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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.

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The previous Survey of Luxembourg was issued in June 2017.

Basic Statistics of Luxembourg, 2018*

(Numbers in parentheses refer to the OECD average)**

LAND, PEOPLE AND ELECTORAL CYCLE					
Population (million, 2017)	0.6		Population density per km² (2017)	245.4	(37.7)
Under 15 (%, 2017)	16.4	(17.9)	Life expectancy (years, 2017)	82.7	(80.3)
Over 65 (%, 2017)	14.3	(16.8)	Men (2017)	80.1	(77.7)
Foreign born (%, 2017)	45.4		Women (2017)	85.4	(83.0)
Latest 5-year average growth (%)	2.4	(0.6)	Latest general election	October-2018	
ECONOMY					
Gross domestic product (GDP)			Value added shares (%, 2017)		
In current prices (billion USD)	69.5		Primary sector	0.3	(2.4)
In current prices (billion EUR)	58.9		Industry including construction	12.1	(27.3)
Latest 5-year average real growth (%)	3.0	(2.3)	Services	87.7	(70.3)
Per capita (000 USD PPP, 2017)	107.6	(44.7)			
Gross national income (GNI)					
In current prices (billiion EUR, 2017)	39.2				
Per capita (000 USD PPP, 2017, OECD: 2016)	76.2	(42.7)			
GENERAL GOVERNMENT					
Per cent of GDP					
Expenditure (OECD: 2017)	43.1	(40.3)	Gross financial debt (OECD: 2017)	28.8	(112.4)
Revenue (OECD: 2017)	45.5	(38.1)	Net financial debt (OECD: 2017)	-48.0	(69.4)
EXTERNAL ACCOUNTS					
Exchange rate (EUR per USD)	0.85		Main exports (% of total merchandise exports, 2017)		
PPP exchange rate (USA = 1)	0.87		Manufactured goods	37.8	
In per cent of GDP			Machinery and transport equipment	27.4	
Exports of goods and services	224.8	(56.1)	Chemicals and related products, n.e.s.	10.7	
Imports of goods and services	190.7	(52.0)	Main imports (% of total merchandise imports, 2017)		
Current account balance	4.8	(0.3)	Machinery and transport equipment	34.6	
Net international investment position (2017)	50.0		Manufactured goods	15.4	
			Chemicals and related products, n.e.s.	11.3	
LABOUR MARKET, SKILLS AND INNOVATION					
Employment rate (aged 15 and over, %)	67.1	(68.4)	Unemployment rate, Labour Force Survey (aged 15 and over, %)	5.6	(5.3)
Men	70.7	(76.0)	Youth (aged 15-24, %)	14.1	(11.1)
Women	63.4	(60.9)	Long-term unemployed (1 year and over, %, 2017)	1.9	(1.7)
Participation rate for 15-64 year-olds (%, 2017)	70.2	(72.1)	Tertiary educational attainment (aged 25-64, %, 2017)	40.3	(36.9)
Average hours worked per year (2017)	1 518	(1 746)	Gross domestic expenditure on R&D (% of GDP, 2016)	1.2	(2.5)
ENVIRONMENT					
Total primary energy supply per capita (toe, 2017)	6.3	(4.1)	CO2 emissions from fuel combustion per capita (tonnes, 2016)	14.6	(9.0)
Renewables (%, 2017)	6.9	(10.2)	Water abstractions per capita (1 000 m³, 2015)	0.1	
Exposure to air pollution (more than 10 μg/m³ of PM 2.5, % of population, 2017)	73.0	(58.7)	Municipal waste per capita (tonnes, 2017)	0.6	(0.5)
SOCIETY					
Income inequality (Gini coefficient, 2016, OECD: 2015)	0.304	(0.315)	Education outcomes (PISA score, 2015)		
Relative poverty rate (%, 2016, OECD: 2015)	11.1	(11.8)	Reading	481	(492)
Median gross household income (000 USD PPP, 2016, OECD: 2015)	42.3	(23.3)	Mathematics	486	(490)
Public and private spending (% of GDP)			Science	483	(493)
Health care (2017)	6.1	(8.8)	Share of women in parliament (%)	28.3	(29.7)
Pensions (2015)	8.4	(8.5)	Net official development assistance (% of GNI, 2017)	1.0	(0.4)
Education (public, 2017)	5.2	(4.5)			

Better Life Index: www.oecdbetterlifeindex.org

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

Executive Summary

Growth has been robust and well-being is high

Reducing households' and banks' financial risks should be a priority

Fiscal policy should support sustainable growth

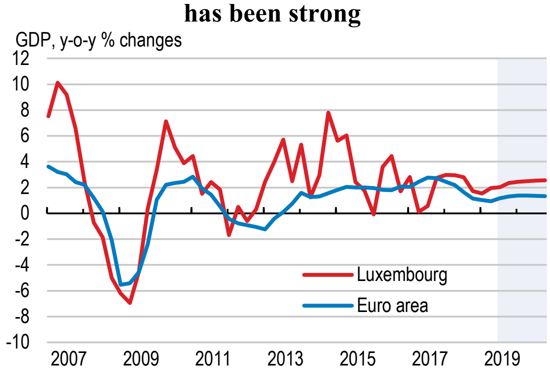
Future prosperity will require stronger productivity growth

The housing market needs to become more efficient and equitable

Growth has been robust and well-being is high

The economy has continued to expand rapidly (Figure A). GDP grew by 2.6% in 2018, mainly underpinned by private consumption. Over most of the past decade, GDP growth in Luxembourg has strongly outpaced the euro area average. Coupled with other strengths, such as relatively low gender inequality and a healthy work-life balance, high income levels are a mainstay of Luxembourg's well-being.

Figure A. Post-crisis economic performance has been strong



Source: OECD Economic Outlook: Statistics and Projections (database), June.
StatLink http://dx.doi.org/10.1787/888933950981

However, slower growth is projected (Table A), **and there are downside risks.** In case of a slowdown, the authorities should allow automatic stabilisers to operate. A fiscal stimulus could be envisaged in case of a severe downturn, which might result from rising trade tensions and financial volatility. Building on recent measures, one option to stimulate the economy could be to further reduce taxes on low wages, which would have the side-benefit of making the labour market more inclusive by favouring job insertion of low-skilled workers.

Table A. The expansion is projected to continue

(Annual growth rates, unless specified)	2018	2019	2020
Gross domestic product (GDP)	**2.6**	**2.0**	**2.5**
Private consumption	4.2	2.8	3.6
Government consumption	4.0	4.3	3.2
Gross fixed capital formation	-2.8	5.5	4.5
Exports of goods and services	4.6	3.8	4.1
Imports of goods and services	5.1	4.4	4.8
Unemployment rate (% of labour force)	5.5	5.2	5.1
Consumer price index	2.0	1.7	1.9

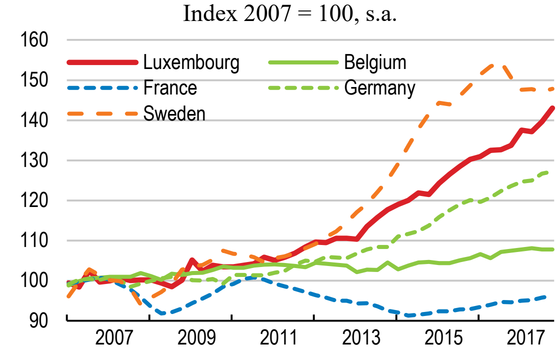
Source: OECD Economic Outlook.

Reducing households' and banks' financial risks should be a priority

Rising household indebtedness creates vulnerabilities for some families and some banks. Mortgage debt has continuously increased in line with rising house prices (Figure B), creating a high debt service burden for a larger share of households than in most other countries. Though the regulator has imposed higher capital buffers, domestic banks have large exposures to the residential real estate market, which is a source of risk. Introducing borrower-based macroprudential instruments, such as caps to loan-to-value or debt service-to-income ratios, as envisaged in draft legislation, would help avoid the further build-up of vulnerabilities.

Figure B. Real house prices are growing strongly

Index 2007 = 100, s.a.



Source: OECD, Analytical house prices indicators database.
StatLink https://doi.org/10.1787/888933951000

Reinforced supervision and regulation can further enhance financial sector resilience and foster the transition to a low-carbon economy. The large investment fund industry is sensitive to external risks, and sizeable intra-group exposures of international banks likewise call for close monitoring. The financial sector is globally exposed to climate-related risks, inter alia through holdings of high-carbon assets which are likely to lose value when policies are implemented to meet international climate change mitigation targets. Building on Luxembourg's leading role in green bonds, strengthening climate-related disclosure requirements for financial intermediaries will increase transparency and thus the allocative efficiency of financial markets.

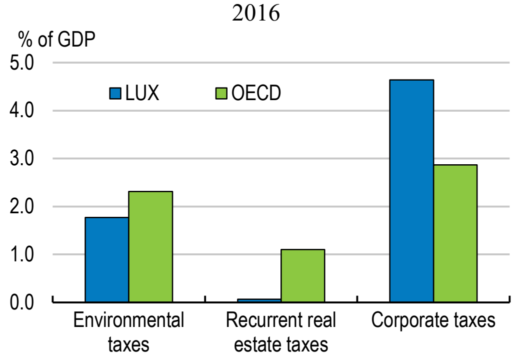
Fiscal policy should support sustainable growth

The fiscal position is very strong, but ageing creates a long-term fiscal challenge. The 2018 budget surplus exceeded 2% of GDP, and gross public debt is low and far outweighed by financial assets. However, under unchanged policies, ageing-related costs are projected to rise substantially, posing a long-run fiscal sustainability challenge. Taking steps to increase the retirement age with life expectancy and/or reduce the generosity of pensions would help address this challenge. Options outlined in the 2012 pension reform should be discussed in this context.

The composition of revenues should be also revised to support more sustainable growth (Figure C). Increasing environmental taxes, such as those on transport fuel or on motor vehicles, would reduce CO2 emissions and pollution. More reliance on recurrent real estate taxes would also be desirable. This would allow less reliance on base-narrowing tax arrangements that in the past attracted multinationals to Luxembourg and thus helped increase corporate tax revenues. Those provisions are being gradually phased out as part of Luxembourg's engagement in international efforts towards tax transparency, which should continue.

Figure C. Environmental and recurrent real estate taxes are low

2016



Source: OECD Global Revenue Statistics and OECD Green Growth Indicators.

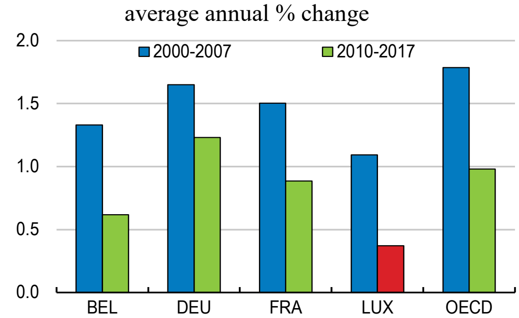
StatLink https://doi.org/10.1787/888933951019

Future prosperity will require stronger productivity growth

Productivity growth has disappointed, especially in services. The level of productivity is high, but its growth has been subpar for two decades (Figure D). Weak growth can largely be traced to services, where often the most productive firms have failed to pull ahead and weaker firms have fallen further behind. Within services, the financial sector has remained the main area of activity, despite declining productivity growth. Policy initiatives to diversify the economy need to be further pursued, with systematic monitoring and evaluation.

Figure D. Productivity growth has been sluggish

GDP per hour worked, USD 2010 PPPs, average annual % change



Source: OECD Productivity Indicators Database.

StatLink https://doi.org/10.1787/888933951038

Firms that are not top-performers, but viable, need to catch up. Firms often face skill shortages, *inter alia* in digital technologies, which weighs on productivity outcomes. Market congestion by inefficient firms compounds the problem. Training offers should be stepped up and need to be better informed by regular skill foresight exercises. Restrictive regulations in professional services hamper productivity in that sector but also in downstream production. A more efficient insolvency regime would foster entrepreneurship and help struggling firms to either restructure or exit.

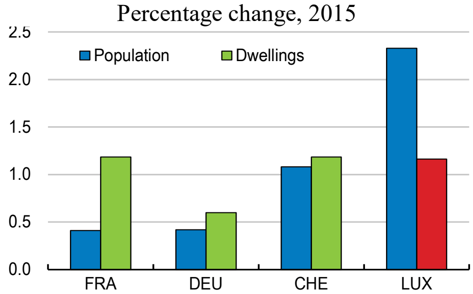
Top-performing firms could still become more innovative. This can take place through more widespread adoption of cutting-edge technologies, such as artificial intelligence or blockchain applications, where public sector use can have a valuable demonstration effect. R&D investment is low by international standards, and the share financed by firms has been declining. Income-based R&D tax incentives have been recently made more targeted, but remain likely to benefit large firms disproportionately. Introducing expenditure-based tax incentives could thus be considered.

The housing market needs to become more efficient and equitable

Housing supply has not kept pace with growing demand. Strong demographic growth, coupled with a trend towards smaller households, have fuelled housing demand, while structural constraints have hampered supply (Figure E). Limited use of land available for construction and cumbersome zoning restrictions have made land prices soar. In turn, this has worsened land hoarding, left unchecked by the low opportunity cost of vacant constructible land, but also by weak incentives of municipalities to enforce an obligation to build on private landowners. Complex construction norms set by municipalities have made building costs rise further.

Figure E. Population growth has outpaced new construction

Percentage change, 2015



Note: Population data for Germany refers to 2016.
Source: OECD (2018), International Migration Outlook; and OECD Affordable Housing Database.
StatLink http://dx.doi.org/10.1787/888933951057

High urban sprawl weighs on housing affordability and on the environment. Single-family houses still account for half of the housing stock, which contributes to high urban sprawl in international comparison. This private preference for low-density housing entails major social costs in terms of pollution, traffic congestion (not least due to massive cross-border commuting) and more expensive public infrastructure. Enhanced incentives for densification are hence called for. As with other supply constraints, better coordination between central and local government, as well as across different municipalities, is key.

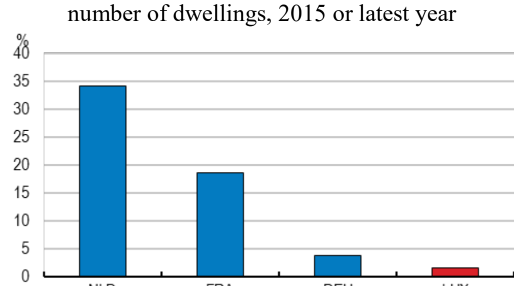
Tax provisions hamper housing supply, fuel mortgage indebtedness and harm equity. Recurrent real estate taxes are very low, partly because they are based on outdated cadastral valuations. Besides raising little revenue, these taxes hardly provide any incentives for socially efficient land use and territorial development. For instance, unused constructible land is seldom taxed, thus encouraging land hoarding. Rising house prices are also due to the favourable income tax treatment of owner-occupied housing, *inter alia* through mortgage interest deductibility, which tends to be regressive.

Equitable access to housing is also made difficult by a small social rental sector. The stock of social rental housing is very low (Figure F), partly reflecting the past practice of re-sale of subsidised housing on the unregulated market. Social rental agencies can alleviate this shortage by acting as intermediaries between landlords and vulnerable tenants, providing rent payment guarantees and maintenance services to the owners and supporting tenants in their future transition to unsubsidised housing. Financial support for these agencies should be stepped up and municipalities could provide up-to-date information on unoccupied dwellings.

Social housing allocation can be improved. Social rental housing should be targeted at those households most in need, to provide them with an affordable dwelling and prevent socio-economic segregation. However, the admission criteria for social housing are often flexible and with low transparency. Moreover, partly due to unlimited tenure contracts, many tenants come from the two top income quintiles. Recurrent means-testing should be combined with tailored plans for re-entering the private rental sector, similar to those used by social rental agencies. Rents in the social housing sector should also increase more steeply with tenant income.

Figure F. Social rental housing is scarce

Number of social rental dwellings as a share of the total number of dwellings, 2015 or latest year



Note: Data refer to 2011 Luxemburg; 2012 for Germany; 2014 for France.
Source: OECD Affordable Housing Database.
StatLink http://dx.doi.org/10.1787/888933951076

MAIN FINDINGS	KEY RECOMMENDATIONS
Reducing households' and banks' financial risks	
Rising house prices and household indebtedness create vulnerabilities for some families and for some banks.	Introduce borrower-based macroprudential instruments, such as caps to loan-to-value or debt-service-to-income ratios, as foreseen in draft legislation.
As elsewhere, the financial sector faces risks from exposures to high-carbon assets which could lose value in the context of policies to meet internationally agreed climate change mitigation targets.	Strengthen disclosure of climate-related risks by financial intermediaries, in line with the recommendations by the Task Force on Climate-related Financial Disclosures.
The financial sector is exposed to risks arising in international markets.	Further reinforce financial supervision, namely by continuing to monitor credit risks on intra-group bank exposures and to enhance on-site inspections and data collection on investment funds.
Using fiscal policy to make growth sustainable and inclusive	
As in the euro area, there are signs of a slowdown in activity and the most vulnerable workers would be the first affected.	Allow automatic stabilisers to work in case of a downturn and, if it intensifies, implement a countercyclical fiscal expansion.
In a no-policy-change scenario, ageing-related costs are projected to rise substantially over the long run.	Increase the retirement age with life expectancy and/or reduce the generosity of pensions.
Recurrent taxes on immovable property are very low.	Turn recurrent taxes on immovable property into a more important fiscal resource, e.g. by regularly aligning the tax base with the market price of the property.
Past tax arrangements for large corporations have contributed to raise significant tax revenues, but are no longer a sustainable attractiveness factor.	Continue to engage in international efforts to address tax challenges of cross-border activities and to strengthen tax transparency.
Luxembourg has low environmental taxation. Fuel tourism is high.	Continue to raise taxes and excise duties on transport fuel, especially on diesel, and develop flanking measures over the short term for most affected poor households.
Reviving productivity growth	
Productivity growth has long been slow, partly due to skill shortages.	Undertake regular skill foresight exercises and ensure their outcomes feed into enhanced training offers.
In services, the less productive firms have tended to fall further behind, which weighs on aggregate productivity.	Modernise bankruptcy law to ease early restructuring and second-chance opportunities, as well as the exit of non-viable firms.
Regulations for some professional services remain restrictive in international comparison.	In those professional services, eliminate restrictions on advertising and marketing.
Even top firms often fail to innovate.	Promote the adoption of cutting-edge technologies, inter alia through the demonstration effect of public sector use.
Addressing pressures and improving inclusiveness in the housing market	
Limited use of land available for construction and cumbersome zoning restrictions have fuelled land prices and encouraged land hoarding.	Increase the opportunity cost of unused land by reforming recurrent taxes on immovable property. One option is to increase land value taxes on land zoned for construction. Make part of government financing of municipalities conditional on municipalities penalising landowners and developers for non-use of building permits.
The personal income tax treatment of owner-occupied housing favours home ownership, encouraging indebtedness and house price rises.	Phase out or at least reduce mortgage interest deductibility.
High urban sprawl increases pollution, traffic congestion and the cost of public infrastructure.	Increase residential density, in particular around transport network hubs, namely by building higher buildings.
The social rental housing stock is small and often allocated to high-income tenants. The 2019 budget includes a new budget line to acquire land for housing purposes, currently endowed with an amount of EUR 100, which can be increased according to budgetary procedures.	To increase the stock of social rental housing while preserving social mixity, directly finance new land acquisition by public providers of social housing. Use recurrent means testing to better target the provision of social housing.
Housing allowances and rents in the social housing sector are not spatially differentiated, despite highly heterogeneous housing and rental market prices across municipalities.	Link housing allowances and rents in the social housing sector to reference rents at the local level.

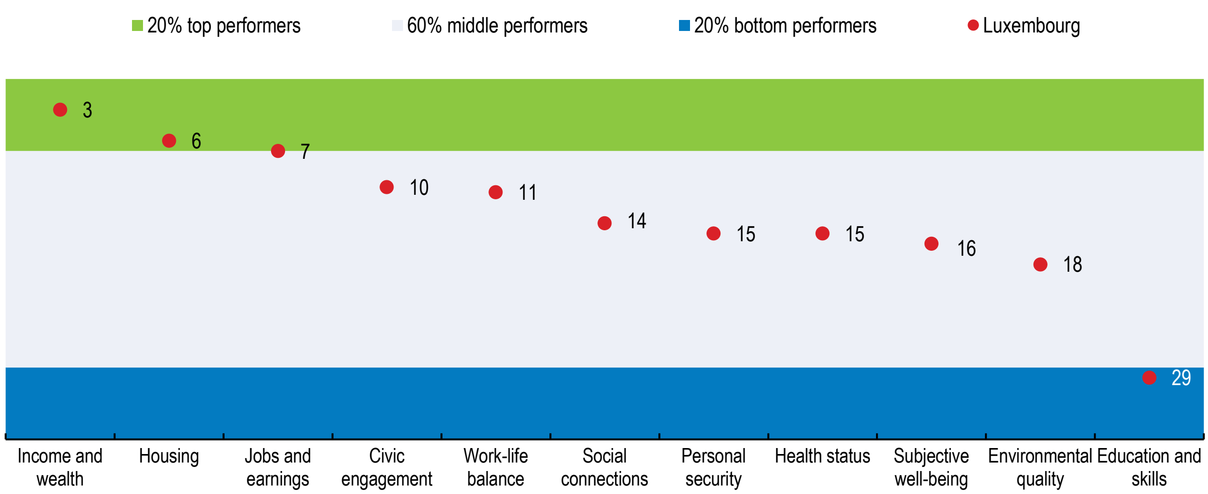
Key Policy Insights

Luxembourg is one of the most prosperous economies in the OECD. Thanks to overall sound policies and institutions, the financial sector remains competitive and has made inroads into new areas, such as fintech and green finance. Dynamic job creation has reduced unemployment and enabled Luxembourg to integrate numerous immigrants, who have become an essential pillar of the labour force while embracing the opportunity of a better life. A very large number of residents in neighbouring countries have also found work in Luxembourg, illustrating the high interconnectedness of the economy. The strong fiscal position is well illustrated by a long-standing AAA rating and the large accumulation of government financial assets.

Well-being benefits from high income levels, but also relies on many other strengths (Figure 1). Most people enjoy a healthy work-life balance and supportive social connections. Housing is generally spacious and well-equipped. Gender inequalities are comparatively low, especially as regards wages (Figure 2).

Figure 1. Wellbeing is high in multiple dimensions

Better Life Index, country rankings from 1 (best) to 35 (worst), 2017



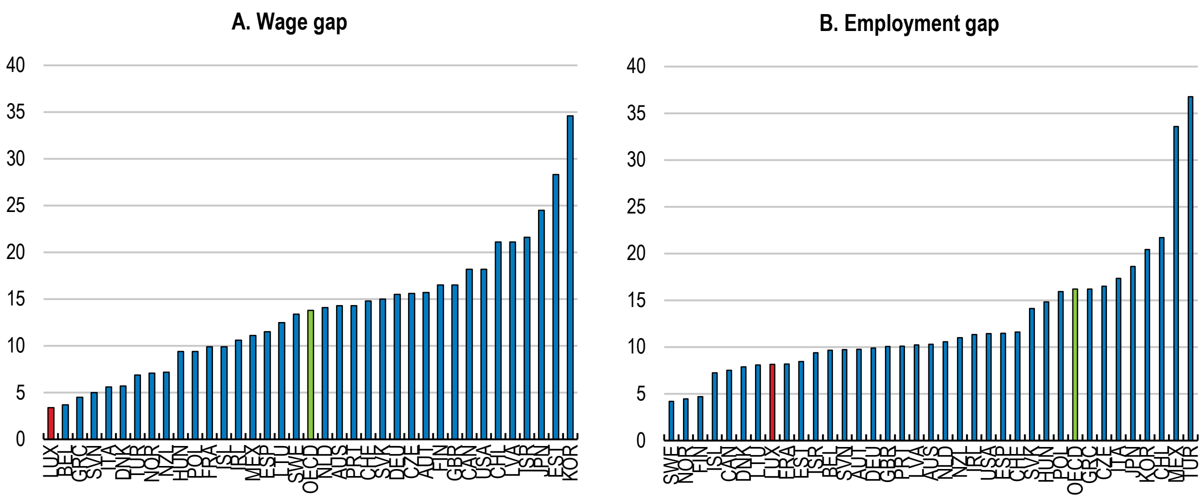
Note: Each well-being dimension is measured by one to four indicators from the OECD Better Life Index set. Normalised indicators are averaged with equal weights.
Source: OECD (2018), OECD Better Life Index, www.oecdbetterlifeindex.org.

StatLink https://doi.org/10.1787/888933951095

However, prosperity and quality of life cannot be taken for granted, and face some risks. For example, important challenges remain in education and skills, partly due to the large diversity of the resident population. Furthermore, though most immigrants find a job, they tend to earn less than the native-born and are more exposed to poverty, which weighs on the poverty rate for the population as a whole (Figure 3). The provision of multilingual education and 20 hours per week of free care for children aged 1-4, introduced in 2017, is a worthy policy initiative to address these challenges, which were extensively analysed in the 2017 OECD Economic Survey of Luxembourg.

Figure 2. Gender wage and employment gaps are comparatively small

Percentage, 2017 or latest year available



Note: The gender wage gap is defined as the difference between median earnings of men and women relative to median earnings of men, for full-time employees. The employment gap is defined as the difference in percentage points between the employment rates of men and women.
Source: OECD Labour Force Statistics (database).

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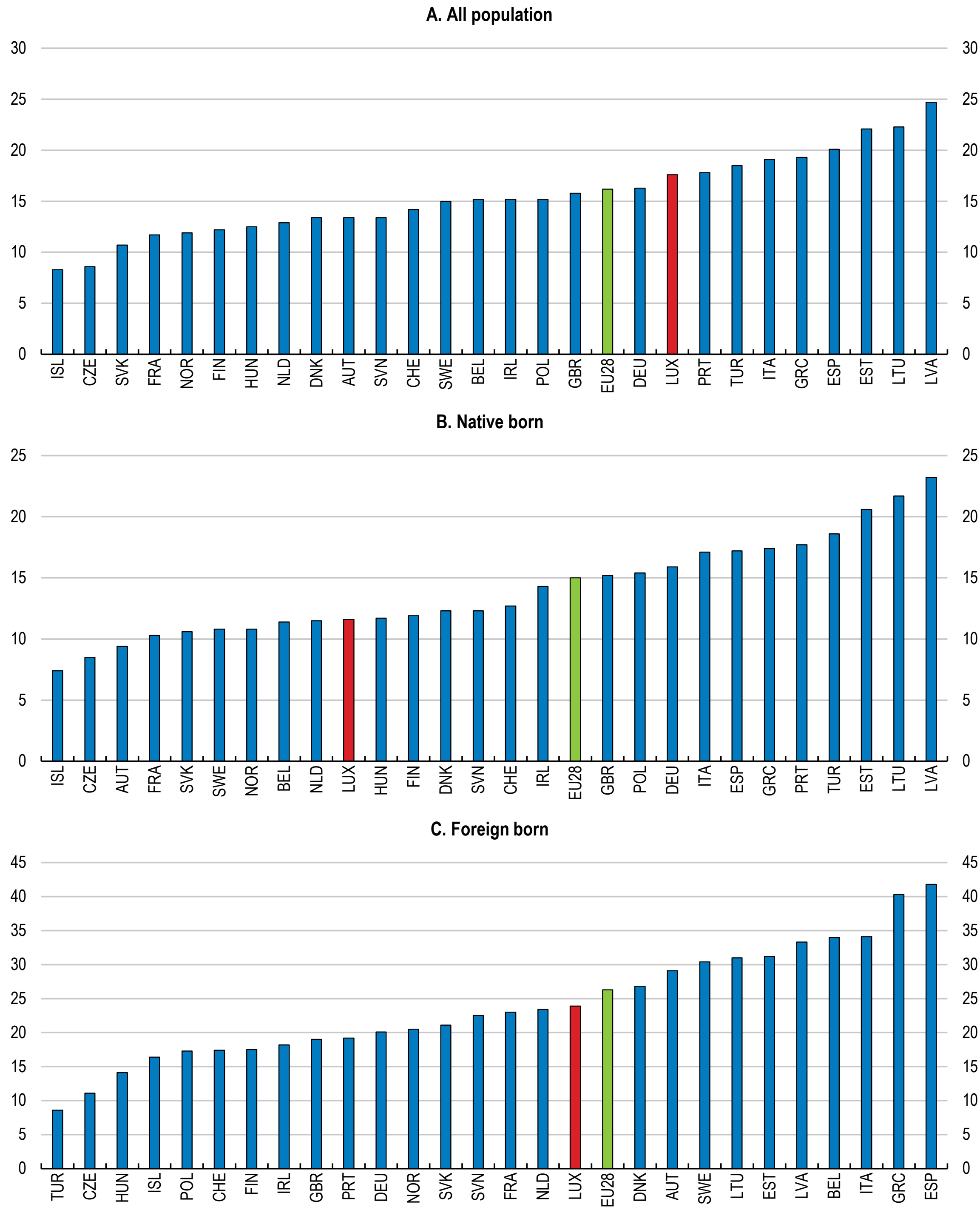
This Survey focuses on three main challenges. The first relates to housing, which is analysed in the thematic chapter. Strong population growth and supply constraints have made housing prices surge, which worsens affordability problems and creates vulnerabilities for some households and for some banks. The second main challenge is sluggish productivity growth, which has been lasting for several years. The third challenge is to achieve a more sustainable and inclusive growth. Environmental quality has deteriorated due to transport emissions and congestion related to cross-border commuting and urban sprawl. Facilitating labour market integration of older people is also an issue, notably since under unchanged policies ageing will create a long-term fiscal challenge.

Against this background, this Survey has three main messages:

- Tackling housing supply constraints, such as land hoarding, and increasing the supply of social rental housing are key to improving housing affordability.
- Reviving productivity growth will require supporting viable non-frontier firms to catch up, *inter alia* through digitalisation and related upskilling, and to help frontier firms to innovate more.
- Growth, equity and sustainability would all benefit from fiscal reforms to address rising pension expenditure and tilt revenues towards environmental and property taxation.

Figure 3. The risk of poverty among immigrants is a concern

Percentage of population at a risk of poverty, age 18 and above, 2017 or latest year available



Note: The at-risk-of-poverty rate is the share of people with an equivalised disposable income (after social transfers) below the at-risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income after social transfers.
Source: Eurostat, "Income and living conditions".

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Growth has been solid, but there are risks ahead

After somewhat lower figures in 2016-2017, mainly caused by disappointing developments in the non-financial sector, GDP growth rebounded in 2018, outperforming the euro area average (Table 1 and Figure 4, Panel A). The lasting effects of the 2017 cuts in personal income taxation, high household confidence and a strong labour market have all boosted private consumption. The unemployment rate has declined to just above 5%, although it remains elevated among young workers (Figure 4, Panel B).

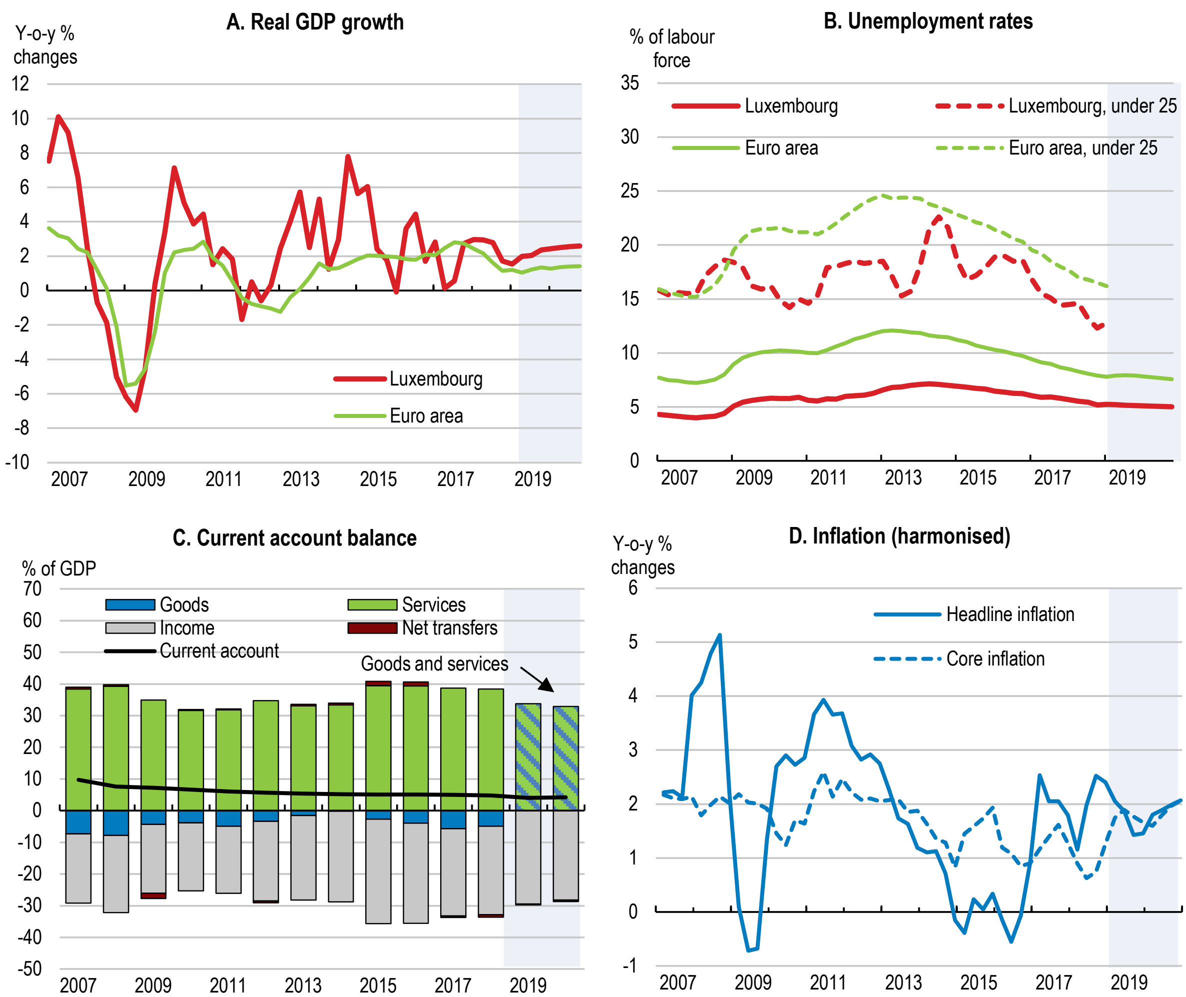
Table 1. Macroeconomic indicators and projections

Annual percentage change, volume (2010 prices)

	2015 Current prices (billion EUR)	2016	2017	2018	2019	2020
Gross domestic product (GDP)	**51.6**	**2.4**	**1.6**	**2.6**	**2.0**	**2.5**
Private consumption	15.9	1.7	3.0	4.2	2.8	3.6
Government consumption	8.7	2.5	3.5	4.0	4.3	3.2
Gross fixed capital formation	9.4	10.1	3.9	-2.8	5.5	4.5
Housing	1.6	8.3	0.5	15.3	-8.6	2.5
Final domestic demand	33.9	4.1	3.4	2.2	3.9	3.7
Stockbuilding[1]	0.5	-0.4	-0.5	0.6	-0.6	0.0
Total domestic demand	34.4	3.5	2.6	3.3	3.0	3.6
Exports of goods and services	115.9	3.8	-1.9	4.6	3.8	4.1
Imports of goods and services	98.8	4.5	-2.2	5.1	4.4	4.8
Net exports[1]	17.1	0.1	-0.1	0.5	0.1	0.1
Other indicators (growth rates, unless specified)						
Potential GDP	. .	2.8	2.8	2.6	2.6	2.6
Output gap[2]	. .	-0.7	-1.9	-1.9	-2.6	-2.7
Employment	. .	2.3	2.8	2.8	2.6	2.6
Unemployment rate	. .	6.3	5.9	5.5	5.2	5.1
GDP deflator	. .	0.9	2.1	3.8	2.8	2.2
Harmonised consumer price index	. .	0.0	2.1	2.0	1.7	1.9
Harmonised core consumer price index	. .	1.0	1.4	0.9	1.8	1.9
Household saving ratio, net[3]	. .	13.7	16.5	16.5	18.0	18.1
Current account balance[4]	. .	5.1	5.0	4.8	4.0	4.2
General government fiscal balance[4]	. .	1.9	1.4	2.4	1.9	1.8
Underlying general government fiscal balance[2]	. .	2.2	2.4	3.5	3.3	3.3
Underlying government primary fiscal balance[2]	. .	2.0	2.3	3.3	3.1	3.2
General government gross debt (Maastricht)[4]	. .	20.7	23.0	21.4	21.7	22.1
General government net debt[4]	. .	-49.7	-49.8	-48.0	-47.7	-47.3
Three-month money market rate, average	. .	-0.3	-0.3	-0.3	-0.3	-0.3
Ten-year government bond yield, average	. .	-0.2	0.5	0.6	0.3	0.4

1. Contribution to changes in real GDP.
2. As a percentage of potential GDP. Based on OECD estimates of cyclical elasticities of taxes and expenditures. For more details, see OECD Economic Outlook Sources and Methods.
3. As a percentage of household disposable income.
4. As a percentage of GDP.
Source: OECD (2019a), OECD Economic Outlook: Statistics and Projections (database), June.

Figure 4. Macroeconomic developments are solid



Source: OECD Economic Outlook (database); Eurostat, Employment and Unemployment (Labour Force Survey) Statistics; OECD National Accounts Statistics.

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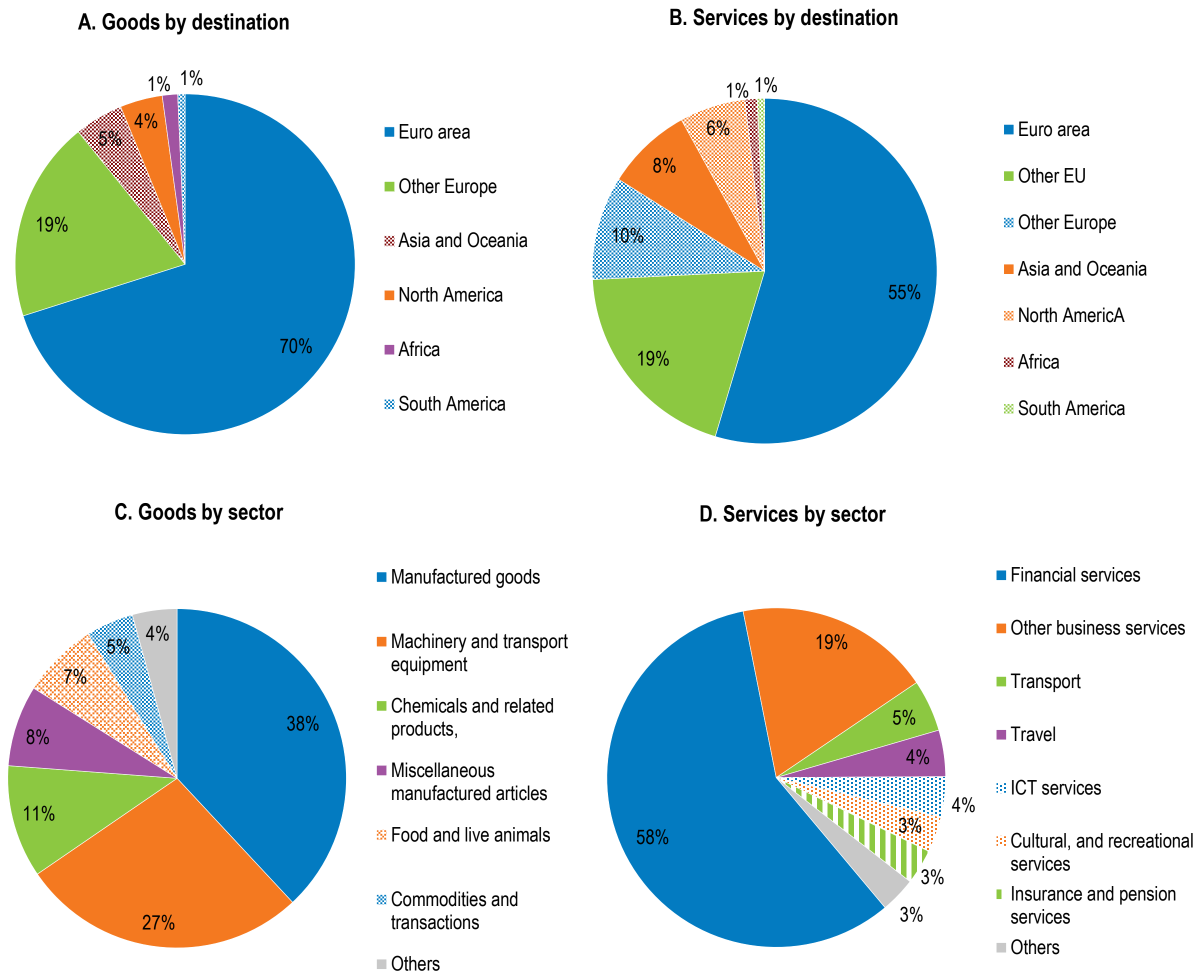
However, growth has slowed down towards the end of 2018, in line with developments in the euro area as a whole. Prospects of subdued euro area growth in the near future are likely to affect Luxembourg, given the very strong trade and financial linkages with euro area partners (Figure 5). In case of a downturn, the government should allow automatic stabilisers to operate and, if the downturn intensifies, implement a countercyclical fiscal expansion, taking advantage of Luxembourg's ample fiscal space. Building on recent measures, further lowering labour taxation at modest income levels would provide short-run stimulus and foster labour market inclusiveness by reducing unemployment among low-skilled workers.

Risks are both of internal and external nature and have become tilted to the downside (Table 2). At home, rising real estate prices and mortgage indebtedness have stoked vulnerabilities in asset markets and in the resident non-financial sectors; indicators point to historically high risk in the credit and housing markets (Figure 6). As a consequence, house price reversals or steep interest rate hikes could affect some banks. On the external front, rising trade tensions could lower GDP growth by about 1pp in 2019 (STATEC, 2018b).

The impact of Brexit is uncertain. On the one hand, potential disruptions could harm the financial sector in case of a "hard Brexit"; on the other hand, some financial firms have already announced the reallocation of their activities to Luxembourg.

Figure 5. Luxembourg mainly trades with European partners

Share of exports by sector and destination, 2017



Note: In Panel C, Others include crude materials, beverages and tobacco, mineral fuels and lubricants, and animal and vegetable oils. In Panel D, Others include intellectual property charges, insurance and pension, construction services, maintenance services, and manufacturing services. In 2017, goods made up 13% of exports while services made up 87% of exports.
Source: OECD International Trade Statistics.

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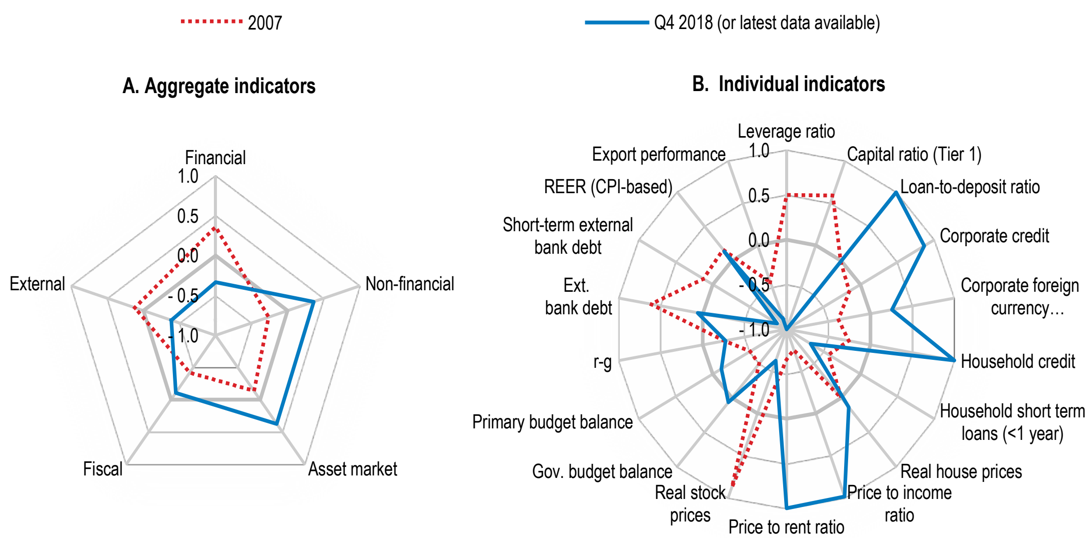
Table 2. Low probability events that could lead to major changes in the outlook

Vulnerability	Possible outcome	Possible policy action
High household indebtedness and rising real estate prices	Sharp reversals in real estate prices and steep increases in interest rates could put some households in financial distress, and endanger some banks.	Expand the macroprudential toolkit with borrower-based measures to contain credit growth, as proposed in draft legislation. Address structural factors in housing markets that contribute to rising prices. In case of a housing market downturn, consider taking fiscal policy measures, which could take the form of a temporary cut in transaction taxes for houses sold in a low price range.
Rising trade tensions or heightened financial volatility could affect the fund industry.	Degradation of the external environment and materializing risks in international markets would impact demand for financial services and lower growth.	Maintain close supervision of banks and investment funds. Continue to participate in international collaboration platforms that promote free markets and a rules-based trade system.
Disorderly exit of the United Kingdom from the European Union.	As the United Kingdom is a major trading partner, particularly for financial services, its disorderly exit from the EU could lead to disruptions for Luxembourg's financial activities. At the same time, Luxembourg could benefit from the reallocation of banks and insurance companies.	Implement contingency plans.

Figure 6. Macro-financial vulnerabilities have increased in housing and credit markets

Index scale of -1 to 1 from lowest to greatest potential vulnerability, where 0 refers to long-term average, period since 1970



Note: Each aggregate macro-financial vulnerability dimension is calculated by aggregating (simple average) normalised individual indicators from the OECD Resilience Database. Individual indicators are normalised to range between -1 and 1, where -1 to 0 represents deviations from long-term average resulting in less vulnerability, 0 refers to long-term average and 0 to 1 refers to deviations from long-term average resulting in more vulnerability.

Source: Calculations based on OECD (2019a), OECD Resilience Database, February.

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Strengthening financial regulation to address risks

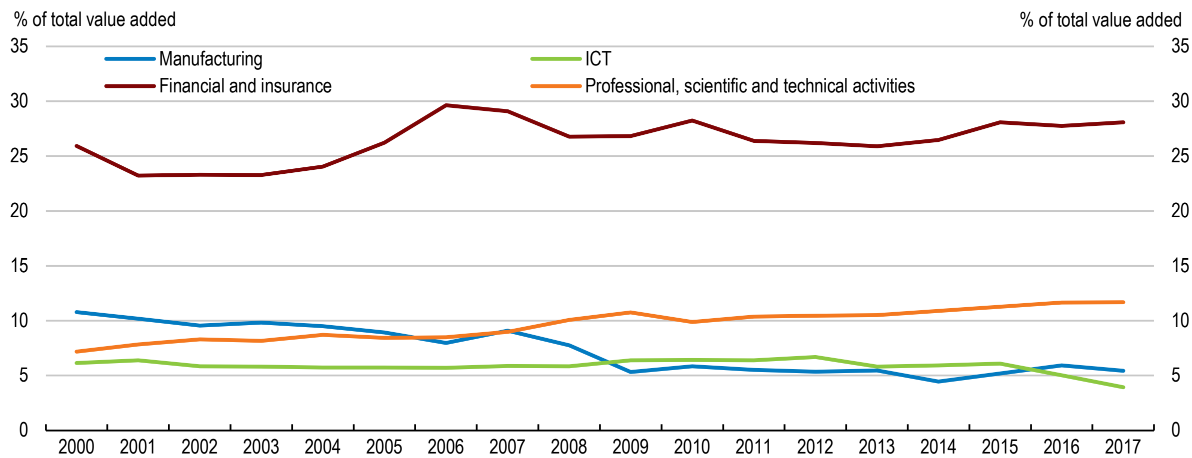
External risks to the large financial sector call for enhanced monitoring

The financial sector is the most important pillar of Luxembourg's economy, accounting in 2017 for 28% of GDP and 10% of total employment (Figure 7). As such, the financial sector is also a major driver of the country's macroeconomic performance (Figure 8).

Luxembourg's attractiveness for finance is explained by its stable macroeconomic and political environment, multilingual and multicultural society, favourable overall tax settings, efficient legal framework, openness and technological readiness, as well as by its capacity to attract and retain talent, thus creating a pool of labour with the required skills and expertise (Global Competitiveness Report, 2017).

Figure 7. The financial sector accounts for a large share of total value added

Share of total value added, 2010 prices



Source: OECD National Accounts database.

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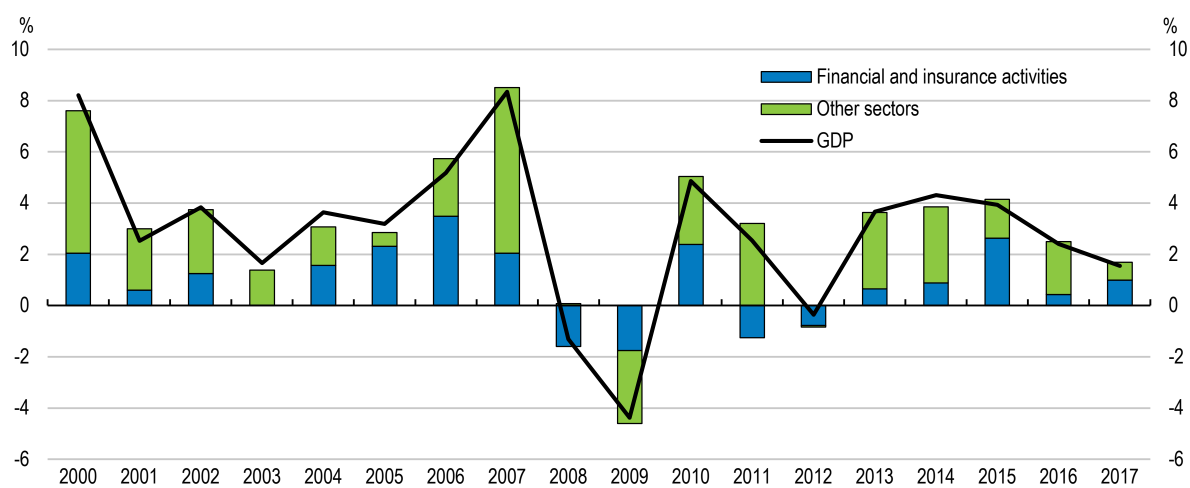
Figure 8. The contribution to growth from financial services has been high

Contributions to total value added growth, y-o-y changes



Source: OECD National Accounts database.

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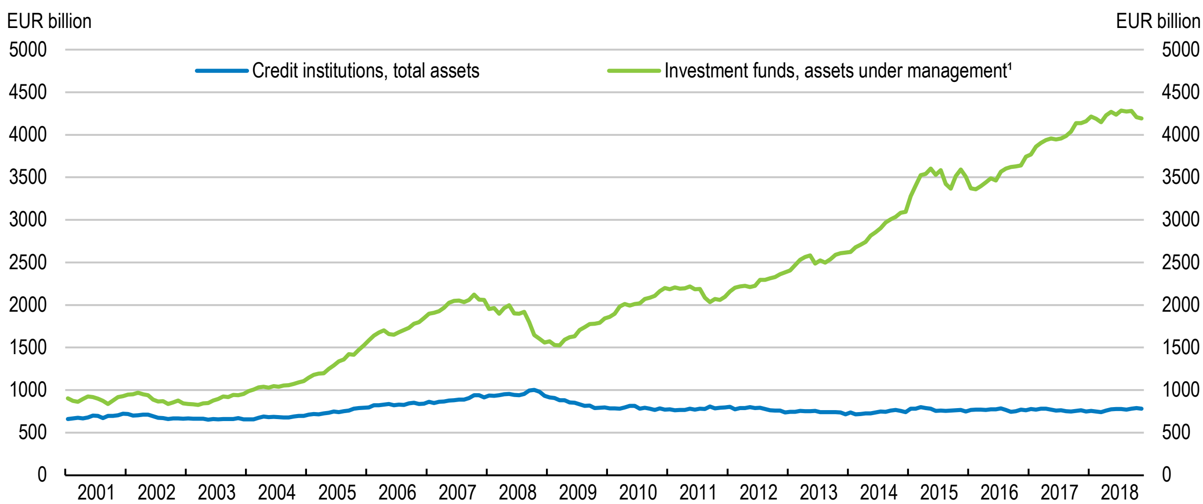
Luxembourg investment funds rank second worldwide in terms of assets held, after the US, and operate on global financial markets. Indeed, actors from around the world invest in funds domiciled in Luxembourg, which in turn invest in various markets and asset classes abroad. The banking sector mainly comprises international banks with many cross-border activities. Many of these banks are foreign-owned with parent companies abroad, such that at the end of 2017, 83% of total inter-bank credit consisted in intra-group lending (BCL, 2018). Finally, these various actors are strongly inter-connected since investment funds hold deposits and claims over depository banks, although, according to the financial supervisor, the Commission de Surveillance du Secteur Financier (CSSF), internal stress testing shows that this interconnection does not represent a major channel of risk.

Linkages of credit institutions and investment funds to international markets expose the domestic economy to external financial shocks. In particular, heightened financial volatility and tensions on global stock markets could affect the fund industry. Assets under management have been growing rapidly since the global financial crisis, due to decreased bank intermediation, the expansion of the ECB balance sheet and the low interest rate environment, which created abundant liquidity and motivated search for higher yield (Figure 9). However, the financial market volatility observed in 2018 weighed on the expansion of the sector compared to previous years, illustrating its sensitivity to the materialization of external risks (STATEC, 2018b).

Figure 9. Assets under management have been on an upward path since the crisis



1. Undertakings for collective investment (UCI), net assets.
Source: Banque centrale du Luxembourg, Statistical tables.

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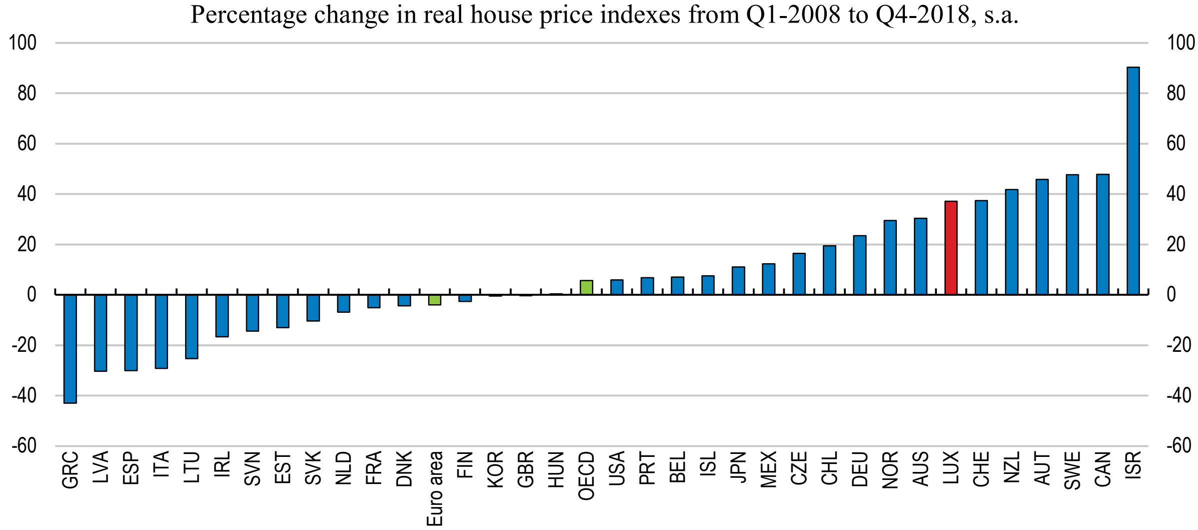
The financial sector's exposure to external risks warrants substantial surveillance and monitoring. In addition to the supervision conducted by the ECB, the CSSF has been increasing its staff and runs on-site inspections and fund-bank stress tests twice a year, which is welcome, in addition to engaging in international institutions. Efforts to monitor and supervise must continue to keep pace with the financial sector's size and complexity. For example, regarding the fund industry, authorities must keep up on-site inspections and pursue efforts to close remaining data gaps, so that supervision on an individual fund basis can be enhanced. Furthermore, credit risks on intra-group exposures in the banking sector should continue to be closely monitored. These exposures build up through liquidity transfers to parent banks abroad, under an exemption from large exposure limits for intra-group exposures. The supervisor should continue to verify that these exemptions still comply with the conditions set out by law , assess the risk arising from the resulting intra-group exposure, and recall the exemption if need be.

Macroprudential tools can help contain soaring house prices

Housing prices have been increasing strongly since the crisis (Figure 10), which is likely to reflect structural factors, as discussed in the thematic chapter. Strong economic and demographic growth has been pushing up demand. Owing to low interest rates and tax deductibility of mortgage interest payments, this demand has been increasingly financed by indebtedness. As residential real estate construction has remained subdued due to supply constraints, this has resulted in steep price rises.

Figure 10. Real house prices are growing strongly

Percentage change in real house price indexes from Q1-2008 to Q4-2018, s.a.



Source: OECD Analytical House Price Indicators.

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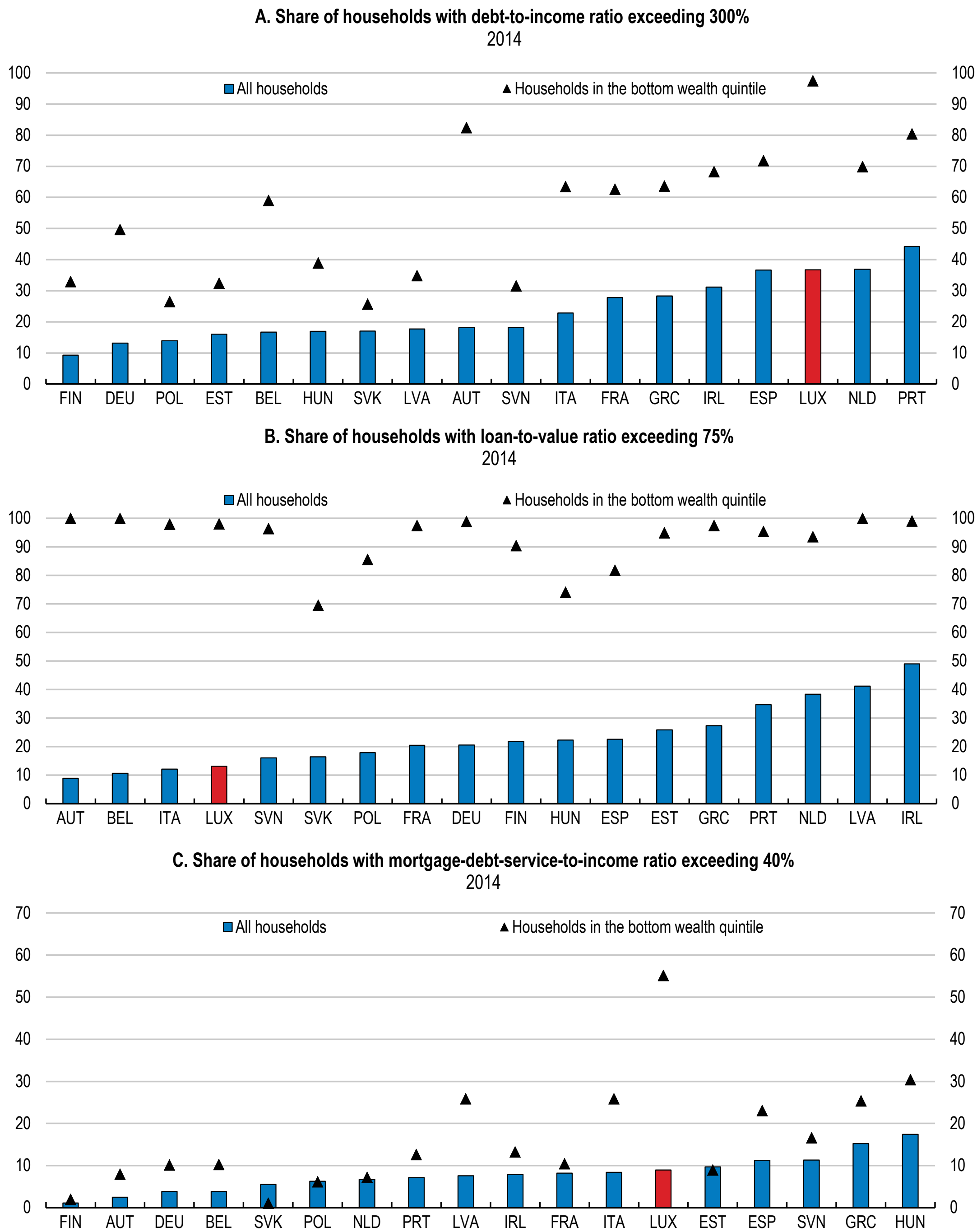
Mortgage debt represented 91% of total household liabilities in 2014 (Girshina et al., 2017). Rising debt has made Luxembourg's debt-to-income (DTI) ratio comparatively high, at 176% in 2017 against 108% for the EU average (BCL, 2018). The same holds for the debt-service-to-income (DSTI) ratio (17%, against 14% for the OECD average). In contrast, at 34%, the loan-to-value (LTV) ratio is below the OECD average (43%), reflecting households' high assets, which are partly a consequence of rising house prices.

One way to assess vulnerabilities linked to the real estate market is to determine the share of households whose debt burden exceeds some commonly accepted thresholds. These households could be vulnerable to real estate price drops, income losses or interest rate hikes, as most outstanding loans are variable-rate ones (BCL, 2018). In Luxembourg, the share of vulnerable households on the basis of the debt-to-income and debt-service-to-income ratios is internationally high, while the opposite is true for the loan-to-value ratio (Figure 11).

For all three indicators, however, Luxembourg's shares are among the highest when focussing on households in the bottom wealth quintile. Moreover, younger households are more likely to be financially vulnerable (Giordana and Ziegelmeyer, 2017). As regards bank vulnerabilities, exposures to the real estate market represent 50% of GDP (ESRB, 2016) and are concentrated in a small number of domestic banks, including some identified as systemically important (BCL, 2018). However, according to the CSSF, regular stress testing shows that banks would withstand extreme mortgage default rates and house price declines as observed in the context of the 2008 crisis without the need of recapitalization.

Figure 11. The share of over-indebted households is high, in particular for those with low wealth



Note: Computations of these shares only include households with mortgage on their main residence. The debt-to-income ratio calculates outstanding debt on main residence divided by annual household gross income. The loan-to-value ratio computes the outstanding stock of main residence mortgages divided by the current value of the main residence. The debt-service-to-income ratio represents monthly debt service payment on main residence (including interest and principal, excluding taxes) divided by monthly household gross income. The thresholds of respectively 300%, 75% and 40% are commonly used in the literature on household financial vulnerabilities, for example in studies covering Luxembourg (Giordana and Ziegelmeyer, 2017), the euro area (ECB, 2013) or the UK (IMF, 2011).
Source: HFCS database, LWS database, OECD Affordable Housing Database.

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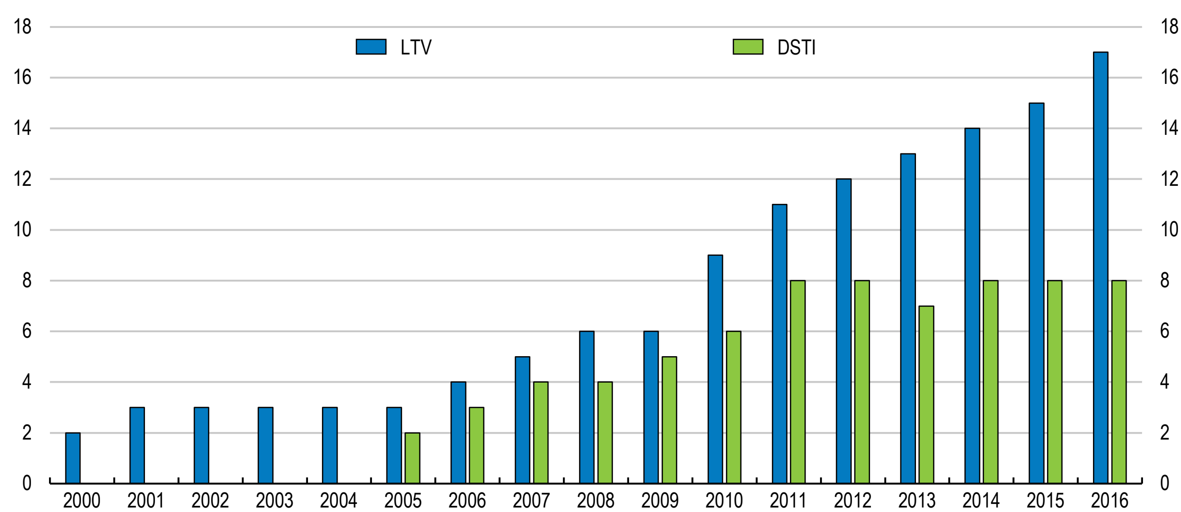
Sustained increases in housing prices and household indebtedness warrant expanding the macroprudential toolkit. In 2016, the ESRB issued a warning to Luxembourg, considering that the existing policies were insufficient to contain risks and financial vulnerabilities in the residential real estate market (ESRB, 2016). In the light of fast-paced credit growth, Luxembourg has been stepping up its macroprudential capital requirements, upon recommendations of the Comité du Risque Systémique (CdRS). Since 2012, banks must use a 75% (instead of the standard 35%) risk weight for the part of a new mortgage loan above an LTV of 80%. In 2014 Luxembourg introduced a capital conservation buffer of 2.5%, in 2016 an O-SII (Other Systemically Important Institutions) buffer, and at the end of 2018 the counter-cyclical capital buffer was raised to 0.25%. However, there are currently no measures focussing specifically on borrower risks in Luxembourg, while this type of instrument has been increasingly adopted in OECD countries (Figure 12). The relatively recent implementation of these measures makes it difficult to assess their impact. However, a growing empirical literature points to the effectiveness of LTV and DSTI ratios to contain mortgage lending and house price increases (Cerutti et al., 2017; IMF, 2014; Lim et al., 2011; Kuttner and Shim, 2013).

A 2018 draft law would enable the CSSF to set limits to mortgage credit, including DTI, LTV and DSTI caps, upon the recommendation of the Conseil du Risque Systémique (CdRS) and after consulting with the central bank. The draft law received a favourable opinion from the ECB and is pending Parliament approval. Like other European countries facing tensions in their housing markets, Luxembourg should move ahead in the implementation of this type of borrower-based macro-prudential instruments.

Additionally, the authorities should be prepared to use remedial measures in the event of a serious housing market downturn, which could depress household consumption through negative wealth effects, and produce financial stress. For instance, the authorities could consider a temporary cut in transaction taxes for houses sold in a given (low) price range. Such policy has been found effective in the UK to uphold consumer spending and minimise house price falls (Best and Kleven, 2017).

Figure 12. Borrower-based macroprudential measures have been increasingly implemented

Number of OECD countries with limits to debt-service-to-income (DSTI) and loan-to-value (LTV)



Source: OECD Resilience database.

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Luxembourg has become a gateway for fintech and big tech firms

Luxembourg has succeeded in attracting prominent fintech and big tech companies. Licensed by the Minister of Finance (upon advice from the CSSF) to perform different activities (e.g. those of banking, payment or e-money institutions), these companies then service customers all over Europe. Some of these firms offer online checking accounts and payment services with lower fees than those charged by incumbent banks. Others operate trading platforms for virtual assets (or cryptoassets). Others still are exploring the use of blockchain (or distributed ledger technology) to cut costs in the fund distribution (ILNAS, 2018).

It is still early to assess the contribution of these strands of innovative finance to economic activity through conventional metrics, like value added or employment. But they clearly have the potential to help preserve and enhance Luxembourg's competitive edge in financial services. At the same time, fintech and big tech activities raise important regulatory issues, often with a cross-border dimension, which calls for action at the EU level.

Large cryptoasset trading platforms raise unfair trading concerns

Cryptoasset trading platforms allow buying and selling cryptoassets as well as the conversion of cryptoassets into fiat currency. Luxembourg is home to two entities of two large groups active in trading, Bitstamp and bitFlyer, which also operate as payment institutions. Bitstamp, for instance, ranks third among cryptoasset trading platforms with respect to the Bitcoin trading against the Euro, with around 10% of global market share. Bitstamp Europe S.A. (the Luxembourg entity) operates as a payment institution only and does not have any cryptoasset trading platform in Luxembourg, whereas bitFlyer Europe S.A. (the Luxembourg entity), in addition to payment services, operates a cryptoasset trading platform.

The CSSF was the first EU supervisor to have granted a license of a payment institution to these platforms, covering the fiat currency part of their activities, thus requiring compliance with legislation to prevent money laundering and terrorist financing, as well as with relevant regulation in other areas (e.g., governance, internal control). However, the payment regulations in Europe do not cover risks related to cryptoasset trading, such as market manipulation and insider trading. There is growing evidence of price manipulation in the bitcoin markets (Gandal et al., 2018; Griffin and Shams, 2018). In this context, a recent report based on questionnaires sent to major platforms operating in the US (Office of the New York Attorney General, 2018) found that often those platforms have not implemented any formal policy to detect market manipulation and it is not clear either whether those platforms prevent insider trading. Furthermore, there is no European or Luxembourg regulation setting rigorous standards for listing a new cryptoasset, and platforms themselves do not have such standards either.

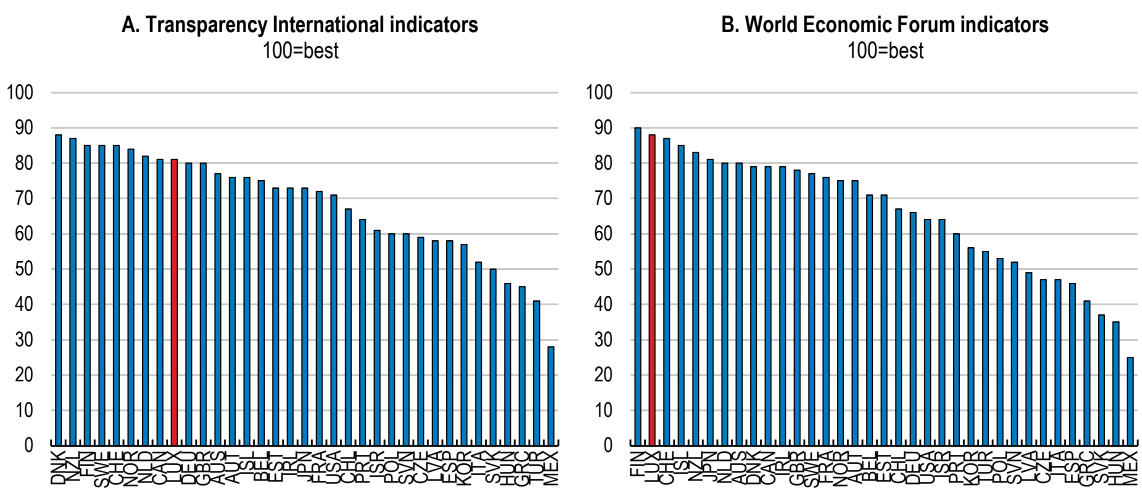
There is therefore a case for regulation of trading activities of cryptoasset trading platforms, but still no international "best practices" in this domain. The EU authorities have not yet decided whether to consider cryptoassets as transferable securities and, hence, the EU financial rules (e.g. MiFID II, the Market Abuse Directive) do not apply to their trading (ESMA, 2019). The authorities in Luxembourg have always been in favour of trying to fit the new business models into existing European regulation (such as the directive on payment services PSD2), rather than developing specific regulation on their own while waiting for a common EU solution. Other jurisdictions have designed a specialized license (e.g BitLicense in New York, amended Payment Services Act in Japan and the recently adopted PACTE law in France), and China has banned these platforms altogether (in 2017). Numerous consultations and reports suggest that policy makers are in the process of learning about this new asset class (e.g. ESMA, 2018, 2019; OECD, 2019a; Le Moign, 2018).

To foster learning on how best to ensure fair trading, the CSSF should have the legal capacity to conduct inquiries into the activities of trading platforms. As of now, the legal power of the CSSF is limited to issuing warnings to retail investors about cryptoasset related risks and it does not have any supervisory power over these cryptoasset activities. Eventually, trading platforms should be subject to regulation similar to the regulation of other market operators, preferably at the EU level, to prevent regulatory competition (ESMA, 2019). In addition, the CSSF should continue, in line with the warnings issued in 2018, to disseminate information to investors about the risks of virtual currencies.

Enforcement against international corruption needs to be stepped up

Luxembourg is regarded as one of the least corrupt countries in the world, according to different indices of perception of corruption (Figure 13). Fighting corruption is important for ethical, political and economic reasons. On the economic front, it undermines the business climate, distorts competition and can be a major driver of public spending inefficiency. Across the EU, Luxembourg residents are among those who perceive corruption to be less of a problem both in public institutions and as part of the country's business culture (European Commission, 2017).

Figure 13. Corruption is perceived as very low



Note: "Transparency International indicators" refers to the average of five sub-indicators available for all OECD countries in the "Corruption Perception Index"; "WEF indicators" refers to the World Economic Forum's Executive Opinion Survey.
Source: Transparency International; and World Economic Forum.

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However, the large magnitude of capital flows involving Luxembourg poses associated risks of economic crime, especially of a cross-border nature. A case in point is bribery of foreign public officials. Luxembourg's enforcement of the OECD Anti-Bribery Convention remains very modest, with only one criminal case concluded over 1999-2017, and only one individual sanctioned (OECD, 2018f). The authorities claim that recent draft legislation will, when approved, implement two OECD recommendations for combatting this form of corruption. They have also mentioned that Luxembourg has adequately responded to requests for mutual legal assistance from other countries, sanctioned one case in 2018, and investigated two more cases that are still ongoing. Progress on enforcement will be assessed by the OECD Working Group on Bribery, with the next evaluation of Luxembourg scheduled for 2021.

Luxembourg faces an inherent high risk of money laundering of foreign proceeds. The legal framework to fight money laundering has been upgraded with the transposition into national law of the 4th EU Anti-Money Laundering Directive, which was completed in 2018. Active enforcement is key for risk mitigation, and should be informed by the national risk assessment exercise completed in 2018. In this context, a register of beneficial owners of corporate and other legal entities, which will help detection, has been set up by recent legislation (January 2019), and will be accessible to the authorities as of September this year. A draft bill setting up a separate register of beneficial owners of trusts and other types of legal arrangements is under preparation as part of the transposition of the 5th EU Anti-Money Laundering Directive.

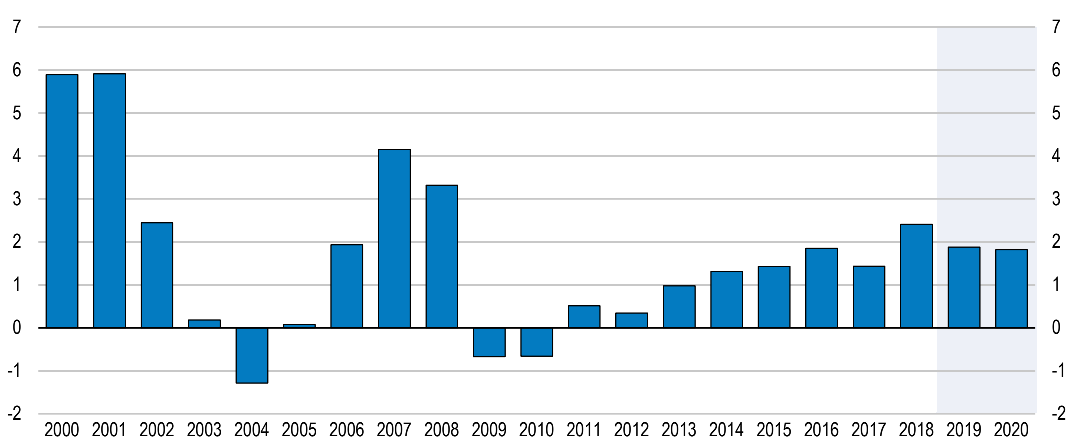
Fiscal reforms for inclusive growth and sustainability

The fiscal position is strong, but ageing poses a long-term challenge

Luxembourg has a fiscal surplus, which has been on an upward trend since the crisis (Figure 14). After a slight decline in 2017, due to expansionary measures included in the tax reforms and the loss of e-commerce VAT, the surplus exceeded 2% of GDP in 2018, far above Luxembourg's Medium Term Objective for 2016-2019 (-0.5% of GDP). Gross public debt is among the lowest in the OECD, at 21% of GDP by end-2018. The government's objective to keep the public debt ratio below 30% and preserve the AAA rating in the 2018-2023 legislature appears well within reach. Being a small open economy, it is important for Luxembourg to maintain ample fiscal space. However, there is significant budgetary room for manoeuvre, which could be used to support the economy in case of a downturn characterised by weak demand.

Figure 14. The fiscal balance is sound

Percentage of GDP



Source: OECD Economic Outlook (database).

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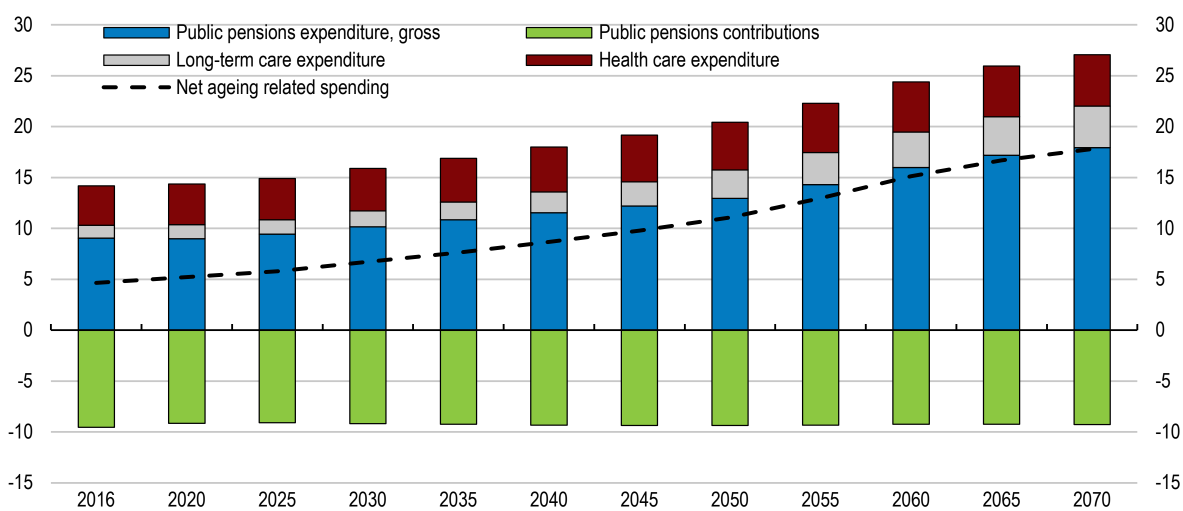
The pension system enjoys a comfortable situation in the short to medium term, with a sizeable surplus of contributions over outlays and considerable accumulated assets. Luxembourg has a detailed monitoring system in place, including a reassessment of the financing of the general pension scheme every 5 years. In the future, when some conditions are met, the authorities will be under a legal obligation to implement reforms, to be decided and fully specified at the time. For instance, as per the 2012 pension reform, the automatic indexation of pensions to wage developments is to be reduced (to an adjustable extent) when contributions no longer cover pension expenditure. The 2012 reform also outlines other possibilities, such as a suspension of end-of-the-year pensions ("allocation de fin d'année"). Another mechanism is an increase in contributions, to be decided when the reassessment taking place every 5 years concludes that, under current parameters, the financial viability of the system is no longer guaranteed according to pre-defined thresholds.

However, the relatively high replacement rates and low effective retirement age of the pension system (OECD, 2017a) will entail considerable fiscal pressure in the long run. Under the current parameters, ageing-related costs are projected to rise substantially (EC, 2018a; Figure 15): for instance, public expenditure on pensions is estimated to reach 18% of GDP by 2070, against 11% on average in the EU. In this no-policy-change scenario, there would be a large impact on public debt (Figure 16). Soaring pension costs stem from an increasing dependency ratio (due to rising longevity) which is not compensated, unlike in other EU countries, by an increasing retirement age or decreasing replacement rates (EC, 2018a).

Figure 15. Ageing related costs are projected to rise substantially

Percentage of GDP



Note: Costs are interpolated based on projected figures for every 5 years, assuming no change in the current parameters of the pension system. Net ageing-related costs amount to public expenditure on pensions, long-term care and health care minus pension contributions.
Source: European Commission (2018a).

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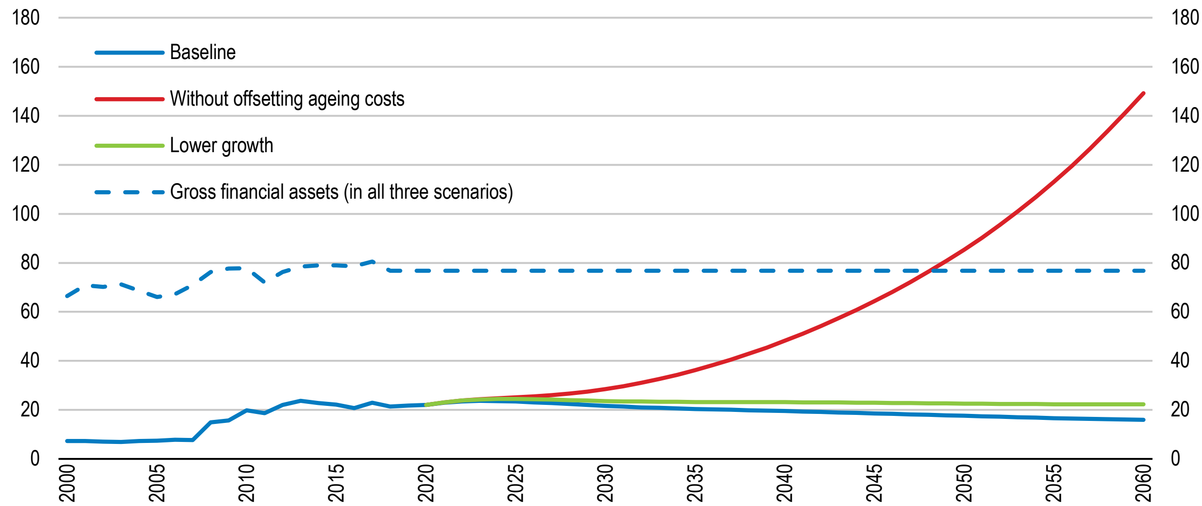
Figure 16. Debt is sustainable in the long-term provided ageing related costs are dealt with

Gross public debt, Maastricht definition, percentage of GDP



Note: The baseline consists of the Economic Outlook No. 105 projections up to 2020, and the long-term projections of the Economic Outlook No. 105 database afterwards. These long-term projections include a primary balance gradually converging from 2 to 1% of GDP over the long-term, a real GDP growth rate close to 2.5% and a real interest rate close to 1%. The "Lower growth" scenario assumes real GDP growth lower by 1% each year compared to the baseline. The "Without offsetting ageing costs" scenario assumes no change in the current parameters of the pension system, and hence increased net ageing-related costs (reaching 17.8% of GDP by 2070), in line with European Commission (2018a). All three scenarios assume that over the projection horizon general government gross financial assets remain constant as a fraction of GDP, which implies that the change in the general government gross debt-to-GDP ratio is larger than what would be implied by government net lending and nominal GDP growth only.
Source: Adapted from OECD (2018), OECD Economic Outlook: Statistics and Projections (database), June; Guillemette, Y. and D. Turner (2018), "The Long View: Scenarios for the World Economy to 2060", OECD Economic Policy Paper No. 22., OECD Publishing, Paris; and European Commission (2018a), "The 2018 Ageing Report - Economic and budgetary projections for the 28 EU Member States (2016-2070)" Directorate-General for Economic and Financial Affairs.

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To contain these costs and ensure long-term sustainability, Luxembourg should adapt its pension system, with the involvement of social partners and, if needed, gradual phasing-in of reforms. Unlike in many other European countries, there are no plans to link the retirement age to changes in life expectancy (OECD, 2017b), and therefore creating this link should be considered. Furthermore, the gap between the statutory and effective retirement age (65 against 61 in 2016) indicates that there is scope to restrict early retirement schemes. Increasing the retirement age can have a regressive impact since more educated and richer people tend to live longer; however, when the increase is linked to longevity, the overall impact depends on how even across socio-economic groups gains in life expectancy are (OECD, 2017c). Compensatory measures could be taken (or kept) for those who started to work at a very young age since they are also those who tend to have a lower life expectancy. In parallel or as an alternative to a higher retirement age, the generosity of the replacement rate could be reviewed (IMF, 2019a).

Further adjusting corporate taxation to a globalised world

As a highly open economy, Luxembourg is sensitive to taxation developments at the European and global levels. Luxembourg has been supportive of initiatives for greater tax transparency and for tackling tax avoidance, such as the OECD/G20 Base Erosion and

Profit Shifting (BEPS) project. Notably, the country was among the 49 “early adopters” of the OECD’s Common Reporting Standard for the automatic exchange of financial account information, with the first such exchange, which now covers almost 100 partner countries, taking place in 2017. Additionally, Luxembourg has been found “largely compliant” with the OECD standard for exchange of information on request, and agreed to implement provisions against tax avoidance in bilateral tax treaties. Furthermore, in line with efforts under the BEPS project and at the EU level, Luxembourg has since 2016 made substantial progress as regards exchange of information on tax rulings with partners’ tax administrations (OECD, 2018a). Past tax arrangements may have contributed to very low effective tax rates on large corporations (Wright and Zucman, 2018).

Hybrid mismatches can cause undue tax advantages, arising from cross-country differences in the tax classification of payments, entities or business activities. This will be the case, for example, if an entity of a multinational firm located in a specific country makes a tax-deductible payment to another entity of the same multinational in another country, where this revenue is not taxed. Luxembourg transposed into law the Anti-Tax Avoidance Directive 1 (ATAD 1), entering into force in 2019, which inter alia neutralises hybrid mismatches between EU member states. The authorities should continue to implement tax transparency rules, in particular through the transposition into law of the ATAD 2 rules. They include rules on hybrid mismatches which extend the scope of ATAD 1 rules by covering mismatches with third countries.

To partly offset the broadening of the tax base induced by these developments, the corporate income tax rate was decreased to 18% in 2018 and cut by a further 1% in 2019, bringing the maximum statutory combined rate (inclusive of a municipal surcharge) down to 25% in Luxembourg city.

Existing tax rules for the allocation of taxable profit among countries are under pressure from the challenges posed by the digitalisation of the economy (OECD, 2018a; Devereux and Vella, 2017). Innovative finance strands, such as fintech, are concerned by these issues. Luxembourg should continue to take part in the ongoing work on a global and consensus-based approach to address the tax challenges arising from the digitalised economy.

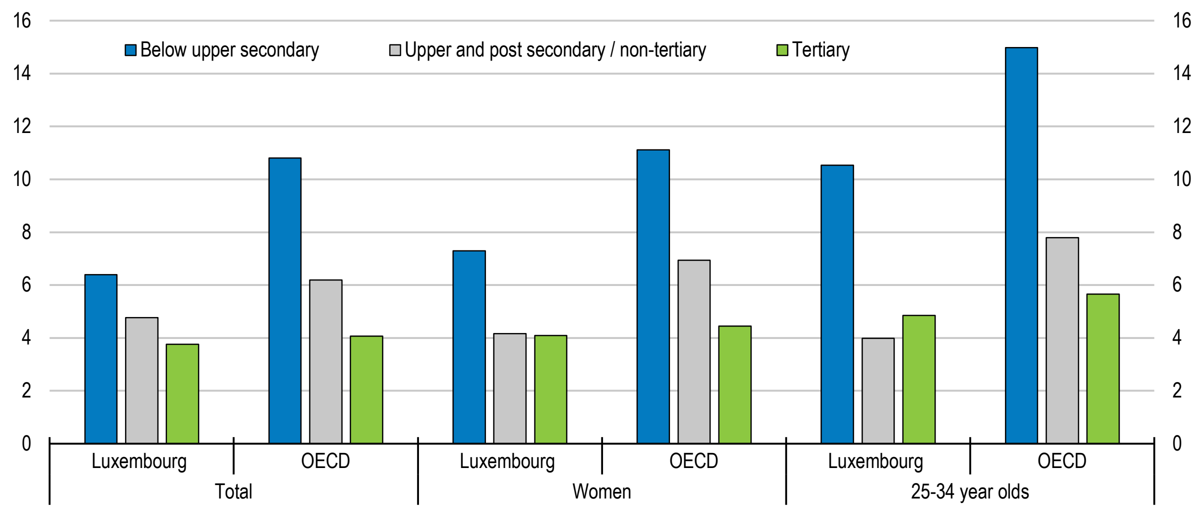
Improving work incentives and diversifying tax bases

Individual taxation for resident and cross-border workers was introduced on an optional basis in 2018. This reduces the marginal taxation of second earners, increasing their work incentives. Since second earners tend to be women, sometimes working part-time, individual taxation is also welcome from a gender neutrality and inclusion perspective. The authorities are analysing the feasibility of full individual taxation, which would be welcome as it would reinforce the impact on work decisions (OECD, 2017a). In addition, further efforts have been announced to simplify the tax system, and to promote and improve electronic tax declaration.

Other avenues for fiscal policy to promote an inclusive labour market should be exploited. Vulnerable groups like young low-skilled workers still face higher unemployment (Figure 17). The participation rate of women lags behind that of men, at 66% against 74% in 2017 respectively. Addressing disincentives from the tax-benefit system would promote labour market inclusiveness. The welfare system is generous: in 2015, total social expenditure reached 33% of GNI, against 20% for the OECD average. However, the loss of social benefits combined with labour taxation when taking up a job often generates important unemployment traps, and low-earning households may find that it is not worth re-entering employment (Figure 18). The newly implemented Revis (Revenu d’inclusion sociale), which replaced the minimum guaranteed income, is a welcome step to alleviate these disincentives (Box 1). From 2019, an existing tax credit for wage earners (the crédit d'impôt salarié), at most 600 euros per year, will be complemented by a new minimum social wage tax credit of 70 euro per month for salaries at or closely above the minimum social wage. Greater use of in-work tax credits for earners further above the minimum social wage could still be considered.

Figure 17. Unemployment mainly affects young low-skilled workers

Percentage, 2017



Note: For Luxembourg 25-34 year old bottom upper secondary educational attainment group, 2015 is the latest data available.
Source: OECD Education and Training Database.

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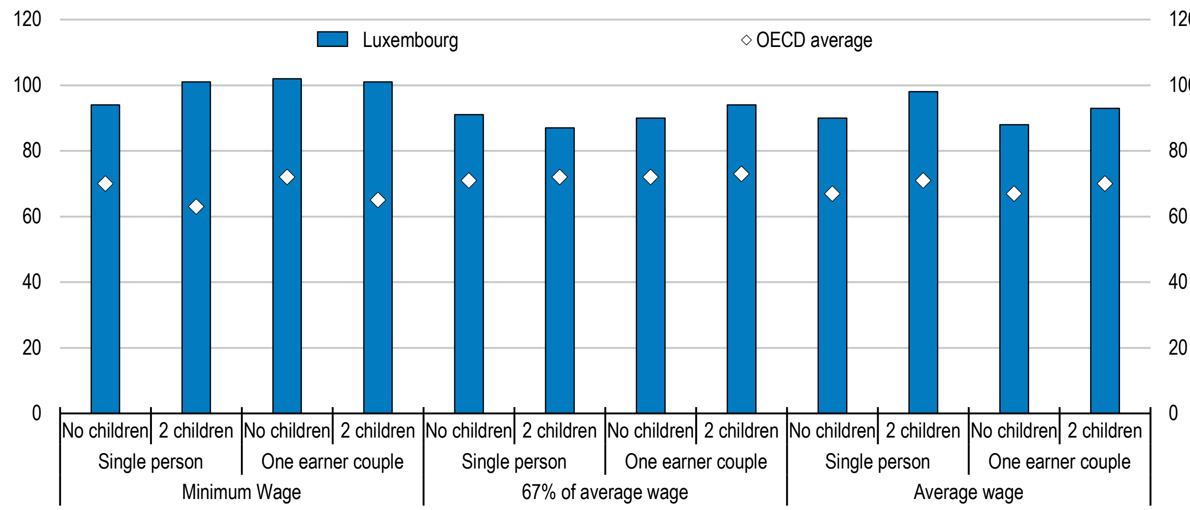
Box 1. The Revenu d'inclusion sociale

Some measures have been taken to address work disincentives, such as the introduction of the Revenu d'inclusion sociale (Revis), which replaces the minimum guaranteed income as of 2019. The Revis is made of two components. The first is a social inclusion benefit calculated for the household and accounting for personal and common expenses such as housing. Not to discourage work, 25% of professional income (as well as of replacement income and pensions) are excluded from the calculation of this component. The second component of Revis is an activation benefit consisting in an allowance for activities organized by the social inclusion office (ONIS), such as community work or activities favouring social stabilization. The former eligibility criterion of no more than 40 hours of activation measures per week for the household as a whole has been removed. Beneficiaries who are evaluated as being fit for work must be registered at the employment agency (ADEM) and provide evidence that they are actively looking for a job.

Figure 18. Unemployment traps are significant particularly for low-earners

Percentage of earnings lost to either higher taxes or lower benefits when a jobless person takes up employment, 2018



Source: OECD Benefits and Wages database.

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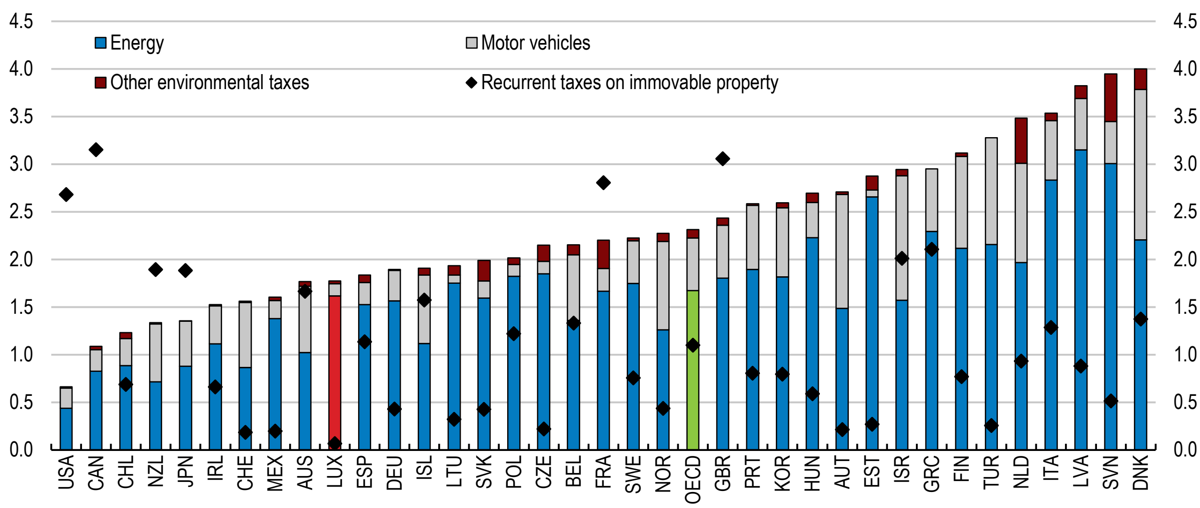
To make the tax mix more supportive of sustainable growth and accommodate potential revenue losses from greater international corporate tax transparency (IMF, 2019b), Luxembourg should diversify its tax revenues. Currently, Luxembourg obtains more revenue from the corporate income tax than other European countries (4.6% of GDP against 2.8% in 2016), including a volatile share from the financial sector (OECD, 2017a). The tax base could be diversified on two fronts. First, recurrent taxes on immovable property are the lowest in the OECD (Figure 19). Measures to increase taxation of the real estate sector should be envisaged, with the additional benefit of addressing some of the structural factors responsible for the strong increases in housing prices over the past years. For example, increasing effective taxation of non-used constructible land could be an avenue to address the low incentives to build on available land. The thematic Chapter discusses property taxation in more detail. Additionally, phasing out or at least reducing the tax deductibility of mortgage interest payments would be welcome.

Second, Luxembourg lags behind in environmentally-related taxation (Figure 19). Fuel taxation revenues are close to the average, reflecting significant fuel tourism induced by lower taxes than in neighbouring countries. Diesel taxes are particularly low. Although the authorities have raised petrol tax by 1 cent and diesel tax by 2 cents in 2019, such increases do not appear sufficient to curb incentives to cross the border and buy fuel in Luxembourg (OECD, 2018b). Taxes and excise duties on transport fuel should therefore be increased further, combined with targeted social support measures. There are CO_2-based tax incentives to encourage purchases and usage of cars with low emissions (the "taxe sur les véhicules routiers").

The 2017 tax reform also modified the benefit in kind for company vehicles, depending on the type of engine and CO_2 emissions, and introduced a tax allowance for personal hybrid and electric cars. However car taxation is comparatively low (Figure 19), which may help to explain why average CO_2 emissions from new cars are above the EU average (European Environment Agency, 2018). This suggests that there is scope to increase car taxation further, for example by taking account of both CO_2 emissions and local air pollution. Box 2 shows that recommended reforms whose fiscal impact lends itself more easily to quantification would amount to a non-negligible increase in taxation. However, other tax reforms, which are harder to quantify, would tend to have the opposite impact. In any case, even if the overall impact could be broadly neutral, recommended tax increases should be deferred in case a substantial downturn materializes.

Figure 19. Environmental taxes and recurrent taxes on immovable property are low

As a percentage of GDP, 2016 or latest available year



Note: OECD average is a simple average of the countries shown on the figure. For environmental taxes, data is for 2015 for France, 2014 for Canada, Greece, Israel, and Korea. Motor vehicle taxes refer to one-off import or sales taxes, recurrent taxes on registration or road use and other transport taxes.
Source: OECD Green Growth Indicators; and OECD Global Revenue Statistics.

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Box 2. Quantifying the fiscal impact of selected policy recommendations

These estimates roughly quantify the annual fiscal impact of selected recommendations in this Survey. Some other recommendations with first-round fiscal impacts are not quantifiable given available information or the complexity of the policy design. This is the case, for instance, with eliminating or reducing mortgage interest deductibility, with decreasing labour taxation at modest income levels and with implementing tax transparency measures. The combined revenue impact of these measures would likely be negative.

Table 3. Illustrative annual fiscal impact of recommended reforms

	% of GDP
Expenditures	
- Increased spending on active labour market policies	-0.15
- Reduced spending on pensions through increased retirement age	+0.2
Revenues	
- Increase in recurrent taxation of immovable property (*)	+0.25
- Increase in environmental taxation (*)	+0.35
- Impact of structural reforms	+0.2
TOTAL	0.85

Note: The estimated effects abstract from behavioural responses that could be induced from policy changes, in line with past OECD work modelling long-term scenarios (Johansson et al., 2013). The estimates are short-run effects and are based on the following assumptions: i) an increase in active labour market spending as a share of GDP to the average of the top third of OECD countries (from 0.8% to 0.95% of GDP); ii) the estimated change in public pension spending when the retirement age increases in line with a 1% gain in life expectancy (projected at a 5-year horizon), calculated by the European Commission (2018a); iii) an increase in recurrent taxation of immovable property as a share of GDP to the average of the bottom third of OECD countries (from 0.07% to 0.32% of GDP), since political and technical constraints (e.g. related to the updating of cadastral values) would likely prevent a larger increase in a short-run horizon; iv) an increase in environmental taxation as a share of GDP to the OECD average (from 1.77% to 2.32% of GDP), with flanking measures to support poor households most affected costing about one third of the increase in revenues; and v) the annual GDP impact stemming from higher employment of the structural reforms quantified in Box 4 (two-year effect). Tax increases marked with (*) should be postponed in the event of a substantial downturn.
Source: OECD calculations and European Commission (2018a), "The 2018 Ageing Report - Economic and budgetary projections for the 28 EU Member States (2016-2070)" Directorate-General for Economic and Financial Affairs.

Reviving productivity growth in Luxembourg

Understanding productivity developments

Luxembourg enjoys high levels of productivity vis-à-vis other OECD countries, but productivity growth has been subdued since the turn of the century (Figure 20). Even though most advanced countries saw a productivity slowdown starting in the early 2000's (OECD, 2015), Luxembourg's performance appears to be particularly weak. To some extent, this may reflect the intrinsic difficulty of increasing productivity levels for countries close to or at the frontier (Gordon, 2012), but its long lasting nature also signals the presence of structural dimensions. Policy action aiming at increasing productivity features prominently in the agenda of the new government (Box 3).

Box 3. Selected policy measures announced in the Coalition Agreement for 2018-2023

The new government has outlined its planned policy reforms for the 2018-2023 legislative period in the Coalition Agreement of November 2018. The main measures include:

Digitalisation

- Providing 5G coverage across the country;
- Developing a legal framework for businesses of the "sharing economy", to prevent unfair competition, and to ensure maintenance of ecological and social standards, notably with respect to worker protection;
- Expanding the range of E-government services and strengthening public support services, for instance through chatbots;
- Fostering the use of open source software in the public sector;
- Strengthening digital inclusion of the elderly, through intergenerational computer classes;
- Developing a national "e-learning" strategy, which will comprise the introduction of a new section for information and communication students in secondary schools and guarantee students access to either laptops or tablets (project "one2one").

Housing

- Increasing the public rental housing stock and limiting the sale of public social housing;
- Reforming the housing assistance system, focussing on single parents and families with children;
- Stepping up technical assistance to municipalities in the areas of land development, housing construction, sale or renting of land and rental property management;
- Establishing a New Housing Pact (Pacte logement 2.0) between the state and municipalities, including simplified and generalised use of the pre-emption right;
- Reforming the property tax to replace the system of specific municipal taxes on undeveloped land and vacant dwellings;
- Setting up a Committee for acquisition of constructible land involving the Ministry of Housing and the Ministry of Finance;
- Introducing contracts for housing development and reforming rules for construction on land covered by such contracts.

Mobility

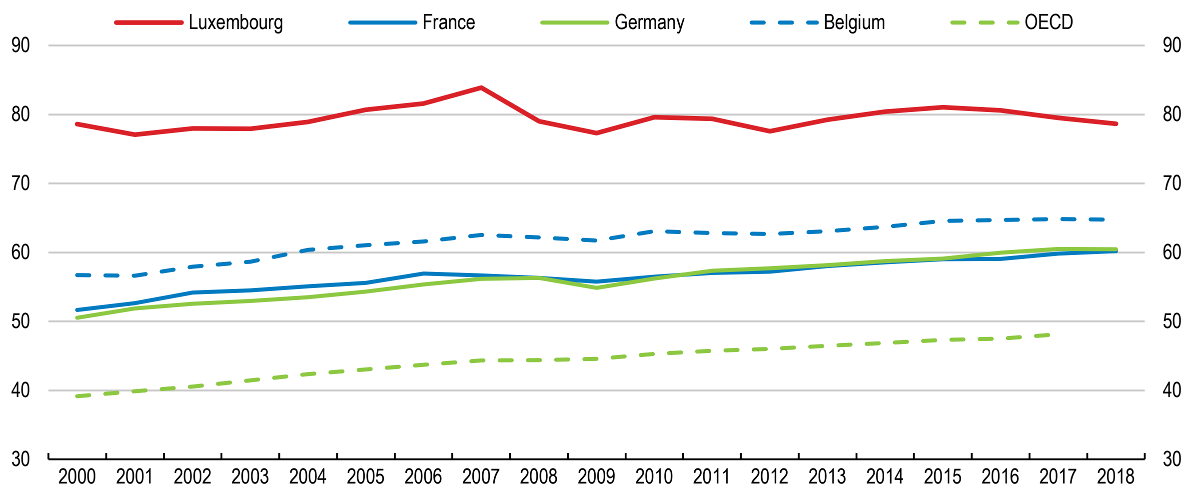
- Making public transport free of charge from 2020;
- Introducing a national mobility strategy to accommodate mobility needs until 2035;
- Doubling the capacity of Park and Ride (P+R) parking by 2025.

Taxation

- Increasing excise duties on fuel and petrol;
- Increasing net minimum wages by introducing a minimum social salary tax credit;
- Revisiting the tax system for cross border commuters to facilitate working from home.

Figure 20. Productivity is high, but has grown sluggishly in recent years

GDP per hour worked, USD 2010 PPPs



Source: OECD Productivity Indicators Database.

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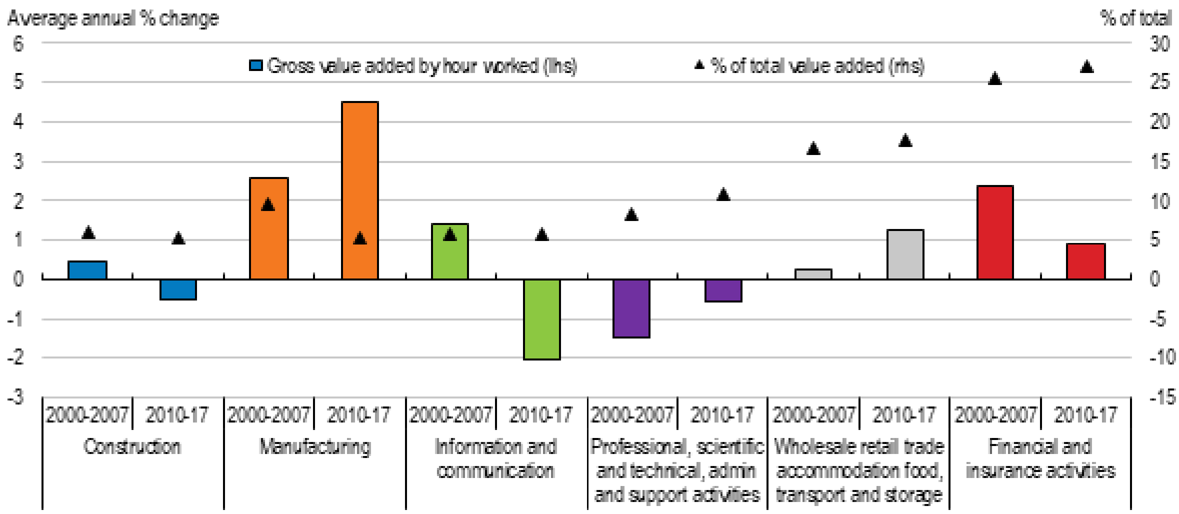
Looking beneath aggregate trends indeed shows that the composition of sectors sustaining business sector productivity growth has changed over time. In particular, the contribution of financial services, a strong driver of aggregate productivity growth in the decade preceding the crisis, significantly diminished in recent years (Figure 21). With persistently low interest rates and tightened banking regulations weighing on value added outcomes, both factors likely contributed to this trend (STATEC, 2018a). Productivity growth in other services sectors and in construction even turned negative. Only the manufacturing sector succeeded to increase its already high levels of productivity growth after 2010. However, since this occurred in tandem with a declining share of value added, the impact on aggregate productivity growth remains limited.

Figure 21. The contribution of the financial sector to productivity growth declined, and other service sectors struggle to catch up

Average growth of gross value added per hour worked (left scale); average share of total value added (right scale)



Source: OECD Productivity Indicators.

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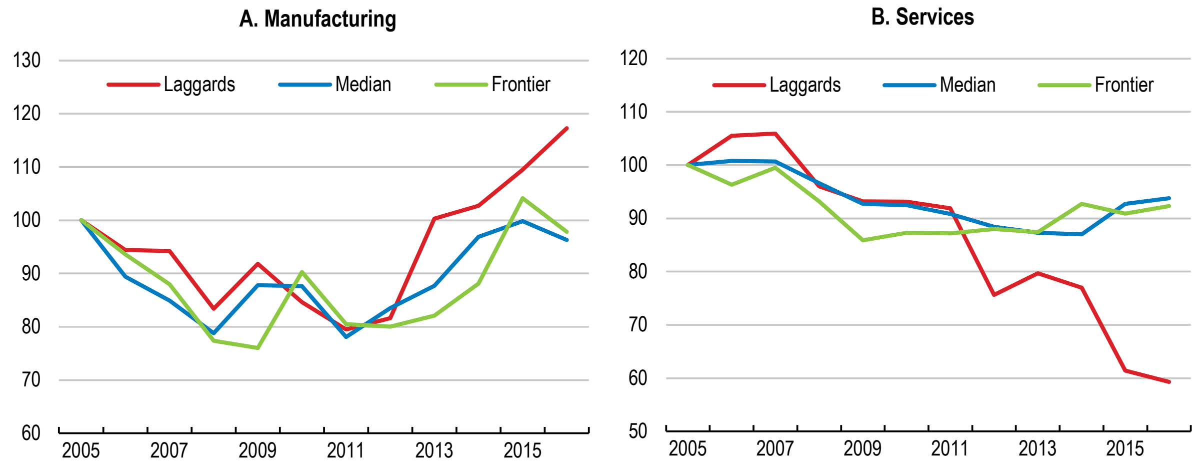
Firm-level evidence suggests that the source of low aggregate productivity growth lies in the services sector (Figure 22). In this sector, productivity growth for firms at the median and the top of the productivity distribution – hereafter referred to as "median" and "frontier" firms – declined up to 2011 and has broadly stagnated since, while for firms at the bottom of the distribution ("laggards") productivity levels plunged by 40% between 2005 and 2016. Indeed, a number of services sectors display significant differences between median and average productivity performance, suggesting the presence of low-productivity outliers (Figure 23). In contrast, manufacturing witnessed a decline in productivity growth in the run-up to the global financial crisis, but also a vigorous rebound afterwards, especially for laggards (Figure 22). In the same vein, median productivity almost equals average levels. Although productivity growth since 2005 was particularly weak for small firms (0-49 employees), the observed slowdown in services sector laggards' productivity performance cannot certainly be associated to only one firm size class (Figure 24).

Overall, the productivity developments above call for policy initiatives to regularly monitor and analyse sectoral changes, especially those induced by Luxembourg's diversification efforts; to support viable non-frontier firms in their recovery, or ease their exit otherwise; and to help frontier firms push the boundaries towards higher levels of productivity. These three avenues are discussed below. Implementing the recommended reforms is estimated to have significant positive effects on GDP per capita (Box 4).

Figure 22. Depressed productivity growth stems from a stagnating frontier and tumbling laggards in services

Labour productivity, value added per worker (2005=100)



Note: Frontier firms are defined as the top 20% of firms with the highest labour productivity levels by industry; median firms are in the 40th-60th percentiles; and laggard firms correspond to the bottom 20%. Productivity deciles are calculated on a yearly basis. Services refer to non-financial business services. The underlying dataset was cleaned following Berlingieri et al. (2017).

Source: Authors' calculations based on data from STATEC, structural business statistics.

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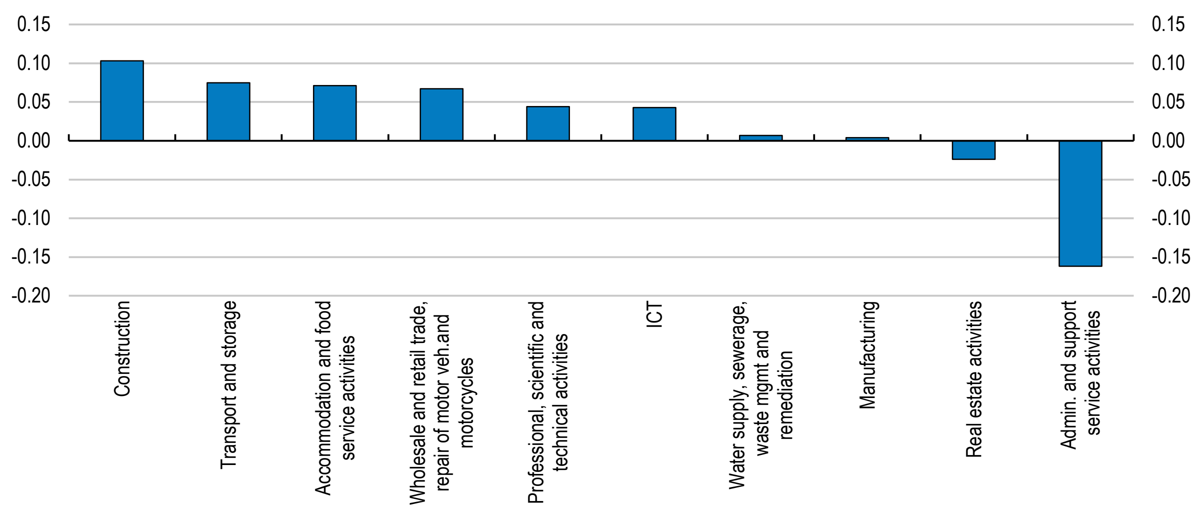
Figure 23. Numerous sectors are characterised by low productive outliers

Difference between median and average labour productivity by sector, 2016



Note: Labour productivity is calculated as value added per person employed. The difference is positive (negative) for sectors in which the median exceeds the average (or vice versa).

Source: Authors' calculations based on data from STATEC, structural business statistics.

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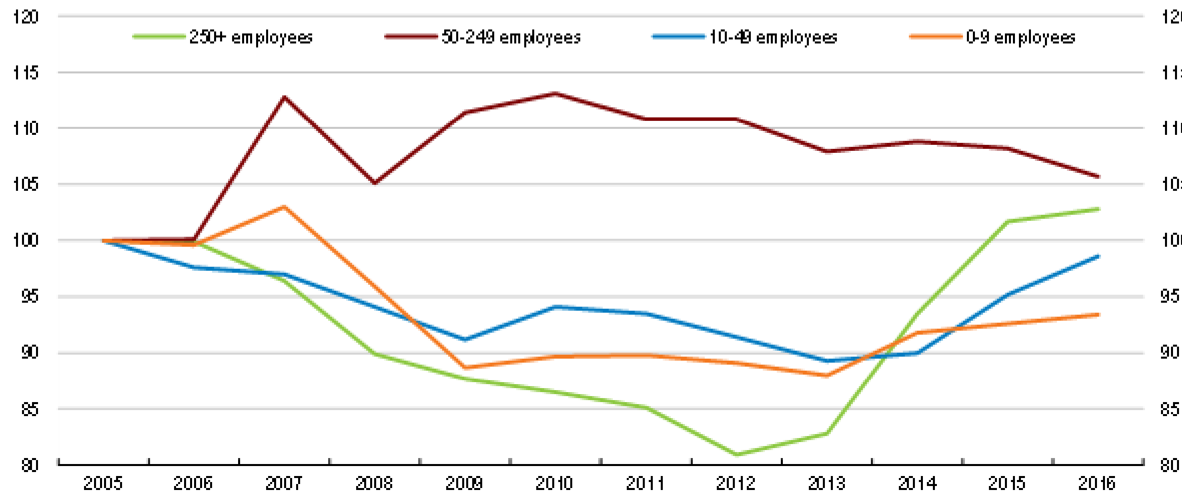
Figure 24. Weak productivity developments concern firms of all sizes

Labour productivity developments by firm size class, 2005=100



Note: Labour productivity is calculated as value added per person employed. The underlying dataset was cleaned following Berlingieri et al. (2017).
Source: Authors' calculations based on data from STATEC, structural business statistics.

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Box 4. Quantification of the structural reforms recommended in this survey

This box quantifies the effect of some of the structural reforms for Luxembourg recommended in this Survey based on the OECD's most recent quantification framework (Égert and Gal, 2017). The effects are derived from a range of reduced-form panel regressions on a sample of OECD countries and in some cases non-OECD countries as well. The estimated effects are allowed to vary across countries as a result of differences in factor shares, the level of the employment rate and a country's demographic composition. The approach is illustrative and results should be interpreted with care.

Additional positive effects could be expected from other recommendations, but these are harder to quantify. Examples include a tax shift towards recurrent real estate taxes, a reform of the insolvency regime and measures to reduce financial risks (which likely decrease the frequency and severity of crises, and therefore the associated hysteresis effects).

Table 4. Illustrative impact of structural reforms on GDP per capita

	Total effect on GDP per capita		
	5-year effect	10-year effect	Long-term effect
Product market regulations (PMR)			
Make regulations in professional services less restrictive	0.2%	0.3%	0.4%
Labour market policies			
Improve active labour market policies	0.9%	1.2%	2.4%
Pension reforms			
Link retirement age to life expectancy	0.4%	0.6%	0.8%
Total	1.5%	2.1%	3.6%

Note: Calculations are based on (i) a reduction of the OECD Product Market Regulations sub-indicator of professional services regulations to the average of the top (i.e. less restrictive) third of OECD countries, which corresponds to lowering the overall PMR indicator from 1.73 to 1.55; (ii) increasing ALMP spending as a share of GDP to the average of the top third of OECD countries (from 0.8% to 0.95% of GDP), which corresponds to increasing ALMP spending per unemployed as a ratio to GDP per capita from 27% to 31%; and (iii) an increase in the legal retirement age by 1%.
Source: OECD calculations.

Evaluating and adjusting diversification efforts

Luxembourg's authorities made considerable efforts to diversify the economy over the past years, according to the "Smart Specialisation Strategy" formally adopted by the government in December 2017. The process is based on inputs from the "Third Industrial Revolution", a large foresight exercise commissioned by the government in 2015 with a view to preparing society for upcoming megatrends and inherent disruptive forces (TIR Consulting Group LLC, 2016; OECD, 2017a). In line with previous recommendations (OECD, 2016a), the strategy focuses primarily on a small number of knowledge-intensive priority sectors, to achieve critical mass and impact (Ministry of the Economy, 2017). For instance, significant efforts were put onto Luxembourg's space sector, which has recently seen the creation of its own Space Agency (Luxembourg Space Agency). Overall, the strategy is therefore a welcome step towards greater economic resilience, and provides a well-articulated approach of directing innovation policy in a comprehensive way.

Within Luxembourg's diversification strategy, the information and communication technologies (ICT) sector occupies a special position, as it serves as a common strategic layer on which all other sectors can be grounded. Through cluster policies reinforcing the links between business and research, especially in high-potential areas (e.g. cybersecurity, FinTech, blockchain), continuous investment in connectivity and high-end data centres (OECD, 2016a), and a growing start-up ecosystem fostered by dedicated seed funds (Digital Tech Fund; Fit4Start), Luxembourg indeed succeeded in establishing itself as an ICT hub in Europe (Ministry of the Economy, 2018). As a result, ICT patents doubled from 2000 to 2015 (OECD, 2017d), and employment in the ICT sector as a percentage of total employment is now among the highest in the OECD (OECD, 2017e).

Contrary to these positive developments, however, diversification efforts were not sufficient to strengthen the sector's share of value added over the past decade, nor could they put a halt to the sector's declining levels of productivity (Figure 21). Since national accounts data measuring ICT sector productivity growth were recently subject to considerable revisions, the magnitude of the decline should be treated with caution though (see Box 5).

Evaluating the impact of diversification efforts is crucial to assess their efficacy and adjust policy programs if needed. For instance, regularly performing the benchmark exercise proposed by the "Smart Specialisation Strategy" would allow monitoring diversification outcomes and adapting policies to businesses' innovation progress, while ensuring coherence between all stakeholders involved in the diversification process. Considering the dual role played by the ICT sector (its own growth contributes to the diversification of the economy, but the sector is also key to the digitalisation of the whole business sector), successfully strengthening its growth could entail a double dividend, and therefore merits special attention. In this context, the role of demand-side policy initiatives propelling business sector digitalization should also be examined.

Box 5. Data and measurement issues in Luxembourg

Luxembourg's national accounts underwent significant revisions in October 2018, due to technical difficulties in measuring the performance of a few multinational corporations in non-financial sectors. These revisions had a significantly negative impact on GDP, as average annual GDP growth was corrected downwards from 3.5% to 3.0% over 2014-18 (STATEC, 2018b). Changes to value added were especially pronounced for the ICT sector, initially displaying strong value added growth in 2016-17, which turned negative following the revisions.

Moreover, policies aimed at enhancing productivity greatly benefit from, and increasingly rely on, firm-level analysis, but the availability of micro-founded data for Luxembourg remains scarce. For instance, identifying firm-level determinants of productivity, comparing multinationals' productivity to that of domestic firms, or determining the role of financial frictions on firm-level productivity are all issues that can only be satisfactorily studied with firm-level data (Kalemli-Özcan et al., 2015). One ongoing initiative to address this shortage is Luxembourg's participation in the next round of the OECD MultiProdproject, but micro-level data that is already available within national institutions should be further exploited.

Finally, an additional difficulty in measuring and interpreting economic activity in Luxembourg is the vast difference between GDP and GNI (gross national income), which in relative terms is the highest across the OECD. GNI excludes income from domestic production accruing to non-residents. Given that cross-border workers account for over 40% of employment, and that numerous multinational corporations operate in Luxembourg, GNI only amounts to 71% of GDP (2017 data). Still, GNI per capita is the highest in the OECD.

Luxembourg's recently established national productivity board, the Conseil National de la Productivité (CNP), would be well placed to assist the government in this process. Its institutional set-up being built on three existing national bodies – namely the Observatoire de la Competitivité, STATEC, and the Economic and Social Council – the CNP can tap into the expertise of several established institutions. This positions the productivity board as the ideal support to the government to run in-depth evaluations of various policy areas and to carry out early stakeholder consultations on proposed reforms (Renda and Dougherty, 2017).

Reviving productivity growth for firms below the frontier

The pool of firms below the productivity frontier, and especially those falling into the category of "laggards", is highly heterogeneous. Laggard firms are on average smaller and younger than the rest, but they range from old firms with ageing technologies to young firms with a high potential for productivity growth (Berlingieri et al., 2019). Addressing the weak productivity performance of Luxembourg's non-frontier firms thus requires a set of policies targeting each sub-category.

Reducing the share of zombie firms

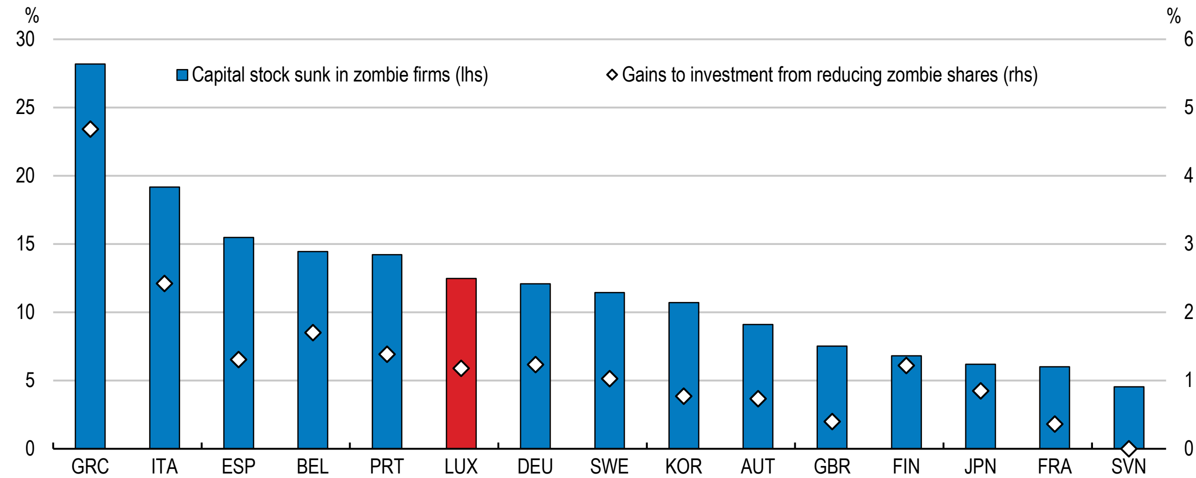
Some laggard firms in Luxembourg likely correspond to the so-called "zombie firms". Zombies are defined as firms aged 10 years at least that are unable to cover interest payments with profits for three consecutive years (Adalet McGowan et al. 2017). Since such firms capture scarce resources, their survival (or delayed restructuring) not only drags down average productivity growth, but also constrains the efficient reallocation of their resources (i.e. capital and labour) towards more productive firms. Based on firm-level balance sheet data, the share of capital sunk in Luxembourg's zombie firms stood at a relatively high 12.5% in 2013, a figure that may have risen further in the light of the continued productivity decline of laggard firms in services (Figure 25, left scale). In turn, investment rates of non-zombie firms could increase by at least 1% if zombie congestion was reduced (Figure 25, right scale).

The appropriate design of insolvency regimes plays a crucial role to facilitate the exit of non-viable firms and the restructuring of viable firms that encounter temporary financial distress (Adalet McGowan and Andrews, 2016). There is substantial scope for raising the efficiency of Luxembourg's insolvency framework (Figure 26). For example, failed entrepreneurs in Luxembourg must wait more than three years to start another business, compared to just one year in the United Kingdom. Moreover, courts are involved in almost all stages of both liquidation and restructuring processes, thus increasing the associated costs, while other countries only require court involvement in one stage (e.g. Korea, where courts are only involved in the launch of the insolvency procedure). Finally, new financing has no priority over unsecured creditors in the event of liquidation, although international best practice shows that this could lead to successful restructuring and a higher final recovery value for all creditors (Adalet McGowan and Andrews, 2018; EC 2014a and 2014b; Bergthaler et al., 2015).

Draft legislation to ease early business restructuring and modernise bankruptcy law (bill no. 6539) could remedy these concerns, but the bill has been pending since 2013. Swiftly implementing this legislation is key to help honest entrepreneurs get a second chance by no longer holding them personally responsible for the outstanding debt of the failed business after the closure of personal bankruptcy proceedings. Moreover, the legislation would enact a series of preventive measures that would ease early identification of businesses in financial difficulty, thereby allowing for more effective restructuring and resolution procedures.

Figure 25. There is scope to reduce zombie congestion

2013



Note: Firms aged ⩾10 years and with an interest coverage ratio<1 over three consecutive years. Capital stock refers to the share of capital sunk in zombie firms. Right-hand size axis shows counterfactual gains to investment of a typical non-zombie firm from reducing the share of zombies to the sample minimum level, here Slovenia.
Source: Adalet McGowan, Andrews and Millot (2017a), based on ORBIS data.

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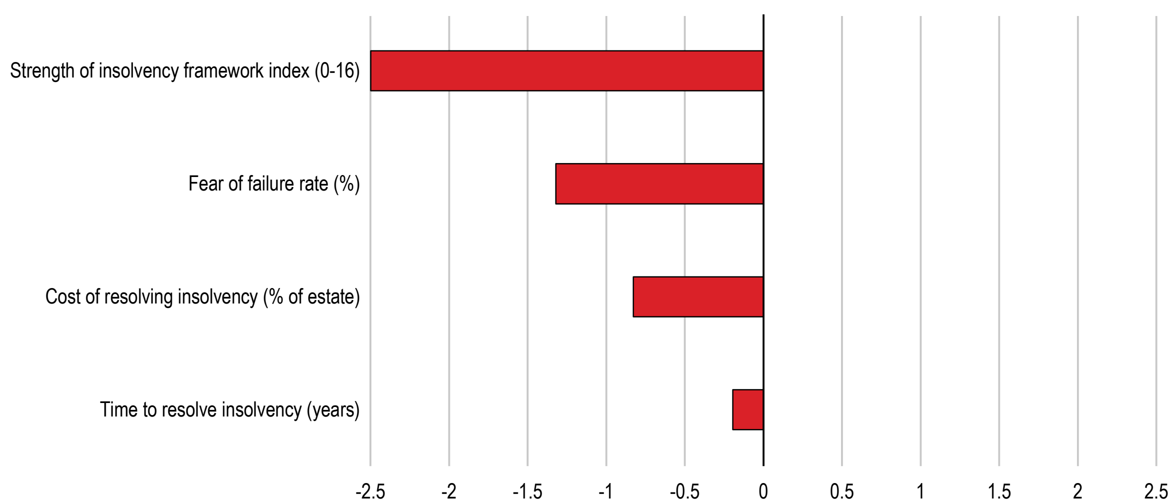
Figure 26. Luxembourg's insolvency regime is weak, calling for reforms

Deviation from the OECD average measured in standard deviations, OECD=0



Note: Data bars to the right of zero show better performance than the OECD average and data bars to the left show worse performance than the OECD average.
Source: World Bank, Trade and Competitiveness data.

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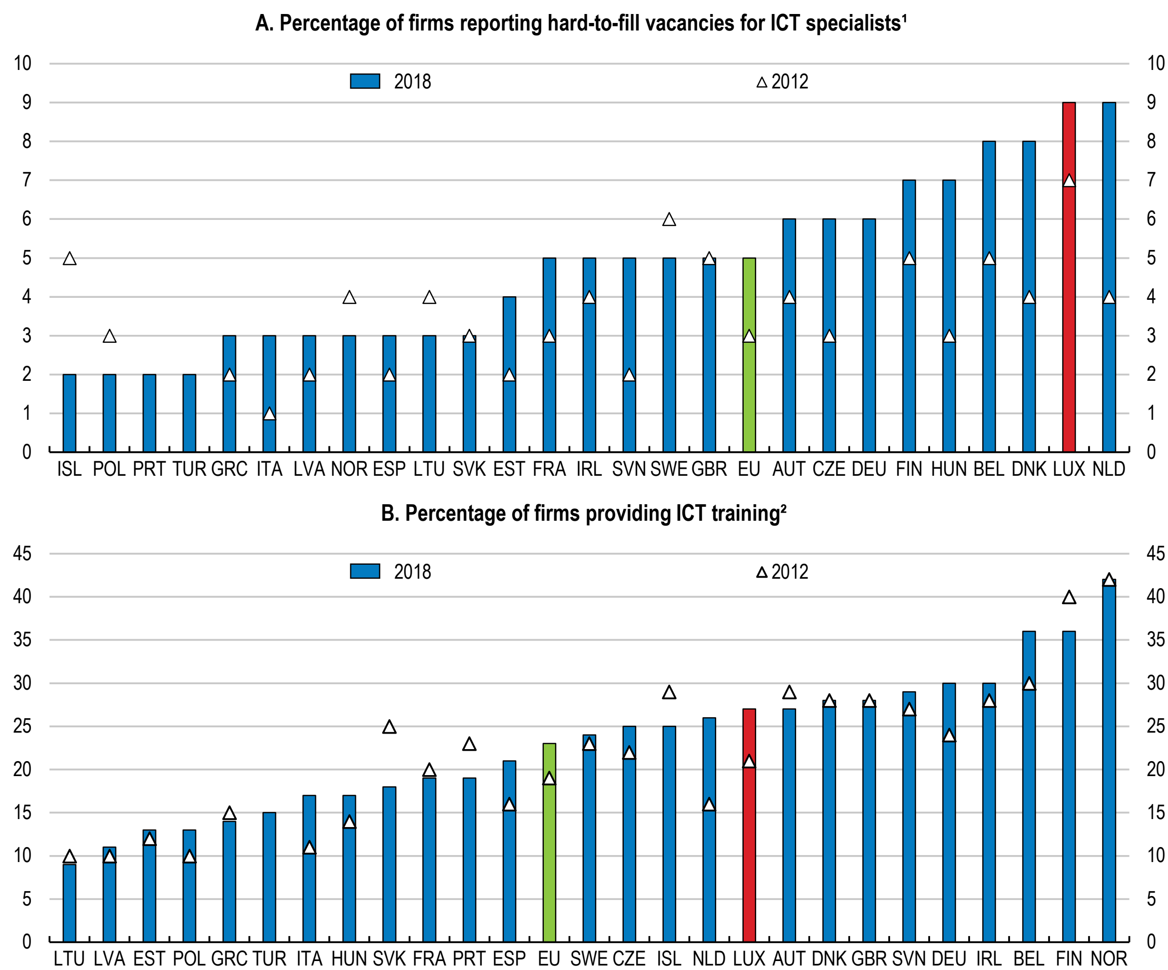
Lessening current skill shortages and anticipating future ones

Skill shortages directly and indirectly affect productivity outcomes by forcing firms to operate below their potential capacity and by diminishing the returns from investment in intangible capital, including digital technologies (Gal et al, 2019). This is because highly productive firms have access to the necessary human capital, while firms of average or low productivity find it more difficult to compete for available talent on the market. In turn, laggard firms more likely fail to adopt digital technologies in the first place or to make the best use of them.

Assessments of skill shortages undertaken by Luxembourg's employment agency ADEM indicate a 30% y-o-y increase in the number of reported vacant positions in 2018. The majority of unfilled vacancies related to financial and administration professionals, partly because of the sector's size, but critical shortages are also reported for digital experts (ADEM, 2018). A similar picture is conveyed by the share of firms facing difficulties in filling vacant ICT positions, where Luxembourg has led the skill shortage ranking since 2012 (Figure 27, Panel A).

Figure 27. ICT skills shortages remain high but ICT training offers in firms remain scarce



1. All enterprises with 10 or more employees, excluding the financial sector.
2. For Iceland, data is for 2017.
Source: Eurostat, Information Society database.

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As an immediate solution to the shortage of qualified ICT workers, the government created more favourable immigration schemes for a range of relevant occupations by optimizing

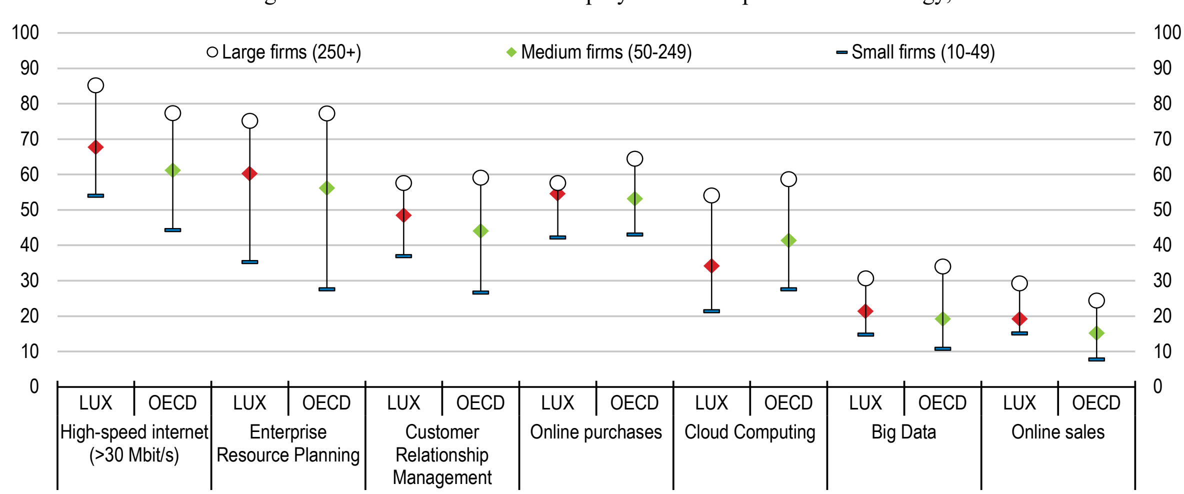
Blue Card requirements and lowering the associated wage thresholds. Moreover, matchmaking events organised by the government help to connect recruiters with professionals.

In tandem with attracting talent from abroad, policies should focus on maximizing the human capital of Luxembourg's residents. In this regard, training plays a crucial role. Despite the pervasive role of digitalisation, only about a quarter of all firms provide training to their personnel to develop and upgrade their ICT skills (Figure 27, Panel B). "Digital Skills Bridge", a pilot programme ranked by the Financial Times among the 100 digital champions in 2018, aims to fill this gap by providing firms undergoing digital disruption with technical and financial assistance to upskill their employees. In so doing, the initiative not only contributes to retraining the current workforce but also facilitates the transition of workers whose jobs may be at risk of automation to other sectors. Once the pilot phase reaches its end, ensuring enough funds and outreach efforts towards prospective participants will be vital for a rapid scaling-up, together with careful programme evaluation and subsequent redesign if needed.

Luxembourg's innovation agency, Luxinnovation, also supports digital adoption in SMEs by linking firms with external experts. Digitalisation indeed tends to lag behind in smaller firms, precisely due to the lack of investment in complementary human skills (Figure 28; OECD, 2018c). *Fit4Digital* thus provides firms with tailored recommendations as to which digital tools promise the highest returns and accompanies them in their transformation journey, which often starts with simple changes (e.g. creating a website). More general advice on different areas of SME digitalisation (i.e. visibility, reputation, customer acquisition, business models & beyond) is provided by the programme *GoDigital*. Both initiatives go in the right direction, but achieving measurable impact will require further investment into advertising these programs among small businesses to increase participation rates, which still lie below 100 firms per year.

Figure 28. In Luxembourg, as elsewhere, digitalisation lags behind in smaller firms

Percentage of firms with more than 10 employees that adopted each technology, 2018*



Note: Value for Enterprise Resource Planning and Customer Relationship Management refer to 2017.
Source: OECD, ICT Access and Usage by Businesses (database), http://oe.cd/hhind, accessed on 12 February 2019.

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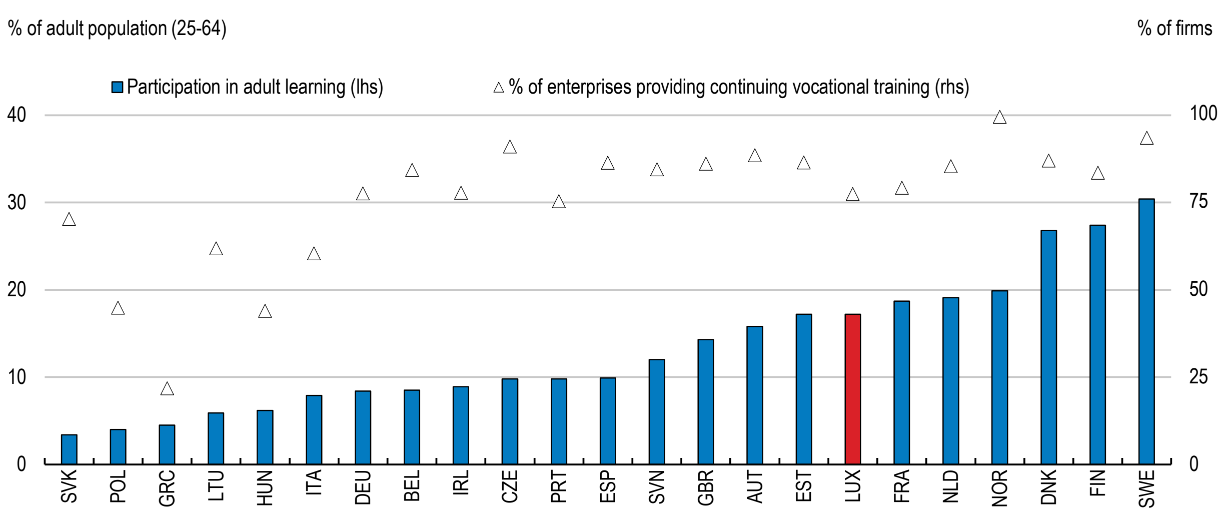
Adults, especially those with low or medium skills, often fail to value lifelong learning and should be made aware of the need to continuously upgrade their skills in the face of automation and structural changes (Windisch, 2015). In Luxembourg, 77% of firms offer some form of training but only 17% of the population engage in adult learning (Figure 29). Yet, employees who have been working with the same employer for at least six months are entitled to 80 days of training during their professional career. Matching future skill needs and protecting workers at risk will therefore require the use of targeted public awareness campaigns, preferably through various channels to maximise outreach. Countries pursuing similar strategies include Slovenia, whose Institute for Adult Education organises an annual lifelong-learning week since 1996 and Portugal, who launched in 2016/17 a public campaign titled “More Qualification, Better Jobs” (OECD, 2019b).

To better identify future skill needs, regular skill foresight exercises would also be appropriate. Luxembourg already performs some studies assessing skill needs (e.g. through its multi-sectoral business federation, FEDIL), but most of them focus on current shortages or specific sectors of interest. Moreover, the extent to which they inform skill-related policies is uncertain (Skills Panorama, 2017). Building a structured process that feeds the outcomes of regular foresight exercises, including those performed at the EU level (i.e. CEDEFOP; see OECD, 2016b, OECD, 2017a) into training offers of all bodies delivering vocational training is thus critical to help alleviating future skill shortages. ADEM and the UEL (Union des Entreprises Luxembourgeoises) recently entered a cooperation that foresees the regular publishing of a list of job profiles in high need. While this initiative goes into the right direction, its effectiveness remains yet to be gauged.

Figure 29. Too few firms and workers recognise the importance of continuous training



Note: Adult learning covers formal and non-formal learning activities, both general and vocational, undertaken by adults after leaving initial education and training.
Source: Eurostat, and OECD (2019).

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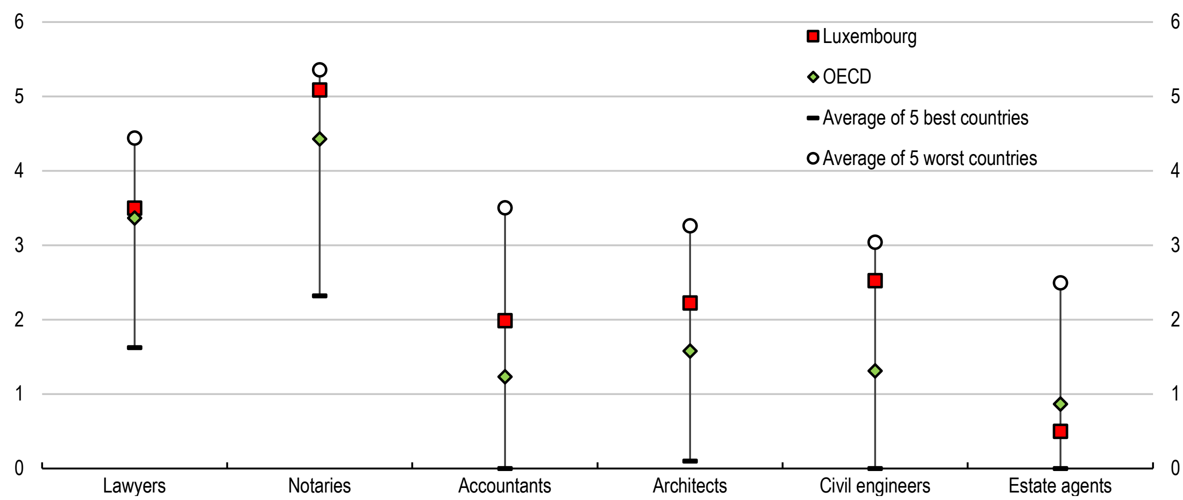
Raising the productivity contribution of professional services

Professional services represent a growing share of value added in the Luxembourg services sector, but average productivity growth has been negative for the past two decades (Figure 21). Moreover, since professional services are often intermediate inputs to other sectors, their low productivity performance can curb efficiency in downstream production (Arnold et al., 2011; Bourlès et al. 2013; van der Marel, 2016).

Lifting anti-competitive product market regulations would contribute to stronger market selection and post-entry growth of efficient firms in the professional services sector. Regulation in Luxembourg tends to be more restrictive than the OECD average (Figure 30), especially for civil engineers, which are often unregulated in other OECD countries. This is despite recent reforms facilitating the recognition of professional qualifications and eliminating fixed prices in public contracts for architects and engineers (Ministry of the Economy, 2018). Eliminating restrictions on advertising and marketing for architects and engineers is thus strongly advised.

Figure 30. Product market regulations remain high despite recent reform



Source: OECD Product Market Regulation Indicators of Professional Services, 2019.

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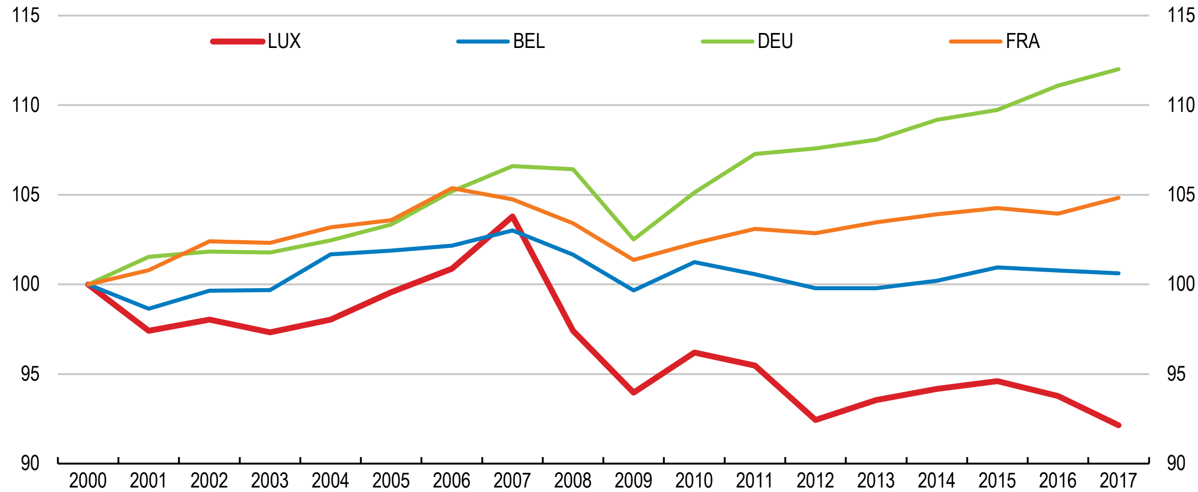
Stimulating the innovation engine to push the frontier

As countries approach the technological frontier, sustaining productivity growth increasingly relies on their innovative capacity (OECD, 2015). In Luxembourg, innovative activity appears to be high at first sight, as one third of SMEs reported introducing new or significantly improved products, services or organisational methods in 2018 (EC, 2018b). This, however, contrasts Luxembourg's weak multifactor productivity growth (MFP), in turn pointing to firms' inability to translate these innovations into productivity gains (Figure 31). MFP is a residual measure capturing changes to output that cannot be explained by changes in labour and capital, and is therefore often used as a proxy for innovation. In services, even the productivity performance of frontier firms has been disappointing. Hence, further efforts are needed to stimulate experimentation with cutting-edge technologies and to foster investment in R&D.

Figure 31. Multifactor productivity growth did not recover since the financial crisis

2000=100



Source: OECD (2019), Multifactor productivity (indicator).

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Embracing new, disruptive technologies

Artificial intelligence (AI) is set to transform the existing innovation landscape and holds the promise of reviving productivity growth. AI use has already spread to most industrial activities, from optimising multi-machine systems to enhancing industrial research (OECD, 2018d), although its greatest commercial application is expected to lie in supply chains, logistics and process optimisation (McKinsey Global Institute, 2018).

As requested by the European Commission in its Coordinated Action Plan on AI, Luxembourg will shortly launch its national AI strategy (EC, 2018c). Among other things, skills related to AI development and use, as well as public sector use of AI will figure prominently in this plan. Indeed, making Luxembourg's public administration a frontrunner of AI use could entail a double dividend through positive demonstration effects for the private sector and potentially large benefits for the public sector itself. Selected public data is already available online for training purposes as stipulated by the European Directive on the re-use of public sector information. In addition, the government could also act as a catalyst to arrange partnerships between firms with valuable but confidential data and AI start-ups with the competence to draw value from it (OECD, 2018d).

As with other disruptive technologies enabling automation, the uptake of AI will likely alter the nature of some existing jobs, and might even put them at risk. While it is too early to fully gauge the labour market implications of AI use, low-skilled jobs tend to be especially vulnerable to the wider use of AI applications (Nedelkoska and Quintini, 2018). Preparing for the labour market changes brought about by AI therefore also requires the provision of retraining offers and social protection for workers whose jobs are at risk. To some extent, the Digital Skills Bridge project, once scaled up, remedies these concerns, but a more holistic approach to protecting workers at risk could be anchored in the national AI strategy.

In a similar vein, Blockchain technologies have recently sparked lively debates. Blockchain applications are widely known from financial markets (e.g. investment fund distribution, remittances, inter-bank transfers and securities trading) but their scope of usage is much broader. In collaboration with private actors, Luxembourg's authorities established *Infrachain*, a non-profit organisation and blockchain community with the aim to create a European community of certified host operators to host private chain instances with third party distributed trust and to support the diffusion of blockchain technologies in Europe. In so doing, it bridges the gap between this new technology and the regulators, and positions Luxembourg as a competence centre in Europe. As for AI, however, public sector use would help raise awareness of its potential outside the financial sector and address trust issues related to the data placed on the blockchain, although legal certainty when making financial transactions by way of distributed ledger technology has recently been increased (bill of law 7363).

More generally, Luxembourg has made considerable efforts to provide an appropriate infrastructure for existing and new digital technologies, through the foreseen rollout of 5G, and more importantly, by hosting EuroHPC, the European strategic project in High Performance Computing (HPC). This joint undertaking between 13 EU countries will oversee the pooling of resources within Europe to develop supercomputers for processing big data (Luxinnovation, 2018). However, demonstrating the technical and commercial implications of HPC would be helped by greater awareness of industrial use cases and cost-benefit analyses. Moreover, since SMEs often fail to recognize the potential of new digital technologies, the government should also consider developing a one-stop source of HPC services and advice, while providing low-cost or free experimental HPC use for SMEs for a limited period of time (OECD, 2018d).

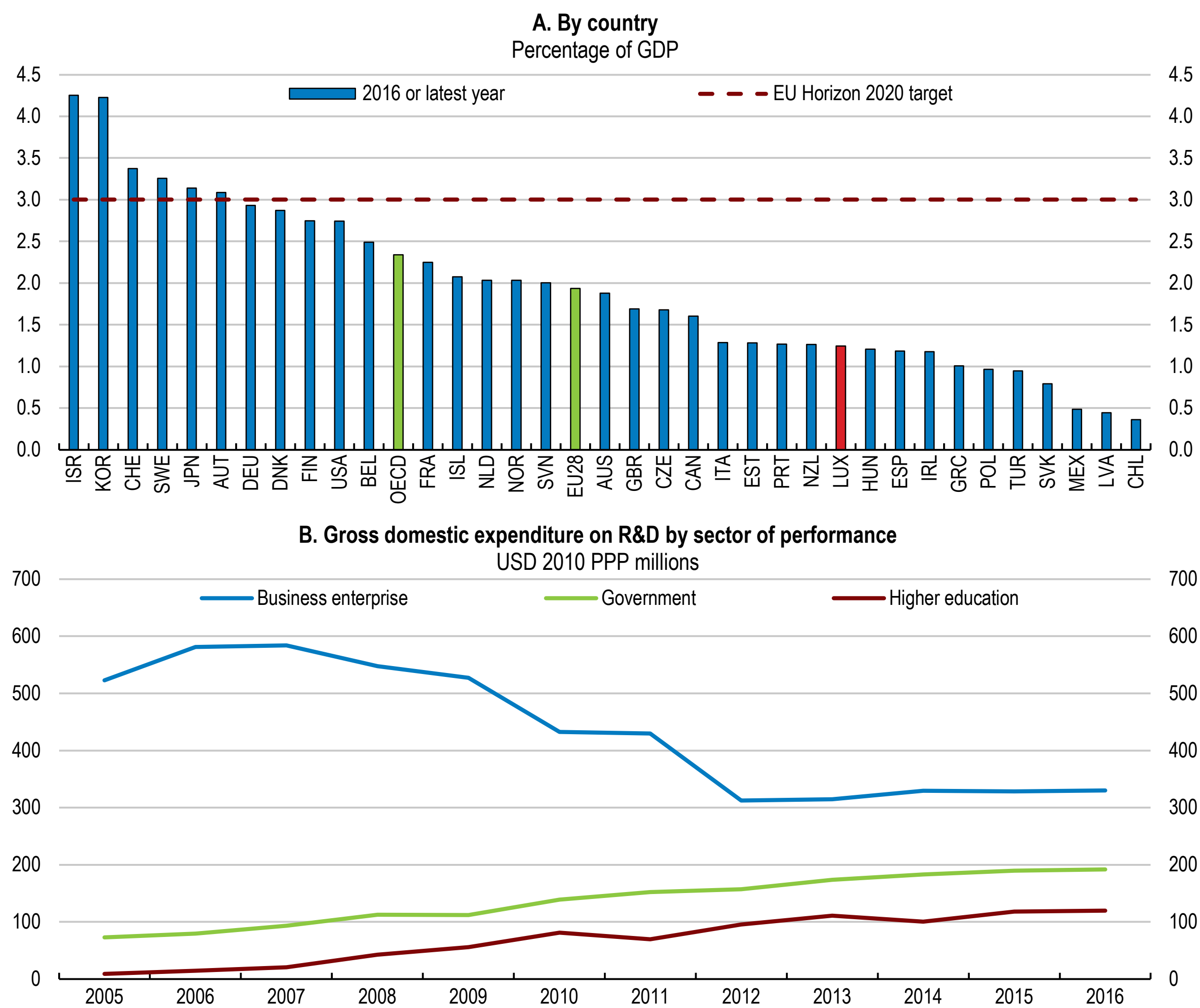
Incentivising more firms to invest in R&D

Investment in R&D is a widely acknowledged key factor driving innovation (Bloom and Van Reenen, 2002; Hall et al., 2010; Westmore, 2013), and in turn, productivity growth. Governments across the OECD support R&D to compensate for market failures related to firms' difficulties in finding external finance, especially in the case of small firms, and in fully appropriating R&D investment returns (OECD, 2015). Support can be provided directly (i.e. through grants) or indirectly (i.e. through tax incentives). While direct support can be more easily targeted at high-potential projects or at smaller, younger and first-time R&D-active firms, take-up can be deterred by the high fixed cost of applying to grants (Veugelers, 2016). Tax incentives, on the other hand, are generally easier to operate than grants, but have less scope to identify projects that would not have been carried out in the absence of tax relief (Appelt et al. 2016).

At 1.3%, Luxembourg's share of GDP allocated to R&D activities stands far below the OECD median and its own national 2020 target of 2.3%-2.6% of GDP (Ministry of the Economy, 2018). In particular, business R&D strongly decreased over the past decade, (Figure 32). While the underlying drivers of this phenomenon are still unexplored, there are reasons to believe that the behaviour of few multinational companies could potentially have had large bearings on official business R&D statistics. In addition, although to a lesser extent, the observed decline could also be attributed to composition effects, since traditionally low R&D intensive services sectors account for a growing share of the economy.

Implementing effective R&D policies has become a priority for Luxembourg, which tripled expenditures for government and higher education R&D over the past decade (Figure 32; NRP, 2018). Luxembourg also recently expanded the list of available grant schemes and broadened the scope for action of Luxembourg's innovation agency, Luxinnovation, which now generates a third of business R&D expenditures through its programs, and thus considerably more than its European equivalents (Taftie, 2018). More evidence on the use and impact of individual support measures would be helpful, however, in assessing their value.

Figure 32. R&D spending remains far from EU 2020 headline target for R&D



Source: Eurostat and OECD Research and Development Statistics.

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Luxembourg's tax-related R&D incentives are confined to income-based schemes, which provide a 80% exemption on qualifying income associated with R&D outputs (e.g. patent or other forms of knowledge-capital). In place since 2008, this incentive has largely failed to spur business expenditure on R&D (Figure 32), as the R&D activity underlying the exempted income was not required to have been performed in Luxembourg. The scheme was amended in April 2018 to only provide relief for entities bearing the risk of the developments that are located in Luxembourg (Draft Law No. 7163). While this amendment is welcome, income-based incentives can disproportionately benefit large firms and innovations susceptible to protection by patents (Appelt et al., 2016). Therefore, complementing the use of income-based schemes with expenditure-based tax incentives through enhanced allowances or tax credits should be considered, as in a large majority of

OECD economies (OECD, 2017f). This would provide incentives to a larger proportion of firms, and especially SMEs, to increase R&D spending, and could help come closer to Luxembourg's 2020 target. However, expenditure-based tax incentives should be carefully designed to take into account that young innovative firms are often in a loss position in the early years of an R&D project, by including the use of carry-forward provisions, cash refunds or reductions in social security and payroll taxes (Appelt et al. 2016).

Avenues for greener growth

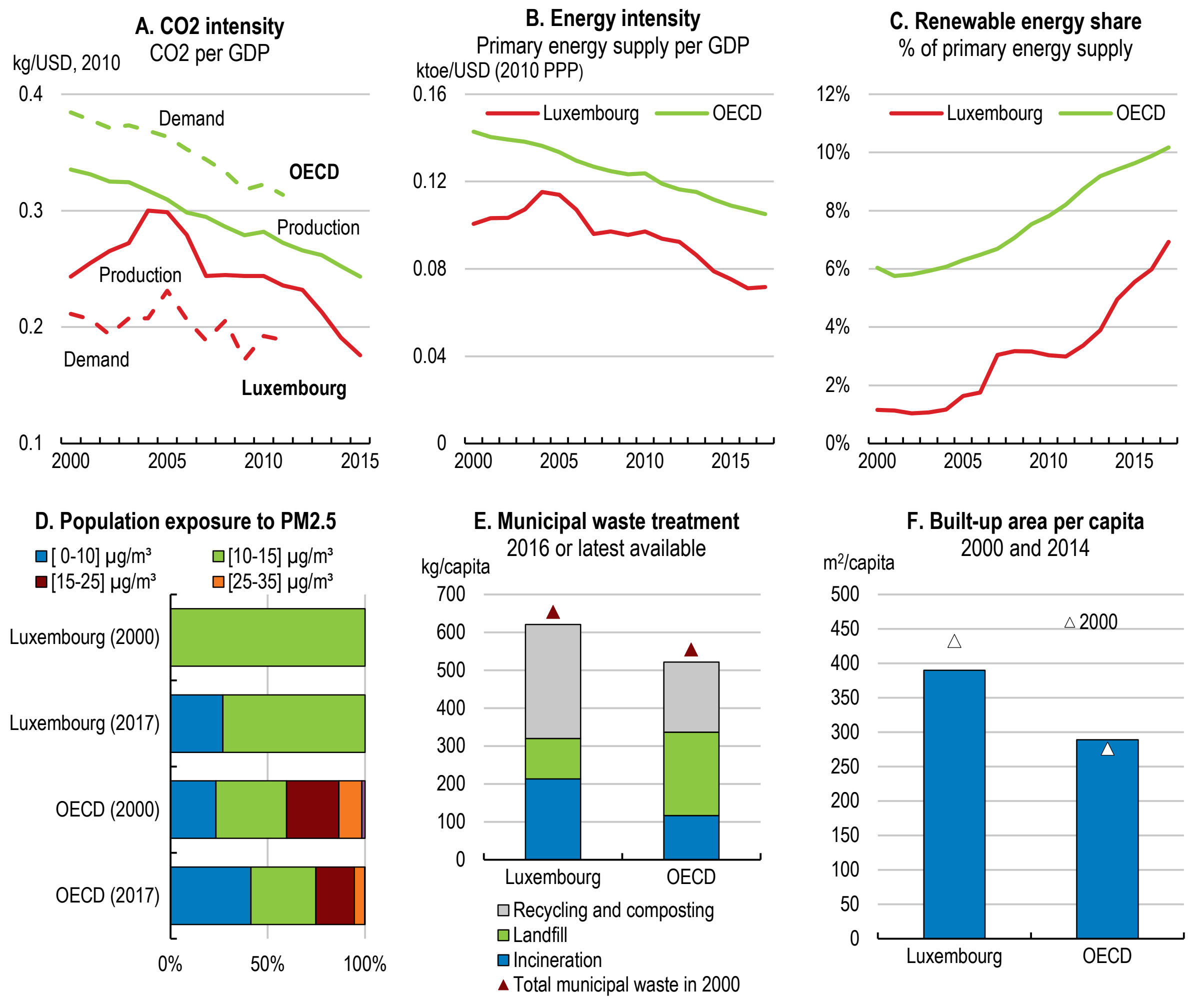
There is scope to further reduce CO_2 emissions, especially from transport

Luxembourg has made progress in decoupling CO_2 emissions from economic growth in recent years, as energy intensity of production has fallen and the share of renewable energy has increased (Figure 33, panels A-C). CO_2 emissions have fallen by around 20% since 2010. Nonetheless, per capita emissions are among the highest in the OECD. Road transport accounts for more than one half and also causes air pollution. More than half of the population is exposed to small particle emissions above the limit recommended by the World Health Organisation (10 micrograms per m^3), a larger share than the OECD average (Figure 33, panel D). Outdoor air pollution raises premature mortality substantially (Roy and Braathen, 2017). It also affects children the most (World Health Organisation, 2018). One study suggests that air pollution may have a negative impact on young children's education outcomes (Heissel, Persico and Simon, 2019).

Urban sprawl has contributed to large built-up surfaces, fostering car dependency and traffic congestion (Figure 33, panel F). Policies to limit urban sprawl, discussed in chapter 1, reduce pollution, energy consumption and CO_2 emissions markedly and lastingly (OECD, 2018e). They would also lower the cost of deploying public infrastructure substantially, including public transport, and improve its quality, for example, by making it easier to improve frequency of service. The 2017 *Economic Survey* also called for improving the quality of public transport services in cooperation with neighbouring regions in Belgium, France and Germany. Integrated multimodal services are key. This needs to be complemented with investment to facilitate walking and cycling, as well as electromobility. Low-emission zones, which restrict access by polluting vehicles to certain urban areas, are also seen as cost effective (ITF, 2018a). Like car use pricing, they create incentives for using low-emission transport options.

As discussed above, there is scope to curb CO_2 emissions and air pollution by increasing taxes on transport fuel and on cars. Car use pricing which takes into account congestion and pollution would also boost efficiency and environmental performance (ITF, 2018a). Indeed, the economic and environmental costs of car use far exceed what car drivers pay in urban areas (OECD, 2018e). Luxembourg plans to introduce free public transport in 2020, which can encourage some switching of mobility to public transport. As planned, public financing should be provided to ensure that quality of public transport services does not deteriorate and the new policy should be reviewed after a few years of implementation.

Figure 33. Green growth indicators: Luxembourg



Source: OECD Green Growth Indicators.

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Luxembourg should take the lead in rolling out electric charging infrastructure for vehicles with the aim of fully decarbonising transport and reducing local pollution. It is welcome that Luxembourg is rolling out the *Chargy* infrastructure, with the ambition to become the most densified network of electric charging infrastructure in Europe. It could follow France, which has committed to ending the sale of cars with petrol and diesel combustion engines by 2040. A promising avenue for reducing congestion, pollution and CO_2 emissions sharply, while improving connectivity and accessibility, especially for low income households and at low cost to the public purse, is to explore options to move away from individual car use, towards digital-based ride sharing, as recently modelled for Dublin, for example (ITF, 2018b).

The volume of household waste remains large, although much is recycled (Figure 33, panel E). Policies to avoid waste lower natural resource and energy consumption in products consumed domestically. This would reduce greenhouse gas emissions, including in sectors which are relatively difficult to decarbonise. An option to avoid waste is to reinforce policies to extend producers' responsibility over the life cycle of their products

(OECD, 2016b). This can for example include product take-back requirements on retailers, refundable deposits, or disposal fees levied at purchase based on the estimated costs of treatment. Luxembourg could consider making more use of such instruments. Charging taxes for landfilling of municipal waste could encourage more recycling.

Harnessing finance for the transition to a low-carbon economy

Being a major financial center, Luxembourg can play a concomitantly large role in financing the global transition to a low-carbon economy. The first-ever green bond was issued by the EIB in 2007 on the Luxembourg Stock Exchange, LuxSE. In 2016, LuxSE launched the Luxembourg Green Exchange, the first platform dedicated to green and sustainable securities. Between them, these two exchanges have become the world leader of green bond listing (Figure 34). Further transparency is given by Luxembourg's labelling agency LuxFLAG, which offers a series of labels intended to clarify the content and impact of various asset classes. These include labels on climate finance, on green bonds and on Environmental, Social and Governance (ESG) criteria. Furthermore, in 2018 Luxembourg created a legal framework for the renewable energy covered bond.

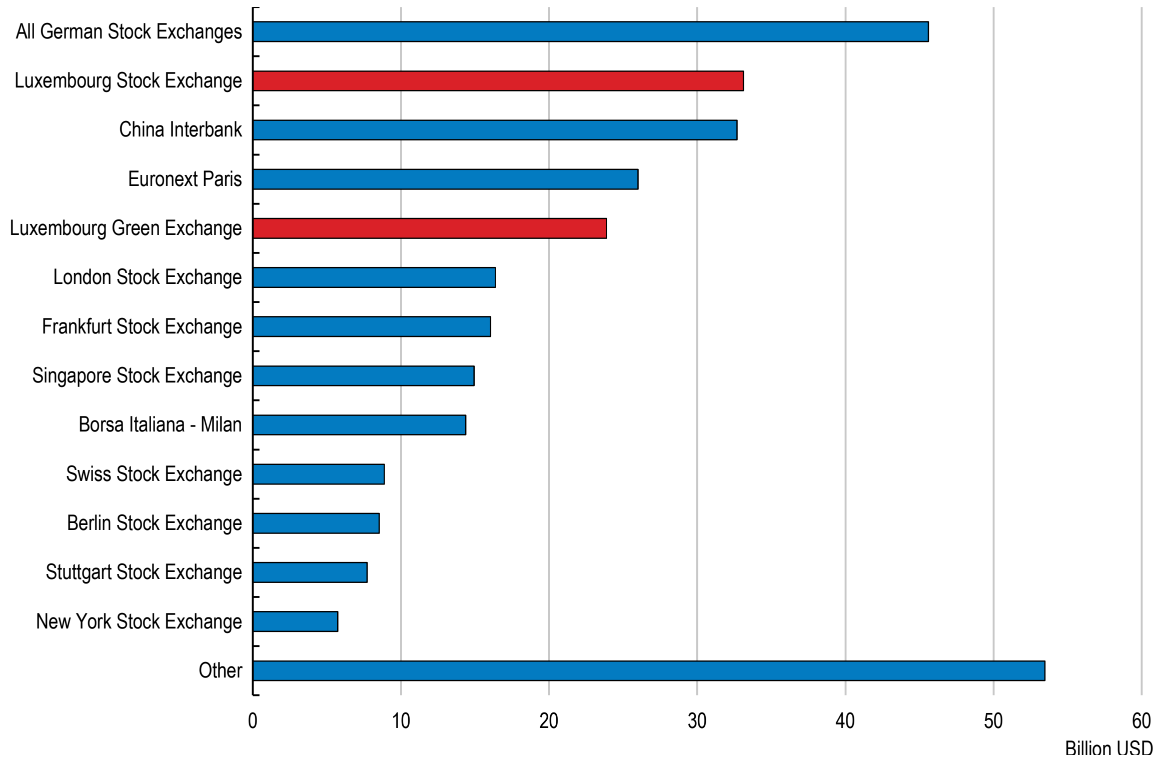
It is not clear whether this new asset class has contributed to additional investment in renewable energy and energy-saving projects or whether it has just provided labeling to projects that would have been realized anyway. Indeed, such labeling is beneficial because at issuance green bonds have on average been priced at a premium relative to conventional bonds (Ehlers and Packer, 2017). There are currently several competing frameworks setting standards for green bond labelling. As a step towards more transparent and demanding requirements, the EU is currently developing an EU Green Bond Standard. In this context, The Luxembourg Green Exchange has been a member of the High-Level Expert Group on Sustainable Finance created by the European Commission.

A more comprehensive approach to green finance is required for a successful financing of the transition to low-carbon economy. To this end, the Luxembourg government has published a Sustainable Finance Roadmap, covering inter alia governance arrangements, promoting innovation, developing expertise and measuring progress. Furthermore, a project assessing the current portfolio exposure to climate risks is underway in the insurance sector (through the sector's association, ACA). The Task Force on Climate-related Financial Disclosures (TCFD) has recommended more ambitious and concrete disclosure practices (TCFD, 2017). For instance, banks would need to disclose the amount and percentage of carbon-related assets relative to total assets, while asset managers and asset owners would disclose the weighted average carbon intensity for each product, fund or investment strategy. Governments and financial regulators from other countries have already expressed support for this initiative. Current work on a EU regulation on disclosure of sustainability risks may help strengthen the disclosure of climate-related risks, in line with TCFD recommendations.

Major risks do arise from exposures to high-carbon assets which could have to be written off before the end of their economically useful life because they are inconsistent with reaching climate objectives. These assets could amount to one trillion US dollars worldwide for the energy supply and industry sectors alone, and could treble if decisive climate mitigation action is delayed to 2025 (OECD, 2017g). Furthermore, financial institutions should also start to stress test their assets under an adverse scenario of bursting a 'carbon bubble' (Schoenmaker and van Tilburg, 2016).

Figure 34. Luxembourg has become a leader in green bond listing

Total issuance of labelled green bonds to July 2018, billion USD



Note: The figure includes only green bonds listed on exchanges and excludes over-the-counter bonds and the category “not available/not applicable”.
Source: Climate Bond Initiative data for Global Green Finance Index 2.

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Annex. Progress in main structural reforms

This annex reviews action taken on recommendations from the previous Survey released in June 2017.

Recommendations from the previous Survey	Actions taken
Making growth more resilient and greener	
Develop further the capacity to undertake regularly system-wide stress tests of fund-bank linkages and consider publishing their results.	The CSSF now runs fund-bank interlinkage stress tests twice a year. High-level results are shared with interested external public organisations
Introduce additional macro prudential measures, such as limits to loan-to-value or loan-to-income ratios.	A draft law for the implementation of LTV, DTI and DSTI caps was presented to Parliament in December 2017,but not yet passed.
Improve access to credit for SMEs by introducing a central credit registry.	Anacredit, a central credit register for Luxembourg, is currently under construction by the BCL in cooperation with the European System of Central Banks.
Reform land planning and introduce time-limited building permits.	Draft law no. 7139 of May 2017 proposes a development contract (Baulandvertrag) according to which land classified as residential area must be developed within 3 years.
Increase taxation of non-used constructible land.	No action taken.
Limit further mortgage interest deductibility to reduce housing demand.	No action taken.
Align the legal age of pension entitlement with increases in life expectancy.	No action taken.
Link more closely the level of pensions to the level of contributions.	No action taken.
Increase taxes and excise duties on transport fuel.	In 2019, the authorities increased excise duties on petrol and diesel by 1 and 2 cents per litre respectively.
Explore the introduction of a system of congestion charges.	No action taken.
Improve cross-border railway connections and transport infrastructure.	A 10-year investment plan has been signed between Luxemburg and France in 2018 for cross-border public transport infrastructures. Significant investments in railways are already underway.
Better skills for more inclusive growth	
Reduce grade repetition by providing earlier individualised support to students falling behind.	In 2018, Luxembourg introduced seven specialized centres for improving the support for pupils with special educational needs and a mediation service for inclusion and integration addressing individual complaints from pupils, with a view to lower drop-out rates.
Improve the mobility between secondary tracks via curriculum alignment and differentiated teaching.	The law of 13 March 2018 created a national syllabus council and two national syllabus commissions, one for elementary and one for secondary education, aimed at improving the syllabus consistency in national education.
Create individual learning accounts and expand the individual study leave to enhance access to lifelong learning.	No action taken.
Make systematic use of the tools for assessing and anticipating skills needs in policy making, especially in education policy and immigration policy.	A new "National Observatory for School Quality" was created in 2018 to evaluate the school system and to issue policy recommendations with a special focus on equity.
Strengthen career guidance and counselling to improve responsiveness of tertiary education to labour market needs.	The law of 22 June 2017 introduces the "Maison de l'orientation", whose responsibility is to ensure consistent professional and educational guidance to young and adult students. There is a strong collaboration between the new structure, the national employment agency ADEM and the department of vocational training.
Tailor lifelong learning programmes to the needs of the low skilled and older workers.	The State's financial participation increased by 20% for the wages cost of low-skilled and participants over 45 years.
Provide incentives for fathers to share parental leave. Consider introducing bonus parental leave if fathers take up a minimum amount and remove the cap on parental leave allowance.	Implementation of a 2016 reform has made the share of fathers in total parental leaves increase from 25% (2016) to 50% (December 2018).

Recommendations from the previous Survey	Actions taken
Adjust the tax and benefit system to increase incentives to work for low-skilled youth, older workers and second earners. For example, limit the access to unemployment benefits for young people with no employment record.	The newly implemented "Revis" (revenu d'inclusion sociale) replaces the minimum guaranteed revenue as of 2019 and reduces some of the work disincentives by excluding 25% of professional income from the computation of the benefit amount, and by permitting more than 40 hours of work per week and per household. A new minimum social wage tax credit of 70 euro per month on monthly gross salaries between the minimum social wage and 2.500 euro was introduced in January 2019.
Improve the evaluation of existing active labour market policies and set and partly publish output measures for local PES offices.	The EvaLab4Lux project will improve evaluation of ALMP by providing systematic studies and conducting impact evaluation studies.
Move to a system of fully individual taxation to make the tax system more gender neutral.	No action taken.
Close off various routes into early retirement and support more flexible workplace practices to strengthen labour market attachment of older workers.	Conditions to enter partial retirement, which keeps older workers attached to the labour market, have been eased in 2017.
Improving the integration of immigrants	
Ease immigrants' access to public sector jobs.	Since 2017, measures have been taken within the civil service to facilitate the learning of the Luxembourgish language.
Continue to increase public supply of language courses. Diversify language training to take better account of workplace needs.	The Government introduced several classes for learners of different ages to enhance language skills.
Speed up decisions on asylum applications. While waiting for a decision, ease provisional labour market access for applicants with high prospects of being allowed to stay.	The average duration from the submission of the application for international protection to the first decision has decreased from 21 months in 2015 to 6.5 months in 2018. No action has been taken to ease provisional labour market access.
To attract talent and better respond to skill shortages, reduce the time needed for non-EU citizens to obtain a work and residence permit.	In July 2018, the Grand-Ducal Regulation laying down the conditions and procedures for the issue of a residence permit as a salaried worker has been modified to reduce the administrative burden on the applicant and to simplify the procedure for obtaining a work and residence permit.
As planned, increase the provision and affordability of early childhood education and care, and familiarise children aged 1-4 with both Luxembourgish and French. Ensure that all providers comply with quality standards.	The initiative "Staark Kanner" (Strong Childen; Law of 29 August, 2017) provides multilingual education and 20 hours of free child care in nursery facilities for children ages 1 to 3 (until they turn 4, when compulsory school starts). Public funding is conditional on compliance with high quality standards. Data from December 2017 states that 58% of the children aged 1 to 3 have been benefitting from this measure.
Make resource allocation across schools more equitable, and introduce incentives to attract more qualified and experienced teachers to disadvantaged schools.	No action taken.

Thematic Chapter

Chapter 1. Policies for a more efficient and inclusive housing market

Housing prices have been growing strongly in Luxembourg, stoked by population growth, a high rate of household formation and limited use of land available for construction. Increases in price-to-income ratio mainly reflect high valuations of residential real estate, which rise faster than incomes, leading to increasing financial risks related to household indebtedness. Housing affordability has been deteriorating in particular for low-income households who do not profit from highly subsidised social housing. A mix of policies addressing supply-side restrictions, such as land hoarding and resistance to densification, together with policies to increase housing tenure neutrality and better targeted fiscal support will be needed to make the housing market more efficient and inclusive. Measures increasing the opportunity costs of unused land in urbanised areas and unoccupied dwellings could be combined with further reform of land-use planning, including measures involving municipalities in selectively increasing residential density in areas well-connected to the transport network. Housing tenure neutrality could be supported by removing or at least reducing mortgage interest deductibility and other fiscal instruments supporting homeownership and by developing the recurrent taxation of immovable property into a more important fiscal resource based on up-to-date real estate valuations. The supply of social rental housing should be stepped up and access to it made conditional on recurrent means testing ensuring better targeting to those most in need. Private rental sector could be expanded by relaxing the rules on renting parts of housing units and conversion of existing dwellings into rental housing.

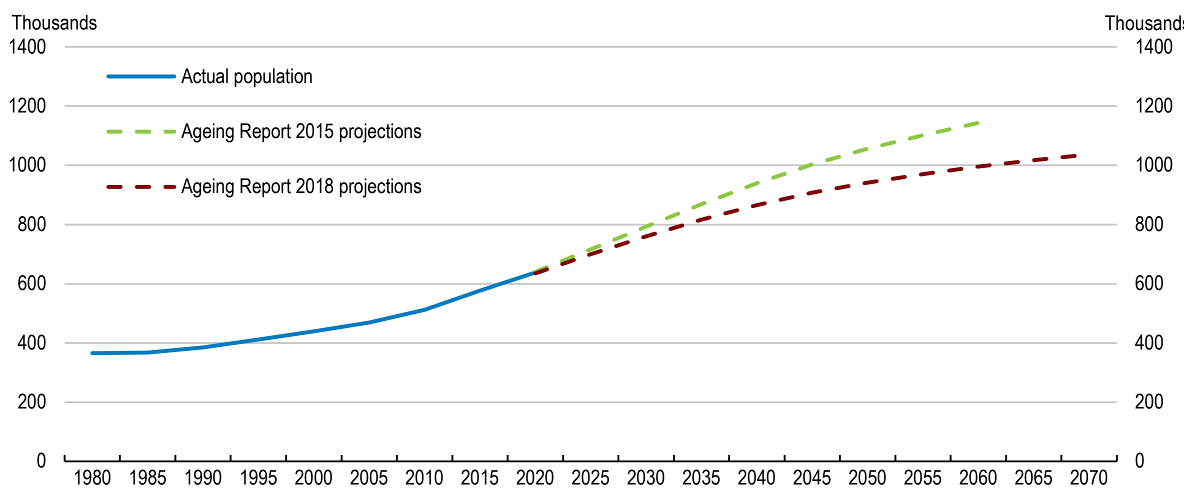
Population growth and constrained supply diminish housing affordability

Strong population growth and an above-average increase in the number of people living alone pushed up the demand for housing in Luxembourg. The supply of housing has not kept up with demand, restricted by the limited use of land available for construction and the practice of land hoarding. The accumulated gap between housing demand and supply thus mainly resulted in strong house price increases and deteriorating affordability of housing.

Demographic growth has exceeded housing supply

Luxembourg's population has increased strongly, by 36.2% from 2000 to 2017, mainly driven by the inflow of foreign workers (net migration), while the average increase in the EU was just over 5%. The strong positive trend is projected to continue, albeit less forcefully than previously projected (Figure 1.1) with total population exceeding 1 million in 2060 (European Commission, 2018). In addition, the growing number of single-person households associated with higher divorce rates, population ageing and other factors, resulted in the highest rate of household formation in the European Union, 2.5% per annum between 2005 and 2013 (European Union, 2015).

Figure 1.1. Strong population growth is projected to continue



Source: STATEC; European Commission (2018) The 2018 Ageing Report; and European Commission (2015) The 2015 Ageing Report.

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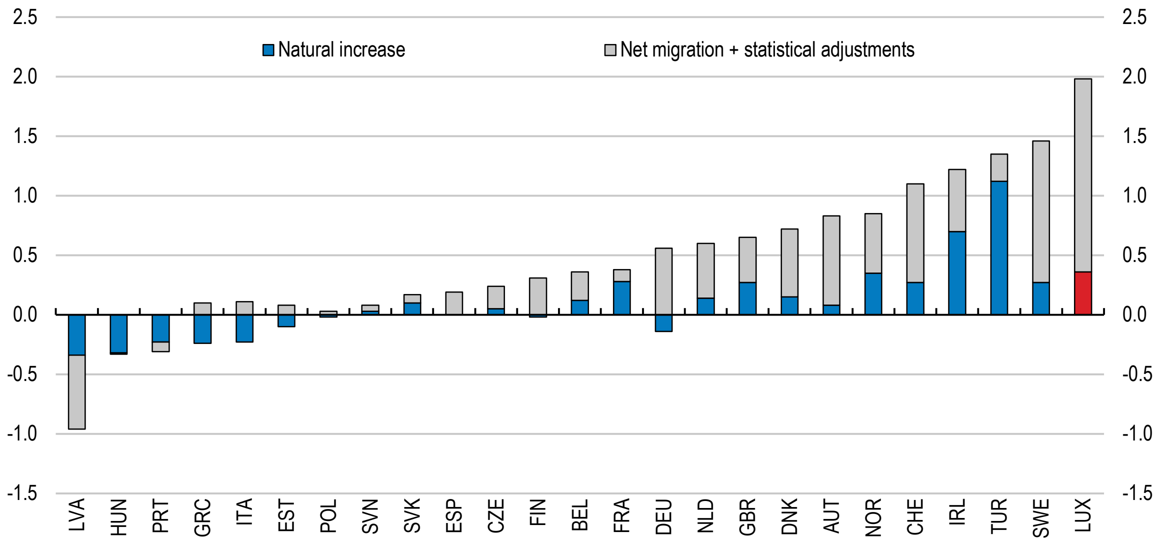
Prior to the global financial crisis, net migration broadly reflected economic developments, increasing in periods of strong economic growth and vice versa. However, in the aftermath of the 2008 crisis net migration grew strongly, reaching historically high levels (Figure 1.2).

Figure 1.2. Population growth is driven by net migration

Percentage, 2016



Source: OECD (2018), International Migration Outlook.

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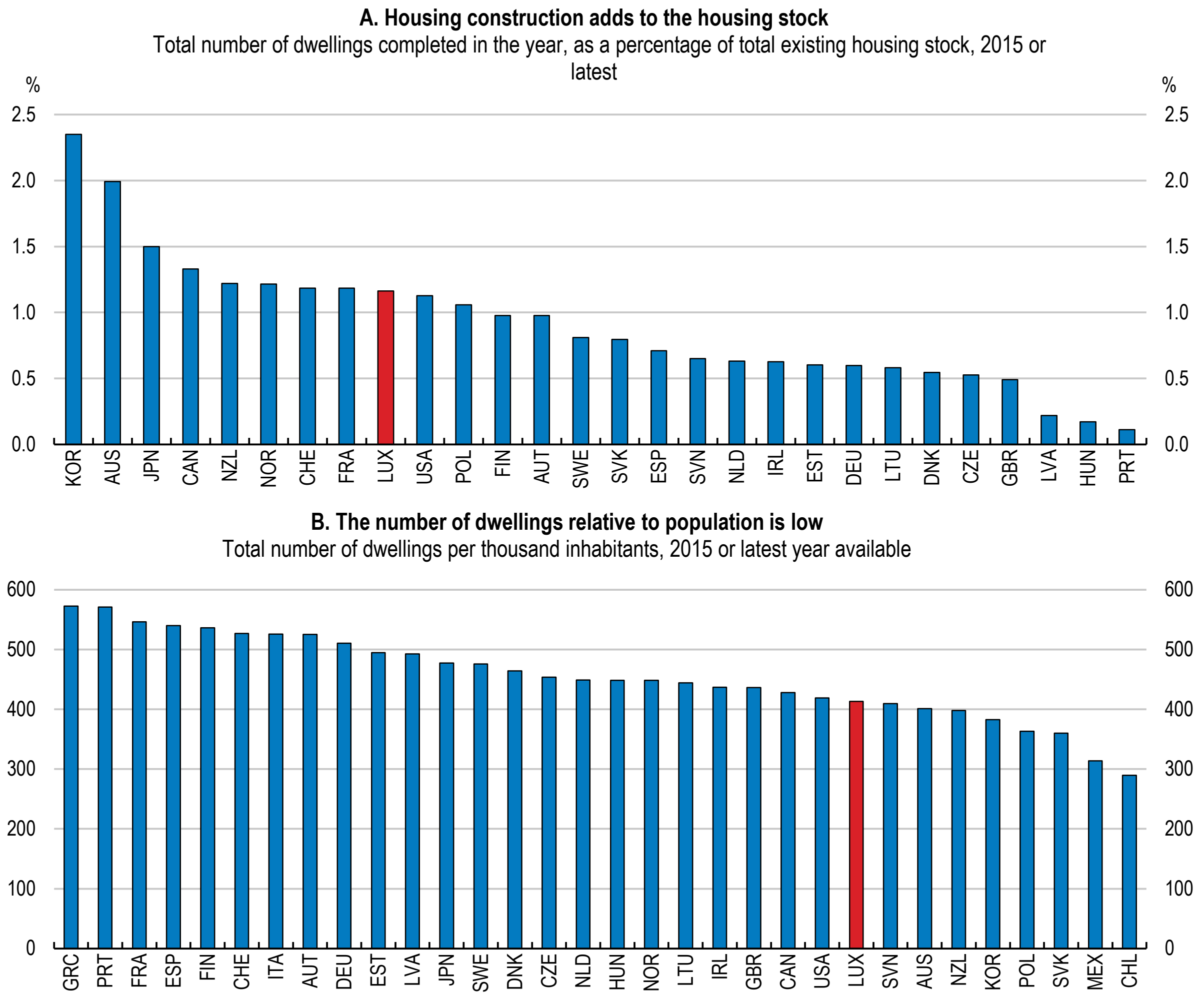
The housing stock does not expand in line with the growing demand. Although the number of newly completed dwellings as a share of total housing stock is above the OECD average (Figure 1.3, panel A), this increase is more than offset by strong population growth and the growing number of single-person households. The number of dwellings relative to population is among the lowest in the OECD (Figure 1.3, panel B). Although the number of dwellings per 1000 inhabitants slightly increased (from 406 in 2010 to 414 in 2015), this improvement was more than offset by the decreasing size of the average household.

The gap between housing demand and supply has increased over many years, further restricting the effective housing supply. A pre-crisis study projecting moderate population growth up to 2021 (already surpassed by observed population growth in 2012) and taking into account the historical backlog in construction has put the annual building target at 3.800 units (Eichberger, Seidenberger and Blanda, 2008). A more recent study, based on the projected population of 647000 in 2030, put the construction needs between 2010 and 2030 at almost 6500 dwellings per year (Peltier, 2011). However, the average number of newly built dwellings between 2001 and 2016 was only 2804 dwellings per year (STATEC, 2017b).

Figure 1.3. Housing construction has not kept up with population growth



Note: In Panel B data refer to: 2010 for Cyprus and Mexico; 2011 for Canada the Czech Republic, Estonia, Greece, Italy, Latvia, Malta, Romania, the Slovak Republic and Spain; 2013 for Chile, Croatia and Japan; 2014 for France, Lithuania, Luxemburg, Poland, Switzerland and the United Kingdom, 2015 for Korea.
Source: OECD Affordable Housing Database.

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Price developments reflect limited use of available land

Housing prices are high, especially in Luxembourg City, which is among the most expensive cities in Europe, and have recently been rising on most definitions, reflecting strong growth of residential land prices, buoyant economic performance and low interest rates. In addition, the high share of cross-border workers (more than 40% of total employment) creates a large latent demand that reinforces the upward pressure on housing prices.

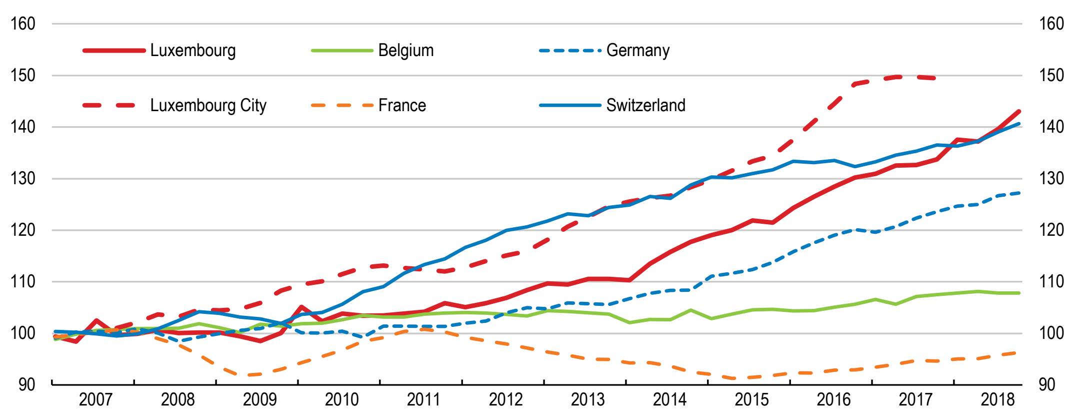
Housing prices are also much higher than in the neighbouring regions. In the Grand Duchy, the price per square meter for existing dwellings in 2017 ranged from 3930 euro in the North to 6563 euro in the area around Luxembourg City (Observatoire de l'habitat and STATEC, 2018). In the French region of Lorraine, the average price per square meter in 2017 was about 1350 euro. In addition, there are spillover effects on neighbouring housing markets in the Greater Region; price differentials for equivalent dwelling can be 30% or more, especially in Lorraine, depending on the distance from the border (OECD, 2007).

While land prices were thought to represent typically about a half of house prices in European countries (Calmfors et al., 2005), more recent decompositions that cover the period of strong residential land prices growth since 2000 put the weight of imputed land prices close to 80% (Knoll, Schularick and Steger, 2014), possibly reflecting the limited use of available land for housing construction in Luxembourg. In line with the recent evidence, land prices are considered the main factor behind the increase in house prices in Luxembourg (Conseil économique et social, 2018). A novel index of residential land prices, based on the data from notarial deeds, cadastral data and geo-spatial characteristics of Luxembourg estimates the growth rate of land prices between 2010 and 2014 at 40%, about twice the growth rate of overall nominal house prices over the same period (Glumac, Herrera-Gomez and Licheron, 2018).

Real residential house prices have been growing strongly since the crisis (Figure 1.4) and both price-to-income and price-to-rent ratios are at historically high levels (Figure 1.5). The upward trend in price-to-income ratio suggests that housing affordability is on average deteriorating, while strong growth in price-to-rent ratio could point to overvaluation. The possibility of a moderate overvaluation is also reflected in recent assessments of other institutions (European Union, 2019). If continued, this tendency may lead to a correction in the future.

Figure 1.4. Real house prices are growing strongly

Index 2007 = 100, s.a.



Note: For Luxembourg City, nominal annual values were interpolated linearly and deflated using a house price deflator calculated from the OECD Analytical House Price Indicators database.
Source: OECD, Analytical house prices indicators database; and Observatoire de l'Habitat.

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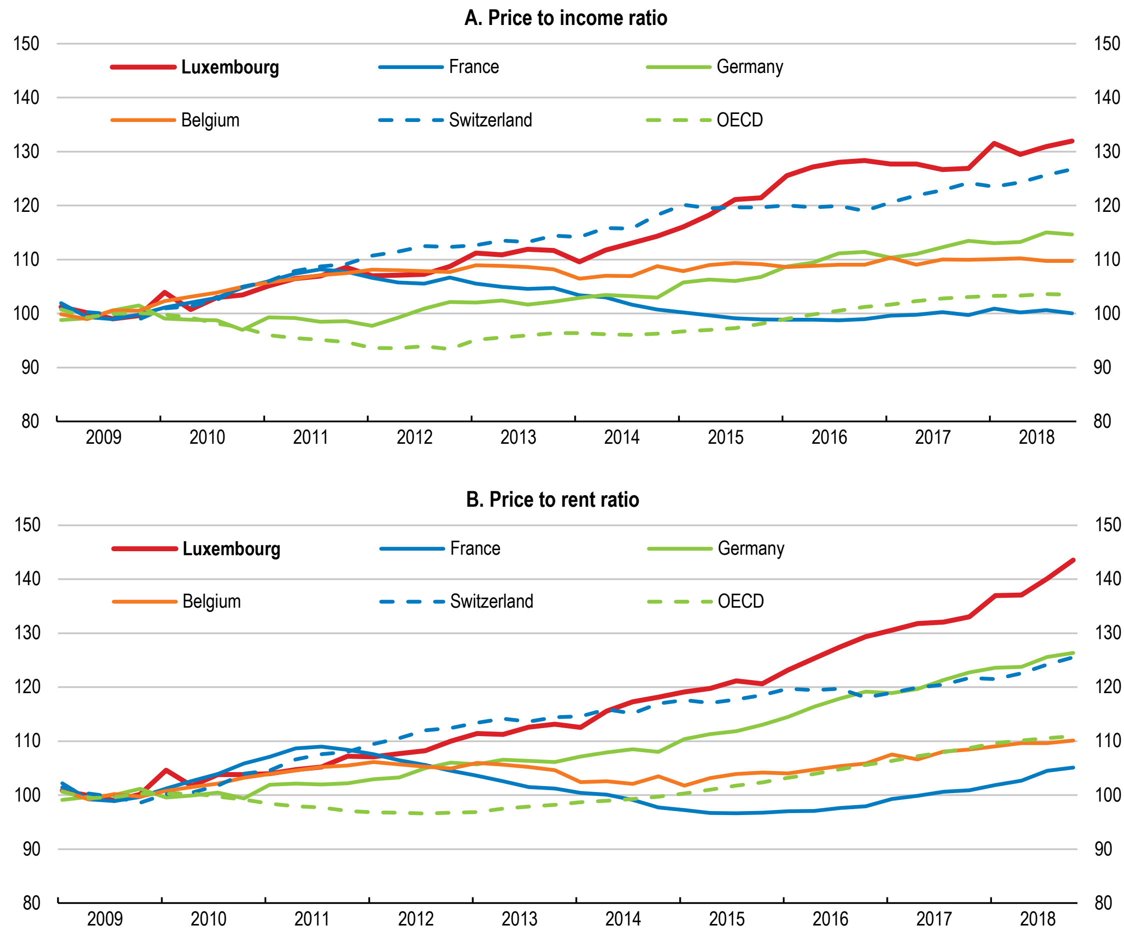
Figure 1.5. Increasing price-to-income and price-to-rent ratios point to affordability problems

Index 2009=100, s.a.



Source: OECD, Analytical house prices indicators database.

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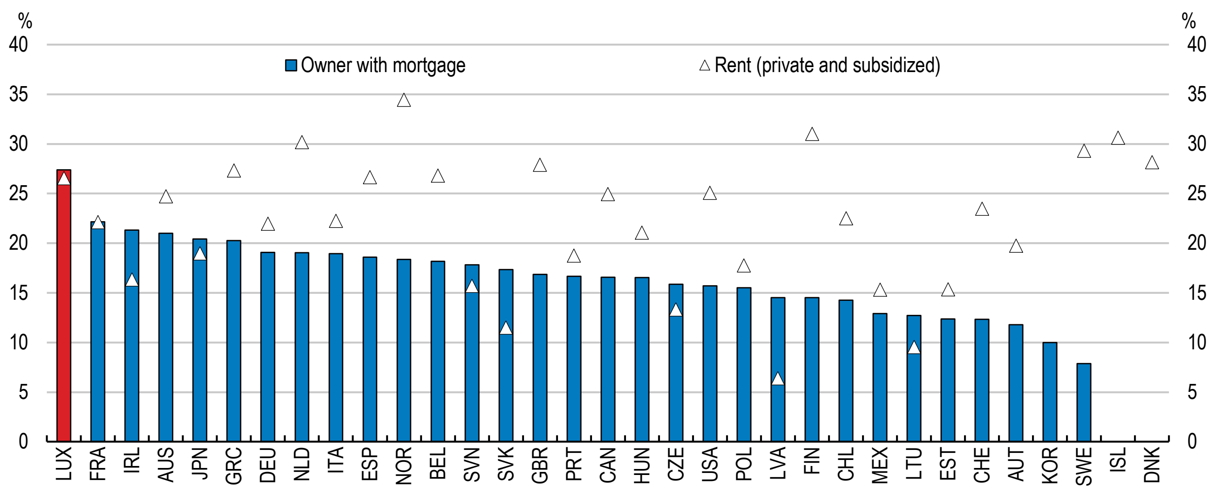
The housing cost burden is indeed high by OECD standards, in particular for owners with a mortgage, reflecting the high values of residential real estate relative to income (Figure 1.6). While many cross-border workers find it too expensive to live in Luxembourg and resort to commuting, an increasing number of residents move across the border in search for affordable housing. The number of such cases, although small, more than doubled between 2001 and 2007 and a large proportion of these workers returned to their countries of origin to become homeowners (L'Observatoire de l'habitat, 2010). More up-to-date data on this trend would be useful and the decision to consider establishing a housing observatory at the level of the Greater Region, collecting and analysing territorial and cross-border data on housing, is a step in the right direction.

Figure 1.6. Households' housing cost burden is high

Median of the mortgage burden (principal repayment and interest payments) or rent burden (private market and subsidized rent) as a share of disposable income, in percent, 2016 or latest year available



Note: No information for New Zealand and Turkey due to data limitations. In Chile, Mexico, Korea and the United States gross income instead of disposable income is used due to data limitations. No data on mortgage principal repayments available for Denmark due to data limitations. Data for Japan only available on the respondent level due to data limitations.
Source: Preliminary data from the OECD Affordable Housing Database.

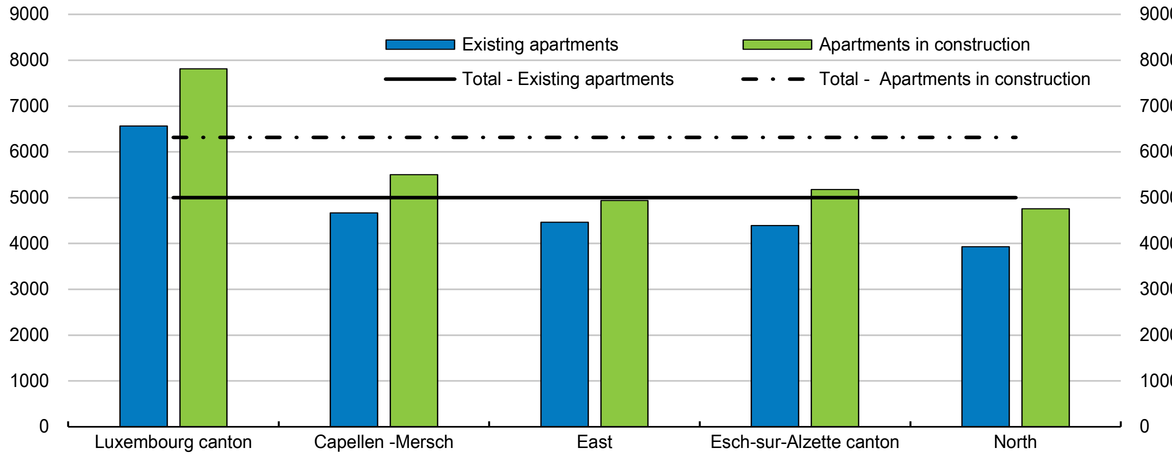
StatLink https://doi.org/10.1787/888933951836

However, there are significant regional differences in housing prices. The prices per square meter, for both existing and newly built apartments, are the highest in the canton of Luxembourg, followed by the cantons of Capellen and Mersch and the lowest in the North region, comprising the cantons of Clervaux, Diekirch, Redange, Vianden and Wiltz (Figure 1.7). The regional variation (as measured by the coefficient of variation) has increased strongly for existing housing, from 15.8% in 2014 to 19% in 2017, while the variation in prices of newly built apartments remained broadly unchanged (Observatoire de l'habitat and STATEC, 2018).

Against this backdrop, the chapter looks at policies that would make the housing market more efficient and inclusive. The chapter starts with land-use policies that could stimulate the use of constructible land and the ways to improve co-ordination among municipalities as well as between municipalities and the central government. The chapter then turns to polices facilitating new construction, including ways to reduce high construction costs, and densification of urban areas, which could help curbing house price growth and make housing more affordable, while reducing urban sprawl and helping to achieve environmental objectives. The rest of the chapter focuses on policies to make housing more inclusive. The main policy levers considered are tax policies to restore tenure neutrality, policies to promote the supply of and fair access to social housing and improve social mix as well as strengthen the private rental sector.

Figure 1.7. The regional variation in housing prices reflects the distance from capital

Price in euros per m²



Note: The prices take into account transactions between 1st October 2016 and 30th September 2017. Capellen-Mersch includes Capellen and Mersch cantons; East inlcudes the cantons Echternach, Grevenmacher, and Remich; North includes the cantons Clervaux, Diekirch, Redange, Vianden, and Wiltz.
Source: Statec (2018), Logement en chiffres no. 7.

StatLink https://doi.org/10.1787/888933951855

Increasing the supply of housing

Spatial planning instruments fail to prevent land hoarding

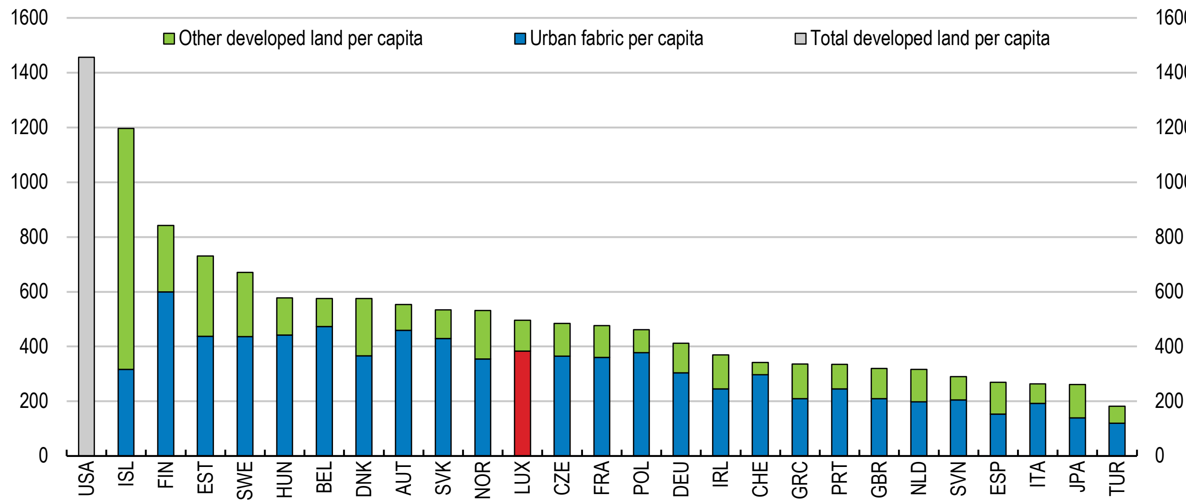
The land available for housing construction appears sufficient and could be used to build up to 80.000 new dwellings (L'Observatoire de l'Habitat, 2019a). Indeed, the amount of developed land per capita is higher than in many OECD countries (Figure 1.8), despite the ongoing decrease in developed land per capita due to strong population growth, mainly driven by immigration (Figure 1.9).

However, the land available for housing construction is mainly in private ownership and many landowners do not have a strong incentive to sell or develop their land. Most of the land available for housing construction, some 92%, is privately owned, while the municipalities, public providers of housing and the state own the remaining 8%. According to a recent survey, urban areas and areas designed to be urbanised represent about 9% of the land surface (23.499 hectares). Some 12% of those areas (2.863 hectares) was unconstructed and could potentially be developed for housing (L'Observatoire de l'Habitat, 2019b).

The results are very similar to the previous survey conducted in 2013 (L'Observatoire de l'habitat, 2015). The slight increase in land available for housing is due to the allocation by some municipalities of previously unallocated land to residential areas, as required by new spatial planning rules. The unchanged amount of land available for housing construction underscores the need to mobilise land development, but it also seems consistent with the prevalence of land hoarding. At 16%, the unchanging share of available building land held by private companies, mostly developers, also points to land hoarding.

Figure 1.8. Developed land per capita is high

2012



Source: OECD (2017), "A snapshot of land use across OECD Countries", *in The Governance of Land Use in OECD Countries*: *Policy Analysis and Recommendations*, OECD Publishing, Paris.

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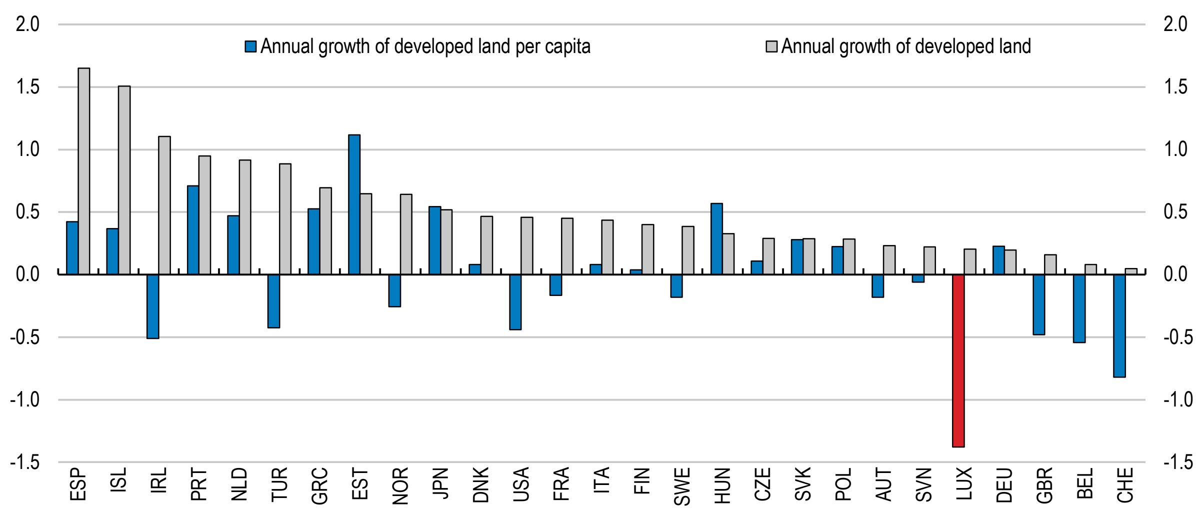
Figure 1.9. Growth rates of developed areas per capita is strongly negative

2000-2012



Source: OECD (2017), "A snapshot of land use across OECD Countries", in *The Governance of Land Use in OECD Countries: Policy Analysis and Recommendations*, OECD Publishing, Paris.

StatLink https://doi.org/10.1787/888933951893

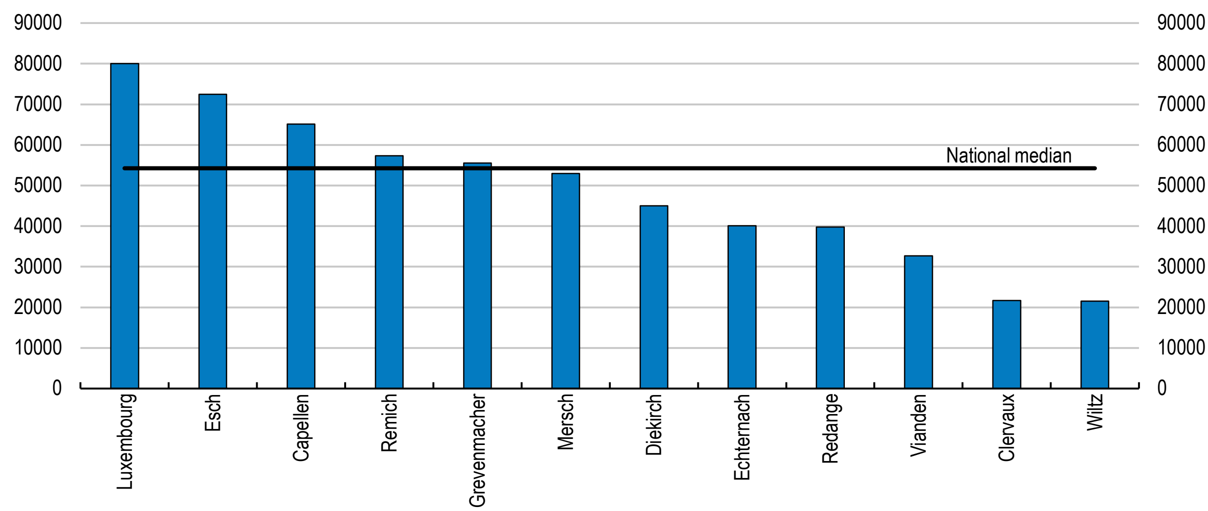
Some 33% of land available for housing construction (941 hectares) are the so-called "Baulücken", plots of land enclosed in urbanised areas, already serviced and available for immediate development. The Ministry of Housing is encouraging municipalities to prioritise this fully serviced land for building, but given the high rate of private ownership, this effort mainly relies on soft measures, such as awareness-raising tools and personalised dialogue with the owners. As the programme is voluntary and the municipalities do not have strong incentives to participate, the results have so far been limited.

Land prices, which are the main component of total housing costs, have been growing strongly on average, by some 50% between 2010 and 2017 (L'Observatoire de l'Habitat, 2019b). Although the prices of land vary a lot across municipalities and tend to decrease with the distance from the capital (Figure 1.10), small urban centres, in particular in the rural northern half of the country, are becoming more attractive and the number of employees commuting between small rural towns and Luxembourg City has been increasing.

Strong land price growth further stokes the practice of land hoarding, where constructible land is kept undeveloped to capitalise on continuing price increases. As developers normally buy the land they develop and land owners face low opportunity costs of not developing the land themselves, the amount of undeveloped land in urbanised areas remains more or less constant. There are two main drivers behind land hoarding. First, holding unbuilt land is virtually cost free, given the low level of property taxes. Second, there are few constraints or real incentives for municipalities to implement the guidelines from the Master Programme for Spatial Planning in municipal Land Use Plans and to initiate new developments (Box 1.1).

Figure 1.10. Prices of land for construction vary strongly across the country

Median price of plots in a residential zone, per canton (2010-2014), in euros per acre



Source: Observatoire de l'Habitat (2015), La note 21.

StatLink https://doi.org/10.1787/888933951912

Box 1.1. Spatial planning and its main instruments

In accordance with the Law of 17 April 2018 concerning spatial planning, one of the objectives of spatial planning is to ensure a sustainable use of land and compact urban development. The main spatial planning instruments defined by this law are the Master Programme for Spatial Planning, the Sectoral Master Plans, the Special Zoning Plans and the Conventions for territorial cooperation between the State and municipalities. At the municipal level, in accordance with the Modified Law of 19 July 2004 concerning municipal land use and urban development, there exist two additional spatial planning instruments, General and Detailed Land Use Plans. Those planning instruments are detailed below:

Master Programme for Spatial Planning (Programme directeur d'aménagement du territoire, PDAT) is the key instrument of national spatial planning, determining the general guidelines and priority objectives for the sustainable development of the national territory. The Master Programme for Spatial Planning of 2003 is currently under revision.

Sectoral Master Plans (Plans directeurs sectoriels, PDS) for four interconnected areas of spatial planning – housing, transport, landscapes and economic activity areas – underpin the Master Programme for Spatial Planning with legally binding instruments facilitating sustainable spatial development. The Sectoral Plan on Housing reserves plots of land for future housing construction and aims to ensure good connections to places of work. The adoption procedure for the four sectoral master plans was launched in May 2018 and is foreseen to be completed in 2020.

Special Zoning Plans (Plans d'occupation du sol, POS) are enforceable spatial planning documents prepared and approved by the central government. This zoning instrument can, under certain conditions, override the General Land Use Plan where the public interest calls for state intervention. Once approved, the municipalities are required to adjust their General Land Use Plans in accordance with the provisions of the Special Zoning Plan.

Conventions of territorial co-operation between the State and municipalities (conventions de cooperation territoriale État-communes) promote inter-municipal and multi-level co-operation in areas of sustainable regional development and integrated planning. Following the expiration of one convention at the end of 2018, there are currently three such conventions and the effectiveness of the instrument is being evaluated (OECD, 2019b).

General Land Use Plans (Plans d'aménagement général, PAG) are enforceable land use plans encompassing zoning at the municipal level, which have to be approved by both the municipal council and the Ministry of Interior. There are currently three co-existing PAG regimes, dating back to 1937 (51 municipalities), 2004 (8 municipalities) and 2011 (27 municipalities and 16 in the process of transition).

Detailed Land Use Plans (Plans d'aménagement particulier, PAP) elaborate the provisions of the General Land Use Plan for a particular municipal zone. It is prepared by the owner or developer of the land, the municipality (or a syndicate of municipalities) or the state and again approved by both the municipal council and the Ministry of Interior. There are two different types of PAPs, for new and existing districts. The new district PAP covers an area to be urbanized and defines the public space, building lots and future construction involved in the urbanisation project. The existing district PAP relates to an already serviced area and covers the rules for the integration of new buildings into the existing urban fabric.

A public consultation process launched by the government in 2018 aims at creating a shared development vision and reviewing the Master Programme for Spatial Planning. The process builds on collaborative workshops in four regions (North, Centre, East and South) and shall culminate in a revised Master Programme, incorporating the recommendations from a public participation exercise, to be adopted in 2020. This process is welcome and it should result in an up-to-date and complete set of spatial planning documents, including binding instruments for effective collaboration, both at the level of municipalities and between municipalities and the central government.

Improving co-ordination in spatial planning and infrastructure provision

The spatial planning decisions are characterised by a high level of municipal autonomy. The central government provides various subsidies to municipalities for housing construction. Some are directly linked to already approved construction projects; other are indirect, for example supporting municipalities to meet population increases agreed with the central government. However, these instruments do not create binding rules and cannot compel municipalities to act (IMF, 2018). For example, the additional financial incentives for municipalities introduced in 2008 have not been effective in increasing sufficiently new housing construction in municipalities with strong planned population increases.

Practices in OECD countries show that planning instruments at the national level may or may not be legally binding. For example, whereas the national spatial planning instruments of countries including Estonia, Korea, Czech Republic and Japan are legally-binding, similar instruments in most other countries serve advisory purposes to sub-national level planning. However, in most instances where national-level instruments are not legally binding on sub-national authorities, formal and informal mechanisms for the participation of national and sub-national authorities and sector agencies ensure that lower-level plans are consistent with higher-level goals and objectives (OECD, 2015).

For example in Germany, co-ordination between levels of government takes place through the counter-flow principle, in which lower levels of government have to adapt their plans to plans at higher levels, while at the same time providing input and shaping those higher-level plans. A special instrument for the co-ordination of important development projects is the Spatial Planning Procedure; while its outcome has no direct legal force, it must be considered in subsequent planning decisions by public authorities (OECD, 2017a).

Investment costs of infrastructure facilities induced by new housing construction are partly financed by municipalities and housing and community amenities represent more than 8% of local government expenditure in Luxembourg, compared to average 3% in OECD countries (OECD, 2016a). Despite the existing financial support from central government, such financing and administrative costs of infrastructure investment may discourage municipalities from housing construction.

When a Detailed Land Use Plan for a new district is prepared, the promoter is obliged to build the public domain infrastructure indicated in the urban planning documents, such as green spaces, playgrounds or access roads. However, the promoter is not responsible for building schools, nurseries or roads extending out of the area. To internalise the impact of developers' building plans on the communities, indirect value capture instruments, such as negotiated developer obligations, are used in many OECD countries, including the Netherlands, Spain, France, the U.S. and Canada (Muñoz Gielen and Lenferink, 2018). Negotiated developer obligations are flexible, only lightly regulated in national legislation and with detailed regulation usually provided at the municipal level.

To ensure that the municipalities do not perceive housing development as a financial disadvantage, the central government could introduce a more equitable infrastructure financing mechanism using non-negotiable (i.e. legislated) or negotiated developer obligations. In addition to improving urban development by providing more clarity, such mechanism could provide a clear enumeration of the developer's or owner's responsibilities (OECD, 2007). Additionally, the effective use by municipalities of some land-use planning instruments, such as the tax on unused land and unoccupied dwellings, and the introduction of an instrument obliging owners of undeveloped constructible land to start building (the so-called Baulandvertrag), could be made a precondition for a part of the central government's financing to municipalities (Conseil économique et social, 2018).

The conventions of territorial co-operation between the state and municipalities provide some welcome examples of co-ordination among the municipalities, in a partnership with the state. Already in 2005, Luxembourg City and four other municipalities on its southwest edge (Luxembourg, Bertrange, Hesperange, Leudelange and Strassen) have signed an agreement with the central government adopting a regional approach to territorial development. Although other municipalities have not yet decided to co-operate at the same comprehensive level, a coordinated approach could help to achieve greater density in functional occupancy and transportation infrastructure as well as to create additional green spaces that could reduce individual car traffic.

The existing municipal fiscal equalisation system seems broadly aligned with the territorial development needs, but it could be improved further. Municipal revenues come from three main sources: grants and subsidies from the central government, which amount to 55% of revenues in 2013, taxes, mainly the municipal business tax, at 26% of revenues, and fees and charges for public services at 19% of revenues (OECD, 2016b). Although, the municipal business tax is collected by the central government and partly redistributed among municipalities, the bulk of equalisation is provided by the Communal Fund for Financial Grants through grants and subsidies for basic municipal tasks, which in per capita terms are the highest in the least populated municipalities (OECD, 2007). The strong reliance on the municipal business tax, which is a corporate income tax and represents more than 90% of municipal tax revenue, could intensify tax competition. Replacing corporate income taxes by higher property taxes could help reduce tax competition (Blöchliger and Pinero Campos, 2011).

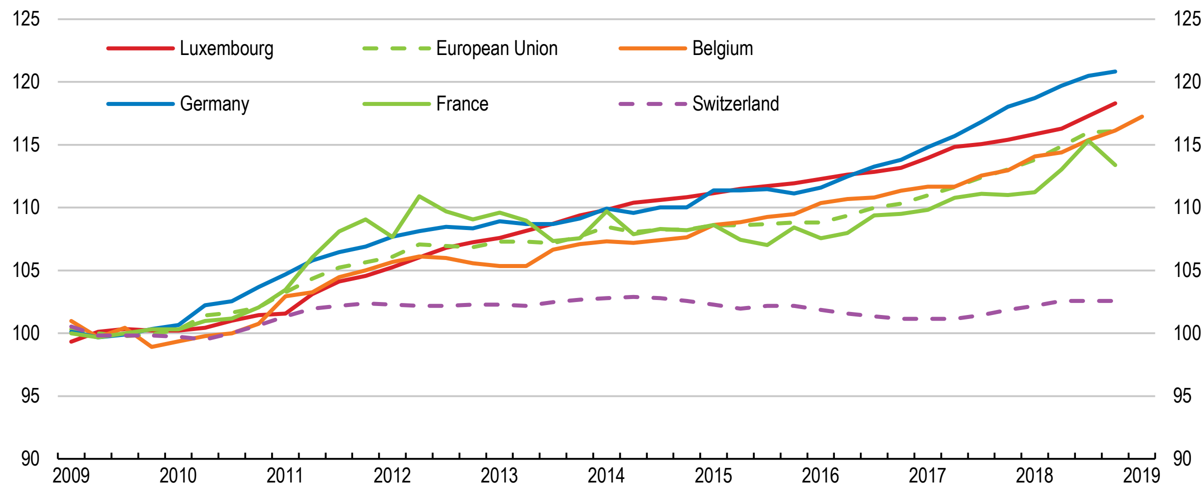
New construction

Building regulations (Règlement sur les bâtisses), which are set at the municipality level, are not standardised and may add to increases in building costs by hampering productivity in the construction sector (Figure 1.11). As discussed in the KPI, the construction sector includes some low productivity firms, resulting in a substantial positive differential between median and average productivity growth. The building regulations divide the municipal area into different zones (e.g. high density, low density, residential, industrial) and define the general rules and construction requirements, such as safety and building site rules, applicable to each zone. The building regulations also specify the extent of building works that not require a building permit and the application documents in case a municipality requires a building permit. In order to standardise these requirements, the government programme for 2009-2014 foresaw preparation of a standard municipal building code (OECD, 2010); such a standardisation would be welcome.

The cost of new housing has also been increasing following the introduction of more stringent energy efficiency requirements, an investment that will ultimately reduce energy costs. From 2017, well before the EU deadline of 2021, all new residential buildings in Luxembourg must comply with the AAA class requirements regarding both thermal insulation and energy performance. In addition, there are strict rules for the use of space, such as the requirement that each new dwelling must include one or two parking spaces, often requiring expensive construction of underground parking (IMF, 2018). Finally, transaction costs are among the highest in the OECD, further limiting market dynamism (Figure 1.12).

Figure 1.11. Construction prices have increased strongly

Index 2009=100



Note: Construction includes residential buildings, except residences for communities.
Source: Eurostat, Short-term business statistics.

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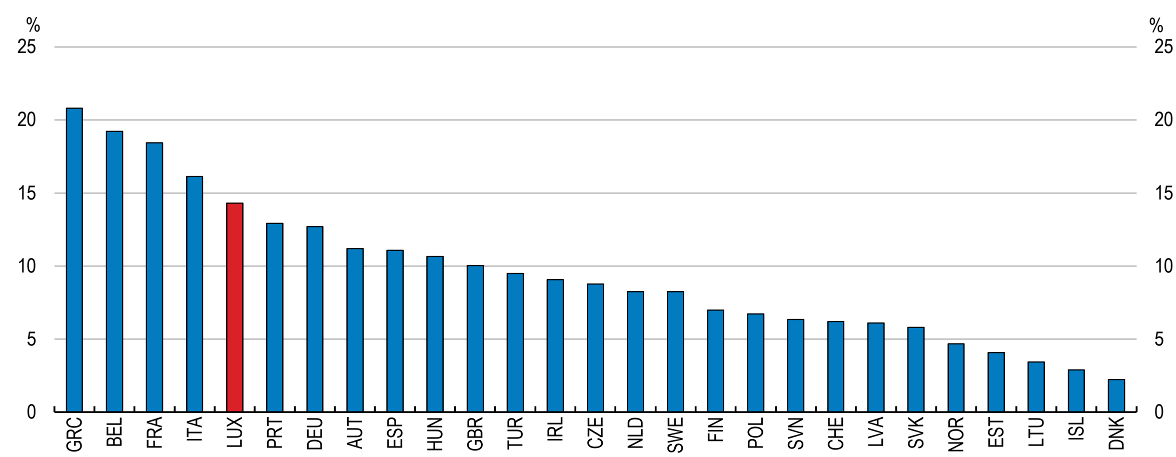
Figure 1.12. Transaction costs are high

As a percentage of property value, 2017



Source: Global Property Guide.

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Administrative barriers

The law of 3 March 2017 (the Omnibus law) has considerably simplified procedures related to construction, including streamlining the procedures for the preparation of the General Land Use Plan (PAG), shortening the deadlines for adjusting the Detailed Land Use Plan (PAP) and simplifying the procedure for the designation of an existing district. In some limited situations, the law has also introduced the concept of tacit consent, where an absence of reaction from the administration constitutes a positive answer. Furthermore, the law extended the right of municipalities to buy real estate put up for sale by private owners in preference of any other buyer (the pre-emption right) to all plots of undeveloped land within urban areas.

Municipalities and other public promoters

The state subsidises the construction of housing generously, distinguishing between public and private developers. Public developers, such as municipalities, the Housing Fund (*Fond du logement*) and the National Affordable Housing Company (*Société Nationale des Habitations à Bon Marché*, SNHBM), can get subsidies amounting to 50% of infrastructure and land for housing projects intended for sale and up to 70% of the acquisition and construction costs for rental projects. For municipalities, the maximum support for rental projects is capped at 75% and for all providers, the cap amounts to 100% for accommodation for applicants for international protection. The same conditions apply to rental housing built by non-profit associations, foundations, religious communities, civil hospices and social services. Private for-profit providers of housing are also eligible for support and the state usually participates in their projects through tailored agreements negotiated by the Ministry of Housing.

Furthermore, the 2008 Housing Pact (*Pacte logement*) provides additional incentives to municipalities to engage in construction of new housing, in exchange for additional financial support from the state (Box 1.2). However, despite the potentially high rate of subsidisation, the current framework has not been successful in stimulating sufficient supply of housing.

Some instruments of the Housing Pact are simply not used. Although municipalities were given the possibility to levy an annual specific tax on unused constructible land that have not been developed for more than three years as well as on unoccupied housing, only 8 municipalities chose to introduce it. In addition, some 80 municipalities have introduced a special property tax on building land for residential purposes (*impôt foncier B6*), but this instrument is based on the low cadastral valuations and the revenues from it are negligible.

To increase the costs associated with land holding, the central government could introduce a levy, possibly even increasing with time, or a recurrent tax on unused building land for residential purposes. In Ireland, for example, the 2015 Urban Regeneration and Housing Act introduced a register of vacant sites to stop property owners hoarding land suitable for development. Local authorities identified unused properties that in 2019 attract a levy of 3% of the land value, raising to 7% in 2020, if the land remains undeveloped.

To strengthen the incentives to develop constructible land, the draft law no. 7139 submitted to Parliament in May 2017 proposes a new instrument that would introduce an obligation to build on land zoned for housing construction within a certain period (the so-called *Baulandvertrag*). This contract between a municipality and the owner of the land zoned for housing construction oblige the owner to start construction on the land within a period of three years, or face penalties, including the right of the municipality to buy back the land. This welcome proposal could provide a useful policy instrument to decrease the amount of available unbuilt land.

Box 1.2. The Housing Pact

This voluntary instrument of co-operation between municipalities and the central government, aims at increasing the supply of housing and introduces new administrative measures, such as the pre-emption right and the right of emphyteusis (long-term lease).

The main conditions of the Pact with respect to participating municipalities are the following:

- Population growth of at least 15% over a period of 10 years.
- A capital grant by the central government of 4.500 euro for each additional person beyond the 1% growth threshold.
- A 50% supplement to the capital grant from the central government (6.750 euro) per person for selected communes (see below).

The municipalities signing a convention with the government pledge to:

- Draw up a list of housing and community facility projects, such as schools and day care centres, including completion schedules.
- Promote and accelerate construction of the planned housing.
- Set aside 10% of housing units, in each new development containing more than 25 housing units, for moderately priced housing.
- Introduce a specific communal tax on certain buildings, in particular dwellings unoccupied for an extended time and on undeveloped land zoned for residential construction.

Some municipalities are eligible for supplementary payments. This includes 16 municipalities recognised as "centres of development and attraction" (CDA) and other municipalities, located either near a CDA or in the housing development priority zones of Nordstad and the Alzette Valley.

According to the third round of monitoring of the Pact in 2018, 63 municipalities of the 75 monitored municipalities with ten-year contracts have achieved the population growth objective. Since 2008, more than 32 thousand housing units were built, with the total state support to the municipalities of 360 million euro. The use of pre-emption right, however, remains relatively limited: municipalities and the Housing Fund applied the pre-emption right to some 16% of land put up for sale (22 ha out of the total 135 ha).

In addition to municipalities, there are two main public housing providers, the Housing Fund, a public institution financed by the Ministry of Housing, and the National Affordable Housing Company, a private joint stock company eligible for state subsidies. The 2017 reform of The Housing Fund (the law of 24 April 2017) aligned its governance with the EU rules on state aid and reserved one seat on the Board of Directors to municipalities to improve co-operation between the Fund and municipal administrations. In addition to building new housing, the Housing Fund manages the largest rental stock in Luxembourg. The National Affordable Housing Company similarly stepped up the supply of housing; it aims at doubling its stock of social rental housing by 2020. However, new housing construction generates financial losses for the National Affordable Housing Company, mainly because the regulated rents on social housing do not cover the growing costs of new land acquisition and construction.

While the construction costs are constantly increasing, partly reflecting the more stringent energy efficiency requirements, social housing rents, fixed by the Grand Ducal Regulation of 16 November 1998, have remained broadly unchanged. On average, the social rents charged by the National Affordable Housing Company represent 16% of net disposable income of its tenants, well below the overburden rate of 30%.

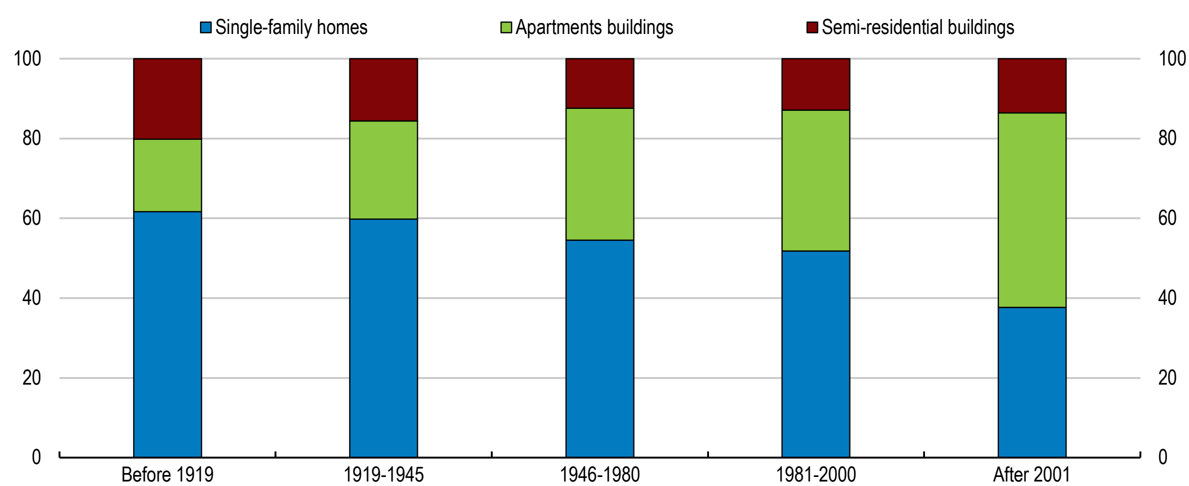
In order to make the financial situation of public providers sustainable, the calculation of social rents could be revised to take into account the energy efficiency of the building or to increase the part of social housing rent related to the surface of the dwelling. This component is very small, amounting to 0.86 euro per square meter, compared to the average market rent of 16 euro per square meter (OECD, 2012). Alternatively, the state could increase its financial support for the public providers of housing from 70% to 75% of the acquisition and construction costs, to match the level of support provided to municipalities, or directly finance new land acquisition by public providers.

Densification measures

The existing housing stock mainly consists of single-family houses (50.7% in 2017), followed by apartments (35%) and semi-residential, mixed-use buildings (14.3%), revealing the preference for low-density housing (STATEC, 2017a). Although the share of single-family houses in new construction has been gradually declining (Figure 1.13), the surface area of single-family houses is actually increasing. The existing housing stock is characterised by a high number of rooms per member of household, in particular in the sector of owner-occupied housing (Figure 1.14). This abundance of space further indicates the room for densification in most areas.

Figure 1.13. New construction is shifting towards apartment buildings

Share by type



Source: STATEC.

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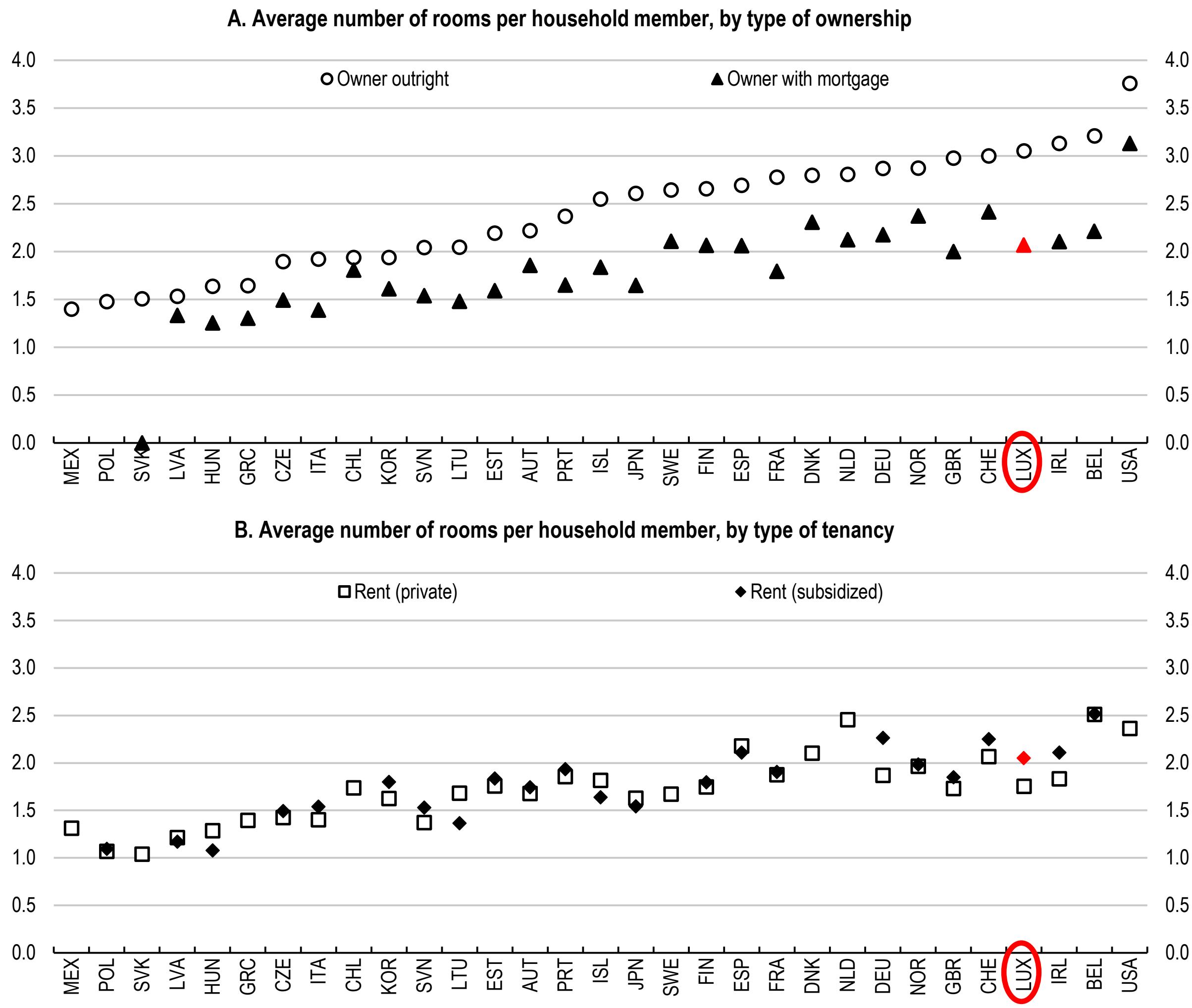
The environmental and social benefits of more compact urban development ought to be balanced against the potential cost of densification such as overcrowding and smaller living spaces. Although the subjective level of noise and pollution reported by inhabitants in

Luxembourg is one of the highest in Europe (Figure 1.15), the density, even in the largely urbanised outskirts of Luxembourg City, is still moderate.

Figure 1.14. Average number of rooms per household is high for all tenures

2016 or latest year available



Note: Limits to comparability across countries exist due to the definition of rooms.
Source: Preliminary data from the OECD Affordable Housing Database.

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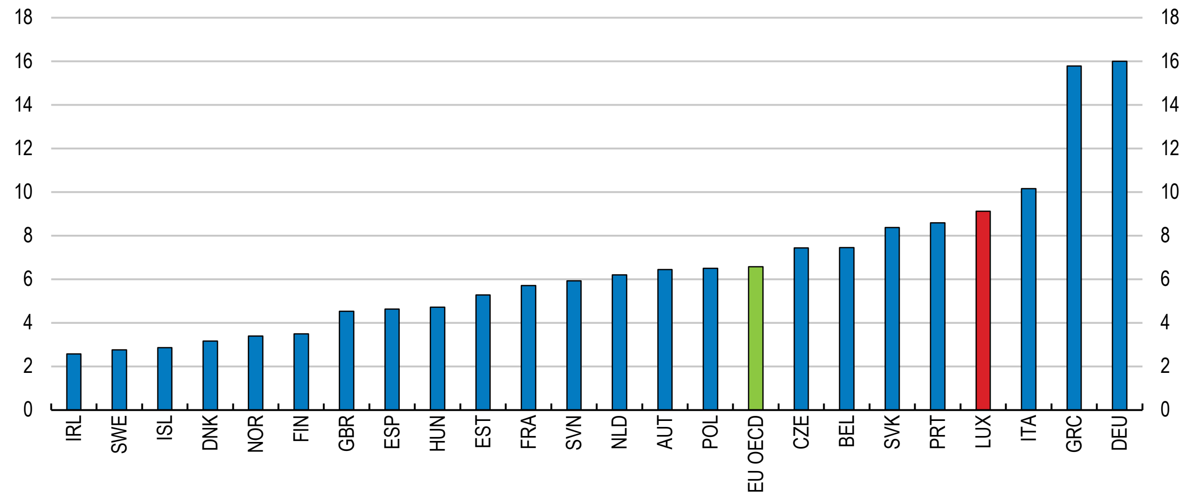
More than 30% of the urban population in Luxembourg in 2014 resided in areas of very low population density, defined as a density of 150-1 500 per km^2, which is the highest value among 29 OECD countries (Figure 1.16). While the only functional urban area in Luxembourg, according to the OECD definition, covers 82% of the country's surface, it is considerably more decentralised, resulting in population density some 28% below the OECD average for functional urban areas (OECD, 2018a). These indicators suggest that urban sprawl is a problem in Luxembourg and call for a densification policy as well as limits on the conversion of dwellings into offices in order to guarantee a desirable functional mix.

Figure 1.15. Perceived noise and pollution levels are high

Percentage of households reporting neighbourhood noise and pollution, 2012



Note: EU OECD refers to European OECD countries.
Source: Salvi del Pero, A. et al. (2016), "Policies to promote access to good-quality affordable housing in OECD countries", OECD Social, Employment and Migration Working Papers, No. 176.

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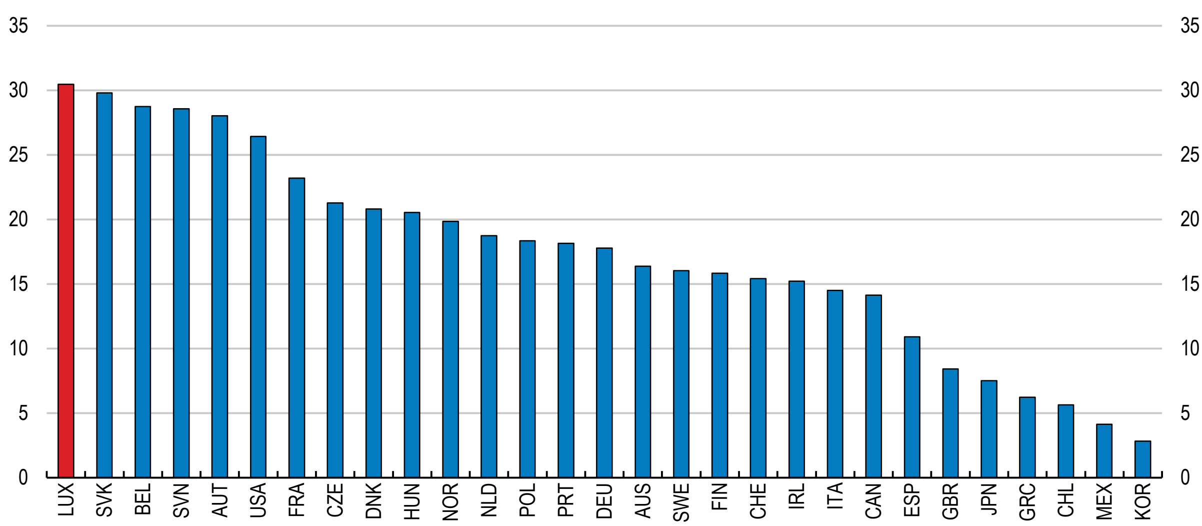
Figure 1.16. Urban sprawl is high

Percentage of urban population living in areas with a density of 150-1 500 people per km², 2014



Source: OECD (2018), Rethinking Urban Sprawl.

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To encourage the use of public transport, the densification of the existing urban and suburban space must be concentrated within the immediate vicinity of transport network hubs, in particular railway stations. In that way, densification could lead to shorter trips and encourage alternative means of travel, which tends to be more competitive with car travel over short distances. Empirical evidence shows that the propensity to use public transport (modal split) is very sensitive to the density of urban fabric determining the average travel distance and to the availability of public transport (OECD, 2007).

Recent sustainable mobility strategy emphasises both the multimodal and cross-border dimension and plans to double the number of park and ride facilities, including at the borders, by 2025 (Ministère du Développement durable et des Infrastructures, 2018). The strategy is welcome and should include coherent policy for automobile parking in the cities and control over the flow of automobiles, such as congestion charges. As the main transportation flows involve cross-border travel, infrastructure projects will have to be prepared with support and participation of the neighbouring regions and will require close involvement of border municipalities, public and private providers of rail and road transport.

To overcome existing municipal resistance to densification, the Housing Pact targets could be extended to include additional objective criteria, such as numerical targets for social housing construction for municipalities and more frequent use of the Special Zoning Plans (POS). Municipalities in the U.S. and Canada often deal with the opposition from existing homeowners by "density bonusing" that allows developers to build above a zone's density of height restrictions in exchange for cash contributions towards various social amenities or transit improvements (Cheung, 2014).

Making the access to housing more equitable

This section looks at policies to make homeownership equally attractive as other forms of providing housing services, the so-called tenure neutrality, and ensure more equal access to housing. Tax stimulation of homeownership tends to be regressive and can lead to overinvestment in housing and stoke housing prices growth. Lower affordability associated with house price increases can be addressed by a well-functioning rental market, both public and private.

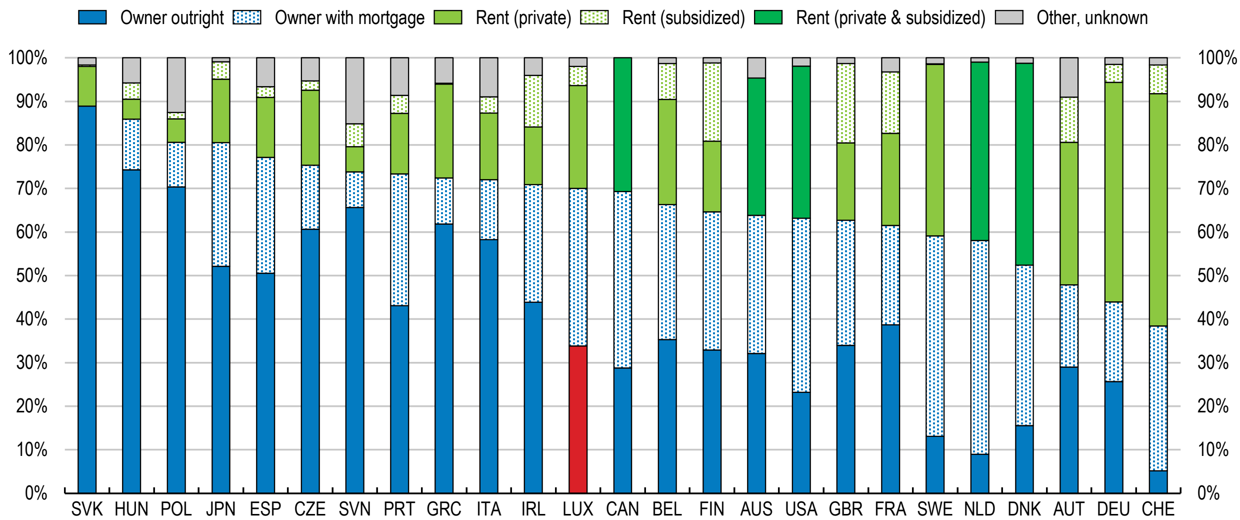
Tax preference for homeownership

At 73.8%, the rate of home ownership is higher than the euro area average and the rates in neighbouring countries. Meanwhile, the private rental market is more than five times the size of the social rental sector (Figure 1.17).

The tax system favours homeownership compared to other housing tenures, such as renting. Although tax neutrality with respect to other assets is difficult to achieve and tax systems in many OECD countries are biased towards owner-occupied housing, the tax subsidy in Luxembourg is particularly large. Imputed rents are not taxed, homeowners may reduce their income tax obligation by mortgage interest (up to a generous ceiling increased in 2017), enjoy other tax credits on transaction costs related to real estate purchases and the construction works related to primary residence are taxed at the super-reduced VAT rate of 3%. Moreover, the contributions to housing saving schemes are tax deductible for savers below the age of 40 and a reduced tax rate has been applied on capital gains from the sale of land and buildings between July 2016 and December 2018 (Box 1.3).

Figure 1.17. Housing tenure is dominated by homeownership

Share of households in different tenure types, percentage, 2016 or latest year available



Note: Tenants renting at subsidized rent are lumped together with tenants renting at private rent in Australia, Canada, Denmark, Mexico, the Netherlands and the United States, and are not capturing the full extent of coverage in Sweden due to data limitations. Data for Japan only available on the respondent level due to data limitations.

Source: OECD Affordable Housing database.

StatLink https://doi.org/10.1787/888933952045

Box 1.3. Tax measures and other demand subsides promoting homeownership

Tax deductibility of mortgage interest covers interest expenses on primary residence located in Luxembourg or abroad (interest expenses on a secondary residence are not deductible). The annual amounts were increased by the 2017 tax reform (from 1.500 euro for the first six years of occupancy to 2.000 euro).

The super-reduced VAT rate on housing of 3% is applied on the construction or renovation of the main residence, either by direct application or by reimbursement, up to the ceiling of 50.000 euro.

Tax credit on fees associated with notarial deeds (Bëllegen Akt) applies to the registration and transcription fees for acquisition of main residence, which amount to some 7% of the value of the land and buildings. The tax credit is capped at 20.000 euro per person, but can be doubled in the case of purchase by a couple.

Acquisition premium and construction premium depend on income, family situation and the type of housing bought and range from 250 to 9.700 euro.

Interest subsidy is calculated according to family status and taxable income, ranging from 0.58% to 2.45%, with the aim of reducing the payments burden on low-income households.

Bonification of interest provides a 0.5% reduction on interest payments per dependent child to families with mortgage. This interest subsidy paid by the state to the mortgage holder cannot exceed the effective rate of the mortgage loan or the maximum rate of 3.45%.

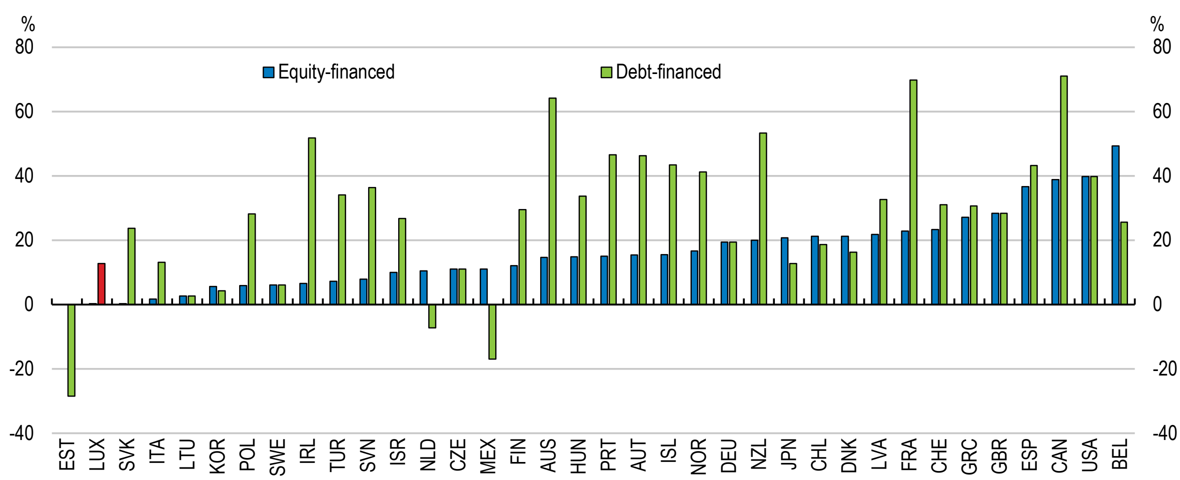
Housing saving schemes contributions are tax deductible. Taxpayers below 40 profit from a doubled tax deductible limit for contributions paid under the housing savings schemes.

Moreover, a reduced tax rate, at ¼ of the full rate, has been applied to capital gains from the sale of land and buildings between July 2016 and December 2018. There are also various subsidies for enhancing energy efficiency, premium for refurbishing of old dwellings, assistance covering partly the costs of an architect and engineer and a possibility for the state to guarantee the housing loan of a private person (Ministère du logement, 2018).

Marginal effective tax rates (METRs) on owner-occupied residential property, financed by both equity and debt, are among the lowest in the OECD (Figure 1.18). The METRs are calculated as the difference between the pre- and post-tax rates of return on a marginal investment divided by the pre-tax rate of return on that investment. Marginal effective tax rate on owner-occupied housing is typically lower than on other assets, since imputed rents are not taxed and interest payments are deductible in many countries.

Figure 1.18. Marginal effective tax rates on owner-occupied residential property are low

Personal tax rate at 100% of average wage, actual inflation, 2016



Source: OECD (2018), Taxation of Household Savings.

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Equity considerations cannot really justify the favourable tax treatment of owner-occupied housing, which is unlikely to benefit low-income households the most. This is particularly true for the deductibility of mortgage interest, which is generally regressive, as high-income households are much more likely to finance their house with mortgage debt (Fatica and Prammer, 2018). In addition, and similarly to other demand subsidies, in the presence of supply restrictions, the tax relief could be capitalised in house prices, redistributing income from new entrants in the housing market to insiders (Andrews, Caldera Sánchez and Johansson, 2011).

Housing should be taxed similarly to other investment. The first best would be to tax imputed rental income, less depreciation allowances, while allowing for interest rate deductibility (Andrews, Caldera Sánchez and Johansson, 2011). However, in Luxembourg as in many OECD countries, imputed rents are not taxed and owner-occupied housing is highly tax-favoured compared to other forms of household savings, with the exception of retirement plans (OECD, 2018b).

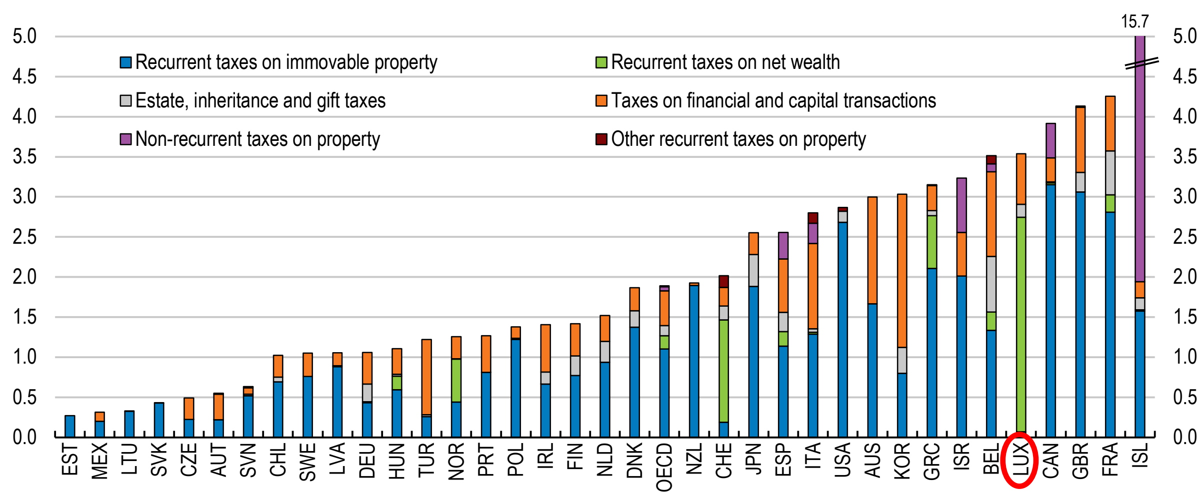
Taxation of owner-occupied property should become less regressive by gradually phasing out mortgage interest rate deductibility. If removing mortgage interest rate deductibility is not an option, the rebate could be granted as a capped tax credit, rather than a tax deduction.

More progressivity could also be achieved by introducing a recurrent progressive tax schedule to the owner or by allowing deferral of the recurrent tax on immovable property until the death of the taxpayer or sale of the property for older taxpayers. For example, in France, the largest recurrent tax on immovable property (*taxe d'habitation*), before its gradual phasing out, has become progressive since 2000 thanks to income and family-related tax relief.

Luxembourg is one of the few OECD countries that applies recurrent taxes on net wealth of corporations, which generate more than 2% of GDP in tax revenues (Figure 1.19). Well-designed capital income taxes at the individual level combined with inheritance taxes are in principle preferable to net wealth taxes (OECD, 2018c). In combination with higher recurrent taxes on private immovable property, they could be used to increase both efficiency and equity.

Figure 1.19. Taxes on property consist mainly of net wealth taxes

Revenues as a percentage of GDP, 2016



Source: OECD Global Revenue Statistics Database.

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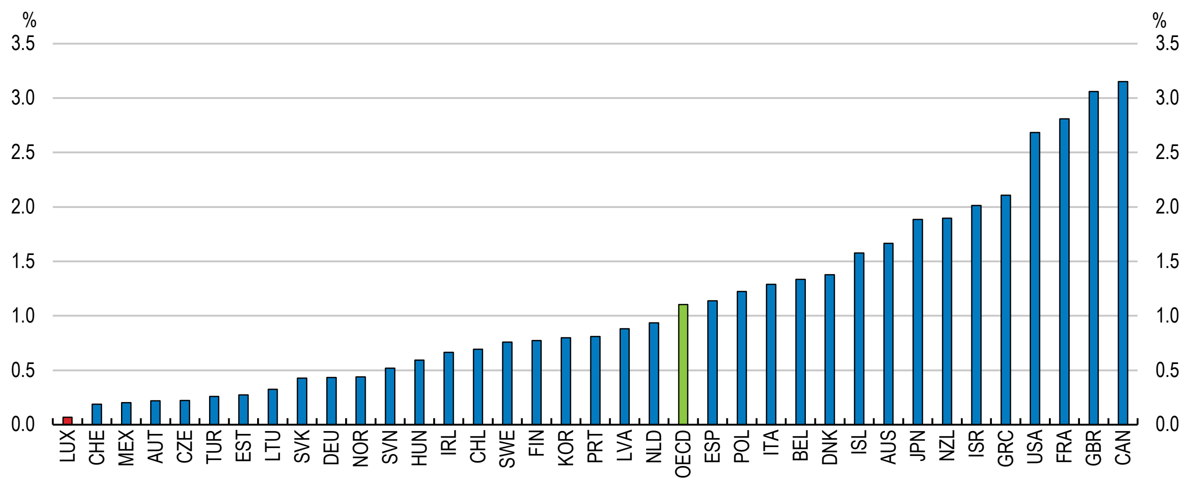
Recurrent taxes on immovable property are low, partly because the tax rates are applied to obsolete valuations that are far below the current market level (Figure 1.20). The main recurrent tax on immovable property in Luxembourg is the property tax (*impôt foncier*). It is a fiscal revenue of the municipalities, who are free to set the tax rate in a wide range, but it represents only a small fraction of municipal revenues that are dominated by revenues from the municipal business tax (*impôt commercial communal*) and transfers from the intra-municipal equalisation mechanism.

Given the soaring prices of land and real estate in Luxembourg, the land value tax, and more broadly recurrent immovable property taxation (*impôt foncier*), should be used as a more important fiscal resource and an indirect tool of territorial development. The municipalities, in search of tax revenue, would take care to maximise land rent by making good public decisions. Appropriate differentiation between tax rates for built and non-built areas could encourage or discourage construction as necessary and help achieving the key objectives of balanced spatial planning (OECD, 2007). In expanding the tax base, a land-value tax, which targets the price of land rather than the value of constructions built on it, could also be considered, because the valuation of land generally reflects the demand for a location, which depends on quality, which in turn is closely related to public infrastructure and the supply of community services.

Figure 1.20. Recurrent immovable property taxes are low

Share of recurrent immovable property tax revenue in GDP, 2016



Source: OECD Global Revenue Statistics Database.

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Given the soaring prices of land and real estate in Luxembourg, the land value tax, and more broadly recurrent immovable property taxation (*impôt foncier*), should be used as a more important fiscal resource and an indirect tool of territorial development. The municipalities, in search of tax revenue, would take care to maximise land rent by making good public decisions. Appropriate differentiation between tax rates for built and non-built areas could encourage or discourage construction as necessary and help achieving the key objectives of balanced spatial planning (OECD, 2007). In expanding the tax base, a land-value tax, which targets the price of land rather than the value of constructions built on it, could also be considered, because the valuation of land generally reflects the demand for a location, which depends on quality, which in turn is closely related to public infrastructure and the supply of community services.

Such a reform of the property tax would release additional fiscal resources to municipalities, allowing them to capture part of the value associated with soaring land prices. While making users pay the real value of services, it would improve the efficiency of public goods and services provision and the quality of territorial development, while helping to release unused land for construction that is currently taxed at low rates and kept mainly for the purposes of speculation.

Any increases in recurrent taxes on immovable property need to be accompanied by regular updating of property values, if needed in combination with special arrangements for households with low incomes and less liquid assets. For instance, Denmark has recently introduced a new system for housing valuation, which involves proportional taxation, while maintaining a progressive element for the most valuable homes (OECD, 2019a).

Housing is the largest source of household's wealth and hence a fundamental driver of wealth accumulation and inequality dynamics. Luxembourg is close to the OECD average in terms of both the main residence ownership and wealth inequalities (Claveres et al., 2019 and Box 1.4). However, ownership of other real estate property, such as holiday homes, rental homes, land or office space rented to business, is above the euro area average (Ziegelmeyer, 2015) and strongly concentrated in the top 10% of the net wealth distribution (Figure 1.21). As in many other OECD countries, second residences form an increasing share of the gross wealth of those with higher net wealth levels. This suggests that, from the equity perspective, the taxation of second homes is likely to be progressive with respect to income and should be higher than the taxation of the principal residence (OECD, 2018b).

Box 1.4. Housing and inequality in Luxembourg and the Greater Region

Across OECD countries, housing is the main asset in households' portfolios and thus a main driver of the wealth distribution. Indeed, higher wealth inequality is generally associated with a lower rate of homeownership. While Luxembourg displays levels of both homeownership and wealth inequality close to the OECD average, there is a larger difference between homeownership rates in the top and bottom income quintiles. In the top income quintile, 86% of households are homeowners, while the OECD average is 85%. In the bottom income quintile, some 38% of households are homeowners, compared to the OECD average of 50%.

Housing is an especially important asset for households in the middle income and wealth quintiles. In Luxembourg, housing net wealth represents 62% of the total wealth of households in the middle net wealth quintile. However, housing is much less prominent at the top of the wealth distribution: the share of housing in the portfolios of households in the top percentile of the wealth distribution is 18%, well below the OECD average.

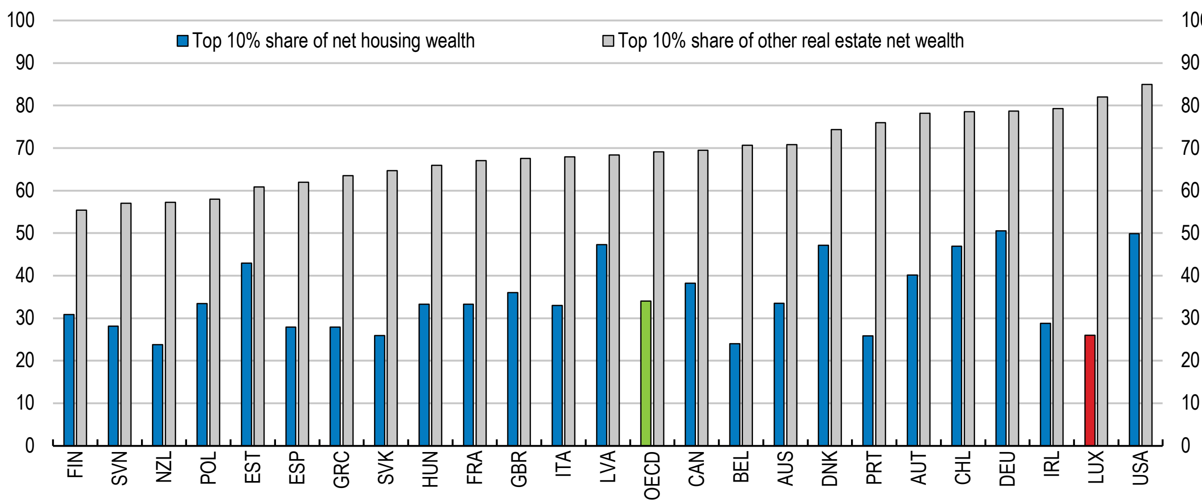
Participation in the mortgage market in Luxembourg is high. On aggregate, 29% of households have a mortgage on their main residence, compared to 17% in Germany, 19% in France and the OECD average of 25%. Moreover, the access to mortgage is better in the middle of the income distribution. Unlike in most OECD countries, in Luxembourg households in the middle income quintile are almost as likely to have a mortgage as those in the top income quintile. Middle income quintile households are 2.1 times more likely to have a mortgage than in France and 2.6 times more likely than in Germany.

Cross-border workers account for more than 40% of total employment. It is thus important to compare housing choices and housing wealth between residents and cross-border workers, two groups that access the same labour market, but choose, possibly driven by differences in housing prices, as well as by varying tax treatment and rental market regulation, to access separate housing markets. Among cross-border workers, the homeownership rate, mainly due to the gross income difference, is higher than in the respective national samples, by some 15 percentage points (p.p.) for Germany and France and by 3 p.p. for Belgium. Cross-border households also tend to become homeowners at a younger age than their respective national counterparts. Among residents in Luxembourg, the overall homeownership rate of 65% masks a marked difference between native-born households (80%) and foreign-born households (50%).

Resident and cross-border employed households differ substantially in both levels and distribution of wealth. The median net wealth of employed households residing in Luxembourg is significantly higher than that of cross-border commuters from Belgium, France and Germany. This difference in net wealth is largely driven by higher values of main residences in Luxembourg; indeed, the real estate price data reveals a significant price discontinuity at the Luxembourg border. Furthermore, in France and Germany the median net wealth of commuters is significantly higher than that of their national counterparts. The wealth gaps between homeowners and renters, although present in all countries studied, are more pronounced in Luxembourg.

Figure 1.21. Other real estate is predominantly owned by top 10%

Top 10% share of net housing wealth and of other real estate wealth, percentage



Note: The figure shows the share of net housing /net other real estate wealth held by households at the top of the net wealth distribution. Other real estate property includes second residences (holiday homes), rental homes, land and other real estate held for investment purposes.
Source: OECD Wealth Distribution Database.

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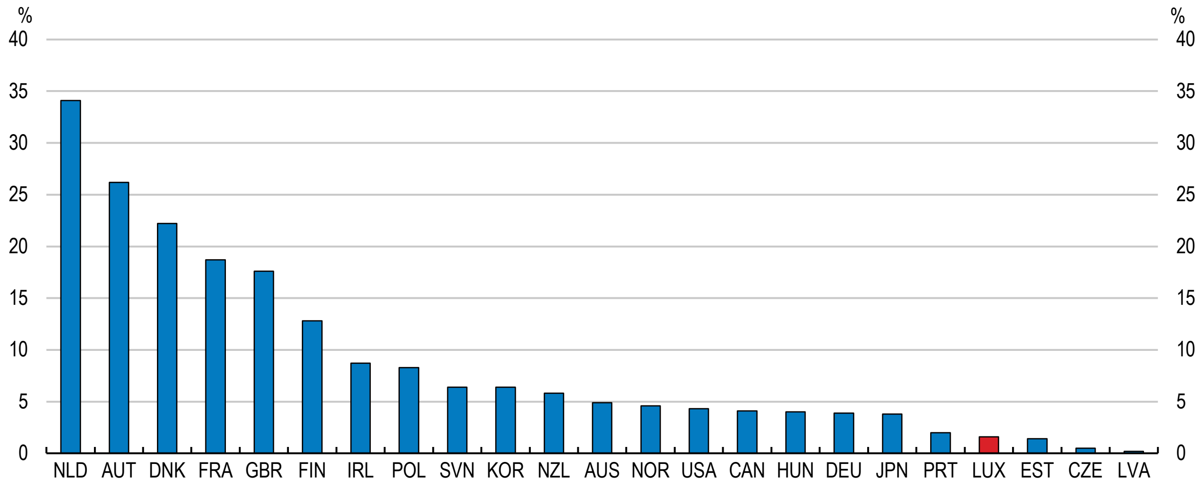
Measures to expand the stock of social housing

The stock of social housing is one of the lowest in the OECD (Figure 1.22). The limited stock partly reflects the preference of public providers who used to allocate about one third of constructed units to renting and two thirds for sale (Ministère du logement, 2018) and the past practice of allowing re-sale of subsidised housing on the unregulated market (European Social Housing Observatory, 2007). However, efforts to increase the share of social rental housing are underway. Since 2017, the sale of social housing has taken the form of a long-term lease. This policy is welcome, as it effectively captures the value of developed land, which remains a property of the public housing providers.

Although the stock of unoccupied housing is not particularly high by the OECD standards, it is higher than in other small countries facing housing supply limitations, such as Switzerland and the Netherlands (Figure 1.23).

Figure 1.22. Social rental housing stock is low

Number of social rental dwellings as a share of the total number of dwellings, latest year available



Note: Data refer to 2011 for Canada, Hungary, Ireland, and Luxemburg; 2012 for Germany; 2013 for Denmark, Estonia, Japan and Poland; 2014 for Australia, Austria, France, Norway and the United Kingdom; 2015 for the Czech Republic, Finland, Korea, Latvia, the Netherlands, New Zealand, Portugal, Slovenia and the United States.
Source: OECD Affordable Housing Database.

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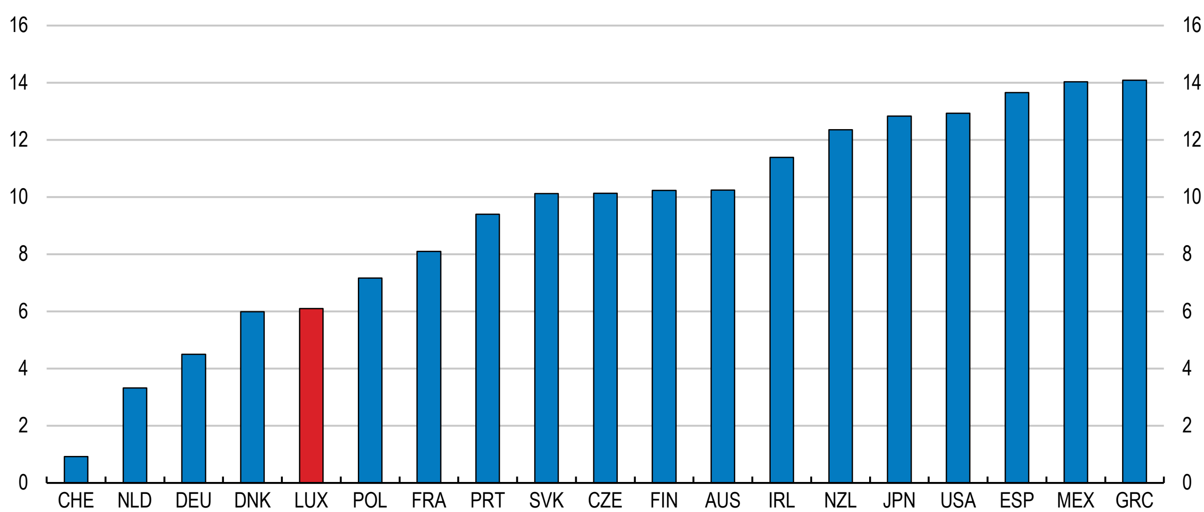
Figure 1.23. The stock of vacant dwellings could be reduced further

Percentage of vacant dwellings, out of the total dwelling stock, latest year available



Note: For Luxembourg, the number of vacant dwellings is adjusted for dwellings mobilised by the social rental agencies. Data refer to 2010 for Mexico; 2011 for Australia, the Czech Republic, Germany, Greece, Luxembourg, Poland, the Slovak Republic, and Spain; 2013 for Ireland, Japan and New Zealand; 2014 for France and Switzerland; 2015 for Denmark, Finland, the Netherlands, Portugal and the United States.
Source: OECD Affordable Housing Database and Eurostat Census Hub, Census 2011.

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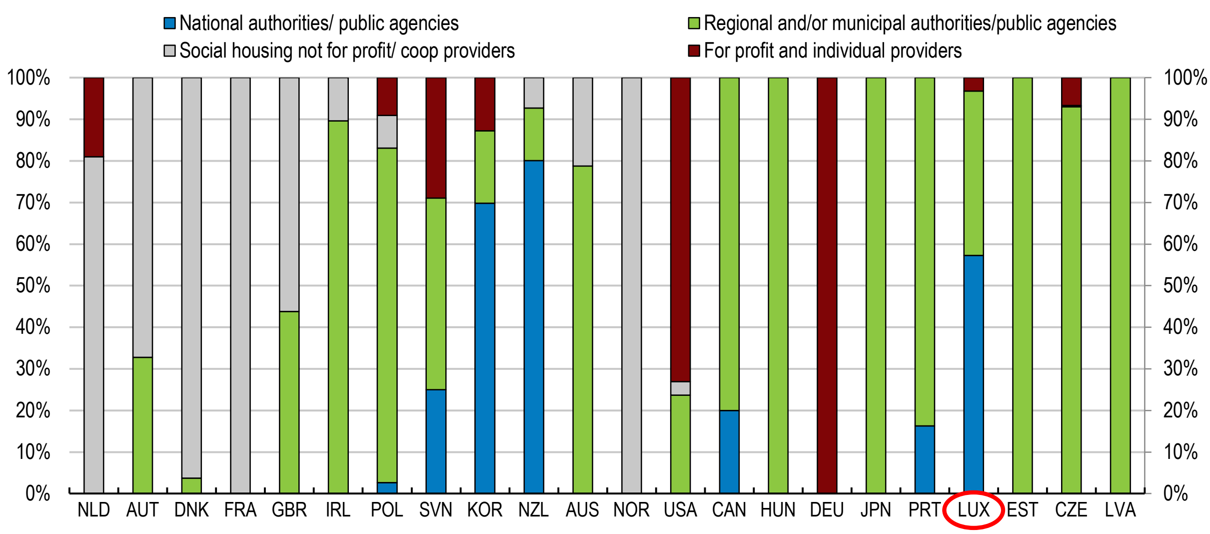
Social rental agencies can mobilise unoccupied housing stock and alleviate the lack of social housing by improving private rental access for low-income households (Salvi del

Pero et al., 2016). For example, in Italy, special contracts between tenants and property owners (*contratti convenzionati*) allow for below-market rents and longer duration than standard private rental contracts, in exchange for rental income tax relief. In Ireland, property owners renting to tenants supported by housing assistance can claim full tax relief on their mortgage interest since 2018.

Social rental housing in Luxembourg is provided mainly by national and municipal public agencies (Figure 1.24). The Social Housing Agency (*Agence Immobilière Sociale*, AIS) and other social rental agencies act as intermediaries between private property owners and vulnerable tenants providing guarantees of rent payments and maintenance costs to the property owners and support services to tenants. For example, the Social Housing Agency targets households that may not qualify for social housing or are on the long waiting lists and in co-operation with social services drafts a personal and professional development plan of the tenant, aiming at achieving sufficient financial autonomy to enter the private rental market after three years, the fixed and non-expandable length of the Social Housing Agency contract.

Figure 1.24. Providers of social rental housing are mainly public bodies

Share of total social rental housing stock by type of providers, 2015 or latest year available



Note: There is no social rental housing in Chile, Greece, Mexico, Sweden and Turkey. Information is missing for Belgium, Finland, Iceland, Israel, Italy, Lithuania, the Slovak Republic, Spain and Switzerland. Data refer to 2011 for Canada, Hungary, Ireland, Luxemburg and Malta; 2012 for Germany; 2013 for Denmark, Estonia, Japan and Poland; 2014 for Australia, Austria, France, Norway and the United Kingdom.
Source: OECD Affordable Housing Database.

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The Ministry of Housing subsidises part of the management cost of social rental agencies, up to 100 euro per month and dwelling, while setting the maximum rent that social rental agencies may charge. Property owners who rent their unoccupied housing unit through a social rental agency have 50% of the ensuing rental income exempted from personal income tax.

The financial support for social rental agencies should be stepped up. Although the Social Housing Agency has started by managing the stock of unused state-owned service dwellings, the tax advantage and the guarantees provided by the social rental agencies are slowly expanding the supply (Ministère du logement, 2018).

The municipalities could contribute to the mobilisation of unoccupied dwellings by providing social rental agencies with up-to-date information. As property owners are required by law to declare unoccupied housing within a fixed period to the municipal administration, including the size of the unoccupied area, the number of rooms and the last rent, the municipalities could use this information to set up a real-time database of unoccupied dwellings (Conseil économique et social, 2018).

To expand the supply of social housing, the State could also directly finance purchases of land available for residential construction using the government budget. Evidence from countries and metropolitan areas suffering from affordable housing shortages suggests that building on state-owned land could help alleviate the situation (van Veen, 2005; Lawson, 2009). Newly acquired land should remain in public ownership and made available for social housing construction, for example by the Housing Fund and the SNHBM, through long-term lease. The new government's Coalition Agreement envisages to set up a committee for the acquisition of housing land and to finance its acquisitions through a new dedicated fund, financed by the state budget, which is welcome. The recent re-focussing of public providers on the provision of social rental housing, rather than social housing for sale, would help reinforce such policy.

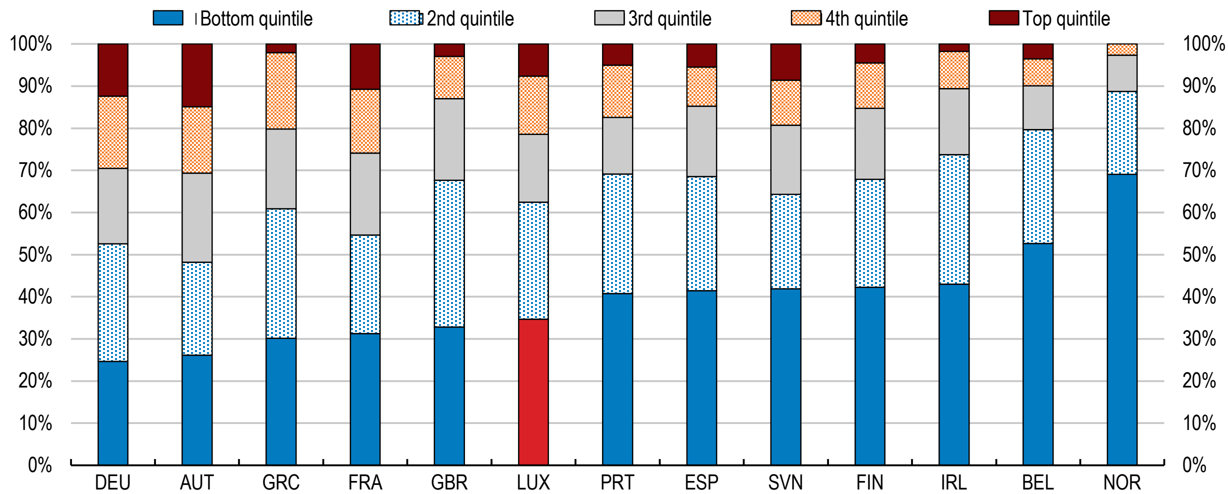
Social housing should be targeted to those most in need

The provision of social housing is insufficiently targeted and does not appear to protect the low-income households from the shortage of affordable housing and socio-economic segregation. Waiting lists of public social housing providers are long and turnover low. While rents in the protected sector are on average 30% below market rents (Ministère du logement, 2018), the admission criteria are flexible, at the cost of lower transparency, and the waiting times may vary considerably, due to the discretion in matching households' specific needs. Consequently, the equity of access to social housing may not be warranted.

More than 20% of the subsidised housing tenants came from the two highest income quintiles in 2014, compared to about 10% in the best performing OECD countries (Figure 1.25). The presence of households in the highest quintiles of the income distribution among subsidised housing tenants reflects the fact that tenants whose income conditions improve are charged higher rent, following the annual check of their income situation, but are not asked to leave the subsidised accommodation. However, as the stock of subsidised housing is limited, tenants whose situation has improved ought to move to other forms of housing, especially if they are better off than those on the waiting lists.

Figure 1.25. Subsidised rental housing tenants include many high earners

Percentage of households in social rental housing by income quintile, 2014



Note: Subsidised rental housing covers all housing rented at below-market-rate, including social rental housing, employer-provided housing and housing where rent levels are fixed by law.
Source: OECD calculations based on OECD Affordable Housing Database.

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While potential hardship associated with increased flows and turnover of tenants, including relocation costs and potential disincentives for economic advancement, needs to be acknowledged and possibly mitigated, the existing tenants are in better position to face them than the social housing candidates on waiting lists. Rents in the social housing sector should also increase more steeply with income to encourage the recipients of social housing in higher income quintiles to switch to the private rental sector, and hence vacate the social housing in favour of those who need it most.

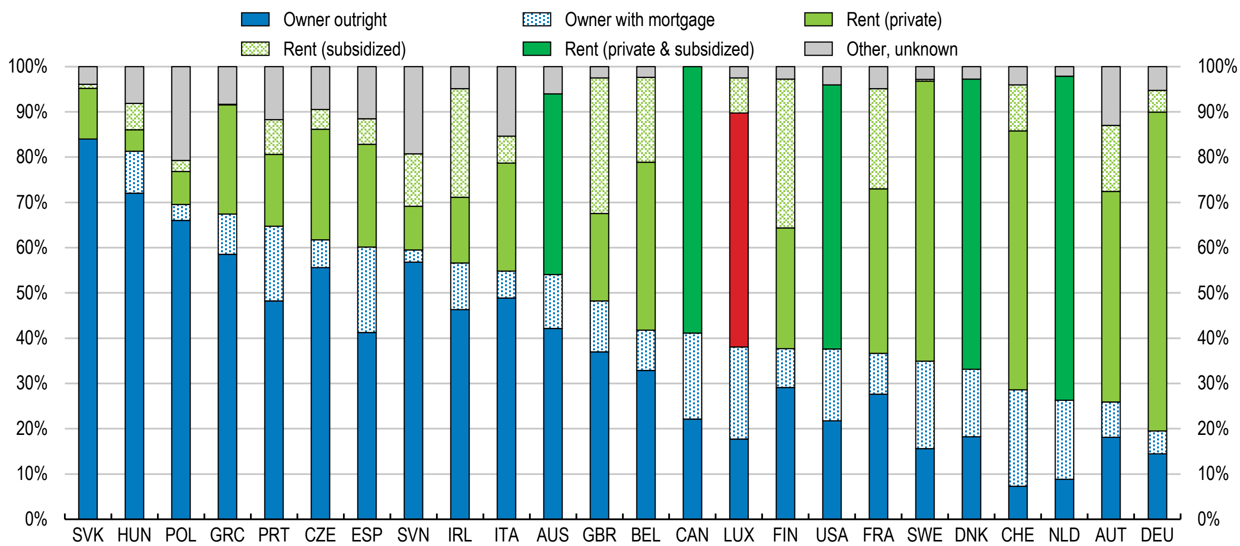
The rents in the social housing sector are cost-based and their price increases are capped at the country level. As a result, the price differences between the social and private rental housing, on average some 30%, are higher in the most densely populated areas, such as Luxembourg City and Esch-sur-Alzette, but much lower in the less-populated North region.

Affordable private rental sector

The policies stimulating homeownership can have important effects on the investment decisions, which well-functioning rental markets may partly mitigate. In Luxembourg, the private rental market provides housing to many low-income households, who are disproportionately represented compared to other OECD countries (Figure 1.26).

Figure 1.26. Many low-income households rely on the private rental sector

Share of different tenure types across households in the bottom quintile of the income distribution, percentage 2016 or the latest year available



Note: Tenants renting at subsidized rent are lumped together with tenants renting at private rent in Australia, Canada, Chile, Denmark, Mexico, the Netherlands and the United States, and are not capturing the full extent of coverage in Sweden due to data limitations.
Source: Preliminary data from the OECD Affordable Housing database.

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Conversion of existing owner-occupied dwellings to rental dwellings is a fast way to increase the private rental supply, and if the rules for conversion or temporary renting of owner-occupied housing are relaxed, it may help adapt the housing stock to changing market circumstances. Transaction taxes can also form a barrier for investments in the private rental sector. Earlier OECD research recommended lowering of high transaction taxes, and replacing these by increasing taxation on ownership (Boulhol, 2011).

The recipients of many homeownership subsidies (prime de construction, prime d'acquisition, interest subsidy and interest bonification), are not allowed to rent out part of their dwelling, unless the tenant is enrolled as post-secondary student in Luxembourg. Similarly, a homeowner profiting from a tax credit on notarial deeds (Bëllegen Akt) cannot rent out the dwelling for two years. These rules on partial rental could be relaxed, to improve access to the private rental sector for vulnerable groups of tenants, such as interns and employees on fixed term contracts, and to provide low-income homeowners with additional income. In addition, the tax treatment of the net income of owner-occupiers from the rental at home could be made more favourable, as is the case with the existing tax exemption on rental income from social rental management companies (Mellouet, 2018).

In addition to tax measures, demand subsidies, such as housing allowance, can also be used in strengthening an affordable private rental sector. Housing allowances can have fewer distortion effects on residential mobility than social housing and do not stoke the spatial mismatch. Subsidies may also improve equity in access, if designed as entitlements, as they can be more easily withdrawn from households that become no longer eligible for them.

However, housing allowances do not automatically guarantee quality standards and security of tenure, which may require additional instruments, such as tenancy law or social rental agencies. In addition, housing allowances may not effectively address the issue of housing affordability, as they might be captured by rental prices. This problem occurs when allowances are based on actual rents and especially in a presence of housing supply restrictions (André, 2010). The capture rate is estimated at around 16% in the U.S., but much higher in the U. K. and France, where it is estimated at 50% and 78%, respectively (Gibbons and Manning, 2006; Fack, 2006). For example, France has recently decided to decrease progressively the housing allowances by 2020.

In general, housing support in Luxembourg should be better targeted, as less than 10% of total public support related to rental and owner-occupied housing is clearly earmarked based on socio-economic or environmental criteria (Mellouet, 2018). For example, housing allowances in Luxembourg do not include any spatial differentiation, such as coupling the allowance to local reference rents, as in Germany. However, considering the heterogeneity of housing and rental prices in Luxembourg, this may be useful in making them more effective (de Boer and Bitetti, 2014).

Box 1.5. Recommendations

Recommendations to reduce land hoarding and improve the co-operation between government and municipalities

Key recommendations:

- Increase the opportunity cost of unused land by reforming recurrent taxes on immovable property. One option is to increase land value taxes on land zoned for construction.
- Make part of government financing of municipalities conditional on municipalities penalising landowners and developers for non-use of building permits.
- Increase residential density, in particular around transport network hubs, namely by building higher buildings.

Additional recommendations:

- Establish a housing observatory at the level of the Greater Region, collecting and analysing territorial and cross-border data on housing.
- To ensure effective co-operation by all stakeholders, the central government should introduce binding spatial planning instruments and explore the use of binding targets in spatial planning.

Recommendations to increase housing tenure neutrality

Key recommendations:

- Make owner-occupied property taxes more progressive, for example by phasing out or at least reducing mortgage interest deductibility.
- Turn recurrent taxes on immovable property (impôt foncier) into a more important fiscal resource and an indirect tool of territorial development, e.g. by regularly aligning the tax base with the market price of the property.

Additional recommendations:

- Abolish the resort to temporary tax exemptions of capital gains on home sales as a policy instrument.
- Make taxation of unoccupied dwellings in Luxembourg progressive with respect to income and higher than the taxation of main residences.

Recommendations to improve the supply of social and private rental housing

Key recommendations:

- To increase the stock of social rental housing while preserving social mixity, directly finance new land acquisition by public providers of social housing.
- Use recurrent means testing to better target the provision of social housing.
- Link housing allowances and rents in the social housing sector to reference rents at the local level.

Additional recommendations:

- Increase financial support for social rental management agencies, while municipalities provide access to an up-to-date database of unoccupied dwellings.
- Introduce numerical targets for social housing construction in each municipality.
- Make public providers of social housing focus on rental housing, rather than social housing for sale.
- Relax the rules on partial rental and conversion of existing dwellings into rental housing and consider a tax exemption or tax credit on partial rental income.

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