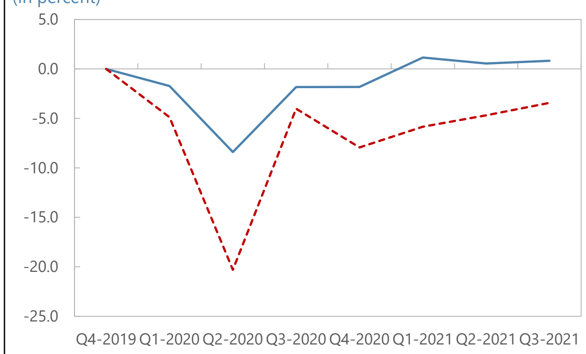
CONTEXT

1. Structural features of the economy and unprecedented policy support cushioned the pandemic's impact in 2020 and set the economy for a strong recovery in 2021. The economy has benefited from the global stimulus and accelerated digitalization. Real GDP surpassed the pre-pandemic trend by early 2021, and the labor market recovered rapidly. Although private consumption has grown steadily, households continued to accumulate excess savings, pressuring housing prices. However, the recovery has faced challenges from supply bottlenecks, labor shortages, rising inflation, and reduced confidence due to Omicron. While the financial sector weathered the pandemic well, pre-pandemic vulnerabilities have increased, notably stretched asset prices that could prompt abrupt corrections.

GDP, Private Consumption Deviation from 2015-19 Trends
(In percent)



Sources: Haver and IMF staff calculations

2. The war in Ukraine and high inflation have increased uncertainty and are posing new risks. While direct economic links with Russia and Ukraine are low and concentrated in a small number of entities, Luxembourg's economy has been affected through global spillovers, including lower growth. Inflation reached record highs in 2022Q1 and confidence dropped. Financial market volatility increased amid faster monetary policy tightening in many advanced and emerging economies, with some effects on financial sector performance. In March, the government announced a fiscal package to protect purchasing power and support affected firms, while facilitating the green transition.

3. The green and digital transitions create opportunities and challenges. Luxembourg has positioned itself well as a sustainable finance hub and has set ambitious targets for greenhouse gas (GHG) emission reductions. The country is also well-placed to take advantage of digitalization, with a highly-educated labor force and large planned investment in digital infrastructure and innovation. However, the green and digital transitions pose financial sector and fiscal challenges. They could also increase job polarization, wage inequality, skills mismatches, and housing affordability problems, with implications for Luxembourg's attractiveness for workers.

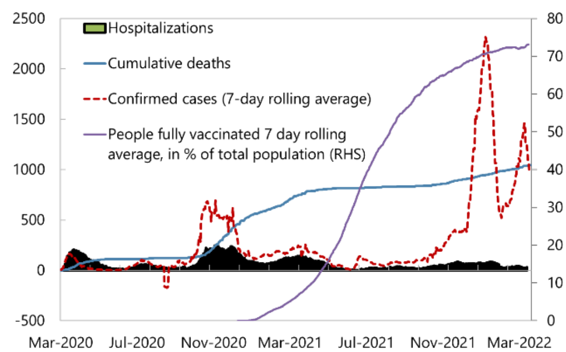
Inequality and Poverty Indicators
(In percent)

Sources: Eurostat

RECENT DEVELOPMENTS: CONTINUED RECOVERY AMIDST SIGNIFICANT HEADWINDS

4. **The health situation has gradually improved with a swift vaccination rollout.** With about 73 percent of the population having received at least two doses of the vaccine by end-March, hospitalization and mortality rates have remained relatively low despite recent increases in cases.

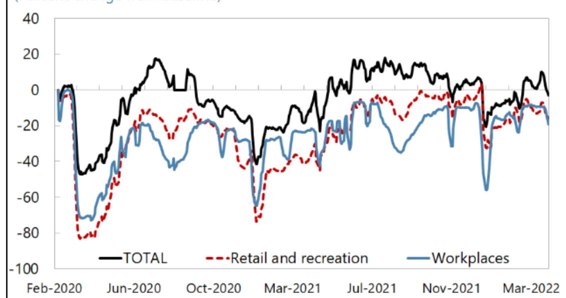
COVID Cases



Sources: Our World in Data; and IMF staff calculations.

Mobility

(Percent change from baseline)

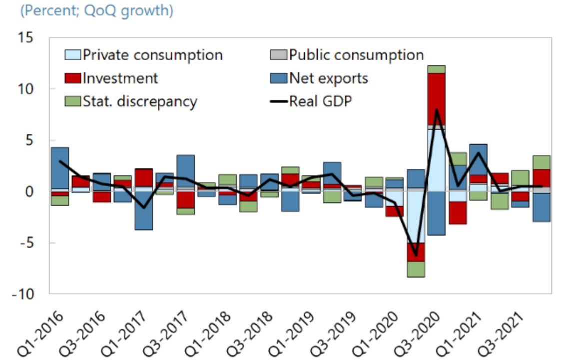


Sources: Google Mobility Report; and IMF staff calculations.
Notes: The baseline is the median value, for the corresponding day of the week, during the 5-week period Jan 3–Feb 6, 2020.

5. **Luxembourg recorded one the fastest recoveries in the euro area, but the economy is now facing significant headwinds.** GDP surpassed its pre-pandemic trend in 2021Q1 and grew by 6.9 percent in 2021, buoyed by an exceptional performance in services exports and rebounding domestic demand (Table 1). Private consumption has steadily increased, and private investment has grown. Yet, the savings rate remained above pre-pandemic levels as mobility restrictions, though significantly reduced, weighed on consumption of services (especially in H12021) and supply bottlenecks affected car purchases. On the supply side, while most sectors have surpassed their pre-pandemic trends, the recovery is not yet well-entrenched for travel, hotels, and recreational services. Also, activity indicators have lagged confidence in construction and industry, reflecting shortages in labor, raw materials, and equipment. More recently, the war in Ukraine has adversely impacted consumer confidence and, together with faster-than-expected policy normalization in some major advanced economies, increased financial market volatility, with somewhat higher redemptions from investment funds.

Contribution to Real GDP Growth, Quarterly

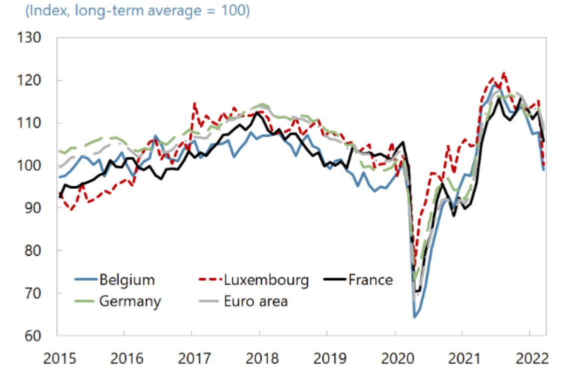
(Percent; QoQ growth)



Sources: STATEC; and IMF staff calculations.

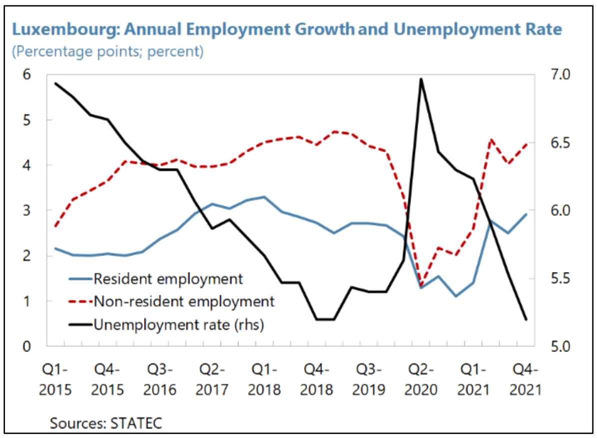
Economic Sentiment Indicator

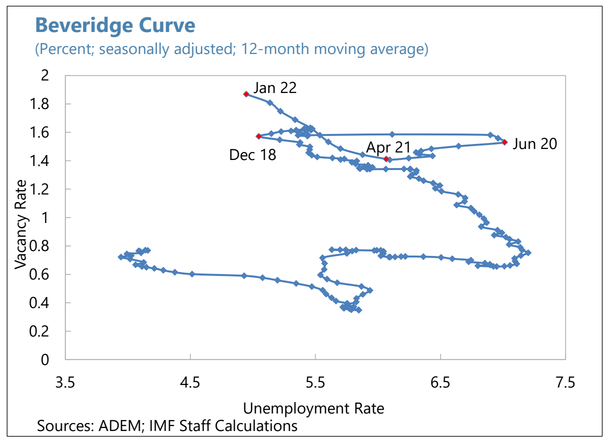
(Index, long-term average = 100)



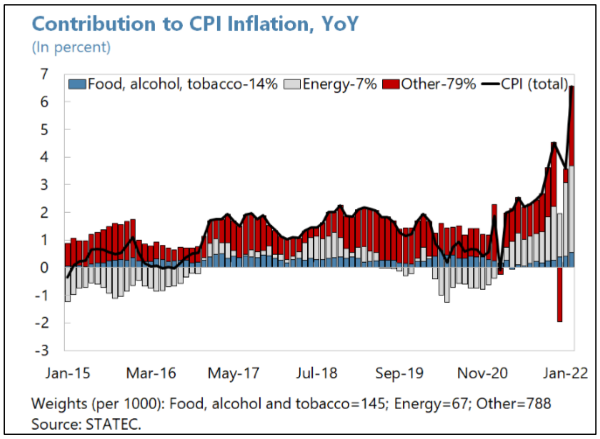
Sources: Haver Analytics.

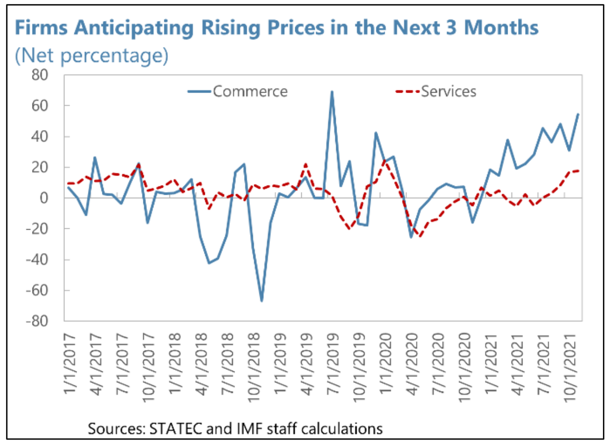
6. The economic rebound has been accompanied by a solid recovery in the labor market, amidst growing signs of imbalances (Box 1)**.** Employment increased by 3.6 percent in 2021. About half of these—mostly public jobs—benefited resident workers. This, together with a slower increase in the active population due to lower immigration flows, contributed to a rapid drop in unemployment to its pre-pandemic level (5.2 percent in December 2021). Job vacancies have almost doubled compared to end-2019, partly reflecting growing skills mismatches, and wages have grown by 2.7 percent year on year (y/y). At the same time, while long-term unemployment (over 12 months) declined in absolute terms, its share in total unemployment has been rising, from 44 percent pre-pandemic to 50 percent. To reduce these imbalances, in addition to reskilling/upskilling programs already in place, the government announced an acceleration of administrative procedures for work permits for spouses of foreign workers. So far, the war in Ukraine has not affected labor demand, with vacancies continuing to rise.





7. Inflation increased notably towards end-2021 and further in early 2022, mostly driven by energy and food prices. Consumer prices rose by 4.1 percent y/y in December 2021. The war in Ukraine further pressured commodity prices, sending inflation above 6 percent, while core inflation has risen, reaching 3.5 percent in March 2022. The rise in the cost-of-living index triggered the activation of the automatic wage indexation in October 2021 and April 2022 (2.5 percent each), which added to wage pressures. Surveys in commerce and services show an increasing share of firms foreseeing higher prices in coming months and very low levels of inventories.





8. **The 2021 fiscal position was stronger than expected, as revenues overperformed and most of the COVID-related discretionary measures expired.** The 2021 fiscal balance is estimated at about 1 percent of GDP. Most revenues performed well (VAT, personal income tax, including tax on capital gains, subscription tax), reflecting a stronger-than-expected recovery and employment, the exceptional performance of financial markets, and the buoyant housing market.[1] Nonetheless, corporate income tax receipts remained about 1½ percent of GDP lower than pre-pandemic levels which were temporarily boosted by the introduction of e-filing. Primary spending declined as uptake on COVID support was lower than expected (thanks to the strong recovery and the authorities shifted toward more targeted support, allowing automatic stabilizers to operate (Text table). Public debt stood at 24½ percent of GDP, below the authorities' notional limit of 30 percent.

Luxembourg's COVID-19 Fiscal Measures in 2020–21

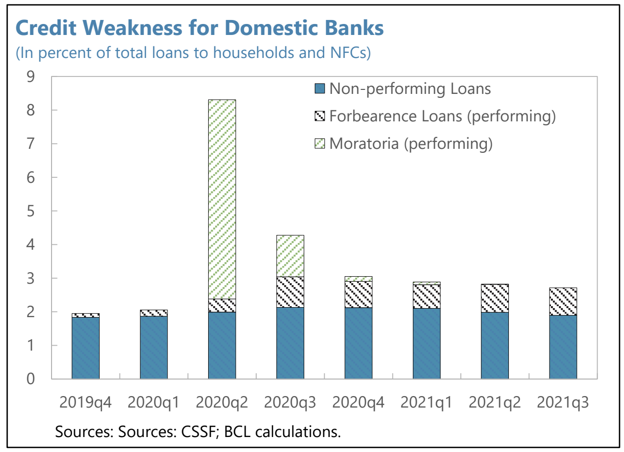
	2020				2021	
	Allocated		Uptake		Uptake	
	Million euros	Percent of GDP	million euros	Percent of GDP	million euros	Percent of GDP
Direct support	**7,620**	**11.9**	**2590**	**4.0**	**689**	**1.1**
Revenue measures	*4,590*	*7.1*	*532*	*0.8*	*8*	*0.0*
- Direct taxes (PIT/CIT)	1,290	2.0	232	0.4	4	0.0
- Indirect taxes (VAT)	300	0.5	196	0.3		0.0
- Social security contribution	3,000	4.7	104	0.2	4	0.0
Expenditure measures	*3,030*	*4.7*	*2058*	*3.2*	*681*	*1.1*
- Health crisis management	240	0.4	247	0.4	157	0.2
- Grants to firms	540	0.8	178	0.3	220	0.3
- Reimbursable advances to businesses	400	0.6	152	0.2	25	0.0
- Measures to support investment and green recovery	50	0.1	3	0.0	14	0.0
- Short-time work	1,310	2.0	1007	1.6	188	0.3
- Leave for extraordinary/sick	410	0.6	383	0.6	61	0.1
- Social support	50	0.1	41	0.1	0	0.0
- Other current spending	30	0.0	47	0.1	15	0.0
Indirect support	**3,390**	**5.3**	**253**	**0.4**	**267**	
State-guarantee for new loans	2,500	3.9	149	0.2	165	
Other capital support/loan guarantee	890	1.4	104	0.2	102	
Total	**11,010**	**17.1**	**2843**	**4.4**		

Notes: The uptake figures are as of end-March 2022.
Source: 2021 Stability and Growth Programme; and IMF staff calculations

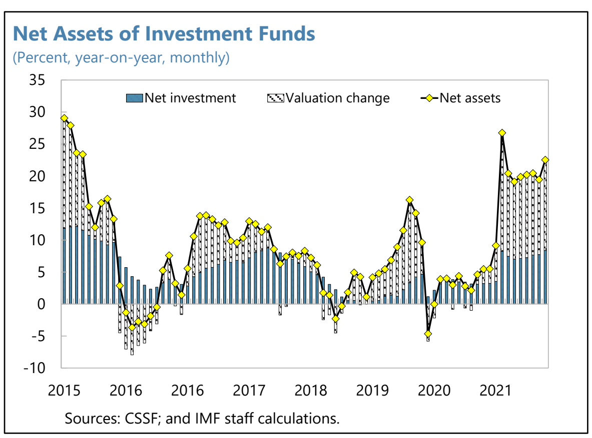
[1] The strong VAT performance is partly due to lower VAT refunds.

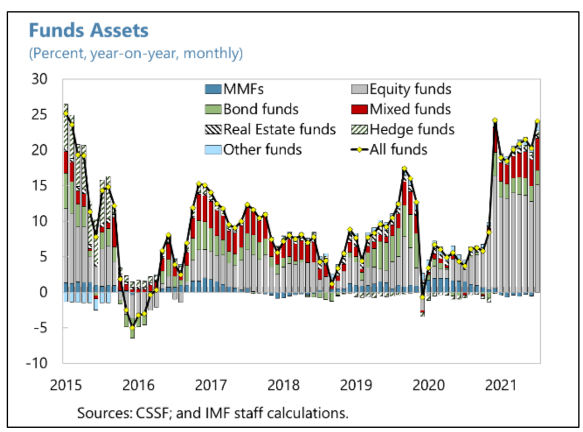
9. The financial sector continued to benefit from favorable conditions in 2021, but vulnerabilities remain.

- *Banks.* Banks' balance sheets expanded significantly (+18 percent in December 2021 versus end-2019), buoyed by large customer and intra-group deposits. Capital and liquidity buffers remained at comfortable levels (CET1 averaging 21.1 percent, liquidity coverage ratio (LCR) above 150, and net stable funding ratio at 140 percent in 2021), with some heterogeneity across banks (Table 6).[2] NPL ratios declined slightly, but are still above pre-pandemic levels for small and medium enterprises (SMEs). Though still structurally weak, profitability improved, benefiting from lower impairment costs (notably for corporate and universal banks) and higher fees and commissions income (for custodian banks). Net interest income continued to fall, mainly driven by larger deposits at the ECB at negative rates.

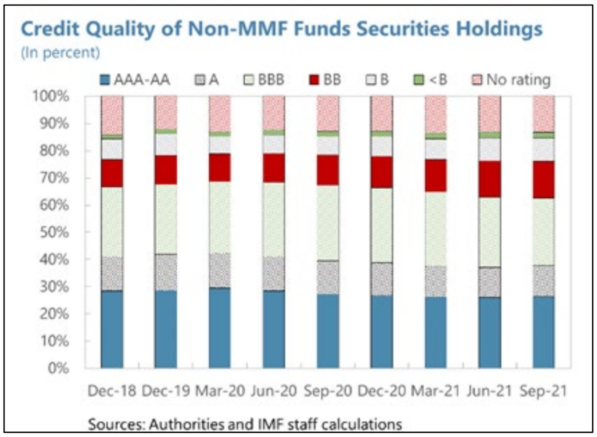


- *Investment funds.* Apart from money market funds, which faced outflows in the first 9 months of 2021, investment funds performed well during 2021. Equity funds outperformed the rest of the fund sector, reflecting strong risk appetite . Net assets increased by about 18 percent y/y in 2021, reflecting valuation effects and net investments. However, credit and liquidity risk increased as the quality of portfolios deteriorated, partly due to the pandemic's effect on credit ratings, while duration came down slightly. In early 2022, higher global financial markets volatility was accompanied by asset valuation losses and small net redemptions.

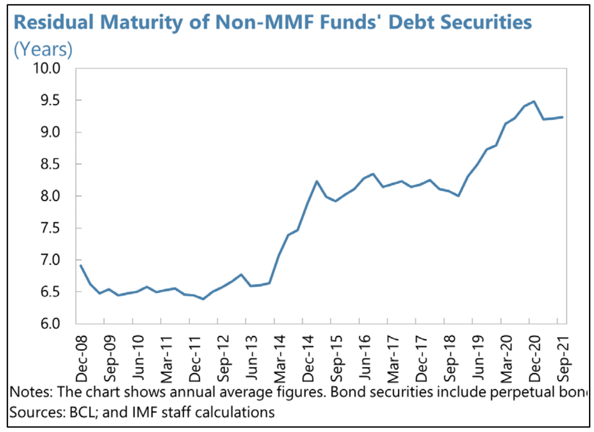




[2] Corporate banks have a Capital ratio of 16.9 percent while custodian banks solvency ratio stood at 29 percent at end-2021.

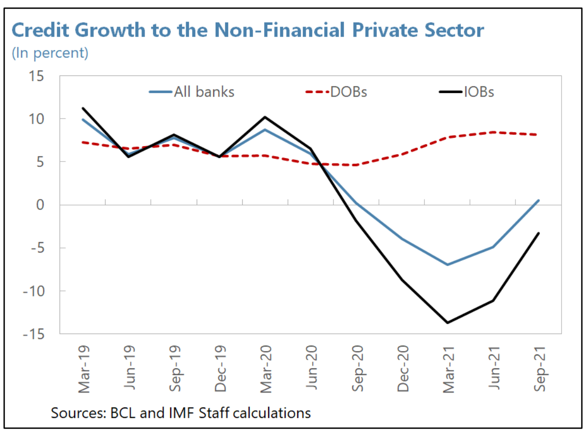


Credit Quality of Non-MMF Funds Securities Holdings
(In percent)
Sources: Authorities and IMF staff calculations

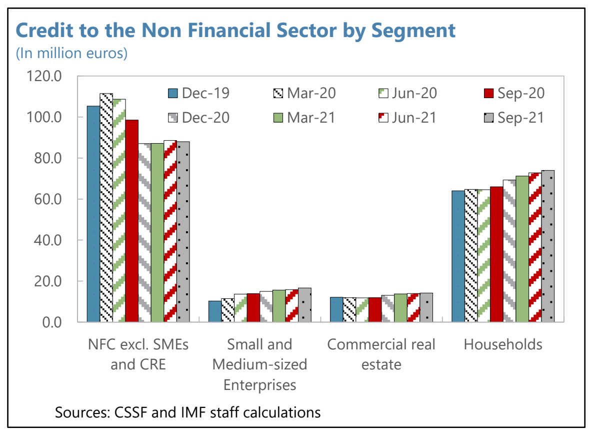


Residual Maturity of Non-MMF Funds' Debt Securities
(Years)
Notes: The chart shows annual average figures. Bond securities include perpetual bon
Sources: BCL; and IMF staff calculations

10. Credit growth to the (non-financial) private sector was shallow, though uneven across business models and segments. On aggregate, average credit growth has been negative in 2021 (albeit positive for domestically-oriented banks, DOBs). This was driven by lower demand from large non-resident firms due to low investment and working capital needs. Meanwhile, credit to households and SMEs grew rapidly during the first three quarters of 2021. Publicly guaranteed loans have stabilized, and the outstanding amount of loan moratoria declined from EUR3.7 billion in June 2020 to EUR0.4 billion in October 2021.



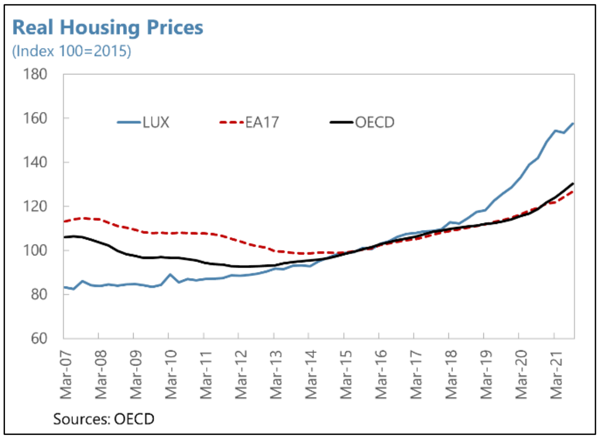
Credit Growth to the Non-Financial Private Sector
(In percent)
Sources: BCL and IMF Staff calculations

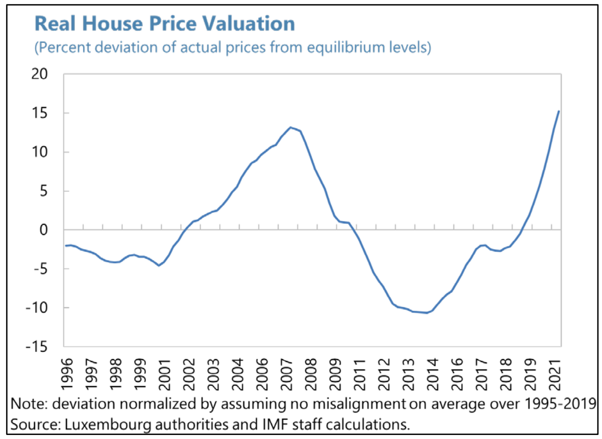


Credit to the Non Financial Sector by Segment
(In million euros)
Sources: CSSF and IMF staff calculations

11. Housing prices have increased by double digits since 2019, raising concerns about affordability and potentially financial stability. High demand, partly due to large excess savings and low mortgage interest rates, combined with constrained supply, pushed prices up further (+13.9 percent y/y in Q4 2021). This has kept the overvaluation of residential real estate (RRE) at high levels (estimated at around 15 percent in Q2) and further increased households' indebtedness (the debt-to-income ratio was 187 percent in 2020).[3]

[3] The assessment of the price misalignment draws on the model estimated in the 2018 Article IV Selected Issues "Housing market: Assessment and Policy Recommendations". Changes compared to the last Article IV reflect revisions in historical data, in particular on income, which required a re-estimation of the model over 1995-2019.





12. The current account surplus has recovered to pre-pandemic values. The current account grew to 4.8 percent of GDP in 2021 from 4.1 percent in 2020, driven by a lower net factor income deficit that offset a deterioration of the trade balance. The 2021 net international investment position (NIIP) remained relatively-stable at 54.1 percent of GDP. Reserves increased, boosted by the SDR1.3 billion allocation (2.1 percent of GDP), which the authorities support channeling to countries in need. Staff assess the external position in 2021 to be broadly in line with fundamentals and policy settings (Annex I)

OUTLOOK AND RISKS

13. The war in Ukraine is expected to weigh on the recovery mainly through effects on global financial conditions, confidence, and external demand. The baseline assumes no major lockdowns related to the pandemic and no cut-off of Russia's oil and gas. Nonetheless, growth is expected to be significantly lower than projected prior to war at around 1¾ percent in 2022 and 2¼ percent in 2023). Exports and corporate investment are likely to be adversely affected, reflecting tightening global financial conditions, lower confidence and trading partners' demand.[4] Private consumption should remain relatively resilient, albeit growing slower than projected prior to the war, as consumption of services normalizes (after lifting COVID restrictions). The strong labor market, high excess savings, automatic wage indexation, and comparatively large fiscal support to households and affected firms are expected to shield purchasing power against inflation pressure and protect jobs. The output gap is expected to be slightly negative, although uncertainty is large. Despite measures to reduce pass-through from international prices, higher energy and commodity prices will pressure inflation further this year (4.5 percent) with core inflation also rising, reflecting higher wages. Relatively high demand, rising construction costs, and persistent supply constraints, will likely maintain pressure in the housing market. Barring a prolonged war, the medium-term outlook is likely to be more positive, with GDP growing around its pre-pandemic trend, though inequality could increase.

[4] Exports and imports of goods, while recovering gradually, are projected to remain at a lower level over the medium term, compared to the past several years, largely reflecting smaller fuel sales to nonresidents due to lower price differential with neighboring countries.

14. Uncertainty is high and near-term risks are clearly to the downside (Table 7). Key risks stem from further escalation of the war, with cuts in trade ties between Europe and Russia, and a sharp tightening of global financial conditions. Also, uncontrolled COVID outbreaks could lead to more protracted supply chain disruptions, causing higher and more persistent inflation and triggering an abrupt tightening of monetary policy. The performance of the financial sector in Luxembourg could be significantly affected, lowering GDP growth and fiscal revenues. At the same time, persistent supply bottlenecks, including labor shortages domestically, could boost inflation and delink the strength of domestic demand. Finally, private consumption growth could be lower than projected, if the decline in confidence is larger and more persistent than in the baseline. In contrast, a continuation of the ECB's very accommodative monetary policy could further encourage risk-taking behavior in the financial sector and add pressure to the housing market, heightening the risks of a sharp correction in the medium term. Cyber security risks may also intensify, affecting critical physical or digital infrastructure.

15. Medium-term risks are more balanced, and the outcome will hinge on the authorities' ability to preserve the country's attractiveness and address structural challenges. Positive spillovers from NGEU plans in Europe could be stronger than in staff's baseline and successful policies to green and digitalize the economy could boost Luxembourg's potential output. In contrast, uncertainty remains high on potential scarring from the war in Ukraine. Also, higher housing prices could pose financial stability risks and reduce the country's attractiveness, weighing on potential growth and reducing fiscal revenue over the longer term. While offering opportunities, climate change and digitalization could pose challenges for fiscal policy and the financial sector. Also, fiscal risks stem from changes in international taxation and ageing.

Authorities' Views

16. The authorities shared staff's views on the outlook and risks. As a result of the war, the authorities foresee growth to slow but remain positive around 1½ in 2022. They highlighted the large uncertainty and the difficulty to assess the magnitude of the impact as the situation remains fluid. Like staff, they expect that inflation may be higher and more persistent than projected. The main risks are that ripple effects from global financial markets could have significant impacts on financial sector performance, growth, and fiscal revenues, though this has not yet been observed. There was also broad agreement that the war in Ukraine could, to a lesser extent, weigh indirectly on the real sector in Luxembourg through the trade channel.

POLICY DISCUSSIONS

Over the near term, policies should remain flexible and strike the right balance between safeguarding the recovery and mitigating imbalances in the housing and labor markets. The authorities should also intensify efforts to address long-standing issues in the housing market and navigate successfully the green and digitalization transitions.

A. Securing a More Sustainable, Balanced, and Inclusive Recovery

Fiscal Policy: Navigating Short- and Medium-Term Challenges

17. The 2022 budget appropriately envisages an accommodative fiscal stance and a continued high level of capital spending. Staff project a deficit of about 1¼ percent of GDP in 2022 from 0.9 percent of GDP surplus in 2021, as the withdrawal of pandemic-related measures is more-than-offset by lower fiscal revenue and higher spending to support the economy (mainly in response to higher inflation). Excluding COVID measures, staff assesses that the 2022 fiscal stance is accommodative with an additional impulse of about 1½ percent of GDP . This is broadly appropriate, considering Luxembourg's ample fiscal space, the negative output gap, the large impact of rising inflation on low- and middle-income households and firms, and downside risks . In the 2022 budget, the authorities increased the cost-of-living allowance (*allocation vie chere*) and re-introduced the automatic indexation of family allowances (in addition to the automatic wage indexation). They also doubled investment in social and affordable housing and extended the targeted short-time work scheme (to be phased out by June 2022).

18. Using their ample fiscal space, the authorities have announced an additional package to address the impact of high inflation. The package (2 percent of GDP) aims at protecting purchasing power and supporting affected firms while promoting the green transition. It includes: i) a temporary increase in the amount and coverage of the cost-of-living-allowance and other transfers as well an energy tax credit and ii) temporary subsidies for electricity and gas prices (network costs) and reduction in excises on fuel (7.5 cents per liter) to reduce pass-through from international prices to inflation.[5] An envelope of EUR725 million (1.2 percent of GDP) has been allocated to support affected firms (of which EUR500 million in guarantees) and increased support

Discretionary Measures in Response the Energy Price Shock

	2022		2023	
	Million euros	Percent of GDP	million euros	Percent of GDP
Direct support	**672**	**1.0**	**165**	**0.2**
Revenue measures	*280*	*0.4*	*165*	*0.2*
- Tax credit (energy)	275	0.4	165	0.2
- Other tax credits	5	0.0	0	0.0
Expenditure measures	*392*	*0.6*	*0*	*0.0*
- State contribution to the compensation mechanism for renewable energy/cogeneration and subsidy of network costs (gas)	50	0.1	0	0.0
- Increase in cost of living allowance	25	0.0	0	0.0
- Reduction in excise tax (fuel)	75	0.1	0	0.0
- Rental allowance	5	0.0	0	0.0
- Adaptation prime house	2	0.0	0	0.0
- Tertiary education allowance	10	0.0	0	0.0
- Grants to affected firms	225	0.4	0	0.0
Indirect support	**500**	**0.8**	**0**	**0.0**
State-guarantee for new loans	500	0.8	0	0.0
Total	**1,172**	**1.8**	**165**	**0.2**

Sources: Authorities and staff calculations.

[5] The authorities have also announced a rent freeze till end-2022.

for acceleration of the energy transition. In parallel, the authorities, in close consultation with social partners, have rightly decided to temporarily limit the frequency of wage indexation to once per year for 2022-23 to reduce the effect on firms' competitiveness and inflation persistence.[6]

19. Going forward, fiscal policy should remain nimble and strike the right balance between supporting vulnerable households and businesses and mitigating imbalances. First, given that the purchasing power of the top 40 percent continued to increase, it would be preferable to rely on better-targeted and timebound measures, designed to allow for consumption adjustment and promoting behavioral change to a greener economy. Second, there is merit to postpone non-urgent hiring in the public sector until pressures in the labor and housing markets abate.[7] Finally, once risks from the war dissipate, the authorities should resume a gradual fiscal policy normalization to promote non-inflationary growth, while preserving capital spending.

20. The medium-term fiscal framework (MTFF) rightly aims at a more inclusive, sustainable, and innovative recovery while maintaining buffers. Staff projects the structural fiscal balance to improve in 2023–24, before slightly declining thereafter (to -0.3 percent of GDP by 2027), reflecting lower social security surpluses. This is lower than the current medium-term objective (MTO) of 0.5 percent of GDP, but would stabilize public debt at about 26 percent of GDP, leaving ample fiscal space.[8] The authorities' focus on growth enhancing investment such as transportation, social and affordable housing, as well as green and digital infrastructure, public R&D spending, and innovation, and the allocated amounts, are broadly appropriate. To increase the efficiency of these projects, strengthening inter-sectoral coordination, project monitoring, and oversight is needed, in line with past Article IV recommendations.[9] Also, preserving the long-term fiscal sustainability requires early reforms of the pension system to ensure a smooth adjustment and more intergenerational equity.

21. Fiscal reforms are needed to deal with potential revenue losses and distributional costs associated with the green and digital transitions as well as housing affordability.

- *Risks on the revenue side* are non negligeable and stem mainly from changes to international taxation, the net impact of carbon taxation, and, to a lesser extent, remote/hybrid work becoming the new norm. Revenue will also depend on the country's capacity to maintain its attractiveness for workers over the medium term.
- *Distributional costs*. While beneficial for the environment, the economy, and potentially increasing fiscal revenue, the green and digital transitions could have distributional consequences, which together with rising housing affordability concerns, could adversely affect social cohesion.

[6] All in all, recently adopted measures will fully shield households from rising energy prices and offset real wage losses from limits to wage indexation to once per year.

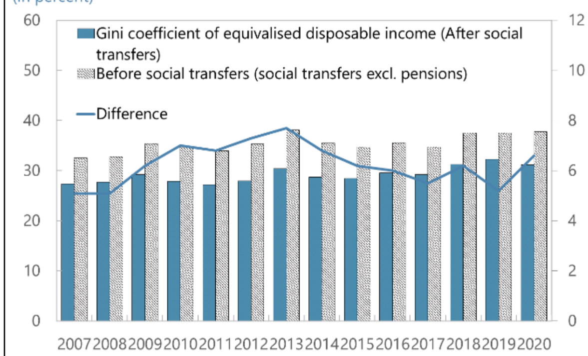
[7] The authorities plan to double hiring in 2022 after several years of relatively large recruitment programs.

[8] The current MTO of 0.5 percent of GDP is likely to be revised down, given the recent downward revisions of ageing costs (Ageing report 2021).

[9] For more details, see the 2021 Article IV Staff Report for Luxembourg (Box1).

- To address these challenges while keeping debt below the authorities' notional limit of 30 percent of GDP, tax and spending policies should be redesigned in a way that diversifies sources of revenue, improves equity, promotes adaptation of skills, and preserves the country's attractiveness for labor. On the taxation side, reforms include higher real estate taxation, well-designed environmental taxation, and reform of the corporate wealth tax and individual personal income taxation. On the expenditure side, it is critical to better target social spending (including homebuyers assistance), further boost supply of social and affordable housing, and continue investment in education and skills (see next sections).

Efficiency of Social Transfers
(In percent)



Sources: Eurostat EU-SILC and IMF staff calculations

Authorities' Views

22. The authorities agreed that fiscal policy should remain nimble in the short term, while, remaining committed to maintaining buffers. They indicated that the package agreed with social partners in April will help protect purchasing power of low- and middle-income households, while preserving firms' competitiveness and accelerating the green transition. Should upside risks to inflation materialize, the tripartite group will meet to assess the situation and discuss the need for a potential additional response. The government remains committed to prudent fiscal policy, given fiscal risks and will resume policy normalization to maintain buffers once risks dissipate. Regarding inequality, the authorities highlighted that several measures have been taken in recent years, with an increased focus on in-kind transfers (e.g., free transportation, free schoolbooks, free childcare), which traditional measures of income distribution do not account for. That said, they acknowledged that there is room to better target some tax expenditures and social transfers, which could be considered in coming years. They also highlighted the potential policy trade-offs between reducing inequality and maintaining the country attractive for talent.

Financial Sector Policies: Bolstering Resilience

23. Overall, the banking system remains resilient, although the longer-term impact of the pandemic is still uncertain and structural vulnerabilities remain. On aggregate, banks remain well-capitalized and liquid, and asset quality has improved. Provisioning (including for performing loans) and the share of loans covered by collateral has increased. Forborne loans, which rose during the pandemic, stabilized in Q32021 (0.8 percent of total loans). Yet, it is possible that various support measures have made it more difficult for banks to assess the underlying credit risk for some sectors. High corporate indebtedness and the increased concentration of loan portfolios on riskier counterparts—mortgages, SMEs, and commercial real estate (CRE)—require continued vigilance at the micro-level. Intra-group exposures have declined during 2020-21 but remain large, and cross-border exposures to non-EU emerging economies have been on the rise. Continuous monitoring of

these risks, including through greater coordination with non-EU supervisory authorities, and regular review of waivers on large exposures limits, are needed.

24. The war in Ukraine poses new risks. Banks' aggregate direct exposures to Russia and Ukraine are limited (0.45 percent of assets and 0.2 percent of liabilities). Although concentrated in three banks, these exposures are partially covered by collateral and guarantees and do not raise systemic concerns. However, the situation is fluid and the impact of the war on the financial sector will mainly depend on spillovers to global financial conditions, in a context where rising inflation could complicate central banks' trade-off between price and financial stability. The supervisory authorities have created and are regularly updating a dedicated webpage on sanctions. They are closely communicating with financial market participants on implementation.

25. An abrupt tightening of global financial conditions, which could be triggered for example by the repercussions of the war in Ukraine, could affect banks in Luxembourg through different channels, depending on their business models. Custodian and private banks could see significantly lower commissions and fees. Higher risk premia could increase private sector defaults and lead to large exchange rate depreciations in emerging markets, affecting corporate banks with high exposure to these markets. For domestically oriented banks (DOBs), the impact of higher interest rates on profitability is less clear. While positive ECB deposit rates could improve profitability, the shift of mortgage lending to fixed interest rates in recent years may reduce credit risk but could keep interest margins low for some time. If significant, an increase in interest rates could also weigh on asset quality. The risk of transmission through linkages with investment funds seems limited. Past evidence suggests that investment funds' deposits in the banking sector tend to increase in periods of stress.

26. On aggregate, Luxembourg's banks should be able to withstand severe but plausible shocks, though there are risks for some institutions. The CSSF's solvency top-down stress tests suggest that the aggregate common equity Tier 1 (CET1) capital ratio would fall by about 3½ percentage points by end-2023 under the 2020 EBA adverse scenario but remain well above minimum requirements (at 18.5 percent).[10] Yet, some banks are at risk of capital shortfalls, including due to structurally low profitability (private banks) or credit risk in corporate loan portfolios. Two significant institutions would have to use most of their capital conservation buffer under the adverse scenario. Sensitivity analysis by the CSSF shows that overall DOBs have sufficient buffers to absorb plausible RRE shock, but some would face capital shortfalls in case of very severe shocks. Liquidity stress tests indicate that most banks would have sufficient liquidity buffers to counterbalance very large deposit outflows from investment funds or interbank liquidity shocks. The authorities recently tested banks' ability to deal with adverse interest rate (+300 bps over three years) and cost shocks (+40 percent over the same period). The results shows that some banks (notably, custodian banks) would benefit from higher interest rates. Others, notably retail banks, would suffer, including as a

[10] Since capital positions seem to have improved in 2020, staff does not expect major changes to this result using 2021 data (not available at the time of the mission).

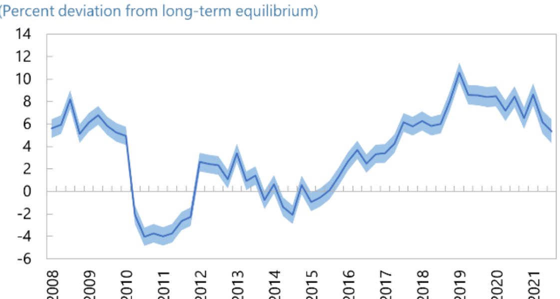
result of repricing of their available-for-sale bond portfolios. Overall, while Tier 1 capital would decline by 3.2 ppt o 19.6 percent, buffers would remain sizable.

27. Banks' structurally low profitability remains a source of concern over the medium term. Banks' profitability has been declining in recent years as staff and administrative expenses have been increasing faster than operating income.[11] In addition to cyclical risks, increasing operational risks (for example, cyber security and regulatory compliance costs) and personnel costs (due to automatic wage indexation) could weigh further on profitability in coming years, leading to consolidation in the sector, downsizing or excessive risk-taking. The supervisory authorities should maintain incentives for achieving greater efficiency, including by reviewing banks' business models, monitoring cost-cutting efforts, providing prescriptive guidance on unprofitable non-core assets, and incentivizing diversification of activity and mutualization of compliance costs.

28. The authorities appropriately kept the countercyclical capital buffers (CCyB) unchanged during the pandemic. The credit to GDP gap is estimated to have been positive in Q32021, though narrowing in recent quarters. Given uncertainty around the war and the pandemic, and the fact that credit growth has been mostly driven by mortgages, no change to the CCyB is required in the short term. However, the authorities should continue to monitor closely the risk profile of portfolios, credit demand/supply dynamics, and particularly firms' indebtedness (including debt issuance) to identify a potential build-up of systemic risks. Should high credit growth persist, some tightening could be considered.

Real Credit Gap

(Percent deviation from long-term equilibrium)

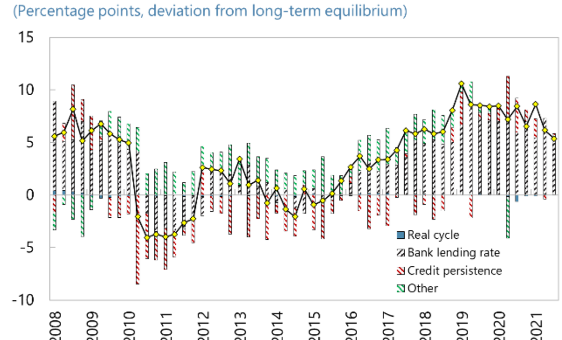


Note: Credit gap is estimated using a semi-structural model for Luxembourg. The shaded area corresponds to the confidence band surrounding the filter estimates. Real credit is defined as the credit to resident private non-financial sector extended by domestically-oriented banks; and is deflated by the GDP defaltor.

Sources: De Resende, Solovyeva and Souissi (Forthcoming).

Contributing Factors to Real Credit Gap

(Percentage points, deviation from long-term equilibrium)



Sources: De Resende, Solovyeva and Souissi (Forthcoming).

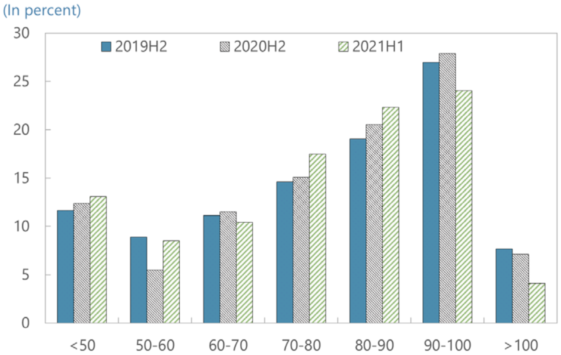
29. Rapidly rising house prices and households' indebtedness require further tightening of borrower-based limits and curbing banks' high exposures to residential real estate.[12] The introduction of the LTV measure has had mixed results so far. While the weighted average LTV for new loans has improved and the share of riskier loans to lower income households (more vulnerable to income shock) decreased somewhat, the debt-service-to-income and debt-to-income ratios have

[11] The cost-to-income ratio rose from 49 percent in 2016 to 59 percent in 2021.

[12] CSSF's sensitivity analysis suggests that most DOBs would remain resilient in the case of an extreme real estate price shocks and a sharp increase in household defaults, reflecting strong capital positions and low loss-given-default.

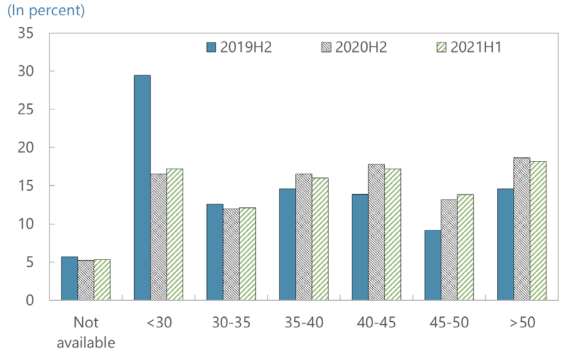
remained high. The effectiveness of the LTV limit may have been hindered by the high level of excess savings accumulated by households, especially middle and high income, during the pandemic as well as by unintended signaling effects. At the same time, exposure to the real estate sector (RRE and CRE) has increased for DOBs and the trend is likely to continue given the expected sustained growth in housing prices. The higher share of fixed rate mortgages, the high assets to debt ratio, and the high level and stability of income for a large share of borrowers could mitigate the risks in the short term. That said, to avoid a further build-up of vulnerabilities, the authorities should consider introducing limits on the debt-service-to-income and the debt-to-income ratios, clarify the LTV limit for the public, and accelerate the establishment of a credit registry.[13] The authorities could also consider introducing limits on banks' exposure to real estate.

Distribution of New Loans by LTV Level
(In percent)



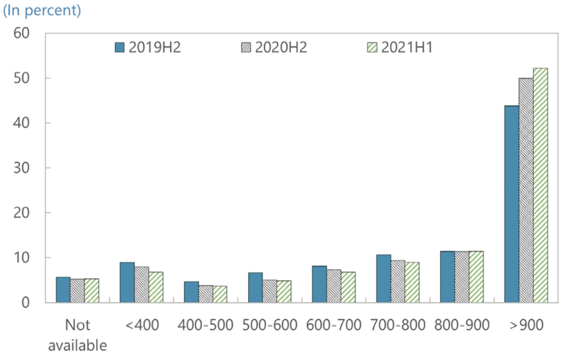
Sources: CSSF and IMF staff calculations

Distribution of New Loans by DSTI Level
(In percent)



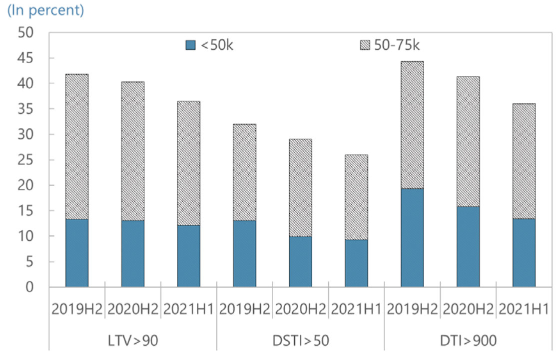
Sources: CSSF and IMF staff calculations

Distribution of New Loans by DTI Level
(In percent)



Sources: CSSF and IMF staff calculations

Distribution of Risky Loans by Income Level
(In percent)



Sources: CSSF and IMF staff calculations

30. For investment funds, given heightened credit and liquidity risks, efforts to strengthen oversight and enhance the regulatory and macroprudential framework are welcome. On aggregate, investment funds' direct exposures to Russia and Ukraine are only 0.3 percent of total assets. The impact of the war on the industry, including money market funds, has been so far much smaller than at the start the pandemic, although risks of liquidity squeeze through indirect effects

[13] Potential distributional consequences of such measures could be offset with higher targeted assistance to facilitate access to affordable and social housing to low-income households.

cannot be excluded in the future. The authorities are working with the industry to enable funds with significant exposures to adjust. They also reinstated daily liquidity reporting for the largest investment fund managers and issued guidance on the use of liquidity management tools to deal with the non-tradability of Russia-linked assets. In line with the 2017 FSAP recommendations (Annex III), the CSSF has continued to strengthen their liquidity stress testing methodologies, by incorporating second-round effects and expanding the coverage of asset classes. The CSSF has also contributed actively to ESMA work on developing a guidance on the design, calibration, and implementation of macroprudential leverage limits in the context of the alternative investment funds, which became applicable in August 2021. Building on this noticeable progress, the authorities should continue to engage actively in international fora for the design and calibration of a macroprudential toolkit for investment funds.

31. Efforts to further strengthen the Anti-Money Laundering/Combating the Financing of Terrorism (AML/CFT) framework are welcome and should be sustained. Ahead of the 2022 mutual evaluation by the Financial Task Action Force, the criminal law framework for AML/CFT was strengthened, and efforts to enhance AML/CFT supervision of financial institutions were maintained. The authorities should continue to sharpen the understanding and mitigation of risks posed by cross-border proceeds of crime, including through greater cooperation with foreign counterparts. While measures to improve the accuracy, searchability, and use of information on beneficial ownership of legal persons and arrangements were introduced, the authorities are encouraged to explore the possibility to enable searches by name for the general public. In line with EU Regulation 2019/452, Luxembourg is developing legislation (bill 7885) on screening of FDI in critical sectors by non-EU investors. It will be important that this legislation and its implementation be focused judiciously on its security, public order, and financial integrity objectives, while preserving Luxembourg's attractiveness as an investment destination.

Authorities' Views

32. The authorities stressed that the financial system remains resilient and that they stay vigilant to potential risks. They see no systemic impact on Luxembourg's financial system from the direct exposures to Russia and Ukraine. While admitting potentially tangible indirect effects if global financial systems are heavily affected, the authorities assessed these risks as manageable. They emphasized that they continue to closely monitor investment funds' liquidity and noted their regular communication with market participants and international supervisors. They indicated that cyber security incidents have been marginal but remain vigilant about a potential increase in cyber-attacks.

33. The national authorities prefer to reassess the effectiveness of the LTV limits before considering staff's proposal of further tighten borrower-based limits. They indicated that the full impact of the LTV might not have materialized yet, given the slow pass-through of borrower-based measures to the stock of lending and house prices. Also, they pointed to the potential impact of income-based measures on affordability. For concentration limits, they viewed them as less effective, noting risks as customers could circumvent these measures by borrowing from cross-

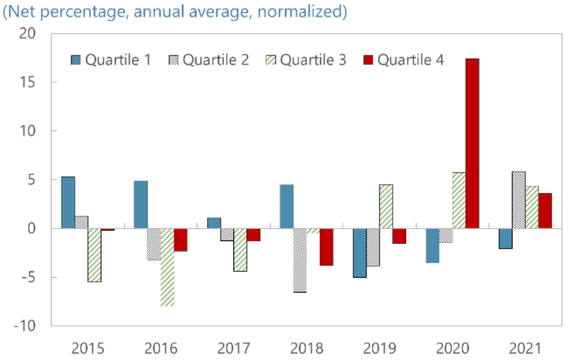
border banks. Nevertheless, the Systemic Risk Committee will assess the need for further measures as well as the pros and cons of different tools in the months ahead.

34. On *AML/CFT*, the authorities confirmed their commitment to fighting ML/TF activities and underlined that special consideration is paid to the risks arising from Luxembourg's role as a global financial center. Luxembourg has an effective AML/CFT regime based on a solid legal framework and a comprehensive institutional set-up involving competent authorities and other relevant stakeholders to prevent, supervise, detect, investigate and prosecute ML/TF, to recover assets and, to the extent applicable, implement targeted financial sanctions. The authorities agreed on the importance of accurate and up-to-date information on the beneficial owners of legal structures and emphasized that the transparency on beneficial ownership is in the process of being further improved through a strengthening of the powers of the relevant registers.

B. Addressing Housing Imbalances and Improving Affordability to Maintain Luxembourg's Attractiveness[14]

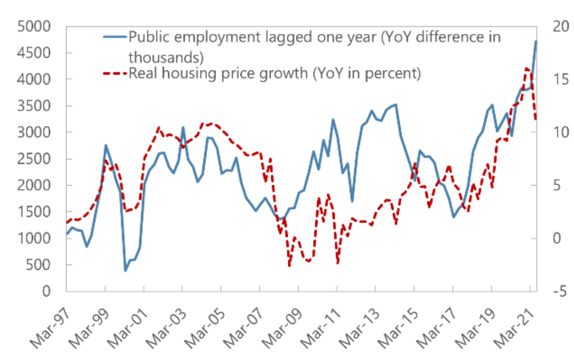
35. Housing prices have more than doubled since 2010, with half of the increase recorded in the last four years driven by a sharp increase in demand and supply rigidity. *Demand* has been buoyed by easy financial conditions, rapid income growth, rising share of highly-skilled and paid resident employment (partly public jobs), and more generous fiscal incentives to homeownership. The tight labor market, large savings accumulated during the pandemic, low real interest rate environment, and potential reallocation from financial assets could sustain demand in the short to medium term. *Supply* has been constrained by several factors. First, construction firms have been struggling with increased labor shortages, long time to get construction permits, availability of landfills, and low productivity gains. Second, land hoarding increased land prices and reduced supply, and may have hampered competition from smaller firms. Finally, while sales of existing homes have increased in recent years (in part because of people moving across borders or

Intentions to Buy/Build Home by Income Level
(Net percentage, annual average, normalized)



Sources: EC consumer survey and staff calculations

RRE Price and Public Employment Dynamics



Sources: STATEC and IMF staff calculations

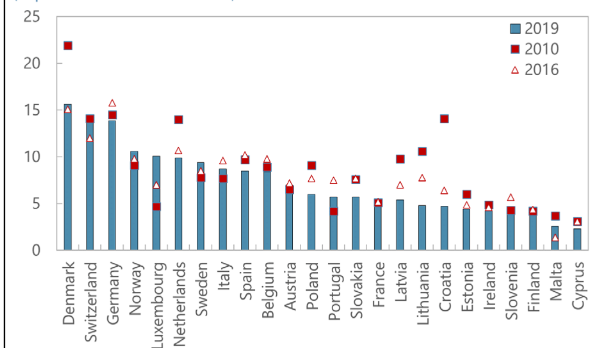
[14] For further analysis, see Selected Issues Paper.

looking for larger dwellings), residential mobility could have been discouraged by high transaction costs and conditionality on access to housing assistance.[15]

36. Housing price developments are raising affordability concerns. The housing cost burden has been increasing as prices and rents grew notably faster than income. The share of overburdened households doubled in the last decade to over 10 percent. As income inequality widened, the bottom 40 percent have been disproportionately affected. About a third (more for new renters) of tenants and single adults with children are spending more than 40 percent of their income on housing. Foreigners are also more likely to be overburdened than nationals (likely because of lower ownership rate). Finally, the share of homeowners has been on a downward trend since 2017, suggesting that the authorities' "help-to-buy" policy in a context of constrained supply may have reached its limit.

Housing Cost Overburden

(In percent of total houdeholds)



Sources: Eurostat and IMF staff calculations

37. Should these trends continue, the attractiveness of Luxembourg for workers could be affected. Luxembourg has been able to attract foreign workers thanks to high wages, advantageous taxation and benefits, and high quality of life. In recent years, high housing prices have pushed many workers to look for housing across the borders. Yet, the balancing role of the cross-border housing market may weaken going forward due to higher transport costs, longer commuting time and rapid increase of RRE prices in the Greater Region. The initial effects could be felt through rising vacancies in recent years in sectors where the wage differential with neighboring countries is not high (construction and industry). In the medium term, with increased competition for talent, relatively high housing prices in Luxembourg could become a competitive disadvantage.

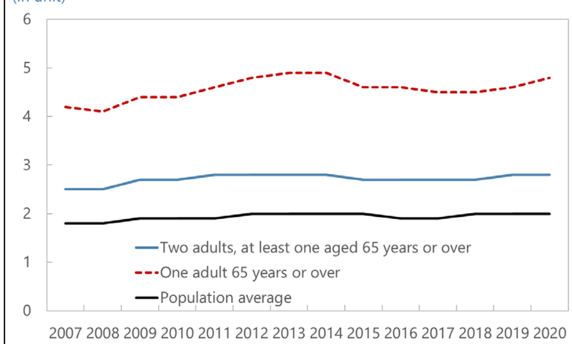
38. In response, the authorities have accelerated measures to improve housing affordability. In 2021, they started implementing the *Housing Pact 2.0*, which conditions the payment of state subsidies to the actual construction of affordable housing by local councils. The government announced in October 2021 plans to increase the property tax (rate and revaluation) on unused lands and empty properties to reduce speculation. In January 2022, two draft laws were submitted to parliament. The first bill proposes to increase affordable housing supply (rental and owned) in public hands, introduces the concepts of social landlord and affordable lease, and establishes a national register of affordable housing. The second expands eligibility and increases caps for housing assistance, while simplifying and digitalizing the administrative system to facilitate access.

39. Mitigating housing sector pressures over the medium term requires a multipronged approach. Staff commends the expanded coverage and size of rental allowances and efforts to

[15] Buyers were required to live in the house for a minimum of 10 years to benefit from some homebuyer assistance programs. This is expected to be reduced to 2 years in the new laws.

boost housing supply. However, the latter would take time to materialize and pose implementation challenges, requiring careful design and enforcement at the municipal level.[16] The expansion of help-to-buy policies could become a transfer to sellers and would have only a short-lived effect on affordability as they are likely to exacerbate supply-demand imbalances and fuel further price hikes. Hence, efforts should be focused on containing demand pressure, use existing stock more efficiently, build more, faster and at lower cost, while enhancing affordability.

Number of Rooms per Person
(In unit)



Sources: Eurostat EU-SILC database

- *Supply.* Given supply constraints, priority should be given to fostering residential mobility (e.g., by reducing registration tax for main residence and limiting the eligibility for exemptions from capital gains tax on inherited properties to 1-2 years) and reducing under occupation, especially for seniors (e.g., by increasing housing options for them). To boost the supply of new dwellings at lower costs, the authorities should encourage building higher with greater density and tackle bottlenecks, in particular, labor shortages ana landfills. Raising productivity in the construction sector (e.g., by reducing delays in obtaining building permits, promoting prefab/modular homes, and providing incentives for technological and skills upgrade) would also help. Over the medium term, the authorities could further encourage innovation through public-private initiatives and assess the cost-benefit of rehabilitating commercial real estate.

- *Demand.* In addition to expanding borrower-based limits and carefully calibrating the fiscal stance (see above), the authorities should: i) better target tax expenditures and other support measures to homeownership, and ii) steer households' excess savings away from speculative investments in real estate (e.g., by increasing recurrent property taxes and registration tax on secondary properties). Over the medium term, the authorities should aim at reducing geographic concentration of demand for housing, by continuing infrastructure development (residential communities, transport, etc.), promoting remote work, and developing activity outside the current clusters (e.g., near the borders).

- *Implementation and monitoring.* There is a need to strengthen coordination between municipalities and central government as well accountability for a more effective implementation of policies. More efforts are needed to fill data gaps to better formulate policies and monitor implementation.

[16] Construction of new dwellings takes time and could face labor constraints. The benefits of taxation of lands will start in 2025 at the earliest. The taxation of empty dwellings poses the problem of their identification and does not necessarily meet the demand requirements in terms of location.

Authorities' Views

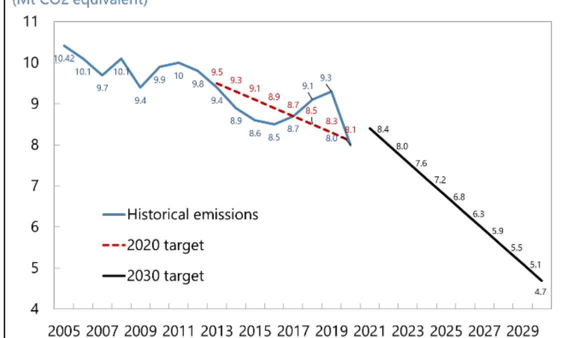
40. The authorities agreed on the need for a multi-pronged approach to reduce housing imbalances. While noting that the surge in housing price is not unique to Luxembourg, they shared staff views that both supply and demand measures are needed. In this context, they noted that several measures have been taken to increase supply of affordable and social housing and support to homebuyers and renters should address affordability. The authorities reiterated their strong commitment to taxation of unused lands and unoccupied houses. There was broad agreement that this would reduce speculative demand, but it would take time for the effect to materialize. They concurred that more efforts are needed to streamline permits procedures and underscored the importance of more coordinated actions, as responsibilities are divided among different ministries, public entities, and local authorities.

C. Achieving Better-Quality Growth: Opportunities and Challenges from the Green and Digital Transitions

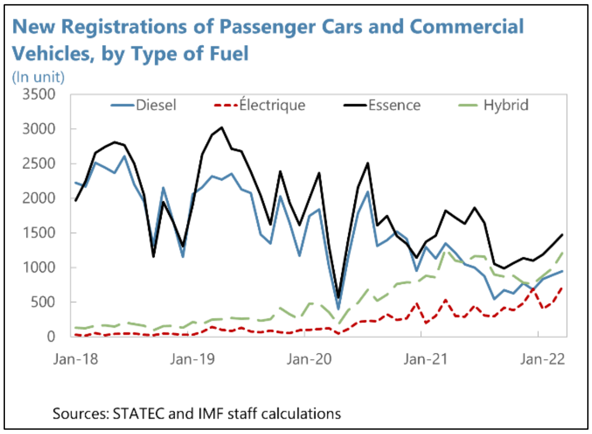
The Green Transition

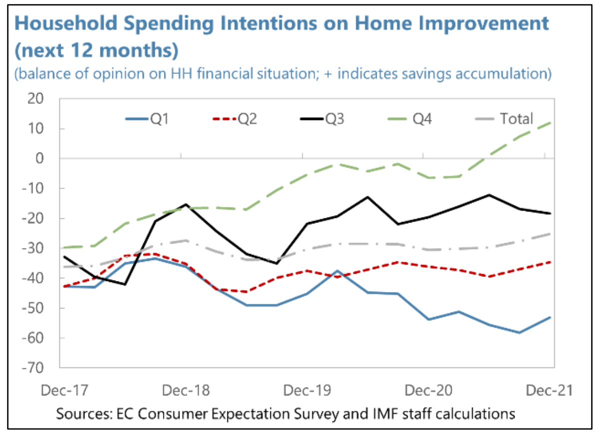
41. Luxembourg has a comprehensive, integrated strategy to achieve carbon neutrality by 2050. Despite the rapid increase in its population and many cross-border commuters, the country has been able to meet its 2020 energy efficiency goals, reducing energy consumption by 11 percent since 2005, much more than the OECD average. Building on this performance, the authorities have a very ambitious target to reduce GHG emissions by 55 percent by 2030 (compared to 2005 levels). This would be achieved through reforms of energy taxation, incentives to support green investment, energy-efficiency, investment in public transportation, e-mobility, renewable energy and circular economy. In this regard, following an increase of the excise tax on diesel in 2019, a carbon tax of €20 per ton in 2021 has been introduced (to be raised to €25 in 2022 and €30 in 2023). A grant of up to €8,000 was made available for any purchase of new electric/hybrid vehicles before March 2024, and interest subsidies and guarantees were provided for sustainable renovation of homes. Preliminary evidence shows encouraging results on car sales and growing interest for home improvement, though uneven across income levels and with a still-high share of diesel vehicles.

Non-ETS GHG Emissions
(Mt CO2 equivalent)



Source: Ministry of Sustainable Development and Infrastructure.





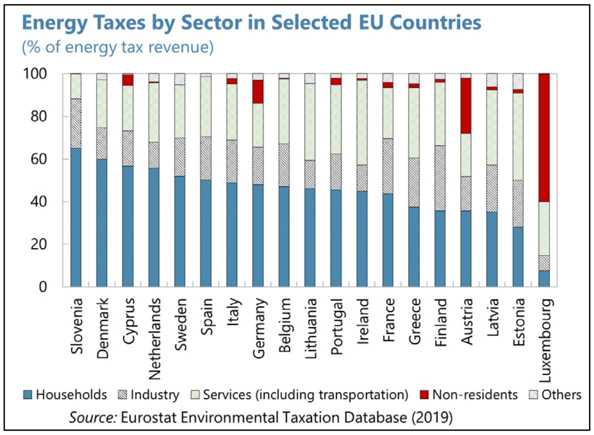
42. To benefit from the green transition, the authorities are promoting sustainable finance. Luxembourg has been a leader in sustainable finance, launching a range of initiatives. Luxembourg's Green Exchange lists over 50 percent of the green bonds issued worldwide and over 20 percent of assets under management in ESG funds worldwide. Luxembourg also published a Sustainability Bond Framework, established a Climate Finance Platform with the EIB, and launched an International Climate Finance Accelerator to train and support climate fund managers. A public-private partnership, the Luxembourg Sustainable Finance Initiative, launched a strategy in 2021 to further strengthen Luxembourg's role as an international hub for sustainable finance.

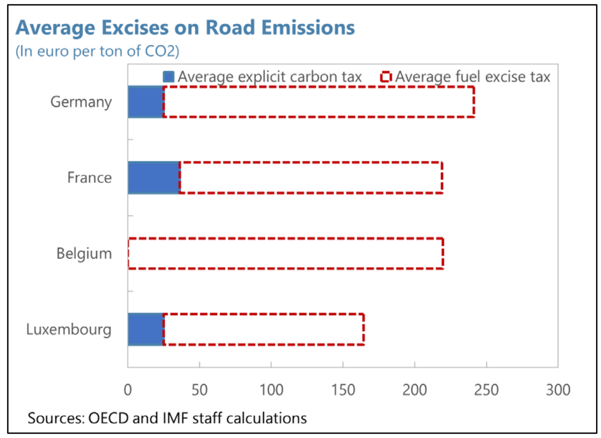
43. However, achieving the authorities' goals of reduction of GHG emissions may entail large fiscal costs during the transition. The transport sector accounts for more than 60 percent of the expected reduction in emissions, and is dominated by non-residents' demand for fuel Hence, achieving the authorities' pledge could prove costly and will depend on neighbors' policies.

- *Carbon leakages.* Fuel sales to non-residents are elastic to the price differential with neighboring countries, exposing Luxembourg to potential large revenue losses that would outweigh the revenue from carbon taxation (about 60 percent of energy taxes equivalent to 0.9 percent of GDP are paid by non-residents). With the introduction of the carbon tax in Luxembourg (€20/ton cumulatively in 2021), diesel prices for professionals became aligned with France and higher than Belgium, which contributed to a revenue loss of over 0.1 percent of GDP. Higher losses are expected in 2022-23 as the price gap with France turns negative.

- *Tax-base erosion and impact on attractiveness for workers.* A rapid reduction of fuel sales to non-residents would lead to tax-base erosion, especially in transport-related activities (fuel station, transport, and commerce, including tobacco sales). More importantly, a rapid increase in transport costs could reduce the country's attractiveness for cross-border commuters and have unintended consequences on growth, housing, etc. (see above).

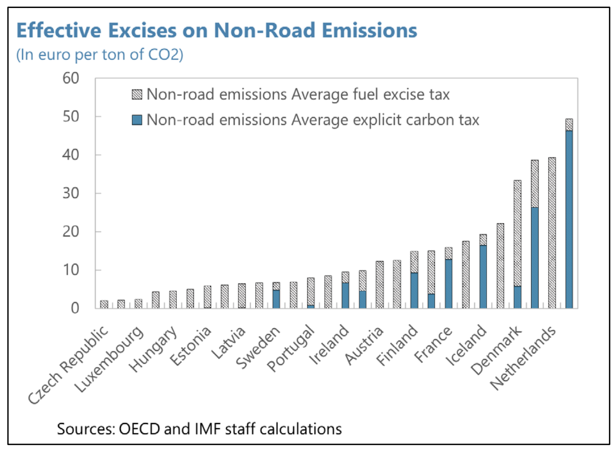
- *Mitigation of the distributional impact of higher CO2 taxes.* The authorities introduced a progressive tax credit and raised the cost-of-living allowance by €200 (after a 10 percent increase in 2020) to reduce the risk of energy poverty. This comes in addition to the free public transport introduced in March 2020 and likely to benefit mostly the lower income households.





44. Advancing green policies reform requires a careful balancing act and strengthened communication.

- *Energy taxation and incentives.* The increase in carbon taxation should be gradual, predictable, and aligned to the implementation of public infrastructure projects. It is critical that some of the carbon tax revenue from cross-border commuters is recycled to promote their behavioral change (e.g., better service for public transportation to the borders, parking facilities and free parking for cleaner energy vehicles). In parallel, there is merit in reviewing environmental taxation to enhance the carbon price signal, including by reducing implicit fuel subsidies (e. g., diesel), increasing taxes on non-road carbon emissions, and revising user fees for cars. These reforms should be well-timed and communicated to ensure buy-in by the public.



- *Equity-enhancing measures.* The authorities should continue to compensate vulnerable households, while eliminating redundant compensation schemes. Incentives for the transition to greener and more energy-efficient products could be more progressive (increased for lower income), to accelerate behavioral change among this category and reduce the fiscal cost going forward.

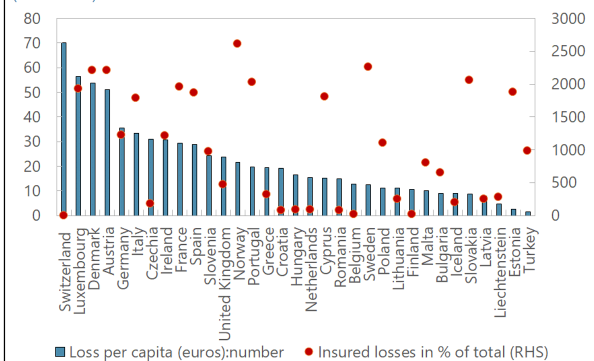
- *Coordinated public policies.* Achieving the authorities' goals requires a coordinated approach that involves other public policies (housing, spatial planning, innovation, etc.). In addition to promoting remote work among residents, the authorities should negotiate continue to a larger number of remote workdays with neighboring countries with a view of reducing emissions and congestion at the Greater Region level.

- *Governance.* The Parliament's adoption of the law on climate and climate pact with municipalities are steps in the right direction to enhance governance, accountability, and regular

monitoring of the effectiveness of environmental policies. These efforts could be further strengthened through the adoption of green budgeting (examples include France, Finland) to ensure better alignment of fiscal measures with climate goals.

45. Building on ongoing efforts, the authorities should strengthen resilience to climate change risks and challenges.

Economic Losses Due to Extreme Weather Events
(1980-2019)



Sources: European Environment Agency

- *Extreme climate change events*. In recent years, Luxembourg has been exposed to severe flood events, storms (tornado), and record heat. The cost of the July 2021 flood is estimated at 0.3 percent of GDP, of which about half was insured and half supported by the government. In addition, the government has extended the short-term work scheme to cover the impact on unemployment. As these events become more frequent in the future, the insurance premium might become unaffordable and some areas could become uninsurable, requiring more government intervention. In this context, the authorities should continue investing in climate adaptation infrastructure and enhancing early-warning systems, and systematically include climate risks in fiscal risks analysis.
- *Challenges for the financial sector*. Climate change and the transition toward sustainable finance also involve costs and risks for the financial sector. The ECB's recent climate change stress tests show that there are significant physical and transition risks in the corporate loan portfolios of Luxembourg's banks, and that most of these loans are not backed by collateral.[17] However, as corporate loans constitute only about 13 percent of banks' balance sheets, the overall risks are moderate to low, albeit subject to uncertainty. Equity and bonds issued by carbon-intensive sectors comprise about 18 percent of the assets under management by Luxembourg's investment funds. Although Luxembourg is well advanced in the transition to sustainable finance, the adaptation to the relevant taxonomies and regulations and related changes to organizations and governance mechanisms are likely to weigh on profitability during the transition phase. For investment funds to become an effective driver of the transition toward a green economy, efforts are needed to further strengthen the global climate information architecture and ensure proper regulatory oversight to prevent greenwashing (see October 2021 GFSR, Chapter 3).

Authorities' Views

46. The authorities remain committed to achieve their ambitious climate goals. They consider carbon pricing, complemented by measures to address distributional consequences and

[17] See ECB Occasional Paper No 281, September 2021.

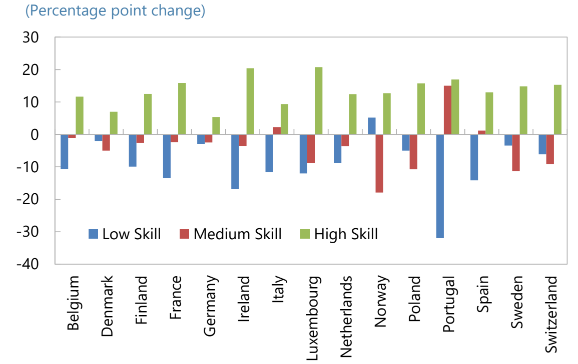
promote behavioral change, to be an important tool in steering policy in the years ahead. They noted the ongoing discussions at the EU level to include road transport and buildings in the emission trading system. Regarding extreme risks events, the authorities indicated that insurance companies and banks are adapting to these new risks (e.g., through packaging of flood risks with other risks and insurance for mortgage-linked home insurance). They agreed that continuous investment in adaptation infrastructure is needed.

Automation/Digital Transition

47. The authorities have been investing in the digital transformation well before the pandemic. The Digital Luxembourg strategy was launched in 2014 to facilitate public-private sector multidisciplinary work in five main areas—skills, policy, infrastructure, ecosystem, and government. The Ministry of Digitalization was created in 2018 to promote the development of the information and computation technology (ICT) and the digitalization of the public sector. The authorities' "Recovery and Resilience Plan" envisages to further promote e-public services, invest in high-power computing, and develop the innovation eco-system. This, together with more than 40 percent of the population having tertiary education, positions the country well for the digital transition.

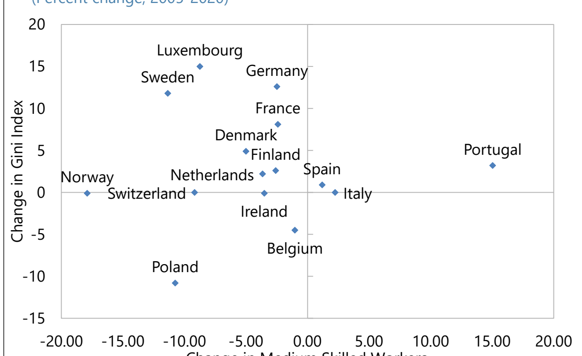
48. While boosting productivity, accelerated digitalization and automation are likely to further increase polarization in the labor market and increase inequality. The shift towards high-skill workers has increased inequality, albeit from low levels, both in terms of disposable income and employment opportunities (right chart).[18] A growing share of unemployed are older, relatively lower skilled compared to the population, and increasingly likely to experience longer bouts of unemployment (aging would put further pressure on this trend). The rising skill intensity of the public sector and further digitalization of the economy will reduce demand for low-skill workers and reinforce skill obsolescence (Box 2). In the medium term, adoption of labor replacing automation could help alleviate labor market tightness but also risks placing added pressures on disadvantaged groups, notably low-skill workers.

Share of Total Employment by Skill, 2005-2020
(Percentage point change)



Sources: Eurostat

Change in Gini and Medium Skilled Workers
(Percent change; 2005-2020)



Source: Eurostat; IMF Staff Calcuations

[18] Income inequality in Luxembourg increased compared to the euro area peers and is currently somewhat higher than the euro area average.

49. Strengthened policies that support labor participation, reallocation, and employment of disadvantaged groups are needed to mitigate potential adverse impacts on inequality. The authorities are appropriately focusing on reskilling workers with outdated skills and investing in digital education. Programs such as the *Future Skills* initiative implemented during the pandemic and efforts by the Ministry of Education to increase digital education in schooling are welcome. Existing active labor market policy (ALMP) are also welcome but should increase focus on cross-sector reallocation of unemployed workers through skill development and training . Programs could be further extended to allow for participation by currently employed workers and offering lifelong learning opportunities. These programs should also increase targeting towards workers facing skill obsolescence in partnership with the private sector, which would improve labor participation for this group. ALMP efficiency should continue to be reviewed. There is also merit in reviewing the pension system to reduce early retirement and labor market dropout.[19] These efforts should inform adaptation of educational programs to get ahead of trends and avoid large-scale skill mismatches. Furthermore, improved access to vocational training and apprenticeship programs is needed .

Authorities' Views

50. The authorities agreed that the digital transition could adversely impact low- and middle-skill occupations and income inequality. They agreed that, working with the private sector, they should continue to monitor and identify occupations at risks. They broadly agreed that scaling up skilling and training programs for both registered jobseekers and the employed would foster employability and thus strengthen the functioning of the labor market. However, they acknowledged the limited effectiveness of certain ALMP measures to reattach low-skilled old workers to the labor market. The authorities also initiated analysis of the effectiveness of existing policies to guide future reforms and are finalizing the national talent strategy as well as the national skills strategy.

STAFF APPRAISAL

51. The economy has rebounded strongly in 2021, but the war in Ukraine will weigh on the recovery, mostly through financial sector performance. As pandemic-related restrictions were lifted, Luxembourg's activity and labor market rebounded strongly and inflation picked up. Although growth is expected to remain positive and close to potential, the war in Ukraine will dampen the recovery. An escalation of the war and related sanctions and spillovers is the key near-term risk together with a sharp tightening of global financial conditions.

52. The accommodative fiscal stance in 2022 is broadly appropriate; any additional support should be targeted and temporary to avoid exacerbating labor and housing market imbalances. Given the negative output gap and downside risks, the supportive fiscal stance in 2022 is broadly appropriate. Also, the decision to compensate for higher inflation through temporary measures, while limiting wage indexation to once per year is welcome. Going forward, fiscal policy

[19] Compared to others in the region, Luxembourg has one of the lowest participation rates among workers aged 50 or above and has one of the youngest effective retirement ages.

should remain nimble, with any additional measures, to the extent possible, targeted (to low- and middle-income households) and timebound. Price distortions should be avoided to allow consumption and production to adapt. Additionally, postponing non-urgent public hiring could help relieve pressures in the labor and housing markets. Once the risks from the war dissipate, the authorities should resume gradual policy normalization to maintain buffers over the medium term, while promoting non-inflationary growth and accelerating reforms to increase resilience and reduce inequality.

53. **The financial system weathered the pandemic well, but continued close monitoring of risks, including those emanating from the war, is needed.** The direct exposures of banks and investment funds to Russia and Ukraine are limited as a share of assets. However, the situation is fluid and the impact of the war on the financial sector will mainly depend on spillovers to global financial conditions. Continuing close monitoring of evolving risks (including cyber security), coordination with other jurisdictions, and communication with financial sector participants will be essential to mitigate adverse impacts. The authorities should continue their efforts to address banks' structural profitability issues. For investment funds, the authorities should continue to engage in international fora on the design and calibration of a macroprudential toolkit.

54. **Actions are urgently needed to reduce pressures in the housing market to enhance affordability and limit financial stability risks.** Efforts to boost housing supply, including for affordable and social housing, and higher taxation of unused land and empty dwellings are welcome. However, these measures will take time to bear fruit and a multipronged approach is needed. It is essential to increase efficiency of using existing resources. Bottlenecks in the construction sector should be addressed and the sector's productivity enhanced. To reduce demand, fiscal policy should better target homebuyers' assistance and phase out interest payments deductibility. Also, the authorities should consider introducing debt-service-to-income and debt-to-income limits and accelerating the implementation of the credit registry. Sectoral concentration limits (on real estate loans) could also be considered.

55. **Achieving the authorities' ambitious GHG emissions targets requires a careful balancing act.** The transition may be associated with sizable revenue losses. The increase in carbon taxation should be gradual, well-timed and communicated, supported by further improvements in public transportation and incentives for behavioral change, and accompanied by compensation for low-income households. The carbon tax should be complemented with a gradual removal of implicit subsidies and higher taxes on non-road carbon emissions and car user fees. Incentives for the transition to greener and more energy-efficient products and homes should be more progressive. Raising investment in climate adaptation and improving preparedness of the financial sector to deal with transition risks should continue.

56. **Strengthened policies that support labor market participation, reallocation, and employability of disadvantaged groups are needed to mitigate adverse impacts of digitalization on inequality.** Existing active labor market policies are welcome but should increase focus on cross-sector reallocation of unemployed workers and be further extended to currently-employed workers. The authorities should continue to monitor and identify occupations at risk of

obsolescence, and redesign training programs with input from the private sector. To improve labor participation of the older population, there is also merit in reducing incentives for early retirement. Finally, improvements in education should be accompanied by enhanced vocational training and apprenticeship programs.

57. It is recommended that the next Article IV consultation be held on the standard 12-month cycle.

Proposed Decision

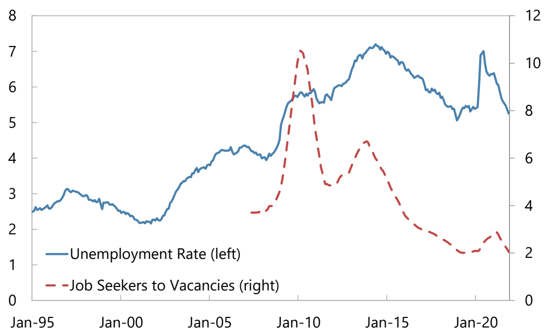
The Executive Board endorses the thrust of the staff appraisal in the report for the 2022 Article IV Consultation with Luxembourg (SM/22/95, 5/13/22).

It is expected the next Article IV Consultation with Luxembourg will take place on the standard12-month cycle.

Box 1. Luxembourg's Labor Market During the Pandemic

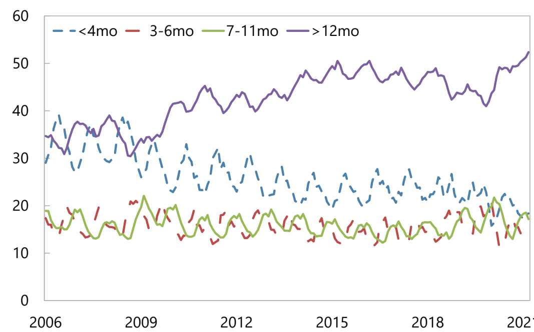
Luxembourg's labor market has experienced a swift recovery, despite some groups lagging. The economy has returned to the pre-pandemic unemployment rate of just over 5 percent, following a sharp increase in unemployment to near 7 percent at the start of the pandemic. Also, the participation rate has increased relative to the pre-pandemic period.[1/] However, following a downward trend in the years prior to the pandemic, the share of job seekers for more than 12 months increased and reached 52percent in August 2021 (right chart). Similarly, foreign, women, and low-skill workers have yet to reach pre-pandemic rates of unemployment. The recovery has also been uneven across sectors with commerce, education, public services experiencing rapid employment growth relative to the pre-pandemic period, while in construction, food services, manufacturing employment declined despite high job vacancies.

Unemployment Rate and Job Seekers to Vacancies Ratio
(Percent; Seasonally Adjusted; 12-Month Moving Average)



Sources: Statec; IMF Staff Calculations.

Job Seekers by Duration
(Percent)



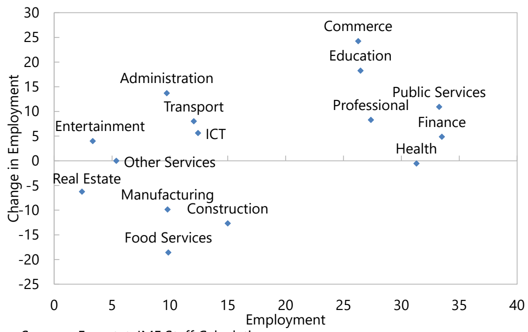
Sources: ADEM; IMF Staff Calculations

Notes: Employment is calculated in 2019 and 2021 as the average employment in Q1 through Q3. New Vacancies are calculated as total new vacancies listed on ADEM from Janaury to November of 2021.

Labor market skill mismatches across and within sectors have increased during the recovery. Some sectors, such as professional and administrative services, have experienced relatively low employment growth despite a high labor demand, as evident from high rate of new job postings. Other sectors, such as public services and education, have been able to grow rapidly by attracting new workers to meet labor demand. Finally, some sectors, such as entertainment and real estate, have experienced a slow recovery with low employment growth on the back of weak labor demand. On the workers' side, the uneven recovery across sectors has led to some qualified workers facing difficulties finding employment, despite the tightness of the labor market.

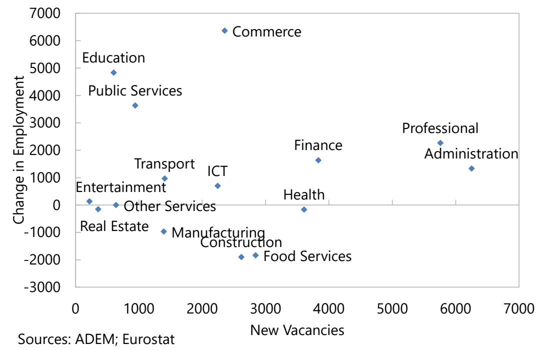
Box 1. Luxembourg's Labor Market During the Pandemic (Concluded)

Employment Growth by Sector, 2019-2021
(Thousands of employees; percent)



Sources: Eurostat; IMF Staff Calculations

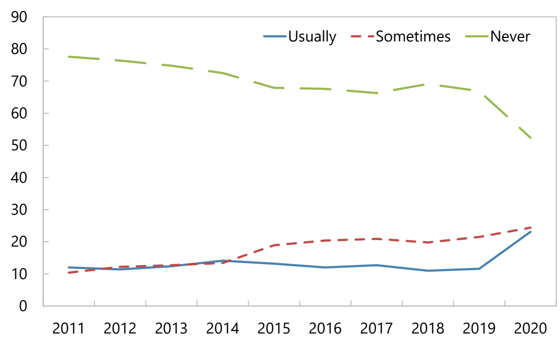
Sectoral Mismatch
(New vacancies; change in employees)



Sources: ADEM; Eurostat

The pandemic has accelerated trends in the workplace. The sharp increase in teleworking, helped protect jobs from the pandemic and will likely persist in some form in the future. Trends in digitalization and automation accelerated during the pandemic, as firms and workers adjusted to new working conditions, which may also help lessen labor market tightness in sectors facing difficulties attracting workers. However, these trends could also increase pressures on disadvantaged workers—especially old and low-skill—that were already facing declining job prospects prior to the pandemic.

Telework in Luxembourg
(Percent of workers)



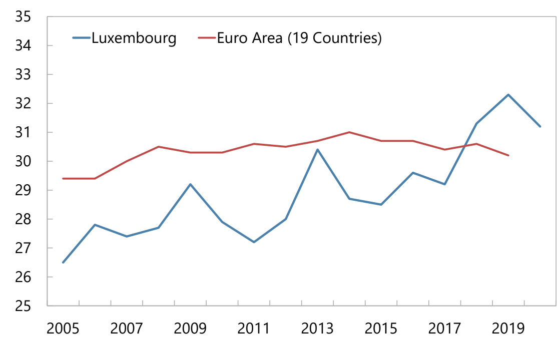
Sources: Eurostat.

1/ Hours worked have not recovered to pre-pandemic levels. However, this is likely due to changes in work schedules from increased flexibility and changes in the sectoral composition of occupations.

Box 2. Luxembourg: Long-Term Trends in the Labor Market and Inequality

Staff analysis examines the drivers of increasing inequality and labor market dynamics in Luxembourg over the past 20 years. The digitalization and automation trends increased the polarization of the labor market, inequality, and skill mismatches, with adverse effects on unemployment. While initially low, the Gini index of disposable income has steadily increased and surpassed the euro area average in 2018 (chart). Staff analysis develops and estimates a structural model to match features of the labor market during early 2000s to the pre-pandemic period. The findings highlight three structural shifts in the labor market related to technological progress, including digitalization.

Gini Index of Disposable Income



Sources: Eurostat

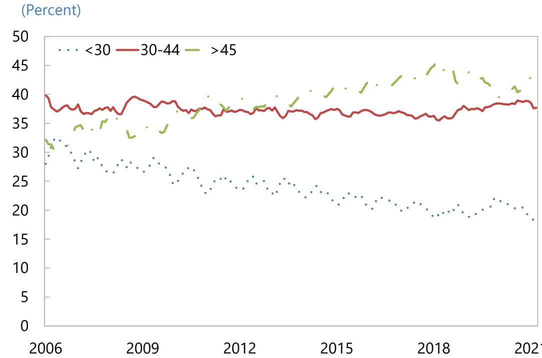
- Matching efficiency between job seekers and employers has declined while the cost of posting vacancies has also declined. This reflects that, in the data, the ratio of job seekers to vacancies has been relatively stable while unemployment has increased.
- The market value of high-skill labor (high-skill premia) has increased relative to medium- and low-skill labor. This reflects both an increase in wage inequality as well as a decline in the share of high-skill job seekers relative to the share of high-skill persons in the population.[1/]
- The labor market value of older workers has declined. This reflects that, in the data, the share of older workers that are unemployed is rising disproportionately to older workers in the labor force.

The analysis also highlights that further digitalization will exacerbate these trends as it increases the skill bias of the labor market and reinforces the rate of skill obsolescence.

Change in Skill Share, 2006-2019
(Percentage Point Change)

Sources: Eurostat; STATEC; IMF Staff Calculations

Job Search by Age
(Percent)



Sources: ADEM; IMF Staff Calculations.

Staff simulated three policy scenarios to support displaced workers and mitigate inequality. The idea of the simulations is to show potential tradeoffs these policies could create. The effects of the policies on the skill distribution, inequality, and the unemployment are summarized in the panel chart below.

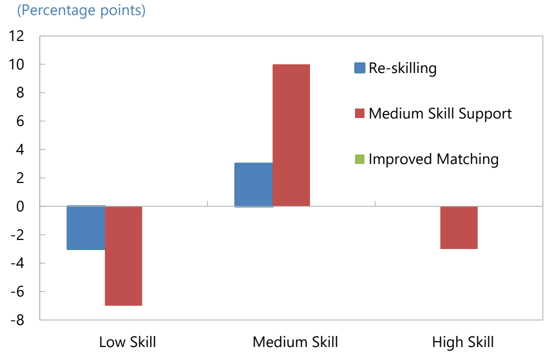
Box 2. Luxembourg: Long-Term Trends in the Labor Market and Inequality (Continued)

- **Re-skilling of older workers** through a program that increases the ability of low- to medium-skill older workers. This would include programs that provide skill upgrades, including digital training such as the *Future Skills* initiative or *lifelong learning*. The programs allow workers vertical mobility, both from low- to medium-skill and from medium- to high-skill occupations. Even within skill groups, the policy improves worker ability, providing workers with higher wages and better employment prospects. Consequently, overall inequality and unemployment fall.[2/] However, the downside of these policies is that they are limited by the size of the targeted group.

- **Support for medium-skill occupation** through a subsidy to medium-skill employment. This policy would include both programs that directly (e.g., occupation-specific subsidies or tax benefits) or indirectly (e.g., increase public hiring of specific occupations) support medium-skill occupations. The policy decreases unemployment of the medium-skill workers by increasing the net value of employment. The policy also decreases unemployment by allowing some workers to move from low- to medium-skill occupations. However, a careful balancing should be maintained as the policy also disincentivizes some workers from moving from medium- to high-skill occupations by increasing wages of medium-skill workers.

- **Programs that improve matching between job seekers and firms.** This policy would include, for example, job boards—such as ADEM—that create easy points of contact between job seekers and employers, job counseling services, or accreditation of skills and training programs. While the policy has little effect on the skill distribution or inequality, this policy reduces unemployment across the distribution. The reduction tends to be largest for disadvantaged groups—low-skill or older workers—where unemployment is initially highest.

Change in Skill Distribution
(Percentage points)



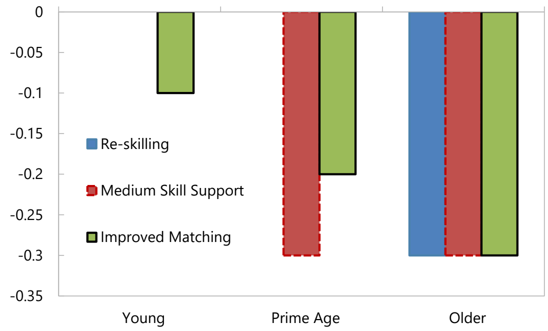
Sources: IMF Staff Calculations

Change in Inequality
(Percent change)

Sources: IMF Staff Calculations

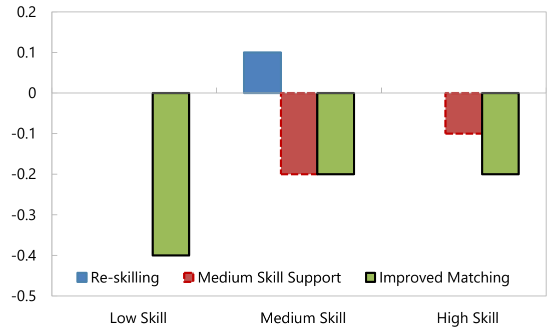
Box 2. Luxembourg: Long-Term Trends in the Labor Market and Inequality (Concluded)

Change in Unemployment Rate by Age Group
(Percentage points)



Sources: IMF Staff Calculations

Change in Unemployment Rate by Skill Level
(Percentage points)



Sources: IMF Staff Calculations

1/ The decline in the low skill share of job seeker relative to the population may suggest some gains by this group. However, this is primarily due to its large initial level, which at around 40 percent remains around double the share of low-skilled in the population.

2/ While the unemployment rate of high-skill workers increases, this is driven by a composition effect due to the marginal workers entering high skill occupations.

Table 1. Luxembourg: Selected Economic Indicators, 2018-27

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
				Projections						
Real Economy (percent change)										
Gross domestic product	2.0	3.3	-1.8	6.9	1.8	2.1	2.9	2.5	2.5	2.5
Total domestic demand	0.4	4.7	-2.3	7.3	3.7	3.2	2.9	2.6	2.5	2.5
Private consumption	2.6	2.5	-6.9	7.4	4.2	3.9	2.6	2.7	2.6	2.6
Public consumption	4.7	3.9	7.7	4.7	4.3	1.9	2.0	2.3	2.4	2.4
Gross investment	-7.1	9.6	-3.1	9.7	2.3	3.2	4.2	2.6	2.5	2.5
Foreign balance 1/	1.7	0.3	-0.1	2.1	-0.9	-0.1	0.9	0.7	0.8	0.8
Exports of goods and nonfactor services	3.6	5.8	1.3	9.7	-0.1	0.8	3.4	2.8	2.5	2.5
Imports of goods and nonfactor services	3.2	6.9	1.6	10.4	0.4	1.0	3.5	2.9	2.5	2.5
Labor Market (thousands, unless indicated)										
Resident labor force	279.9	287.1	294.5	299.2	305.2	311.3	317.5	323.9	330.2	336.6
Unemployed (average)	15.3	15.4	18.7	17.1	15.3	15.5	15.9	16.2	16.5	16.7
(Percent of total labor force)	5.1	5.4	6.4	5.7	5.0	5.0	5.0	5.0	5.0	5.0
Resident employment	264.7	271.7	275.8	282.1	289.9	295.7	301.6	307.6	313.7	319.9
(Percent change)	2.9	2.6	1.5	2.3	2.8	2.0	2.0	2.0	2.0	2.0
Cross-border workers (net)	183.3	191.9	196.4	204.6	211.4	217.1	222.8	228.7	234.6	240.8
Total employment	448.0	463.6	472.2	486.7	501.3	512.8	524.4	536.3	548.3	560.7
(Percent change)	3.7	3.5	1.9	3.1	3.0	2.3	2.3	2.3	2.3	2.3
Prices and costs (percent change)										
GDP deflator	1.7	0.6	4.3	6.8	3.4	2.3	2.7	2.0	2.0	2.0
CPI (harmonized), p.a.	2.0	1.7	0.0	3.5	5.6	2.0	2.0	2.0	2.0	2.0
CPI core (harmonized), p.a.	0.9	1.8	1.2	1.5	3.0	2.4	2.0	2.0	2.0	2.0
CPI (national definition), p.a.	1.5	1.7	0.8	2.5	4.5	2.3	2.0	2.0	2.0	2.0
Wage growth 2/	2.7	2.0	0.3	5.1	4.0	3.1	2.0	2.3	2.3	2.3
Nominal unit labor costs 2/	4.4	2.2	4.1	1.4	5.3	3.3	1.3	2.1	2.0	2.0
Public finances (percent of GDP)										
General government revenues	45.1	45.2	43.7	43.2	42.9	43.5	43.3	43.5	43.6	43.7
General government expenditures	42.1	42.9	47.2	42.3	44.0	43.9	43.5	43.6	43.7	43.9
General government balance	3.0	2.3	-3.4	0.9	-1.2	-0.4	-0.2	-0.1	-0.2	-0.3
General government structural balance	3.0	1.9	-2.0	0.7	-0.7	-0.3	-0.2	-0.1	-0.2	-0.3
General government gross debt	20.8	22.3	24.8	24.4	25.7	26.4	26.3	26.4	26.3	26.2
Balance of Payments (percent of GDP)										
Current account	4.7	4.6	4.1	4.8	4.0	4.1	4.3	4.4	4.4	4.4
Balance on goods	3.1	3.4	3.2	1.1	0.3	0.5	0.6	0.7	0.7	0.7
Balance on services	35.2	33.5	34.0	34.1	31.9	31.3	31.8	31.9	31.8	31.9
Net factor income	-33.0	-32.8	-32.8	-30.2	-28.4	-27.8	-28.3	-28.4	-28.3	-28.4
Balance on current transfers	-0.6	0.4	-0.3	-0.1	0.2	0.2	0.2	0.2	0.2	0.2
Exchange rates, period averages										
U.S. dollar per euro	1.18	1.12	1.14	...	...	...	...	...	...	...
(Percent change)	4.6	-5.2	1.9	...	...	...	...	...	...	...
Nominal effective rate (2010=100)	102.2	101.5	103.2	...	...	...	...	...	...	...
(Percent change)	2.0	-0.6	1.6	...	...	...	...	...	...	...
Real effective rate (CPI based; 2010=100)	100.3	99.6	100.9	...	...	...	...	...	...	...
(Percent change)	1.4	-0.7	1.3	...	...	...	...	...	...	...
Credit growth and interest rates										
Nonfinancial private sector credit (eop, percent change) 3/	8.5	7.2	5.0	5.3	5.7	4.9	6.1	4.9	4.9	4.9
Government bond yield, annual average (percent)	...	...	...	...	...	...	...	...	...	...
Memorandum items: Land area = 2,586 sq. km; population in 2019 = 626,108; GDP per head = €101,446										
GDP (billions of euro)	60.4	62.7	64.2	73.3	77.1	80.5	85.2	89.0	93.1	97.4
Output gap (percent deviation from potential)	0.1	1.1	-3.0	0.5	-0.2	-0.2	0.0	0.0	0.0	0.0
Potential output growth	2.4	2.3	2.3	3.2	2.5	2.0	2.8	2.5	2.5	2.5

Sources: Luxembourg authorities; IMF staff estimates and projections.

1/ Contribution to GDP growth.

2/ Overall economy.

3/ Including a reclassification of investment companies from financial to non-financial institutions in 2015.

Table 2. Luxembourg: Balance of Payments, 2018-27[1/]
(Percent of GDP)

	2018	2019	2020	Est. 2021	Projections 2022	2023	2024	2025	2026	2027
Current account	4.7	4.6	4.1	4.8	4.0	4.1	4.3	4.4	4.4	4.4
Balance on goods and services	38.3	36.9	37.2	35.1	32.2	31.8	32.4	32.6	32.6	32.6
Trade balance 1/	3.1	3.4	3.2	1.1	0.3	0.5	0.6	0.7	0.7	0.7
Goods exports	39.9	40.7	35.5	33.9	31.3	31.2	31.7	31.9	31.8	31.9
Goods imports	36.8	37.2	32.3	32.8	31.0	30.7	31.1	31.1	31.1	31.2
Balance on services	35.2	33.5	34.0	34.1	31.9	31.3	31.8	31.9	31.8	31.9
Services exports	157.7	164.7	166.0	161.5	142.9	140.9	143.5	144.1	143.9	144.2
Services imports	122.5	131.2	132.0	127.4	111.0	109.6	111.6	112.3	112.1	112.3
Net factor income	-33.0	-32.8	-32.8	-30.2	-28.4	-27.8	-28.3	-28.4	-28.3	-28.4
Compensation of employees, net	-16.7	-17.2	-16.3	-15.2	-15.8	-16.0	-15.9	-15.9	-16.0	-16.0
Compensation of employees, credit	2.8	2.8	2.9	2.6	2.6	2.6	2.6	2.6	2.6	2.7
Compensation of employees, debit	19.6	20.0	19.2	17.7	18.4	18.7	18.5	18.6	18.6	18.7
Investment income, net	-16.3	-15.6	-16.5	-15.1	-12.6	-11.8	-12.4	-12.5	-12.3	-12.4
Investment income, credit	463.3	453.5	429.7	375.5	385.0	378.7	367.5	360.8	354.0	347.2
Investment income, debit	479.6	469.1	446.2	390.6	397.6	390.5	380.0	373.2	366.3	359.6
Balance on current transfers	-0.6	0.4	-0.3	-0.1	0.2	0.2	0.2	0.2	0.2	0.2
Capital and financial account	-4.7	-4.6	-3.7	-7.3	-4.0	-4.1	-4.3	-4.4	-4.4	-4.4
Capital account	2.8	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Financial account	7.5	4.5	3.5	7.3	4.0	4.1	4.3	4.4	4.4	4.4
Direct investment, net	-35.0	111.8	11.0	111.7	100.5	90.4	81.4	73.3	65.9	59.3
Abroad	-871.7	-426.8	-279.9	-144.9	-130.1	-117.1	-105.5	-95.0	-85.5	-76.9
In reporting economy	-836.7	-538.6	-290.9	-256.6	-230.6	-207.6	-186.9	-168.2	-151.4	-136.3
Portfolio investment, net	-155.8	-108.4	24.5	-152.7	-152.7	-152.7	-152.7	-152.7	-152.7	-152.7
Portfolio investment, assets	183.2	256.3	315.1	469.2	271.1	205.1	183.1	175.8	173.3	172.5
Portfolio investment, liabilities	339.0	364.7	290.6	621.9	423.8	357.8	335.8	328.5	326.0	325.2
Financial derivatives, net	26.4	14.9	9.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3
Other investment, net	171.7	-14.1	-41.3	19.9	28.9	39.6	49.0	57.4	64.8	71.4
Other investment, assets	234.8	72.2	161.7	186.5	186.5	186.5	186.5	186.5	186.5	186.5
Other investment, liabilities	63.2	86.3	203.0	166.6	157.6	147.0	137.5	129.1	121.7	115.1
Reserve assets	0.1	0.1	0.0	2.1	1.1	0.5	0.3	0.1	0.1	0.0
Errors and omissions	0.0	0.0	-0.5	2.6	0.0	0.0	0.0	0.0	0.0	0.0

Sources: STATEC and IMF Staff calculations.
1/ Includes merchanting trade operations.

Table 3. Luxembourg: General Government Operations, 2018-27
(Percent of GDP)

				Projections						
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Revenue	45.1	45.2	43.7	43.2	42.9	43.5	43.3	43.5	43.6	43.
Taxes	28.2	28.1	26.8	27.2	26.8	27.2	27.2	27.3	27.4	27.
of which, corporate income taxes	6.3	6.0	4.8	4.5	4.5	4.5	4.5	4.5	4.5	4.
of which, personal income taxes	10.5	10.8	11.1	11.2	10.8	11.2	11.4	11.6	11.7	11.
of which, taxes on international trade &	2.4	2.5	2.2	2.3	2.3	2.1	2.1	2.0	1.9	1.
Social contributions	12.1	12.3	12.6	11.7	11.8	12.0	11.8	11.9	11.9	11.
Grants	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.
Other revenue	4.7	4.7	4.1	4.2	4.2	4.2	4.2	4.2	4.2	4.
Expenditure	42.1	42.9	47.2	42.3	44.0	43.9	43.5	43.6	43.7	43.
Expense	40.3	41.0	44.7	40.6	42.2	41.9	41.5	41.6	41.8	42.
Compensation of employees	9.9	10.1	10.8	9.9	10.2	10.4	10.3	10.3	10.3	10.
Use of goods and services	4.1	4.2	4.4	4.2	4.2	4.1	4.0	3.9	3.9	3.
Interest	0.4	0.3	0.2	0.2	0.1	0.1	0.4	0.4	0.4	0.
Subsidies	1.1	1.1	1.1	1.0	1.4	1.1	1.0	0.9	0.9	0.
Social benefits	18.1	18.4	20.8	18.1	18.6	18.8	18.6	18.8	19.0	19.
Other expense	7.9	8.0	8.5	8.2	9.1	8.5	8.3	8.2	8.2	8.
Gross public invtesemnt	3.9	4.1	4.7	4.0	4.2	4.5	4.5	4.5	4.5	4.
Net acquisition of nonfinancial assets	1.8	1.9	2.4	1.8	1.8	1.9	2.0	2.0	2.0	2.
Gross operating balance	7.1	6.5	1.5	5.0	3.0	4.1	4.4	4.4	4.4	4.
Net operating balance	4.8	4.2	-1.0	2.6	0.6	1.5	1.8	1.8	1.8	1.
Net lending / borrowing	3.0	2.3	-3.4	0.9	-1.2	-0.4	-0.2	-0.1	-0.2	-0.
Net acquisition of financial assets	4.0	5.1	-0.6	...	...	...	…	…	…	
Monetary gold and SDRs	...	...	...	...	...	...	…	…	…	
Currency and deposits	0.6	3.6	-1.7	...	...	...	…	…	…	
Securities other than shares	0.0	0.5	1.1	...	...	...	…	…	…	
Loans	0.2	0.1	0.1	...	...	...	…	…	…	
Shares and other equity	1.7	1.0	0.5	...	...	...	…	…	…	
Insurance technical reserves	...	...	...	...	...	...	…	…	…	
Financial derivatives	0.3	0.3	-0.3	...	...	...	…	…	…	
Other accounts receivable	1.2	-0.4	-0.3	...	...	...	…	…	…	
Net incurrence of liabilities	1.0	2.8	2.8	...	...	...	…	…	…	
Special Drawing Rights (SDRs)	...	...	...	...	...	...	…	…	…	
Currency and deposits	0.0	0.0	0.0	...	...	...	…	…	…	
Securities other than shares	0.0	2.4	3.1	...	...	...	…	…	…	
Loans	-0.2	-0.1	-0.2	...	...	...	…	…	…	
Shares and other equity	0.0	0.0	0.0	...	...	...	…	…	…	
Insurance technical reserves	0.0	0.0	0.0	...	...	...	…	…	…	
Financial derivatives	0.0	0.0	0.0	...	...	...	…	…	…	
Other accounts payable	1.1	0.5	-0.1	...	...	...	…	…	…	
Memorandum items:										
GDP (in billions of euro)	60.4	62.7	64.2	73.3	77.1	80.5	85.2	89.0	93.1	97.
Structural balance	3.0	1.9	-2.0	0.7	-0.7	-0.3	-0.2	-0.1	-0.2	-0.
Output gap	0.1	1.1	-3.0	0.5	-0.2	-0.2	0.0	0.0	0.0	0.
Public gross debt (Maastricht definition)	20.8	22.3	24.8	24.4	25.7	26.4	26.3	26.4	26.3	26.

Table 4. Luxembourg: General Government Financial Balance Sheet, 2016–20
(Millions of euros unless noted otherwise)

	2016			2017			2018			2019			2020		
	Trans-actions	Other economic flows	Closing balance	Trans-actions	Other economic flows	Closing balance	Trans-actions	Other economic flows	Closing balance	Trans-actions	Other economic flows	Closing balance	Trans-actions	Other economic flows	Closing balance
Net financial worth	1,055	763	27,831	770	121	28,713	1,046	247	30,037	1,649	2,216	33,920	-2,101	525	32,429
Financial assets	340	844	42,895	2,492	-71	45,316	1,656	122	47,094	3,449	2,127	52,670	-227	683	53,126
Currency and deposits	-799	0	7,220	1,781	0	9,001	338	81	9,420	2,246	0	11,666	-1,103	37	10,600
Debt securities	348	137	9,210	466	-380	9,296	20	-58	9,258	330	524	10,112	691	51	10,854
Loans	-22	1	1,274	23	-1	1,296	97	-2	1,391	86	0	1,477	51	-2	1,526
Equity and inv. fund shares	863	767	20,316	456	53	20,825	1,036	-457	21,404	604	1,981	23,989	300	594	24,883
Financial derivatives	31	-61	17	0	17	34	0	-21	13	0	40	53	0	11	64
Other financial assets	-81	0	4,858	-234	240	4,864	165	579	5,608	183	-418	5,373	-166	-8	5,199
Liabilities	-631	81	15,064	1,731	-192	16,603	579	-125	17,057	1,782	-89	18,750	1,789	158	20,697
Currency and deposits	10	0	282	9	0	291	11	-1	301	10	0	311	5	0	316
Debt securities	2	80	7,231	1,990	-193	9,028	4	-100	8,932	1,533	-40	10,425	1,984	133	12,542
Loans	-427	-1	4,516	-334	1	4,183	-99	-24	4,060	-60	-50	3,950	-111	26	3,865
Other liabilities	-216	2	3,035	66	0	3,101	663	0	3,764	299	1	4,064	-89	-1	3,974
Statistical discrepancy	-84			-9			31			18			85		
Memorandum items:															
Net financial worth (percent of GDP)			49.5			49.4			49.8			54.1			50.5
Financial assets (percent of GDP)			76.3			77.9			78.0			84.0			82.7
Liabilities (percent of GDP)			26.8			28.5			28.3			29.9			32.2
GDP			56,208			58,169			60,362			62,704			64,221

Sources: IFS and IMF staff estimates.

Table 5. Luxembourg: International Investment Position, 2015–21[1/]

	2015	2016	2017	2018	2019	2020	2021
Billions of Euros							
International investment position	34.2	31.2	46.9	19.9	36.5	34.3	39.7
Assets	10,452.7	10,923.2	11,019.4	10,637.6	11,252.1	11,048.3	11,424.3
Liabilities	10,418.4	10,892.0	10,972.5	10,617.7	11,215.6	11,014.0	11,384.7
Direct investment	777.8	783.6	763.6	765.6	837.6	765.2	847.0
Assets	5,679.0	5,827.1	5,584.0	5,202.3	5,090.7	4,698.8	4,592.5
Liabilities	4,901.1	5,043.5	4,820.4	4,436.7	4,253.0	3,933.6	3,745.5
Portfolio investment	-1,023.8	-1,080.7	-1,065.9	-1,122.4	-1,143.4	-928.1	-1,040.1
Assets	3,375.0	3,588.2	3,936.7	3,882.0	4,546.6	4,847.7	5,191.7
Liabilities	4,398.8	4,668.9	5,002.6	5,004.4	5,690.0	5,775.8	6,231.7
Financial derivatives	7.6	-1.2	5.6	9.9	12.6	22.4	41.7
Assets	136.7	155.6	146.0	135.7	143.0	131.8	131.8
Liabilities	129.1	156.9	140.4	125.8	130.5	109.4	90.1
Other investment	271.9	328.7	342.9	366.0	328.7	173.9	188.5
Assets	1,261.3	1,351.4	1,352.0	1,416.8	1,470.8	1,369.1	1,505.9
Liabilities	989.4	1,022.7	1,009.2	1,050.8	1,142.1	1,195.2	1,317.4
Reserve assets	0.7	0.9	0.7	0.8	0.9	0.9	2.5
Percent of GDP							
International investment position	63.3	55.5	80.6	33.0	58.2	53.4	54.1
Assets	19,305.9	19,433.5	18,943.9	17,622.9	17,944.7	17,203.6	15,582.9
Liabilities	19,242.6	19,378.0	18,863.3	17,589.9	17,886.5	17,150.2	15,528.7
Direct investment	1,436.6	1,394.0	1,312.7	1,268.3	1,335.9	1,191.5	1,155.4
Assets	10,488.9	10,367.0	9,599.6	8,618.4	8,118.6	7,316.6	6,264.2
Liabilities	9,052.3	8,972.9	8,286.9	7,350.1	6,782.7	6,125.1	5,108.9
Portfolio investment	-1,890.9	-1,922.8	-1,832.5	-1,859.5	-1,823.5	-1,445.2	-1,418.7
Assets	6,233.6	6,383.8	6,767.7	6,431.2	7,250.9	7,548.5	7,081.5
Liabilities	8,124.5	8,306.5	8,600.1	8,290.7	9,074.4	8,993.7	8,500.1
Financial derivatives	14.0	-2.2	9.6	16.5	20.1	34.9	56.9
Assets	252.5	276.9	251.0	224.8	228.1	205.2	179.8
Liabilities	238.5	279.1	241.4	208.4	208.1	170.3	122.9
Other investment	502.2	584.7	589.4	606.4	524.2	270.8	257.1
Assets	2,329.6	2,404.2	2,324.3	2,347.1	2,345.6	2,131.9	2,054.0
Liabilities	1,827.4	1,819.5	1,734.9	1,740.8	1,821.4	1,861.1	1,796.9
Reserve assets	1.3	1.6	1.3	1.4	1.5	1.4	3.4

Sources: STATEC and IMF Staff estimates.

1/ Balance of Payments Manual 6 (BPM6) presentation.

Table 6. Luxembourg: Financial Soundness Indicators, 2015–21
(Percent)

	2015	2016	2017	2018	2019	2020	2021Q3
All Banks							
Capital adequacy							
Regulatory capital to risk weighted assets	22.0	25.0	25.9	25.0	22.0	24.8	24.3
Regulatory tier 1 capital to risk weighted assets	21.0	24.0	25.1	24.3	21.5	22.8	22.3
Capital to assets	7.0	7.0	8.4	8.0	7.4	8.6	8.2
Profitability and efficiency							
Return on assets	0.8	0.8	0.7	0.6	0.5	0.5	0.7
Return on equity	11.0	11.0	8.1	7.4	7.4	6.2	8.7
Interest margin to gross income	27.0	25.0	27.9	27.1	26.7	24.9	21.0
Trading income to total income	2.0	3.0	1.3	3.5	2.8	1.5	1.2
Noninterest expenses to gross income	67.0	69.0	73.6	77.5	77.7	79.5	78.7
Personnel expenses to noninterest expenses	29.0	25.0	25.9	24.9	25.1	24.2	22.1
Asset quality and structure							
Residential real estate loans to total loans	4.0	6.2	6.2	6.8	6.9	8.5	7.9
Household debt to GDP	57.0	60.0	59.5	59.8	64.3	69.7	74.1
Nonperforming loans to total gross loans	...	0.9 1/	0.8 1/	0.9 1/	0.8 1/	1.0	0.8
Sectoral distribution of loans (in percent of total loans)							
Residents	27.0	33.0	33.4	33.7	32.0	36.9	39.8
Nonresidents	73.0	67.0	66.6	66.3	68.0	63.1	60.2
Liquidity							
Liquid assets to total assets	58.0	21.2 1/	22.9 1/	24.9 1/	24.7 1/	29.8 1/	33.0 1/
Liquid assets to short-term liabilities	67.0	31.8 1/	31.7 1/	34.6 1/	33.2 1/	38.8 1/	36.1 1/
Customer deposits to total (non interbank) loans	129.0	106.0 1/	102.9 1/	106.2 1/	107.7 1/	109.0 1/	108.0 1/
Domestically Oriented Banks							
Capital adequacy							
Regulatory capital to risk weighted assets	22.6	23.0	23.0	22.9	22.5	22.9	23.2
Regulatory tier 1 capital to risk weighted assets	22.2	23.0	22.1	22.1	21.8	22.2	22.5
Capital to assets	8.4	9.0	8.2	8.8	8.7	8.9	9.0
Profitability and efficiency							
Return on assets	1.0	1.0	0.8	0.8	0.7	0.7	0.7
Return on equity	11.0	11.0	9.7	8.8	8.6	7.6	7.6
Interest margin to gross income	64.0	56.1 1/	54.8 1/	52.8 1/	51.5 1/	52.2 1/	47.0 1/
Asset quality and structure							
Residential real estate loans to total loans	28.0	28.0	26.7	24.9	25.6	35.1	37.0
Household debt to GDP							
Nonperforming loans to total gross loans	...	2.4 1/	2.0 1/	1.8 1/	1.7 1/	1.9 1/	1.5 1/
Sectoral distribution of loans (in percent of total loans)							
Residents	67.0	71.0	69.5	67.5	71.0	76.4	77.4
Nonresidents	33.0	29.0	30.5	32.5	29.0	23.6	24.6
Liquidity							
Liquid assets to total assets	44.0 2/	19.5 1/	20.3 1/	20.9 1/	23.4 1/	24.0 1/	29.0 1/
Liquid assets to short-term liabilities	51.0 2/	26.0 1/	27.2 1/	28.0 1/	30.7 1/	32.3 1/	36 1/
Customer deposits to total (non interbank) loans	137.6	124.0 1/	128.0 1/	112.0 1/	108.1 1/	99 1/	94 1/

Sources: BCL, and CSSF.

1/ Change in underlying data source and calculation methodology.

2/ Q3 2015.

Table 7. Luxembourg: Risk Assessment Matrix[1]

Risks	Likelihood	Expected Impact of Risk and transmission channels	Policy response
Global Risks:			
Russia's invasion of Ukraine leads to escalation of sanctions and other disruptions. Sanctions on Russia are broadened to include oil, gas, and food sectors. Russia is disconnected almost completely from the global financial system and large parts of the trading system. This, combined with Russian countersanctions and secondary sanctions on countries and companies that continue business with Russia, leads to even higher commodity prices, refugee migration, tighter financial conditions, and other adverse spillovers, which particularly affect LICs and commodity-importing EMs.	**High**	**High** Although direct exposures are limited, Luxembourg's economy and financial sector are vulnerable to indirect effects through global financial conditions, confidence, and trade. Further EU sanctions on Russian oil and gas would likely add to inflationary pressures.	- Fiscal policy may need to remain accommodative, including by providing more targeted support to vulnerable households and businesses. - For financial measures, see next row.
Outbreaks of lethal and highly contagious Covid-19 variants. Rapidly increasing hospitalizations and deaths due to low vaccine protection or vaccine-resistant variants force more social distancing and/or new lockdowns. This results in extended supply chain disruptions and a reassessment of growth prospects, triggering capital outflows, financial tightening, currency depreciations, and debt distress in some EMDEs.	**Medium**	**High** Weaker growth in Europe and heightened volatility in global financial markets would weigh on the performance of the large financial sector, with adverse implications for tax revenues and growth. Domestically, further impairment of corporate balance sheets, rising unemployment, and the resulting adverse confidence effects would weaken growth prospects.	- Provide any additional fiscal support in a targeted and timebound manner. - Deepen further risk surveillance in the investment fund sector and spillovers to the rest of the financial system.
Rising and volatile food and energy prices. Commodity prices are volatile and trend up amid supply constraints, war in Ukraine, export restrictions, and currency depreciations. This leads to short-run disruptions in the green transition, bouts of price and real sector volatility, food insecurity, social unrest, and acute food and energy crises (especially in EMDEs with lack of fiscal space).	**High**	**Medium** Volatility in food and energy prices may have price, supply, and demand effects throughout the economy. Energy price and/or supply shocks (including the ongoing pressure in Europe's natural gas markets) may further push up inflation and could negatively affect production in certain sectors. Energy prices are likely to continue to increase durably as a result of policies addressing climate change.	- Allow pass-through to domestic prices. - Provide targeted support to households for energy bills for the most vulnerable. - Longer-term: accelerate diversification of sources of energy and the transition to green energy.

Table 7. Luxembourg: Risk Assessment Matrix (Concluded)

De-anchoring of inflation expectations in the U.S. and/or advanced European economies. Worsening supply-demand imbalances, higher commodity prices (in part due to war in Ukraine), and higher nominal wage growth lead to persistently higher inflation and/or inflation expectations, prompting central banks to tighten policies faster than anticipated. The resulting sharp tightening of global financial conditions and spiking risk premia lead to lower global demand, currency depreciations, asset market selloffs, bankruptcies, sovereign defaults, and contagion across EMDEs.	**Medium (for U.S.)/ Medium/Low (for Euro area)**	**High** Economic growth would be negatively affected, possibly resulting in recession, lower fiscal revenues, and increasing financial stability risks. The investment fund industry could face large aggregate redemptions, which together with valuation effects would weaken fund profitability and adversely impact banks' fees and commissions. If inflation expectations become de-anchored only in the US, the shock would be milder, but it would still affect the EU and Luxembourg through international financial markets and a global growth slowdown.	– A coordinated response will be needed within the euro area. – Deepen the surveillance of systemic risks in the investment fund sector. Closely monitor the effectiveness of liquidity management tools and take actions as needed. – Ensure robust contingency planning for operational risks that may arise from market volatility.
Cyberthreats. Cyberattacks on critical physical or digital infrastructure (including digital currency platforms) trigger financial instability or widespread disruptions in socio-economic activities.	**Medium**	**Low** Cyberattacks can lead to disruptions in financial services and more broadly the economy. However, the magnitude of the disruptions would depend, among other things, on the scale of the event.	– Further enhance cybersecurity protection and coordination between the public and private sectors. – Ensure robust contingency planning for operational risks.
Geopolitical tensions and de-globalization. Intensified geopolitical tensions, security risks, conflicts, and wars cause economic and political disruptions, fragmentation of the international monetary system, production reshoring, a decline in global trade, and lower investor confidence.	**High**	**High** Retaliatory cycles of trade restrictions could hurt Luxemburg's exports, financial sector profitability, tax revenues from multinational companies, and GDP growth. Increased market volatility could further weigh on the profitability of the financial sector.	– Further strengthen support for the multilateral rules-based trading system, and advocate trade liberalization. – Ensure robust contingency plans to diversify tax revenue base.
Business model risk:			
Changes in EU and international taxation rules and transparency standards for cross-border activities.	**High**	**High** Tax base erosion, and reduction of budget revenues and activity.	– Further diversify the fiscal revenue base, develop contingency plans and consider further pension reforms.

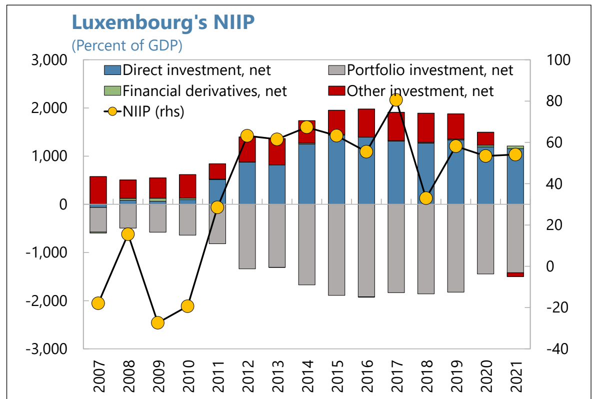
[1] The Risk Assessment Matrix (RAM) shows events that could materially alter the baseline path. The relative likelihood is the staff's subjective assessment of the risks surrounding the baseline ("low" is meant to indicate a probability below 10 percent, "medium" a probability between 10 and 30 percent, and "high" a probability between 30 and 50 percent). The RAM reflects staff views on the source of risks and overall level of concern as of the time of discussions with the authorities. Non-mutually exclusive risks may interact and materialize jointly. The conjunctural shocks and scenario highlight risks that may materialize over a shorter horizon (between 12 to 18 months) given the current baseline. Structural risks are those that are likely to remain salient over a longer horizon.

Annex I. External Sector Assessment

Overall Assessment: *The external position of Luxembourg in 2021 was broadly in line with the level implied by fundamentals and desirable policies.* This assessment is based on EBA-lite quantitative models, a review of developments in the balance of payments, and net foreign asset positions, as well as consideration of Luxembourg's roles as a financial hub and center for intra-corporation cash pooling. However, this assessment is subject to uncertainty related Russia-Ukraine war and to the ongoing COVID-19 pandemic and recovery, both domestically and abroad.

Potential Policy Responses: In response to the COVID-19 pandemic, Luxembourg deployed significant fiscal resources to bolster the health care system and provide support to affected firms and individuals. The majority of the policy support has expired by the end of 2021 but may need to be re-engaged if imbalances emerge.

Foreign Assets and Liabilities: Position and Trajectory



Sources: Haver Analytics; and IMF staff calculations.

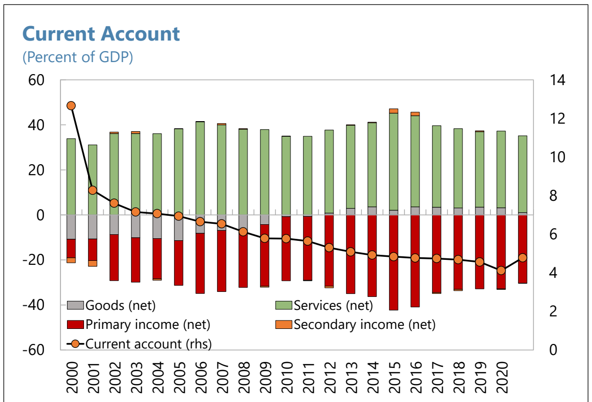
Background. Luxembourg's net international investment position in 2021 remains below its pre-pandemic position. The net international investment position (NIIP) remained broadly unchanged at around 53-54 percent of GDP during 2020–2021, declining from 58.2 percent of GDP in 2019, despite an increase in the NIIP from 34 billion EUR in 2020 to 49 billion EUR in 2021. The stability of the NIIP was due to a decline in net other investment (14 percent of GDP) and net direct investment (35 percent of GDP), despite an improvement in the net portfolio investment (26 percent of GDP) as well as the net financial derivatives and employee stock options (22 percent of GDP). Since 2017, gross positions in direct investment assets and liabilities have been trending downwards, partly reflecting the U.S. CIT reform, and so has been the net direct investment position.

Assessment. The NIIP is positive and is projected to improve moderately in the medium run as it returns to its pre-pandemic balance. The current NIIP and its projected path do not imply risks to external sustainability.

2021 (% GDP)	NIIP: 54.1	Gross Assets: 15,582	Debt Assets: 3,524	Gross Liab.: 15,529	Debt Liab.: 1,176

Current Account

Background. The CA surplus grew to 4.8 percent of GDP in 2021 from 4.1 percent of GDP in 2020 despite a decline in net goods exports, which was more than offset by a lower net factor income deficit. The surplus in services is mainly related to private banking, the investment fund industry, and corporate cash management entities. Most of these financial institutions are part of large international financial groups and multinational corporations which mainly operate cross-borders. Net factor income outflows are somewhat equally shared between investment income and compensations of employees.



Sources: Haver Analytics; and IMF staff calculations.

Luxembourg: Model Estimates for 2021 (in percent of GDP)

	CA model	REER
CA-Actual	**4.8**	
Cyclical contributions (from model) (-)	-0.4	
COVID-19 adjustor (+) 1/	0.0	
Additional temporary/statistical factors (+)	0.0	
Natural disasters and conflicts (-)	-0.1	
Adjusted CA	**5.3**	
CA Norm (from model) 2/	**11.4**	
Adjustments to the norm (+)	-6.1	
Adjusted CA Norm	**5.3**	
CA Gap	**0.0**	**2.5**
o/w Relative policy gap	3.4	
Elasticity	-1.34	
REER Gap (in percent)	**0.0**	**-1.9**

1/ Additional cyclical adjustment to account for the temporary impact of the tourism (0.0 percent of GDP).
2/ Cyclically adjusted, including multilateral consistency adjustments.

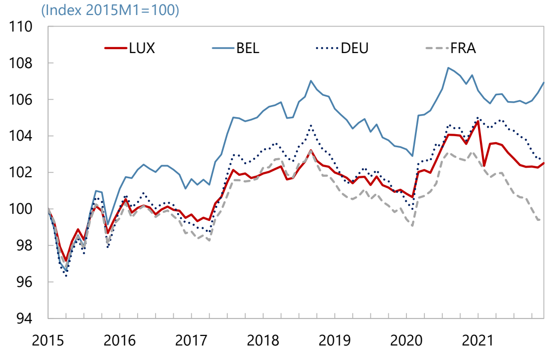
Assessment. Staff's bottom-line assessment is that Luxembourg's external position is broadly in line with fundamentals and desirable policy settings. This assessment is based on the quantitative External Balance Assessment (EBA-lite) supplemented with staff judgement. The EBA-lite models can only partially capture some important specificities of Luxembourg, such as being a financial center with a large investment fund

industry and a very small open economy with a large share of non-resident workers. Exports and imports of financial services which drive Luxembourg's current account are less sensitive to relative prices changes, and the large number of non-resident workers affects net factor income and population-based variables in the models. In this sense, as in previous years, staff has adjusted the EBA-lite explanatory variable "output per worker" to reflect that over 40 percent of Luxembourg's labor force is non-resident. Based on this adjustment, the current account norm for 2021 is now estimated at 5.3 percent of GDP. In comparison with the norm, the current account gap is estimated at 0.0 percent of GDP. The current account gap includes a policy gap of 3.4 percent of GDP, reflecting lower-than-expected public health expenditure, negative private credit growth, and a looser world average fiscal stance. In the near term, increased uncertainty and rising commodities prices from the Ukraine-Russia war could place pressure on the trade balance. Over the medium term, staff projects that the CA surplus will recover to 4.4 percent of GDP in the medium term as net factor income and net service exports normalize at pre-pandemic levels.

Real Exchange Rate

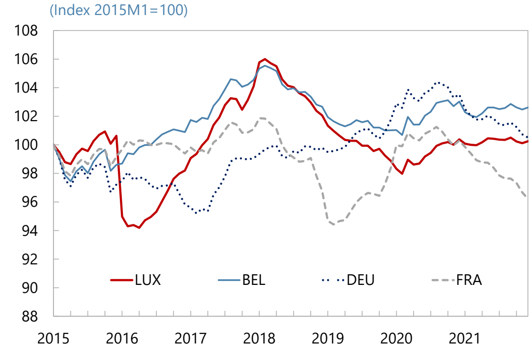
Background. The real effective exchange rates (REER) remained relatively unchanged in 2021. Luxembourg's CPI-based REER was broadly stable, depreciating by about 0.2 percent year-over-year compared to December 2020 as in neighboring countries as was the ULC-based REER, depreciating by 1.6 percent year-over-year.

CPI-based REER
(Index 2015M1=100)



Sources: GDS; and IMF staff calculations.

ULC-based REER
(Index 2015M1=100)



Sources: GDS; and IMF staff calculations.

Assessment. Staff assess the REER to be broadly in line with fundamentals and desirable policy settings based on the Real Effective Exchange Rate (REER) gap suggested by the CA gap that indicates no significant under- or over-valuation. The REER index model suggests an over-valuation of 1.9 percent with a policy gap estimated at 1.8 percent reflecting mainly growth in private credit.

Capital and Financial Accounts: Flows and Policy Measures

Background. The financial account increased to 7.3 percent of GDP in 2021 from 3.5 percent in 2020 due to a recovery in net direct investment. The capital account remained close to 0 percent of GDP in 2021.

Assessment. Risks related to capital flows are assessed to be small.

FX Intervention and Reserves Level
Background. The euro has the status of global reserve currency. The allocation of 1,266.9 million SDRs—around 2.1 percent of GDP—by the IMF in August 2021 will be channeled to help other countries manage the pandemic. **Assessment.** Reserves held by euro area countries are typically low relative to standard metrics. The currency is free floating.

Annex II. Debt Sustainability Analysis

Figure 1. Luxembourg: Public Sector Debt Sustainability Analysis (DSA) – Baseline Scenario

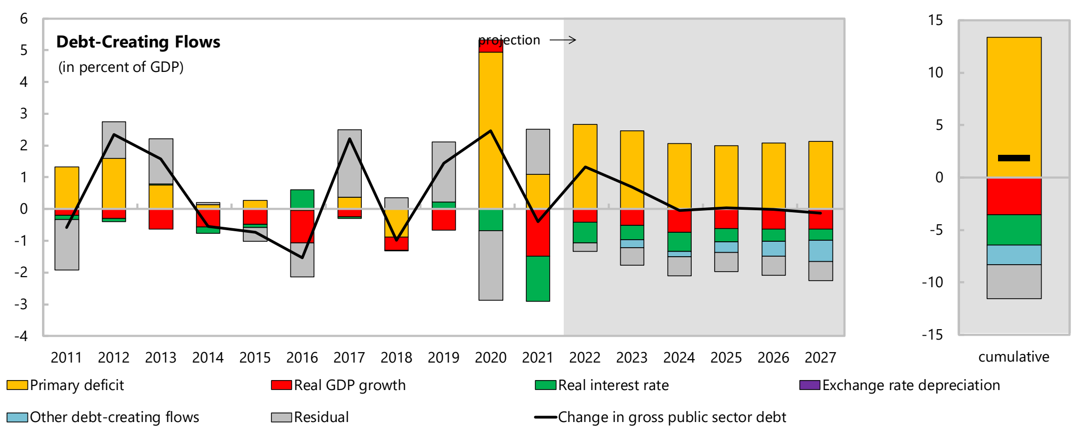
(in percent of GDP unless otherwise indicated)

Debt, Economic and Market Indicators [1]

	Actual			Projections						As of March 30, 2022		
	2011-2019 [2]	2020	2021	2022	2023	2024	2025	2026	2027	Sovereign Spreads		
Nominal gross public debt	21.0	24.8	24.4	25.7	26.4	26.3	26.4	26.3	26.2	EMBIG (bp) 3/		27
Public gross financing needs	0.5	5.0	1.1	4.0	4.6	2.3	3.7	4.4	5.0	5Y CDS (bp)		n.a.
Real GDP growth (in percent)	2.5	-1.8	6.9	1.8	2.1	2.9	2.5	2.5	2.5	Ratings	Foreign	Local
Inflation (GDP deflator, in percent)	1.9	4.3	6.8	3.4	2.3	2.7	2.0	2.0	2.0	Moody's	Aaa	Aaa
Nominal GDP growth (in percent)	4.4	2.4	14.2	5.2	4.4	5.7	4.6	4.6	4.6	S&Ps	AAA	AAA
Effective interest rate (in percent) [4]	2.1	1.1	0.7	0.6	0.5	0.4	0.5	0.6	0.7	Fitch	AAA	AAA

Contribution to Changes in Public Debt

	Actual			Projections							
	2011-2019	2020	2021	2022	2023	2024	2025	2026	2027	cumulative	debt-stabilizing primary balance [9]
Change in gross public sector debt	0.4	2.5	-0.4	1.3	0.7	0.0	0.0	0.0	-0.1	1.9	
Identified debt-creating flows	-0.1	4.6	-1.8	1.6	1.2	0.6	0.6	0.6	0.5	5.1	
Primary deficit	0.4	4.9	1.1	2.7	2.5	2.1	2.0	2.1	2.1	13.4	-1.7
Primary (noninterest) revenue and grants	29.1	29.3	29.4	29.1	29.2	29.0	29.2	29.2	29.3	174.9	
Primary (noninterest) expenditure	29.5	34.2	30.5	31.7	31.6	31.1	31.2	31.3	31.4	188.3	
Automatic debt dynamics [5]	-0.5	-0.3	-2.9	-1.1	-1.0	-1.3	-1.0	-1.0	-1.0	-6.4	
Interest rate/growth differential [6]	-0.5	-0.3	-2.9	-1.1	-1.0	-1.3	-1.0	-1.0	-1.0	-6.4	
Of which: real interest rate	0.0	-0.7	-1.4	-0.7	-0.5	-0.6	-0.4	-0.4	-0.4	-2.9	
Of which: real GDP growth	-0.5	0.4	-1.5	-0.4	-0.5	-0.7	-0.6	-0.6	-0.6	-3.5	
Exchange rate depreciation [7]	0.0	0.0	0.0	…	…	…	…	…	…	…	
Other identified debt-creating flows	0.0	0.0	0.0	0.0	-0.2	-0.2	-0.3	-0.5	-0.7	-1.9	
Privatization/Drawdown of Deposits (negative)	0.0	0.0	0.0	0.0	-0.2	-0.2	-0.3	-0.5	-0.7	-1.9	
Contingent liabilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Please specify (2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Residual, including asset changes [8]	0.4	-2.2	1.4	-0.3	-0.6	-0.6	-0.6	-0.6	-0.6	-3.2	



Source: IMF staff.

1/ Public sector is defined as general government.

2/ Based on available data.

3/ Long-term bond spread over German bonds.

4/ Defined as interest payments divided by debt stock (excluding guarantees) at the end of previous year.

5/ Derived as [(r - π(1+g) - g + ae(1+r)]/(1+g+π+gπ)) times previous period debt ratio, with r = interest rate; π = growth rate of GDP deflator; g = real GDP growth rate; a = share of foreign-currency denominated debt; and e = nominal exchange rate depreciation (measured by increase in local currency value of U.S. dollar).

6/ The real interest rate contribution is derived from the numerator in footnote 5 as r - π (1+g) and the real growth contribution as -g.

7/ The exchange rate contribution is derived from the numerator in footnote 5 as ae(1+r).

8/ Includes asset changes and interest revenues (if any). For projections, includes exchange rate changes during the projection period.

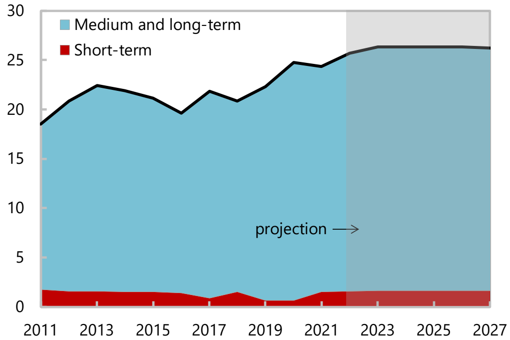
9/ Assumes that key variables (real GDP growth, real interest rate, and other identified debt-creating flows) remain at the level of the last projection year.

Figure 2. Luxembourg: Public DSA – Composition of Public Debt and Alternative Scenarios

Composition of Public Debt

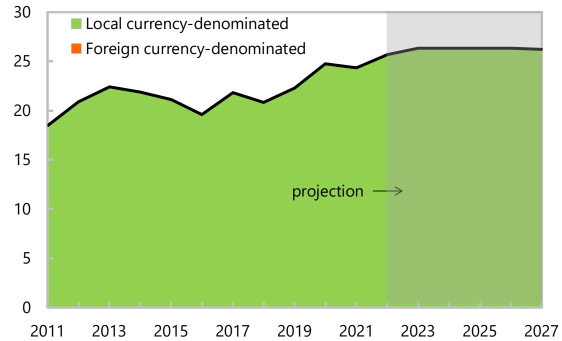
By Maturity

(in percent of GDP)



By Currency

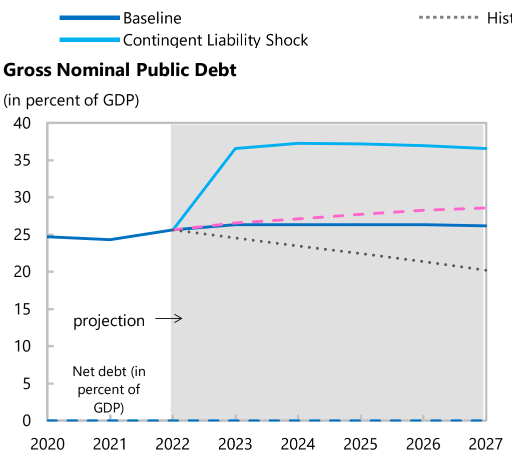
(in percent of GDP)



Alternative Scenarios

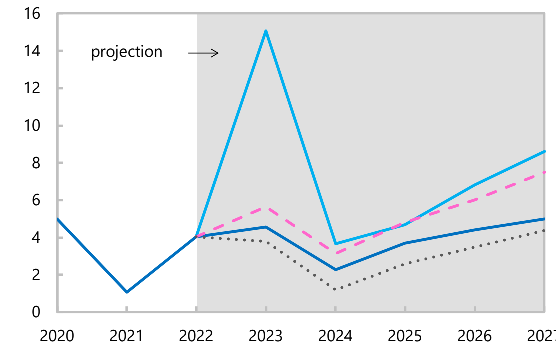
Gross Nominal Public Debt

(in percent of GDP)



Public Gross Financing Needs

(in percent of GDP)



Underlying Assumptions

(in percent)

Baseline Scenario	2022	2023	2024	2025	2026	2027
Real GDP growth	1.8	2.1	2.9	2.5	2.5	2.5
Inflation	3.4	2.3	2.7	2.0	2.0	2.0
Primary Balance	-2.7	-2.5	-2.1	-2.0	-2.1	-2.1
Effective interest rate	0.6	0.5	0.4	0.5	0.6	0.7
Constant Primary Balance Scenario						
Real GDP growth	1.8	2.1	2.9	2.5	2.5	2.5
Inflation	3.4	2.3	2.7	2.0	2.0	2.0
Primary Balance	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7
Effective interest rate	0.6	0.5	0.4	0.5	0.6	0.7

Historical Scenario	2022	2023	2024	2025	2026	2027
Real GDP growth	1.8	2.6	2.6	2.6	2.6	2.6
Inflation	3.4	2.3	2.7	2.0	2.0	2.0
Primary Balance	-2.7	-0.8	-0.8	-0.8	-0.8	-0.8
Effective interest rate	0.6	0.5	0.6	0.7	0.9	1.1
Contingent Liability Shock						
Real GDP growth	1.8	-0.2	0.7	2.5	2.5	2.5
Inflation	3.4	1.7	2.2	2.0	2.0	2.0
Primary Balance	-2.7	-12.0	-2.1	-2.0	-2.1	-2.1
Effective interest rate	0.6	0.6	1.4	1.3	1.4	1.3

Source: IMF staff.

Annex III. Implementation Status—FSAP Update 2017 Recommendations

Table 1. Luxembourg: FSAP Update 2017: Key Recommendations

Recommendations	Timeframe	Status
General/Cross-Cutting		
1. Continue resource allocation toward risk-based supervision at BCL, CSSF and CAA.	NT	• The CSSF assesses the correspondence between resources and needs from a risk-based perspective on an ongoing basis. • The CAA regularly hires new staff—all will be involved in risk-based supervision. The CAA grew by approximately 13 units (FTE) in 2021. • The BCL also plans additional hiring in risk analysis.
2. Increase engagement with supervision and resolution authorities in countries where Luxembourg's Less Significant Institutions (LSIs) and investment funds conduct significant activities.	NT	• Banking supervision: The CSSF's participation in joint supervisory teams and colleges and the establishment of annual meetings covers 80 percent of bank assets. For the rest, memoranda of understanding have been concluded. • Resolution: The CSSF has bilateral contacts and participates in resolution colleges, either as group level resolution authority or resolution authority of a subsidiary. • Investment funds: The CSSF has regular bilateral meetings and exchanges, including regarding the delegation of activities, with EU/third-party supervisory authorities (such as France, Ireland, Germany, Switzerland, the United Kingdom, the United States and Asian jurisdictions). These bilateral exchanges continued in 2021, albeit at a lower frequency, leading to information exchanges on certain market/fund developments (e.g., in MMFs), but also on other more general topics. Since 2020, the CSSF requests standardized information from regulators of the jurisdictions to which Luxembourg fund managers mostly delegate portfolio management activities. In 2021, these also cover distribution activities performed by delegates abroad.
3. Enshrine in legislation the operational independence of the CSSF and CAA, and introduce (CSSF, CAA) or update (BCL) board member codes of conduct	NT	• The code of conduct for non-executive members of the BCL Supervisory Board has been revised but could be further aligned to best practices. • The CAA Board's internal rules have been formally updated in mid-2021 and now include a "conflict of interest" policy.
Risk Analysis		
4. Examine merits of a regulatory LCR requirement in FX at the group level and step-up monitoring of related FX liquidity risk.	MT	• This recommendation is being considered by the ECB and the EC.
5. Provide industry guidance on liquidity stress test modalities and liquidity management tools for investment funds, and develop internal	NT	• The CSSF has actively contributed to IOSCO and EU level initiatives on liquidity risk management, including the ESRB Expert Group on Investment Funds (http://www.iosco.org/news/pdf/IOSCONEWS486.pdf). • ESRB Recommendations (ESRB/2017/6) have been addressed to the European Commission to take legislative action on liquidity risk management, including making more Liquidity Management Tools (LMTs) available in Europe, but also thereafter to provide ESMA guidance on the enhanced scope. This will be

Table 1. Luxembourg: FSAP Update 2017: Key Recommendations (Continued)		
liquidity stress testing capacity.		implemented via the forthcoming AIFMD/UCITS review. The CSSF supports guidance on a European level. • Recommendations addressed to ESMA also cover guidance on liquidity stress testing by asset managers. These have been implemented (see below).
		• The CSSF actively contributed to ESMA's guidelines on liquidity stress testing in UCITS and AIFs published in September 2019, which became applicable at end-September 2020, and which the CSSF has implemented into the local regulatory framework via CSSF Circular 20/752; the CSSF also actively contributed to ESMA's development of stress testing guidelines under the MMF Regulation as well as related MMF reporting guidelines. The CSSF also contributes to and implements the yearly update of the ST parameter calibration. • Internally, the CSSF implemented an annual liquidity stress testing (LST) framework, and continues to improve it (2021 exercise: second round effects, extension of asset classes) based amongst others on experience with the 2020 CSA Liquidity, ESMA-ESRB work (and 2021 follow-up (data collection)), as well as experience from the COVID-19 crisis. The study on the effectiveness of LMTs in collaboration with the BIS has been delayed in 2020-2021 to integrate the Covid-19 experience.
6. Continue to contribute to discussions within ESMA on leverage, with a view to developing a single methodology for measurement of leverage across the fund industry.	MT	• The discussion at IOSCO on a consistent measure of leverage was finalised and the final report was published in December 2019. These recommendations will most likely be implemented in EU rules in the context of the forthcoming AIFM/UCITS review, which has also been highlighted in ESMA's letter to the EU Commission. IOSCO has agreed on the global collection/ publication of consistent measures of leverage (Recommendation 4) and the first report is currently being prepared for publication by early 2022. • An ESRB Recommendation (Feb. 2018) requested ESMA to develop guidance on the design, calibration and implementation of macroprudential leverage limits in the context of the AIFMD (Art. 25) for National Competent Authorities (NCAs). ESMA finalized these guidelines in December 2020 with active contribution by the CSSF. The CSSF actively contributed at the ESMA level in 2021 to develop a methodology for the concrete implementation of those guidelines, which became applicable on August 23, 2021.
Macroprudential Policy		
7. Expand the macroprudential policy toolkit to include borrower-based lending limits.	I	• The law establishing a legal framework for borrower-based measures (BBMs)was adopted by Parliament in December 2019. It expands the existing macroprudential policy toolkit with a comprehensive set of BBMs. • Based on this law, the systemic risk committee (CdRS) has acted to set LTV caps on mortgage loans and recommended to the CSSF to enact these (see CdRS Recommendation CRS/2020/005). Accordingly, the CSSF issued Regulation N°20-08 (December, 2020) introducing differentiated LTV limits for mortgage loans as follows: (1) for first-time buyers (FTBs), the LTV limit is set at 100 percent; (2) for non-FTBs acquiring their primary residence, the LTV limit is 90 percent (some flexibility is introduced as banks may provide up to 15 percent of their annual mortgage credit portfolio loans with an LTV ranging from 90 to 100 percent); (3) for borrowers buying a property to be rented out (buy-to-let property), the maximum LTV limit is 80 percent. • The measure applies both to residential real estate (RRE) loans contracted by private households as well as legal entities such as a real-estate company constituted under civil law ("société civile immobilière" – SCI).

Table 1. Luxembourg: FSAP Update 2017: Key Recommendations (Concluded)		
8. Continue to strengthen risk-based monitoring of the residential real estate market and bank-investment fund interlinkages, and close remaining related data gaps.	I	• Risk-based monitoring: The CSSF conducts a regular semiannual liquidity stress test of fund deposits for all depositary banks. It also performs an annual assessment of maturity transformation between liabilities and intragroup assets at all banks. • Investment funds-related data gaps: Discussions with the BCL and ECB are ongoing on access to the centralized securities data base (CSDB), possibly via an MoU between the CSSF and BCL. • Bank-investment fund interlinkages: The BCL performs network analysis of interconnections among banks and investment funds. This work aims at identifying systemically important banks that have important interconnections with the fund sector. • Monitoring of risks in the real estate market: The CSSF conducts an annual stress test of banks' exposures to residential real estate and regular analyses of the lending standards based on its semiannual bank level survey (CSSF Circular N°18/703 amended by CSSF circular N°20/737). The BCL continued to strengthen its analysis of related macro-financial risks. Both participate in SSM and ECB working groups on residential real estate. • Real estate-related data gaps: CSSF Circular N°18/703 issued in December 2018 and amended by CSSF circular N°20/737 of 19 February 2020 formalizes the data collection on real estate-related indicators. The Circular is based on the ESRB's recommendation on closing real estate data gaps (ESRB/2016/14) and provides harmonized definitions of relevant borrower-related residential real estate indicators. The data are collected on a semiannual basis. Since June 2020, new data on residential real estate loans are also available on a quarterly basis in the financial reporting (FINREP), including LTV distributions.