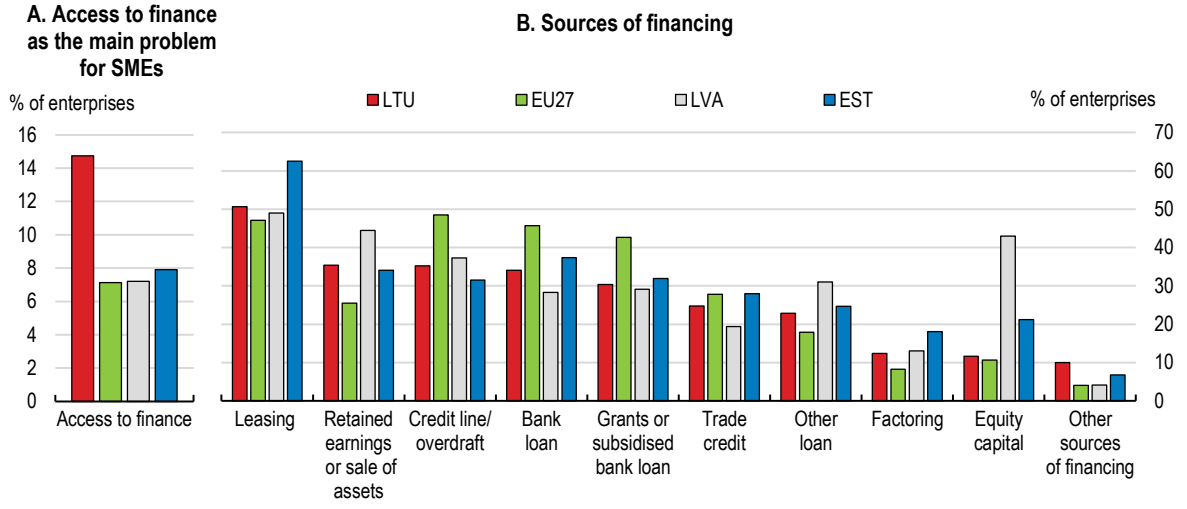
The digital transformation poses new challenges for regulatory frameworks and competition policy. Digitalisation promotes competition in many product and service markets through the increased use of data and cross-border mobility, with potential benefits for consumers in the form of lower prices and broader choice of products (OECD, 2020[41]). However, digitalisation can also raise barriers to entry because of economies of scale and scope and network effects (i.e. gains enjoyed by consumers of a product when the number of users increases), which can strengthen the market position of dominant firms ("winner takes most dynamics") (OECD, 2022[42]). In particular, digital technologies can create barriers to entry, which provide a competitive edge to digital platform incumbents. As a result, new regulatory frameworks may be needed to address competition challenges arising from digitalilastion (OECD, 2021[43]). Existing sector regulatory frameworks may also need to be re-assessed. In the United Kingdom, for instance, a new council (the Regulatory Horizon Council) has been established to advise the government on regulations that may need to be reformed to keep pace with technological change. Moreover, an Innovation Test has been piloted to ensure that the impact of regulation on innovation is taken into consideration in the early stages of policy making (OECD, 2021[44]).

Broadening the range of financing sources for firms

Broadening the range of financing sources is important to ease access for SMEs and support investment in digital assets. Around 15% of small and medium-sized (SMEs) firms in Lithuania report difficulties in accessing finance, almost twice the EU average (Figure 2.18, Panel A). According to recent research, the main factors limiting credit for SMEs include a lack of acceptable collateral, a lack of information on available financing options and poor financial literacy (Bank of Lithuania, 2021[45]). Survey data suggest that 23% of Lithuanian SMEs identify the insufficient collateral or guarantee the most important obstacle to obtain external financing (European Commision, 2021[46]). As in other countries, firms facing financial constraints are often young innovative SMEs, with high growth potential.

Figure 2.18. SMEs in Lithuania rely more on bank lending than equity financing

2021



Source: European Commission, Survey on the Access to Finance of Enterprises (SAFE) wave 25.

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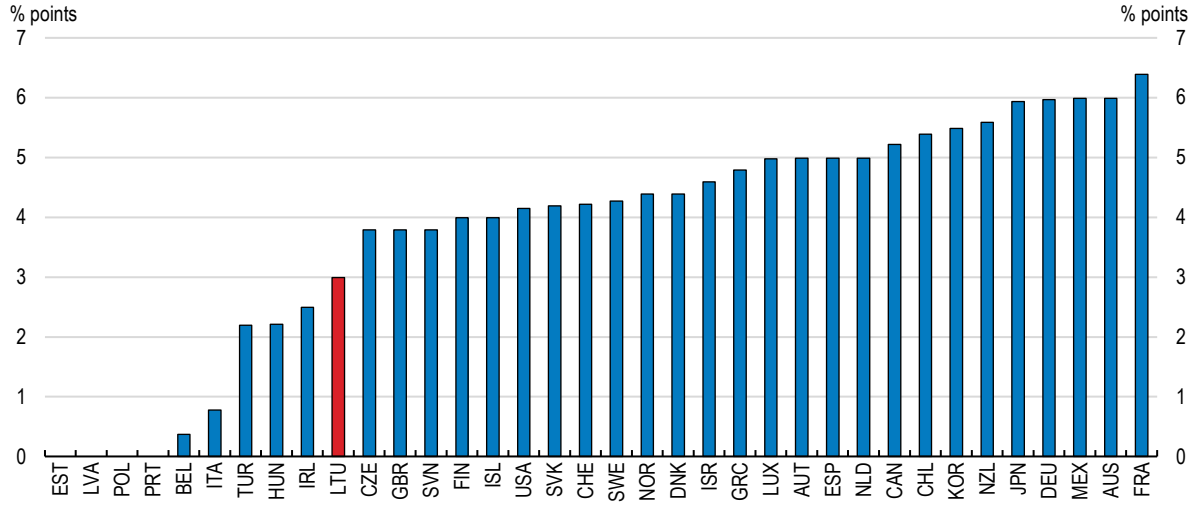
Equity financing needs to develop further. Enhancing access to equity for small and young firms can boost digitalisation by allowing more intangible investment (Demmou, Franco and Stefanescu, 2020[47]). The share of SMEs in Lithuania making use of equity finance is on par with the EU average, but bank lending remains the main source of external finance (Figure 2.18, Panel B). As with other countries, this may reflect, to an extent, more favourable tax treatment for debt than for equity finance (Figure 2.19). While corporate income tax systems allow deductibility of interest expenses in general, equity finance is not deductible, making it relatively costly compared to debt financing (Sorbe et al., 2019[4]). Lithuania limits the interest deductibility, including through the application of a thin capitalisation rule. Some countries, such as Belgium, Italy and Portugal have introduced an allowance for corporate equity (ACE), to address the asymmetry in tax treatment and make equity financing more attractive (Demmou et al., 2021[48]; OECD, 2021[14]). If well-designed, ACE can reduce leverage at the firm level, with the additional advantage in the post-COVID-19 era to provide support for firms without creating potential debt overhang problems (Branzoli and Caiumi, 2020[49]; Demmou et al., 2021[48]). Greater awareness among firms of equity financing instruments could also increase take-up. For instance, Portugal has developed a platform available to entrepreneurs that includes information on financial instruments (OECD, 2021[50]).

Figure 2.19. The debt-bias in the Lithuanian corporate tax system could be reduced

Differences in effective tax rates for equity and debt financing, 2020



Source: OECD, Corporate Tax Statistics.

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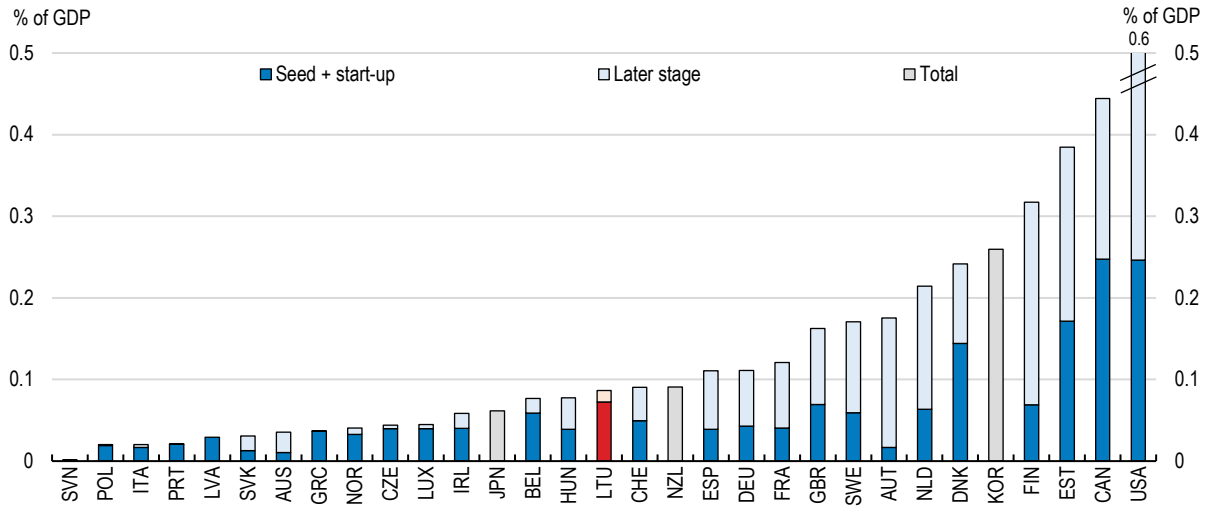
The government supports SMEs through loans with preferential rates to obtain the necessary financing to start a business. Moreover, the national promotional institution INVEGA (Investment and Business Guarantees) provides guarantees of loan repayment for companies that do not have sufficient collateral (OECD, 2020[51]). INVEGA has also started providing direct loans to young SMEs. This is a positive step towards facilitating access to funding for firms that are not financed by private financial institutions. The coverage of INVEGA loans should be expanded on the basis of careful assessment, targeting firms with a high innovation and productivity potential.

Venture capital (VC), an important source of investment of innovative start-ups, is growing but is still less developed than in many OECD countries (Figure 2.20). Several VC funds were designed by the government to support young firms with high innovation potential, including the Accelerator Fund, in particular, in operation since 2019, and a new venture capital instrument ("Accelerator 2") since 2021 that will gradually replace the Acceleration Fund. The new accelerator scheme provides mentoring and acceleration services, in addition to investing in start-ups (EC-OECD, 2021[52]). The availability of venture capital could increase further (Figure 2.20). In addition, there are concerns that a large number of financial assistance measures are targeting early-stage start-ups, whereas relatively few address business upscaling needs (OECD, 2021[21]), with scope for a more balanced financing of the different stages of the start-up life-cycle. The government should consider engaging indirectly, through privately-owned venture funds, rather than directly in VC activity, in line with international experience. Indeed, most OECD countries have moved progressively towards co-investment funds and funds-of-funds that aim to leverage private investment on the rationale that government funding is most effective when disciplined by private management (Demmou and Franco, 2021[53]).

Figure 2.20. Reliance on venture capital could increase

Venture capital investments, 2021 or latest year



Note: Venture capital (VC) is private equity capital provided to young enterprises not quoted on a stock market. VC stages are defined according to the OECD VC Harmonised Stages definition and include support for pre-launch, launch and early stages under "Seed/start-up/early stage", which also includes support provided by angel investors, and support for expansion and growth stages under "Later stage". Data refer to 2020, except for Australia (2019) and the United States (2019).
Source: OECD (2021), OECD Enterprise Statistics database.

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Financial technology (fintech) offers new digital financing solutions that can help to bridge the funding gap for young innovative firms, while also increasing competition in the SME lending and funding activities. Fintech lenders (non-banking lending participants), such as crowdfunding platforms, participate actively in the financial market in Lithuania (Box 2.5). Around 15% of the funding raised by the Lithuanian businesses in 2021 was attracted by fintechs alone (Invest Lithuania, 2021[35]). The authorities expect increased activity in this segment of the market, as a result of the EU-wide harmonisation of crowdfunding regulation in November 2021. There is scope, however, to better connect companies and investors (OECD, 2020[51]).

Box 2.5. Crowdfunding: an alternative source for financing SMEs with high-innovative potential

Crowdfunding can complement venture capital, especially in the case of start-ups at early stages. In particular, crowdfunding enables start-up companies to raise capital from a large group of financially unsophisticated individuals through open online platforms. Peer-to-peer lending can be particularly attractive for young innovative firms that lack credit records or collateral for bank loans. In addition to providing an alternative source of finance for young firms, crowdfunding works as a marketing channel, raising public attention to the company and its investment opportunities. At the same time, crowdfunding enables business angels (see below) to find investment opportunities in wider geographical areas.

In addition to financing undertaken by not-for-profit organisations (the patronage model), crowdfunding arrangements can take the following forms: i) the reward-based model, according to which investors receive a reward for their commitment either in the form of a donation or of preferential access to and prices for the new product; ii) the lending model, which resembles peer-to-peer lending: investors receive just a promise of repayment after a predefined period of time of the capital loaned plus interest; and iii) the equity model, in which investors receive a share of the company and effectively become shareholders.

Crowdfunding platforms seem to have a growing appeal among individual investors in OECD area, but they are still developing. In Lithuania, crowdfunding platform operators have been regulated for nearly five years, with the value of transactions made through crowdfunding platforms increased 60-fold during this period, according to official data. There are currently 21 crowdfunding platform operators in the country. As a step forward, an EU-wide regulation on crowdfunding came into force in November 2021 that synchronises divergent regulations, introducing common rules for platforms. The impact of this investment vehicle in bridging the funding gap of young innovative firms needs to be evaluated further.

Source: Bank of Lithuania; (Demmou and Franco, 2021[53]).

As a further step towards strengthening the role of alternative financing for start-ups and SMEs, the government could consider providing support (logistical/and or financial) for the establishment of more formal business angel networks, in line with the experience in other countries (OECD, 2016[54]). Several OECD countries also provide preferential tax treatment or tax relief on capital gains to promote business angel lending as for instance, the “tax shelter” scheme in Belgium that grants a 45% tax reduction in the personal income tax for investors in a start-up (OECD, 2016[54]). Angel investment has increased considerably in the past few years in Lithuania but as a share of GDP it remains below the levels recorded in the Baltic peers and Finland (EBAN, 2021[55]). Business angels may play an important role in providing not only finance but also business know-how to the companies they invest in.

The Bank of Lithuania has recently announced an action plan (Capital Market Development Action Plan) that aims to increase significantly by 2025 the alternative financing options for Lithuanian firms, including through a doubling of the crowdfunding market (Bank of Lithuania, 2022[56]). The plan also provides a mechanism for innovative domestic firms to efficiently attract external financing on the capital market throughout their entire life cycle, i.e. from their start-up to sustainable development. A Capital Market Council will be set up to supervise the implementation of the plan, encompassing representatives of both public institutions and private sector associations. Assessing regularly the effectiveness of the measures included in the plan in terms of broadening the alternative financing options for smaller innovative firms is important.

Information on digital tools and management competencies also need to improve

Smaller firms are often unware of the potential benefits of digital technologies and how to incorporate them in their day-to-day commercial activities. They also often lack the means and skills to adopt digital

technologies (Digitally Driven, 2021[57]). The government supports the digital transformation of SMEs in Lithuania mainly through the Business Consultant LT programme, providing business development consultations for SMEs (OECD, 2021[58]). The programme provides, in particular, information and consultation to SMEs about the introduction of new technologies, sources of financing and other business organisation issues. Some financial support is also available. The Digitisation Industry initiative, for instance, supports SMEs to assess digitalisation opportunities (Lithuanian Innovation Center, 2020[2]). Moreover, since 2021(under the E-commerce model COVID-19), the government finances 85% of the cost incurred by the eligible micro and small and medium-sized enterprises for the implementation of e-commerce models. Consideration could be given, subject to fiscal space, to the provision of well-targeted financial support for the implementation of digital tools, such as cloud computing and big data analysis, that can have an important impact on the digital transformation of SMEs. Korea, for instance, offers grants for cloud services (Box 2.6). The financial support measures should be carefully designed and their effectiveness monitored closely.

Box 2.6. Supporting the digital advancement of SMEs: international experience

A number of OECD countries have actively engaged in supporting the digital uptake of SMEs, adopting different approaches:

- Targeted financial support to SMEs: Korea, for instance, offers grants for cloud services, while Denmark provides direct financial support to improve the adoption of digital technologies and e-commerce among SMEs; Estonia's financial support scheme aims at ensuring the implementation of digital technologies and robots, as well as enhancing automation in specific sectors.
- Consultancy and information to help SMEs: Lithuanian's Business Consultant LT (see text) is one example in this regard; Germany supports SMEs in specific areas, such as IT security and digitalisation of business processes, through expertise provided by consultancy firms that assist businesses individually throughout the whole process.
- More comprehensive support to SMEs, combining financial and technical support with training and guidance services: the Robo-Lift programme in Sweden, for instance, aiming to support automation, provides small or medium sized businesses with financial support and access to training and gives them the opportunity to participate in networking exercises; Australia's Small Business Advisory Service grants tailored advisory services to small businesses, and since November 2020, new businesses accessing this service are offered an initial review of their needs and given access to webinars, workshops and one-to-one mentoring.

Source: (OECD, 2021[58])

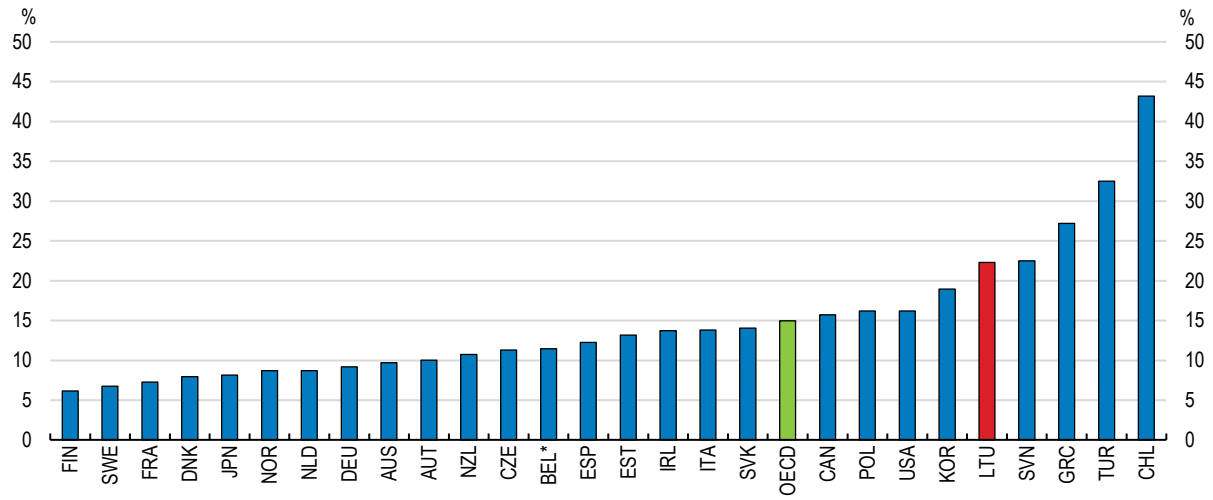
Increases in financial support to stimulate the uptake of digital technologies by SMEs should be accompanied by a more comprehensive network of advisory and mentoring services. Lithuania faces a shortage of experts who can assist companies to prepare action plans for digitalisation and integrate it in their longer-term strategy. Progress in this domain is vital. Germany, for instance, supports the digitalisation of business processes and digital market development of SMEs through expertise provided by authorised consultancy firms (Box 2.6) (OECD, 2021[58]). Some countries, such as Australia and Sweden, complement the financial and technical support to facilitate the digital transformation of SMEs with training programmes and guidance for the required set of skills and organisational changes. Developing a centralised platform to connect SMEs planning to digitalise with a network of experts would be an important step forward.

Managerial skills can be improved further. This is important for the adoption of digital technologies and their effective use (Andrews, Nicoletti and Timiliotis, 2018[59]). While managers' skills are higher than average skill levels in Lithuania, according to the OECD 2021 Skills Strategy (OECD, 2021[60]), they still

lag behind in international comparison. For instance, around 22% of Lithuanian managers were found to have low skill levels above the OECD average and comparator countries such as Estonia and especially Finland (Figure 2.21). Entrepreneurship educational programmes play a significant role in the initial development of management skills (see below). Adult learning opportunities in the form of targeted training programmes for managers and owners of SMEs, especially those without specific previous training in management, as well as advanced management courses, on a part-time basis, at tertiary education institutions, would help strengthen managerial skills (OECD, 2021[50]).

Figure 2.21. Managerial skills can be improved

Share of managers with low literacy and/or numeracy



Note: Data for Belgium refers to Flanders. For further details on PIAAC survey, refer to Survey of Adult Skills (PIAAC) - PIAAC, the OECD's programme of assessment and analysis of adult skills.
Source: Skills Strategy Lithuania (OECD, 2021[60]).

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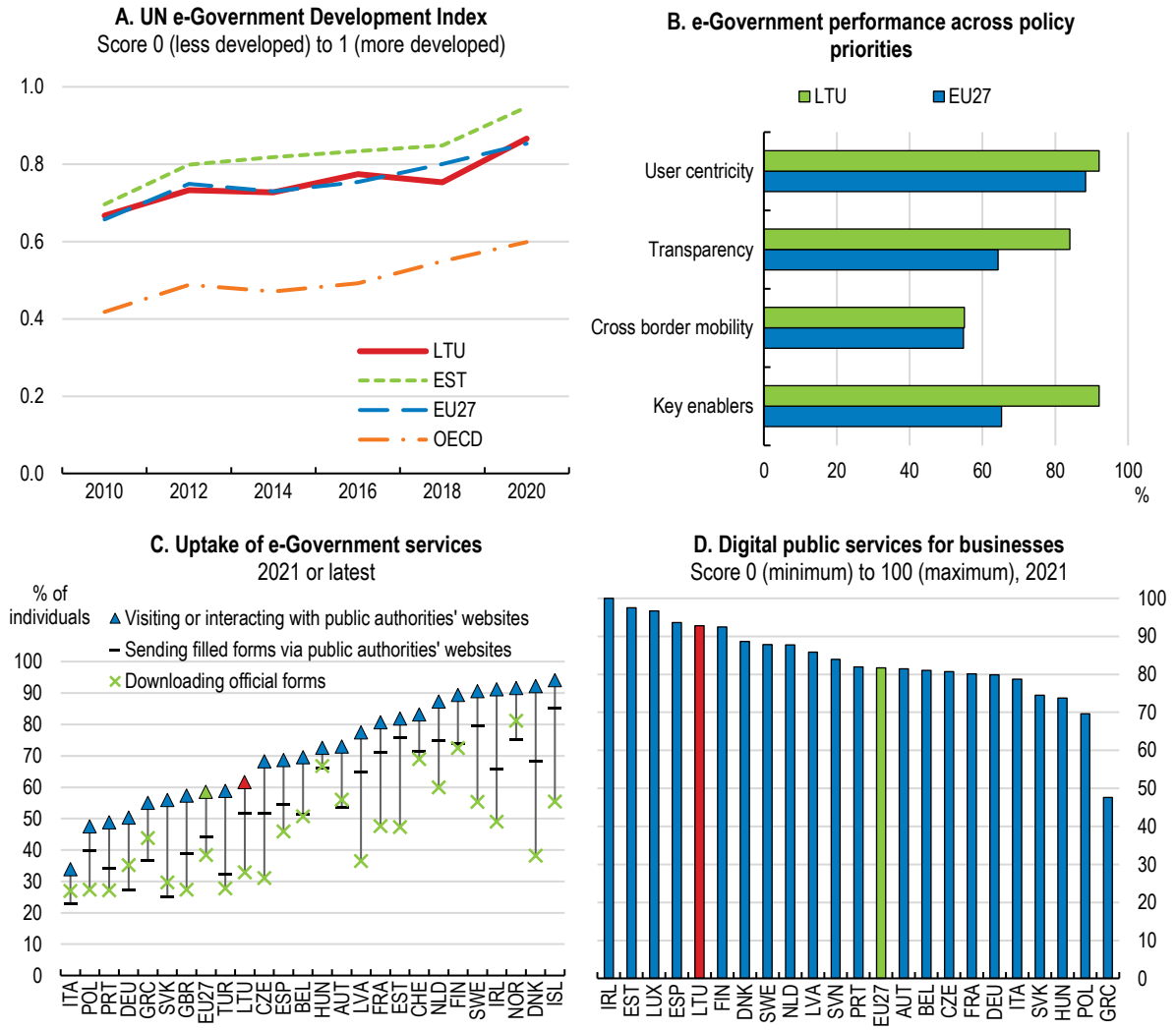
The creation of technological Lithuanian language resources, under Lithuania's Recovery and Resilience Plan, for Artificial Intelligence (AI) solutions to help Lithuanian citizens use advanced AI is expected to increase the capacity of smaller firms to effectively use digital technologies (European Commission, 2021[7]) (Box 2.1).

A well-developed digital government is key to successful digital transition

Accelerating progress towards digital government

The promotion of e-government is crucial for the digital transformation and the public sector can be a front-runner in this area, in close partnership with the private sector which constantly develops advanced tools and technological solutions. Lithuania has enhanced e-government capabilities in recent years, applying advanced ICT technologies to government operations (Figure 2.22). Around 60% of the population uses the Internet to interact with the government, and e-government services for businesses are well developed in international comparison. The Electronic Government Gateway provides a single access point to e-government services, linking with information systems for taxation, e-health, education, municipal institutions, among other services (European Commission, 2021[3]).

Figure 2.22. E-government indicators compare well internationally



Note: Panel A: the *e-Government Development Index* presents the state of e-Government Development of the United Nations Member States, and includes the provision of online services, telecommunication connectivity and human capacity. Panel B: *User Centricity* indicates the extent to which a service is provided online, its mobile friendliness and usability of the service. *Transparency* refers to the process of service delivery, responsibilities and performance of public organisations and personal data processed in public services. *Cross-border mobility* indicates the extent to which users of public services from another European country can use the online services. *Key enablers* indicate the extent to which technical and organisational pre-conditions for e-government service provision are in place. Panel D: the indicator broadly reflects the share of public services needed for starting a business and conducting regular business operations that are available online for domestic, as well as foreign users.

Source: UN (2021). Government Knowledgebase; European Commission, Digital Public Administration factsheet 2021 Lithuania; Going Digital: Shaping Policies, Improving Lives and OECD ICT Access and Usage by Households and Individuals Database (http://oe.cd/hhind); and European Commission, Digital Economy and Society Index Report 2022, DESI | Shaping Europe's digital future (europa.eu).

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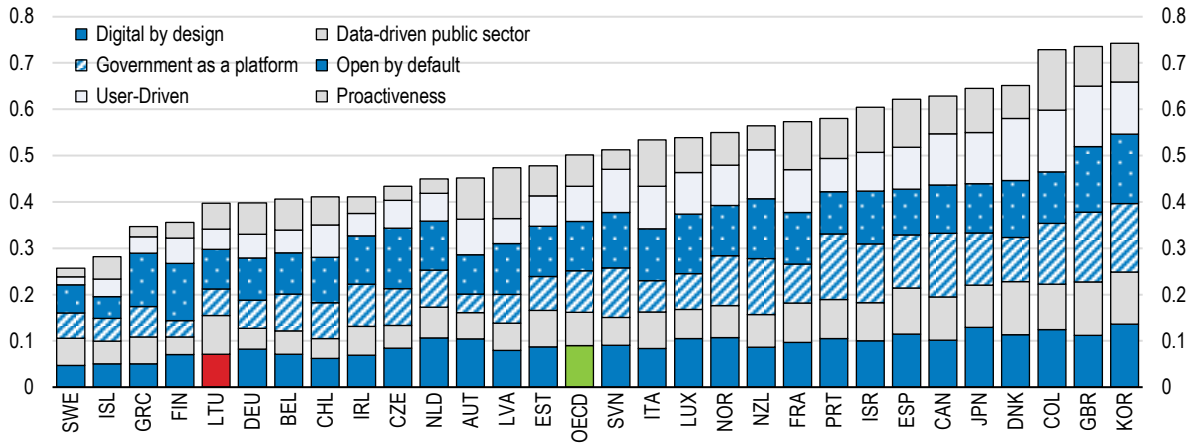
Much scope remains, however, to realise the full potential of digital government. An important obstacle is a weak interoperability among the numerous information systems and registers (Ministry of Economy and Innovation, 2021[5]) Estonia's success in e-government, for instance, hinges upon the development of 'interoperability enablers' **(**Box 2.7**).** Lack of modern data-management practices in the public sector is an additional factor. The launching by the central bank in 2020 of the Data Management Maturity Program, an organisation-wide programme focusing on the areas of data governance, data collection and data storage and analytics (Bank of Lithuania, 2021[61]), is a welcome step in this regard. In addition to

improvements in data management within the central bank, the programme allows for an integration of the central credit register (managed by the central bank) with other information systems in the country, facilitating exchange of data. Efforts in this direction need to continue. Lithuania scores below average in the OECD Digital Government Index, which suggests room to make progress with a 'digital by design' approach when formulating policies and designing services, as well as to move to a more user-driven public sector (OECD, 2020[62]) (Figure 2.23).

Figure 2.23. There is scope to move to higher levels of digital government maturity

Digital Government Index, 2019



Source: OECD Digital Government Index 2019.

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Box 2.7. Digitising government services: the case of Estonia

The success of Estonia's e-government (e-Estonia) hinges on the combination of two interoperability enablers, namely the Estonian digital ID (eID) and the X-road platform for data exchange:

- The digital ID-card is applicable across sectors, enabling customer identification and providing secure, transparent and traceable encrypted communication between public and private service providers and individuals (OECD, 2019[63]). The system is based, in particular, on cryptographic keys, with a personal key used as the primary key in the majority of databases containing personal information. The enactment of digital signatures in 2000 enabled a number of government services requiring signature to go online.
- The data exchange platform, X-Road, allows e-service information systems to link up and operate as an integrated system to support citizens and businesses. To secure data sharing, all incoming and outgoing transfers are authenticated and encrypted. In addition, transactions are traceable, through a distributed ledger, which means that any transaction or information access will be recorded in several places (OECD, 2019[63]).

The above reforms have simplified considerably the interactions of citizens and business with the government in Estonia. In addition, citizens and businesses can monitor the time and access point of their data files through the portal (X-Road platform). The use of digital signatures in Estonia is estimated to save 2% of GDP every year (OECD, 2019[64]). Moreover, the use of X-Road saved the Estonian administration 804 working years, reducing state budget expenditure.

The digitalisation of the public sector is a high priority for the government (Box 2.1). Over half of the funds allocated in the digitalisation component of Lithuania's Recovery and Resilience Plan (RRP) are dedicated to digital public services and infrastructure (European Commission, 2021[3]; European Commission, 2021[7]). The focus is on the digitalisation of government processes, the expansion of digital public services, and the consolidation of state information resources, IT infrastructure and services. Ensuring reliable public data and the possibility to share them across sectors is an additional objective. The digitalisation of the health sector and public employment service are also key areas of public sector reform (Box 2.8).

Box 2.8. Modernising Lithuania's public sector through digitalisation

Lithuania aims to modernise its public sector and enhance the quality of the provided services. Two notable ongoing initiatives include:

Digitalising the health care system

The 2014–2025 National Health Strategy has among its main goals to complete this stage of development of the country's e-health system. It also foresees the integration of the Lithuanian system in the EU e-health systems. The overall aim is to develop a coordinated and interoperable e-health system. Lithuania's Resilience and Recovery Plan allocates around a third of the funds under the health component for the digitalisation of the health care sector.

The national e-health system became operational in 2015, with all health care providers (except dentists) connected. The system links to a register of insured people. Electronic prescribing was the most advanced section of e-health until 2019, but the pandemic has accelerated the development of the system with an increasing number of medical consultations taking place online (OECD and European Observatory, 2021[65]). The pandemic has provided a powerful stimulus for improving data collection processes and increasing reporting speed, while enhancing information exchange.

Digitalising public employment services

Efforts are under way to digitalise the Public Employment Service (PES) and enhance its customer orientation, to ensure more effective activation policies. A reform, to be completed in 2024, includes a revision of working methods and automation of key processes, bringing about important changes in the structure of the PES. Underlying the reform is the creation of an employment platform, a new multifunctional IT tool that would be interoperable with other national IT systems, enabling 90% of services to be provided digitally (European Commission, 2021[7]). The reform paves the way for more intensive personalised services by the PES not only through a better matching of information, but as well by freeing up human resources to be used for more tailored support to jobseekers.

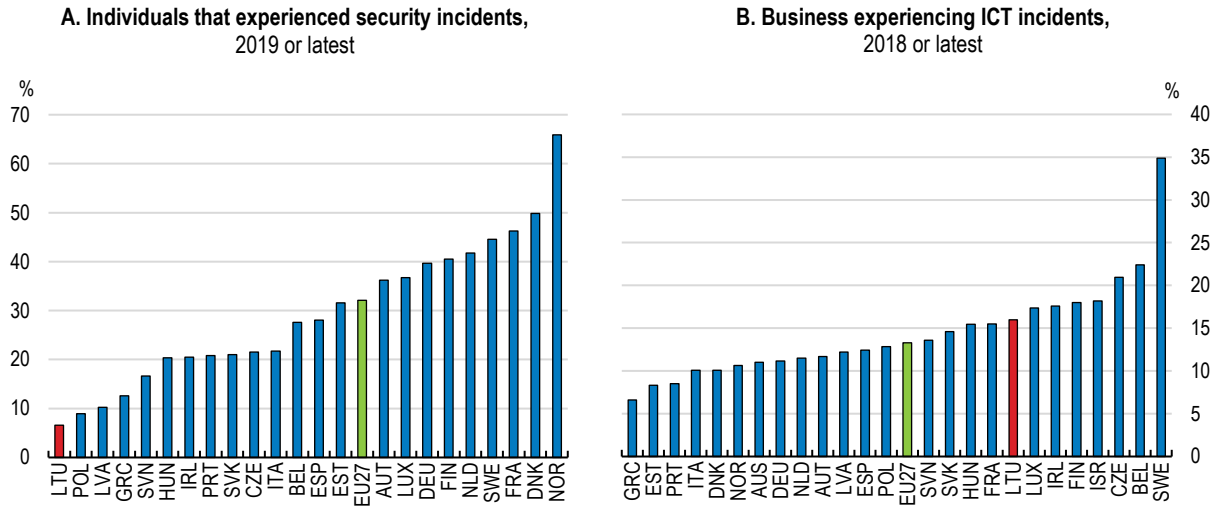
The priorities set by the government digitalisation agenda, and planned reform measures, are positive steps. Reforms should go ahead and be implemented within the envisaged schedule. Indeed, the pandemic has heightened the need to deploy digital technologies and process automation in the public sector. Further increasing the take-up of e-government services is important for the effectiveness of reforms. At 60%, the share of the population currently using public services (Figure 2.22, Panel C) is comparable to the EU average but still below countries such as Estonia and Finland. Also, the content of online information created by the public sector is not always available for persons with disabilities, restricting access. Less than half of this group has access to digital services (Ministry of Economy and Innovation, 2021[5]). The government aims to enhance the accessibility of digital services for persons with disabilities (Box 2.1). A user-driven approach, placing citizens' needs at the core of the development of processes and services, is key to ensuring inclusiveness in the provision of digital public services. Government plans to move towards customer-oriented services are therefore welcome (Box 2.8). Ensuring

effective implementation of the agenda is critical, given that digital public services are an integral part of the digital transformation, with positive effects on productivity (Sorbe et al., 2019[4]).

Digital security is high but there is scope to strengthen it further

Digital security (cybersecurity) is essential to build individuals' and businesses' trust in advanced new technologies and digital government (OECD, 2020[6]). Lithuania is among the frontrunners in the field of digital security according to the 2020 Global Cybersecurity Index (which evaluates legal, technical and organisational measures, as well as capacity building and cooperation) (ITU, 2021[66]). The National Cybersecurity Strategy (2018-2022) provides a comprehensive approach that also aims at promoting a culture of cybersecurity and stepping up public-private collaboration to combat cyber incidents (Ministry of National Defence, 2018[67]). Survey data suggest that before the pandemic businesses were experiencing cybersecurity incidents more frequently than in many European countries (Figure 2.24). Across OECD countries, digital security risks have risen since the onset of the pandemic as the use of Internet and uptake of digital technologies has accelerated (OECD, 2020[68]). The war in Ukraine may have implications with respect to digital security.

Figure 2.24. Cybersecurity incidences for businesses are relatively high



Source: OECD, ICT Access and Usage by Households and Individuals database; and OECD, ICT Access and Usage by Businesses database.

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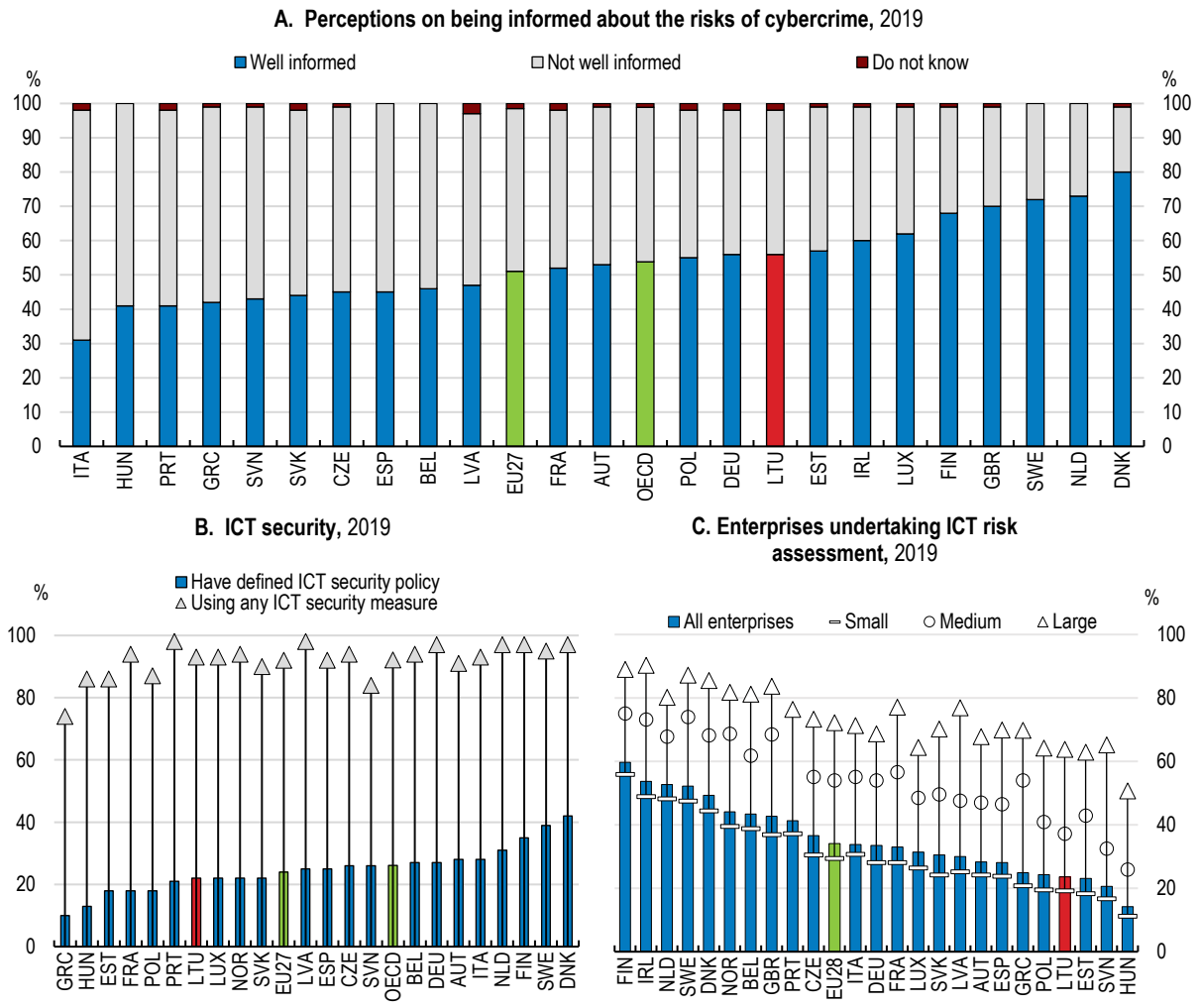
Raising awareness about digital security risks among individuals and businesses is essential for developing a strong cybersecurity culture and promoting more pro-active cybersecurity practices. 42% of the Lithuanian participants in a special Eurobarometer survey on the attitudes towards cybersecurity reported that they were not well-informed about the risks of cybercrime; this share is not high compared to the EU average or Baltic peers, but still points to the need for more efficient dissemination of information on digital incidents (European Union, 2020[69]) (Figure 2.25, Panel A). Well-designed and regularly updated awareness-raising programmes and seminars for relevant demographic groups from public and private sectors, as well as academia, are crucial in this regard.

Figure 2.25. Awareness about cybercrime and risk assessment by firms need to be strengthened



Source: Special Eurobarometer 499 "Europeans' Attitudes Towards Cyber Security"; Eurostat, ICT Access and Usage by Households and Individuals database; and OECD based on Eurostat, Digital Economy and Society Statistics, Comprehensive database.

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In addition, Lithuanian firms have scope to improve digital security risk management. Almost all firms in Lithuania implement ICT security measures, but less than a quarter had defined a cybersecurity policy in 2019, well below top performers such as Finland, Denmark and Ireland (Figure 2.25, Panels B and C). Risk assessment – a central practice in digital security risk management – is not widespread, especially among smaller firms that tend to have fewer resources for effectively evaluating digital security risks and implementing prevention and management measures (OECD, 2019[36]). Less than 20% of small firms carried out risk assessments in 2019 – around 10 percentage points less than the EU average. The corresponding share for large Lithuanian firms was at least three times larger than for small firms, above the EU average. Enhancing awareness of good practices in digital risk management is important, especially in the case of SMEs that face distinct challenges in this regard (OECD, 2020[6]).

The government plans to introduce a revised set of cybersecurity requirements. Ongoing changes in IT management in the public sector, involving a move from traditional IT management to cloud computing, and a rise in digital security risks since the onset of the pandemic and as a result of the war in Ukraine,

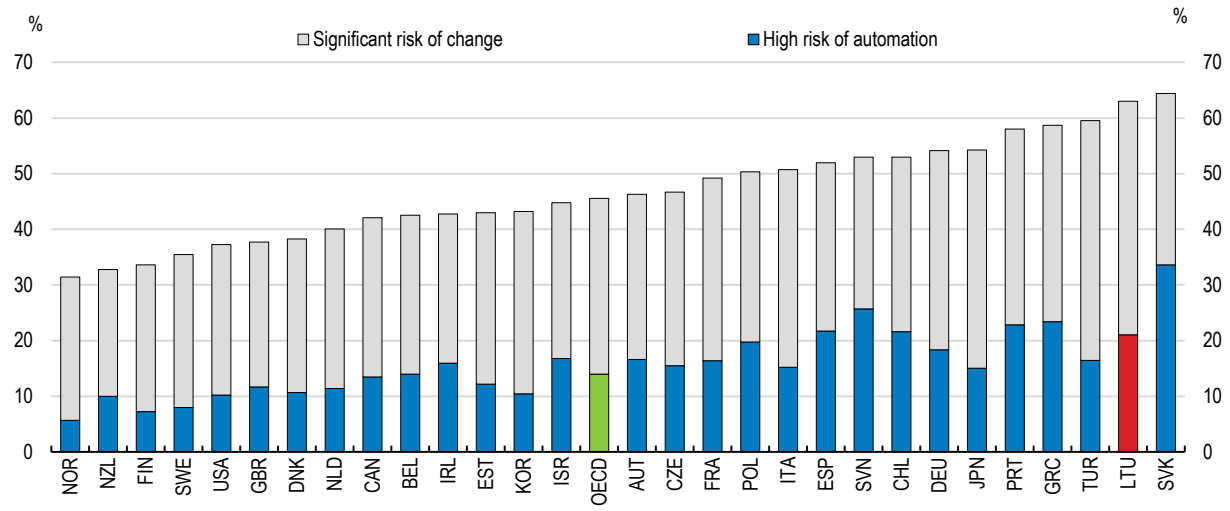
necessitate amendments to the National Cybersecurity strategy (see above). A key objective of the reform is to improve the implementation of organisational and technical cybersecurity requirements by cybersecurity managers. Swift progress towards the development of a unified system for monitoring the application and implementation of cybersecurity requirements is vital in this regard. At present, Lithuania lacks such a unified system (Ministry of Economy and Innovation, 2021[5]). A stronger focus on firms, and digital security risk management in particular, would be advisable. The United Kingdom's National Cybersecurity Strategy, for instance, attempts to ensure that the regulatory framework for cybersecurity is outcome-focused and sufficiently flexible (HM Government, 2016[70]). The war in Ukraine enhances the importance of digital security risk management at a firm level as some businesses' critical services might be more exposed and vulnerable to cyber incidents, increasing the need for higher cyber security preparedness levels (KPMG, 2022[71]). Increasing the number of cybersecurity experts is an additional key challenge (see below). The focus of the National Cybersecurity Strategy, currently in place, on the development of advanced capabilities and cybersecurity skills (Ministry of National Defence, 2018[67]) is appropriate and should be preserved.

Harnessing skills for a digital economy

Making the most of digitalisation is contingent on the development of relevant skills that respond to rapidly changing labour market needs in the digital era. This is also essential for boosting digital technology adoption by firms (Andrews, Nicoletti and Timiliotis, 2018[59]). The labour market transformation is already underway with even more radical changes to come in view of rising automation trends. Lithuania faces among the highest risks of job automation among OECD countries (Figure 2.26). Approximately one-fifth of jobs are at high risk of being automated over the next 10 to 20 years, while another 40% face a risk of significant changes in their tasks due to automation, with both shares well above the OECD average.

Figure 2.26. Lithuania faces high risks of job automation in international comparison

Share of jobs at high risk of automation or at risk of significant change in OECD countries



Note: Significant risk of change refers to the risk of automation between 50-70%, and high risk of automation refers to the risk >70%. Calculations are based on PIAAC 2012 data.
Source: OECD calculations based Nedelkoska, L. and G. Quintini (2018).

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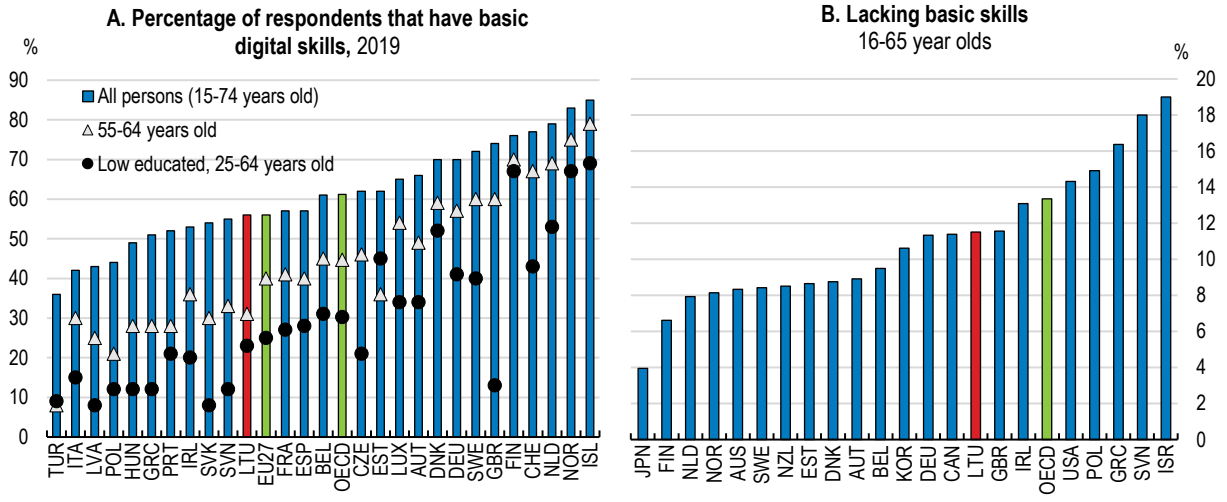
ICT-related skills, both advanced for digital specialists and generic used at work, are essential for the adoption of new technologies, including artificial intelligence (OECD, 2020[41]). Lithuania has scope to further raise digital skills, especially among the less educated and elderly workers (Figure 2.27). Foundational skills also need to improve to ensure a solid digital skill base (OECD, 2019[72]; OECD, 2020[6]). The necessary pool of skills to work in a digitalised environment also includes social, communication and management skills. The challenge is heightened by a large skills mismatch and labour shortages, especially of highly qualified workers, already evident before the pandemic (OECD, 2018[12]). The pandemic accelerated the digital uptake by firms, and with it the demand for specialised ICT skills. Equipping workers with relevant skills is also necessary to limit the rise in inequalities that may stem from digitalisation. In education, the main objectives of government policy are to ensure that children acquire basic digital skills at school, to digitise educational content and resources, and to provide digital skills training for adults (Government of the Republic of Lithuania, 2021[32]).

Figure 2.27. There is scope to strengthen digital and foundational skills



Note: Panel B: individuals lacking basic skills score at most Level 1 (inclusive) in literacy and numeracy and at most Below Level 1 (inclusive) in problem solving (including failing ICT core and having no computer experience). Chile, Greece, Israel, Lithuania, New Zealand, Singapore, Slovenia and Turkey: Year of reference 2015. All other countries: Year of reference 2012. Data for Belgium refer only to Flanders and data for the United Kingdom refer to England and Northern Ireland jointly.
Source: Eurostat, Digital skills database; OECD calculations based on OECD (2012) and OECD (2015), Survey of Adult Skills (PIAAC), www.oecd.org/skills/piaac/publicdataandanalysis; and OECD, PISA 2018 database.

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The education system needs to adapt to digital changes

Building solid foundational and basic digital skills at schools and reducing educational gaps

Many students in Lithuania lack strong foundational skills at the end of compulsory education (Figure 1.24), making it more difficult to acquire new skills over their lifetime and succeed in a digital environment. Moreover, as discussed in Chapter 1, educational achievements vary considerably across schools and regions. Like in other countries, the pandemic may have exacerbated educational inequalities as children from disadvantaged backgrounds are less likely to benefit from online learning (OECD, 2020[73]).

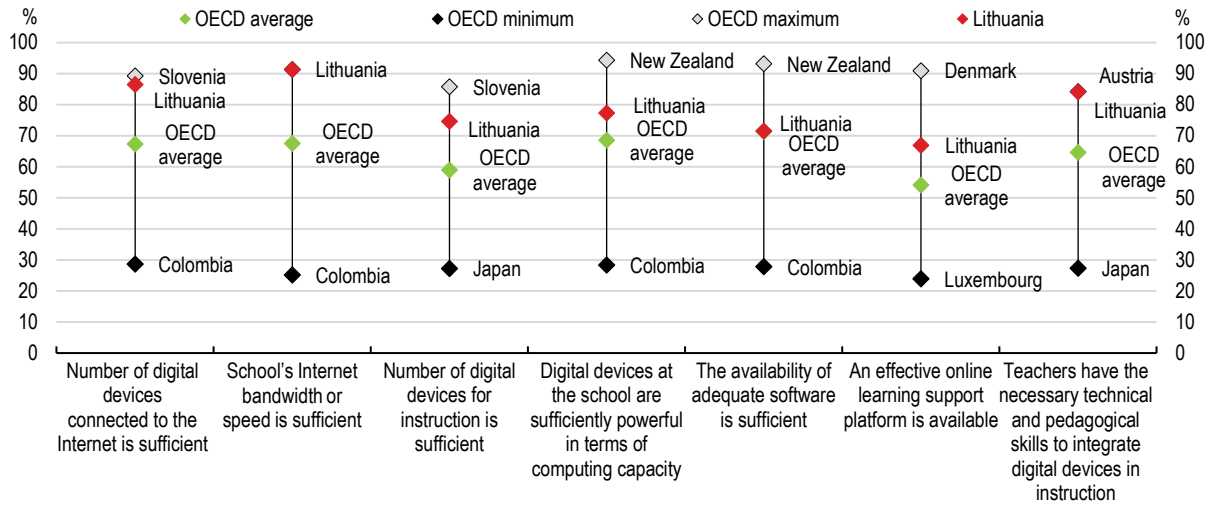
A school curriculum reform is under way. The aim is to introduce new competence-based curricula from 2022 (OECD, 2021[60]). The reform paves the way for a more modern, and better adapted to the digital era, school curriculum framework and needs to be implemented within the envisaged timeframe. In the renewed school curriculum, the development of digital competences along with cognitive, social and creative competences will form a part of the learning process, allowing for a better integration of general competencies across subjects. The focus of the curriculum reform on equipping students with general digital skills and competencies, starting at primary school level, is welcome (European Commission, 2020[74]). Particular subjects, such as computer science, will be strengthened, with teaching to start at primary level. The Informatics curriculum for primary education, in particular, includes algorithms and programming as one of the main teaching areas. The government also aims to integrate digital literacy better into STEM (science, technology, engineering, and mathematics) subjects (Seimas, 2020[75]). Exposing students to computational thinking, through programming, at early stages of education helps them to improve digital competencies and provides a better understanding of new technologies. Such policy is also in line with international experience. Portugal, for instance, has included programming as a learning objective in its recently reformed national curriculum (OECD, 2021[50]).

To reduce the risk that students in disadvantaged schools fall behind in terms of digital skills, the government could consider including attainment targets in the new curriculum for schools. The targets could be developed in collaboration with teachers and stakeholders (OECD, 2021[76]). Moreover, the government should continue providing vulnerable students who lack adequate equipment with electronic devices (computer or tablet) and tutorials, addressing digital divides. It is also important to ensure that the new school curricula raise the relatively low digital problem-solving skills of students in vocational schools. PIACC data suggest that gaps in digital problem-solving skills between Lithuanian graduates from vocational education and training and those from general education are more pronounced than those for numeracy and literacy skills (Vandeweyer and Verhagen, 2020[77]).

Adequate ICT tools in schools and teachers with the needed skills to use them effectively in classrooms are essential for students to develop digital skills for the future. Lithuania fares better than the OECD average, according to school principals' perceptions, when it comes to availability of digital devices in schools and teachers' ICT preparedness is high in international comparison (Figure 2.28). This is encouraging, but Lithuanian schools still have scope to improve ICT capacity in a number of areas, including the availability of effective online learning support platforms and software adequacy. As a positive step, the government started providing funding to schools for the purchase of ICT equipment and digital tools. Moreover, Lithuania's Recovery and Resilience Plan envisages improvements in school infrastructure (European Commission, 2021[7]). The Digital Transformation in Education project under way aims to strengthen the use of ICT tools in schools, focusing in particular on children with special education or linguistic needs, and to enhance the digital skills of educators. It also opts to develop, in parallel, an innovation culture in schools by inviting education institutions and developers to cooperate in the development, testing and application of innovative solutions.

Figure 2.28. Lithuanian schools can further increase ICT capacity

Percentage of students in schools whose principal agreed or strongly agreed with statements about the school's capacity to enhance learning and teaching using digital devices, 2018



Source: Minea-Pic, A. (2020), ICT resources in school education: What do we know from OECD work?

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ITC training for teachers needs to be stepped up. Whereas a relatively high share of teachers (60% compared to an OECD average of 43%) perceive themselves as well prepared for the use of ICT in teaching, a quarter still report a high need for professional development in this domain, above the OECD average (OECD, 2019[78]). Spending on training to boost digital skills is low, however. Only about 3% of the financial support provided to schools in 2020/21 to increase their ICT capacity was spent on such training, according to official data. The government should go ahead with plans to expand training opportunities for teachers and invest in the development of their digital competencies (European Commission, 2021[7]). The Digital Transformation in Education project (see above) launched in 2022 aims to strengthen the digital competencies of educators at all levels, which is welcome. The effectiveness of the project needs to be closely monitored. Overall, the quality of teachers' continuous professional development needs to improve through better targeting support to the areas of identified training needs of teachers, providing innovative forms of formal training, as well as reducing fragmentation in the provision (OECD, 2021[60]). Continuous professional development is currently provided by 60 teacher centres in Lithuania, undermining the system's coherence and training quality.

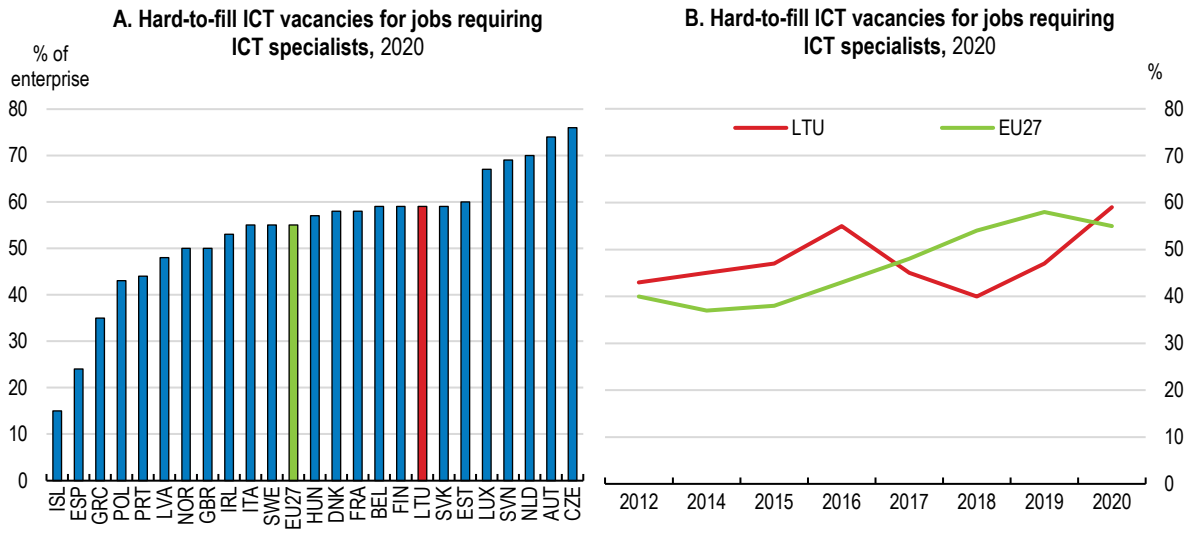
Responding more effectively to labour market needs for digital skills

Large shortages in ICT and ICT-related skills impede digital transformation and higher productivity growth. Approximately 60% of Lithuanian enterprises that recruited or tried to recruit ICT specialists in 2020 reported difficulties to fill such vacancies, above the EU average (Figure 2.29). Shortages of ICT skills are projected to grow substantially (OECD, 2020[79]). Attracting highly-skilled workers is a key priority of Lithuania's immigration policy. Building on previous initiatives that have reduced restrictions to employment of workers from non-EU countries, the government in 2021 eased the migration procedures for computer specialists from such countries and the conditions for investors to transfer their employees to Lithuania (see above). The number of temporary residence permits issued in 2021 (first three quarters) increased almost six-fold compared to the previous year, according to official data, reflecting a rise in inflows of

specialists from Belarus as well as a relocation of firms from this country to Lithuania. High-skilled immigration can help ease shortages, and recent policy measures go in the right direction in this regard. However, more can be done to improve the responsiveness of the tertiary education system to changing skills needs. Indeed, in 2019 around 41% of tertiary graduates in employment recorded a mismatch by field of study and/ or qualification level (OECD, 2021[60]).

Figure 2.29. Lithuania faces large and rising shortages in ICT skills

Share of enterprises that recruited or tried to recruit ICT specialists



Source: Eurostat, ICT usage in Entreprises.

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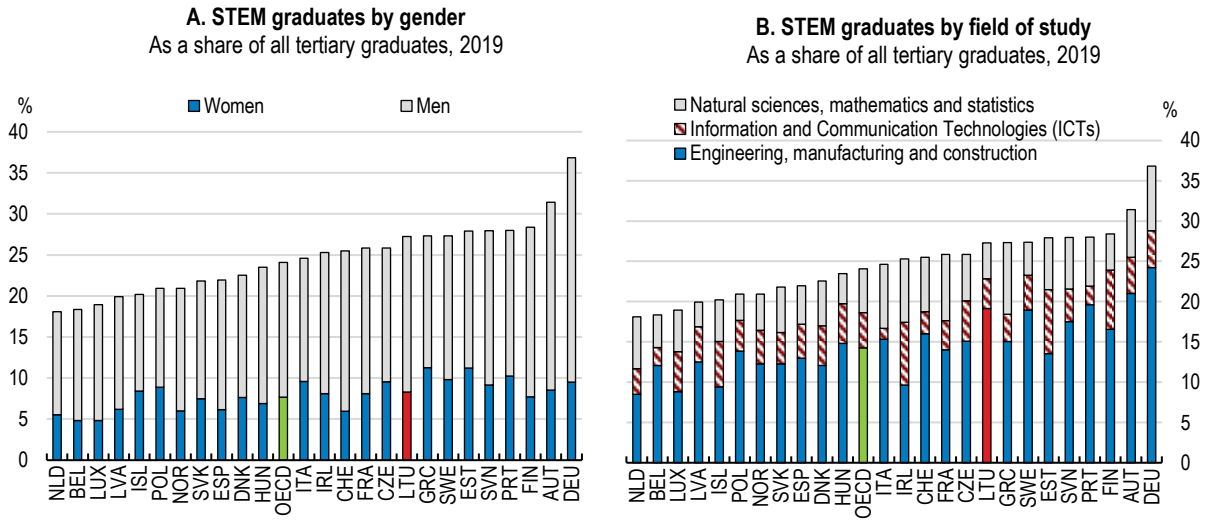
Tertiary education funding should encourage institutions to address evolving skills needs. As a positive step, ongoing reforms plan to relate around 20% of public funding to higher education institutions to the achievement of the performance targets agreed with such institutions (Seimas, 2020[75]). Introducing incentives in the new funding formula by providing additional funding to tertiary institutions for degree completions in disciplines which are important for the labour market, including digital transformation, would be advisable. For instance, degree completions from specific fields, such as certain disciplines within STEM (science, technology, engineering, and mathematics) fields, could receive additional funding. The share of graduates from STEM fields in Lithuania exceeds the OECD average, but a relatively small share complete their studies with an ICT specialisation (Figure 2.30). Broadening the set of performance indicators in the new funding system for tertiary education to include international mobility indicators would help increasing the comparatively low share of foreign students in total enrolment, with large potential benefits in terms of knowledge transfer (Chapter 1). The government could further consider linking a part of public funding to labour market outcomes, as discussed in Chapter 1. This would encourage universities to better adapt the curriculum to demand. Developing a rigorous methodology for the assessment of current and anticipated skills needs and keeping track of graduates' employability is essential for a successful shift to an outcome-oriented tertiary funding system.

Figure 2.30. Relatively few STEM graduates have an ICT specialisation



Note: Tertiary graduates refer to the students graduating from programmes enrolled at ISCED 2011 5-8 levels.
Source: OECD, Education at a Glance database.

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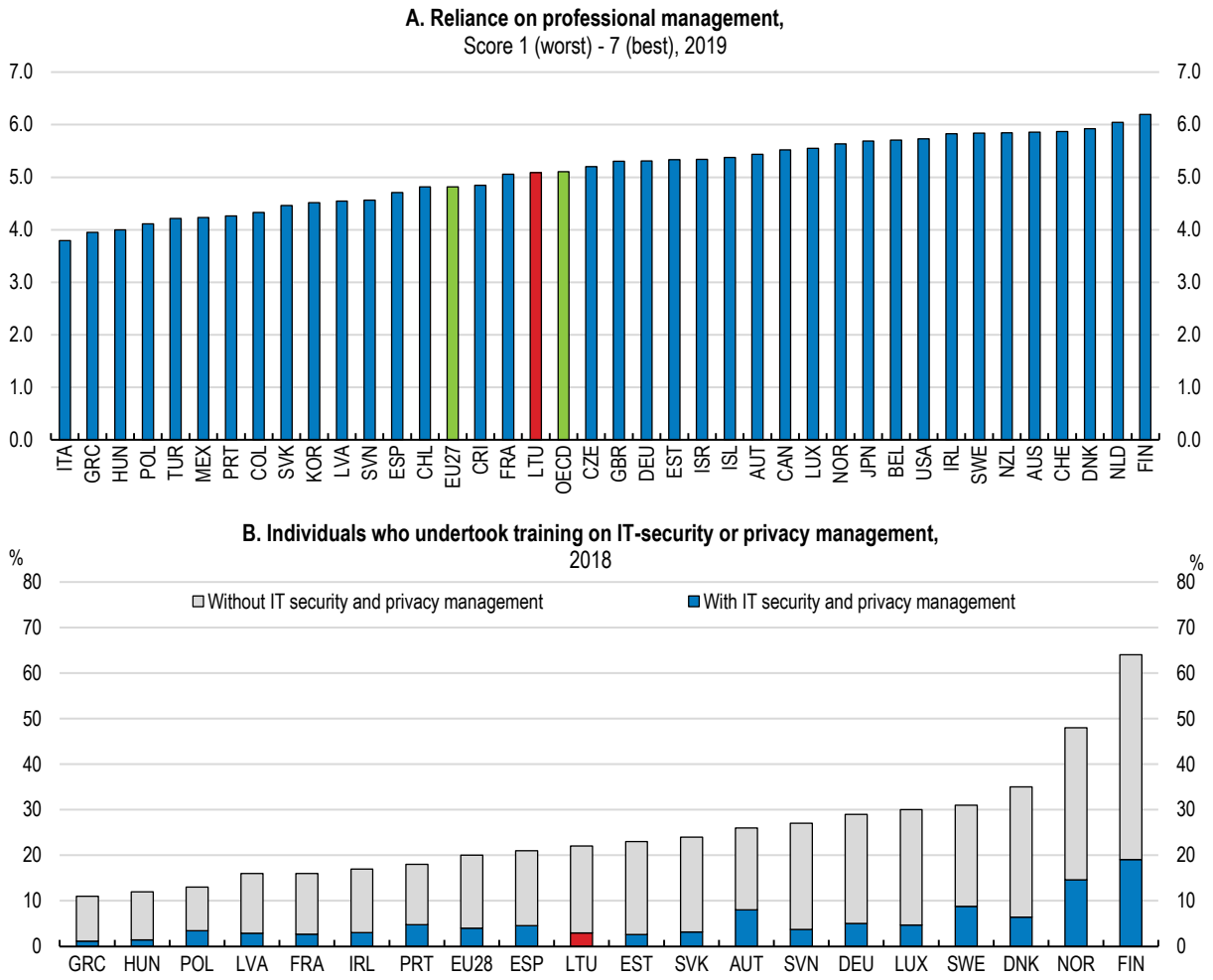
Strengthening admission standards to higher education is also vital for boosting skills for the future. In certain universities, over half of the students enrolled in 2016 did not meet the new threshold standards proposed in 2018 (Caturianas and Budraitis, 2019[80]). Current efforts to modernise student assessment practices at schools are welcome. At present, such practices focus on subject matter knowledge rather than crosscutting competences and skills (OECD, 2021[60]). At the same time, ongoing reforms to make schools more inclusive, including by extending the educational assistance provided, need to continue in order to ensure that students from disadvantaged are not left behind (OECD, 2020[39]). Effective career guidance in schools and universities, along with quality information on graduates' labour market outcomes by field of study, are also important to improve the provision of ICT-related skills and reduce gender imbalances in STEM fields, thereby addressing longstanding shortages in this skills area.

There is scope for introducing new tertiary study programmes that contribute to building an innovation-rich skills base and meet digitalisation needs. The 2020-2030 Industry Digitation Roadmap, for instance, highlights the need for the creation of digital production or related programmes at tertiary level that are vital for industry digitisation, as well as for institutionalising industrial doctorate programmes, along with reviewing higher education programmes that are closely related to digital production, such as engineering (Lithuanian Innovation Center, 2020[2]).

Other relevant programmes for the digital era, including entrepreneurship and cybersecurity, need to be strengthened. Entrepreneurial teaching and learning at higher education institutions in Lithuania has increased noticeably over the past decade (OECD, 2021[81]), but efforts should continue (Figure 2.31, Panel A). In addition, entrepreneurship programmes should go beyond focusing solely on start-up activities and be supported as an academic subject in order to foster entrepreneurial knowledge, skills and capacity with large innovation potential (OECD, 2021[81]). The Norwegian Research School in Innovation provides an example of good international practice of interdisciplinary education, combining different sub-areas of innovation and entrepreneurship. Cybersecurity study programmes should also be increasingly offered as part of the curriculum in ICT specialist education in universities and vocational schools, while starting to build the fundamental knowledge on digital security early on in education. The share of Internet users in Lithuania who have received such training is comparatively low

(Figure 2.31, Panel B). Deepening teachers' knowledge on digital security through well-designed programmes is essential. Digital training programmes should be regularly updated.

Figure 2.31. Other important skills for the digital era also need to be developed further



Note: Score based on response to the question "In your country, who holds senior management positions in companies?" [1 = usually relatives or friends without regard to merit; 7 = mostly professional managers chosen for merit and qualifications].
Source: World Economic Forum (2020), The Global Competitiveness Index dataset; and OECD, based on Eurostat, Digital Economy and Society Statistics, Comprehensive Database, January 2019.

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Broadening the talent pool entering higher education could strengthen digital skills. Tapping the potential of vocational education and training (VET) is essential in this regard. While legislated in 2018, tertiary institutions have not provided until recently short-cycle tertiary programmes, an important pathway for upper secondary VET graduates into higher education in many countries. Moreover, tertiary institutions offering vocationally oriented professional bachelor degrees account only for a relatively small share of higher education enrolments (about 30%) (OECD, 2021[60]). As a positive step, new 2022 legislation introduces short-cycle tertiary programmes in the fields of computer engineering, programme systems and tourism. In addition, admissions to the first cycle college study programmes, in the same field of study, are to be simplified. The pathways from upper secondary vocational studies to tertiary education should be broadened, while ensuring strong skills and competences for VET students. Portugal, for instance, has

recently revised the tertiary entrance system and created a special access channel for VET students (OECD, 2021[50]). Increasing student awareness and guidance regarding educational opportunities is important.

VET programmes could also be better adapted to rapid technological changes, providing more ICT-specialists. Over 50% of Lithuanian students in upper secondary vocational programmes in 2018 graduated from STEM fields, but the majority earned a qualification in the broad field of engineering, manufacturing and construction, with only 3% graduating from the ICT field (OECD, 2020[82]). However, for VET to play a prominent role in the provision of skills for the future, including in meeting labour market needs for mid- to high-level STEM skills such as software development, enrolments need to increase, because Lithuania has one of the lowest VET participation rates among OECD countries (see Chapter 1). Increased efforts are also needed to promote work-based leaning and apprenticeships through VET. Measures to this end include, for instance, a renewal of programmes and infrastructure, an updated admission model based on anticipated skill needs and enhanced incentives for apprenticeships (Seimas, 2020[75]).

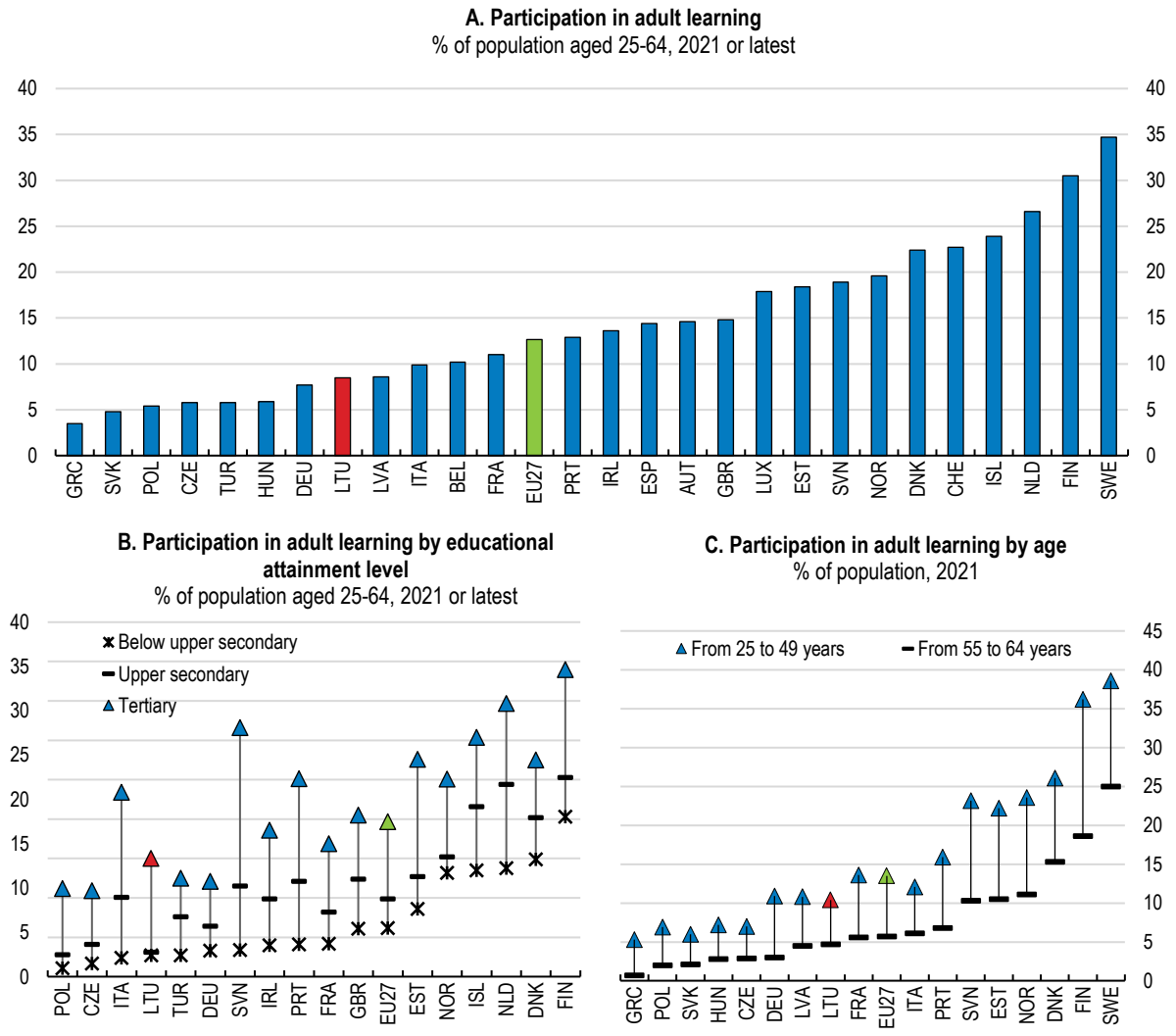
Overall, the tertiary education system has to provide the right mix of skills for the digital era and also adapt to it. Steps towards optimising the network of higher education institutions are important and need to continue to ensure that institutions have the capacity to embrace ICT technologies and their continuous advancements. Students and teaching staff also need to be increasingly familiarised with digital technologies, especially as on-line teaching, which accelerated with the pandemic, may become more of a norm in the future. Timely implementation of the Digital Transformation in Education project, aiming to strengthen the digital competencies of educators at all levels and develop the necessary learning resources for schools (discussed above), is vital. The envisaged review of the quality of tertiary education study programmes in 2025 is welcome.

Addressing social inequalities in tertiary education is vital to ensure a fair distribution of digitalisation dividends. As highlighted in the previous OECD *Economic Survey* (OECD, 2020[39]), students from low-income families in Lithuania are much less likely to enrol in universities than their peers from more affluent families, and when enrolled, are less likely to attend high-ranking universities. The alignment of admission requirements for state-funded and non-stated funded student places in tertiary institutions, to come into effect in 2024, is a step forward. The much stricter entry requirements for state-funded places under the existing regime affects disproportionally less advantaged students who are more likely to opt for such places. Moreover, the provision of short-cycle tertiary studies is expected to provide an attractive pathway to higher education for students from low socio-economic background. The outcomes of these reforms need to be closely monitored.

The digital transformation heightens the need for lifelong learning

Participation in adult (lifelong) learning remains low in Lithuania compared to most EU countries, including neighbouring Estonia (Figure 2.32). As elsewhere, the less educated and those aged over 50 tend to engage less in lifelong learning. This is unfortunate, as such workers are most vulnerable to economic downturns and skills shifts related to technological changes, especially increased automation of jobs. Moreover, adult learning has a stronger impact on digital adoption in the case of low-skilled workers compared to high-skilled ones (Andrews, Nicoletti and Timiliotis, 2018[59]).

Figure 2.32. Participation in adult learning remains low especially among the vulnerable groups



Note: In Panel B, 'below upper secondary' corresponds to less than primary, primary and lower secondary education level (ISCED 2011 levels 0-2); 'upper secondary' corresponds to upper secondary and post-secondary non-tertiary education levels (ISCED 2011 levels 3 and 4); and 'tertiary' corresponds to tertiary education level (SCED 2011 levels 5-8).
Source: Eurostat, Labour Force Survey.

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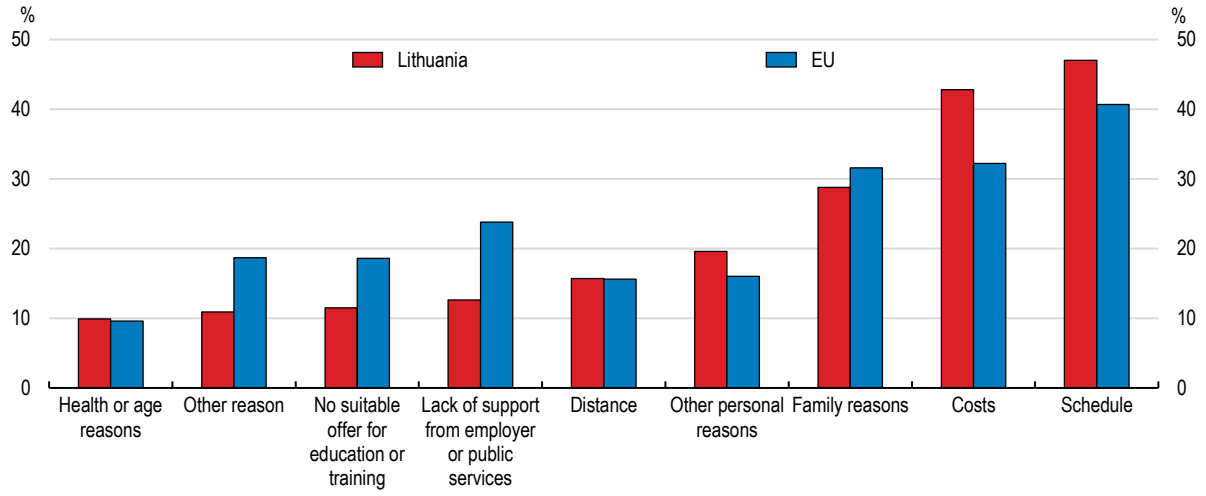
There are multiple barriers to participation in adult training in Lithuania, ranging from financial constraints to lack of suitable training opportunities (Figure 2.33). Addressing such barriers and, importantly, raising awareness of the lifetime benefits of skills investment and available opportunities, is crucial to boost engagement in adult learning. Indeed, around 67% of adults in Lithuania did not want to participate in training in 2016 compared to an EU average of 44.3%, according to survey data (Eurostat, 2016[83]). Motivating employers to provide adult training is also essential. Approximately 13% of training takes place with employers in Lithuania compared to an EU average of 35% (Eurostat, 2016[83]).

Figure 2.33. There are multiple barriers to participation in adult training

2016



Source: Eurostat, Adult Education Survey 2016.

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Lithuania is currently developing a national lifelong learning online platform, that will serve as an "one-stop shop" for adult education, enabling individuals not only to access information regarding available adult learning opportunities, training costs, funding options and other elements, but also to enrol directly in the programmes. It will also provide career counselling in order to help adults decide on their career path. The reform is an important step towards a more effective adult learning system. Readily accessible information, including on the quality and outcome of the training courses that is currently hard to find, is essential for the effectiveness of the new platform as an informational and career guidance tool.

Plans for intensified information campaigns on adult learning should also go ahead, as they would help to reach lower-skilled adults who often are not aware of the need for and potential benefits of further training. Only 10% of adults sought information on lifelong learning in 2016 compared to 30% in Estonia and 25% Latvia, according to survey data (Eurostat, 2016[83]). As an additional step, the government could provide support to enterprises, via training specialists, to assess their training needs, focusing first on SMEs (OECD, 2021[60]).

Lithuania provides financial incentives for individuals to participate in adult learning but the cost of training remains an important barrier (Figure 2.33). Most of the funding for adult learning is provided through the Public Employment Services (PES). Unemployed and employed jobseekers (in certain cases) registered in the PES receive a voucher that covers the cost of vocational training, as well as other benefits. Nonetheless, adults, especially low-skilled ones, still cite the cost of training as the second important barrier to engage in lifelong learning. A new measure will expand the voucher system to also cover higher education modules, in addition to vocational training, with an emphasis to digital skills. To strengthen financial support for adult learning the authorities are advised to focus on adult jobseekers for whom training costs are a major obstacle to further learning, as well as on those in jobs facing a high risk of automation. Low-skilled workers tend to be vulnerable on both grounds. Indeed, some countries, such as France and the Netherlands, allocate training vouchers via individual learning accounts where training rights are accumulated over a certain period of time. The attraction of such schemes is the portability of training rights from one job to the other (Box 2.9). However, such schemes tend to be used more by high-skilled rather low-skilled individuals, and may also involve high administrative costs (OECD, 2019[84]). The OECD Skills strategy for Lithuania (OECD, 2021[60]) also highlights the need to complement subsidies for

adult learning with financial incentives for firms to increase training opportunities. The option of introducing a training levy on employers, as for example in Italy and the Netherlands, that can finance the establishment of training funds could be considered.

Box 2.9. Financial incentives to encourage participation in adult learning: international trends

A range of financial incentives is provided across OECD countries to enhance participation in adult learning. This is justified, as workers and firms may not fully internalise the need for further investment in skills. The financial incentives used include subsidies (in the form, for example, of vouchers, grants and scholarships), tax incentives, loans, and training leave measures. In Sweden, for instance, an education entry grant was introduced in mid-2017 with a focus on the low-qualified unemployed aged 25-56. In the United Kingdom, low-skilled adults have access to digital programmes that are fully-funded. The United States grants vouchers to unemployed low-skilled adults for training programmes that respond to in-demand sectors.

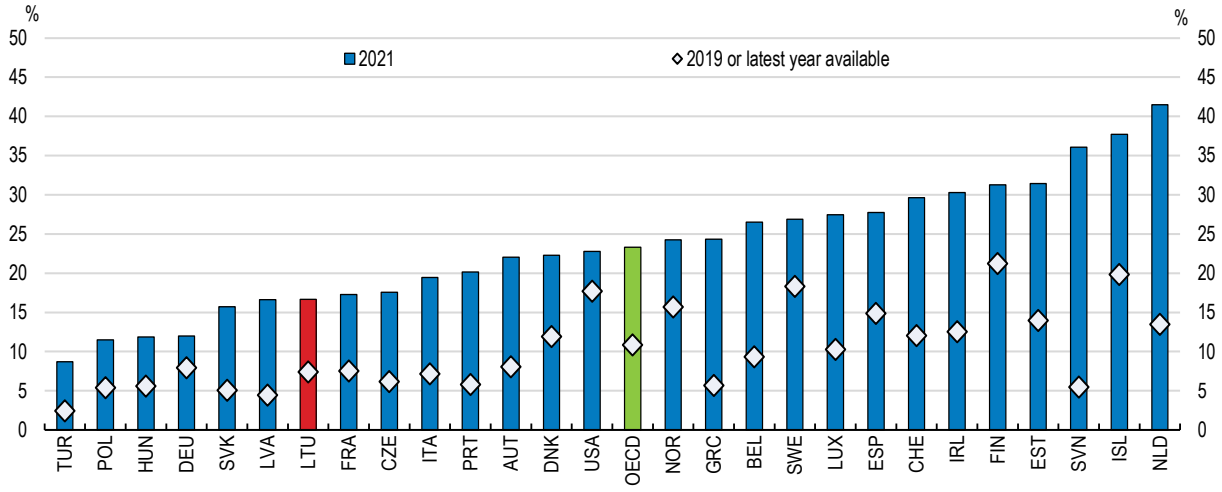
Some countries, for instance, France and the Netherlands, have introduced individual learning accounts (ILAs), where training rights are accumulated over time. Such schemes present attractive features as they allow for portability of training rights from one job to another. This could facilitate career transitions. However, such schemes have a poor record in terms of attracting low-skilled workers to adult training; in fact, ILAs are more likely to be used by high-skilled individuals, while they also can be relatively difficult to administer. ILAs have remained relatively uncommon, possibly because of these shortcomings and/or other reasons, such as limited awareness of the scheme among workers.

Source: (OECD, 2021[60]).

Time-related constrains are another important barrier to participation in adult learning (Figure 2.33). Developing further online adult learning, also building upon the pandemic experience, would be important in this regard. Participation in online courses was low in international comparison before the onset of the pandemic, and even though it increased since then, the scope for catching up remains large (Figure 2.34). Massive open online courses, for instance, provide a wide range of courses by educational institutions and business sector, offering new learning opportunities for students and workers (OECD, 2019[72]). By facilitating studying and working at the same time, e-learning further provides flexibility to workers and savings to firms, especially SMEs, while helping to reconcile work and family responsibilities. The government could encourage vocational and higher education institutions to enhance online courses by providing them methodological and technical support. The development of an online learning platform, that hosts courses from various Lithuanian educational institutions, could be given consideration (OECD, 2021[60]). It is essential to ensure that online opportunities are also seized by lower-skilled workers. Based on cross-country experience such groups participate less in online courses than their higher-skilled counterparts (OECD, 2019[72]). Appropriate course design is very important in this respect. Other measures, such as reducing child-care related gaps, could also contribute to reduce obstacles faced by individuals seeking to engage in lifelong learning.

Figure 2.34. There is scope to foster online learning

Share of individuals participating in online courses



Note: Participation in online courses over the past three months.
Source: OECD, ICT Access and Usage by Households and Individuals database.

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A comprehensive effort to increase participation in adult education and training programmes should also include initiatives to improve skills validation for non-formal learning, which is a core part of adult learning in Lithuania, as in other countries. At present, different vocational institutions require different levels of work experience as part of the skills recognition process. National guidelines and standards for the implementation of skills validation by the educational institutions are therefore needed to improve coherence while raising awareness of skills validation as an option among adults (OECD, 2021[60]). Lithuania also needs to strengthen the quality of non-formal adult education and training, including through the introduction of a monitoring framework for the learning outcomes from such training. The Institute for Adult Education in Slovenia, for instance, has developed comparable indicators to monitor the quality of adult education providers.

Table 2.1. Recommendations for unleashing the productive potential of digitalisation

Promoting investment in innovation to speed up digital transition	
The take-up of R&D tax incentives for businesses is low, despite generous provisions, and a relatively large share of smaller firms does not engage in innovative activities. Direct R&D support to firms is very low.	**Provide R&D support through a more balanced combination of tax-incentives and direct support to smaller innovative firms.**
The design of the R&D tax scheme and the relevant administrative and compliance procedures were not modified since its introduction in 2008.	Regularly evaluate the effectiveness of R&D tax incentives to inform policy choices and further reforms.
Researchers lack strong incentives to collaborate on innovation with the business sector.	Introduce collaboration-related ("engagement") criteria in the appointment and promotion arrangements for academics.
The innovation system suffers from weak co-ordination among government institutions and fragmented provision of support schemes.	Ensure that the newly established Single Innovation Agency becomes operational, consolidating at a later stage more innovation agencies.
Fostering the digitalisation of firms, especially smaller ones	
Despite progress, the share of households with access to fast broadband is low in international comparison, especially in rural areas.	**Proceed with the implementation of the National Broadband Plan, ensuring universal access to high-speed broadband by 2027.**
Licencing procedures remain overly complex, holding back digital innovation by hampering the entry of young firms. A licensing review in the health sector is underway, with plans to cover other priority sectors.	Review and simplify swiftly licensing procedures in priority sectors.
Venture capital is not yet well developed.	**Support the development of venture capital by prioritizing public support through privately-owned funds rather than direct engagement.**
Many smaller firms are not aware of the potential benefits of digital technologies and how to use such technologies.	**Continue current efforts to develop a comprehensive network of advisory and mentoring services for SMEs.**
Accelerating progress towards digital government and strengthening digital security	
Lack of interoperability of state information systems along with the absence of modern data-management practices in the public sector, hinder the development of digital government.	Proceed with the digitalisation of public sector, implementing the planned reforms within the envisaged timeframe**.**
A relatively small share of firms define a cybersecurity policy and undertake a digital security risk assessment.	Enhance awareness of good practices in digital risk management, especially in the case of SMEs.
The cybersecurity requirements are being amended in response to ongoing changes in IT management in the public sector and a rise in digital security risks since the onset of the pandemic and as a result of the war in Ukraine.	Proceed with the timely introduction of the revised cybersecurity requirements.
Harnessing skills for a digital economy	
Many students lack strong foundational skills.	**Ensure timely implementation of the new curricula for schools, including attainment targets for digital skills.**
A comparatively high share of teachers report a need for professional development in ICT skills for teaching.	Strengthen the digital competencies of teachers by expanding, as envisaged, training opportunities in ICT areas.
University funding does not address skills mismatch and large ICT shortages. The share of foreign students is low.	**Introduce labour market outcome and international mobility indicators in university funding formulas.** **Provide additional funding to tertiary institutions for degree completions in disciplines that are important for the labour market, including digital transformation.**
The tertiary education programmes do not provide sufficiently broad skills.	Encourage higher education institutions to introduce new programmes, such as digital production, and increase the provision of entrepreneurship and other relevant programmes for the digital era.
Participation in adult learning remains low, especially among the less educated and elderly workers.	**Proceed with the development of national lifelong learning platform that will serve as a "one-stop shop" for adult education, complementing it with intensified information campaigns and provision of career counselling.**

Note: key recommendations, featuring in the Executive Summary, are in bold.

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LITHUANIA

Lithuania's economy exited the COVID-19-crisis successfully and was growing fast until early 2022, buoyed by rising exports and rapid integration into global value chains. However, with Russia's aggression of Ukraine continuing and its consequences spreading, the outlook has darkened. Growth has slowed, and inflation has risen to some of the highest levels in the euro area, driven by high energy and food prices. The country cut all energy ties with Russia, relying on imports from other countries instead. The government supports the many Ukrainian refugees and helps households and firms weather the energy crisis. Structural unemployment and skills mismatch remain high, while poverty declines only slowly. Further reform could help maintain economic resilience and cope with rising uncertainty. Reducing the scope of state-owned firms and improving their governance would help raise productivity. Linking education to labour market needs more closely would help improve employment and skills. Greater uptake of digital technologies by firms, along with a modernised public sector and strong skills will also help lift trend growth. Reaching the climate objective of net zero emissions by 2050 will require bold policy action, both on the tax and the spending side.

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