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EXECUTIVE SUMMARY

This report assesses Luxembourg's economy in the light of the European Commission's Annual Growth Survey published on 26 November 2015. The survey recommends three priorities for the EU's economic and social policy in 2016: re-launching investment, pursuing structural reforms to modernise Member States' economies, and responsible fiscal policies.

Economic activity has gained strong momentum in recent years approaching the growth rates of the period before the crisis. GDP is expected to increase by 4.7 % in 2015 after 4.1 % in 2014. According to the Commission 2016 winter forecast, economic activity is projected to continue expanding in 2016 and in 2017 at a rate around 4 %. Growth is expected to be driven mainly by the contribution of net exports and especially financial services.

Investment growth has been lagging behind that of the overall economy in recent years. In the aftermath of the financial crisis, low capacity utilisation has pushed corporations to delay new investment plans. Overall, private investment growth is skewed by large transactions by the satellite and freight enterprises. Public investment, slowed down in the context of government consolidation efforts in recent years, is however expected to rebound sharply, supported by the realization of sizeable infrastructure projects.

The financial sector remains the main economic engine of the country. The recent sharp increase in economic output is mostly explained by the recovery of its profitability. In particular, the investment fund industry has gained momentum, also boosted by the European Central Bank's non-conventional monetary policy measures. At the same time, the low interest rates environment is limiting the performance of the banking sector and of the life branch of the insurance industry.

Subdued inflation has contributed to moderate wage developments. In line with the absence of price pressure and the sustained weakening of commodities prices, in particular oil, inflation is set to remain subdued. The protracted low inflation environment has delayed the triggering of the automatic wage adjustment that is now expected only in the second half of this year. The last automatic wage adjustment took effect in October 2013. In parallel with weak wage developments

and the surge in output, cost-competitiveness losses have abated.

Employment growth remains robust. As in previous episodes of economic upswing, it has favoured more cross-border workers than resident workers. As a consequence, the unemployment rate did not fall and it is expected to decrease only slightly in 2016. At 6.1 %, unemployment remains however markedly low compared with the EU average.

Public finances remain overall sound. However the general government surplus is estimated to have declined in 2015 to 0.2 % of GDP from 1.4 % in 2014. The fiscal consolidation and expenditure savings measures adopted by the government are expected to only partially compensate the significant VAT revenue decline that has followed the 2015 change in the regulation related to e-commerce.

Overall, Luxembourg has made limited progress in addressing the three country-specific recommendations issued by the Council in 2015. First, there has been no progress in relation to the broadening of the tax base for consumption, recurrent property and environmental taxation. In particular, concerning the broadening of the consumption tax base, Luxembourg continues to have a high number of reduced VAT rates that are not fully conducive to achieving redistribution objectives. However, Luxembourg is currently working on an overall tax reform that is expected to take effect in 2017. Second, limited progress has been made to reduce early retirement possibilities. However, age-related liabilities remain a risk in the long-term, in particular as regards pension costs. Luxembourg stands out as the only EU country where no further raising of the statutory retirement age has been laid down by law. Third, no progress has been made as regards a reform of the wage setting system to ensure that wages evolve in line with productivity.

Regarding the progress in reaching the national targets under the Europe 2020 Strategy, Luxembourg is performing well in employment rate, energy efficiency, reducing early school leaving and tertiary education attainment, while more effort is needed in R&D investment, reducing greenhouse gas emissions, renewable energy and reducing poverty.

The main findings of the analysis in this report and the related policy challenges are as follows:

- **The rise of age-related expenditure still poses a threat to the long-term sustainability of public finances.** At the same time, new demographic projections indicate a strong downward revision of expenditure estimations, compared to the 2012 Ageing Report. According to the 2015 Ageing Report, Luxembourg's public pension expenditure will represent four additional percentage points of GDP by 2040, one of the highest increases amongst EU Member States. This result is driven by a large increase in the number of pensioners relative to the number of contributors. The above-mentioned downward revision is explained almost exclusively by more favourable old-age dependency ratio projections, and the underlying assumption of strong population growth. In addition, the revised demographic assumptions point to an increased pressure on demand for infrastructures, including those related to transport, education and health care.
- **House prices have been constantly increasing, with the risk of discouraging people from moving to Luxembourg,** undermining its ability to attract and retain a high-skilled labour force, of which non-nationals represent a large share. House price pressures emerge from both the supply and demand side. On the supply side, land availability and administrative procedures seem to represent a bottleneck to the creation of new housing units. On the demand side, high population and employment growth, as well as, to a lesser extent, tax policies encouraging ownership push up prices. This, in turn, can exacerbate traffic congestion in the country, given that commuters live relatively far away from their workplace.
- **Luxembourg presents a healthy financial sector, for which risks can be assessed as contained.** Luxembourg's economy as a whole has benefited from the presence of a large financial sector and in the near term, developments in the financial sector will still continue to have a strong impact on country's economic performance. The fund investment management sector has been constantly growing and Luxembourg has become a world centre for this branch of financial services. Domestic banks display strong capital ratios, and fulfil their intermediary role as credit providers to the economy.
- **At the same time, the heavy reliance on the financial sector, which is a structural feature of Luxembourg's economy, represents a risk factor.** The authorities have long shown awareness of the need to diversify the economy and have taken a number of steps in that direction. Tangible results have been achieved in areas such as the information and communication technology sector. In other areas such as biotechnology results have been less encouraging. The high level of restrictiveness of legislation in the services sector also appears to be negatively affecting the business environment. Achievement of diversification is however potentially constrained by a number of factors such as innovation and entrepreneurship, as well as the fact that wage developments in some sectors may not be in line with productivity developments, which limits the sectors that can be targeted mainly to those with high added value.
- **Maintaining a high level of investment is essential to preserve growth prospects.** While public investment is above average compared with the euro area, private investment is underperforming. A reduction or removal of existing barriers to investment and innovation that limit economic development, especially in the business services and retail trade sectors, would contribute to fully unleashing the potential for innovation and, help diversification. Furthermore, Luxembourg performance in the area of entrepreneurship is below the EU average. Finally, as mentioned above, the new demographic projections add pressure to enhance public investment in infrastructures.
- **Job creation continues to be dynamic, but unlocking the full employment potential of the resident population is still a challenge.** Employment rates are low at both ends of the age spectrum. Financial disincentives to work

are widespread, which can be partly linked to the design of the social benefit system and to the joint taxation system. Moreover, in light of the strategy to pursue diversification efforts in high value added sectors, education outcomes are a source of concern. In addition, socioeconomic status seems to have a significant influence on education outcomes, which can be particularly unfavourable for people with a migrant background. Adapting vocational education and training to labour market needs remains challenging. Poverty and social exclusion risks in Luxembourg are still among the lowest in the EU. Nevertheless, social transfers remain essential in lifting people out of poverty, also considering that income inequalities have increased (although from moderate levels).

- **Public finances are underpinned by a strong policy framework.** In view of the estimated deterioration of the fiscal balance in 2015, the government embarked on a series of corrective measures. They target both the expenditure and revenue side and aim at ensuring continued respect of the country's medium-term objective of a structural surplus of 0.5 % of GDP. The fiscal consolidation plan, including VAT rate increases, the introduction of a new temporary levy of 0.5 % on personal income and expenditure savings, is expected to help improve the nominal balance over the period 2016-18.
- **Dynamic revenues, such as VAT from e-commerce activities, have contributed to sound public finances, while keeping public debt at a low level.** Nevertheless, some features of the Luxembourg taxation system are threatened by international developments, beyond the control of the authorities. The announced overhaul of the taxation system could integrate these external factors into the design of the tax system. A well-designed tax reform would also contribute to addressing environmental challenges. These relate especially to transforming Luxembourg's economy into a low-carbon and resource-efficient one.
- **Fulfilling its commitments concerning the objectives set out under the Europe 2020 strategy in the field of non-ETS greenhouse gas emissions remains a challenge.** Reasons behind would be related to current policy design: on the one hand, relatively low excise duties on fuels attract demand from neighbouring countries. On the other hand, company cars, an important element of in-kind payments in the wage bill, encourage the use of private cars instead of public transport. In addition, constantly increasing housing prices deter households from establishing their residence in Luxembourg, therefore exacerbating the problem of traffic congestion and pollution.

1. SCENE SETTER: ECONOMIC SITUATION AND OUTLOOK

Recent macroeconomic developments and outlook

After hitting a trough in 2012, economic activity in Luxembourg has rebounded sharply.

According to the Commission 2016 winter forecast, GDP growth in 2015 is estimated to have reached 4.7 %, compared with 4.1 % in 2014. While several indicators, first of all, a robust employment growth, confirms the strengthening of economic activity, its measurement has been subject to frequent and sharp revision over the last months, in particular the growth estimations for the years 2013 and 2014.⁽¹⁾ The reasons lie in the difficulty of estimating the contribution of the financial sector to the overall growth, in particular the measurement of the contribution of the financial intermediation services indirectly measured to growth.⁽²⁾

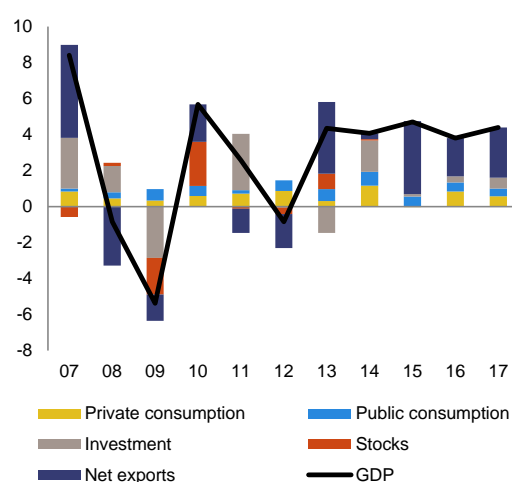
Growth drivers

Turning to drivers of growth, overall private and public consumption have provided a steady positive contribution to growth over the last decade.

The continuous demographic expansion combined with dynamic wages has sustained the purchasing power of households, only partially offset by inflation higher than the EU average. In the aftermath of the crisis, buoyant revenues, in particular from VAT on e-commerce activities, have made it possible to preserve sound public finances, while government has engaged in a generous spending process (government total current expenditure, excluding interest, between 2007 and 2014 increased on average by 6.5 % per year compared with 2.7 % for the euro area). By contrast, investment has been rather volatile, swinging between a positive and a negative contribution depending on large purchases from the satellite and freight industries. However, as a small and open economy, Luxembourg mainly

depends on its ability to export its output, mostly services and in particular financial services. In the aftermath of the financial crisis, the contribution of net exports became negative, rebounded in 2010 but turned negative again in the following two years. It is only since 2013 that a steady positive contribution has been observed (see Graph 1.1).

Graph 1.1: Breakdown of GDP



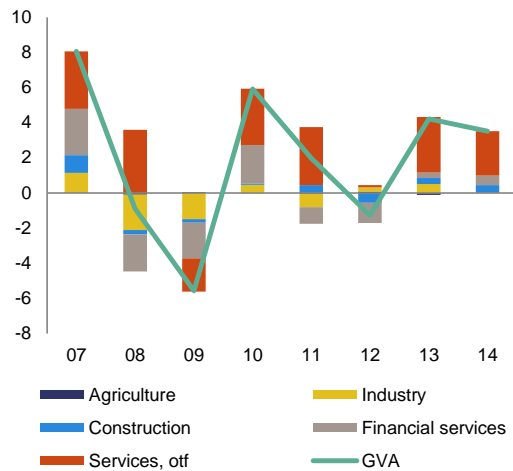
Source: European Commission

The economic growth analysis based on breakdown by sectors shows that the recent increase in output is mostly explained by the overall strength of the services-to-business sector, which has expanded at a fast pace over the last two years. The contribution of the financial sector returned to be slightly positive, after having been negative since 2008 (with the exception of 2010) (see Graph 1.2).

⁽¹⁾ In July 2015 STATEC revised the estimate economic output for 2013 at 4.3 %, up from an estimation of 2.0 %. Estimations of growth for 2014 have as well been subject to sharp revisions. In July 2015, GDP growth was estimated at 5.6 % to be revised down to 4.1 % in November.

⁽²⁾ It is worth noting that the treatment of these services in the national accounts has changed with the introduction of the national accounts ESA2010 principles. For more information see the note of September 2014 by STATEC on changes to its estimation method introduced with the ESA2010 and its impact on the estimation of GDP.

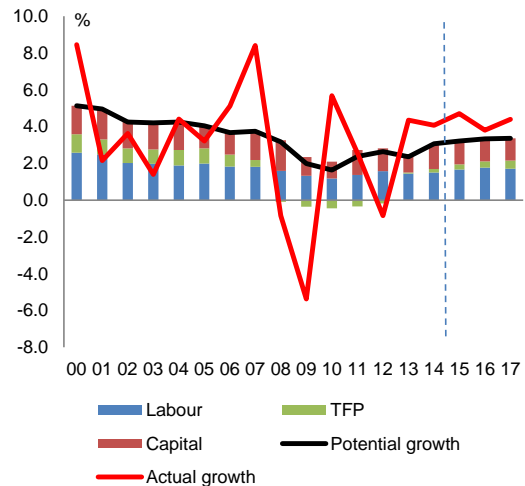
Graph 1.2: Breakdown of gross value added (in nominal terms)



Source: European Commission

More recently the recovery has gained momentum with the growth levels approaching those of the period before the crisis, when output growth averaged 4.6 % over the period 2000-2007 (see Graph 1.3). However, estimations of potential growth between 2008 and 2014 have ranged between 1.6% and 3.2%, well below the average of 4.3% over the period 2000-2007. The estimate is dragged down by the drop in the labour contribution and by the contribution of total factor productivity that has been negative since 2008. The downward revision of potential growth might reflect, among other things, lower prospects for productivity and profitability in the financial sector, where the outlook has been weakened by the new regulatory framework recently put in place, introducing, for example, more stringent capital requirements. GDP growth is projected to remain close to 4 % in the near future, partly supported by the diversification efforts that could help to increase productivity. In this vein, section 2.4 discusses the diversification efforts that both the government and main economic actors are engaged in.

Graph 1.3: Potential growth



Source: European Commission

Inflation

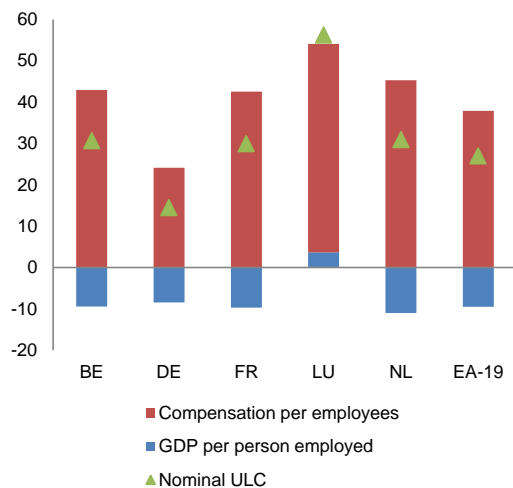
In December 2014, headline inflation became negative for the first time since October 2009. As a whole, inflation stood at 0.1 % in 2015, down from 0.7 % in 2014. In spite of the impact on prices of the two percentage point increase in VAT rates that entered into force on 1 January 2015, plummeting oil and commodity prices have contributed to inflation pressure abating. According to the most recent figures, the continuous low inflation will push forward the triggering of the automatic indexation of wages to the second half of 2016. By contrast core inflation (which excludes energy and unprocessed food) settled at 1.8 % on average in 2015, marginally up from 1.6 % in 2014.

Unit labour costs

The cost competitiveness of the economy has deteriorated over the last decade. Between 2000 and 2014 overall unit labour costs (ULC) rose by 56.2 % in Luxembourg, more than twice as fast as the euro area average of 27 % and compared with 14.4 % in Germany over the same period. These losses of competitiveness reflect a steady increase in nominal wages, partly related to the automatic indexation of wages and a fall in productivity in more recent years (see Graph 1.4). It is worth noting that over the period 2012-2014, despite a wage moderation agreement, the average

compensation per employee continued to expand at a faster pace than in the neighbouring countries and in the euro area. Section 2.4 looks at this issue in more detail.

Graph 1.4: Evolution of ULC between 2000-2014



Source: European Commission

Labour market developments

After a remarkable show of resilience throughout the crisis⁽³⁾, the pace of job creation accelerated in 2015 to 2.6 % from 2.4 % in 2014. Though it has not yet matched the rates recorded before the crisis. All sectors posted positive growth in 2015, with job creation in the tradable sector accelerating and increasing at the same pace as in the non-tradable sector. The outlook for employment growth over the coming years remains positive, though a slowdown in the pace of job creation is expected, in line with GDP projections. However, as in previous times of economic upswing, job growth in 2015 favoured cross-border workers more than residents. Employment across non-resident workers increased by 3.2 % in 2015 compared with 1.9 % for nationals. Unemployment, as a percentage of the labour force in 2015, went up slightly to 6.1 %, but it is projected to decrease to 6.0 % in 2016.

⁽³⁾ Between 2009 and 2014, employment in Luxembourg increased on average by 2.1 % per year compared with a 0.5 % decline for the euro area.

In spite of the generally good labour market performance, employment rates remain persistently low at both ends of the age spectrum. The employment rate of young people is substantially lower than the EU average, which may well be due to the very high rate of enrolment in education or training among those aged 15 to 24. Though it has increased in recent years, the employment rate of older workers remains far below the EU average. At the same time, the design of activation measures and the financial disincentives to taking up a job, do not fully support more substantial progress. Section 2.5 discusses these issues in more detail.

External developments

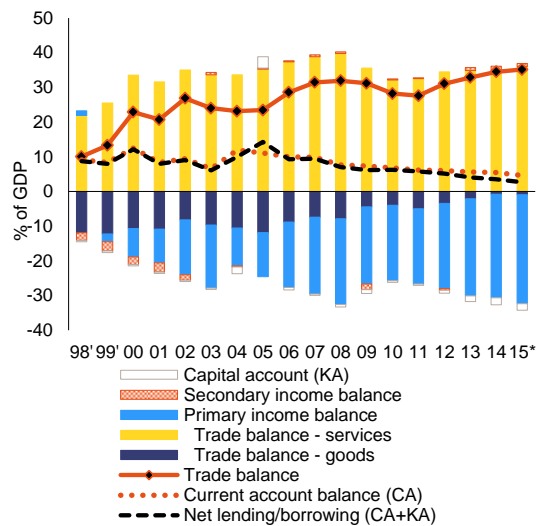
The current account balance remains comfortably in surplus (see Graph 1.5). However, its surplus shrank below 6 % of GDP⁽⁴⁾ in 2013, stood at 5.5 % of GDP in 2014 and is expected to lose further ground in 2015, as VAT on e-commerce, paid to the countries of residence of consumers, will be discounted from the export of services. The still large current account surplus is driven by the surplus of the services balance, mostly financial services. Financial service exports represent more than half of the total export of services and are to a large extent (more than 80 %) related to the activities of the investment funds.⁽⁵⁾

At the same time, due to new international standards for producing the balance of payment statistics, the position of Luxembourg's balance of goods has been substantially revised and improved. According to the new standards, the balance of goods in 2014 recorded a deficit equivalent to 0.7 % of GDP, down from 2.1 % of GDP in 2013. Using the previous balance of payments accounting standards, the deficit in 2013 stood at 13.9 % of GDP (see Graph 1.6).

⁽⁴⁾ Relevant threshold in the context of the macroeconomic imbalance procedure.

⁽⁵⁾ More details are available at: <http://www.statistiques.public.lu/catalogue-publications/regards/2015/PDF-05-2015.pdf>

Graph 1.5: Breakdown of current account balance

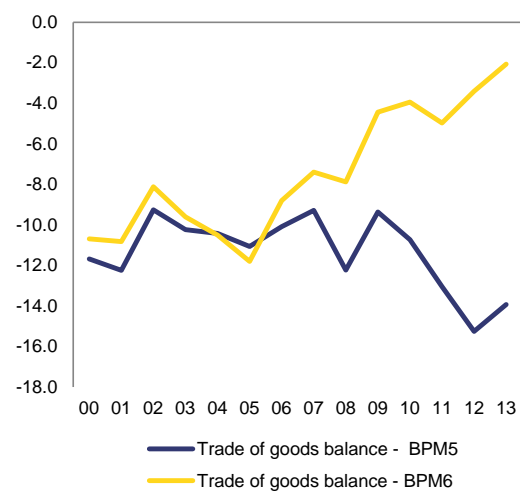


Source: European Commission

Consequently, the large and increasing deficit observed with the previous methodology has been replaced by a small and shrinking deficit according to the new methodology. The revision is related to the classification of merchanting activities⁽⁶⁾ that — under the new accounting standards — are classified as goods and no longer as services, and thus does not reflect any real improvement in the overall balance. The growth of merchanting activities has been remarkable since 2002, mainly due to the establishment of multinational groups in Luxembourg and the steady development of their central purchasing departments. While their production sites and the majority of suppliers and customers are abroad, the ‘merchanting’ business is done from a Luxembourg-resident company. By contrast, the traditional trade balance, excluding the balance of merchanting activities, still shows a sizeable deficit, whose further deterioration has been prevented by the recent decline in energy and commodity prices.

Finally, the overall current account surplus is dragged down by the widening deficit of the primary income balance. This net outflow increased to almost 30 % of GDP in 2014 (from 8.1 % of GDP in 2000), mirroring the increasing success of the financial services industry in placing its products abroad and the large number of foreign workers and pensioners.

Graph 1.6: BPM5 versus BPM6 – Trade of goods balance



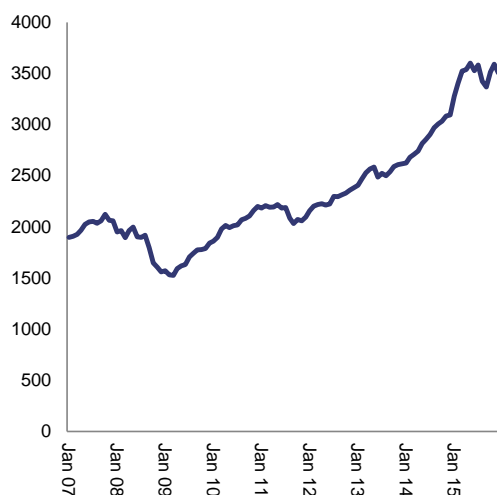
Source: European Commission

⁽⁶⁾ Purchase of goods by a resident from a non-resident followed by sale to a non-resident, with the goods not entering the country of the first purchaser. For more details see STATEC, 2015, ‘Regards sur certains éléments de la balance courante en 2014’, available at: <http://www.statistiques.public.lu/fr/publications/series/regards/2015/09-15-balance-courante/index.html>

The financial sector

The financial sector in Luxembourg is very large relative to the size of the economy. Performance has been unequal across a rather diversified financial sector. The fund industry profited from favourable financial markets in the first part of 2015 and has increased the amount of assets under management, thanks also to new subscriptions. By the end of 2015, investment funds had more than EUR 3.5 trillion of net assets under management, a figure that has doubled since the trough of the financial crisis (see Graph 1.7).

Graph 1.7: **Assets under management (EUR million)**



Source: European Commission

By contrast, the performance of the more traditional banking sector has been lacklustre.

Due to the ultra-low interest rate environment eating into the profit margins and digitisation, several institutions underwent restructuring, including cost-cutting. In recent years, balance sheets have been broadly stable despite the decrease in intermediation activity and lower profitability. Total bank staff decreased by 4.2 % between 2011 and 2015 (second quarter). Insurance sector results are fairly stable and show progress mostly in the non-life branch.

Credit and investment

Demand for loans among corporations has increased recently — boosted by investment projects and debt restructuring operations — as

firms continue to benefit from relaxed credit conditions. The latest bank lending survey confirms that Luxembourg banks have eased their lending criteria, in line with the more flexible trend observed across the euro area. These more lenient criteria relate to loans to both business and households (and for the latter, both consumer and mortgages). Increasing competition with other banks, lower costs of resources and a relaxing of balance-sheet constraints are the main reasons cited for this easing. Banks also anticipate a significant recovery in business loan applications, while better conditions on the housing market should sustain demand for home loans. Box 1.1 discusses investment trends and provides an overview of the existing barriers to greater investment and ongoing reforms. These barriers and reforms are further analysed in the relevant sections of this report.

Domestic debt

Public debt dropped to 23 % of GDP in 2014, from 23.4 % in 2013. It remains more than four times lower than the euro area average (94.5 % of GDP). Existing public guarantees⁽⁷⁾ represent 9.3 % of GDP, of which 5.5 % is related to the financial sector. In light of the low level of public debt and its relatively solid economic fundamentals, Luxembourg, together with Germany, is the only country in the euro area still enjoying an ‘AAA’ rating from all the three major rating agencies. Due to the low level of its public debt, Luxembourg has only partially benefited from the low interest rate environment.

While public debt is low in comparative terms, private sector debt is at a level well above the euro area average. It peaked in 2007 at 408.9 % of GDP (in gross terms) and since then has fallen substantially to 355.9 % in 2013, and to 342.2 % of GDP in 2014. The largest share (285.6 % of GDP) of private debt is from non-financial corporations, in particular multinational corporations that use Luxembourg as a financial hub for their intra-group financing operations.

Low interest rates and easing of financial conditions have supported steady growth of mortgage loans, which represents a large part of household indebtedness (in 2014 household debt

⁽⁷⁾ Luxembourg 2015 Draft Budgetary Plan, Table 2c.

amounted to 56.7 % of GDP, compared with 59.6 % in the euro area). The surge in house prices is likely to have exacerbated this trend, with households having to ask for higher loans. While recent figures prove that the share of fixed-rate mortgages is increasing, most mortgages are taken out at variable rates. If interest rates were to return to average historical levels, it could put debt service constraints on households, especially those with low incomes.

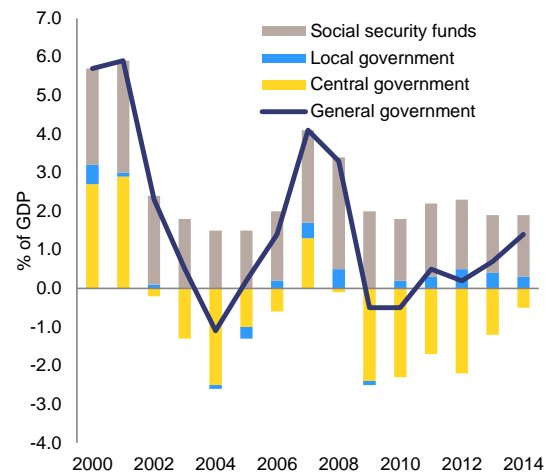
Public finances

In 2014, the fiscal position of the country improved substantially, thus creating room to absorb the shock related to the drop in e-VAT revenues. The general government balance recorded a surplus of 1.4 % of GDP in 2014, better than the 0.7 % surplus recorded in 2013. In 2015, the general government balance is projected to have presented a surplus of 0.2 % of GDP, as a change in the European legislation on VAT on e-commerce that entered into force on 1 January 2015 is expected to shave off around 1.1 % of GDP in revenues. This loss is expected to be only partially offset by the impact of the consolidation measures adopted by the authorities.

In spite of the overall surplus, a breakdown by sector reveals that the central government accounts have posted large deficits since the onset of the financial crisis. At the consolidated level of general government they are offset by the steady surpluses of the social security sector (see Graph 1.8).

The government, via an expenditure review process, is targeting substantial savings across public expenditure as a whole, while improving the quality and effectiveness of public policies. Alongside the measures on the expenditure side, the government has decided to increase VAT rates by two percentage points and introduced a new ‘temporary’ levy on personal income. In addition, a reform of the taxation system has been announced to take effect from 2017 onwards. A reform of the taxation system meeting the criteria of predictability and fiscal stability, competitiveness, sustainable employment and social equity would help to preserve the soundness of public finances. Section 2.6 discusses these issues in more detail.

Graph 1.8: Sector breakdown of general government balance



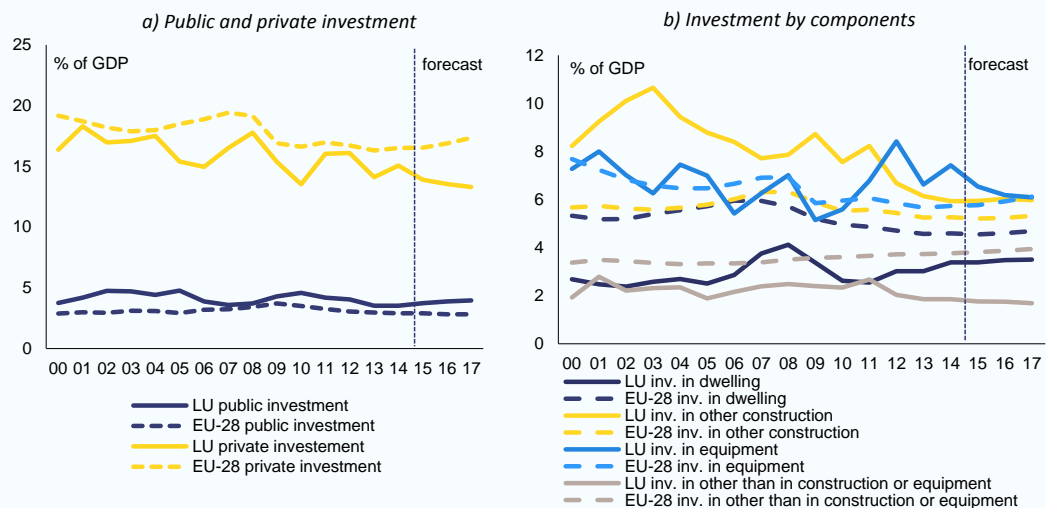
Source: European Commission

Box 1.1: Investment challenges

Section 1. Macroeconomic perspective

Overall, investment in Luxembourg, has benefited from favourable lending conditions and has been dynamic over recent years, largely outpacing developments in the euro area or in Germany. In particular, since 2000, public investment has regularly stood above the euro area average (see Graph 1a). The government plans to further increase investment in the coming years in order to carry out important projects in the area of transport infrastructure. By contrast, the share in GDP of private gross fixed capital investment is below the euro-area average. This could be explained by the presence of a large financial sector, and the weaker investment intensity that is associated with its activities. Moreover, investment in knowledge-based capital, including overall and business spending on research and development, is lower than in many euro-area countries, with unexploited growth and employment potential.

Graph 1: Public and private investment, % of GDP; Investment by components, % of GDP



Source: European Commission

Section 2. Assessment of barriers to investment and ongoing reforms

Some regulatory and non-regulatory barriers exist in Luxembourg and they constitute a bottleneck to private investment and economic growth.¹ Luxembourg gets an average score according to the World Bank's Doing Business indicators. It ranks particularly well in terms of paying taxes, enforcing contracts, getting a construction permit and trading across borders. However, it ranks less favourably in terms of the ease of starting a business, registering a property, resolving insolvency or accessing credit.

As regards SME policy, a number of issues still have to be addressed. There has been no improvement on a number of basic issues that may cause problems for small start-ups, such as: the cost of starting a business (still more than three times the amount it takes in other EU Member States on average); the paid-in minimum capital (double the EU average); and the costs required to transfer property (also twice as much as it would cost on average in other EU Member States). In addition, Luxembourg has the third highest number of tax payments per year in the EU, though paying these taxes only takes about a quarter of the average time. In the area of internationalisation, the challenges still to be tackled concern mainly import and export costs,

¹ European Commission Staff Working Document, *Challenges to Member States' Investment Environments* (http://ec.europa.eu/europe2020/challenges-to-member-states-investment-environments/index_en.htm).

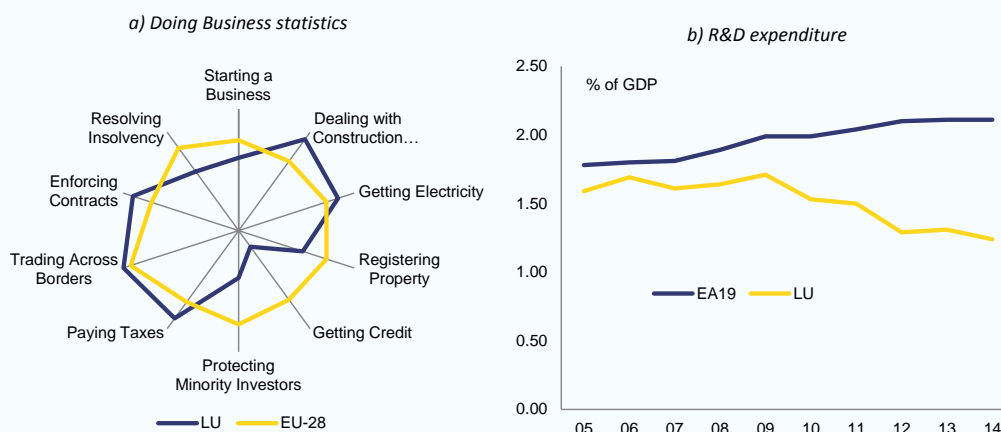
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Box (continued)

which are significantly higher (some 40 %) than in the EU on average. On the positive side, it takes almost four days less to import or export than in the other EU Member States on average.

Luxembourg ranks below the EU average in the ‘second chance’ area and this has not changed noticeably in recent years. The costs of resolving insolvency remain about 50 % higher than the EU average, which is a significant difference that should be tackled in the new bankruptcy law. Progress in this area is limited because no policy measures were introduced. The new draft legislation on the preservation of companies and on modernising the bankruptcy law deposited at the Chamber of Deputies at the beginning of 2013 has not yet been adopted. Expectations regarding this law are high as it could mean a substantial move forward in this area but, as of early 2016, the draft legislation still needs to complete the consultation process and be adopted. The bill is designed to encourage entrepreneurship by assisting entrepreneurs and giving them a second chance in the event of failure. Mechanisms to maintain employment and activities in the event of bankruptcy are also included.

Graph 2: Ranking on Doing Business Statistics; Expenditure in R&D, % of GDP



Source: World Bank, Eurostat, European Commission

A low and decreasing level of private investment in R&D is explained by the lack of attractiveness of the R&D environment (including the disconnection between private sector R&D and the public research system), see Section 2.4. To reverse the trend in business R&D investment new measures are needed. A first step in this direction is the revision of the law on public support to business R&D. This revision will allow, among else, extending the range of instruments that can be used for that support.

Finally, a low level of investment in housing construction has led to a growing mismatch between demand and supply of housing (see Section 2.2). Recent measures aiming at increasing the supply of social housing will contribute to reduce the gap, although their effect will be felt only in the long-term. In the meantime, other measures are needed in order to remove those factors that restrain investment and have contributed, together with a strong demand from a fast-increasing population; to the sharp hike in the house prices.

Box 1.2: Contribution of the EU Budget to structural change

Luxembourg can receive up to EUR 140 million for the period 2014-2020 from the European Structural and Investment Funds (ESIF). This is equivalent to 0.9% of the expected national public investment in areas supported by the ESI funds.

Ex ante conditionalities relating to the smart specialisation strategy have not yet been fully met as the government has still to adopt the R&I strategy for smart specialisation. When ex-ante conditionalities are not fulfilled by end 2016, the Commission may suspend interim payment to the priorities of the programme concerned.

Given Luxembourg's relatively modest ESIF allocation, the programmes concentrate on addressing specific aspects of the issues identified in recent years either in the context of the European Semester or under the European 2020 objectives. Increasing R&D investment is of crucial importance for creating greater economic diversification and increasing the number of SMEs involved in research. Furthermore support will also be given to sustainable professional integration of jobseekers, inactive persons and young people (including through the implementation of the Youth Guarantee), active inclusion, and skills development through better access to lifelong learning. Funding has also been allocated to measures relating to protection of the environment and resource efficiency and the shift to a low-carbon and resource-efficient economy. Regular monitoring of implementation includes reporting in mid-2017 on the contribution of the funds to Europe 2020 objectives and progress in addressing relevant structural reforms to maximise the use of EU financing.

Financing under the new European Fund for Strategic Investments (EFSI), Horizon 2020, the Connecting Europe Facility and other directly managed EU funds would be additional to the ESI Funds. Following the first rounds of calls for projects under the Connecting Europe Facility, Luxembourg has signed agreements for EUR 74 million for transport projects. For more information on the use of ESIF in Luxembourg see: <https://cohesiondata.ec.europa.eu/countries/LU>.

Table 1.1: Key economic, financial and social indicators - Luxembourg

	2003-2007	2008	2009	2010	2011	2012	2013	2014	forecast		
									2015	2016	2017
Real GDP (y-o-y)	4.5	-0.8	-5.4	5.7	2.6	-0.8	4.3	4.1	4.7	3.8	4.4
Private consumption (y-o-y)	2.4	1.4	1.0	1.7	2.2	2.7	0.9	3.7	-0.1	2.9	2.0
Public consumption (y-o-y)	2.6	2.4	4.2	3.3	1.1	3.6	3.9	4.5	3.3	3.0	2.6
Gross fixed capital formation (y-o-y)	5.4	7.3	-13.2	0.0	17.2	-0.3	-7.2	9.9	0.7	1.9	3.5
Exports of goods and services (y-o-y)	8.2	6.0	-12.0	8.3	5.4	0.2	6.9	6.8	7.5	3.5	4.9
Imports of goods and services (y-o-y)	8.4	9.4	-13.3	8.6	7.5	1.5	5.7	8.0	6.6	3.0	4.3
Output gap	1.1	1.2	-6.1	-2.4	-2.2	-5.5	-3.7	-2.7	-1.3	-0.9	0.1
Potential growth (y-o-y)	4.0	3.2	2.0	1.6	2.4	2.6	2.4	3.1	3.2	3.3	3.4
Contribution to GDP growth:											
Domestic demand (y-o-y)	2.2	2.3	-1.9	1.1	4.0	1.4	-0.5	3.7	0.7	1.7	1.6
Inventories (y-o-y)	0.3	0.2	-2.0	2.4	-0.1	-0.4	0.9	0.1	0.0	0.0	0.0
Net exports (y-o-y)	1.9	-3.3	-1.5	2.1	-1.3	-1.9	4.0	0.3	4.1	2.1	2.8
Contribution to potential GDP growth:											
Total Labour (hours) (y-o-y)	1.9	1.6	1.3	1.2	1.4	1.6	1.4	1.5	1.7	1.8	1.7
Capital accumulation (y-o-y)	1.4	1.7	1.0	0.9	1.3	1.2	0.8	1.4	1.3	1.2	1.2
Total factor productivity (y-o-y)	0.7	-0.1	-0.4	-0.4	-0.3	-0.2	0.1	0.2	0.3	0.3	0.4
Current account balance (% of GDP), balance of payments	9.9	7.7	7.3	6.8	6.2	6.1	5.7	5.5	.	.	.
Trade balance (% of GDP), balance of payments	26.1	31.9	31.2	28.2	27.6	31.1	32.9	34.5	.	.	.
Terms of trade of goods and services (y-o-y)	0.3	1.1	1.3	0.0	0.5	0.6	0.3	-0.4	0.6	0.1	0.1
Capital account balance (% of GDP)	-0.1	-0.7	-1.1	-0.5	-0.4	-0.9	-1.6	-2.0	.	.	.
Net international investment position (% of GDP)	23.1	16.5	-29.5	-20.7	29.5	35.7	35.1	36.4	.	.	.
Net marketable external debt (% of GDP)1	2577.3*	2628.8*	2854.1*	2995.7*	2355.2*	2240.1*	.	.	.	.	.
Gross marketable external debt (% of GDP)1	3050.6	3257.5	3099.3	2950.9	2770.3	3193.2	3096.6	3641.0	.	.	.
Export performance vs. advanced countries (% change over 5 years)	27.6	28.8	21.3	11.7	5.0	0.9	14.4	18.77	.	.	.
Export market share, goods and services (y-o-y)	4.7	-3.9	2.8	-8.0	-1.0	0.8	11.7	8.5	.	.	.
Net FDI flows (% of GDP)	38.7	60.5	35.1	-33.5	-55.1	-164.9	-311.8	78.3	.	.	.
Savings rate of households (net saving as percentage of net disposable income)	4.1	9.5	12.1	13.0	13.6	13.7	.	.	.	.	.
Private credit flow (consolidated, % of GDP)	51.7	-36.2	-31.6	-15.8	50.8	31.5	21.6	0.6	.	.	.
Private sector debt, consolidated (% of GDP)	268.4	362.7	356.0	311.9	339.2	359.8	355.9	342.3	.	.	.
of which household debt, consolidated (% of GDP)	44.4	49.8	56.2	55.3	54.3	56.1	55.3	56.7	.	.	.
of which non-financial corporate debt, consolidated (% of GDP)	224.0	312.9	299.8	256.6	284.9	303.7	300.6	285.6	.	.	.
Corporations, net lending (+) or net borrowing (-) (% of GDP)	1.9	-0.6	-9.8	-5.8	-8.7	-10.1	-7.5	-7.2	-2.4	-0.9	1.2
Corporations, gross operating surplus (% of GDP)	31.6	30.5	26.1	30.3	30.1	28.7	27.5	27.7	30.0	30.4	31.3
Households, net lending (+) or net borrowing (-) (% of GDP)	0.7	0.8	2.1	3.8	2.8	3.3	1.3	0.2	1.1	0.3	0.0
Deflated house price index (y-o-y)	8.4	1.0	-1.7	4.3	1.1	2.5	3.7	3.7	.	.	.
Residential investment (% of GDP)	2.9	4.1	3.4	2.6	2.5	3.0	3.0	3.4	.	.	.
GDP deflator (y-o-y)	3.6	3.3	1.8	3.1	4.2	4.1	2.4	1.0	3.6	1.2	2.1
Harmonised index of consumer prices (HICP, y-o-y)	3.0	4.1	0.0	2.8	3.7	2.9	1.7	0.7	0.1	0.4	2.4
Nominal compensation per employee (y-o-y)	3.5	2.7	1.6	2.1	2.0	1.6	3.6	2.9	0.9	1.4	2.6
Labour productivity (real, person employed, y-o-y)	1.4	-5.3	-6.4	3.8	-0.4	-3.2	2.5	1.5	.	.	.
Unit labour costs (ULC, whole economy, y-o-y)	2.1	8.5	8.6	-1.7	2.3	4.9	1.1	1.4	-1.1	0.3	0.7
Real unit labour costs (y-o-y)	-1.5	5.0	6.6	-4.7	-1.7	0.8	-1.2	0.4	-4.6	-1.0	-1.4
Real effective exchange rate (ULC, y-o-y)	1.4	6.2	5.7	-3.3	1.6	0.9	1.6	0.7	-4.3	-0.5	.
Real effective exchange rate (HICP, y-o-y)	1.6	1.9	0.9	-1.6	0.8	-1.5	1.5	0.5	-2.8	0.6	0.4
Tax wedge on labour for a single person earning the average wage (%)	26.0	27.4	26.2	26.4	28.1	28.0	29.3	29.9	.	.	.
Tax wedge on labour for a single person earning 50% of the average wage (%)	15.5*	16.4	15.1	15.2	16.5	16.2	16.9	17.3	.	.	.
Total Financial Sector Liabilities, non-consolidated (y-o-y)	17.4	-11.2	7.3	13.7	8.8	15.6	8.5	19.8	.	.	.
Tier 1 ratio (%)2	.	10.4	15.6	17.6	15.0	21.2	28.3	26.0	.	.	.
Return on equity (%)3	.	6.1	-1.9	5.3	-16.3	1.3	6.0	5.9	.	.	.
Gross non-performing debt (% of total debt instruments and total loans and advances) (4)	.	0.2	.	0.0	.	.	.	1.1	.	.	.
Unemployment rate	4.4	4.9	5.1	4.6	4.8	5.1	5.9	6.0	6.1	6.0	6.0
Long-term unemployment rate (% of active population)	1.2	1.6	1.2	1.3	1.4	1.6	1.8	1.7	.	.	.
Youth unemployment rate (% of active population in the same age group)	14.7	17.3	16.5	15.8	16.4	18.0	16.9	22.3	14.0	.	.
Activity rate (15-64 year-olds)	66.1	66.8	68.7	68.2	67.9	69.4	69.9	70.8	.	.	.
People at-risk poverty or social exclusion (% total population)	16.3	15.5	17.8	17.1	16.8	18.4	19.0	19.0	.	.	.
Persons living in households with very low work intensity (% of total population aged below 60)	5.6	4.7	6.3	5.5	5.8	6.1	6.6	6.1	.	.	.
General government balance (% of GDP)	1.0	3.3	-0.5	-0.5	0.5	0.2	0.7	1.4	0.2	0.5	0.5
Tax-to-GDP ratio (%)	38.1	38.1	40.0	39.0	39.2	40.1	39.5	39.4	37.7	37.6	36.6
Structural budget balance (% of GDP)	.	.	.	0.5	1.5	2.6	2.3	2.5	0.8	0.9	0.4
General government gross debt (% of GDP)	6.6	14.4	15.4	19.6	19.2	22.1	23.4	23.0	21.3	22.7	22.0

(1) Sum of portfolio debt instruments, other investment and reserve assets

(2,3) domestic banking groups and stand-alone banks.

(4) domestic banking groups and stand-alone banks, foreign (EU and non-EU) controlled subsidiaries and foreign (EU and non-EU) controlled branches.

(*) Indicates BPM5 and/or ESA95

Source: European Commission, winter forecast 2016; ECB

2. STRUCTURAL ISSUES

This section provides an analysis of the main structural economic and social challenges for Luxembourg. Focusing on the policy areas covered in the 2015 country-specific recommendations, this section analyses issues related to long-term sustainability of public finances, the housing market, the financial sector and relative diversification efforts. Moreover, labour market policies, the taxation system and environmental challenges are analysed as well.

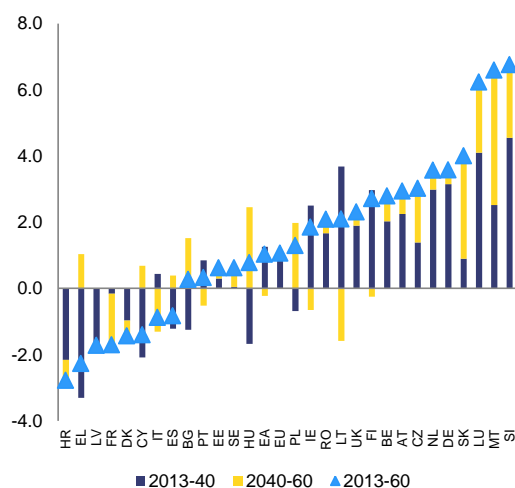
2.1. LONG-TERM SUSTAINABILITY OF PUBLIC FINANCES

Some lessons from the 2015 Ageing Report

According to the 2015 Ageing Report published in May 2015 by the Commission, Luxembourg will be confronted with a substantial increase in age-related public expenditure by 2040. Age-related expenditure, including pensions, healthcare, long-term care, education and unemployment benefits, up to 2040, is estimated to increase by around four percentage points of GDP (second highest increase over this period, after Slovenia). Looking beyond that to 2060, it could attain more than 6 pps. of GDP, compared with a moderate 1.3 pps. of GDP on average in the EU (see Graph 2.1.1).

Looking at the components of total age-related expenditure, the increase is mostly driven by pension spending, followed by long-term care and healthcare expenditure. Pension expenditure also explains most of the difference from the average projected trend in the EU (see Graph 2.1.2). Other age-related components are projected to evolve more in line with EU average standards.

Graph 2.1.1: Total age-related expenditure in EU Member States, projected change 2013-2060, percent of GDP (baseline scenario)



Source: 2015 Ageing Report

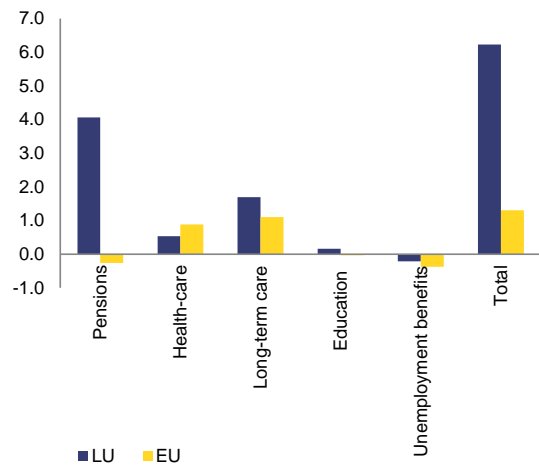
Table 2.1.1: **Benefit ratio and replacement rate, 2013 and 2060 (%), Luxembourg versus EU / EA**

	Benefit Ratio (%)						Gross Average Replacement Rate (%)					
	Public pensions - earnings related			Public pensions			Public pensions - earnings related			Public pensions		
	2013	2060	% change	2013	2060	% change	2013	2060	% change	2013	2060	% change
LU	57.3	57.8	0.5	51.3	53.4	2.1	77.7	64.6	-13.1	na	na	na
EU	45.4	36.5	-8.9	44.0	34.9	-9.1	45.7	38.9	-6.8	41.6	32.6	-9.0
EA	47.5	37.7	-9.9	46.1	37.5	-8.7	47.6	39.1	-8.4	45.2	35.1	-10.2

Note: EU and EA aggregates are calculated as simple averages.

Source: 2015 Ageing Report

Graph 2.1.2: **Total age-related expenditure Luxembourg vs EU, projected change 2013-2060, percent of GDP, by main components (baseline scenario)**



Source: 2015 Ageing Report

The pressure on public pension expenditure is driven by a high increase in the number of pensioners relative to the number of contributors.⁽⁸⁾⁽⁹⁾ Luxembourg is expected to experience an increase in the old-age dependency ratio of around 15 pps. (going from 20.3 % in 2013 to 35.6 % in 2060) according to Eurostat projections.⁽¹⁰⁾ This increase, although substantial, will be lower than the EU average (+22.3 pps.), and one of the lowest recorded in the EU.

The relatively greater increase in Luxembourg’s public pension spending compared with other Member States is thus

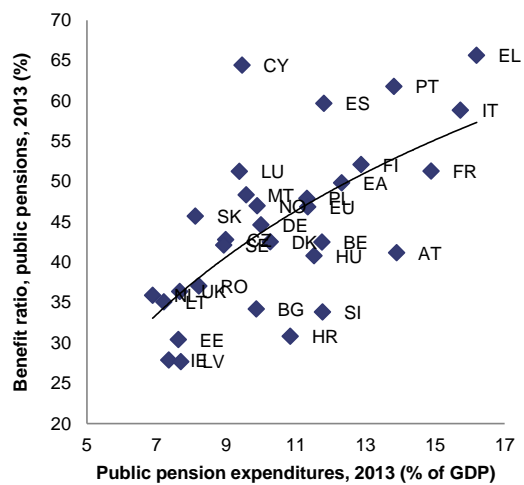
⁽⁸⁾ At the same time, Luxembourg would experience a major increase of its total population (from 0.5 million in 2013 to 1.1 million inhabitants in 2060, the highest relative change within the EU), largely due to the projected very high net migration.

⁽⁹⁾ According to Luxembourg authorities’ calculations (see Box 2.1.1).

⁽¹⁰⁾ Population projections used in the Ageing Report are made by Eurostat (Europop 2013 in the 2015 Ageing Report).

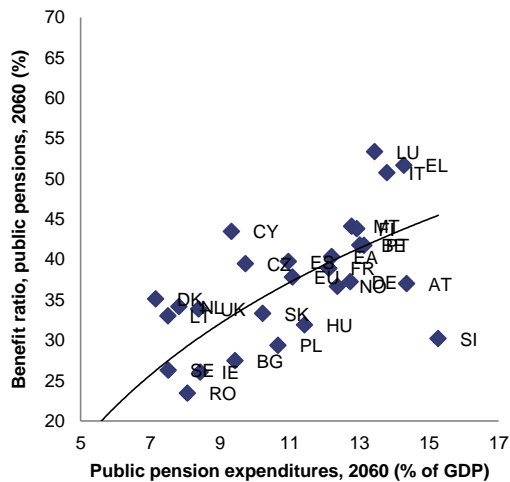
mostly explained by the development of the benefit ratio. This ratio is projected to increase slightly in the long run (+2.1 pps.), against a substantial decrease in the EU (around -9 pps. of GDP), (see also Box 2.1.1) In 2060, Luxembourg should exhibit the highest benefit ratio and replacement rate in the EU (see Table 2.1.1 and Graphs 2.1.3 and 2.1.4), even if the latest 2012 reform slightly reduced the generosity of the public pension system (through reduced accrual rates and a new indexation formula).

Graph 2.1.3: **Benefit ratio (public pensions, %) and public pension expenditures (% of GDP) in 2013**



Source: 2015 Ageing Report

Graph 2.1.4: **Benefit ratio (public pensions, %) and public pension expenditures (% of GDP) in 2060**



Source: 2015 Ageing Report

Luxembourg also stands out as the only EU country where no further raising of the statutory and early retirement ages has been laid down by law for the period 2013-2060.⁽¹¹⁾ Thus, the statutory retirement age would remain at 65 in 2060, against a simple average of 67 in the EU. Under this assumption, the incentive for older people to keep working for longer will be weak, while it should progress by around two years in the EU (to around age 65). As a consequence of gains in life expectancy, the duration of retirement should rise by around 4½ years between 2013 and 2060 in Luxembourg (around 29 years, against 24 years on average in the EU).

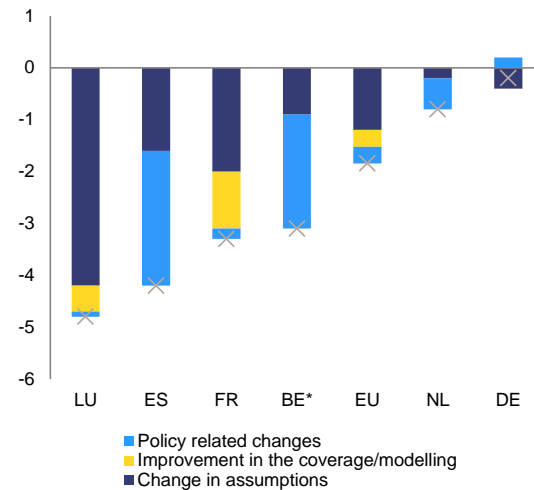
These projections represent a strong downward revision of expenditure estimations in Luxembourg compared with the 2012 Ageing Report and largely reflect more favourable demographic assumptions. However, Luxembourg is still the country that projects the strongest increase in public pension spending in the EU over the long run.⁽¹²⁾ Luxembourg is also among the countries for which the downward

⁽¹¹⁾ At the time of publication of the 2015 Ageing Report, this was also the case for Belgium and Finland, but new measures, aimed at raising pension ages, have been adopted since then.

⁽¹²⁾ This average was revised slightly downward in November 2015 compared with the 2015 Ageing Report (-0.2 pps. of GDP), following Belgium’s pension peer review by the EPC / AWG.

revision between the 2012 and 2015 projection exercises has been largest (at close to – 5 pps. of GDP). The bulk of this favourable revision is explained by the improvement in underlying assumptions, in particular in the old-age dependency ratio projections (ratio between people older than 64 and those of working age 15-64), whose progression has been revised downward in the 2015 projection exercise. In contrast, in countries like Spain, Belgium and the Netherlands, the substantially decreased pension spending projections result from the introduction of major pension system reforms (see Graph 2.1.5).

Graph 2.1.5: **Decomposition of the changes in public pension expenditure between the 2012 and the 2015 Ageing Report (2013-2060) pps. of GDP.**



BE: Updated in November 2015.

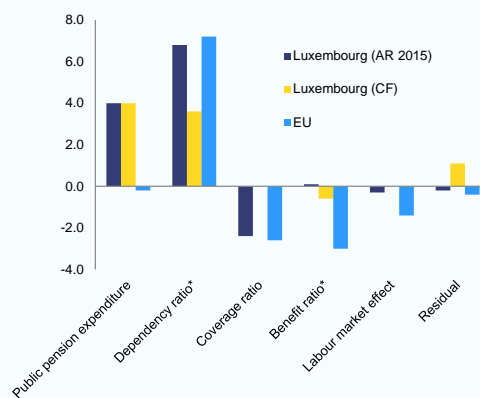
Source: 2015 Ageing Report

Box 2.1.1: Specific characteristics of Luxembourg's labour force and breakdown of the change in public pension expenditure

The change in public pension expenditure to GDP ratio is traditionally broken down into four main components: the old-age dependency ratio effect capturing pure demographic effects (population ageing), the coverage ratio effect capturing the effect of changes in eligibility conditions, the benefit ratio effect capturing the changing generosity of the pension system, and the labour-market effect component.

In the case of Luxembourg, where cross-border workers account for more than one third of total employment, ratios (partially) calculated over the resident population only capture part of the projected dynamics. Therefore, the breakdown of the change in public pension expenditure to GDP ratio is limited to two main terms in Luxembourg's case: the ratio between pensioners and contributors (capturing both demographic and eligibility effects) and a proxy of the benefit ratio (ratio of average pensions and GDP over contributors⁽¹⁾). Graph 1 below provides a comparison between the standard and the specific breakdown for Luxembourg (and the standard breakdown for the EU).

Graph 1: **Decomposing the change in public pension expenditure over 2013-60 (percent of GDP)**



Source: Ageing Report 2015, Country fiche 2015

⁽¹⁾ See the 2015 Ageing Report (page 85) for more explanations on the traditional breakdown and the Luxembourg 'country fiche' for specificities of this country (http://europa.eu/epc/working_groups/ageing_en.htm).

The public pension expenditure ratio is relatively sensitive to alternative assumptions, especially compared with other EU countries that have introduced automatic stabilisation mechanisms. Under less favourable demographic or macroeconomic assumptions, Luxembourg's public pension expenditure ratio would be significantly higher than projected in the baseline scenario (by around +1 pp. of GDP in the case of reduced migration flows or lower total factor productivity growth; see Table 2.1.2)⁽¹³⁾.

⁽¹³⁾ In the lower migration scenario, net migration flows are supposed to be reduced by 20 % compared with the baseline. In the lower TPF (total factor productivity) scenario, TPF growth is supposed to converge only to 0.8 % in the long run, against 1 % in the baseline scenario.

Countries that have introduced automatic balancing mechanisms (such as Germany, Sweden and Spain), a sustainability factor (e. g. Latvia), and / or a link between retirement age and gains in life expectancy (e. g. Netherlands, Denmark and Slovakia) exhibit much lower sensitivity of their projections to alternative underlying assumptions.

As regards early retirement, a 2015 government bill aims at suppressing the 'retraites de solidarité', a special scheme allowing people to retire from age 57. However, this is compensated by an easing of restrictions on other kinds of early retirement schemes, such as the 'shift worker', 'night worker' and 'gradual retirement' schemes. The net impact of the pension act on the effective

retirement age average and on expenditure is uncertain. Furthermore, the draft law on the reclassification of workers with working disabilities has been adopted in July 2015 and implemented since 1 January 2016. The law increased the possibilities to remain in the labour market for workers with working disabilities and consequently imply a reduction in the number of people entering an early retirement scheme.

The supervision and assessment of the financial position of the pension system has been brought forward by one year to 2016, instead of 2017.

On the basis of these results, the government could discuss with the social partners the implementation of other measures necessary for financial consolidation. Finally, as a mitigating factor it is worth mentioning that the financial reserves of the general pension fund represent around four times the amount of annual pension benefits.

Fiscal sustainability

Though fiscal sustainability risks are low in Luxembourg in the short and medium term, the need to meet future ageing cost increases puts the country at medium fiscal sustainability risk in the long term. Overall, following the Fiscal Sustainability Report 2015⁽¹⁴⁾, and confirmed with the Commission 2016 winter forecast no significant fiscal sustainability risks are envisaged in the short and medium term (based on the so-called sustainability indicators⁽¹⁵⁾ S0 and S1, and on debt sustainability analysis). In the long run, Luxembourg faces medium risks to fiscal sustainability (as indicated by the relatively sizeable value of the long-term fiscal sustainability gap indicator S2, at 4.7 percentage points of GDP). These risks are entirely driven by the above-mentioned need to meet future increases in ageing costs, in particular pension and long-term care expenditure. The revised demographic assumptions point to an increased pressure on

⁽¹⁴⁾ January 2016.

⁽¹⁵⁾ S0 is an early-detection composite indicator which captures the extent to which there might be a risk of fiscal stress in the short term. S1 fiscal gap indicator is used for assessing fiscal sustainability risks over the medium term. This medium-term perspective is most relevant when considering the need for consolidation, in terms of the reduction in the fiscal deficit and in public debt necessary to comply with the provisions contained in the Stability and Growth Pact. S2 fiscal gap indicator is used to assess long-term sustainability risks.

demand for infrastructures, including those related to transport, education and health care. Moreover, under a more adverse scenario in the healthcare and long-term care areas (with non-demographic drivers pushing up costs), the projected increase in age-related expenditure would be higher with the long-term fiscal sustainability gap then reaching a level above the critical threshold associated with high risk.

Table 2.1.2: Sensitivity tests on public pension expenditure ratio change over 2013-60 (deviation from baseline change, pp of GDP)

Countries	Change 2013-60 baseline	Impact of			
		Higher life expectancy	Lower migration	Lower labour productivity	Lower TPF (risk scenario)
LU	4.1	0.4	0.8	0.3	1.1
SI	3.5	0.9	0.5	0.2	0.3
MT	3.2	0.6	0.6	0.3	0.4
DE	2.7	0.4	0.2	0.0	0.1
SK	2.1	0.0	0.1	0.5	0.4
BE*	1.3	0.7	0.5	0.8	0.9
IE	1.1	0.4	0.3	0.0	0.0
NL	0.9	0.1	0.1	0.0	0.0
CZ	0.7	0.6	0.3	0.3	0.4
UK	0.7	0.5	0.2	0.0	0.0
AT	0.5	0.4	0.8	0.6	0.6
LT	0.3	0.6	0.3	0.0	0.0
FI	0.1	0.3	0.4	0.4	0.6
HU	-0.1	0.5	0.2	0.3	0.4
CY	-0.1	0.0	0.6	0.3	0.3
RO	-0.1	0.4	0.0	0.3	0.4
BG	-0.4	0.6	0.1	0.2	0.3
PL	-0.7	0.3	0.2	0.4	0.4
PT	-0.7	1.0	0.3	1.1	1.2
ES	-0.8	0.1	0.2	0.2	0.2
EE	-1.3	0.4	0.1	0.1	0.1
SE	-1.4	0.2	0.2	0.0	0.1
EL	-1.9	0.2	0.1	0.6	0.9
IT	-1.9	0.4	0.4	0.5	0.7
FR	-2.8	0.5	0.2	0.8	0.8
LV	-3.1	0.1	0.1	0.1	0.1
DK	-3.1	0.2	0.2	0.0	0.0
HR	-3.9	0.5	0.1	0.2	0.3

Source: European Commission

Second and third pillar pensions in Luxembourg

Uptake of occupational and private pensions in Luxembourg is low. In 2012, occupational pensions represented 6.7 % of all pension payments and private pensions just 1.5 %. These low figures are mirrored in the share of occupational pension fund assets, about 2 % of GDP in 2011. This is low compared with most other Member States.

The low uptake might be related to the generous public benefits system. In addition, the traditionally low portability of occupational pensions in a country with a large proportion of mobile workers might also be a factor. Moreover, real returns on pension investment are low in Luxembourg (+2.5 % annually, almost the lowest among Member States).

The government announced plans to extend supplementary pensions via a change to the law of 8 June 1999 regulating supplementary pension schemes, to self-employed professionals and independent workers, as well as to some categories of employees not affiliated with a company retirement scheme. The mechanism to be adopted must ensure that basic principles are the same for independent workers, self-employed professionals and the categories of employees concerned.

Long-term care

There are no significant access barriers to long-term care benefits, due to the general provision of approved long-term care benefits with almost no co-payments and the possibility to receive, if considered justified, means-tested financial support for any necessary stay in nursing homes. Only one-third of the beneficiaries live in care institutions while two-thirds are cared for at home.

According to the 2015 Ageing Report, long-term care expenditure stood at 1.5 % of GDP (EU average 1.6 % — reference scenario) in 2013 and is expected to increase to 3.2 % of GDP in 2060 (EU average 2.7 %). According to the calculations of the General Inspectorate of Social Security (IGSS), long-term care insurance should remain financially stable until 2030 if the contribution rate is gradually raised from 1.4 % to 1.7 %. However, according to the *Confédération des organismes prestataires d'aides et de soins — COPAS*, even a contribution rate of 1.7 % will not be sufficient if the growth rate of GDP remains low in the coming years.

The government's programme confirms the need for long-term care reform. Following a report in 2013, the government decided to reform long-term care insurance with the aim of providing people in need of long-term care with an adequate level of services and securing the corresponding financing⁽¹⁶⁾. The planned reforms could potentially improve the cost-effectiveness of the long-term care system.

The projected increase in total age-related expenditure still represents a sizeable challenge, even after its downward revision. The improvement compared to the previous projection is largely explained by more favourable population projections. It is worth noting that the underlying demographic assumptions imply, however, that Luxembourg is likely to face in the future significant investment needs to cater for the increasing demand for infrastructures, including those related to transport, education and health care, as well as their associated maintenance or functioning costs.

⁽¹⁶⁾ To this end the report suggested to standardise the needs assessment procedure, to extend the electronic patient file to long-term care, to redefine the role of informal carers and link cash benefits more clearly with the services provided, to review the financial support for house adaptations and to strengthen the coordination between health and social care.

2.2. HOUSING PRICE DETERMINANTS

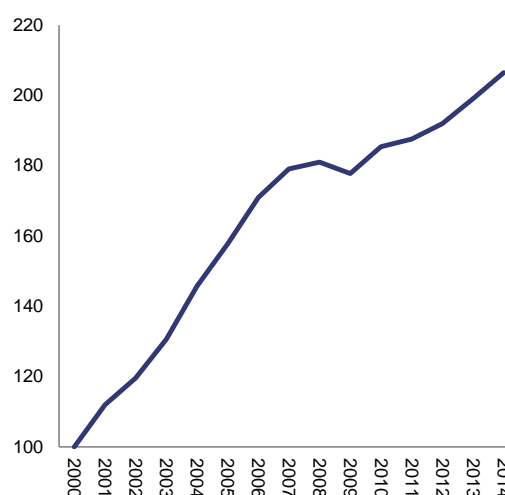
The continuous increase in house prices in the past, together with projected strong population and employment dynamics over the coming years, could become an obstacle to the envisaged increase in population and labour force. Even more so as the economy depends largely on the input of high-skilled workers from the neighbouring countries, who represent around one third of the overall employment. Whether these employees decide to relocate to Luxembourg depends largely on the conditions in the housing market.

Main trends in property prices in Luxembourg

House prices have been rising steadily for several decades. Specifically, according to STATEC, residential prices almost doubled in real terms during the period 2000-2014 (see Graph 2.2.1). After a small correction in 2009, they resumed their upward trend from 2010, although at a slower pace compared with the pre-crisis years. In 2014, prices of residential real estate in real terms were around 14 % higher than their 2008 level, when they peaked before the crisis.

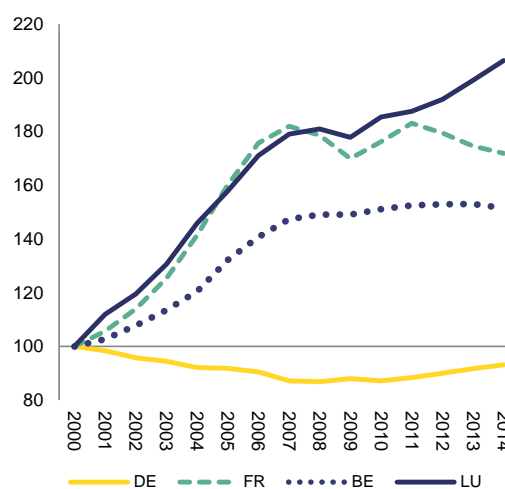
Moreover, there is a persistent price differential compared with other euro area and neighbouring countries (Belgium, Germany and France). From 2000 onwards, house prices accelerated in Luxembourg and started to outstrip those in the neighbouring countries, excluding France where, up to 2008, prices evolved in line with Luxembourg (see Graph 2.2.2).

Graph 2.2.1: Real house prices – Index 2000 = 100



Source: European Commission

Graph 2.2.2: Real house prices in Luxembourg and its neighbouring countries - Index 2000 = 100



Source: European Commission

Determining factors of house price evolution

The dynamism in residential real estate prices in Luxembourg is driven both by demand and supply factors. Excessive demand has contributed to the steep increase in price levels. This is widely attributed to migration-induced demographic pressures and the relatively strong purchasing power of resident households, as well as bottlenecks on the supply side. Appreciation pressures are reflected in the fact that around 8 000

to 10 000 new residents enter the country on average every year, while only 2 500 to 3 500 new units are put on the market during the same time period.

General socio-demographic factors such as reduction of the size of households and the average size of dwellings are also likely to play a role. Significant housing surface divergences exist, especially in Luxembourg City. According to STATEC, the average size of homes in Luxembourg is 140 m², among the highest in Europe. The average size for people aged 65 and over is even larger, exceeding 150 m², and has increased over recent years, posting an opposite trend when compared with neighbouring countries. By contrast, nearly 60 % of homes are under-occupied, a rate that reaches 80 % for people aged 65 and over.

While prices are high on average, they are considerably higher in Luxembourg City and its periphery and lowest in the northern municipalities. As a result, urban sprawl has grown significantly in Luxembourg, with low population density areas experiencing faster population growth rates than urban areas. This has also led to a big increase in commuting within the country. To this end, sectoral plans⁽¹⁷⁾ classifying the Luxembourg territory into four areas as presented by the government in May 2014 were intended to alleviate some supply-related upward price pressures. Their implementation has however been put on hold since the end of 2014.

On the supply side, the main factors at play are linked to land availability and, to a certain extent, permit issuance constraints. The latter often stem from the administrative burden of environmental and other impact studies, including EU requirements. Indeed, suboptimal administrative performance on building permit issuance may feed into market imperfections and imbalances and contribute to house price inflation.

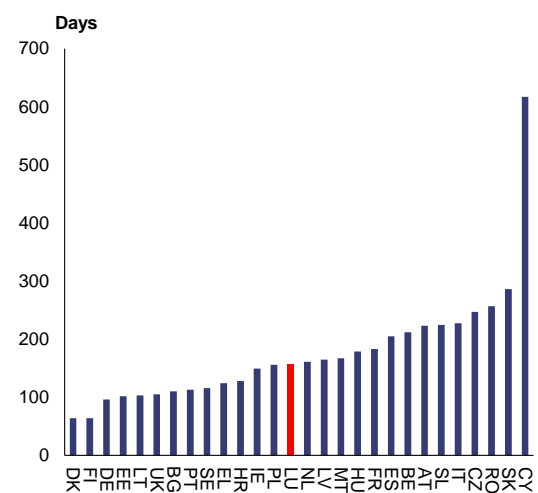
The Doing Business survey points to room for improvement in the administrative procedures dealing with the grant of building permits,

⁽¹⁷⁾ In May 2014 the government presented four sectoral plans on housing, transport, economic activity zones and green landscapes. These plans are designed to underpin, ensure and coordinate a balanced territorial development of the country.

especially on the time required to complete the administrative procedure. According to the 2015 survey, Luxembourg ranks only 50th out of 184 countries, far behind countries such as Denmark and Germany. It is the rather weak performance in the sub-indicator about time needed to complete the administrative procedure, for which it ranks 120th, that affects the overall performance. However, the relative ranking improves substantially when the quality of building regulation is taken into account.

Currently a draft ‘Omnibus’ law⁽¹⁸⁾ is being discussed by the Parliament, aiming specifically at simplifying the current procedure. It could have a material impact in reducing the length of the procedure to obtain a building permit, given that the draft law contains measures aiming at reducing the time available to the administration to react and it introduces the concept of ‘tacit consent’, according to which no reaction from the administration is interpreted as a positive answer.

Graph 2.2.3: Building permits – Time to complete a procedure



Source: 2015 Doing business

Land availability

Land availability is often mentioned as the main cause of the low housing supply. According to recent estimates⁽¹⁹⁾, a large proportion (91.8 %) of the constructible land is owned by private citizens

⁽¹⁸⁾ Draft law No 6704.

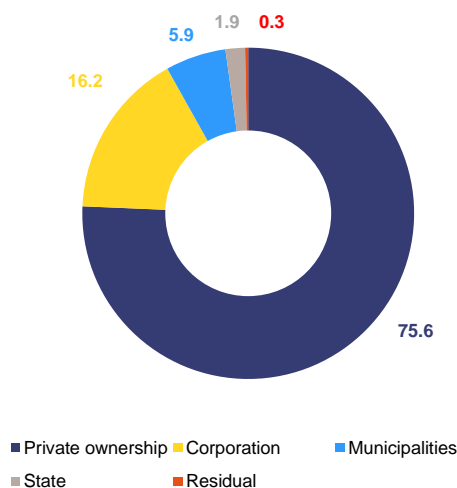
⁽¹⁹⁾ L’Observatoire de l’Habitat, October 2015.

or corporations, while only 5.9 % and 1.9 % belongs to the municipalities and to the state, respectively (see Graph 2.2.4).

In 2008, the government proposed legislation known as the Housing Pact (*pacte logement*) which introduced financial incentives for municipalities to encourage housing development. Under the Pact, local governments, expecting population growth of more than 1 % per year (or 15 % over a 10-year period) could claim subsidies to invest in public facilities, such as schools, while in return committing themselves to build more housing to support the population growth.

In addition, the Housing Pact introduced some new housing policy tools to compensate for the limited amount of land owned by the municipalities. These consisted in the right of first refusal in favour of the municipalities, and some additional fiscal and administrative measures. These include the possibility of enforcing a local tax on specific buildings which are not occupied and on land which has not been developed, to avoid speculation.

Graph 2.2.4: Land availability according to ownership



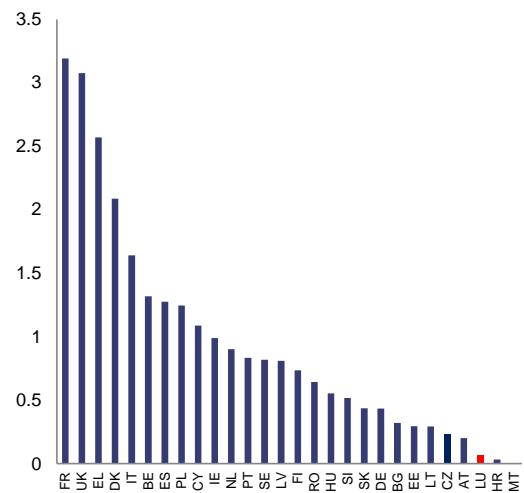
Source: Observatoire de l'Habitat

However, according to the findings of a review carried out in 2014, the Pact did not yield the expected results and only a limited number of housing units have been built. The municipalities have used the financing to build common

infrastructure rather than additional housing. One should recognise however the relatively limited availability of land owned by the local authorities. A very large share of land is owned by households, which prefer to keep the plot and wait for further increases in prices. The cost of keeping unused property is quite low.

Revenues from recurrent property taxes (0.1 % of GDP in 2014) were much lower than in the euro area on average (1.4 % of GDP), see Graph 2.2.5. This results from the way that the base on which recurrent property taxes are levied is estimated. The taxable base is the unit value of a property, calculated according to a scale that dates back to 1941 and is not aligned with real current value. Even though no data are available on the number of empty properties, it cannot be discarded that the low level of taxation is playing a role, or at least is not discouraging owners from keeping their property empty.

Graph 2.2.5: Recurrent property taxes, % of GDP



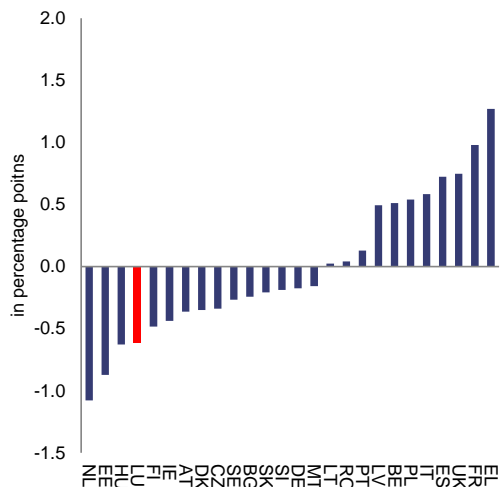
Source: European Commission

Housing policies

Current policies encourage house ownership. Subsidies have been in place for decades and consist chiefly of aid in capital in the form of financial assistance to households to build, purchase or transform their dwelling, and subsidies to reduce the interest payment burden on mortgages. In 2002, in line with the intention of the government to increase supply of both housing

and land for construction purposes, additional fiscal measures were laid down by law.⁽²⁰⁾ The most significant include: (i) lower registration tax costs related to the purchase of a dwelling (Bëllegen Akt); (ii) the decision to apply the ‘super-reduced’ VAT rate of 3 % rather than the standard rate of 15 % on construction and renovation work⁽²¹⁾; (iii) a reduction of capital gains taxes on sales of secondary residences, while first residences were already excluded from the capital gains taxes; and (iv) an increase of the accelerated amortisation rate on rented buildings from 4 % to 6 %. As shown in Graph 2.2.6, housing-related tax advantages, by lowering the marginal cost of owner-occupied housing, are not neutral for the household’s investment choice and this favours ownership.⁽²²⁾ Faced with rather rigid housing supply, a great part of the tax subsidy is likely to be capitalised into house prices.

Graph 2.2.6: Contribution of taxes to the marginal cost of owner-occupied housing (in % of the cost excluding all taxes)



Source: European Commission

Rental market

The existence of well-functioning rental markets can help reduce the volatility of house prices. When house prices rise relative to rent, an increasing number of households would find incentives to opt for renting, so reducing pressure

⁽²⁰⁾ Law of 30 July 2002.

⁽²¹⁾ As from 1 January 2015, the super reduced VAT rate of 3 % applies only to the main residence.

⁽²²⁾ Taxation reforms in the EU, 2014, European Commission.

on prices. However, as mentioned above, given the relative scarcity of dwellings in general, the supply of rental accommodation is not particularly big either. While many factors affect tenure choices, tax systems biased towards homeownership, often coupled with tight regulation of rental markets, have led to a decline in supply of rental accommodation, both in terms of quantity and quality, in many countries.⁽²³⁾

The share of households owning their dwelling stands at 73 % in 2013 and it is higher than in the euro area on average (below 67 %). Luxembourg’s real estate market tends to be skewed towards a large supply of properties for sale rather than for rent. In 2011, 78.5 % of the overall supply was for sale against 21.5 % to let.⁽²⁴⁾

The rental market is quite heavily regulated (see Graph 2.2.7). A law of 2006⁽²⁵⁾ limits the amount of return a landlord can receive to a threshold of 5 % of the initial capital invested. Rents can be increased only every three years to reflect trends in the cost of living. While the objective of the law was to provide enough incentives to increase real estate investment, it is likely that the cap has worked in the opposite direction. When compared with yields from alternative kinds of investment such as financial ones, the cap of 5 % of invested capital could provide a negative incentive to housing investment.⁽²⁶⁾

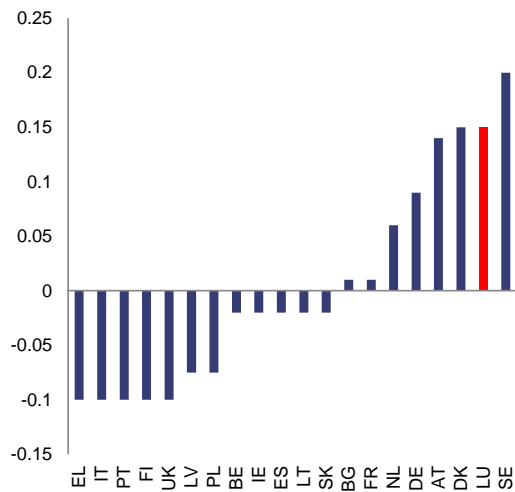
⁽²³⁾ Hilbers et al. (2008) find a positive correlation across European countries between homeownership rates in 2004 and property price appreciation over the period 1990-2004. It is worth noting that two of the countries that experienced large housing booms — Ireland and Spain — have very thin rental markets. In contrast, Germany and Switzerland, which have not participated in the latest house price boom, have large rental markets.

⁽²⁴⁾ CES, 2014, ‘L’abolition projetée par le Gouvernement du taux de TVA super réduit pour le logement locatif’, available at <http://www.ces.public.lu/fr/avis/politique-generale/2014-avis-logement-tva-super-reduit.pdf>, page 4.

⁽²⁵⁾ Law of 21 September 2006, on the rents for dwellings, available at: <http://chd.lu/wps/portal/public/RoleEtendu?action=doDocpaDetails&backto=/wps/portal/public&id=5216#>.

⁽²⁶⁾ As observed by the Trade Chamber in its opinion on the law Available at: http://chd.lu/wps/PA_RoleEtendu/FTSByteServletImpl/?path=/export/exped/sexpdata/Mag/077/309/037068.pdf.

Graph 2.2.7: Rent control - Index



Source: European Commission

Non-residential market

The residential market has to compete with a dynamic rental market for offices and commercial properties. Contrary to the residential market, non-residential rents are less regulated and prices reflect better the market interplay. According to available data⁽²⁷⁾, yields from the renting of offices would be in the range of 5 % to 7 %⁽²⁸⁾, whereas for residential housing it is estimated at between 2 % and 3 %. This would be confirmed by the increasing rate of conversion of dwellings into offices.

The government has tried to address by means of legislation the increased transformation of constructions originally built for housing to offices or spaces for commercial use.⁽²⁹⁾ To increase the availability of housing, Parliament adopted a new law empowering municipalities to introduce a legal obligation to notify empty dwellings. Failure to comply may incur a fine of up to EUR 250. Furthermore, residential properties

⁽²⁷⁾ Investment in commercial real estate would bring yields of 5.5 % on average in Luxembourg City and between 6.75 % and 7.5 % in the periphery, see 'Commercial real estate in Luxembourg: overview', available at <http://uk.practicallaw.com/3-503-6974?source=relatedcontent#a1046468>.

⁽²⁸⁾ Inowai, Luxembourg Office market report 2014, page 12.

⁽²⁹⁾ Law No 6610 adopted on 8 July 2015- 'Projet de loi modifiant la loi modifiée du 21 septembre 2006 sur le bail à usage d'habitation et modifiant certaines dispositions du Code civil'.

should no longer be used for commercial purposes and public administrations are expected to evacuate residential properties over the next five years. The law itself has singled out the relative strictness of rental regulation for residential compared with non-residential as one of the factors causing this phenomenon.⁽³⁰⁾

Government action

The government has recently confirmed its intention to review its housing policy. The review is understood to revolve around a few main objectives:

- First, all existing forms of housing support will be analysed and reformed in order to make them more effective. In particular, support measures will be introduced for individuals who, for financial reasons or for any reason outside their control, are unable to find appropriate accommodation. In this vein the government created a new form of rent subsidy in 2015.⁽³¹⁾
- Second, the acquisition of building and construction land for new housing, in particular due to the national 'Baulücken'⁽³²⁾ plan.
- Third, revival of the creation of social housing at affordable prices with the involvement of the main public players, the 'Fonds pour le Développement du Logement et de l'Habitat' and the 'Société Nationale des Habitations à Bon Marché'. The government's objective is to create at least 2 500 new social housing units by 2025.

Furthermore, the 2008 Housing Pact will be reviewed. In particular, funds for financing housing projects by the municipalities will be released only as long as projects are to be carried out. The money allocated would be placed into a specific fund managed by the Housing Ministry and continuous monitoring will be put in place.

⁽³⁰⁾ Draft law No 6280/2011 — 'Proposition de loi modifiant la loi du 21 septembre 2006 sur le bail à usage d'habitation'.

⁽³¹⁾ The draft law 6542 introduced a rent subsidy that entered into force on 1 January 2016.

⁽³²⁾ Vacant land that is immediately constructible and is located between other developed plots of land.

The continuous dynamism of house prices in Luxembourg raises questions not only about their sustainability and future trends, but also about their impact on the incentive to relocate to Luxembourg for those members of the (present and future) labour force currently not resident in the country. This, in turn, can exacerbate congestion problems on the roads, to the extent that commuters prefer (are virtually forced) to live relatively far away from their workplace.

2.3. FINANCIAL SECTOR

The financial sector represents the main economic engine of the country with a share of 27 % of total value added and 11 % of total employment in 2014. While its predominant business model is based on fund administration (the second largest centre worldwide, after the USA) and wealth management, banking and the insurance sectors are also important. Luxembourg has weathered the financial crisis relatively well, mostly due to the high degree of diversification and specialisation of its financial sector.

Banking

Bank assets expressed as a multiple of national GDP are by far the highest in Europe, yet in absolute numbers the figures look more modest.

Most of the banks have only negligible ties with the real economy. Despite Luxembourg counting 143 active banks, only five institutions provide sizeable retail services to the domestic economy. Among these five systemically important ones, three are Luxembourg banks: (i) the state-owned savings bank (Banque et Caisse d'Épargne de l'État — Spuerkeess), (ii) Dexia's former Luxembourg-based subsidiary Banque Internationale à Luxembourg (BIL) and (iii) the local Raiffeisen cooperative. These three banks, together with two foreign ones, (iv) the French BGL BNP Paribas, created through the merger of Fortis/BGL and BNP Paribas, and (v) the Dutch ING cater for the bulk of the country's banking needs, offering classic retail services including the granting of mortgages to the general public.

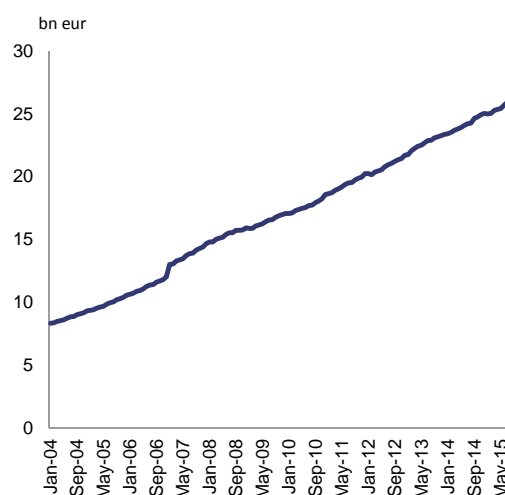
The sector came through the crisis in relatively good shape. As a result, credit to the private sector did not particularly suffer from the financial unrest. This is striking when compared with the impact of the crisis on most EU countries. Luxembourg's position as an important financial centre also favours good financing conditions for companies, including SMEs.

Mortgages granted to households for real estate acquisition have been growing by 10.5 % annually on average since 2004 (see Graph 2.3.1 and section 2.2) and interest rates for housing loans were considerably below the euro area average. Despite already low nominal rates, interest margins on mortgages have been lowering since July 2013, as in the rest of the euro area. The Central Bank of Luxembourg attributes this to

sharp competition among the few banks that offer retail services in the country.

Luxembourg's banks display healthy capital ratios, being part of a handful of countries whose average capital adequacy ratio stands above 20 %. Return on equity is still in double figures and non-performing loans are at the lowest levels in the EU, see Table 2.3.1. Loan to value ratios have also decreased since 2013.⁽³³⁾ Yet, due to the pressure from a very low interest rate environment on the profit margins and digitisation, several institutions recently underwent restructuring processes, including cost-cutting plans. Total bank staff numbers have fallen by 4.2 % between 2011 and 2015 (second quarter).⁽³⁴⁾

Graph 2.3.1: Outstanding loans for house purchase



Source: ECB

Most banks in Luxembourg concentrate exclusively on fund management, and some specialise in wealth management. Yet, wealth management in Luxembourg is declining as wealth managers are moving closer to where the wealthy actually live. Specifically, since 2012 the proportion of wealth managers with client contact fell by 13.7 %, back to the 2010 level.⁽³⁵⁾ Likewise, private banking staff has decreased by

⁽³³⁾ Banque Centrale du Luxembourg, (2015), Revue de stabilité financière.

⁽³⁴⁾ Association des Banques et Banquiers Luxembourgeois: <http://www.abbl.lu/en/mediatheque/media?media=49>.

⁽³⁵⁾ Association des Banques et Banquiers Luxembourgeois: <http://www.abbl.lu/en/mediatheque/media?media=68>

Table 2.3.1: Financial soundness indicators

	2007	2008	2009	2010	2011	2012	2013	2014	Last	Date
Total assets of the banking sector (% of GDP)	3179.8	3378.2	3079.4	2666.2	2603.4	2207.6	1965.6	1969.2	2000.8	Aug-15
Share of assets of the five largest banks	30.6	29.7	29.3	31.1	31.2	33.1	33.7	32.0	32.0	2014
Foreign ownership of banking system	74.2	70.0	64.7	68.6	68.1	71.5	71.8	71.4	71.4	2014
Financial soundness indicators:										
non-performing loans (%) EBA definition	-	-	-	-	-	-	-	3.9	3.7	Jun-15
capital adequacy ratio (%)	-	15.4	19.2	17.4	16.4	19.1	20.9	20.2	19.8	2015Q2
profitability - return on equity (%)	-	5.5	11.5	13.0	5.1	10.4	9.9	11.0	13.3	2015Q2
Private credit growth (y-o-y)	31.0	10.8	-5.3	1.5	1.5	-6.5	-4.8	3.2	6.4	Aug-15
Lending for house purchase (y-o-y)	22.1	8.6	7.1	8.8	8.9	7.2	6.7	7.0	7.1	Aug-15
Loan to deposit ratio	56.8	68.6	66.1	69.0	65.8	60.9	54.9	52.2	49.6	Aug-15
CB liquidity as % of liabilities	4.3	6.2	2.3	0.6	1.5	1.3	1.2	0.6	0.5	Jun-15
Private debt (% of GDP)	-	395.1	407.1	393.7	375.5	350.6	313.0	304.5	271.5	Aug-15
Gross external debt (% of GDP)										
Public	0.1	2.5	2.9	6.3	6.1	8.1	10.0	10.4	10.5	Mar-15
Private	2233.9	2710.3	2906.9	2409.3	2613.0	4063.6	4588.0	4587.3	4279.7	Mar-15
Long term interest rates spread versus DE	24.4	62.3	100.7	42.6	31.5	32.7	28.2	17.3	17.3	2014
Number of branches	229	230	226	226	227	203	213	217	217	2014

Source: EBA, ECB, Eurostat, BIS, IMF, Worldbank

7.8 %. Still the sector employs two thirds more full-time equivalent workers than in 2008.

Insurance

The aggregated sectors' balance sheet amounted to EUR 205 billion in 2014, more than four times Luxembourg's GDP. It concerns mainly life insurance, the rest being reinsurance accounts and non-life insurance products. Life insurance grew by 16.1 % in 2014 to EUR 147 billion. It is worth noting that only 10 % of gross premiums correspond to Luxembourg citizens, with three quarters stemming from other Europeans.

France remains the biggest consumer of Luxembourg life-insurance products, followed by Belgium, Italy, Germany and Luxembourg itself. In terms of net inflows (written premiums minus redeemed insurance) France accounted for EUR 5.5 billion inflows whereas Belgium had more than EUR 1 billion in outflows.

Fund administration

Luxembourg is the world's second biggest investment fund administration centre. The recent drop in interest rates and favourable economic developments have boosted the financial markets and indirectly the country's investment fund industry, whose total amount of assets under management has increased by 47.1 % between the beginning of 2013 and end of 2015.

Total assets under management stood at EUR 3.4 trillion in September 2015, divided over roughly 3 900 undertakings for collective investment. Half of the money invested stems

from the EU and a quarter from the USA. Within the EU, the UK, Germany and France each roughly contribute 8 % of the total, whereas funds stemming from Luxembourg account for less than 3 %. Only 1 % of aggregate funds under management come from China, whose relative share has actually declined over the past six years. Including China, 7.8 % of aggregate money under management comes from emerging markets.

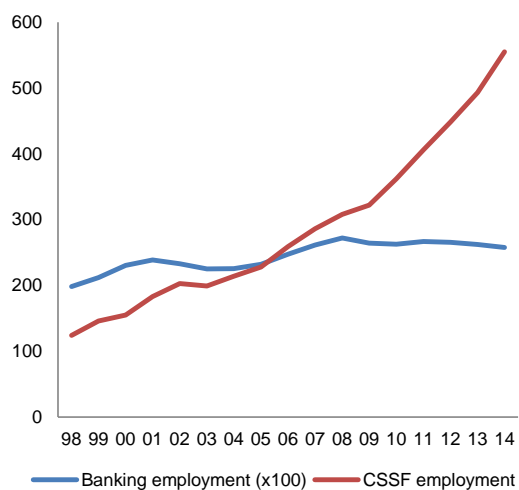
Within the financial sector, the fund administration industry was the only one where employment increased during the peak of the financial crisis. Luxembourg also hosts Clearstream, the world's second largest international central securities depository. The value of assets under custody on behalf of customers averaged EUR 12.2 trillion, dealing with 110 countries.

A new regulatory environment

The future of the financial industry in Luxembourg relies on its ability to ensure that international investors continue to trust Luxembourg as a location for their assets, while further pursuing financial diversification. In this sense the national authorities' efforts to strengthen the financial supervisory framework are a welcome step in the right direction. Resources for the Bank and Fund Administration Supervisor (CSSF) have been strengthened over recent years (see Graph 2.3.2). Investor protection has been improved through better bank stress testing techniques, including strengthening of the criteria

to be complied with when engaging in large intra-group transactions.⁽³⁶⁾

Graph 2.3.2: Trends in employment CSSF and Banks



Source: European Commission, CSSF

In March 2015, the law providing for the creation of a systemic risk committee was adopted.⁽³⁷⁾ The law implements the recommendation of the European Systemic Risk Board to all Member States for establishing a national macro-prudential authority. The committee is entrusted with the key task of identifying, assessing and monitoring risks to the financial stability.

Financial regulation is experiencing relevant changes, including the move towards a Banking Union. Luxembourg is well positioned to benefit from the move towards a Banking Union in the EU as it would provide an improved and more integrated European regulatory framework. The progress towards a Banking Union also offers an opportunity for Luxembourg's banks to further strengthen their role as a treasury hub for euro area activities.

The authorities are taking steps to ensure transposition of these changes into law. They are becoming increasingly aware of the need to meet international expectations in areas such as automatic exchange of information. Luxembourg

⁽³⁶⁾ OECD, 2014.

⁽³⁷⁾ Draft law No 6653 submitted to Parliament on 28 February 2014.

is committed to implementing the new standard on automatic exchange of information by 2017. Although this kind of measure could entail some cost for the financial players in the short term, a consensus seems to have emerged in the country that the sector will benefit from it over a longer time horizon.

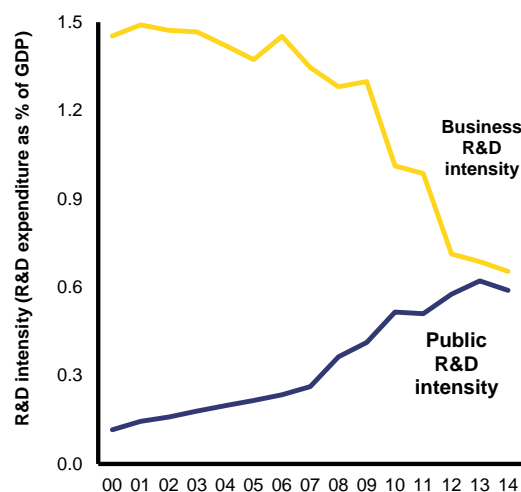
2.4. DIVERSIFICATION OF THE ECONOMY, COST COMPETITIVENESS AND BUSINESS ENVIRONMENT

Diversification through innovation

The Luxembourg authorities have sought to diversify the economy, acknowledging the risks associated with heavy dependence on the financial sector. Given the high level of labour costs in the country, activities with higher added value offer potential for unlocking alternative sources of growth. The successful diversification of Luxembourg's economy therefore depends to a large extent on those sectors which are less sensitive to labour cost levels. They are largely based on research and innovation, which tend to be technology and knowledge-intensive. Further expansion of the already successful non-financial service sector could also support the diversification of the economy.

Progress towards a more diversified, knowledge-intensive economy is a political priority. This is reflected in a fivefold increase in public R&D intensity between 2000 and 2014 (Graph 2.4.1). Because excellent foreign researchers have been attracted, the scientific performance of the public research system has progressed very rapidly and is now above the EU average.⁽³⁸⁾ However, this stands in stark contrast to the sharp drop in business R&D intensity (from 1.5 % of GDP in 2000 to 0.7 % in 2014 — see Graph 2.4.1). This is partly related to the continued dwindling of an already narrow industrial base and the low investment intensity that is associated with the financial sector. However, it points also to a lack of leverage effects of public efforts on business investment in research and innovation. The relatively low level of cooperation between public research institutions and firms is another symptom of the overall weakness of Luxembourg's research and innovation ecosystem⁽³⁹⁾.

Graph 2.4.1: Luxembourg – Trend in business R&D intensity and public R&D intensity, 2000-2014



(1) Business R&D intensity: Business enterprise expenditure on R&D as % of GDP. (2) Public R&D intensity: Government and higher education expenditure on R&D.; break in series between 2009 and the previous years.

Source: European Commission

The reform of the National Research Fund and of the public research centres carried out in 2014 and 2015 should help to ensure a better economic return from the public research efforts. In particular, the merger of the public research centres *Tudor* and *Lippmann* into the Luxembourg Institute of Science and Technology is intended to build critical mass in areas with major prospects of cooperation with industry, such as materials, environment and information and communication technology, with less promising research subjects being discontinued. Moreover, a new funding tool for public-private partnerships has been recently set up.

However, reversing the declining trend in business research and innovation investment could require additional measures, particularly in relation to public support for business research and innovation. A first step in this direction is the revision of the law on public support, which will mean extending the range of instruments that can be used for such public support, strengthening the evaluation of the system and reducing the administrative obstacles to accessing it.

⁽³⁸⁾ For instance, the share of Luxembourg scientific publications that are among the top 10 % most cited publications worldwide rose from 5.5 % in 2000 to 13.7 % in 2010 compared with an EU average of 11.3 %.

⁽³⁹⁾ For instance, the volume of public sector research and innovation financed by businesses represents only 0.017 % of GDP compared with an EU average of 0.051 %.

Information and communication technology is one of the priority sectors selected in the context of the economic diversification strategy where significant improvements have been achieved.

Between 2008 and 2012, the sector recorded the fourth highest growth in the EU, representing 7.3 % of GDP in 2012. The strong technological infrastructure underpins this good performance. In 2015, two additional measures were taken specifically to foster the development of young innovative firms in this sector: the establishment of a seed fund type of financing structure and the launch of the Fit4start programme, which will help a selection of start-ups through a combination of financial support for prototype development and coaching.

Building on the excellent performance of information and communication technology activities, the government intends to deploy the sector's knowhow to create renewable energy and transport solutions. To this end, a 'third industrial revolution strategy' is being designed, which should provide a roadmap on how to develop intelligent systems covering the entire country. It is expected to be presented in summer 2016.

By contrast, the development of the biotech sector, another priority, remains very limited. It represents less than 0.1 % of gross value. The build-up of strong public research capacities in this field has not been enough to foster the development of the sector. Ensuring that the substantial public investments made in this area can still contribute to the economic diversification objective could require a more comprehensive strategy.

Entrepreneurship

To unleash the potential for innovation, entrepreneurship is crucial. Entrepreneurship performance is below the EU average. The values of most indicators measured for the Small Business Act for Europe performance report have dropped in the period since the previous report. Early stage entrepreneurial activity in general, and for women in particular, is now below the EU average. Although slightly more people consider entrepreneurship as a desirable career choice, fewer had entrepreneurial intentions in 2014 than in 2013. The established business ownership rate

(3.7 %) has increased somewhat but remains well below the EU average of 6.7 %.

In spite of the measures introduced⁽⁴⁰⁾, Luxembourg still lacks an entrepreneurial culture. Initiatives to encourage start-ups and entrepreneurship seem neither sufficient nor comprehensive enough to actively encourage self-employment as an alternative to waged work. Still, some initiatives have been put in place. On the policy side, measures taken in 2015 include the introduction of draft legislation on the new simplified limited company. In 2014 the Chamber of Skilled Trades and Crafts also launched a programme to improve skilled trades and crafts in Luxembourg. The 'Hands Up' programme promotes entrepreneurial spirit and provides advice for creating a business based on a trade or craft. During the same year, the Chamber of Commerce launched a series of workshops targeted at secondary school students.

There is some entrepreneurial education at different levels of the education system. *Jonk Entrepreneuren*⁽⁴¹⁾ has programmes in place at the primary, secondary and tertiary levels. The university has a professional Master in Entrepreneurship and Innovation. These programmes are implemented jointly by education institutions and the business sector. There are also initiatives to specifically support women and young entrepreneurs.

The regulatory barriers in the service sector, notably in business services (regulated professions) and retail, appear to be limiting entrepreneurship. In addition, they push up consumer prices and negatively affect allocative efficiency. Business services are a very important input to Luxembourg industry. Improving the performance of business services will therefore have positive effects on industry as well. A stronger business environment can help boost productivity, considering that both new and

⁽⁴⁰⁾ The business permit law (*droit d'établissement*) that has been in place since 2011 introduced both functional and substantial changes that intend to stimulate, facilitate and encourage entrepreneurship.

⁽⁴¹⁾ *Jonk Entrepreneuren* is the Luxembourg branch of the Junior Achievement (JA) network, a worldwide organisation offering entrepreneurial education programmes.

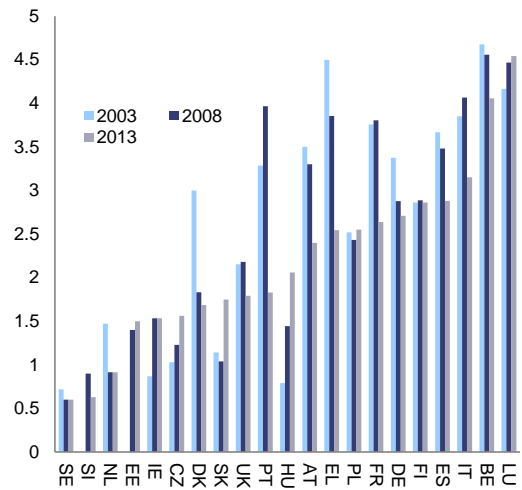
foreign companies generally show higher productivity growth.

An in-depth assessment of the regulation of business services published by the Commission in October 2015 showed that Luxembourg is the country with the most restrictive regulation in the EU. Luxembourg experiences subdued market dynamics and low competition in important business services sectors (market entry rates and churn rates stand significantly below the EU average). Particular problems in business services stem from very restrictive authorisation requirements, restrictions on shareholding and multidisciplinary activities, insurance requirements and tariff restrictions. It should be noted that in 2015 Luxembourg removed some shareholding and voting rights requirements for architects and engineers.

In the context of the mutual evaluation of regulated professions Luxembourg was due to review the necessity and proportionality of restrictions to the access and conduct of regulated professions. An action plan was to be submitted in January 2016 outlining concrete actions to improve access to regulated professions. However by the time of publishing this report, no action plan was submitted to the Commission and the overall participation of Luxembourg to this exercise has been very limited.

Luxembourg scores the highest for restrictiveness in retail establishment in the Commission's indicator on retail establishment. This is due to the complex and burdensome regulatory framework and strict establishment conditions, and is confirmed by the 2013 product market regulation index on operational restrictions in the retail sector, which reveals Luxembourg as the most restrictive country (Graph 2.4.2). Luxembourg's general product market regulation score for services has deteriorated between 2008 and 2013. The OECD attributes this deterioration to tighter regulation of licensing in retail trade. Finally, Luxembourg shows high price levels and declining productivity in the retail sector. It also displays the highest mark-ups in the EU according to a recent Commission study.

Graph 2.4.2: OECD PMR indicators for the retail sector



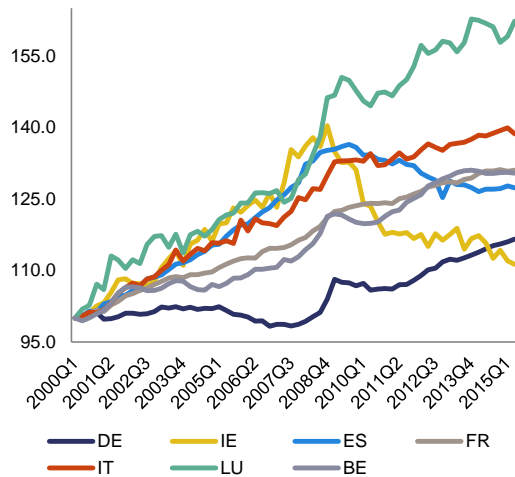
Source: OECD PMR indicator

Since at least 2011, Luxembourg has had one of the lowest publication rates for public procurement contracts advertised at EU level. In 2014, the share of public contracts for works, goods and services (including utilities and defence) published by the Luxembourg authorities and entities under EU procurement legislation was only 1.6 % of GDP. Despite slight progress from last year, it is still well below the EU average of 4.39 % and only the third in the EU. Increasing this rate by further opening up the procurement market would bring more competition and lead to economic benefits, such as better value for public money.

Cost competitiveness

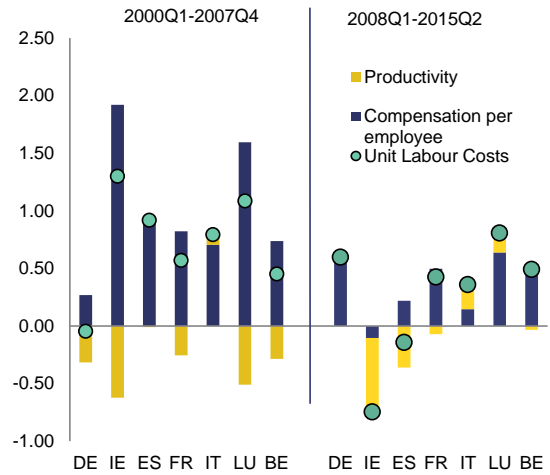
A high level of labour costs is often pointed as an obstacle to the diversification of the economy. Over the last decade, unit labour costs in Luxembourg have grown faster than in most euro area Member States (see Graph 2.4.3). This is mirrored by the appreciation of the ULC-deflated real effective exchange rate vis-à-vis the euro area countries by about 10 % since 2007, while remaining broadly unchanged for France, Germany and Belgium over the same period.

Graph 2.4.3: Unit Labour costs for total economy (2000Q1=100)



Source: Eurostat, National Accounts

Graph 2.4.4: Unit labour cost average growth rates: wages and productivity components

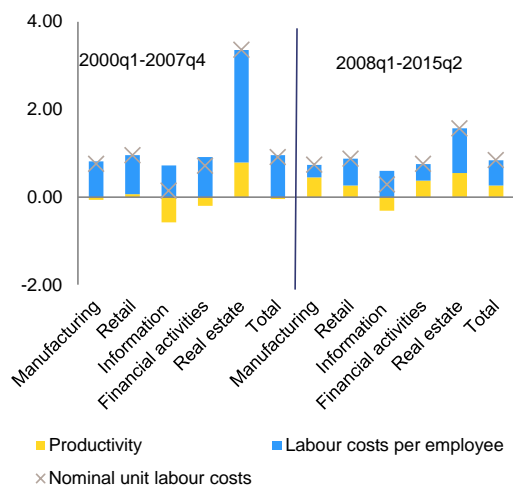


Source: European Commission

Cost competitiveness losses reflect dynamic wages and a fall in productivity in more recent years. As shown in Graph 2.4.4, before the crisis unit labour costs expanded at about 1% on average, owing to sustained wage dynamics and only partly offset by positive productivity developments, while after the crisis moderate wage growth went hand in hand with negative productivity developments. This is in line with trends in other EU countries, where more moderate wage developments and positive productivity growth contributed to lower nominal unit labour costs growth.

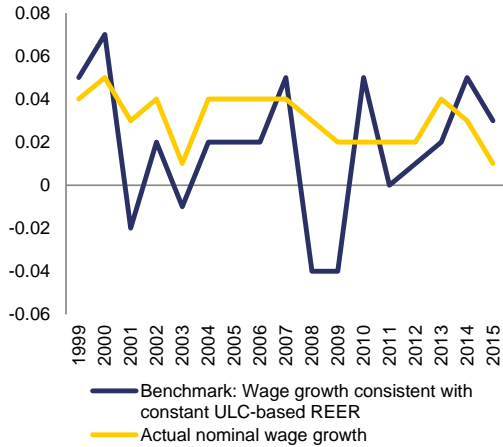
Compared with the pre-crisis period, negative productivity growth characterises all sectors since 2008. The exception has been the information and communication technology sector, where productivity dynamics partly offset moderate nominal wage growth. The fall in labour productivity is partly explained by labour hoarding. Between 2008 and 2014 employment growth in Luxembourg outpaced output growth, a rather exceptional development within the EU. Labour cost developments continued to be dynamic in the real estate sector (see Graph 2.4.5).

Graph 2.4.5: ULC developments by sector



Source: European Commission

Graph 2.4.6: Benchmark for wage growth: constant ULC-based REER

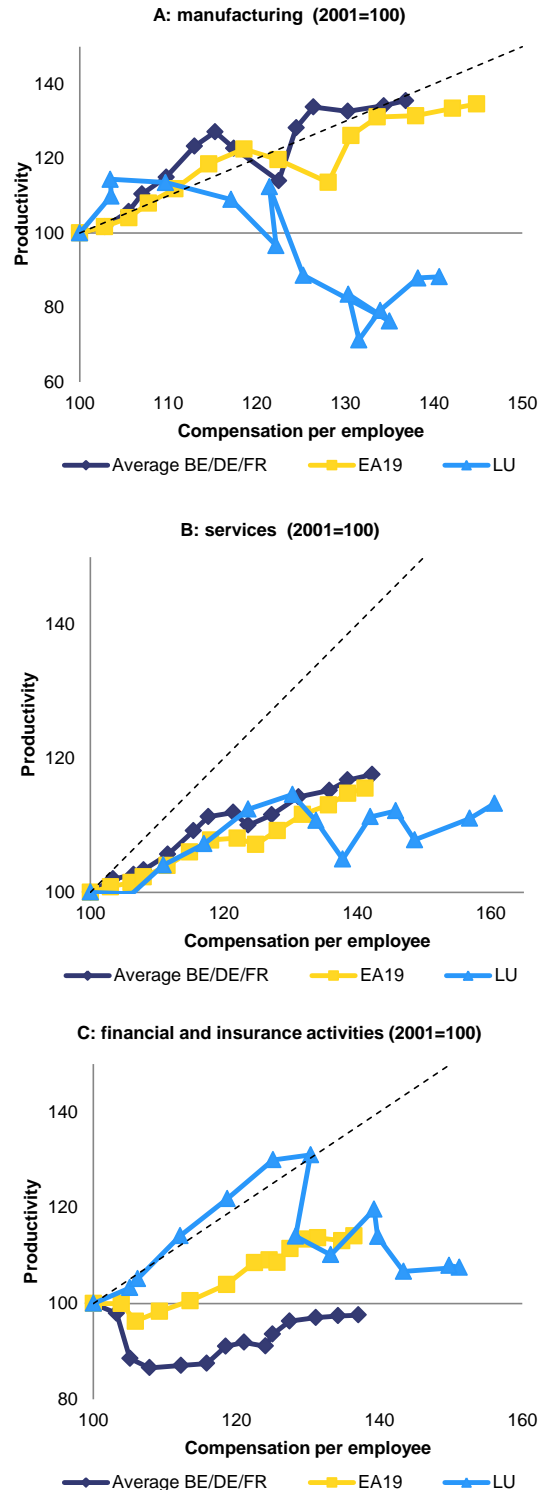


Source: European Commission

Since 2014 wage developments have been in line with trends in productivity growth. Wage growth, partly resulting from the automatic wage indexation, has consistently outstripped productivity gains for a number of years, leading to a loss of cost competitiveness until 2013. As suggested by a comparison of actual wage developments with potential wage growth⁽⁴²⁾ (see Graph 2.4.6), only since 2014 have labour cost increases shown good responsiveness to a less dynamic domestic labour market and to rising unemployment in neighbouring countries (France and Belgium in particular). The decrease in wage growth has also been driven by the temporary modulation of the wage indexation system, which put a cap on the frequency of automatic wage adjustment between 2012 and 2014.

⁽⁴²⁾ For the underlying methodology see: [Analytical Web Note 2/2015 – "Benchmarks for the assessment of wage developments", Spring 2015](#), Directorate General for Employment, Social Affairs and Inclusion, European Commission.

Graph 2.4.7: Trends in unit labour cost components (2001-2014)



Source: European Commission

The deterioration of cost competitiveness observed over the last decade might be partly driven by the strength of the financial sector.

The latter accounts for about a quarter of total valued added. The ensuing labour cost dynamics do not contribute to a resource reallocation towards tradable activities other than the financial sector, which would allow differentiation of the production structure. At the same time, the growth of nominal unit labour costs being higher than in the neighbouring countries does not provide incentives from the labour demand side to shift resources (and make investments) towards sectors other than financial services. In a similar manner, the high income returns associated with the highly productive and well remunerated financial sector provide little incentives for the labour supply to move to other tradable sectors. This can be illustrated by the evolution of labour cost components in the different economic sectors since 2001 (see Graph 2.4.7).

Automatic indexation might limit the scope for sectoral wage adjustment.

Luxembourg reinstated automatic wage indexation in 2015 after the modulation decided for 2012-2014 (see also Box 2.4.2 on the wage-setting mechanism). The reference basket of the indexation mechanism still includes volatile prices such as fuel. Economy-wide wage indexation may limit real wage variation across sectors and prevents labour productivity differentials from being taken into account. While the current low inflation environment limits the risks related to an upward wage-price spiral, the wide labour productivity differences across economic sectors implies that wage indexation might contribute to hindering sectoral wage adjustment. It may also limit the capacity of real wages to respond to macroeconomic shocks. With headline inflation projected to remain low, driven by low oil and other commodity prices, price pressures have abated and the next automatic wage indexation might well be triggered only during the second half of 2016. At the same time, there are risks that the implementation of a recent public sector-wide wage agreement might trigger demands for similar wage increases in other sectors of the economy.

Box 2.4.1: The wage-setting system

Luxembourg's consensus-oriented social model is quite flexible, while being also characterised by strong social dialogue and tripartite institutions. This flexibility stems from the relatively balanced bargaining model, with the predominant negotiation level varying from industry to industry between sector and company level, though most agreements are signed at company level.

The national minimum wage is set by law. Increases are decided at least every two years, based on a report on changes to overall economic conditions and incomes, which is submitted by the government to parliament. The law specifies a minimum wage for unskilled workers and a 20 % higher rate for skilled workers. Workers are considered to be skilled if they are working in a job that requires a professional qualification normally acquired through education or training that results in an official certificate. The minimum wage for workers aged below 18 is fixed as a percentage of the minimum wage for adult workers (80 % for 17-18 year olds and 75 % for 15-17 year olds). The minimum wage is linked to the price index. The gross national monthly minimum wage stood at EUR 1,922 in January 2015, the highest in the EU in absolute terms.

Wages are also automatically linked to inflation. If the consumer price index has increased by more than 2.5 % over the preceding six months, all wages (including the national minimum wage), pensions and certain social security benefits are automatically increased to the same extent. Sanctions apply to employers that do not respect automatic indexation. Although the indexation mechanism is automatic, it may be suspended for a definite duration if the Tripartite Coordination Committee (TCC) approves such a measure. At the TCC meetings in March and April 2010, two reforms of the indexation mechanism were suggested: first, to change the basis of calculation for the consumer price index, for instance by removing petroleum products, tobacco and alcohol from the basket; second, to exclude from wage indexation those employees who earn more than twice the national minimum wage. The reform plans faced strong opposition from the labour unions and parts of the coalition government, and led eventually to a failure of the meeting for the first time since 1982. In January 2012 the parliament adopted a government proposal on wage indexation, under which the adjustment to inflation was to be applied only once a year (instead of twice a year as up to 2011), in October, for three years: 2012, 2013 and 2014. In addition, alcohol and tobacco were removed from the calculation. Since then, the wage-setting system has not been reformed, in consultation with the social partners, as recommended in the 2015 country-specific recommendation. Social partners and the government generally hold the view that the established wage-setting mechanism is a guarantee of social peace in Luxembourg.

2.5. EDUCATION PERFORMANCE AND LABOUR MARKET OUTCOMES

Labour market

With continued robust economic growth, supported by strong net exports and a dynamic financial sector, Luxembourg has witnessed sustained job creation in recent years. Employment growth remained dynamic at 2.6 % in the first part of 2015 (up from 2.5 % in 2014), with net job creation growing in all economic sectors but benefiting cross-border workers especially. Luxembourg resident workers accounted for 12 % of net creation at the beginning of 2015, while foreign residents constituted 37 % during the same period. Cross-border workers, representing 44 % of the workforce⁽⁴³⁾, accounted for 53 % of net creation.⁽⁴⁴⁾

The employment rate at 72.1 % is still slightly below the Europe 2020 target as well as below the national 2015 target of 73 %. Unemployment marginally increased above 6 % in 2015. Unemployment for the low-skilled increased over the years (from 6.6 % in 2008 to 10.2 % in 2014).

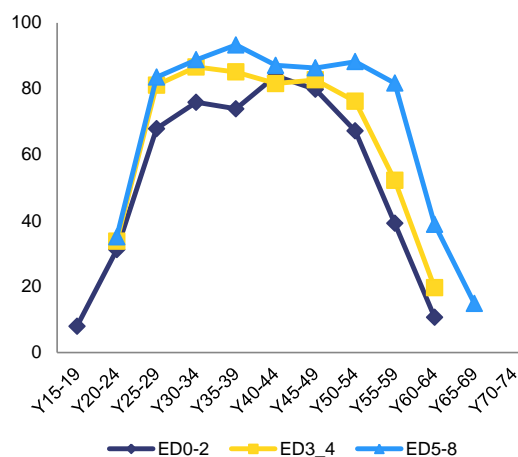
Yet, despite a generally good labour market performance, employment rates remain persistently low at both ends of the age spectrum. Employment levels of older workers, including those with the highest educational attainment, are below the EU average, decreasing sharply after the age of 59 (see Graphs 2.5.1 and 2.5.2). The employment rate of young people is also substantially lower than the EU average (20.4 % against 32.4 % in 2014). Despite a female employment rate well above the EU average, the gender employment gap remains considerable, although it is narrowing (65.5 % against 78.4 % in 2014). Socioeconomic disadvantage in educational outcomes persists, partly due to the linguistic barriers intrinsic to a trilingual country, which hinder the labour market integration of many of the foreign-born residents that constitute about 40 % of Luxembourg's population.⁽⁴⁵⁾

⁽⁴³⁾ Luxembourg residents represent 29 % of the country's employment and foreign residents represent 27 % of employment.

⁽⁴⁴⁾ Statec Note de Conjoncture No 2 'La situation économique au Luxembourg — Évolution récente et perspectives' November 2015.

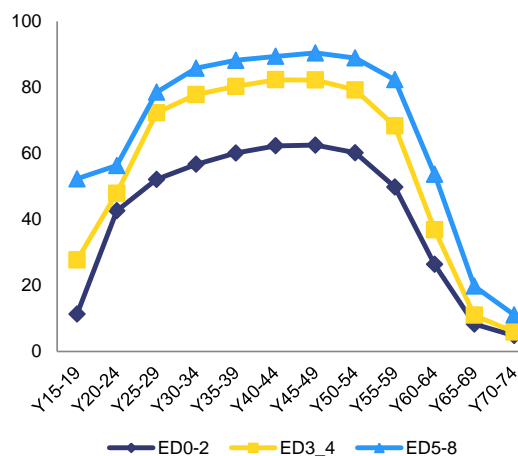
⁽⁴⁵⁾ Luxembourg has the highest share of foreign-born population in the EU: 43.3 %, Eurostat.

Graph 2.5.1: Luxembourg employment rates by age and educational attainment level (%)



Source: Eurostat, LFS

Graph 2.5.2: EU-28 employment rates by age and educational attainment level (%)



Source: Eurostat, LFS

Employment of older workers has long posed a challenge for the country, in view of both the untapped contribution of labour to growth potential and fiscal sustainability concerns. The employment rate of older workers (aged 55-64) is far below the EU average of 53.1 %. While it had gradually increased to 42.5 % by 2014, the first three quarters of 2015 suggest that the trend has been reversed. Older workers are also far more affected by long-term unemployment, with 46.5 % of long-term jobseekers being 50 or older (against

24 % of all jobseekers being older than 50).⁽⁴⁶⁾ Generous early retirement arrangements coupled with extended unemployment benefit for those aged 50 and over, as well as insufficiently targeted activation policies and training, can contribute to these outcomes.⁽⁴⁷⁾

In 2015, measures to increase the employability of older workers have been limited. The specific individualised support introduced at the public employment service could benefit older workers. A real strategy on age policy to keep older workers longer in employment and provide incentives and skills to get them back to work is still missing. The ‘age pact’, aimed at fostering retention of older workers by firms with more than 150 employees, is still being discussed in Parliament. However the reform will concern only 39 % of employees, those working in the private sector and in companies with more than 150 employees, (see also section 2.1 on early retirement).

Youth unemployment is relatively high. After having risen substantially over the last few years, it fell in 2015 to levels seen at the start of the crisis. Figures should be taken with caution given the small size of the sample used for the survey and the very low youth activity rate (26.3 % against 41.7 % in EU-28 in 2014) coupled with the very high rate of enrolment in education or training among those aged 15 to 24. Though slightly increasing in 2014 (6.3 %), the share of young people not in employment, education or training is also lower than the EU average. Unsatisfactory labour market outcomes for young people might derive from different factors, including problems of employability, low labour market attachment, possibly linked to the relatively generous benefit system for these age groups — see below — and to the high wages pricing them out of the labour market.

National data point to 39 % of Youth Guarantee beneficiaries having received a ‘quality job offer’⁽⁴⁸⁾ within four months of their enrolment. 79 % received within nine months. The stronger cooperation of the public employment services with employers and other services and partners is a positive element. Employers offer additional positions to apprentices and partner businesses that participate in the ‘Jobelo’ programme targeting unskilled young people. Nevertheless, an assessment of the extent to which the quality of the offers and the extent to which they lead to sustainable labour market integration of young people involved is not available.

Poverty and social exclusion (19 % in 2014) remains among the lowest in the EU, with high housing costs and related social exclusion being among Luxembourg’s major social challenges. Social transfers continue to be essential for lifting people out of poverty: in 2014, 27.6 % of people were at risk of poverty or social exclusion before social transfers, against 16.4 % after. Income inequalities have increased, although from moderate levels.

Financial disincentives to work

The tax and benefit system still presents large financial disincentives to work. Their design and the way they interact are at the origin of labour market ‘traps’, which are among the highest in the EU. As an example, in 2014 the unemployment trap, i.e. the part of earned income taxed away when taking up a job because of the withdrawal of benefits and the taxes imposed on earned income, was more than 101 % for a one-earner couple with two children resuming work after unemployment at 67 % of the average wage (against 78 % in the EU on average). Similarly it stood at 95 % for a single parent with two children resuming work at 67 % of the average wage, against 75 % on average in the EU⁽⁴⁹⁾. Unemployment benefits are particularly generous for younger and older workers. Young people can qualify for unemployment benefits 26 weeks after they have

⁽⁴⁶⁾ Available at <http://www.eurofound.europa.eu/observatories/eurwork/articles/working-conditions-labour-market-law-and-regulation/luxembourg-new-labour-code-measures-for-older-workers>

⁽⁴⁷⁾ See also section below on active labour market policies and employment services.

⁽⁴⁸⁾ The public employment service and education services have a catalogue of employment and training measures that corresponds specifically to the definition of a good quality offer and is based on an assessment of the needs of the individual.

⁽⁴⁹⁾ OECD, Tax and benefits database.

completed their education in most cases. Benefits are granted regardless of their parents' income, disregarding intra-family transfers. For the unemployed older than 50, longer extensions of the benefit period than for other workers apply, which are likely to bridge them into generous early retirement schemes.

The inactivity trap for those relying on social assistance is also high. For households living only on the minimum guaranteed income and not being in an employment measure (for which people get remunerated), it is always generally worthwhile taking up a job. Yet, for a head of household, it is financially more convenient to have a part-time job (half-time maximum) complemented by the minimum guaranteed income rather than to work full-time at minimum wage level, because the net disposable income will be higher. This could be avoided in part by allowing the amount of the transfer to fade more smoothly as labour income increases and by improving the design of in-work benefits. A reform of the minimum guaranteed income scheme, together with a reform of parental leave and child benefit allowances, has been announced for some time and is supposed to be presented to Parliament in 2016.⁽⁵⁰⁾ The reform is expected to target the scheme more effectively by differentiating its level according to needs. The aim is both to tackle the disincentives to work associated with its design and improve its effectiveness in terms of poverty relief for key target groups such as single parent families. The new benefit would consist of various components (basic necessities per person, fixed costs per household, real cost of housing, or dependent children).

The joint taxation system also contributes to creating financial disincentives to work for second earners, mainly women. Resident married couples, taxpayers living in registered partnerships and non-resident married couples with earnings taxable in Luxembourg can file jointly and are taxed at lower average rates. This reduces work incentives for the spouse with the lower income. Also, the amount of this splitting advantage depends on the income distribution between the spouses and on the absolute level of household income. The splitting advantage declines quickly with rising second earner's share of taxable

household income and becomes zero if both spouses contribute equally. Joint taxation⁽⁵¹⁾ mainly creates incentives for second earners to take part-time rather than full-time jobs: the low-wage trap based on taxation is 40.8 % (seventh highest in the EU).⁽⁵²⁾ Generous not means-tested and not taxable universal benefits paid to all families with dependent children under 18 (or under 27 if still in secondary education), could also negatively affect labour market attachment of second earners in a family.⁽⁵³⁾

Active labour market policies and employment services

Luxembourg's mix of active labour market policies tends to favour temporary job creation schemes. Expenditure on active labour market policy measures represented around 0.5 % of GDP in 2013, in line with most other EU countries. Yet, the policy mix is very different with active labour market policies in Luxembourg being very much skewed towards temporary job creation schemes (*incitations à l'emploi*). Such schemes account for a very high share of active labour market policy spending (77.3 %) and have been increasing significantly in recent years (+ 13.5 % in volume in 2013). In previous assessments, these schemes have been found as not sufficiently effective to ensure labour market integration.⁽⁵⁴⁾ By contrast, expenditure on training represents only 8.6 % of total active labour market policy expenditure (compared with 43 % in the EU) and has seen little increase between 2012 and 2013. Also for the young a large number of active labour market measures concern temporary contracts (*CIE* and *CAE* ⁽⁵⁵⁾). There are no recent independent evaluations to gauge the effectiveness of the current policies.

The reform of the public employment service has been completed at the end of 2015, with the introduction of the system of individualised support in all public employment service agencies. As a result of the reform, all jobseekers

⁽⁵¹⁾ <http://www.eu2015lu.eu/fr/actualites/articles-actualite/2015/10/29-conf-imposition-indiv/index.html>

⁽⁵²⁾ OECD, Tax and benefits database.

⁽⁵³⁾ The impact of parenthood is however lower than the EU average.

⁽⁵⁴⁾ OECD, Economic Survey Luxembourg 2015.

⁽⁵⁵⁾ Subsidised contracts include the *contrat d'initiation à l'emploi* (in businesses) and the *contrat d'appui-emploi* (in the public sector).

⁽⁵⁰⁾ <http://www.gouvernement.lu/3428428/13-cahen-quotidien>.

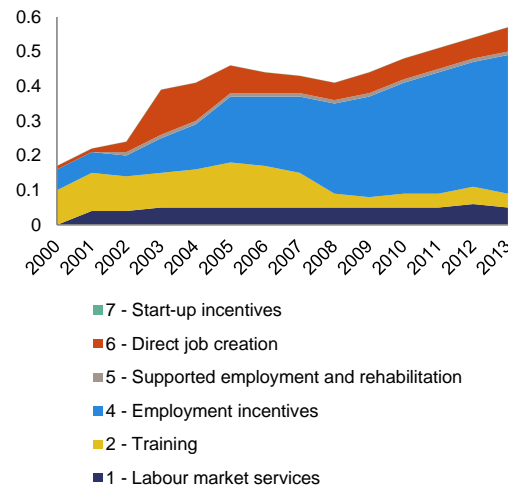
should be profiled and offered, if needed, intensive support through an individual comprehensive action plan covering both social and occupational needs. The public employment service and the jobseeker are expected to set out their respective commitments in a mutual agreement (*convention de collaboration*). As regards the implementation of the reform, currently all new jobseekers are being profiled and a complete roll out is expected over time. The recent creation of an employers' department within the public employment service has helped to strengthen links with the business community, leading to an increased number of open job positions. The public employment service recently signed an agreement with the Union of Luxembourg Enterprises under the label '*enterprises, partners for employment*', which aims at recruiting 5 000 jobseekers in three years, mainly in the retail sector⁽⁵⁶⁾. The public employment service also signed an agreement with the Chamber of Employees (*CSL*) to improve access to training for the unemployed.⁽⁵⁷⁾ However, the overall effectiveness of the public employment service reform has not yet been assessed.⁽⁵⁸⁾

⁽⁵⁶⁾ <http://www.uel.lu/415-conference-de-presse-adem-uel-l-adem-labellise-les-premieres-entreprises-partenaires-pour-l-emploi>

⁽⁵⁷⁾ Jobseekers will have free access to night classes and seminars offered by the continuing education centre of the CSL, Luxembourg Lifelong Learning Centre. Places will be systematically made available to jobseekers registered with ADEM.

⁽⁵⁸⁾ The only external evaluation so far has been conducted by the constitution-based National Court of Auditors (*Cours des comptes*) which issued in 2014 a critical report on unemployment measures in Luxembourg and the public employment service reform. The Court concluded that skilled staff was missing in 2014 to implement the so-called *convention de collaboration individualisé*. Without a staff able to implement a specific profiling procedure, a more intense support for jobseekers does not seem achievable. Since this assessment in 2014, it remains unknown what progress has been made as no official evaluation is available.

Graph 2.5.3: Development of active labour market policy expenditure by category (2 to 7), Luxembourg



Source: Eurostat, LMP database

Education and skills

The proportion of 30-34 year-olds with tertiary education is very high and further increased to 52.7 % in 2014, a level which is among the highest in Europe. It goes some way towards the very high Europe 2020 national target of 66 % (compared with the general Europe 2020 target of 40 %). This trend is further supported by the 2014-2015 reform of the State financial aid scheme for higher education, introducing socioeconomic background among the criteria for calculation of the grant amount, encouraging international mobility and making children of cross-border workers eligible for financial support.

Yet, students' performance in basic skills as measured by the 2012 OECD Programme for International Student Assessment (PISA) is consistently below the EU average in all three components, namely mathematics, reading and science. In reading, 22.2 % of students perform poorly in this test compared with 17.8 % in the EU as a whole. The same holds for mathematics and science, where the proportion of low achievers stands at 24.3 % and 22.2 %, against an EU average of respectively 22.1 % and 16.6 % in 2014.

This underperformance can be mainly explained by difficulties encountered by pupils who are socio-economically disadvantaged.

International as well as national data show a particularly strong relationship in Luxembourg between socioeconomic status and education performance.⁽⁵⁹⁾ Socioeconomic status is in turn correlated with migrant background.⁽⁶⁰⁾ This is not only visible in skills acquirement but also in early school leaving. The latter is relatively high among students with a migrant background. Specifically, while the overall early school leaving rate in Luxembourg was 6.1 % in 2014, meeting the Europe 2020 national target of less than 10 %, national statistics suggest that it is significantly higher among those with a migrant background.

Luxembourg's trilingual tradition — doubtlessly an asset for the national education system — adds to the difficulties encountered by children from a poor socioeconomic background trying to succeed in education.

Difficulties with the language of instruction lead to failure in other disciplines for numerous students, thus diminishing their chances of academic success. School students with an immigrant background fail to comply with the high standards in German language instruction, while students with a background in Luxembourgish often struggle with high expectations in French in secondary schools, in particular in 'Gymnasien'.

The share of students in Luxembourg that need another two years on top of the regular time for secondary school completion is the highest among the OECD countries, due to the widespread practice of grade repetition. Despite having decreased over time, data from PISA 2012 show that the percentage of students reported as having repeated a grade at least once in primary, lower secondary or upper secondary school was 34.5 % in Luxembourg against an OECD average

of 12.4 %. More than one out of two was from a migrant background. Grade repetition is costly and studies have shown that it is largely ineffective in raising educational outcomes. Because socio-economically disadvantaged students are more likely than advantaged students to repeat a grade, grade repetition may also reinforce inequities in the system.

The reform of secondary education, first tabled by the government in 2009 and reintroduced in 2013, is still at an early stage.

The Ministry of Education is currently reintroducing parts of this reform. The government announced an observatory for monitoring early school leaving (*Observatoire du maintien scolaire*). As a second step, the government announced the need to develop support to better assist students with academic shortcomings. The third step involves attention to wellbeing at school. The fourth step is dedicated to the reform of vocational training. The ministry is also engaged in implementing more autonomy of the secondary schools (while at the same time coordinating centrally the courses of subjects studied). Concrete results are however only likely to be observed in 2016. In the meantime, special welcome lessons (elementary school) or classes (secondary schools) are being organised for foreign pupils aged 0 to 12 to ensure better integration. Measures such as improvement of school guidance, systematic personal follow-up of early school leavers by the local youth action service (*ALJ — Action locale pour jeunes*), new provisions for pupils in difficulties and a recent law allowing pupils with particular educational needs to obtain a qualification in the secondary schools of the country are promising. However, a comprehensive early school leaving strategy, addressing all levels of education and training and comprising the right mix of prevention, intervention and compensation measures is still needed.

Luxembourg has a very high participation rate in early childhood education and care (97.9 % for the 4+ age group), which is an effective way to reduce school failure in later years. In February 2015, the government presented a draft bill on youth: if adopted by Parliament, it would introduce mandatory quality standards for all childcare services, parental assistants and youth centres. Free access to early childhood education and care is also anticipated from September 2016

⁽⁵⁹⁾ Among students in economically privileged communes, between 70 % and 75 % will be recommended to enter the more prestigious secondary school track, whereas students from rural communes will be recommended five times less to the same track, namely between 10 % and 20 %, Education and Training Monitor 2015, Country Analysis.

⁽⁶⁰⁾ The 2015 National Education Report (Université du Luxembourg, Bildungsbericht Luxemburg 2015: Analysen und Befunde Bildungsbericht, 2015, p. 42-46) showed that in Luxembourg the disadvantaged socio-economic status, which affects primarily, but not only, families with a migrant background, is a major cause of inequalities and poor educational outcome.

with a particular focus on the development of language skills for children from 1 to 3 years.

Adapting vocational education and training provision to the constantly changing labour market needs is another challenge. Luxembourg has vocational training paths based on dual training, but some of these paths continue to be mainly school-based. While the share of upper secondary students participating in vocationally oriented educational programmes stands at around 60 %, the education attainment rate at medium level vocational orientation ⁽⁶¹⁾ is comparatively low, which suggests early school leaving and difficulties in progressing to higher levels. A considerable number of vocational education and training learners come from a migrant background, following early tracking in the school path at the end of the previous school cycle. In this area, targeted measures exist to tackle the linguistic issue. Following the vocational education and training reform in 2008, it was acknowledged that readjustments to the system were needed, in particular due to organisational issues encountered with the modular system introduced with that reform. A draft law on vocational education and training was submitted to Parliament in early 2015 to address the above concerns and ensure quality learning outcomes but it was blocked for constitutional reasons. In October 2015, the evaluation of the vocational education and training system commissioned by the government identified five fields of action to be taken into account when amending the current draft. These include closer cooperation between the ministry, professional chambers and schools, revision of the high number of training programmes, also given their varying quality and lack of consistency, reintroduction of a yearly performance evaluation, improving guidance in schools and increasing the number of apprenticeships.⁽⁶²⁾

The overall rate of adult participation in lifelong learning (14 % in 2014) is above the EU average (9 %) and close to the average target (15 %) set in the ‘education and training 2020’ strategic framework. Yet, participation in lifelong learning for adults with lower educational

attainment stands at only 7.3 %.⁽⁶³⁾ A campaign has been started to raise public awareness about the lack of basic skills of adults, to create a positive image of basic instruction, and to encourage participation in adult education programmes. Complementary measures promoting the acquisition of basic skills in a professional context have been implemented in cooperation with the social partners.⁽⁶⁴⁾

⁽⁶³⁾ 7.3 % at ISCED levels 0-2 compared with 12 % for ISCED 3-4 and 18.2 % for ISCED 5-8.

⁽⁶⁴⁾ Education and Training Monitor 2015, Luxembourg, Chapter VET and adult learning.

⁽⁶¹⁾ International Standard Classification of Education levels (ISCED) 3-4.

⁽⁶²⁾ Available at <http://www.men.public.lu/fr/actualites/communiqués-conference-presse/2015/10/07-etude-fp/index.html>

2.6. TAXATION SYSTEM, FISCAL FRAMEWORK

Taxation

The overall tax level in Luxembourg amounted to 38.1 % of GDP in 2014⁽⁶⁵⁾ (see Graph 2.6.1). Direct taxes and social contributions make up around two thirds of total tax revenue while the remainder corresponds to indirect taxes. Regarding direct taxes, the share of revenues from corporate income tax is much higher than for the EU. It amounted to 4.4 % of GDP compared with 2.4 % in the EU in 2014. Regarding indirect taxes, the share of VAT stood slightly above the EU average while the share of other indirect taxes (such as environmental taxation) was below the EU average in 2014. The share of consumption taxes in total tax revenues were among the lowest in 2014.

At the end of 2014, Luxembourg announced a major overhaul of its tax system, which is due to enter into force in 2017. It should meet the criteria of predictability and fiscal stability, competitiveness, sustainable employment and social equity. So far, however, little information has been communicated about the measures envisaged under this reform.

Corporate income taxation

Several features of Luxembourg's tax system can be used in structures of aggressive tax planning.⁽⁶⁶⁾ The absence of anti-abuse rules⁽⁶⁷⁾ and the absence of withholding tax on outbound royalties and interest vis-à-vis third countries are particularly relevant. Furthermore, the patent box regime may prompt or facilitate aggressive tax planning. Luxembourg recently announced, however, that the existing patent box regime would be abolished in 2016 (with a grandfather clause).

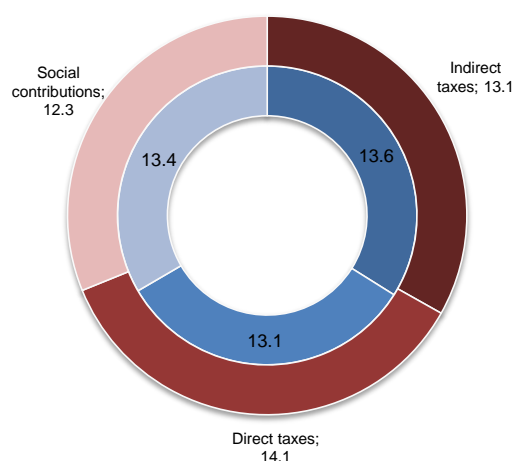
⁽⁶⁵⁾ This figure does not include imputed social security contributions.

⁽⁶⁶⁾ For an overview of the most common structures of aggressive tax planning and the provisions (or lack thereof) necessary for these structures to work, see Ramboll Management Consulting and Corit Advisory (2016), Study on Structures of Aggressive Tax Planning and Indicators, European Commission Taxation Paper n°61. It should be noted that country-specific information provided in the study gives the state of play by May/June 2015.

⁽⁶⁷⁾ For example, the lack of Controlled Foreign Companies rules, lack of rules to counter mismatches in tax qualification of domestic companies or partnerships and those of a foreign state, or the lack of rules whereby the deductibility of interest depends on the tax treatment in the creditor's state.

The levels of inward and outward foreign direct investment stock, expressed as a percentage of GDP, were around 4000 % and 5000 % in 2014.⁽⁶⁸⁾ Around 90 % of these positions were held by so-called special purpose entities⁽⁶⁹⁾, suggesting that Luxembourg is used by multinational companies to channel tax-driven financial flows to other jurisdictions.

Graph 2.6.1: Tax revenues in Luxembourg by main categories, compared with EU-28, 2014 (% of GDP)



The figures in the outer circle are those for Luxembourg.
Source: Eurostat

The OECD 'Global Forum on Transparency and Exchange of Information on Tax Questions', rated Luxembourg as 'largely compliant' in October 2015. First rating in November 2013 was 'non-compliant' regarding the application of the international standard on exchange of information on request between tax administrations. Given the importance of corporate tax revenues for the Luxembourg budget and the presence of a large number of multinational enterprises, the current movement in the corporate tax agenda at EU/global level is relevant for Luxembourg. Luxembourg has announced its intention to actively follow up on the implementation of those rules.

⁽⁶⁸⁾ Source: Eurostat.

⁽⁶⁹⁾ A special purpose entity is a legal entity that has little or no employment, operations or physical presence in the jurisdiction where it is located. It is related to another corporation, often as its subsidiary, and is typically located in another jurisdiction.

Value added taxes

Revenues from VAT amounted to 7.3 % of GDP in 2014, slightly above the EU average of 7 % of GDP, in spite of Luxembourg applying generally low VAT rates. The relatively high level of VAT revenues owes in part to the fact that a significant amount of VAT is collected on sales to non-residents. VAT revenues are set to change quite significantly following two main reforms that entered into force in 2015.

First, new VAT rules under which telecommunications, broadcasting and electronic services are taxed according to the ‘destination principle’, entered into force in January 2015. With several e-commerce operators headquartered in Luxembourg, these new rules will negatively affect VAT revenues. The 2016 draft budget estimates revenue losses of EUR 521 million (compared with 2014 revenues), i.e. 1.1 % of GDP.⁽⁷⁰⁾

Second, Luxembourg increased the standard, intermediary and reduced rates by two percentage points each to 17 %, 14 % and 8 % respectively. The super-reduced rate remains unchanged at 3 %. It applies mostly to food products, but not exclusively.⁽⁷¹⁾ In addition, there has been some broadening of the tax base with the consumption of alcoholic beverages and real estate investments — with the exception of the main residence — being subject to the standard rate, instead of the super-reduced rate. While this reform will impact positively on VAT revenues, it will not outweigh the expected losses due to the change in VAT rules for e-commerce.

VAT is one of the taxes deemed least detrimental to growth.⁽⁷²⁾ In general, targeted reductions and tax expenditures are often seen as

⁽⁷⁰⁾ It is worth noting that estimates are based on a central scenario, where the majority of companies concerned by the change will remain registered in Luxembourg for all their services; in the worst-case scenario, where all concerned companies would choose to leave the country, the losses could exceed 2 % of GDP (i.e. the VAT revenue from e-commerce activities in 2014).

⁽⁷¹⁾ See: http://ec.europa.eu/taxation_customs/resources/documents/taxation/vat/how_vat_works/rates/vat_rates_en.pdf.

⁽⁷²⁾ Arnold, J. (2008). Do tax Structures Affect Aggregate Economic Growth? Empirical evidence from a Panel of OECD Countries. OECD Economics Department Working Papers 643, OECD Publishing.

convenient instruments to accommodate vested interests. Although reduced rates might be warranted in particular cases, they generally introduce distortions and create efficiency losses.

Furthermore, relying on reduced VAT rates may not be conducive to achieving redistribution objectives. Other policy tools might allow better targeting of specific groups, while they have a lower budgetary cost and introduce fewer economic distortions. The VAT system in Luxembourg is characterised by a high number of reduced rates. Next to its standard rate, Luxembourg has an intermediary rate, a reduced rate and a super-reduced rate. The actionable policy gap, which is an ‘indicator of the additional VAT revenue a Member State could theoretically collect if it applied a uniform rate of taxation to all consumption’⁽⁷³⁾, amounted to 16.6 % for Luxembourg, compared with 12.4 % for the EU on average in 2013.⁽⁷⁴⁾

Labour tax burden

The implicit tax rate on labour stood at 32.3 % in 2014 compared with an EU average of 36.4 %. The top personal income tax rate was 43.6 % in 2015 (compared with an EU average of 39.3 %). As analysed in section 2.2, some tax expenditure aims at promoting home ownership (e.g. tax reductions for mortgage payments). In addition, some tax expenditure is aimed at stimulating certain forms of financial investment (e.g. pension savings).

Environmental taxation

Environmental taxes can encourage the efficient use of resources, stimulate innovation and improve the way markets function by correcting market failures. Environmentally related taxes offer a way of internalising the external costs — such as water, soil and air pollution, waste generation or greenhouse gas emissions — that the production and consumption of goods and services impose on the environment.

⁽⁷³⁾ This indicator excludes ‘imputed rents, public goods and financial services that respectively do not involve monetary transactions or are subject to a compulsory exemption following Articles 132 and 135 of the VAT Directive’ (European Commission, Tax Reforms Report 2015).

⁽⁷⁴⁾ Study to quantify and analyse the VAT gap in the EU Member States — 2015 Report, TAXUD/2013/DE/321.

In 2014, environmental taxes amounted to 2 % of GDP. This is the lowest share since 2000 and compares with an EU average of 2.5 % of GDP. Energy taxes make up the largest proportion of environmental taxes (1.8 % of GDP in 2014) in spite of the low level of excise duties. Low excise duties on transport fuels encourage both non-residents and transit operators to travel to Luxembourg to take advantage of lower fuel prices. Diesel taxation in particular is only slightly above the European minimum rate, below the EU average. It is also low relative to rates applied in neighbouring countries. Consequently, the share of new diesel cars in total car registrations reached 73 % in 2013, the highest among EU-15 and EFTA countries.⁽⁷⁵⁾

In general, transport taxes in Luxembourg are low in comparison with other Member States. A fixed vehicle registration fee of EUR 50 is applied, irrespective of vehicle type or emissions. It is one of the lowest vehicle registration charges in the EU and has no impact on a driver's choice of vehicle given the lack of discrimination. Moreover, the tax regime applicable to company cars is attractive. As a result, these in-kind benefits are often included in employees' remuneration packages. Because it encourages both professional and private use of the car, this system creates harmful environmental and economic effects in terms of congestion and pollution (see also section 2.7).

A recent study⁽⁷⁶⁾ examined the potential of environmental fiscal reform in the EU. The potential in terms of additional revenues in 2018 and 2030 is estimated by reference to good practices in different Member States on a range of energy, transport, and pollution and resources taxes.⁽⁷⁷⁾ This study would suggest that there is a theoretical potential for additional revenue from

⁽⁷⁵⁾ European Automobile Manufacturers Association — 2013 data.

⁽⁷⁶⁾ European Commission, (2016), Study on Assessing the Environmental Fiscal Reform Potential for the EU28 (2016), Eunomia Research and Consulting, IIEP, Aarhus University.

⁽⁷⁷⁾ The study was prepared in close cooperation with the Member States. The modelling of revenues was based on projections of the tax base in the absence of any change, and changes to those projections as a result of the suggested change in tax rate. However, the revenue projections are not based on macroeconomic modelling, and interactions between the measures are not explicitly modelled.

environmental taxes in EU Member States, including Luxembourg.⁽⁷⁸⁾

Fiscal framework

Strong national fiscal frameworks have the potential to substantially improve budgetary outcomes. With the law of 12 July 2014, Luxembourg transposed in national legislation the requirements of the 2011 Council Directive on budgetary frameworks and the fiscal compact. The adopted law provides for the introduction of multiannual ceilings in the multiannual financial programming law that, however, cover only the central government sector. In addition, it gives no clear indication of the consequences in the event that ceilings are exceeded, nor does it introduce a national expenditure rule to guide the setting of multiannual expenditure targets. Regarding the binding nature of the ceilings, which is an essential feature for ensuring their effectiveness, the law allows for the ceilings to be changed at the discretion of the government. However, the changes need to be publicly explained. Finally, while currently the multiannual financial programming law is presented to Parliament at the same time as the annual budget, there are plans to move it to spring in order to strengthen national ownership of the budgetary strategy set out in the stability programme.

The adopted bill also provides for the creation of the 'Conseil National des Finances Publiques'. This body is entrusted, among other things, with independently monitoring fiscal rules and evaluating macroeconomic and budgetary forecasts. It was set up in November 2014 upon the appointment of its seven members. Nevertheless, difficulties and delays in completing the recruitment of support staff, in spite of the availability of the budget, are preventing it from becoming fully operational.

At the same time, the transposing law does not contain provisions obliging the government to formally respond to the recommendations of the 'Conseil National des Finances Publiques',

⁽⁷⁸⁾ When presenting the political feasibility scenario for Luxembourg, the study acknowledges the specific characteristics of the country, such as being a small non-island state, which makes it sensitive to certain fiscal reforms, and that cross-border impacts on the economy can be significant.

either by complying or by publicly explaining possible deviations from them. However, the government intends to apply this principle in practice. For example, in October 2015 the government officially reacted to the recommendations put forward by the CNFP in its first report on the 2015 stability programme.

Since late 2015, Luxembourg has started to regularly publish intra-annual fiscal statistics. These are an essential tool for real-time monitoring of budgetary developments. Minimum standards were established by the 2011 Council Directive on budgetary frameworks. However, data are limited in terms of coverage and often subject to sizeable revisions, which limits their usability for monitoring and forecast purposes.

2.7. TRANSPORT, ENERGY AND ENVIRONMENT

Under the Europe 2020 strategy, Luxembourg has committed to reducing its greenhouse gas emissions in the non-ETS sector⁽⁷⁹⁾ by 20 % between 2005 and 2020. According to Luxembourg's projections, based on currently existing measures, non-ETS emissions will not reduce but even increase by 1% over this period of time. Luxembourg is consequently expected to miss its target by a large margin.

Transport

Transport is a key sector for greenhouse gas emissions in Luxembourg. Around 70 % of the transport-related emissions are connected to fuel exports, among other things due to lower excise duties on fuels than the EU average, and these are considerably lower than in neighbouring countries. This, together with the insufficient supply of public transport and the fact that it is increasingly difficult for households to establish their residence in Luxembourg due to constantly increasing house prices (see section 2.2), leads to peak-hour traffic congestion and air pollution.

Luxembourg is among the EU countries where most time is spent in traffic, entailing a significant cost to the economy. Peak-hour congestion in Luxembourg continues to constitute a major problem, above all in the capital city and on the main surrounding motorways and roads.

Furthermore, Luxembourg has the highest motorisation rate in the EU, and 92 % of cross-border commuters use a car to get to work. This behaviour could partially be related to the favourable tax treatment of company cars, which discourages both domestic residents and cross-border commuters from using public transport alternatives.

The government's strategy as outlined in the 2012 sustainable mobility strategy ('MoDu') is intended to increase the share of public transport in all motorised forms from 14.5 % in 2009 to 25 % in 2020. If successfully implemented, the corresponding reduction in the modal share of individual motorised transport should help reduce congestion, air pollution and

CO2 emissions. Similar results are expected from better cooperation with adjacent regions to increase the capacity and attractiveness of the public transport system and to reduce cross-border car traffic. The introduction of a 'Flexpass' in October 2015 for commuters from Belgium represents a step in the right direction.

The existing vehicle fleet in Luxembourg is becoming greener and more fuel-efficient. Yet, it is still far from the government's objective of increasing the proportion of electric vehicles to 10 % by 2020 (i.e. some 40 000 vehicles) and increasing the share of renewable energy used in transport from 2 % in 2011 to 10 % by 2020.

Infrastructure development and energy market

The share of the energy sector in total value added and employment is low compared with the EU as a whole. Luxembourg's energy mix differs significantly from that of the EU as a whole, with the notable difference of a much higher share of petroleum and petroleum products. Luxembourg has a very high import dependency on fossil fuels, particularly gas and petroleum products. The country's energy trade balance deficit amounted to 3.3 % of GDP in 2014, which is higher than the EU average.

Luxembourg has a well-integrated electricity system. The absence of congestion on interconnectors allows wholesale operators to participate in power exchanges. The market concentration in the retail market remains high. Further steps are envisaged to improve regional market integration, including strengthening cooperation within the Pentalateral Energy Forum.

The opening of the gas sector remains very low with supplier switching rates being less than 0.1 % of the number of customers. The launch of the Belgium and Luxembourg transmission system operators' initiative to integrate gas markets represents a first step towards cross-border gas integration.

Due to its location, the interconnection capacity of Luxembourg is the highest among the EU Member States. Household prices in the electricity and gas retail markets are below the EU average.

⁽⁷⁹⁾ The sectors not falling under the Emission Trading Scheme (ETS) include, inter alia, road transport, buildings, agriculture and waste.

Renewable Energy

National policies aim to promote development, installation and use of renewable energy installations, but cooperation with other Member States is needed for the required deployment of renewable energy sources. Therefore, efforts to make use of co-operation mechanisms available under the Renewable Energy Directive are expected to contribute to target achievement in 2020 and would be a welcomed new development.

Energy efficiency

Luxembourg reduced its energy intensity by more than 2 % per year between 2005 and 2013.⁽⁸⁰⁾ Between 2010 and 2013, energy consumption in the industry decreased by one quarter. Moreover, generous support is available for energy-efficient housing.

By contrast, the energy intensity of road and freight transport remains high. This could reflect cross-country purchases and the fact that Luxembourg is often a transit country. Nevertheless, the passenger sector's energy intensity has started to decrease, and the country has taken steps to improve the overall situation through the increase in transport fuel taxation, the share of public transport⁽⁸¹⁾ and financial incentives to buy energy-efficient vehicles. Also, Luxembourg has not discarded restructuring the transportation tax system, possibly including a revision of the vehicle tax, a reform of the company cars taxation and the gradual adjustment of tax rates on transport fuels. However, concrete and ambitious measures to implement the national climate action plan⁽⁸²⁾ have not been announced yet.

Expectations of Luxembourg missing its renewable energy sources target and exceeding the greenhouse gas emission target by 2020 are

reasons to pursue further integration of smart grid deployment solutions. It applies in light of the government's decision to go ahead with a wide-scale rollout of smart meters for electricity and gas from July 2015. Smart electricity grids are capable of reducing the EU's CO₂ emissions by 9 %, mainly by integrating renewables and optimising energy consumption. Smart grid technologies could contribute to greenhouse gas emission reductions by increasing efficiency and conservation, facilitating integration of renewable energy, decentralised generation, and new loads such as electro-mobility, but also enabling new services and products. Deployment of smart grids will boost competitiveness and technological leadership of EU technology providers such as the electrical and electronic engineering industry, consisting mainly of SMEs.

Circular economy

There is so far no national policy to support the development of a circular economy in Luxembourg. However, recent initiatives⁽⁸³⁾ aim to facilitate the transition to a more circular and resource-efficient economy, in particular in the area of financing.

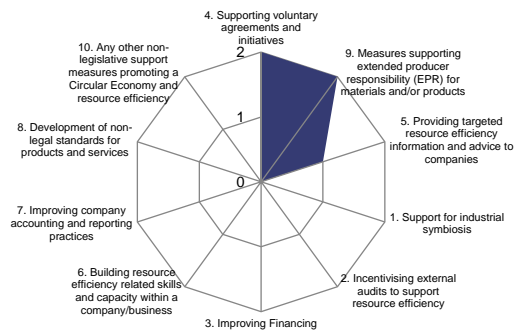
⁽⁸³⁾ A framework for Member States to support business in improving its resource efficiency (2015 forthcoming) — draft final report 30.10.15, Institute for Environmental Studies, Ecologic Institute, IEEP & Bio Intelligence Service
http://ec.europa.eu/environment/enveco/resource_efficiency/pdf/business/RE_in_Business_Final_Report_111115.pdf
 &
http://ec.europa.eu/environment/enveco/resource_efficiency/pdf/business/RE_in_Business_Annexes.pdf.

⁽⁸⁰⁾ Assessment of the progress made by Member States towards the national energy efficiency targets for 2020 and towards the implementation of the Energy Efficiency Directive 2012/27/EU, p. 17, available at: https://ec.europa.eu/energy/sites/ener/files/documents/1_Eprogress_report.pdf.

⁽⁸¹⁾ A tramway in Luxembourg City is expected to be completed in 2017.

⁽⁸²⁾ In May 2013, Luxembourg adopted its second national climate action plan, which outlines the proposed agenda to reach its objectives in terms of climate goals.

Graph 2.7.1: **Level of application of resource efficiency measures in Luxembourg**



Source: Institute for Environmental Studies, Ecologic Institute

As Graph 2.7.1 shows, two support measures are widely used, one is used to a limited extent, and for the others there is no national policy in place. Recent measures to promote resource efficiency have been taken thanks to the impulse of the Luxembourg EcoInnovation Cluster, as part of the wider Luxinnovation initiative. A recent study on ‘Luxembourg as a Knowledge Capital and Testing Ground for Circular Economy’ was published in February 2015.

Luxembourg does not seem to be on a path to meet its Europe 2020 targets concerning non-ETS greenhouse gas emissions. This may be due in part to the current policy approach: on the one hand, relatively low excise duties on fuels attract demand from neighbouring countries. On the other hand, company cars, a major element of in-kind payments in the wage bill, encourage the use of private cars instead of public transport. In addition, constantly increasing house prices deter households from establishing their residence in Luxembourg, so exacerbating the problem of traffic congestion and pollution. Finally, energy intensity remains high in Luxembourg and the uptake of a circular economy is at a low level. Still, some steps in this direction have been taken.

ANNEX A

Overview Table

Commitments

Summary assessment ⁽⁸⁴⁾

2015 Country-specific recommendations (CSRs)	
<p>CSR 1: Broaden the tax base, in particular on consumption, recurrent property taxation and environmental taxation.</p>	<p>Luxembourg has made no progress in addressing CSR1 (this overall assessment of CSR 1 does not include an assessment of compliance with the Stability and Growth Pact):</p> <p>No progress in broadening the tax base, in particular for consumption. In 2015 a series of measures, which had been previously legislated, entered into force. In particular, all VAT rates (except the super-reduced one) were increase by 2%. In addition, all real estate investments, excluding main residences, as well as the consumption of alcoholic beverages have become subject to the standard rate. However, over the last year no additional reform to broaden the tax base has been announced.</p> <p>No progress in broadening the tax base of the recurrent property taxation. It is not sure that the reform of the recurrent property taxation will be included in the forthcoming tax reform.</p> <p>No progress as to the broadening of the tax base of environmental taxation. The increase of VAT rate on energy products had been previously legislated. Over the last year no additional reform to broaden the tax base has been announced. A study on the reform of taxation of energy products for transport has been commissioned but has not been published yet.</p> <p>The government announced its intention to introduce a reform of the taxation system to enter into force at beginning of 2017.</p>
<p>CSR 2: Close the gap between the statutory and effective retirement age, by limiting early retirement and by linking statutory retirement age to life expectancy.</p>	<p>Luxembourg has made limited progress in addressing CSR 2:</p> <p>Limited progress in relation to closing the gap between the statutory and effective retirement age, by limiting early retirement. In July 2015 a draft law was presented in front of the Parliament to</p>

⁽⁸⁴⁾ The following categories are used to assess progress in implementing the 2015 CSRs:

No progress: The Member State (MS) has neither announced nor adopted measures to address the CSR. This category also applies if the MS has commissioned a study group to evaluate possible measures.

Limited progress: The MS has announced some measures to address the CSR, but these appear insufficient and/or their adoption/implementation is at risk.

Some progress: The MS has announced or adopted measures to address the CSR. These are promising, but not all of them have been implemented and it is not certain that all will be.

Substantial progress: The MS has adopted measures, most of which have been implemented. They go a long way towards addressing the CSR.

Fully implemented: The MS has adopted and implemented measures that address the CSR appropriately.

	<p>modify early retirement schemes. However, while one scheme has been abolished, for other pre-retirement schemes accessibility conditions have been eased. The net impact is not clear. Moreover, the draft law on the reclassification of workers with working disabilities has been adopted in July 2015 and implemented since 1 January 2016. The law increased the possibilities to remain in the labour market for workers with working disabilities and consequently imply a reduction in the number of people entering an early retirement scheme. Finally, according to the 2012 pension reform a monitoring and evaluation exercise of the sustainability of the pension system should be carried out every 5 years since the adoption of the reform. The government confirmed its intention to advance the evaluation to 2016, compared to 2017 as originally planned, and created a Pension Working Group with the task to carry out the mentioned evaluation.</p> <p>No progress in linking statutory retirement age to life expectancy. No measures has been adopted or announced.</p>
<p>CSR 3: Reform the wage-setting system, in consultation with the social partners and in accordance with national practices, with a view to ensuring that wages evolve in line with productivity, in particular at sectoral level.</p>	<p>Luxembourg has made no progress in addressing CSR 3:</p> <p>No progress in reforming the wage-setting system, in consultation with the social partners and in accordance with national practices, with a view to ensuring that wages evolve in line with productivity, in particular at sectoral level. The government did not take action in relation to the recommendation to review the wage-setting system. The current low inflation environment has led to a delay in application of the next wage indexation (the last one occurred in October 2013) and made the government action less urgent. In June 2015 the government has launched a study to analyse the impact of the sectors' interaction on the wage evolution. The results of the study are expected by the first semester 2016.</p>
<p>Europe 2020 (national targets and progress)</p>	
<p>Employment: 73 %</p>	<p>The overall employment rate of the resident population increased slightly from 71.1 % in 2013 to 72.1 %, getting closer to their target.</p>
<p>R&D: 2.3 %-2.6 % of GDP (of which 1.5 % to 1.9 %</p>	<p>1.24 % (2014) Luxembourg is not at all on track to reach its R&D</p>

for the private sector and 0.7 % to 0.8 % for public spending)	intensity target for 2020, due to a sharp decrease in business R&D intensity (from 1.46 % of GDP in 2000 to 0.65 % in 2014). Public sector R&D intensity on the contrary steadily increased from 0.12 % in 2000 to 0.59 % in 2014. This nearly fivefold increase reflects the willingness of the Grand-Duchy to build up its public research capacities from a situation where, 30 years ago, the public research system was in fact non-existent.
Greenhouse gas emissions: 20 % compared to 2005 emission (from sources not covered by the Emission Trading System) ^o	According to the latest national projections submitted to the Commission and taking into account existing measures, it is expected that the target will be missed: 1 % in 2020 as compared with 2005 (i.e. a projected shortfall of 21 percentage points). Non-ETS 2014 target: -8 %
Renewable energy target: 11 % Share of renewable energy in all modes of transport	Luxembourg risks failing to reach its 2020 renewable energy (RES) target. Between 2005 and 2012, the RES consumption doubled, and the share of RES reached 4.5% in 2014. This is above the indicative trajectory of 3.9% for 2013-2014. However, the target trajectory becomes steeper in the coming years. Thus, strong and continued effort is important for Luxembourg to reach its 11% renewable energy target in 2020. Given limited capabilities and geographical constraints, the achievement of the 2020 target solely by domestic measures seems challenging. The recent developments regarding use of co-operation mechanisms available under the Renewable Energy Directive, if they materialise, are expected to contribute to target achievement in 2020. With 5.2% RES share in 2014, there is progress in RES development in transport; however there is still a distance to the 10% RES target by 2020.
Energy efficiency: Luxembourg has set an indicative national energy efficiency target which implies reaching a 2020 level of 4.48 Mtoe, expressed in primary consumption and 4.24 Mtoe expressed in final energy consumption.	The 2020 energy efficiency target will be met if efforts as in previous years are continued. The introduction of the energy savings obligation scheme on all electricity and gas suppliers is expected to contribute to the reduction of energy consumption in the industrial, household and services sectors.
Early school leaving:	The number of early leavers from education and training stood at 6.1 % in 2014, decreasing from

<10 %	6.3 % in 2013. However the national pupils register indicates an early school leaving rate of 11.6 % in 2012/2013.
Tertiary education: >40 % (national target 66%)	The tertiary attainment rate according to Eurostat methodology was 50.8 % in 2013, and 52.7 % in 2014 i.e. above the EU target of 40 %. The reform of the State financial aid scheme for higher education was carried out in the 2014/15 academic year. The new scheme should take into account the socio-economic background.
Poverty/social exclusion: reduction of the number of people threatened by poverty or social exclusion by 6 000 in 2020	Luxembourg set this target in 2012. In 2014, 96 000 people were at risk of poverty or social exclusion (starting from 84 000 in 2011). The overall employment and poverty situation in Luxembourg did not change significantly over the past year.

ANNEX B

MIP scoreboard indicators

			Thresholds	2009	2010	2011	2012	2013	2014
External imbalances and competitiveness	Current account balance, (% of GDP)	3 year average	-4%/6%	8.4	7.3	6.8	6.3	6.0	5.8
	Net international investment position (% of GDP)		-35%	-29.6	-20.8	29.4	35.5	36.1	36.0
	Real effective exchange rate - 42 trading partners, HICP deflator	3 years % change	±5% & ±11%	3.8	1.2	0.1	-2.4	0.7	0.5
	Export market share - % of world exports	5 years % change	-6%	11.8	3.2	-3.4	-9.4	5.3	11.2
	Nominal unit labour cost index (2010=100)	3 years % change	9% & 12%	18.3	15.8	9.2	5.6	8.6	7.6
Deflated house prices (% y-o-y change)		6%	-1.8	4.3	1.1	2.4	3.7	3.7	
Private sector credit flow as % of GDP, consolidated		14%	-31.6	-15.8	50.8	31.4	21.6	0.5	
Internal imbalances	Private sector debt as % of GDP, consolidated		133%	356.1	311.9	339.2	359.8	355.9	342.2
	General government sector debt as % of GDP		60%	15.5	19.6	19.2	22.1	23.4	23.0
	Unemployment rate	3 year average	10%	4.7	4.9	4.8	4.8	5.3	5.7
	Total financial sector liabilities (% y-o-y change)		16.5%	8.1	13.2	7.8	14.7	8.6	21.5
Activity rate - % of total population aged 15-64 (3 years change in p.p)		-0.2%	2.0	1.3	1.1	0.7	1.7	2.9	
New employment indicators	Long-term unemployment rate - % of active population aged 15-74 (3 years change in p.p)		0.5%	-0.2	0.1	-0.2	0.4	0.5	0.3
	Youth unemployment rate - % of active population aged 15-24 (3 years change in p.p)		2%	1.0	0.2	-0.9	1.5	1.1	5.9

Note: Figures highlighted are those falling outside the threshold established in the European Commission's Alert Mechanism Report. For REER and ULC, the first threshold applies to euro area Member States.

Source: European Commission.

ANNEX C

Standard Tables

Table C.1: **Financial market indicators**

	2010	2011	2012	2013	2014	2015
Total assets of the banking sector (% of GDP)	2666.2	2603.4	2207.6	1965.6	1953.0	1994.5
Share of assets of the five largest banks (% of total assets)	31.1	31.2	33.1	33.7	32.0	-
Foreign ownership of banking system (% of total assets)	68.6	68.1	71.5	71.8	72.0	-
Financial soundness indicators:						
- non-performing loans (% of total loans)	0.2	0.4	0.1	0.2	-	-
- capital adequacy ratio (%) ¹⁾	17.4	16.4	19.1	20.9	20.2	19.8
- return on equity (%) ¹⁾	13.0	5.1	10.4	9.9	11.0	13.3
Bank loans to the private sector (year-on-year % change)	1.5	1.5	-6.5	-4.8	3.0	5.7
Lending for house purchase (year-on-year % change)	8.8	8.9	7.2	6.7	7.0	6.2
Loan to deposit ratio	69.0	65.8	60.9	54.9	52.4	51.8
Central Bank liquidity as % of liabilities	0.6	1.5	1.3	1.2	0.5	0.6
Private debt (% of GDP)	311.9	339.2	359.8	355.9	342.2	-
Gross external debt (% of GDP) ²⁾ - public	6.3	6.1	8.1	10.0	10.4	9.2
- private	2409.3	2613.0	4063.6	4588.0	5170.5	5864.9
Long-term interest rate spread versus Bund (basis points)*	42.6	31.5	32.7	28.2	17.3	-12.7
Credit default swap spreads for sovereign securities (5-year)*	-	-	-	-	-	-

1) Latest data Q2 2015.

2) Latest data September 2015. Monetary authorities, monetary and financial institutions are not included.

* Measured in basis points.

Source: IMF (financial soundness indicators); European Commission (long-term interest rates); World Bank (gross external debt); Eurostat (private debt); ECB (all other indicators).

Table C.2: Labour market and social indicators

	2010	2011	2012	2013	2014	2015 ⁽⁴⁾
Employment rate (% of population aged 20-64)	70.7	70.1	71.4	71.1	72.1	71.0
Employment growth (% change from previous year)	1.8	3.0	2.4	1.8	2.5	2.5
Employment rate of women (% of female population aged 20-64)	62.0	61.9	64.1	63.9	65.5	64.9
Employment rate of men (% of male population aged 20-64)	79.2	78.1	78.5	78.0	78.4	76.9
Employment rate of older workers (% of population aged 55-64)	39.6	39.3	41.0	40.5	42.5	38.8
Part-time employment (% of total employment, aged 15 years and over)	17.9	18.4	19.0	19.2	18.9	19.1
Fixed term employment (% of employees with a fixed term contract, aged 15 years and over)	7.1	7.1	7.7	7.1	8.2	10.2
Transitions from temporary to permanent employment	26.0	30.7	32.4	34.2	36.9	-
Unemployment rate ⁽¹⁾ (% active population, age group 15-74)	4.6	4.8	5.1	5.9	6.0	6.2
Long-term unemployment rate ⁽²⁾ (% of labour force)	1.3	1.4	1.6	1.8	1.7	1.7
Youth unemployment rate (% active population aged 15-24)	15.8	16.4	18.0	16.9	22.3	16.2
Youth NEET ⁽³⁾ rate (% of population aged 15-24)	5.1	4.7	5.9	5.0	6.3	-
Early leavers from education and training (% of pop. aged 18-24 with at most lower sec. educ. and not in further education or training)	7.1	6.2	8.1	6.1	6.1	-
Tertiary educational attainment (% of population aged 30-34 having successfully completed tertiary education)	46.1	48.2	49.6	52.5	52.7	-
Formal childcare (30 hours or over; % of population aged less than 3 years)	19.0	28.0	27.0	24.0	-	-

(1) Unemployed persons are all those who were not employed but had actively sought work and were ready to begin working immediately or within two weeks.

(2) Long-term unemployed are peoples who have been unemployed for at least 12 months.

(3) Not in Education Employment or Training.

(4) Average of first three quarters of 2015. Data for total unemployment and youth unemployment rates are seasonally adjusted.

Source: European Commission (EU Labour Force Survey).

Table C.3: Labour market and social indicators (cont.)

Expenditure on social protection benefits (% of GDP)	2009	2010	2011	2012	2013	2014
Sickness/healthcare	6.0	5.7	5.6	5.8	5.8	-
Invalidity	2.7	2.6	2.6	2.5	2.5	-
Old age and survivors	8.5	8.1	8.2	8.6	8.5	-
Family/children	4.2	4.0	3.6	3.7	3.6	-
Unemployment	1.3	1.3	1.2	1.3	1.5	-
Housing and social exclusion n.e.c.	0.3	0.3	0.3	0.3	0.3	-
Total	23.4	22.5	21.9	22.6	22.7	-
of which: means-tested benefits	0.9	0.8	0.8	0.8	0.8	-
Social inclusion indicators	2009	2010	2011	2012	2013	2014
People at risk of poverty or social exclusion ⁽¹⁾ (% of total population)	17.8	17.1	16.8	18.4	19.0	19.0
Children at risk of poverty or social exclusion (% of people aged 0-17)	23.7	22.3	21.7	24.6	26.0	26.4
At-risk-of-poverty rate ⁽²⁾ (% of total population)	14.9	14.5	13.6	15.1	15.9	16.4
Severe material deprivation rate ⁽³⁾ (% of total population)	1.1	0.5	1.2	1.3	1.8	1.4
Proportion of people living in low work intensity households ⁽⁴⁾ (% of people aged 0-59)	6.3	5.5	5.8	6.1	6.6	6.1
In-work at-risk-of-poverty rate (% of persons employed)	10.0	10.6	9.9	10.2	11.2	11.1
Impact of social transfers (excluding pensions) on reducing poverty	44.8	50.2	50.0	47.9	45.9	40.6
Poverty thresholds, expressed in national currency at constant prices ⁽⁵⁾	17838	18155	17773	17261	17041	17269
Gross disposable income (households; growth %)	2.4	5.0	3.9	4.2	1.0	2.3
Inequality of income distribution (S80/S20 income quintile share ratio)	4.3	4.1	4.0	4.1	4.6	4.4

(1) People at risk of poverty or social exclusion (AROPE): individuals who are at risk of poverty (AROP) and/or suffering from severe material deprivation (SMD) and/or living in households with zero or very low work intensity (LWI).

(2) At-risk-of-poverty rate (AROP): proportion of people with an equivalised disposable income below 60 % of the national equivalised median income.

(3) Proportion of people who experience at least four of the following forms of deprivation: not being able to afford to i) pay their rent or utility bills, ii) keep their home adequately warm, iii) face unexpected expenses, iv) eat meat, fish or a protein equivalent every second day, v) enjoy a week of holiday away from home once a year, vi) have a car, vii) have a washing machine, viii) have a colour TV, or ix) have a telephone.

(4) People living in households with very low work intensity: proportion of people aged 0-59 living in households where the adults (excluding dependent children) worked less than 20 % of their total work-time potential in the previous 12 months.

(5) For EE, CY, MT, SI and SK, thresholds in nominal values in euros; harmonised index of consumer prices (HICP) = 100 in 2006 (2007 survey refers to 2006 incomes)

Source: For expenditure for social protection benefits ESSPROS; for social inclusion EU-SILC.

Table C.4: Structural policy and business environment indicators

Performance indicators	2009	2010	2011	2012	2013	2014
Labour productivity (real, per person employed, y-o-y)						
Labour productivity in industry	-10.89	2.94	-11.97	6.21	9.23	0.28
Labour productivity in construction	1.56	3.09	3.87	-11.04	7.64	3.91
Labour productivity in market services	-5.22	5.59	1.35	-5.45	2.72	1.32
Unit labour costs (ULC) (whole economy, y-o-y)						
ULC in industry	18.40	-6.18	13.12	-4.00	-5.78	1.42
ULC in construction	6.38	-2.30	-3.68	12.28	-3.23	-0.21
ULC in market services	8.96	-3.30	1.06	7.25	2.10	0.46
Business environment	2009	2010	2011	2012	2013	2014
Time needed to enforce contracts ⁽¹⁾ (days)	321	321	321	321	321	321
Time needed to start a business ⁽¹⁾ (days)	25.0	23.0	17.5	17.5	17.5	18.5
Outcome of applications by SMEs for bank loans ⁽²⁾	0.15	na	0.18	na	0.29	0.00
Research and innovation	2009	2010	2011	2012	2013	2014
R&D intensity	1.71	1.53	1.50	1.29	1.31	1.24
Total public expenditure on education as % of GDP, for all levels of education combined	na	na	na	na	na	na
Number of science & technology people employed as % of total employment	34	34	34	36	38	40
Population having completed tertiary education ⁽³⁾	30	30	32	33	35	40
Young people with upper secondary level education ⁽⁴⁾	77	73	73	72	77	74
Trade balance of high technology products as % of GDP	3.19	1.93	0.91	-0.87	-1.32	-1.40
Product and service markets and competition				2003	2008	2013
OECD product market regulation (PMR) ⁽⁵⁾ , overall				1.60	1.44	1.46
OECD PMR ⁽⁵⁾ , retail				4.17	4.47	4.54
OECD PMR ⁽⁵⁾ , professional services				3.52	3.55	3.47
OECD PMR ⁽⁵⁾ , network industries ⁽⁶⁾				2.96	2.72	2.73

(1) The methodologies, including the assumptions, for this indicator are shown in detail here: <http://www.doingbusiness.org/methodology>.

(2) Average of the answer to question Q7B_a. "[Bank loan]: If you applied and tried to negotiate for this type of financing over the past six months, what was the outcome?". Answers were codified as follows: zero if received everything, one if received most of it, two if only received a limited part of it, three if refused or rejected and treated as missing values if the application is still pending or don't know.

(3) Percentage population aged 15-64 having completed tertiary education.

(4) Percentage population aged 20-24 having attained at least upper secondary education.

(5) Index: 0 = not regulated; 6 = most regulated. The methodologies of the OECD product market regulation indicators are shown in detail here: <http://www.oecd.org/competition/reform/indicatorsofproductmarketregulationhomepage.htm>

(6) Aggregate OECD indicators of regulation in energy, transport and communications (ETCR).

Source: European Commission; World Bank — Doing Business (for enforcing contracts and time to start a business); OECD (for the product market regulation indicators); SAFE (for outcome of SMEs' applications for bank loans).

Table C.5: Green growth

Green growth performance		2009	2010	2011	2012	2013	2014
Macroeconomic							
Energy intensity	kgoe / €	0.14	0.14	0.14	0.13	0.13	
Carbon intensity	kg / €	0.37	0.37	0.35	0.34	0.31	
Resource intensity (reciprocal of resource productivity)	kg / €	0.31	0.30	0.30	0.30	0.30	0.30
Waste intensity	kg / €	-	0.31	-	0.25	-	
Energy balance of trade	% GDP	-2.6	-3.6	-4.5	-4.8	-4.0	-3.0
Weighting of energy in HICP	%	10.93	11.32	11.52	11.59	14.85	14.4
Difference between energy price change and inflation	%	-11.9	3.5	6.8	3.9	-3.5	-6.0
Real unit of energy cost	% of value added	6.4	6.4	6.4	-	-	
Ratio of labour taxes to environmental taxes	ratio	6.7	6.8	6.9	7.1	8.0	8.0
Environmental taxes	% GDP	2.6	2.4	2.4	2.4	2.2	2.1
Sectoral							
Industry energy intensity	kgoe / €	0.33	0.36	0.36	0.31	0.29	
Real unit energy cost for manufacturing industry	% of value added	12.0	12.0	12.0	-	-	
Share of energy-intensive industries in the economy	% GDP	-	-	-	-	-	
Electricity prices for medium-sized industrial users	€ / kWh	0.12	0.10	0.10	0.10	0.10	0.10
Gas prices for medium-sized industrial users	€ / kWh	0.04	0.04	0.05	0.05	0.05	0.05
Public R&D for energy	% GDP	0.01	0.01	0.01	0.01	0.01	0.01
Public R&D for environment	% GDP	0.03	0.02	0.02	0.03	0.02	0.02
Municipal waste recycling rate	%	82.0	82.3	82.3	82.4	82.5	
Share of GHG emissions covered by ETS*	%	18.7	18.4	16.9	16.8	16.6	17.0
Transport energy intensity	kgoe / €	1.89	1.88	2.07	2.06	2.00	
Transport carbon intensity	kg / €	4.62	4.61	5.17	5.16	4.97	
Security of energy supply							
Energy import dependency	%	97.5	97.0	97.2	97.4	96.9	
Aggregated supplier concentration index	HHI	3.4	3.6	3.2	3.2	3.1	
Diversification of energy mix	HHI	0.46	0.45	0.46	0.46	0.46	

All macro intensity indicators are expressed as a ratio of a physical quantity to GDP (in 2005 prices)

Energy intensity: gross inland energy consumption (in kgoe) divided by GDP (in EUR)

Carbon intensity: greenhouse gas emissions (in kg CO₂ equivalents) divided by GDP (in EUR)

Resource intensity: domestic material consumption (in kg) divided by GDP (in EUR)

Waste intensity: waste (in kg) divided by GDP (in EUR)

Energy balance of trade: the balance of energy exports and imports, expressed as % of GDP

Weighting of energy in HICP: the proportion of "energy" items in the consumption basket used for the construction of the HICP.

Difference between energy price change and inflation: energy component of HICP, and total HICP inflation (annual % change).

Real unit energy cost: real energy costs as a percentage of total value added for the economy.

Environmental taxes and labour taxes: from European Commission, 'Taxation trends in the European Union'

Industry energy intensity: final energy consumption of industry (in kgoe) divided by gross value added of industry (in 2005 EUR).

Real unit energy costs for manufacturing industry: real costs as a percentage of value added for manufacturing sectors

Share of energy-intensive industries in the economy: share of gross value added of the energy-intensive industries in GDP

Electricity and gas prices for medium-sized industrial users: consumption band 500–2000 MWh and 10 000–100 000 GJ; figures excl. VAT.

Municipal waste recycling rate: ratio of recycled municipal waste to total municipal waste.

Public R&D for energy or for the environment: government spending on R&D (GBAORD) for these categories as % of GDP

Proportion of greenhouse gas (GHG) emissions covered by EU Emission Trading System (ETS): based on greenhouse gas emissions (excl land use, land use change and forestry) as reported by Member States to the European Environment Agency

Transport energy intensity: final energy consumption of transport activity (kgoe) divided by transport industry gross value added (in 2005 EUR).

Transport carbon intensity: greenhouse gas emissions in transport activity divided by gross value added of the transport sector.

Energy import dependency: net energy imports divided by gross inland energy consumption incl. consumption of international bunker fuels.

Aggregated supplier concentration index: covers oil, gas and coal. Smaller values indicate larger diversification and hence lower risk.

Diversification of the energy mix: Herfindahl index over natural gas, total petrol products, nuclear heat, renewable energies and solid fuels. * European Commission and European Environment Agency

Source: European Commission (Eurostat) unless indicated otherwise