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

The economic situation and policies of Luxembourg were reviewed by the Committee on 29 May 2008. The draft report was then revised in the light of the discussions and given final approval as the agreed report of the whole Committee on 10 June 2008.

The Secretariat's draft report was prepared for the Committee by Jens Christian Høj, Ekkehard Ernst, Arnaud Bourgain and Patrice Pieretti under the supervision of Patrick Lenain.

The previous Survey of Luxembourg was issued in May 2005.

BASIC STATISTICS OF THE LUXEMBOURG, 2007

THE LAND

Area (km^2)	2 586	Major cities (thousand inhabitants), 2007	
Agricultural area (2006)	87%	Luxembourg	84

THE PEOPLE

Population (thousands 2007)	476	Employment (thousands, full-time equivalents):	319
Inhabitants per km^2	184	Agriculture (2006)	4
Net natural increase (2007)	1 611	Industry and construction	66
		Other	248
		Cross-borders	117

PRODUCTION

Gross domestic product (2007)		Origin of GDP in per cent (2006)	
Euro million	36 125	Agriculture	0.5
Gross national income per head,		Industry and construction	14
current price 2006 (US$ PPP)	61 705	Financial services, services to business	47
Gross fixed investment			
Per cent of GDP (2007)	20		
Per head (millions euro)	1 526		

THE PUBLIC SECTOR

Per cent of GDP, 2007		Composition of Parliament (2004)	
General government consumption	15	(number of seats):	60
General government current revenues	41	Christian-social (PCS)	24
General government gross debt	11	Worker socialist (POSL)	14
		Democrats (PD)	10
		ADR	5
		GLEI/GAP	7

THE CURRENCY

Currency units of euro per USD, average of daily figures:

Year 2007	0.73	April 2008	0.64

Executive summary

Luxembourg's economy is in fine shape. Growth has been robust over the past three years, thanks to the expansion of the financial sector, while other business sectors also enjoyed buoyant activity. This has led to impressive employment gains benefitting both job seekers of the Grand-Duchy and cross-border workers living in neighbouring regions of Belgium, France and Germany.

The international financial crisis is, however, now taking its toll, and growth is likely to weaken. *Signs of a financial-sector slowdown began to emerge towards the end of last year. The weakening of activity will have a negative effect on tax receipts, which public finances should be able to shoulder easily, given the comfortable fiscal position registered last year.*

The financial sector remains sound, reflecting high-quality supervision. *It might, however, prove difficult to return to the exceptional pace of growth of the past decade in view of the various challenges faced by the financial sector, such as international competition and possible changes to the tax framework. In response to these challenges, the government should further improve the country's attractiveness for high-skilled talents, including by raising the efficiency of the health and education services and adopting more flexible immigration laws and dual nationality rules.*

The short-term fiscal position is sound, but fiscal policy needs to evolve towards a medium-term framework. *A greater emphasis in the budget should be put on desired outcomes rather than on inputs, and on ensuring efficient delivery. Importantly, public finances need to prepare for the maturing of the pension system. The pre-funding element in place needs to be developed further; in addition, the government and the social partners need to restrain the generosity of pension benefits and encourage later retirement.*

The health care system is well funded, thanks to the contributions of prime-age cross-border workers; the population's health status is, however, only average by international standards. *While non-medical causes are at play, there is scope for improving the transparency of results and the quality of health services within given resources. The proposed merger of health insurance funds is welcome; if approved, the new consolidated fund will be in a good position to act as a wise buyer of health care services. The ample capacity of hospitals tends to lead to unnecessarily long hospital stays, while the fee-for-service remuneration of doctors tends to induce an oversupply of medical interventions; the payment and funding systems should be reformed by introducing a DRG system covering the remuneration of doctors, so as to remove these distortions. Unnecessary demand could be restricted by introducing standardised electronic patient records, promoting efficient medical practices, as well as through the introduction of gate-keepers and higher copayments where appropriate.*

The last OECD *Survey* focused on the compulsory education system, which faces the twin challenges of pupils with a heterogeneous background and a curriculum ambitious in multiple languages. *Since then, PISA 2006 results have confirmed that testing scores are below the international average. The authorities have started to reform the schooling system, with several initiatives bearing fruit, but more could be done. The government could focus more on the objective that students build up their human capital and in particular acquire skills in greater demand by the labour market, which may imply a more balanced focus on languages. School leaders should be held more accountable for the successful achievement of such objective, while getting greater managerial autonomy.*

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Assessment and recommendations

Growth has been strong, driven by the expansion of the financial sector

Luxembourg's economy has enjoyed a strong performance since the 2006 *Survey*. The economy grew by 4.5% in 2007, faster than in most other OECD countries, with relatively moderate national headline inflation of just over 2%. The general government had a surplus of 3% of GDP, while the current account surplus was around 10% of GDP. The main driver of economic growth has been the financial sector, which has continued to sharply expand its activity and now accounts for nearly 30% of GDP. Collective investment funds registered in Luxembourg hold assets of EUR 2 trillions, about one-fourth of investment funds' assets in Europe. Private banking is also an important source of activity, with the third largest market share worldwide after Switzerland and the Caribbean Islands. There have been important beneficial effects of this expansion. Not only has the financial sector created large numbers of jobs, it has also been a significant purchaser of business services supplied by other sectors, such as legal services and real estate. Other positive effects have boosted the rest of the economy, such as knowledge, skill and location spillovers. The budget has benefited from dynamic tax revenues paid by the financial sector, together with temporary and recurrent positive revenue surprises from other sources. This has supported the expansion of the public sector, although its size has declined in relation to GDP.

The global financial turmoil is now taking its toll on growth

Real growth is projected to weaken in 2008, reflecting the international financial crisis. The fall in international equity prices has led to a decline in the nominal amount of assets held by investment funds, hurting commission fees. New net inflows into investment funds have also slowed, due to the change in investor sentiment. Employment in the financial sector remained strong last year, perhaps because firms have been hoarding hard-to-recruit skilled staff, but this could change rapidly if the banking sector feels a durable squeeze on earnings. A contraction similar to that following the bust of the dotcom bubble would lead to a painful adjustment. A fall of net inflows of funds into the Luxembourg financial sector would have large spillover effects on the domestic economy, as financial institutions would reduce their purchases of goods and services from other sectors and lower their payments of tax receipts based on the size of assets under management. While the unfolding of the financial turmoil is uncertain, it is likely that the economic and financial slowdown currently under way will mean that tax receipts will suffer in 2008; this should be relatively easy to absorb, however, given the healthy position of the general government last year (a surplus of 3% of GDP) *and does not call for immediate fiscal restraint measures designed to tighten fiscal policy*.

The financial sector appears to remain sound

Immediately after the onset of the subprime debacle, the financial supervisory authorities (*Commission de surveillance du secteur financier*) launched a special study to investigate the potential exposure of financial institutions to mortgage-related risk. Apart from a limited number of investment funds, the study concluded that the fall-out of the crisis on financial institutions would be limited, reflecting the near absence of activities linked to highly-leveraged financial operations. *The authorities should continue to improve their regulatory framework, so as to foster financial soundness*. In this light, the draft law reinforcing cooperation between the financial supervisor (CSSF), the insurance supervisor (COMASSU) and the Central Bank (BCL) is welcome. *The special investigation on subprime mortgage assets was also welcome, and the supervisors should pursue their quest for financial stability by repeating such exercises at regular intervals as well as fostering greater transparency about the stability of the financial system*.

An erosion of competitive advantages may hurt the financial services in the medium term

Once the current financial crisis is resolved, the financial sector may not be able to return to its past exceptionally rapid pace of expansion. The development of the financial sector has largely benefited from a tax and regulatory framework that has been able to create a "first-mover" advantage, inducing financial firms to settle in Luxembourg. Originally, the main attractions for foreign clients of using the financial sector in Luxembourg included banking secrecy, tax advantages and the early implementation of an EU directive on a European passport for investment funds, allowing promoters in Luxembourg to operate in all EU countries. As a result, Luxembourg emerged as a major location for financial firms to register their investment funds and locate fund administration activity. Luxembourg has built expertise in particular in middle and back office activities (settling, accounting, etc) but has been less successful in attracting the front office activities, such as trading and investment-bank activities, which remain in other international financial centres.

Some of the tax advantages that attracted part of the international clientele are being phased out, as exemplified by the EU Savings Directive requirement to implement a gradually increasing withholding tax rising to 35% from 1 July 2011. The increase in withholding tax is likely to be accompanied by efforts to broaden the scope of the Directive already underway as part of a review process intended to better ensure the effective taxation of saving income in the European Union. Moreover, Luxembourg will remain under pressure to relax its bank secrecy rules and move towards exchange of bank information for tax purposes in line with OECD standards. Likewise, it is becoming increasingly difficult to maintain comparative advantages in the regulatory framework as financial and taxation regulations are increasingly being harmonised across countries. In addition, new technology means that lower value-added activities will tend to be increasingly outsourced to other countries. Developments in the financial sector thus depend on the ability of the sector to diversify into higher value-added activities. Such a shift hinges on continuing to adapt financial sector regulation to changing circumstances and on attracting talent to develop such new activities.

The growth prospects hinge on boosting attractiveness; efficient health and education services would be key assets in this respect

Attracting talent will depend on the financial sector paying competitive wages and on making Luxembourg attractive in terms of the quality of life. The reliance on a growing number of cross-border workers to fill vacancies in the banking system will eventually run into physical limits, with the saturation of the transportation system used by commuters; in this respect, *recommendations contained in the OECD Territorial Review of Luxembourg could go a long way towards fostering the development of transport links.* It is also important to make the country more attractive to highly-skilled international talents; *for this purpose, the government should consider increasing the flexibility of current immigration laws affecting non-EU workers as well as allowing dual nationality.* For both recommendations, legislative proposals have been presented to parliament. *However, the strict language requirement in the dual nationality proposal should be eased. Higher quality education and healthcare services, as discussed in this Survey, would also be important assets to attract international talents.* It is equally important to develop talent locally, but the education system has so far not been able to satisfy this type of labour market demand. *The education sector should aim more at better meeting labour market demands, including at the tertiary level, for example by bolstering higher-education in finance at the University of Luxembourg.*

Slower growth makes it important to strengthen the fiscal policy framework

Since 2005, the buoyancy of tax revenue has resulted in strong budgetary outcomes. Some of this buoyancy is unlikely to last, however, in particular if the financial sector does not return to its past brisk pace of expansion. Furthermore, some of the recent revenue surprises were of a temporary nature, such as the exceptional dividends and withholding tax on dividends which accrued to the budget in the process of the merger of Arcelor and Mittal. The budget has also benefitted from the location in Luxembourg of international internet services firms, which were attracted by agglomeration effects and the low value-added tax of 15% on electronic services (the minimum EU standard rate), charged in the country of origin. This tax advantage is scheduled to become less advantageous in 2015 following a recent decision by EU finance ministers that internet services should be taxed in the country where they are consumed. Both the temporary nature and the high volatility of some tax revenues highlight the need for diversifying the tax structure. *In this respect, higher taxes on fossil fuel energy may achieve the double dividend of abiding by post-Kyoto emission abatement targets and diversifying the tax structure*. Moreover, such a tax increase is likely to be a more efficient abatement measure to meet post-Kyoto targets than investing in renewable energy.

The authorities have improved the fiscal policy framework in recent years: the parliamentary discussion of the budget has been moved closer to the start of the budget year; the time between the budget presentation and the publication of the stability programme has been reduced; and with the 2008 budget the presentation includes a version based on national account rules. Nevertheless, the budget process remains driven by a process of line-item discussion and input-based principles, with a strong focus on the allocation of resources among spending ministries. *The fiscal framework should be reformed to establish multi-annual spending ceilings that link short-term fiscal objectives to a well-defined path towards securing fiscal sustainability.* For example, in order to close the fiscal sustainability gap over a five-year period solely using prefunding, spending growth needs to be 1½ percentage points less than nominal GDP growth. *As well, there should be a move from input-based budgeting to output-based budgeting, so as to emphasise the efficient provision of public services.* To secure a broad political support for the strategy, *transparency and credibility of the budgetary process should be enhanced by implementing a clearer separation of statistics compilation, macroeconomic projections and budget preparation.* This separation could include having an independent institution providing macroeconomic projections and assessments of spending and revenue trends.

Ageing-related public spending will increase sharply

As already highlighted in the previous *Survey*, public finances will deteriorate significantly in the medium term. This reflects the maturing of a generous welfare system, which currently benefits from the large contributions made by prime-age cross-border workers. The demographic ageing of these workers, together with the retirement of persons with full-career working lives, will eventually imply a sharp increase in the level of pension benefits. The authorities (*Inspection Générale de la Sécurité Sociale*) project that public spending on pension benefits will possibly increase by 7 percentage points of GDP by 2050. In addition, updated projections prepared for the present *Survey* suggest that health and long-term care spending expenditures are also likely to increase by 7 percentage points of GDP by 2050. Under unchanged policies, these two sources of spending pressure will put a considerable burden on the public finances and could imply an exponential increase in public indebtedness.

The government seeks to prefund some of age-related spending

The authorities have prefunded only part of these future expenditures. A pension reserve fund established in the early 1980's now holds assets in excess of 25% of GDP, consistent with the current strategy of securing the viability of the pension system within a seven-year time horizon. However, *the time horizon of the strategy should be extended to at least 2050 in order to deal early with the mounting age-related pressures on public pension expenditures.* This implies that the budget should run structural surpluses in years to come and increase the pension reserves by three to four times, as argued in the previous *Survey*. Also, given the special circumstances with respect to the large number of cross-border workers who will become eligible for health insurance coverage during their retirement, there is a need to increase the health care reserve fund, which currently holds assets amounting to about 10% of annual expenditures, and to expand its role so as to prefund future health liabilities. Precise estimates of such health care prefunding are difficult to make, not least because of the issue of coverage of cross-border workers. Nevertheless the increase in health and long-term care spending could be of the same order of magnitude as the increase in pension spending, so that *the required health care prefunding may be similar to that in the pension system*. Overall, if the entire fiscal sustainability gap were to be closed solely through prefunding and the low public debt-to-GDP ratio was allowed to increase to 60%, then the structural balance would need to be improved by 2% of GDP to have a structural surplus of 4½ per cent of GDP. Thus, Luxembourg would have to make difficult choices between raising the tax burden and restraining public spending priorities.

Pension benefits should be reformed to eliminate early-retirement incentives

Prefunding can, however, only deal with the bunching of retiring baby-boomers, not the long-term increase in longevity; in addition, there is a political-economy problem with attempts to maintain large budget surpluses over a prolonged period of time. Thus, other measures could also be envisaged to secure fiscal sustainability. *The contribution base could be expanded by raising the low effective retirement age by reducing access to early retirement, as argued in the previous Survey. Additional measures in this area should focus on moving the public pension system towards an actuarially-neutral basis by raising the retirement age and lowering the replacement rate. The official retirement age of 65 years should be increased by, for example, two years to partially reflect the 10-year increase in life-expectancy since 1960*. Once such a one-off measure has been implemented, *a more robust measure would be to link the official retirement age to developments in life expectancy*. *The generous replacement rate in the pension system should also be lowered, although over a sufficiently long time horizon to allow workers to adjust their working and savings decisions*. This could be achieved by indexing pensions to price developments with some improvements in living standards then being implemented through a partial link to real wage developments.

Greater efficiency is needed in the health care sector

The health care system offers nearly unrestricted access to a medical system that has been improved and modernised over the past decade. This has been achieved without sharp increases in social security contributions, as the contribution base has been expanding rapidly in tandem with the number of cross-border workers. Many of these cross-border workers are relatively young and therefore, for now, make few demands on the health care system. In relation to GDP, total health care spending (8.3%) was in 2005 below the average for the OECD (9.0%), but spending per capita (both in terms of resident and cross-border population) in purchasing power parity terms was among the highest in the OECD, reflecting the high cost of delivery. Despite high spending, the health status of the population – measured by life expectancy at birth – is about average by OECD standards. This is surprising given the country's high income level, an important factor behind a healthy population. This partly reflects non-medical determinants, such as the high number of road accidents (linked to the commuting of workers), a relatively high prevalence of obesity and a higher incidence of liver diseases and cirrhosis than in other European countries. *Thus, there is scope promoting preventive care and lifestyle changes*. *But there appears also to be potential for improving medical care*, as shown by the weakness of care quality indicators, even though such indicators have to be used with a great degree of caution because they can be difficult to interpret and they are not entirely comparable across countries.

The planned health insurance fund should act as a "wise" buyer of healthcare services

At present, the public health insurance fund is close to financial balance. Each year, under the constraint of a legal requirement that the budget is balanced, contribution and reimbursement rates are determined by the UCM taking into account the advice of the "quadripartite" (trade unions, employers, government, and health care providers). Unexpected shortfalls may be covered through a reserve fund (of between 10 and 20% of total expenditures), which subsequently must be replenished through higher contribution or lower reimbursement rates. The annual discussions include a negotiation of price parameters between the UCM (*Union des Caisses de Maladie)* and the country's associations of health care providers. The price benchmark is largely based on historical cost developments with limited systematic use of international comparisons. *To strengthen the bargaining position of the UCM, it should be encouraged to act as a "wise" buyer of health care services, making more frequent use of cost-efficiency analyses and, when appropriate, comparative international benchmarks*. The planned merger of some of the nine sectoral health-insurance funds will create a broader and more powerful agency, which should be given some degree of autonomy in the purchase of services, as well as being subject to a high degree of accountability. The merger goes in the right direction as it should be allowed to reap the benefits of economies of scale. *Further productivity gains should be achieved by merging the remaining four funds and reducing administrative cost.*

There is excess hospital capacity

Mergers and investments in the hospital sector have reduced the number of small and inefficient hospitals. Nevertheless, Luxembourg is left with an internationally high number of hospital beds relative to the population, partly reflecting the large number of general hospitals. As a result, occupancy rates are low and the average length of stay is relatively high. *Further consolidation of the sector requires reducing the number of excessive acute care beds and shifting from hospital care towards more ambulatory care*. Moreover, spending appears to be increased by the incentives faced by doctors, who are generally paid on a fee-for-service basis, although they use medical equipment in hospitals for free. The fee-for-service system for hospital doctors and the lack of authority over investment decisions, which are authorized by the Ministry of Health, mean that hospital management has little autonomy and, therefore, little incentive for seeking efficiency gains. *To rectify this situation, hospital managers should be given more autonomy, while becoming more accountable for their budget decisions and the overall results of their hospitals. This could be achieved by introducing activity-based funding through a DRG system inclusive of the remuneration of hospital doctors, in order to better align incentives faced by hospitals and doctors. The latter should also include capital depreciation to improve decision-making with respect to hospital investments.*

Competition with hospitals in neighbouring regions should be encouraged

Exploiting areas of expertise is already being done within the *Grande Région* as patients requiring certain types of intervention are regularly treated in neighbouring countries. These patients have to seek prior authorisation from a government agency (*Contrôle médical*), which in practice requires a doctor's justification for why treatment is not provided in Luxembourg. In a medical system with strong corporatist ties, this leads to a strong inward orientation of the system. *To enhance competitive pressures from the* Grande Région *and to better exploit comparative advantages in different areas of expertise, patients should have better access to treatment abroad. This would be facilitated by better information on services offered and treatment effectiveness, and should be achieved by lowering the associated administrative burden and introducing the "money-follows-the-user" principle.*

Incentives faced by outpatient doctors could be realigned

In ambulatory care, patients have relatively unrestricted access to services with only a moderate ceiling on the number of consultations per month. Doctors are generally remunerated through a fee-for-service system, providing few incentives for cost-efficient treatments. *Increased out-of-pocket payments would restrict excessive demand for ambulatory services. This would be further strengthened by the introduction of a gatekeeper system, where the exchange of information should be facilitated through a harmonised electronic patient dossier system. Incentives for excessive medical treatment could be further reduced through the introduction of a mixed capitation and fee-for-services system.* Moreover, even though there is in principle freedom of establishment for doctors, new doctors need prior authorisation for their patients to be reimbursed. This authorisation is given by the Minister of Health on advice of the Collège Médical, a professional self-regulating body that informs them on national legislation and verifies language competences for non-EU candidates. *In order to enhance informed patient choices, the authorities should grant authorisation to practice as a doctor on the basis of medical qualifications, transparency of treatment results and life-long training.*

There is overconsumption of drugs

Doctors are free to prescribe any drugs that appear on the relatively short positive list. Nevertheless, low co-payments have contributed to an internationally high consumption of drugs – in itself creating health concerns. Doctors' prescription habits are barely monitored and only in clearly excessive cases will the UCM be alerted. *To reduce excessive consumption of drugs, prescriptions should be monitored and doctors that do not follow state of the art and efficient prescription practises should possibly be sanctioned.* Moreover, the authorities make only few specific recommendations about which drugs to prescribe on the positive lists. *Thus, to encourage cost-efficient drug prescription, doctors should be encouraged to prescribe recommended drugs. This could be reinforced with more differentiated reimbursement rates which would provide patients with incentives for using the most cost-efficient drugs.* Another issue is that it takes a relatively long time for a new drug to be put on the positive list, limiting the benefits of introducing technological advancements in the pharmaceutical market. *This "time-to-subsidy" should be shortened by more frequent updating of the positive list and be made* *more efficient by taking advantage of comparative-effectiveness tests as practised in other OECD countries.* The market for pharmacies is constrained by high barriers to entry. The overall number of pharmacies is strictly regulated and half of them are owned by the state, but run on concession that are awarded on the basis of seniority. New pharmacies are only allowed if there is an unfilled demand. *Competition in the pharmacy market should be introduced by lifting these barriers to entry.* Pharmaceutical practises are also strictly regulated as pharmacists are not allowed to offer alternative equally efficient drugs than those prescribed, denying customers access to cheaper generics or cheaper identical medications. *To boost the use of cost-efficient drugs, pharmacists should be permitted to offer cheaper substitute drugs and the availability of non-harmful non-prescriptive over-the-counter drugs sold outside pharmacies should be increased.*

Education reforms are needed to upgrade skills and improve the transition into the labour market

The previous *Survey* contained an in-depth chapter on how to improve the relatively poor outcomes in education as measured in the PISA 2003 test results. Within this *Survey*'s main theme of how to improve public sector efficiency, the current focus is on how to better use available (ample) resources in the education sector. The last *Survey* identified the education sector's two main challenges as to be a very heterogeneous background of pupils in terms of nationality and a curriculum with a strong focus on language education. The main recommendations of the last *Survey* centred on: *improving the language skills of children with non-Luxembourgish background, both by de-emphasising language education in all three languages and by providing more remedial support; postponing tracking decisions; and increasing the permeability between tracks.* Since then, a more nuanced picture of the education system has emerged. International tests at the primary school level (PIRLS tests) show a relatively good performance. On the other hand, tests at the secondary school level (PISA 2006 tests) show no relative improvement in the educational performance of 14-15 years old pupil – who at that stage have lost almost half year of schooling compared with their peers in other OECD countries. This achievement should be seen in the background of pupils having learned two foreign languages (French and German) since the beginning of primary school. At the same time, the drop-out rate has decreased, but nevertheless remains relatively high and the transition into the labour market has not improved as the increase in youth unemployment in the early 2000s has not been reversed. This reflects a distribution of instruction times that is heavy on certain goals, such as acquiring academic knowledge of four languages, and light on competences deemed useful on the labour market, such as maths and science or creativity and independence. Indeed, many job offers do not require fluency of all languages taught at school, particularly in the financial sector. Thus, *the government could focus more on the objective that students build up their human capital and in particular achieve competencies that are in greater demand by the labour market.*

The authorities are well aware of these issues and have responded by implementing a number of pilot tests: in primary education, the introduction of competence cycles aims at lower class repetition; in technical secondary education, the PROCI-programme refocuses teaching from content to competences by allowing greater school autonomy; and selected schools have introduced full-day schooling and interdisciplinary learning. Moreover, language education is being reworked to increase language support. While these measures are welcome, they do not fully address the core problem of pupils having a heterogeneous

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background. The education system is highly centralised and tends to deliver identical educational services across schools. The Ministry of Education takes important human resource decisions, such as hiring and firing, as well as methods of teaching and curricula. As a result, schools have little autonomy for developing the most appropriate teaching environment to cope with their heterogeneous student populations.

In order to concentrate available resources on improving education outcomes, *the schools should have more autonomy in setting their educational priorities and selecting instruction material*. Moreover, the headmasters should be accountable for school performance. Thus, *the trend of hiring headmasters on time-limited contracts with a performance related element in the remuneration should be continued*. To pursue the objective of improving school performance, *headmasters need greater managerial autonomy, including greater influence on hiring and firing decisions*. Wages are another potential managerial tool to improve performance. However, individual wage increases are based almost exclusively on seniority. *Thus, salaries and career paths of teachers should include merit-based elements*. Moreover, the success of the schools in improving educational outcomes should be transparent. This requires that *the number of tests is increased and that test results corrected for socio-economic background variables should be published*. Part of the balance between granting greater autonomy to schools and improving accountability includes parents, who can provide an important interaction with schools to ensure that developments are on the right course. Thus, *the role of parents should be enhanced by, for example, giving them a greater say in tracking decisions. Transparency in school results would be an additional instrument to enhance school choice and stimulate competition between schools*. This would make it easier for parents with low socio-economic background to identify good performing schools. The above measures should be complemented by earlier detection and implementation of remedial courses. As hours taught per teacher are relatively low and declining with seniority, *the scope for early detection and remedial courses can be enhanced – as currently discussed – byincreasing the number of teaching hours per teacher. This would allow more room for interactions between teachers and students as well as providing more possibilities for extra-curriculum work*.

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OECD Economic Surveys: Luxembourg

Chapter 1

Challenges facing the Luxembourg economy

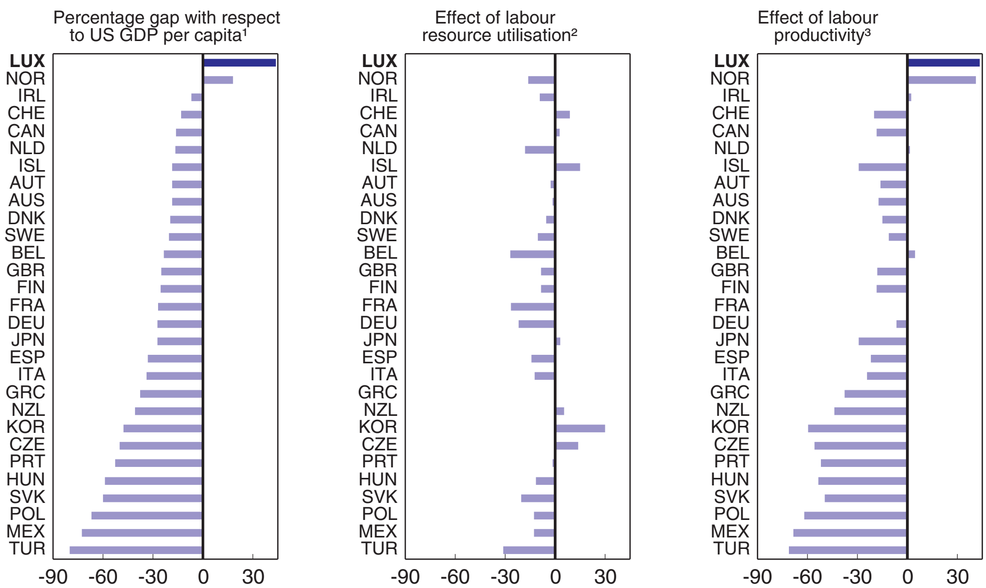
Luxembourg has been growing at between 4% and 6% per year since the last OECD Survey *in 2006, which is faster than almost all other OECD countries. As a consequence, the already substantial positive per capita income gap* vis-à-vis *the best-performing economies in the OECD has widened further. Growth has been mainly driven by a good, albeit slowing, productivity performance, while labour utilisation has decelerated. The financial sector has remained a reliable source of economic expansion, creating jobs mostly filled by cross-border workers and expatriates. By contrast, the number of residents employed in the sector has declined. The financial sector has brought other benefits to the country in the form of dynamic tax receipts, which have allowed a sustained increase in public sector employment and other categories of government spending. On the other hand, there has been little demand for low-skilled residents, explaining the relatively modest declines in the unemployment rate. Outside the financial sector, the deteriorating productivity record is related to a disappointing performance in a number of domestically-oriented service sectors, reflecting strict labour-market interventions and competition-hampering regulations. In the longer term, it is doubtful that the financial sector can continue to grow at such an impressive rate and support the rest of the economy. As a consequence, maintaining the generosity of public services will increasingly depend on boosting public sector efficiency rather than by expanding public sector employment. Along similar lines, if the large fiscal sustainability gap is left unattended, the financing of future ageing-related costs will either require abrupt increases in social security contribution and tax rates or drastically cutting benefits or other public services.*

Volatile times are ahead

After a slowdown during the first half of the decade, the economy has recovered strongly and is performing better than most of the other OECD countries:

- Real GDP growth has remained robust at 4.6% in 2007 – though this is somewhat lower than the year before.
- The level of per capita GDP remains the highest in the OECD, even when cross-border workers are added to the resident population (Figure 1.1).
- The positive income gap *vis-à-vis* the United States has continued to widen (Figure 1.2).
- After registering small deficits in the mid-2000s, public finances have seen increasing surpluses, reaching nearly 3 per cent of GDP in 2007.
- On the downside, despite strong job creation, unemployment has been reduced only modestly leaving the unemployment rate at above 4% – high by historical standards in Luxembourg.
- So far, there are few visible signs that the soundness of financial sector is being seriously affected by the turmoil on the international financial markets.

Figure 1.1. **The sources of real income differences, 2006**



1. Based on 2006 purchasing power parities (PPPs). In the case of Luxembourg, the population is augmented by the number of cross-border workers in order to take into account their contribution to GDP. Data for Greece take into account a 10% upward revision to the level of GDP as agreed by Eurostat in October 2007.
2. Labour resource utilisation is measured as total number of hours worked divided by the population.
3. Labour productivity is measured as GDP per hour worked.

Source: OECD, *Going For Growth*, 2008.

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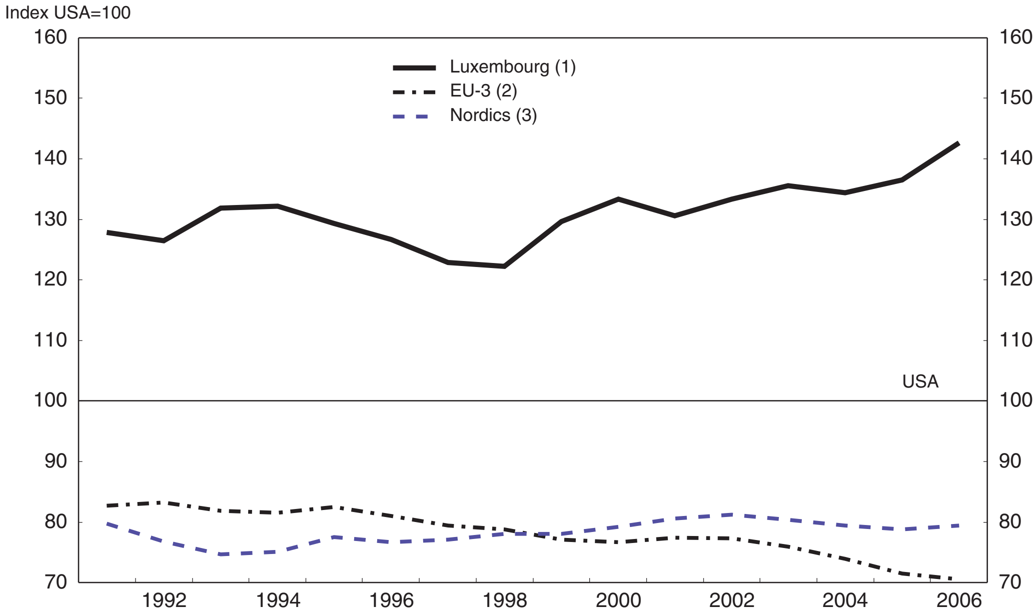
Figure 1.2. **GDP per capita, 1991-2006**

Relative to USA, in PPP 2006 terms



1. Resident population augmented by the number of cross-border workers.
2. France, Germany and Italy.
3. Nordic countries: Denmark, Finland, Mainland Norway, Sweden.

Source: *OECD Analytical Database.*

StatLink http://dx.doi.org/10.1787/380168324853

Even so, the Luxembourg economy is facing important challenges to sustain its impressive performance. The main growth engine in the economy is the financial sector and a prolonged crisis in the international financial markets could have a negative effect on the sector. It is difficult to project the depth and length of such effects, but available evidence suggest that a permanent 10% decline in European stock markets has an effect of a similar proportion on the sector's net income from commissions and transaction fees which, other things equal, could reduce GDP by nearly 1 percentage point after a year compared to a base line scenario (Adam, 2007).[1] Presumably, such effects would be temporary, but experience from past international stock market declines suggests that the slowdown in the sector can be fairly sharp, entailing a substantial decline in government revenues. In the longer term, it may be difficult for the financial sector to maintain its role as the main economic engine in the economy (see Chapter 2 for a detailed discussion). The sector has experienced problems in attracting talent from the main international financial centres to develop higher added value activities and many of its back office activities can be outsourced or automated, with risks for employment in the sector. Moreover, international competition may eventually erode the current comparative advantages that are attached to locating financial service institutions in Luxembourg. The authorities are aware of this challenge and have launched initiatives in various areas, such as identifying the factors behind successful companies (for example, the effects of clustering) and promotion of research and development (R&D) spending. This has been reinforced by the establishment of an institute (*Observatoire de la Compétitivité*) to follow developments in these areas as well as the implementation of the National Reform Programme (the Lisbon Agenda).

A medium-term economic slowdown would have negative consequences for the expansion of the public finances, as the financial sector accounts directly for 22½ per cent of total tax revenues.[2] Revenues are also expected to fall because of non-repetition of windfall gains. These include exceptionally high dividends and withholding taxes on dividends in connection with the merger between Arcelor and Mittal, and lower VAT revenues from electronic commerce as the European Commission's VAT directive is replacing the point-of-sale principle with the end-user country principle for purchases made over the Internet (see Chapter 3). Slower growth will also negatively affect the ability to achieve fiscal sustainability. Indeed, if the sizeable fiscal sustainability gap is left unattended in a situation where revenue growth is likely to slow and ageing-related costs are accelerating, there is a risk that tax or contribution rates will have to be increased sharply or that the provision of public services will have to be drastically cut back. In both cases, the attractiveness for foreigners to work and invest in Luxembourg would be reduced. Part of the solution could be to boost public sector efficiency, particularly in sectors that will expand as the population ages, such as the health care sector. But the public sector in general also needs to improve efficiency. For example, the increasing mismatch problems in the labour market point to a need for ensuring that the costly education system becomes better at adapting to the changing demands of the labour market.

Growth is slowing

The pace of economic expansion of around 5% to 6% annually in recent years has been faster than in other European economies (Table 1.1). In 2007, the economy was only little affected by the turmoil in international financial markets, although growth decelerated through the year and into early 2008. This development is reflected in the financial sector, which continued to be the main driver of economic growth due to the rapid increases in the value of mutual funds under management during most of the year, but with clear signs of slowing towards the end of the year (Figure 1.3). Despite continued increases in unit labour costs (reflecting high wage increases and limited productivity gains), the export sector continued to gain export market shares. This apparent paradox can be explained by the high share (more than three quarters) of services in total exports, where the link between export performance and cost competitiveness tends to be weaker than for goods.[3] High consumer confidence together with strong income growth and relatively low real interest rates sustained private consumption and demand for residential housing. On the other hand, employment creation benefited mainly cross-border workers. As the labour supply continued to expand, there was only a gradual decline in unemployment. Pressures on wage and price inflation were partly contained by the temporary suspension of the automatic wage indexation that has been in place since 2006, although consumer prices started to accelerate in the second half of 2007 on the back of higher energy prices.

Growth is likely to weaken in 2008, mainly as the result of slowing activity in the financial sector as the turmoil on the international financial markets begins to take its toll. The slowdown in domestic demand will be more moderate as disposable incomes are boosted by measures to reduce the tax burden and some decline in unemployment. Headline inflation is set to remain high in most of 2008, until the effects of higher energy and food prices start to fade out towards the end of the year. On the other hand, core inflation will be pushed up by the automatic wage indexation. The economy is expected to experience growth below potential until mid-2009 and then increase again, assuming that the situation of international financial markets normalises.

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Table 1.1. **Demand, output and prices**

	2004	2005	2006	2007	2008	2009
	Current prices (€ billion)	Percentage changes, volume (2000 prices)				
Private consumption	10.9	3.7	2.1	2.0	2.0	2.2
Government consumption	4.6	2.6	2.0	2.4	2.8	2.1
Gross fixed capital formation	5.7	1.9	4.9	13.7	4.6	5.2
Final domestic demand	21.2	3.0	2.8	5.2	2.9	3.1
Stockbuilding[1]	–0.1	1.1	–1.5	–1.0	–0.5	0.0
Total domestic demand	21.1	4.4	0.8	3.7	2.3	3.1
Exports of goods and services	40.7	6.4	9.7	5.5	5.0	4.0
Imports of goods and services	34.4	6.7	7.4	5.2	4.5	3.6
Net exports[1]	6.3	1.1	5.2	2.0	2.2	1.8
GDP at market prices	27.5	4.8	5.9	4.6	3.0	4.0
GDP deflator		4.4	6.3	2.1	1.3	1.8
Memorandum items						
Harmonised index of consumer prices		3.8	3.0	2.7	4.0	2.1
Private consumption deflator		2.9	2.9	2.5	3.3	2.1
Unemployment rate		4.7	4.4	4.4	4.5	4.9
General government financial balance[2]		–0.1	1.3	3.0	1.7	1.3
Current account balance[2]		11.1	10.5	9.9	9.0	9.2

Note: National accounts are based on official chain-linked data. This introduces a discrepancy in the identity between real demand components and GDP. For further details see *OECD Economic Outlook Sources and Methods* (*www.oecd.org/eco/sources-and-methods*).

1. Contributions to changes in real GDP (percentage of real GDP in previous year), actual amount in the first column.
2. As a percentage of GDP.

Source: OECD Economic Outlook 83 database.

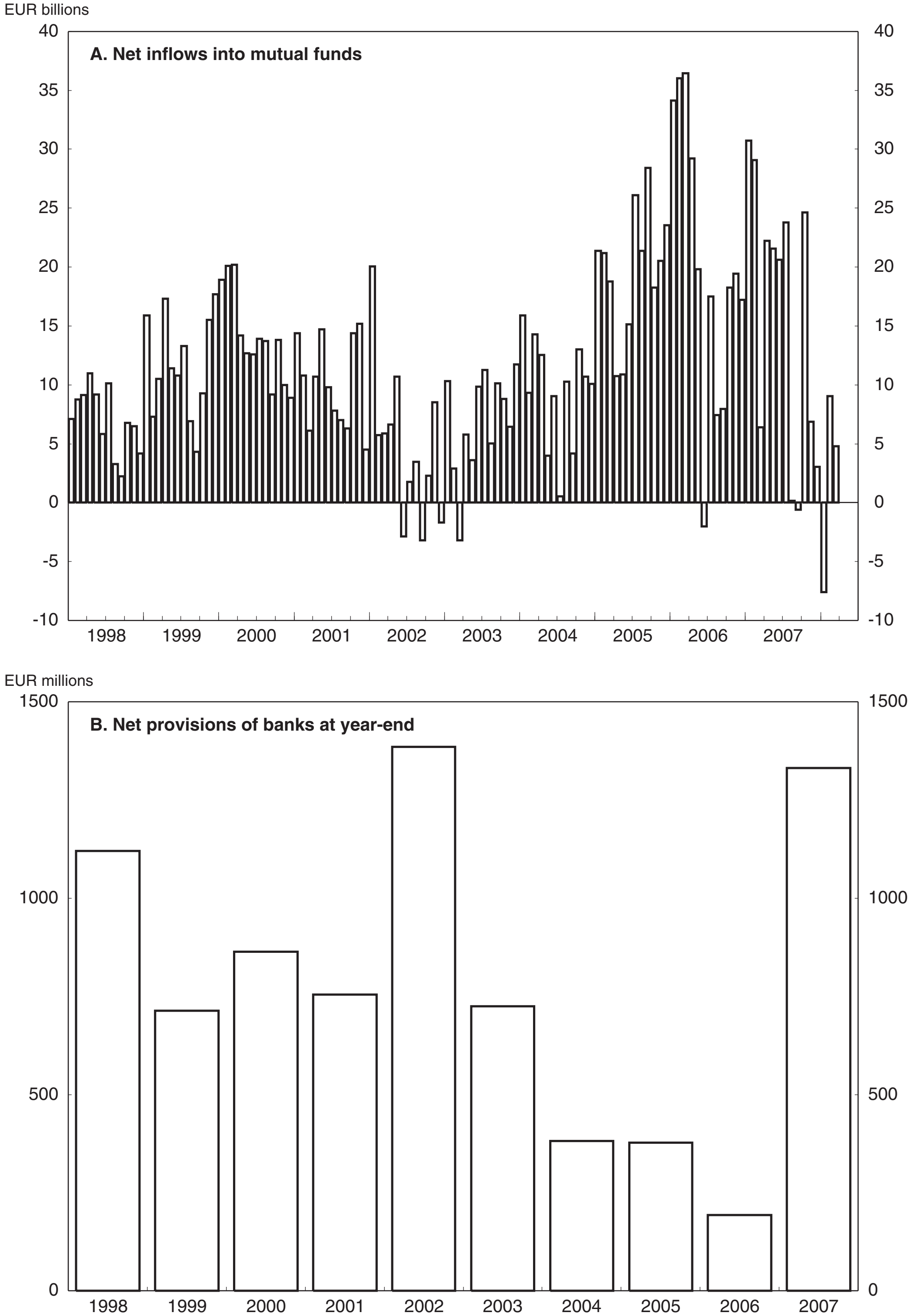
Which labour market groups have benefited from the economic upswing?

The impressive employment growth of around 4% per year over the past couple of years has been concentrated in the services sector, continuing past trends. Employment in manufacturing and primary industries has remained basically unchanged over the past decade. Within the services sector, the largest absolute expansion has been in the financial services sector. In addition, a number of other private services have benefited from the strong economic expansion, such as retailing and wholesaling, construction, and the transportation and communication sectors. Public employment growth has been sufficiently strong to achieve the second largest absolute expansion of employment (Table 1.2). Much of the strong employment expansion has benefited foreigners. Over the past decade, the number of foreigners working in Luxembourg has increased by nearly 50 per cent – with about three quarters of the increase due to the higher number of cross-border workers. As the number of employed natives has expanded at a lesser pace, the composition of employment by origin has changed substantial. By now about 43% of jobs are filled by cross-border workers, nearly one-third by natives, and the remainder by foreigners with residency in Luxembourg (including immigrants and expatriates) (Figure 1.4).

Foreign workers represent the largest share of employment in most private industries (Figure 1.5) and even the public sector relies on foreign workers despite relatively strict nationality and language requirements (see Chapter 2). Moreover, employment growth in the dynamic financial sector has favoured foreigners to such an extent that Luxembourgers are under-represented in this sector in comparison to their average share in the national economy (Figure 1.6).[4] Furthermore, despite strong employment growth, the number of Luxembourgers in the financial sector has been falling, even though of the

Figure 1.3. **Developments in the financial sector**

1998-2008



Source: Banque centrale du Luxembourg and Commission de Surveillance du Secteur Financier.

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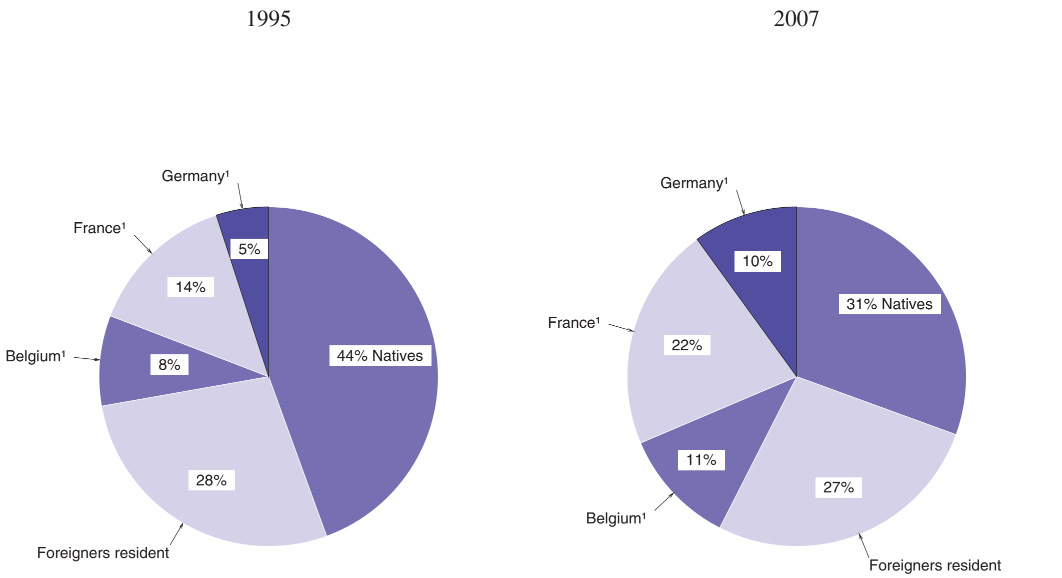
Table 1.2. **Sectoral developments, 1996-2006**

	Value added in real term	Productivity	Employment	Share of employment 2006
	Average growth 1996-2006			
Total	5.3	1.5	3.7	–
Agriculture, hunting, forestry and fishing	–4.0	–4.3	0.2	1.4
Mining and quarrying	0.3	0.3	0.0	0.1
Manufacturing	3.3	3.0	0.3	10.6
Electricity gas and water supply	4.9	4.2	0.7	0.5
Construction	4.2	1.0	3.2	10.5
Wholesale and retail trade; restaurants and hotels	4.0	1.6	2.3	18.2
Transport storage and communications	8.9	4.1	4.7	7.7
Finance, insurance, real estate and business services	6.2	–0.6	6.8	28.2
Financial intermediation	6.4	1.4	5.0	11.4
Real estate, renting and business activities	5.9	–2.2	8.3	16.8
Community, social and personal services	3.3	–0.6	3.9	22.8
Industry including energy	3.4	3.1	0.3	11.2
Basic metals, metal products, machinery and equipment	3.4	3.9	–0.4	4.9
Total services	5.7	1.1	4.5	76.9
Business sector services	6.3	1.4	4.8	54.1

Source: OECD, *STAN Industrial Database*.

Figure 1.4. **Employees in the economy by origins**



1. Cross-border workers.

Source: IGSS.

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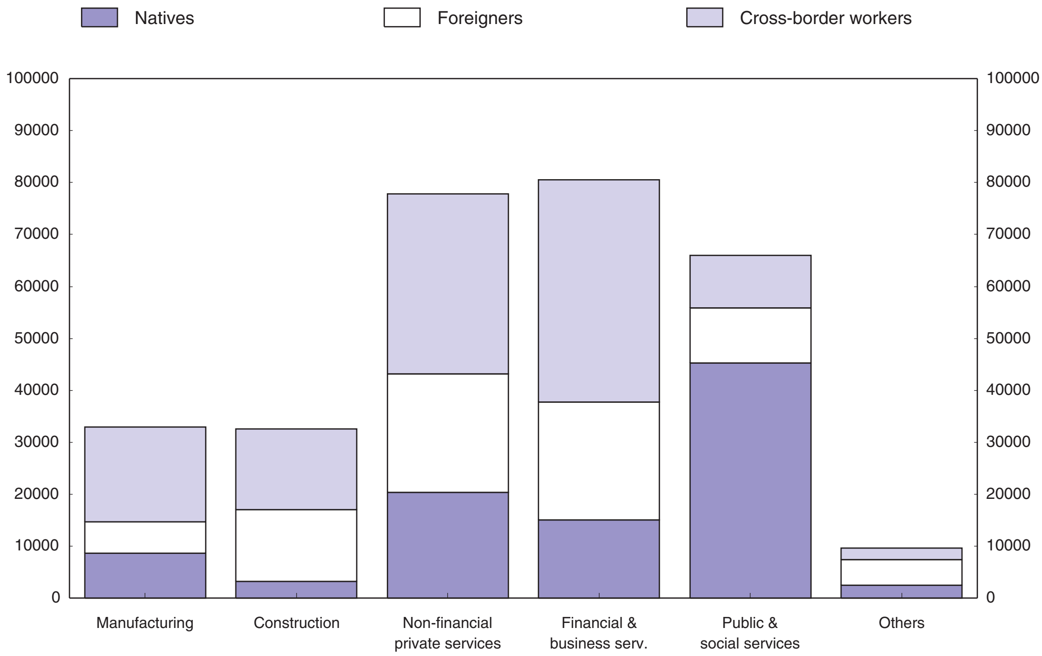
Figure 1.5. **Employees by sector and origins**

March 2006



1. Out of 299 502 employees, 94 900 are natives, 81 034 are foreigners and 123 568 are cross-border workers. Among cross-border workers, 63 010 are French, 32 685 Belgian and 27 863 German.

Source: IGSS.

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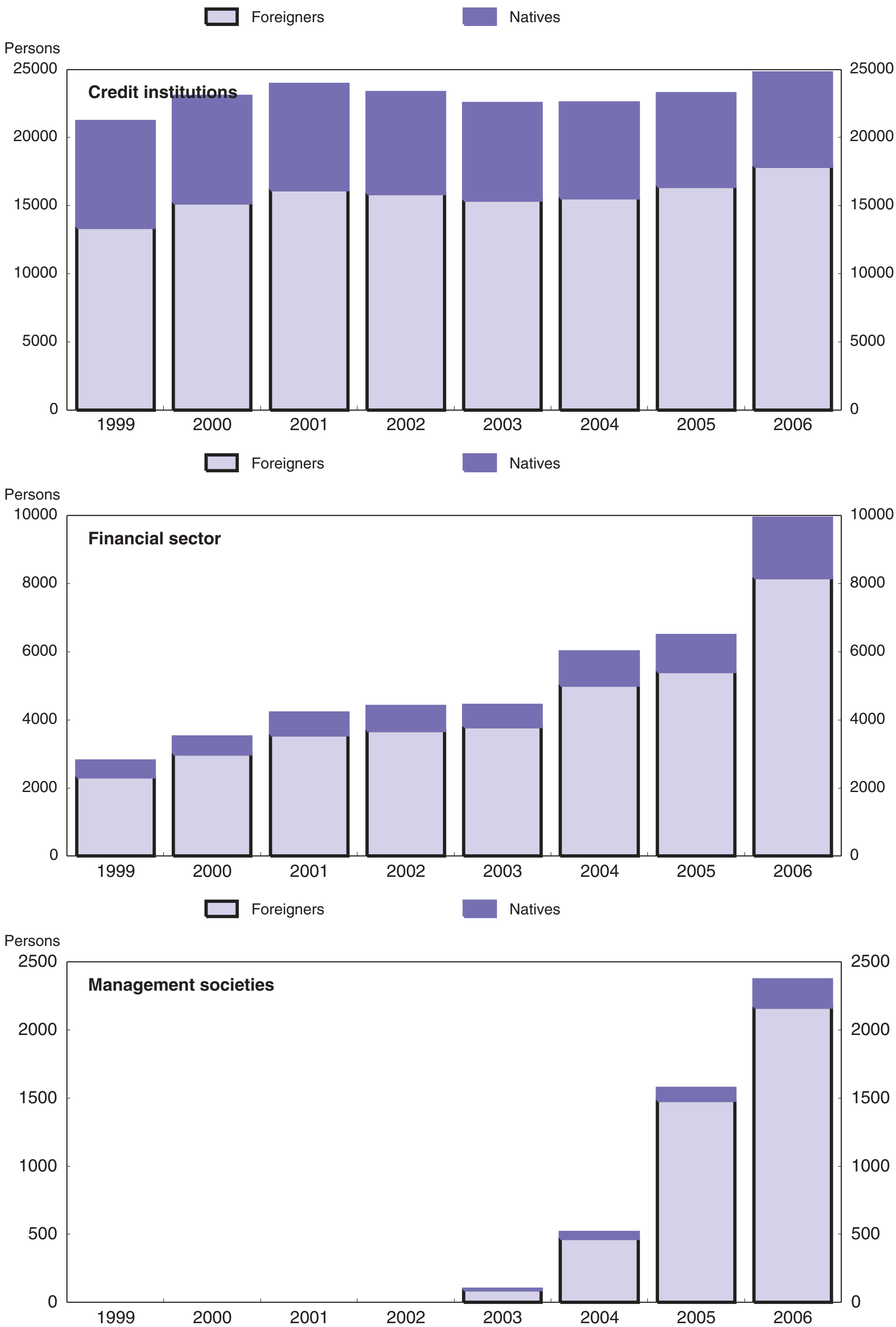
sector's vacancy rate is twice the national average. In this context, it should be noted that empirical investigation suggests that an increase in the number of cross-border workers creates employment opportunities for natives, implying that the relatively poor employment performance of natives does not result from competition from cross-border workers, but rather from rigid labour market institutions (Box 1.1) (Pierrard, 2007). The declining share of natives in employment reflects a relatively unskilled population faced with the continued deindustrialisation of the Luxembourg economy, which has progressed further than in many other OECD countries. The low share of the manufacturing sector is even more visible in terms of output (measured as value added) than in terms of employment, reflecting the relatively higher productivity level in the financial sector as compared with other sectors (Figure 1.7).

The strong expansion of employment in recent years has only had a relatively small impact on the unemployment rate, leaving it at about 1¾ percentage points higher than a decade ago. This reflects increasing mismatch problems on the labour market as the structural changes in the economy boost labour demand in the service sector, but for workers with a different set of skills than those required in the stagnating manufacturing industries (Figure 1.8, Panel A). The problem has been reinforced by the education system continuing to have a relatively strong focus on providing vocational training and technical skills (only one in three upper secondary graduates are directly streamed towards higher education).[5] Moreover, an university in the country was only established in 2003, implying that to a large degree the financial sector has had to rely on foreign workers to satisfy its demand for tertiary graduate workers.[6] And even there, the sector is experiencing troubles

Figure 1.6. **Employment trends in the financial sector by origins**



Source: STATEC.

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Box 1.1. **Labour market policies in Luxembourg**

Luxembourg's labour-market policies tend to create more rigidities than in other countries, as described in the previous *Survey* (OECD, 2006). The main areas of interventions are generous unemployment benefits, strict employment protection legislation and automatic wage indexation.

- The unemployment benefits are relatively generous by international standards during the first year of unemployment (a replacement rate of 80% of the last salary) before the benefit level is reduced to the *Revenu Minimum Garanti*. The replacement rates are on average about 15 percentage points higher than in neighbouring countries, boosting reservation wages of residents compared with cross-border workers in a situation where net wages are about 40% higher than in neighbouring countries.
- Employment protection legislation is the strictest in OECD, which tends to reduce the turnover on the labour market and thus reduce employment possibilities.
- The system of automatic wage indexation prevents downwards adjustments in real wages, which might be needed in some circumstances to allow some categories of unemployed to be priced back into the labour market.

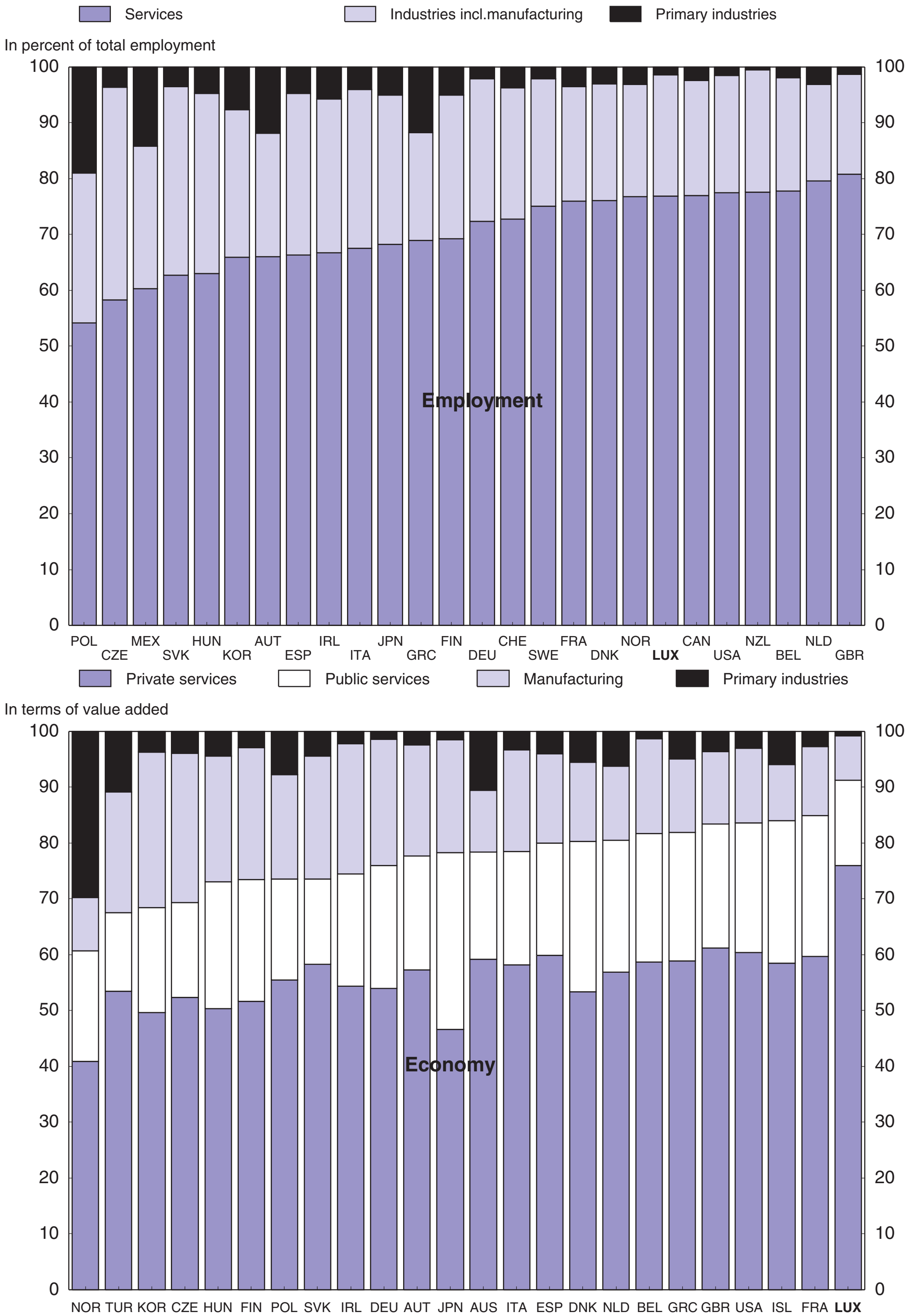
attracting talent from the main financial centres (see Chapter 2). Moreover, labour demand in the financial sector is likely to become more biased towards tertiary degrees in the future as the sector continues to outsource and automate its less sophisticated back-office activities. An additional factor that may restrict the availability of qualified workers in the short term is hard-to-measure labour hoarding. In the previous downturn a number of financial institutions that quickly scaled back their labour force subsequently experienced problems in hiring qualified staff – a situation that they would like to avoid repeating (Banque Centrale du Luxembourg, 2003). The impression of a general mismatch problem is reinforced by the fact that the increase in unemployment has affected almost all groups of residents and the lower-skilled more than the high-skilled (Figure 1.8, Panel B and C). In addition, the number of long-term unemployed increased by about 10% in 2007 (STATEC, 2008).

Growth has mainly been driven by greater labour utilisation

In the second half of the 1990s, the improvement in living standards was built on strong increases in labour utilisation and productivity. The following half decade saw a deceleration of growth in GDP per capita, reflecting somewhat slower productivity growth and a much smaller contribution from labour utilisation (partly reflecting the slowdown of the economy in 2002-03) (Figure 1.9). There is scope for further enhancing labour utilisation (Figure 1.10). The labour participation rate is relatively low, mostly due to very low participation of older workers (the effective retirement age is below 60 years) which have taken advantage of the generous paths to early retirement as described in the previous *Survey*. There has also been a trend decline in average hours worked, although some signs of a recovery can be observed more recently. The slower growth in productivity reflects a declining trend labour productivity growth over the past decades, but to a smaller extent than in other countries (Figure 1.11). Moreover, labour productivity growth in recent years was affected by volatile productivity developments in the financial sector, which is the result of the substantial scale effects in the sector combined with sudden changes in demand (Box 1.2). Also the internationally-exposed transport sector has had substantial gains in productivity (Table 1.2). However, a number of other more domestically oriented

Figure 1.7. **Sectoral composition of the employment and value added**

2006[1]



1. Except for France and Poland: 2005.

Source: OECD, *National Accounts.*

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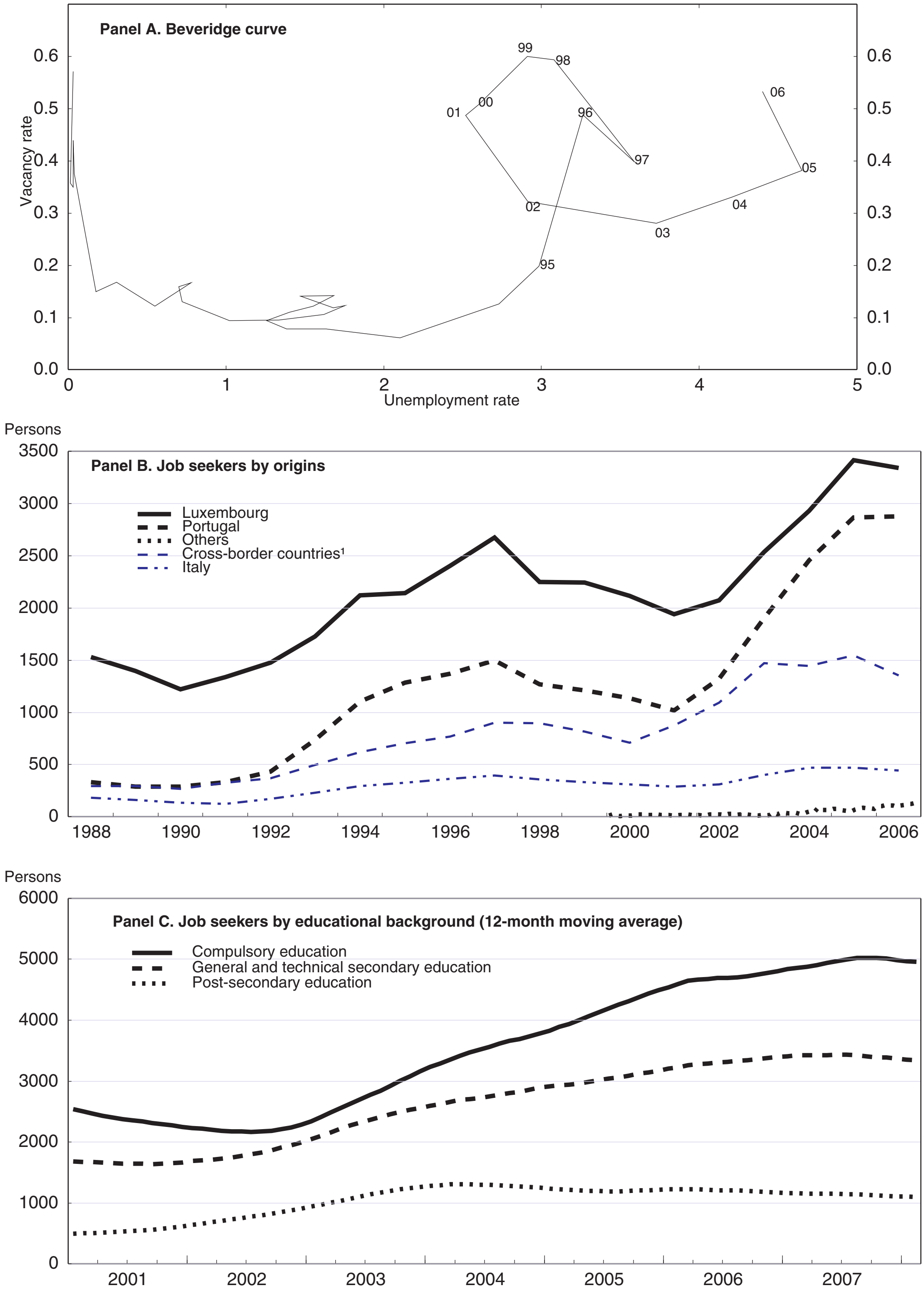
Figure 1.8. **Unemployment in Luxembourg**



1. Belgium, France and Germany.

Source: OECD, *Main Economic Indicators*, 2006; *Analytical Database*.

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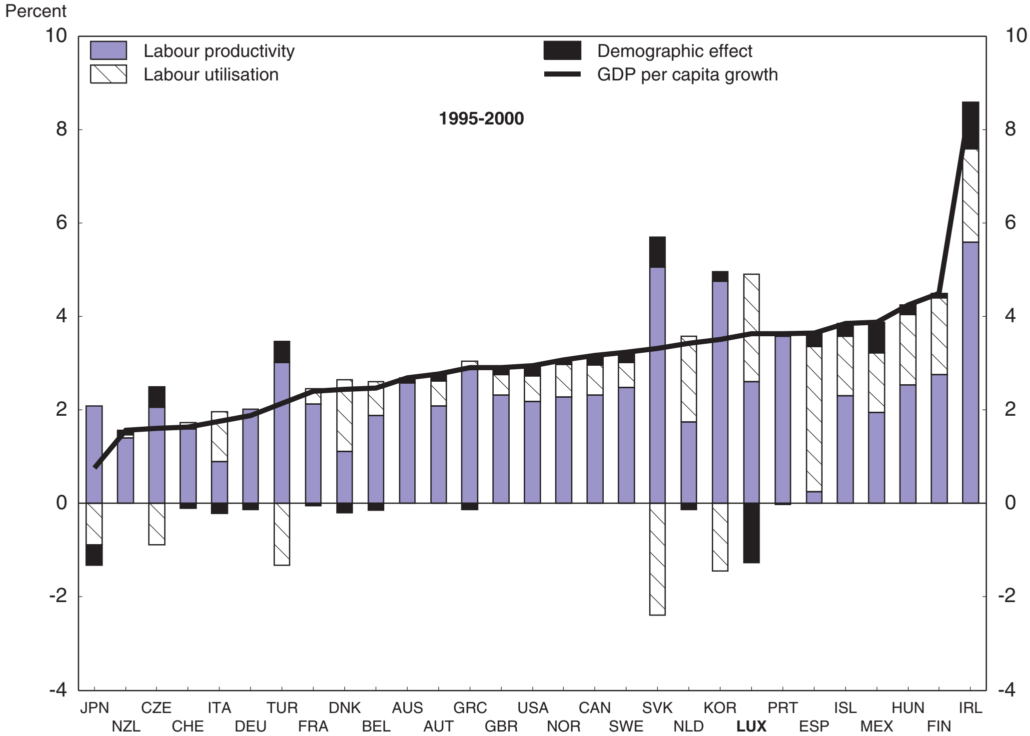
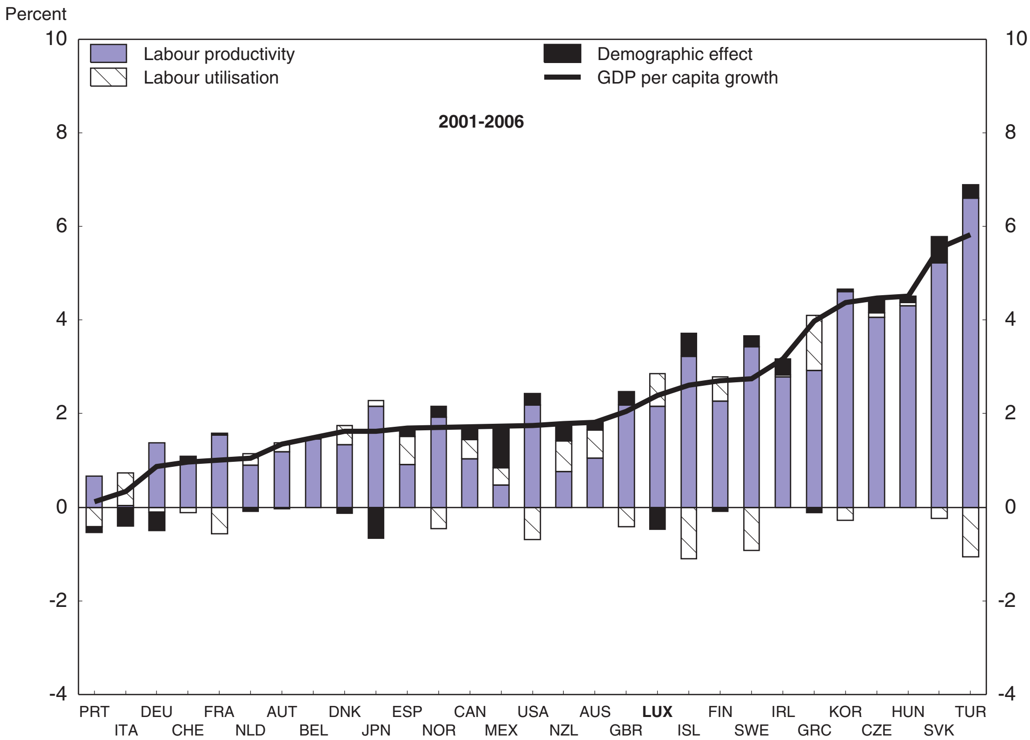
Figure 1.9. **Accounting of GDP per capita growth**[1]





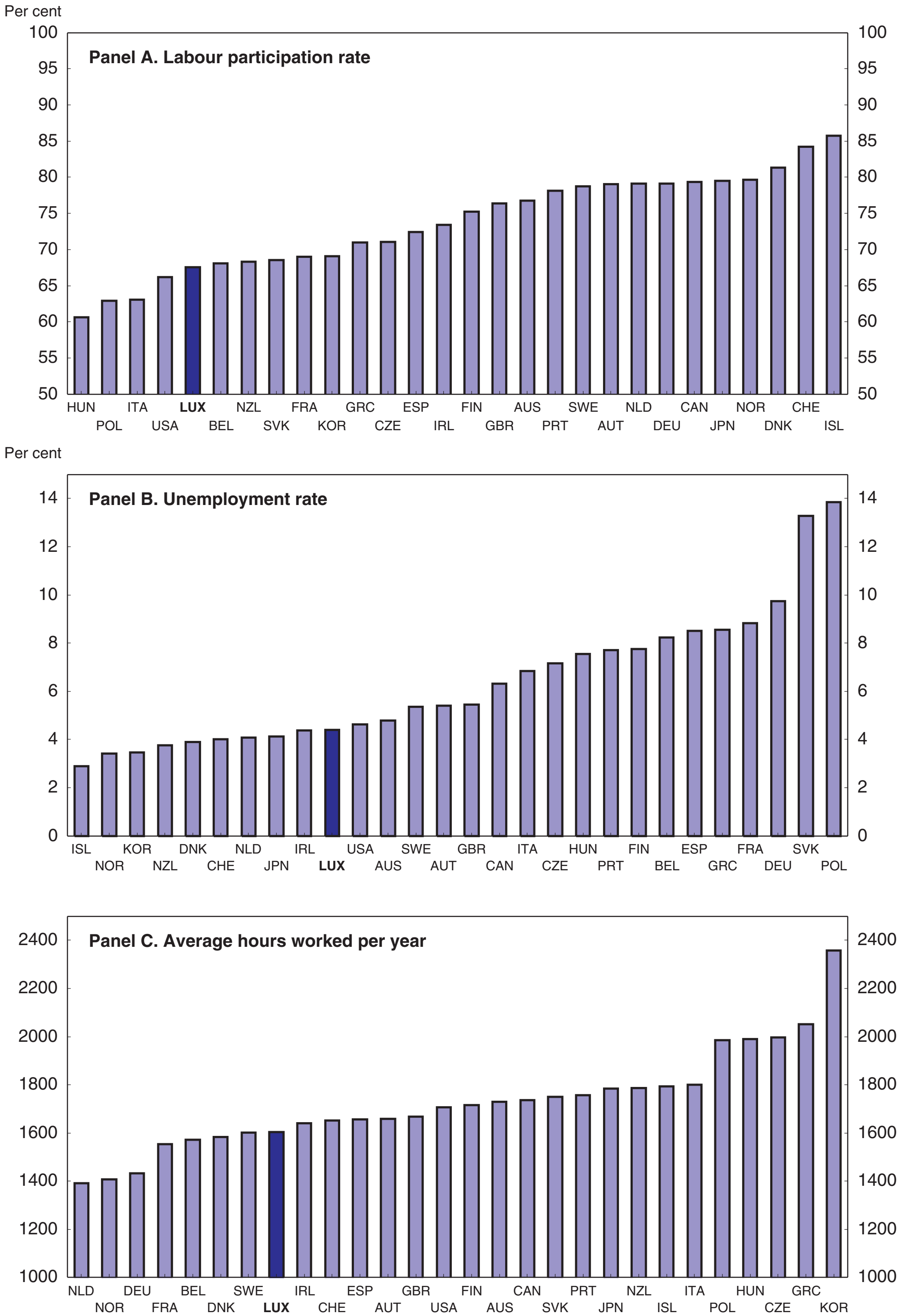
1. The figures show the decomposition of GDP per capita growth over the periods 1995-2000 and 2001-2006 into contributions from labour productivity per hour worked, total hours worked (labour utilisation) and changes in the working age population.

Source: OECD, *Going for Growth,* 2008.

StatLink http://dx.doi.org/10.1787/380321714240

Figure 1.10. **Labour market participation in the OECD countries**

2006



Source: OECD, *Analytical Database*.

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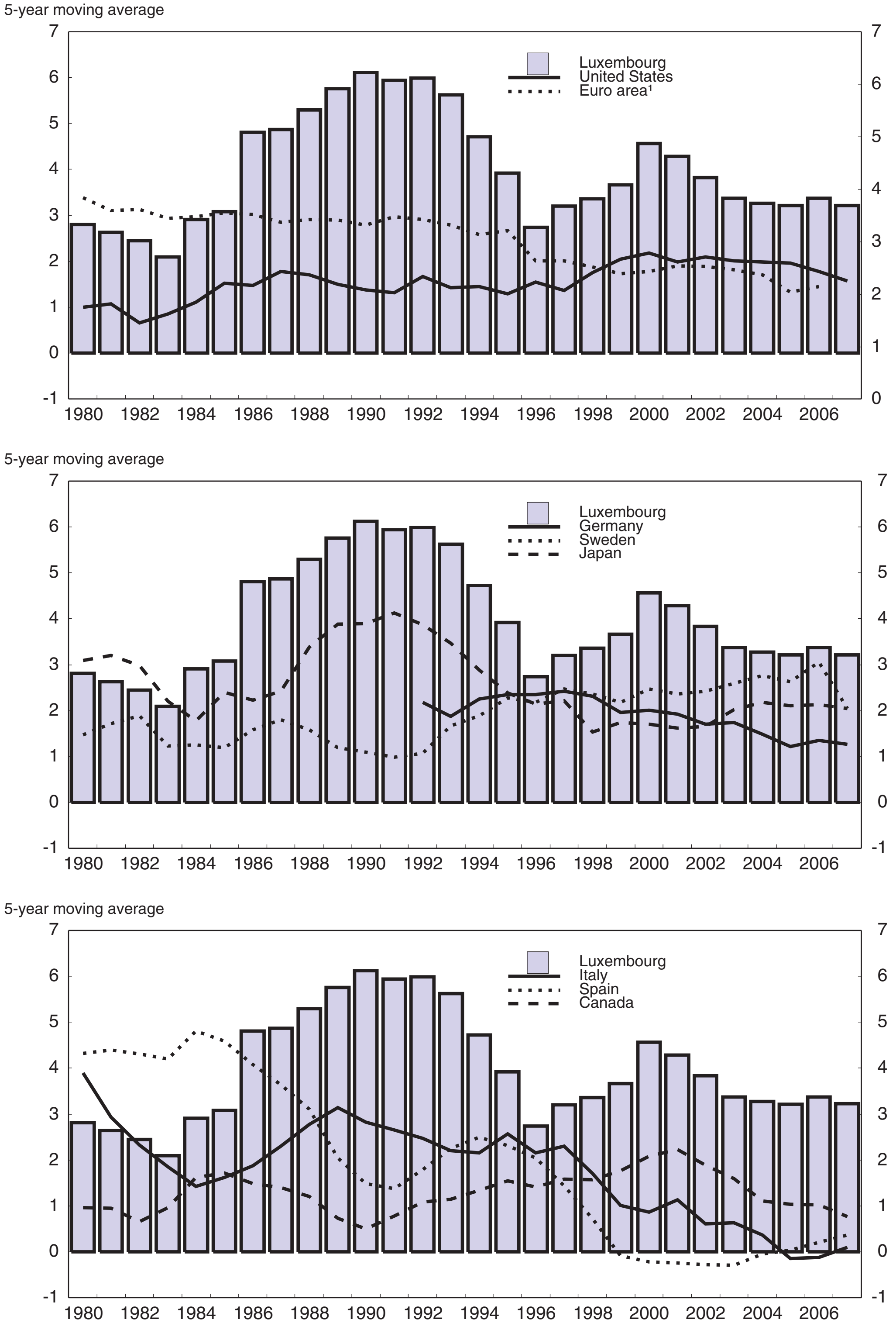
Figure 1.11. **Hourly productivity growth**



1. Excl. Belgium, Austria and Portugal.

Source: OECD, *EU KLEMS Database*.

StatLink http://dx.doi.org/10.1787/380342712158

Box 1.2. **The financial sector and the national accounts**

In the System of National Accounts, the output of banks at current prices is measured directly in the case of explicitly-priced services (such as fees for current accounts or fees for management of investment funds) and indirectly in the case of implicitly-priced services. The value of the latter is captured *via* the so-called financial intermediation services indirectly measured (FISIM). In line with international rules, FISIM is computed separately for loans and for deposits and then entered into the accounts as a service provided to borrowers and as a service provided to depositors, respectively. FISIM on loans is computed as $(r_L - r)Y_L$ where r_L is the interest rate on loans, r is a reference rate (measured as an inter-bank rate) and Y_L is the nominal amount of outstanding loans. Thus, banking services to borrowers are measured as a margin between the interest paid by borrowers and the (risk) free interest that an inter-bank investment would have yielded. Similarly, depositor services are measured as $(r - r_D)Y_D$ where r_D are the interest paid to depositors and Y_D is the value of deposits. Depositors will normally be paid a rate that is inferior to the reference rate and the difference corresponds to the services that a bank renders to depositors. The total value of banking services at current prices is then (approximately) given as $(r_L - r)Y_L + (r - r_D)Y_D + S$, where S stands for the value of explicitly-priced banking services.

To translate this into volumes, the explicitly-riced services S are deflated with a price index that has two components: the "banking services" item of the consumer price index (for "traditional" services provided to clients) and an implicit price index for services provided by investment corporations. The implicit price index for investment corporations reflects stock market prices of all investment corporations, corrected for the general consumer price index. In other words, this component of the deflator is a real price of financial assets. An example of this is when the stock market goes up and fund managers' fees are rising proportionally. The real asset price index would also have risen and applying it to the fees means that the volume service by fund managers remains relatively stable. The same logic, with inverted signs, applies in a period of downturn. So constant price fees would be relatively unaffected by stock market movements.

To obtain a measure of constant-price FISIM, the values of the interest margins $(r^{t-1} - r_D^{t-1})Y_D^{t-1}$ and $(r_L^{t-1} - r^{t-1})Y_L^{t-1}$ of a base year t – 1 are extrapolated by applying a volume index of funds. The volume indexes V_D^t and V_L^t reflect the evolution of the value of the stock of deposits and loans respectively, deflated by the price index of domestic demand, after taking into account the effects of currency variation on stocks.

P^t/P^{t-1} so that $V_D^t = [Y_D^t / Y_D^{t-1}] / [P^t/P^{t-1}]$ and $V_L^t = [Y_L^t / Y_L^{t-1}][P^t / P^{t-1}]$.

So, constant price FISIM for year t is then $[(r_L^{t-1} - r^{t-1})Y_L^t V_L^t + (r^{t-1} - r_D^{t-1})Y_D^t V_D^t]$

$= [(r_L^{t-1} - r^{t-1})Y_L^t + (r^{t-1} - r_D^{t-1})Y_D^t] / [P^t/P^{t-1}]$

The FISIM is allocated to depositors and to borrowers, where the latter typically are corporations so most of $(r_L^{t-1} - r^{t-1})Y_L^{t-1}V_L^t$ is a real intermediate input that does not affect GDP unless it is exported. Depositors are typically households, so GDP volumes would be more affected by $(r^{t-1} - r_D^{t-1})Y_D^{t-1}V_D^t$. It is not obvious how the subprime crises would show up in this measure of production unless the stock of deposits and bonds is affected in which case V^t would grow more slowly than otherwise. Because the interest margins are kept fixed between adjacent years in the volume calculations, a narrowing of interest margins – if ever that was a consequence of the subprime crises – would not show up in year-to-year volume growth rates. It should also not be forgotten that FISIM is measured only on loans and deposits and not on any other assets or liabilities on the balance sheets, let alone any off-balance sheet items.

sectors – such as utilities and the wholesale and retail sectors – have had more disappointing productivity performance. As described in the previous *Survey*, this is related to a prevalence of public ownership in utilities and strict zoning and large-scale shop regulation in the retail sector, preventing it from benefiting from newer and larger outlets, which could particularly exploit the productivity-enhancing effects of introducing new information technology. Since the last *Survey*, there have been few if any new measures in these regulatory areas (Annex 1.A1). Given this background, it would appear that more could be done to improve the growth performance through higher participation of older workers and more growth enhancing regulation of domestically-oriented services. Such measures would also help to diversify the economy, furthering the government's objectives. Another avenue to pursue this objective (and to bolster productivity growth) is the government's programme to stimulate spending on research and development (R&D) with a focus on areas where Luxembourg has some strength already, such as logistics.[7]

As a small open economy with a strong reliance on a single sector, Luxembourg has experienced more volatile GDP growth than most other OECD countries, accentuating the need for diversifying the economy (Figure 1.12). Most of the volatility arises from the financial sector as witnessed by the contraction in the sector in the early 2000s following the international stock market downturn in 2001/02. A factor that is partly offsetting the high volatility in the financial sector is that Luxembourg excels in other international services, such as international air transport of cargo, where CargoLux is the second largest operator in Europe with a market share of about 30% (AEA, 2008).[8]

In assessing the role of the financial sector, the question arises as to what degree Luxembourgers benefit from strong growth in sector that mostly hires foreigners. Reflecting the latter, there has been an increasing gap between GDP and GNI (Figure 1.13, Panel A). This gap is likely to increase further over time as increasing number of cross-border workers retire, as the cross-border transfer of wage income will be augmented by a similar transfer of pension income. Nevertheless, it is clear that Luxembourgers benefit from the financial sector through its derived employment effects and its important contribution to tax revenues. As a result Luxembourgers enjoy the second highest level of consumption per capita in the OECD area (Figure 1.13, Panel B). A more general discussion of the financial sector and its importance for the economy is provided in the next chapter.

The main challenges facing the Luxembourg economy

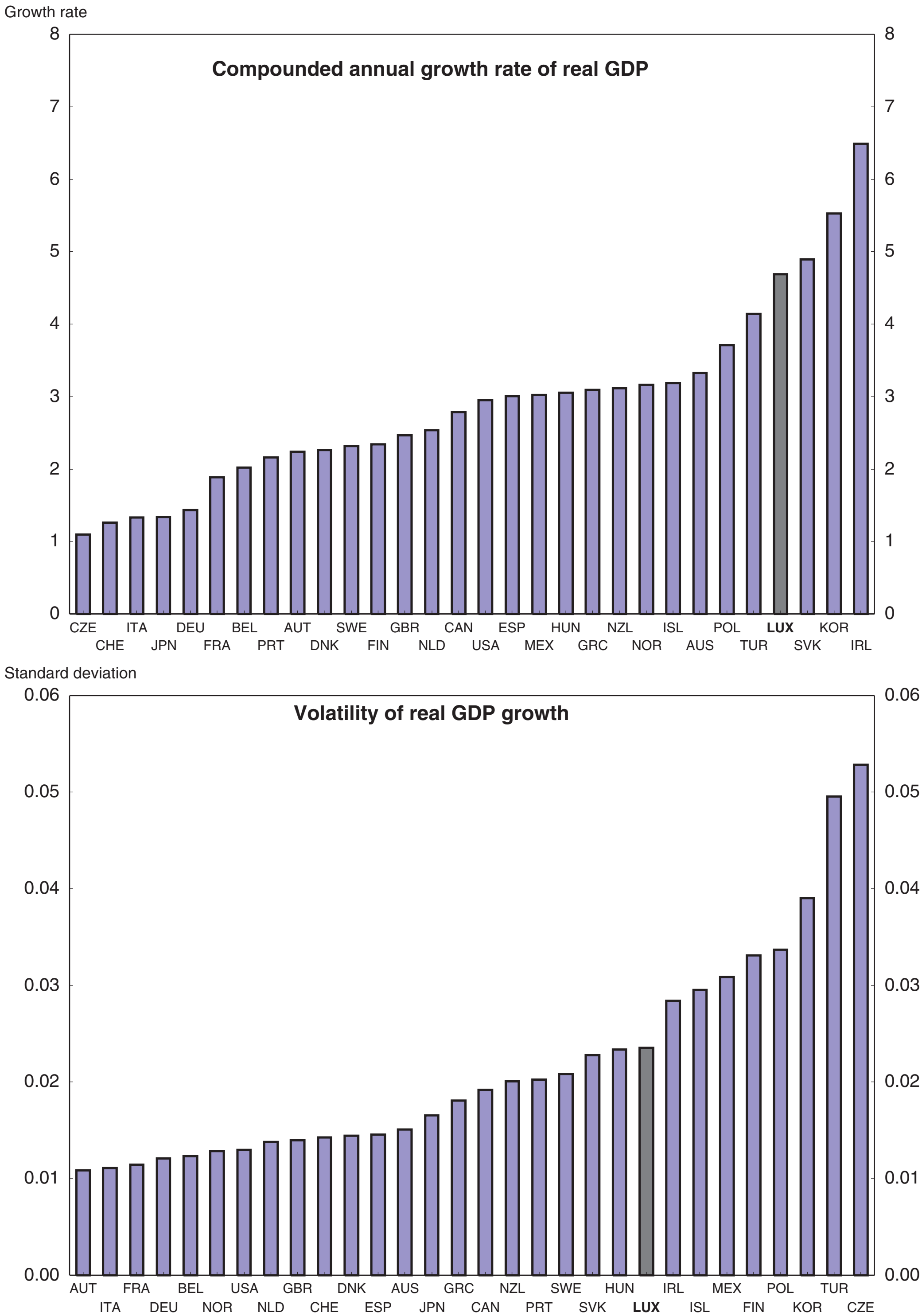
The performance of the Luxembourg economy over the past couple of decades has been exceptional. Living standards are among the highest in the OECD area, unemployment is relatively low, the public sector has hardly any debt and there is a surplus on the general government accounts. Much of this success hinges on the financial sector. In the short-term, the Luxembourg economy will slow down temporarily as a consequence of the financial turmoil. However, in a longer perspective it is highly unlikely that the financial sector will continue to grow at its present pace and a main challenge for the Luxembourg economy is to become less reliant on the financial sector in terms of employment creation and tax revenues.

Maintaining the attractiveness of the financial sector

The financial sector has emerged as the main driver of the economy over the past couple of decades. This development has been driven by a stable economic environment, the comparative advantages of low taxation, sound supervisory policies and an adaptive

Figure 1.12. **GDP growth has been high and volatile**

1990-2007[1]

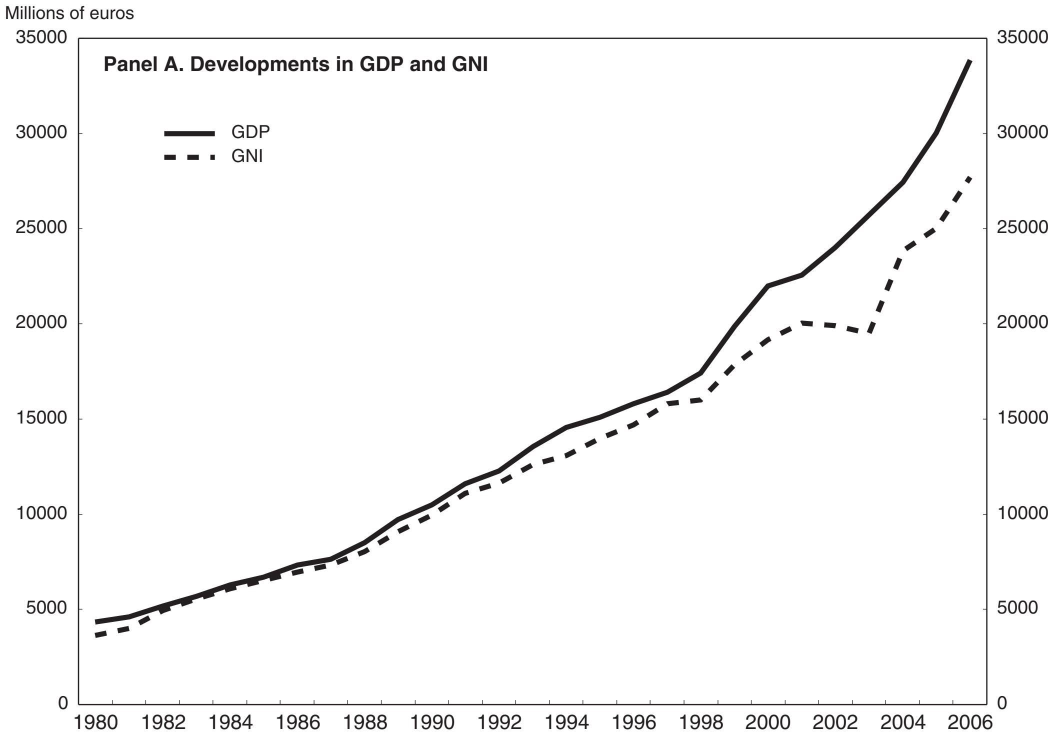


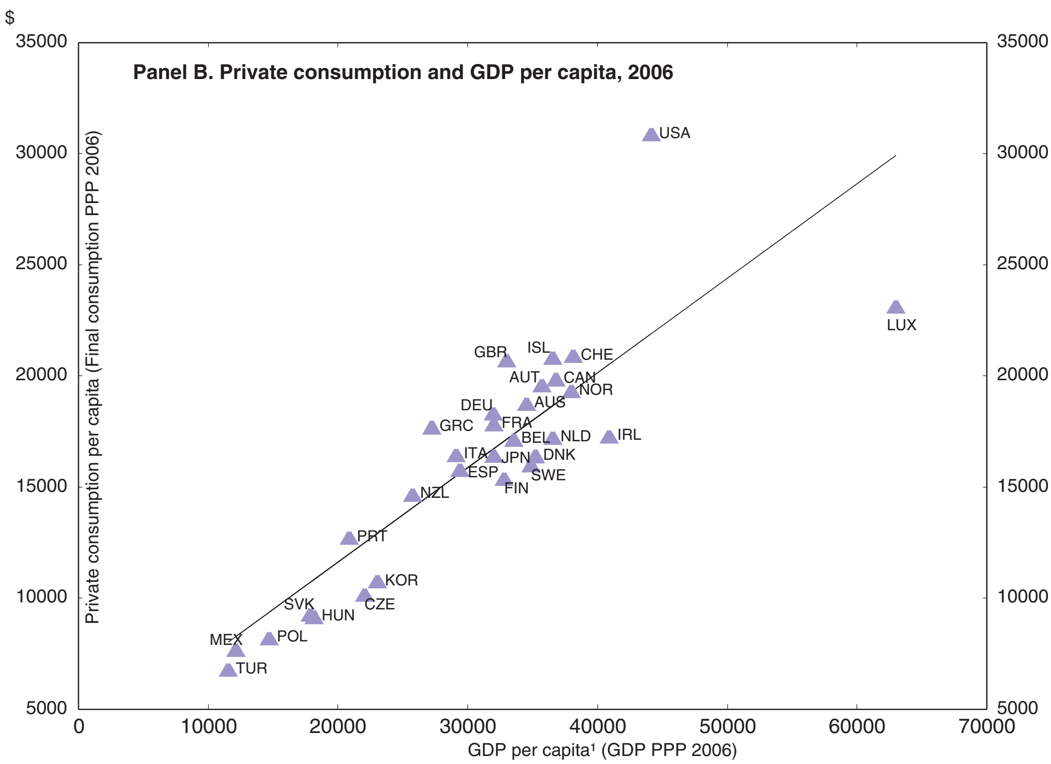
1. Except for Germany and Hungary: 1991, and Slovakia: 1993.

Source: OECD, *Analytical Database.*

StatLink http://dx.doi.org/10.1787/380345720220

Figure 1.13. **Are the Luxembourgers benefiting from the upswing?**





1. Including cross-border workers for Luxembourg, Mainland for Norway.

Source: OECD, *National Accounts* and *Analytical Database*.

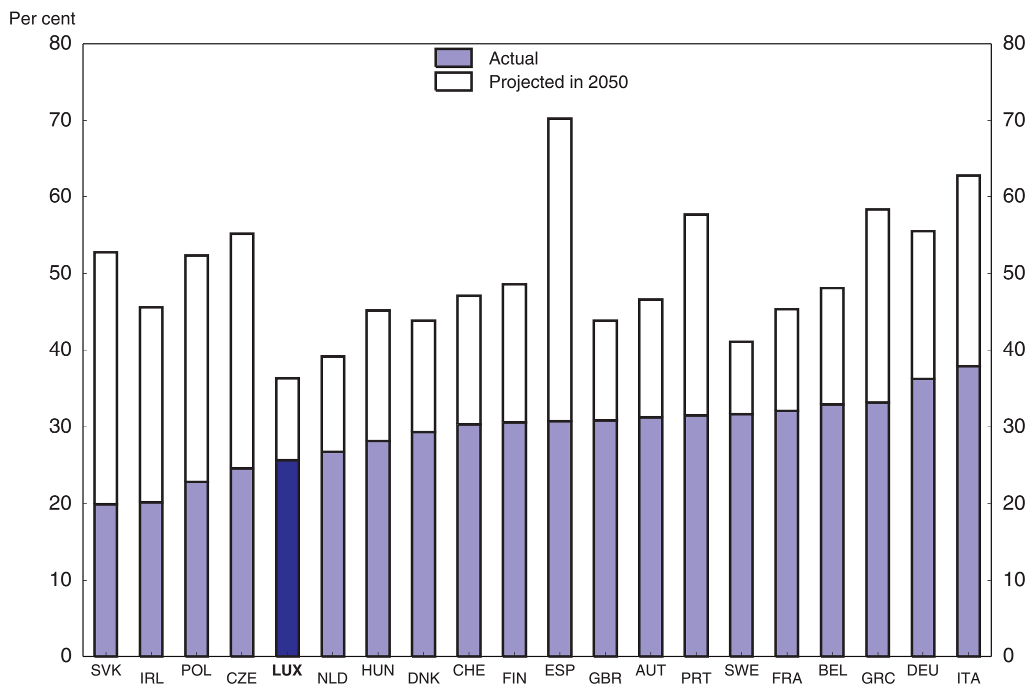
StatLink http://dx.doi.org/10.1787/380353535725

regulatory framework, which have led to the location of financial activities in Luxembourg. However, the expansion of the sector is likely to decelerate. In the near term, activity in the sector will slow temporarily as the turmoil on the international financial markets takes its toll. In the medium term, employment in the sector is likely to come under pressure by the outsourcing of the sector's important middle and back office activities. Until now, there has been a modest move into higher value added front office activities, as the sector has experienced problems in attracting highly specialised talent. Over the longer term, international competition will continue to exert pressures that may eventually erode Luxembourg's position, including in the areas of taxation and regulatory "first-mover" advantages. The main challenges associated with preserving the strong position of the financial sector are related to: the ability to attract highly skilled foreigners; and the fostering of financial soundness by the continuous adaptation of the regulatory framework to maintain the reputational attractiveness of the sector and to pursue greater transparency. These important challenges are discussed in Chapter 3.

The ageing of the population will lead to an increase in the old-age dependency ratio. This increase is relatively modest compared with other European countries, but nevertheless ageing-related spending is set to increase faster than in other countries because of generous parameters in both the pension and the health care systems and as an increasing number of cross-border workers become eligible to receive full benefits from both systems (Figure 1.14).[9] Projecting demographic trends until 2050 and associated cost

Figure 1.14. **Old-age dependency ratios**

% of people older than 65 years to working-age population, 2006



Source: Eurostat.

StatLink http://dx.doi.org/10.1787/380356014154

and revenue developments is difficult and a large amount of uncertainty surrounds these projections. An example of this is the range of health spending estimates presented in this *Survey*. However, common to these estimates is that they only take into account demographic developments, a methodology that thereby exclude the growing number of cross-border workers with life-long careers in Luxembourg that make them eligible for health care coverage in Luxembourg during their retirement years. As a consequence, the projections of total ageing-related costs presented in Chapter 3 are likely to be significantly underestimated. Even without taking these issues into account, the projections presented indicate that with unchanged policies the sustainability gap is at least 4½ per cent of GDP. Closing such a gap requires a strategy covering several policy areas, such as prefunding, broadening of the contribution base, controlling the increases in ageing-related costs, and early action to avoid snowball' effects in the public debt. These challenges of securing fiscal sustainability are discussed in Chapter 3. However, another element in controlling ageing-related costs and securing budget surpluses for the prefunding strategy is to enhance public sector efficiency, which in some areas is rather low by international standards. The challenge of using human resource management to bolster public sector efficiency is also discussed in Chapter 3. More specific efficiency issues in the health care and the education sectors are discussed in Chapters 4 and 5, respectively.

Providing health care in an efficient manner

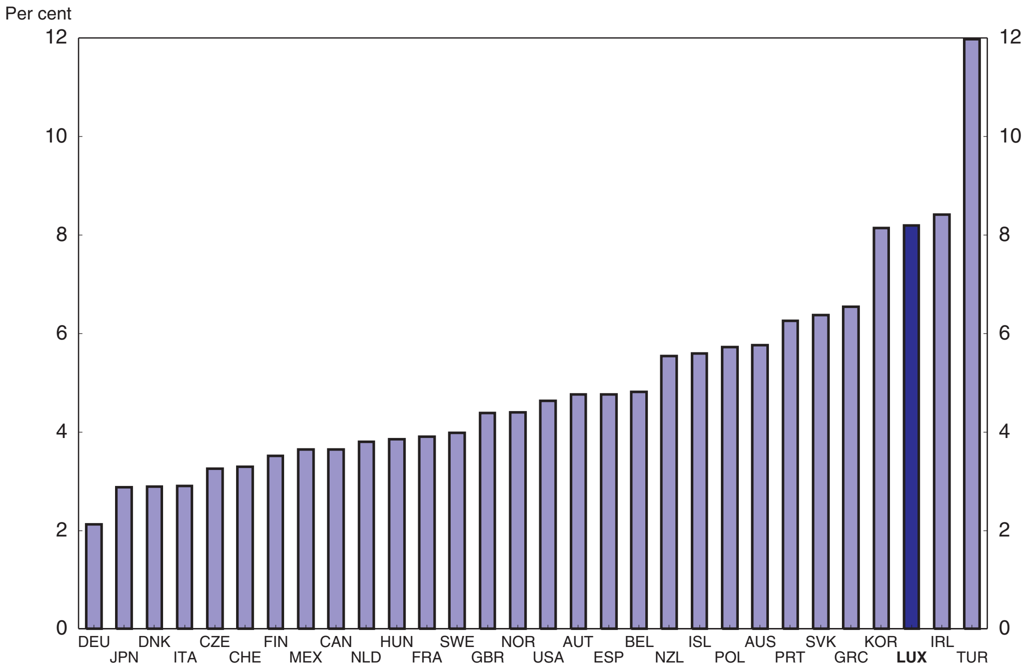
The health care system in Luxembourg is characterised by universal coverage and nearly free access to a modern health care sector with short waiting times, reflecting substantial reorganisation and investments over recent years. On the flip side, costs per insured person have increased faster than in other OECD countries over the past decade (Figure 1.15). Despite this commitment of resources, the health status of the population has not improved more than in other countries and remains on a par with the OECD average, indicating a lack of efficiency in the sector. Financing these cost increases without hikes in social security contribution rates so far has been possible because the large and increasing numbers of prime-age cross-border workers contribute more to the system than they demand. However, as the covered population ages the ratio of those benefiting to those contributing will, in the absence of corrective measures, almost double by 2050, implying that by then Luxembourg will have one of the most expensive health care systems in the OECD. This reinforces the need for seeking efficiency gains and better value for money. A main factor behind the current high cost per insured person is the strong input orientation of the system. The main role of the health insurance funds is limited to reimbursing claims. On the spending side, incentives for cost control are hampered by the fee-for-services remuneration of doctors and poor cost control in hospitals. The challenges of re-orienting the system from being input driven to being focussed on outputs and quality to boost efficiency are discussed in Chapter 4.

Enhancing efficiency in education

Schools in Luxembourg face the challenges of a heterogeneous student population with very diverse nationalities. The schools are allocated ample resources compared with other countries both in terms of GDP and per student. But students in secondary education score below average in terms of the PISA international tests across a wide range of subjects (Figure 1.16), although they score in the top group of countries participating in the Reading 2006 PIRLS study in primary education. The education system is still to a large

Figure 1.15. **Average annual growth of real total health care spending**

1995-2005[1]



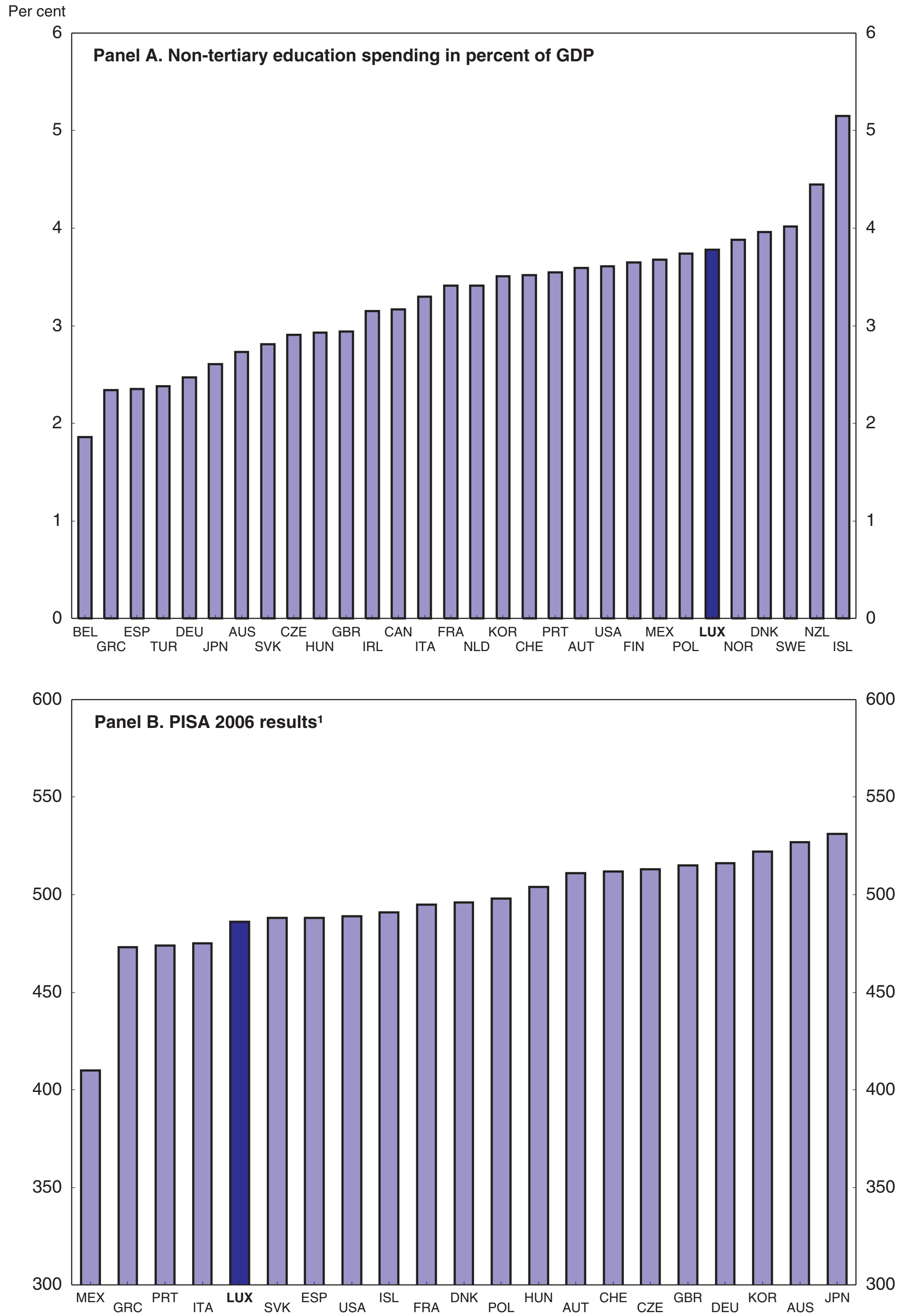
1. 2005, except for Australia, Hungary, Japan and Netherlands: 2004.

Source: OECD, *Health data*, 2007.

StatLink http://dx.doi.org/10.1787/380381146468

extent geared towards providing students with technical skills and vocational training for employment in the manufacturing sector, leading to a situation where cross-border workers benefit from the strong expansion of employment in the financial sector. There is a strong emphasis on teaching German and French which provides clear competences in language fluency, but this appears to be at the expense of competences in other subjects, which may be in higher demand by the labour market. Education spending is boosted by small class sizes and high teacher wages. Some of these factors, such as high wages to attract talent to the teaching profession and small classes, could be seen as measures to stimulate quality teaching. Thus, the low efficiency should be found in other areas, such as the lack of managerial independence of the school leadership to make the best use of available resources, leading to problems of accountability and transparency in the provision of teaching. The challenges of improving efficiency in the education sector with given resources are discussed in Chapter 5.

Figure 1.16. **The Luxembourg education system**



1. Average of mean performance in Reading, Mathematics and Science.

Source: OECD, *Education at a Glance*, 2007.

StatLink http://dx.doi.org/10.1787/380466820836

Notes

1. The subprime crisis in the United States in itself will only have an indirect effect on Luxembourg where banks have a very limited exposure to investment instruments linked to subprime loans. Only 7 investment funds, representing 0.13% of aggregate assets, have had to suspend issuance and redemption activity as the result of the subprime crisis. However, contagion in the financial markets has induced Luxembourg banks to sharply increase their net provisions at the end of 2007.
2. In addition, tax revenues from the financial sector are relatively volatile, implying that the volatility of the general government balance is significantly higher than in neighbouring countries.
3. This includes financial services, but also to other type of services, such as international air cargo services. Moreover, in the national accounts, the purchases of non-residents are registered as tourist exports, implying that cross-workers' purchases of goods and services in Luxembourg are registered as exports. Common for these kinds of services is that the export of them depends on price to some degree, but other non-price characteristics are more important, such as convenience, timeliness and opportunity.
4. Part of the reason for this development is that some of the sector's employment growth is related to new and more specialised activities, such as risk-management (Wampach, 2004). Other factors behind a greater need for specialists include the adoption of new accounting rules and the Basel II agreement.
5. Another 20% of upper secondary graduates may enter tertiary education. Only about 10% of all secondary graduates have an orientation towards business services.
6. The financial sector is increasingly trying to attract students into the sector, through for example enhanced cooperation with the Ministry of Education (ALFI, 2007).
7. A concrete example of the investments in logistics is the government investment in two major logistics parks: the Eurohub Centre for air-freight and the Eurohub South for rail freight.
8. The emergence of Luxembourg as a major air-cargo hub is partly related to its central position in Europe, but also to the fact that all-freight airlines do not have to compete with passenger traffic for slots in contrast with larger European airports, where passenger planes receive priority treatment. Moreover, the regulatory framework has been adopted so freighter planes can be customs-cleared and unloaded faster than in other European freighter hubs.
9. In line with the general principle of equal treatment of European workers, a pensioner who receives a pension or pensions under the legislation of two or more member States, of which one is the member State of residence, and who is entitled to benefits in kind under the legislation of that member State, receives, with the members of his family, such benefits in kind from and at the expense of the institution of the place of residence, as though he were a pensioner whose pension was payable solely under the legislation of that member State. So practically, cross-border workers, as well as "former" migrant workers, receiving partial pensions from institutions of their country of residence are affiliated to the insurance system of their home country and health care costs are at the expense of the residency country of residency. On the other hand, a person who receives solely a pension under the Luxembourg legislation and who is not entitled to benefits in kind under the legislation of the member State of residence receives nevertheless such benefits for himself and the members of his family, insofar he would be entitled thereto under the legislation of the member State competent in respect of his pensions, if he resides in that member State. The benefits in kind are provided at the expense of the competent institution of that member State. So for non-resident pension beneficiaries with no supplementary revenue in the country of residency, health care expenditure is paid for by the Luxembourg social security.

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ANNEX 1.A1

Progress in structural reform

This annex reviews actions taken to follow structural policy recommendations made in the 2006 *OECD Economic Survey of Luxembourg*. Recommendations made in this Survey are shown in the boxes at the end of each chapter.

Past recommendations	Actions taken and current assessment
A. Fiscal policy	
Restore fiscal policy discipline	
Bring the budget close to balance by 2009.	The budget has been in surplus since 2006, at almost 3% of GDP in 2007.
Take measure to rein in expenditure.	Strict limits implemented and enforced to control current operating and investment expenditures. Stricter rules applied to price-revision clauses in public contracts. Adjustments to automatic usage indexation scheme limit "automatic" expenditure increases.
Improve budget management practices.	Improved budgetary oversight for large-scale infrastructure projects. Enhanced transparency through publication of a "Volume III" of draft budget presenting public finances in accordance with national account standards (ESA95).
Modernise the human resource management of government employees.	No action taken.
Pre-fund future pension promises	
Adopt a long-term horizon for actuarial assessment.	No action taken.
Build up the pension reserve.	No action taken.
Raise the rate of return on financial assets.	No action taken.
Establish conditions propitious to later retirement.	No action taken.
B. Labour market	
Strengthen work incentives	
De-link social assistance (RMG) and complementary benefits from minimum wage increases.	The duration of unemployment benefit has been limited to the length of previous employment (proportionality principle).
Tighten access conditions to unemployment benefits for younger unemployed and limit the use of education cheques.	Activation measures have been reinforced, making it compulsory for job-seekers to sign an activation agreement setting out the rights and responsibilities of both ADEM (public employment services) and the unemployed, and provide proof of their efforts to find work.
Phase down unemployment benefit replacement rates after a 3-months unemployment spell.	The education cheque is now confined to those in need. Activation measures have been reinforced for school drop-outs.
Reform employment protection legislation	
Make legislation more neutral between regular and temporary contracts by allowing a longer total duration of fixed-term contracts and more renewals.	No action taken.

Past recommendations	Actions taken and current assessment
Lift thresholds for collective dismissals and reduce additional notice periods.	The legislation has been reinforced to oblige enterprises to find external or internal solutions (reclassification, labour leasing) before dismissing staff.
Improve activation measures	
Introduce ratings to measure the performance of local public employment services.	Activation measures have been reinforced, for instance with the introduction of a compulsory personalised support service for jobseekers (SAPDE), and the obligation to provide proof of efforts to find work.
Reduce the bureaucratic burden of the public employment services (ADEM) and improve activation by setting strategic objectives.	There has been an increase in the number of short-term activation measures.
Strengthen the penalty system for unemployment benefits in case suitable job offers are refused.	The implementation and outcomes of the new employment measures will be monitored by a research institute.
Close exit routes from the labour market	
Phase out pre-pension systems, reduce the ease with which imputed years of contributions can be obtained, reduce net replacement rates for old-age pensions, index the official retirement age to life expectancy and make early retirement pensions actuarially neutral.	The employers' share of the costs has been raised to discourage use of the "préretraite d'ajustement" pre-retirement scheme. No change in the "préretraite solidarité" scheme, which is still an employment policy instrument.
Strengthen labour demand for older workers by reducing seniority premia and investing in life-long learning.	The new legislation on individual access to continuing training, which came into force on 1 January 2008, may have a beneficial impact on the employment rate of older workers.
C. Secondary education	
Overcoming challenges arising from trilingual education	
Encourage more participation in early pre-school education by immigrants.	Two years of pre-school education is compulsory for every child. Early pre-school education (from the age of 3) is not. To raise awareness among immigrants about problems relating to education, a weekly educational programme is now broadcast on Portuguese radio in Luxembourg. Attention has frequently been drawn to the importance of early pre-school education.
Encourage more children of Portuguese and Cape Verdian origin to participate in pre-school courses to help them master their mother tongue.	In pre-school classes with a large proportion of children of Portuguese/ Cape Verdian origin, Portuguese-speaking teachers act as mother-tongue assistants. The Ministry has recommended that municipalities use these assistants wherever possible.
Make more primary-school-course material available in French or in bilingual form (German-French).	The mathematics and science textbooks have been translated into French, as have most of the activity files for the introduction-to-science course.
Increase the participation of immigrant children in supplementary German language courses at the primary-school level.	Supplementary German courses are provided, as are introductory ("welcome") classes for new arrivals.
Make intensive German- or French-language classes available to immigrant students who began their education in a French- or German-speaking country, respectively.	These are available at primary and secondary level.
Increase the proportion of courses in the vocational track of secondary education that are taught in French, especially in the less advanced vocational track (*Régime professionel*).	The number of courses taught in French in the less advanced vocational track is on the rise, as is the number of vocational courses.
Make classes in which German is taught as a foreign language or which provide extra help for students having difficulty with German more widely available in secondary schools.	Classes in which German is taught as a foreign language operate on a regional basis. Where necessary, additional classes will be provided. Extra help for students having difficulty with German is available in all secondary schools.
Implement reforms that aim at offering the International Baccalaureate in French in a public secondary school and creating a German-oriented public secondary school in co-operation with the neighbouring Saar region in which there would be less emphasis on French-language competence.	One public secondary school provides classes leading to the International Baccalaureate in French and another in English. The German-Luxembourgish secondary school in Perl ("Schengen – Lyzeum") opened at the start of the 2007/08 school year.
Reforming education practices to enhance achievement	
Oblige already established secondary schools to offer all three education tracks (academic, advanced and less advanced vocational) in lower secondary school, as is already the case for all new schools since the mid-1990s.	No action taken.

Past recommendations	Actions taken and current assessment
Implement reforms to increase permeability between education tracks.	The PROCI pilot project to increase permeability between education tracks will be extended to all less advanced vocational schools at the start of the 2008/09 school year.
The authorities should reflect on whether they should direct a higher proportion of students into general education.	The Ministry proposed an amendment to the procedure for guiding primary students into secondary education. After protracted discussions, the educational partners failed to reach an agreement.
Implement the reform to reorganise primary education into three two-year modules with defined competences to be achieved at the end of each module.	The relevant draft legislation is in the pipeline.
Expand school hours so as to integrate after-school support arrangements into the regular programme, as is done in the Neie Lycée and extend such arrangements to primary school.	Under the supervision of the Ministry of Education and the Ministry of the Family, these arrangements are being introduced in a growing number of municipalities.
Enhance second-chance arrangements for unqualified school leavers.	The Act of 16 March 2007 on vocational training courses at the CNFPC (*Centre national de formation professionnelle continue)* makes provision for such arrangements.
Prevent poorly performing students from leaving school prematurely by adapting financial incentives resulting from the labour-market-insertion measure (stage d'insertion) and the unemployment benefit system.	The Act of 22 December 2006 introduces individual activation agreements and barriers against potential abuse.
Enhance second-chance arrangements for uncertified teachers, provide more training for teachers to overcome cultural differences between them and immigrant children, and recruit more students from immigrant backgrounds into the profession.	Relevant draft legislation is in the pipeline.
Complete the reform to base school programmes on key competences.	This reform is currently being implemented.
D. Product market	
Strengthen enforcement capabilities of the competition authorities	
Widen the scope of activities to boost enforcement possibilities of the Competition Council and the Inspectorate.	A bill establishing a single competition authority came before Parliament on 10 December 2007. Extending the scope of the competition authority, it introduces, for instance, the power to conduct sectoral enquiries and to act in an advisory capacity, and it aligns the leniency procedure on the European Competition Network (ECN) model leniency programme.
Improve enforcement by the Competition authorities by increasing resources. Consider increasing the deterrent effect of sanctions by including criminal liability and possible incarceration of individuals.	No action taken.
Ease regulation on professional services	
Reduce excessive licensing.	No action taken.
Abolish minimum prices for architects and engineers.	There is no legal or regulatory basis for the prices charged by the national order of architects and engineers (OAI). Responsibility for action in this area lies with the competition authorities.
Liberalise the rules that govern the form of business and inter-professional co-operation.	No action taken.
Enhance competition in broadband internet access	
Reduce barriers to competition in broadband services by lowering access charges to the local loop and by forcing the incumbent telecom company to leave the market for cable internet services.	As part of the *Paquet Télécom*, the market is currently under analysis. Steps have been taken to reduce interconnection charges for markets 11 and 12. The ILR (*www.ilr.lu*) has adopted administrative decisions relating to network access and interconnection, including: Decision 05/80/ILR of 3 February 2005 approving the Reference Unbundling Offer by the EPT (Luxembourg Post and Telecommunications).
Strengthen the role of the Luxembourg regulation institute (ILR) and allow it to set unbundled cost-based tariffs for the use of the electricity networks.	The Act of 1 August 2007 on the organisation of the electricity market strengthens the role of the ILR.
Enhance competition in retail trade by reducing regulatory barriers	
Monitor the land-use policies of municipalities.	No action taken.
Consider further relaxing the rules on shop opening hours.	No action taken.

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Chapter 2

Can the financial sector continue to be the main growth engine?

The financial sector has emerged as the main economic engine over the past two decades. The comparative advantages of placing financial activities in Luxembourg have mostly been in terms of low taxation and an adaptive legislative and regulatory framework. As a result, Luxembourg is today one of the main international centres for investment funds. Besides the sector's direct and indirect employment effects, the most important effect is the large tax revenue generating capacity of the sector, accounting directly for over 20% of aggregate tax revenues. On the other hand, these tax revenues are very volatile as the sector is highly sensitive to developments in international financial markets. Indeed, past downturns in international financial markets have tended to lead to a sharp slowdown of growth in the economy as well as in revenues, pointing to potential large risks associated with the current turmoil in international financial markets. Besides these short-term considerations, a lower trend growth rate of the sector is likely over the medium term. The main activities of the sector are in middle and back offices financial administration, which with new IT technologies, will tend to be increasingly outsourced. At the same time, the sector is having problems in attracting highly specialised talent to enter higher value front office activities. Over the longer term, international competition will continue to exert pressures that may eventually erode Luxembourg's position. The extent of the decline in the sector's trend growth depends on the ability to maintain and expand the attractiveness of investing and working in Luxembourg. Achieving this will depend on being able to adjust tax, infrastructure, and housing policies to attract foreign talent while updating and increasing the transparency of financial sector regulation.

The financial sector in Luxembourg – dependence and challenges

Few if any other OECD countries are as dependent on a single sector as Luxembourg is on the financial sector. The sector has emerged as the main economic engine, pulling not only employment in the sector itself, but also in supporting business services. Over the past decade, the dynamic tax revenues originating in the sector have contributed to finance the expansion of the public sector although its size has declined in relation to GDP, and a sound short-term fiscal position has been achieved. This chapter addresses the question of whether the economy can continue to rely on the financial sector as its main driver. The chapter commences with assessing the scope and scale of this dependence. Then, the sensitivity of the sector to developments in international financial markets is evaluated. Thereafter, the development of the sector and its activities are treated in some details to allow for the subsequent assessment of the emerging challenges to the sector. Subsequently, various strategies for the sector to maintain its dynamism are discussed, with the chapter then concluding with a set of policy recommendations.

Luxembourg began in earnest to develop as a banking and financial centre in the early 1980s – a time of financial-market liberalisation and integration – culminating in its current top-ranking position, primarily in the realm of asset management (Box 2.1). As a result, in the investment-fund sector, Luxembourg is the world's number-two financial centre, second only to New York, for assets under management by investment funds. The

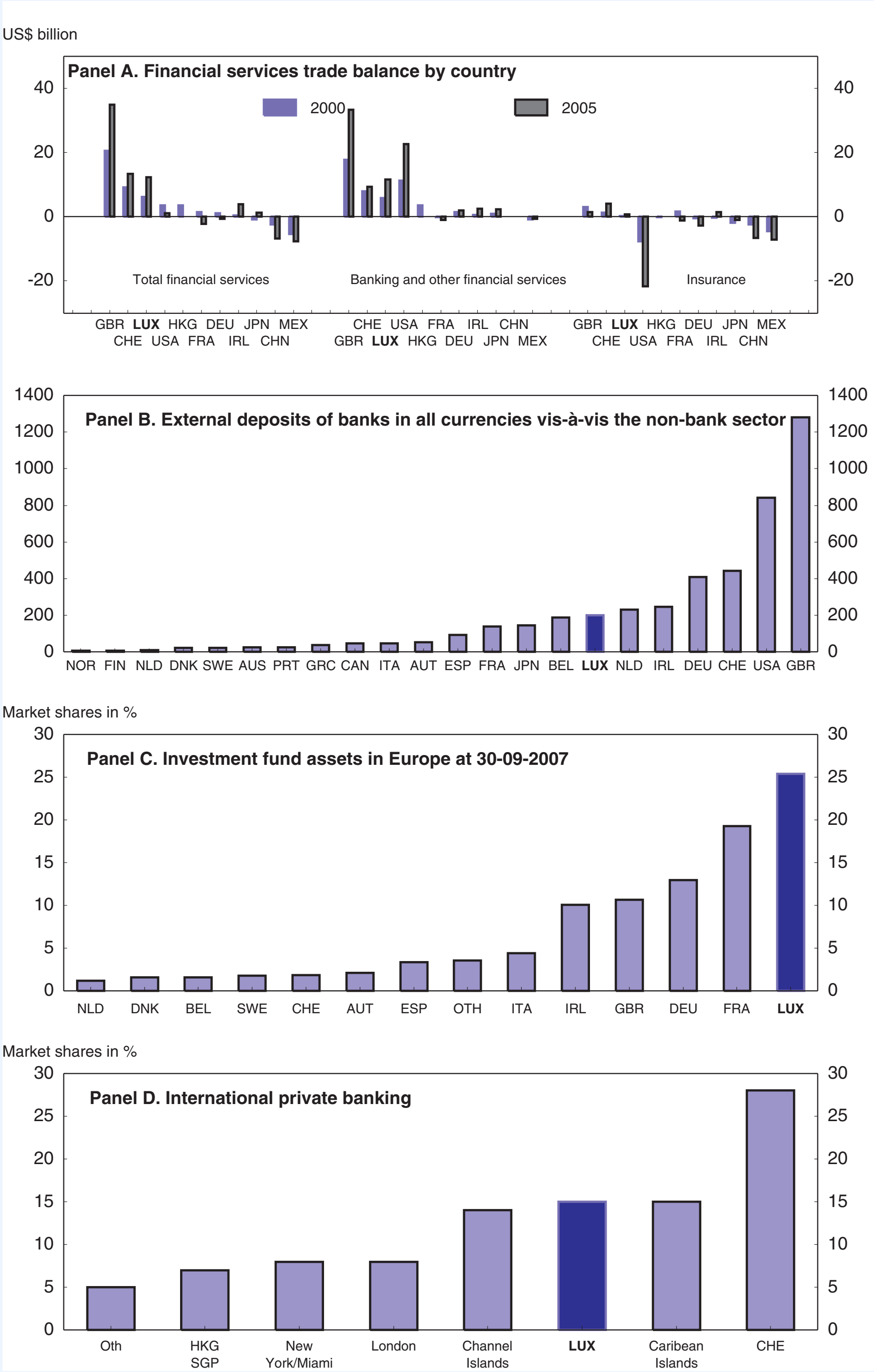
Box 2.1. **The Luxembourg banking and finance centre: selected international comparisons**

For lack of a composite indicator, comparisons between international financial centres are generally based on their respective market capitalisations. Using this criterion, Luxembourg does not emerge as a major centre. The capitalisation of the Luxembourg stock market is only 2% as great as that of Euronext or London. On the other hand, Luxembourg is a major centre in its main activity: administration and management of savings from the international market.

- Luxembourg is, together with the United Kingdom and Switzerland, a major net exporter of financial services (banking and insurance) (Figure 2.1, Panel A).
- Luxembourg ranks ninth in terms of external deposits from the non-bank sector. (Figure 2.1, Panel B)
- Luxembourg is Europe's leading financial centre in terms of assets under management by investment funds (25% of the European market and 29% of the market for UCITS – Undertakings for Collective Investments in Transferable Securities) and number two in the world. (Figure 2.1, Panel C).
- Leading consultancies put Luxembourg third in terms of market share of international private-banking business (Figure 2.1, Panel D).

Box 2.1. The Luxembourg banking and finance centre: selected international comparisons (cont.)

Figure 2.1. The financial sector in an international perspective



Source: International Financial Services London (IFSL), from IMF data; BRI; European Fund and Asset Management association (EFAMA); Boston Consulting Group.

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specialisation of the sector is in private banking, but financial-engineering activities (holding companies, domiciliation, reinsurance, securitisation, etc.) are becoming important. In addition to 157 banks, there are some 30 000 companies known as "special purpose entities" registered in Luxembourg (Schuller, 2005).

The Luxembourg economy is highly dependent on the financial sector

Delineating the boundaries of the financial sector is not a simple matter. In addition to banks and insurance companies, there are undertakings for collective investment (UCI) and "professionals of the financial sector" (PFS) – a high-growth category made up of investment companies (wealth managers, dealers, custodians, distributors of shares in UCI, etc.) and other businesses that are related or complementary to the financial sector (brokers, financial advisers, company domiciliation agents, etc.). In addition, a financial cluster is surrounded by a multitude of suppliers of highly diverse services, some of which are directly related to financial services (suppliers of computer services, auditing and consulting firms, investment-fund management companies, compensation and settlement bodies, fiduciaries, corporate lawyers and notaries).

Econometric estimates of the impact of the financial sector on the economy suggest that a 1% drop in financial-sector real value added would have a negative impact on the Luxembourg economy as a whole, with a first-year effect of a decline by 0.6% and in each of the following two years a decline of 0.3% (STATEC, 2008).[1] In addition, the financial sector has a large impact on tax revenues. There are four main tax contributions from financial activities. The profit taxes paid by banks, insurance undertakings and other financial institutions are supplemented by revenue from the "subscription tax" on corporate securities. The subscription tax is an annual levy, essentially on mutual funds. Its standard rate is 0.05% of net assets, while some types of funds are eligible for a reduced rate of 0.01% of net assets or may even be tax-exempt. For 2006, the financial sector's "direct" contribution to aggregate tax revenue (including local taxes) was 22.5% (Table 2.1).

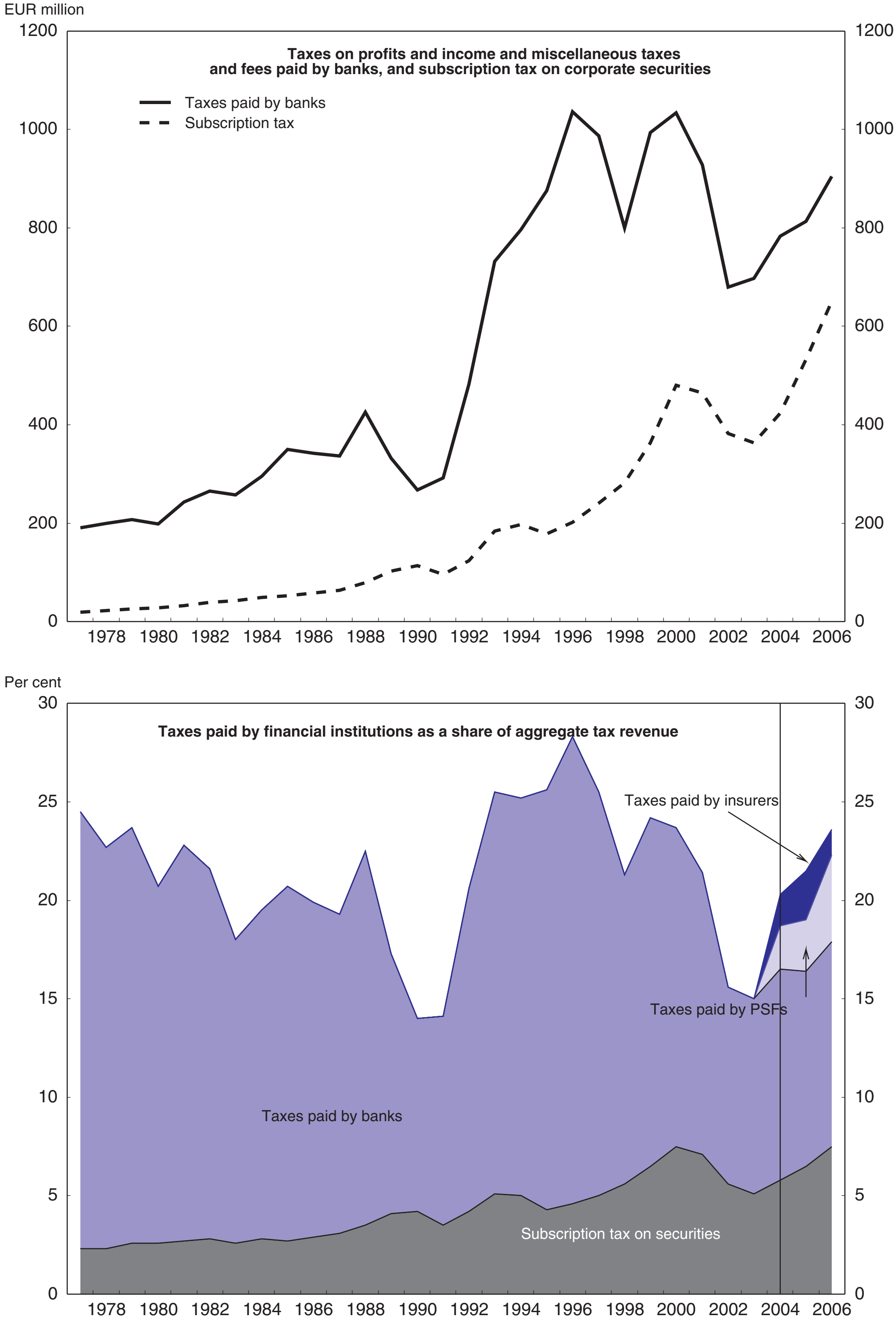
Table 2.1. **Tax revenues from the financial sector (2006)**

	Amount (EUR million)	As a % of aggregate general government tax revenue (%)
Profit tax and miscellaneous taxes paid by banks	904	10.4
Profit tax paid by insurance and reinsurance undertakings	115.2	1.3
Profit tax paid by PFS and management companies	288	4.4
Subscription tax on corporate securities	651.1	7.5
Total		22.5

Source: CSSF, CAA and STATEC.

The two main tax revenues (taxes paid by banks and subscription taxes) have grown strongly (especially in the 1990s) and have been relatively volatile (Figure 2.2, Panel A). With respect to the latter, three cyclical economic shocks stand out rather clearly, reflecting vulnerability to turbulence in international financial markets. In 1989-90 and in 1998, banks boosted their provisions sharply in the light of mounting risks in securities markets (developments in the Soviet Union in 1990; the Asian and Latin American crises in 1998).[2] Together with other factors, such as a nearly 2 percentage points reduction in the corporate income tax rate, the taxes paid by banks declined by 19% in 1998. The stock market crash of 2001-02 (Box 2.2) affected tax revenue from both bank profits and subscription tax. Bank

Figure 2.2. **Developments in tax revenues from the financial sector**



Source: STATEC, BCL, and CSSF.

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Box 2.2. **Effects of the 2001-02 stock market crisis**

The sharp drop in stock market indices attributable to the "bursting of the Internet bubble", as well as to a number of financial scandals (Enron, Tyco, Arthur Andersen, etc.), stretched from late 2000 until early 2003 (primarily in 2001 and 2002). Between end third-quarter 2000 and end first-quarter 2003, the declines were: DJ EURO STOXX 50: –57%; DAX: –62%; CAC40: –56%; Swiss Market Index: –46%.

Among the components of bank revenue, net non-interest income, comprised essentially of commissions and transaction fees, is inherently more dependent on variations caused by turbulence in international stock markets. Following the share price declines in 2001-02, the following decreases in net banking income were observed between end-2001 and end-2003: Germany: –30%; Belgium: –19%; France: –9%; Luxembourg: –4%; Switzerland: –20%. The Figure 2.3 illustrates the trends in these countries' net banking income and in the DJ EURO STOXX 50 index. The data must be interpreted with caution insofar as the share of aggregate bank revenue derived from commissions and transaction fees varies significantly from one country to another (*e.g.* 61% in Switzerland and 34% in Germany in 2005).

The net banking income of Luxembourg banks was affected by the plunge in stock prices in 2001 and 2002, but its sensitivity to the decline was no greater than was the case in neighbouring European countries. Between 31 December 2001 and 31 December 2003, the aggregate balance-sheet assets of credit institutions, declined by 9%. As noted previously, 2002 saw a sharp drop in Luxembourg tax revenue.

With regard to employment in the banking and PFS sector, the decline between end-2001 and end-2003 was 4%, attributable essentially to the banking sector. In contrast, for 2002 the stock market turbulence alone does not fully explain the drop in banking-sector employment. According to the Luxembourg central bank, the wave of bank mergers, which was especially active at that time, was responsible for roughly 50% of the banks' job losses. Moreover, the outsourcing of certain functions had an impact on the number of purely banking jobs (BCL, 2003).

The repercussions of the crisis on the Luxembourg economy as a whole took the form of a significant cyclical slowdown. The fundamental indicators below show growth rates that remained clearly in the black between end-2001 and end-2003, albeit lower than the respective annual growth rates between 1995 and 2006:

	Average annual growth rates between end-2001 and end-2003 (%)	Average annual growth rates between end-1995 and end-2006 (%)
GDP (at current prices)	+6.8	+7.6
GDP (at constant prices)	+3	+5
Tax revenue	+4.3	+7
Total employment	+2.5	+3.6

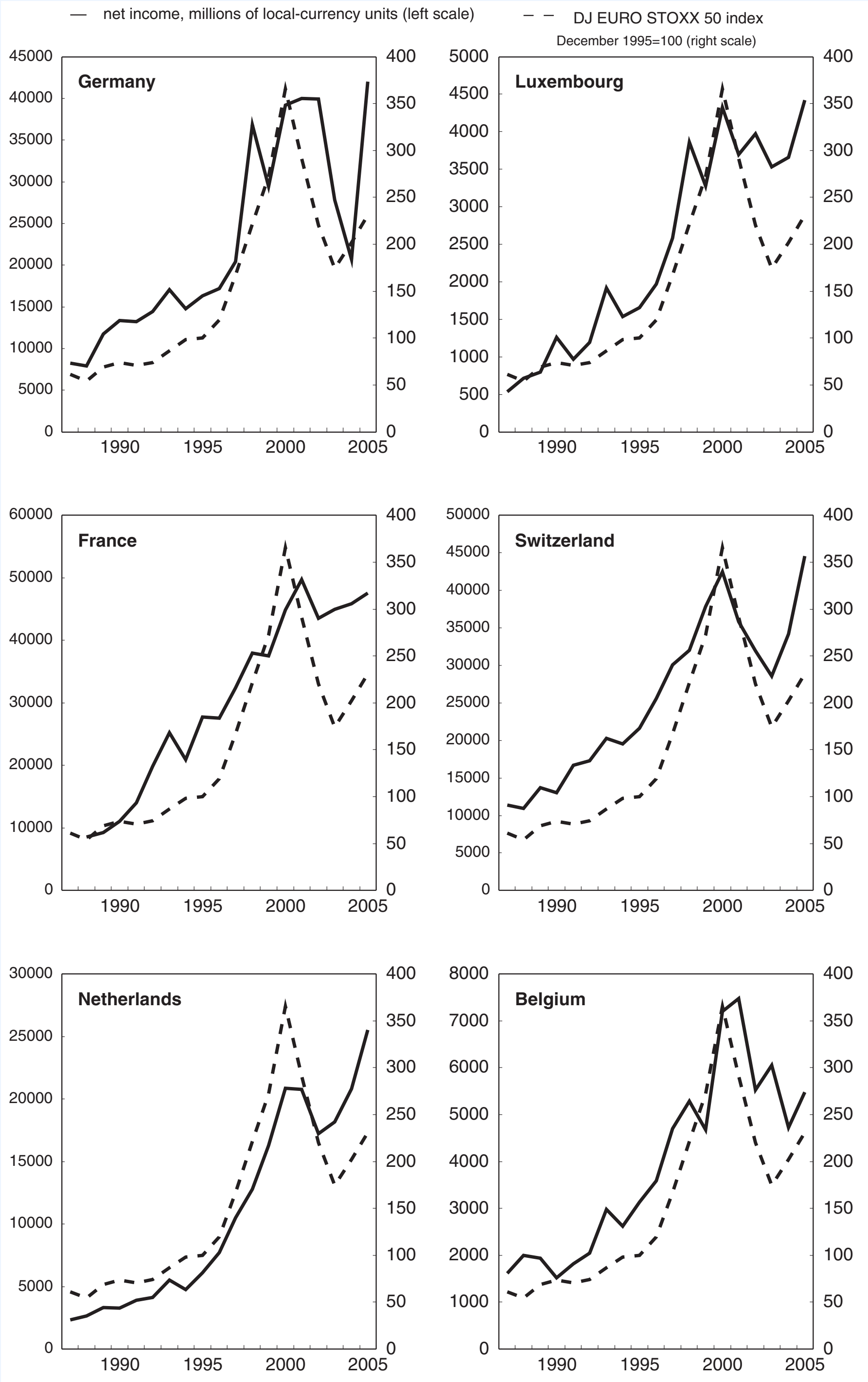
Source: STATEC.

The upswing in Luxembourg financial activity that followed the slowdown (with the financial sector's value added in current prices rising by 4% in 2004, 22% in 2005 and 31% in 2006) is explained in part by the rebound in stock prices (Figure 2.4). However, it was also beginning in this period (2004) that special adjustment measures were taken, such as:

- A search for new private-banking clients in the wake of the savings tax directive (see below).

Box 2.2. **Effects of the 2001-02 stock market crisis** *(cont.)*

Figure 2.3. **Net banking income (commissions and transaction fees)**



Source: OECD, Bank profitability-Financial Statements of Banks and Eurostat.

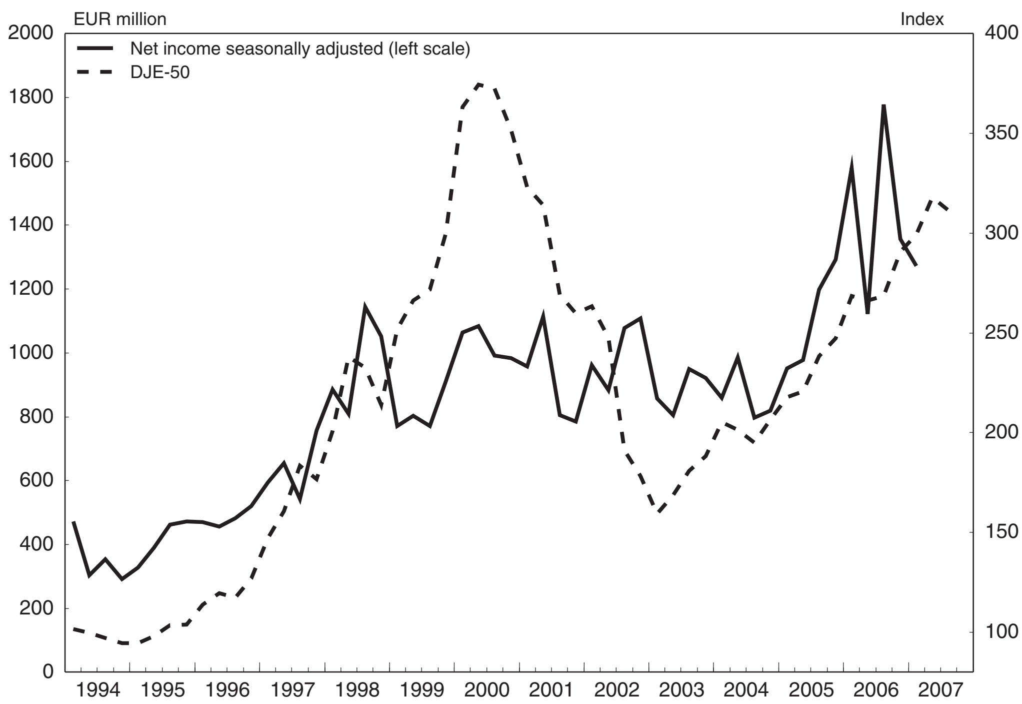
StatLink http://dx.doi.org/10.1787/380483435816

Box 2.2. **Effects of the 2001-02 stock market crisis** *(cont.)*

- Regulatory and financial innovation in the realm of securitisation and risk capital.
- Sharp expansion of the management of investment funds and products such as life insurance, etc.

It is difficult, however, to ascertain whether this movement was stimulated by the sensitivity of Luxembourg's financial activity to international financial turbulence. Moreover, it would be wrong simply to juxtapose the effects of the 2001-02 crisis and the current turbulence in international finance, as the two events may have distinct characteristics in terms of propagation and transmission mechanisms.

Figure 2.4. **Developments in banking net income and European stock markets**



Source: BCL and Eurostat.

StatLink http://dx.doi.org/10.1787/380547863401

profits before provisions held up well to the international stock market downturn in 2001-02, but the sharp (82%) rise in provisions fed through to a 22.6% drop in tax payments. At the time of the crash, the subscription tax proved highly vulnerable, with inflows falling by 25% between 2000 and 2002, and subsequently rebounding by 79% between 2003 and 2006. As a consequence, the share of taxes paid by the financial sector has been very volatile (Figure 2.2, Panel B). Tax revenues from PFS and insurers have been added to the figures for very recent years so as to observe the growth of these related activities, which is partly related to the fact that more financial intermediation is subcontracted to PFS – a trend that may partially explain the banks' declining relative share of aggregate tax revenue.[3] This translates into a higher volatility of tax revenues than in other countries. For example, over the period 1991-2006, the standard deviation of the general government balance amounted to 2.2% of GDP in Luxembourg as compared with 1.3% in Germany and 1.4% in France (BCL, 2007).

The financial-sector's revenues are very sensitive to the international financial cycle

The income structure of the Luxembourg financial sector, and especially its banks, has shifted considerably in recent decades. Income from conventional intermediation (interest income) has been declining steadily in relation to net income from commissions and transaction fees. Whereas such net income accounted for 15% of bank revenues in the early 1980s, the proportion had risen to 55% by 2006, with commissions accounting for two-thirds of this income. Since bank commissions are closely tied to the value of assets traded and managed, the matter of sensitivity to cyclical variations and turbulence on international securities markets becomes increasingly important, especially insofar as the growth of other, non-bank financial activities is based largely on securities transactions.

According to econometric studies on the sensitivity of banking income to international macroeconomic and stock market shocks, the constitution of provisions is negatively correlated with the European macroeconomic cycle, *i.e.* provisions for bad debts are higher in periods of slowdown (Rouabah, 2006; Lehmann and Manz, 2006).[4] To a lesser extent, a rise in interest rates also heightens the constitution of provisions.[5] As would be expected, the findings show that net income from commissions and transaction fees is significantly tied to the performance of financial markets (Figure 2.4). A 10% decline in the European stock market index feeds through to a nearly 10% average decrease in net income from commissions and transaction fees and with large banks seemingly more sensitive than small ones. Although, there is empirical evidence that the link has weakened over time (Annex 2.A1). Assuming that at least 50%[6] of a fall in net income from commissions and fees is passed on to real value added in the financial sector and given the calculated sensitivity of the economy as a whole to the financial sector (STATEC, 2008; Rouabah, 2006), then there are indications that a permanent 1% decline in the European stock index would have as much as a –0.15% impact on the Luxembourg economy in the long term.[7]

With regard to the current US "subprime" financial crisis, the impact on Luxembourg's financial sector appears to be more indirect, involving contagion effects, rather than direct effects as noted above. The "indirect" effects of the subprime financial crisis, on the other hand, are still difficult to ascertain. A fall in confidence with regard to securitisation as a form of financial intermediation could be a bad sign for the "young" Luxembourg securitisation market. Judging from bank earnings reports for the third and fourth quarters of 2007, the income derived from the investment-fund and private-banking businesses does not really appear to have been affected by the financial crisis. Indeed for 2007 as a whole commission income was up by 8.8%.[8] Nevertheless, turbulence in international financial markets has detrimental contagion effects in all banking centres. As a result, with the international banking market drying up, interest income from interbank lending has been weak since the third quarter of 2007. Financial institutions will "mechanically" incur capital losses on their portfolios of long-term financial investments. Accordingly, net provisions by Luxembourg banks were up sharply at 31 December 2007.

Developing the financial centre's competitive advantages

The development of the financial sector in Luxembourg depended historically very much on creating tax advantages and an ability to secure a regulatory "first-mover" advantage (Box 2.3). However, the tax advantages are increasingly being phased out. Thus,

Box 2.3. **A brief account of Luxembourg's ascent as a financial centre**

Luxembourg began its ascent as a financial centre in the early 1960s by syndicating international loans. With the introduction of Interest Equalisation Tax in the United States in 1963 discouraging issues of international loans on the New York financial market, the big American banks at the time sought to set up a capital market in Europe. As other financial centers, such as London, Zurich and Amsterdam, had more restrictive regulation at the time, the banks opted for Luxembourg which, as of the late 1920s, had introduced banking legislation that was a lot less restrictive than in the majority of other countries. As a result, Luxembourg turned itself into a centre where international Eurodollar issues were quoted and deposited, the City of London for its part specialising in issues. It was then that an increasing number of banks began to set up in Luxembourg, the trend becoming more marked as of 1967 with the huge influx of Scandinavian and German banks seeking, *inter alia*, to take advantage of the absence of compulsory reserve requirements.

The debt crisis in the Latin American countries in the early 1980s made it necessary to diversify this particular sector of activity. With neighbouring countries having relatively more restrictive tax policies in place, private banking expanded significantly in Luxembourg from that decade on, especially because of the high level of confidentiality (associated with the bank secrecy rules in place). The rapid transposition of directives, which can be described as a "first mover advantage", also enabled Luxembourg to develop an international market for investment funds. At the same time as it was building up financial activities involving individual clients, Luxembourg was establishing a position in the financial engineering business. With the legislation having allowed numerous different types of company providing financial packages to set up, Luxembourg became one of the prime sites for locating finance companies.

the future development of the financial sector's three main activities (private banking, investment funds, and financial engineering) will depend very much on the continued development of the regulatory framework in Luxembourg. Moreover, tax regulation will need to be updated in response to the phasing out of tax advantages. In the following, the competitive advantages of these activities are discussed in some details.

Private banking and attracting private client business

Private banking and asset management in Luxembourg began to develop in the early 1980s thanks to foreign customers taking advantage of Luxembourg's legislative framework, *i.e.* long-established banking secrecy rules (Article 458 of the Criminal Code) non-taxation of non-residents' income from savings and international co-operation in tax matters being subject to the principle of double incrimination.[9] Bearer bonds were at the time extensively held by foreign clients, who were not necessarily clients of the banks where the bonds were received. Subsequently, banking institutions increasingly developed structured products to expand their clientele, beginning with bearer SICAVs (see below) in particular, and then with other more sophisticated investment funds. Tax rules in this area were changed with the European Directive on taxation of savings, which came into force on 1 July 2005 and which was designed to harmonize savings tax mechanisms (by ensuring that capital income from individual's savings was taxed in the country of origin) while leaving each country free to set its own rate for its residents.[10]

Luxembourg (together with Austria and Belgium) secured agreement that they would not apply the Directive's automatic exchange of information, but they would introduce a withholding tax on income from certain products. The rate of this tax was set to gradually to increase: 15% until 1 July 2008, 20% until 1 July 2011 and 35% as of that date. 75% of the tax collected goes to the saver's country of residence, while the remaining 25% goes to the country collecting the tax. Withholding tax, not in full discharge, is a transitional measure and will in principle be replaced by automatic exchange of information subject to the condition that a number of other countries apply equivalent measures. With negotiations set to resume in 2011, the Luxembourg authorities have ensured that banking secrecy will be maintained at least until that date, although in the wake of the Liechtenstein tax scandal there have been calls for an early review of the Directive. Some of the clauses in the agreements are crucial: only fixed-income products are concerned and only private individuals are liable, and life insurance contracts are excluded. As a result, financial professionals believe that associated capital outflows have mostly been confined to small savers and that savings have been redirected *via* simple interest rate products into more sophisticated, higher value-added products, which are not liable to withholding tax. These include structured products (capital secure, indexed or optional) and specific investment funds, such as hedge funds, real estate funds, venture capital funds, etc.

Another recent development is that personalised management is turning towards "top-of-the-range" types of product, including family office. Drawing on the Swiss experience, family office is a form of private wealth management designed to achieve tax optimisation, in which the bank provides a wide range of services for its wealthy clients – usually members of the same family. These product developments in private banking have sustained growth in the sector, where deposited assets rose by 60% between 2003-07 (Weimerskirch and Flatter, 2007).[11] Another fast-growing product type is Free Provision of Services (FPS) life insurance. This product is not subject to withholding tax and is aimed at non-residents from EU countries. Premiums issued *via* FPS presently account for almost 95% of premiums issued by Luxembourg life insurance companies, accounting for nearly half of all FPS life insurance contracts in the European Economic Area. Since the assets in life insurance contracts are frequently invested *via* investment funds, the existence of a large number of fund promoters has helped to develop the life insurance sector (qualified professionals, underlying investment vehicles, etc.). Similarly, in the framework of private banking, insurers distribute contracts to institutional clients (banks) which in turn use them to structure client assets, making insurers the suppliers of bank inputs. This development has been furthered by the regulatory freedom with respect to underlying assets and by the insurance sector being subject to the banking secrecy law.

The investment fund sector

The investment fund industry grew as the result of the introduction of new legislation. In early 1980s the Luxembourg authorities became aware of the European Directive draft regulating funds and their distribution, inducing them to introduce a law in 1983 to promote the development of such investment vehicles. Two years later, the UCTIS 1 (Undertakings for Collective Investments in Transferable Securities) directive came into force as the first Directive to regulate a financial product at European level providing them with a "European passport." The directive was transposed into Luxembourg law in 1988.[12] For a few years, Luxembourg was the only EU country to provide investment funds authorized on its territory with the European passport. As a result, numerous promoters, whether from EU countries or not, domiciled their funds in Luxembourg so as to be able to market their fund shares on other member countries' markets. Banks acting solely as depository institutions appeared, as did auditing companies, corporate auditors, companies specializing in the publication of reports, transfer agents, and other supporting services. This concentration helped to generate a body of expertise enhancing Luxembourg's attraction to promoters, creating a pole of excellence within Luxembourg banks, and securing Luxembourg a place as the second most important international promoter of investment funds (in terms of managed assets) behind the United States and followed by France.

The investment fund sector has benefited from other regulatory changes. In 1999, Luxembourg was the first country in Europe to pass legislation on international pension funds. The legal framework provides for the creation of two financial vehicles able to accommodate defined benefit or defined contribution funds on behalf of international industrial or commercial firms: SEPCAVs (open-ended pension savings companies) and ASSEPs (pension savings associations).[13] This legislation is separate from the legislation governing pension funds for domestic employees. A recent European Directive (2003/41/EC) (transposed into Luxembourg law in 2005) brought in a Community legal framework for pan-European pension funds. This allows multinational firms located in different European Union countries to set up a single pension fund with which to manage various pension plan assets in other EU member countries. However, industry sources consider it unlikely that these pan-European funds will develop on a large scale because of tax and regulatory obstacles. In February 2007, a Law on Specialised Investment Funds (for professional clients) introduced (for the covered funds) a reduced rate of subscription tax and investment rules that are more flexible than in the case of conventional funds, making them particularly attractive for alternative, hedge fund-style management.

Financial engineering

In 2007, a new form of finance company was introduced – the private asset management company or *Société de gestion de Patrimoine Familial (SPF)* – to replace the so-called 1929 holding legislation (H29).[14] The tax regime applying to SPFs is essentially the same as in the case of H29 companies (no tax on dividends paid, no municipal business tax or net wealth tax, liability to the capital duty tax (*droit d'apport*) of 0.5% (which will be abolished in 2009) and to the yearly subscription tax of 0.25%, no access to double taxation treaties, etc.). However, SPFs are available only to private individuals (or intermediaries acting in the interests of an individual or a group of individuals) and their sole purpose is the administration and management of financial assets, excluding any form of commercial activity. The restriction to private individuals should make the SPFs compliant with European State aid rules. Other legislative changes were already implemented in 1990 to allow setting up so-called *SOPARFIs* (*Sociétés de Participations Financières*) to remedy the limitations of the 1929 holding company as an international financial engineering vehicle. They are ordinary commercial companies not liable to the restrictions applying to company aims and not benefitting from tax exemption on profits. A SOPARFI can therefore pursue all the activities open to SPFs, but can also have an activity related to the management of its participations (advice on management, financing, real estate, etc.) or any other commercial or industrial activity. One advantage for investors of this type of company is to repatriate investments in foreign companies/subsidiaries to the company in Luxembourg and become subject to Luxembourg's tax rules, with the aim of distributing the investment income to shareholders. As a consequence of being fully liable to tax, the SOPARFIs benefit from double-taxation treaties and the parent-subsidiary directive. A common tax regime for the parent company and the subsidiary allows distributed dividends to be tax-exempt (and in some cases also from withholding tax) in the country where the parent company is located.[15, 16] Taxation of SOPARFIs is very light and there is no withholding tax on distributed income in the condition outlined in endnote 15 are fulfilled.[17] Many private equity funds in the European Union go through a Luxembourg SOPARFI – being examples of how Luxembourg's financial sector has benefitted from continuous adaptation of the tax and regulatory framework.

Two other financial innovations were introduced in 2004. SICARs are vehicles to promote venture capital funds and their private equity investments, allowing the financial sector to seek a foothold in a market in Europe, which hitherto has been dominated by London. A SICAR is a structure which has many functions similar to an investment fund, but is not subject to any restrictions in terms of portfolio and investment policies. The legislation was introduced to provide a regulatory framework (previously such funds were completely unregulated) to make such vehicles attractive for investors (banks, insurance companies, pension funds) wanting to work in a more regulated and more transparent framework. Similar products already existed in other countries but, as in the case of SOPARFIs, the advantage of Luxembourg lies in the legal safety and associated tax benefits.[18] The other innovation was a legal framework for *securitisation vehicles* in Luxembourg, as in other countries such as France, Belgium, the Netherlands and the United States.[19] The banking sector uses securitisation to make certain illiquid claims stemming from credits granted more liquid. Securitisation can provide a more flexible and less onerous source of financing than traditional credits, particularly since a great many assets can be securitised. The securitisation vehicle, which can be set up in the form of a securitisation company or fund, finances acquisitions by issuing nominative or bearer securities representing the share portfolio. These securities, which tend to be reserved for institutional investors, give access to an almost unlimited variety of products allowing optimum diversification of the portfolio. Like other investment vehicles, securitisation vehicles enjoy a favourable tax regime and the regulatory definition of assets that can be securitised is very broad.

Intersectoral effects, location and employment

Underpinning Luxembourg's banking and financial system is a capacity for continuously adjusting the regulatory and tax framework. Once favourable conditions have generated competitive advantages, the question arises as to how to ensure that the development of financial activities maintains a lasting momentum. Endogenous forces, for example, can contribute to the emergence of a cluster around a financial activities centre. At the same time, and in a context of intense economic integration, the dynamics of a financial centre raise the issues of out-sourcing and other changes in the financial industry production chain. For a small economy, such questions cannot be separated from the various aspects of attracting and developing talent.

A number of spillover effects can be identified.[20] *Knowledge spillovers* derive from the proximity of actors wanting to exchange complex information that is difficult to codify, and where exchanging and comparing localised information constitutes an important source of financial innovation (Taylor *et al.*, 2003). *Labour market spillovers* (labour market pooling) in a financial centre exist as a result of the concentration of staff specialised in handling economic and financial information. *The location spillovers* are derived from the purchases of a financial pole of inputs, encouraging the setting up and development of intermediate industries and services located upstream: accounting, legal services, consultants, recruitment, publications and information, computer services, etc. Econometric investigation of these external effects for the financial sector and other service sectors shows that a 10% increase in activity in the financial service sector induces 2.8% higher activity in the business-service sector (and 1.6% higher activity in the non-financial market service sector), excluding the financial sector's direct purchases in the business service sector (Bourgain and Pieretti, 2006).[21, 22] These results are evidence of an important self-sustaining process that helps to perpetuate the financial sector's activities.

There are no precise surveys to judge the extent of outsourcing from the financial sector, but Deloitte Research (2004) claims that by 2008 the world's hundred leading financial establishments would have moved activities accounting for 15% of their total costs to the developing countries (LDCs) in the Indian Ocean area. The same survey indicated that 67% of financial service companies had resorted to outsourcing in 2003. The main reason for outsourcing activities is to benefit from reduced labour costs, which in financial services amounts to more than two-thirds (Gordon *et al.,* 2005). New technology in the form of secure means of data transmission has enabled the outsourcing of back office services, which account for a large proportion of the activities of Luxembourg's financial centre (mainly accounting, settlement and clearance). Moreover, these operations are considered to be the most separable of the other functions in the banking production chain. Because of electronic transaction and straight-through processing (STP), a transaction can be performed automatically and forwarded anywhere without any human intervention.[23]

The general forces behind outsourcing have limits and drawbacks specific to banking and financial activities. The information intensity of numerous activities in the production chain remains significant – and not solely *vis-à-vis* clients. Banking and financial centres are places where complex information is handled, which it is difficult to transmit remotely (Gehrig, 2000). And face-to-face contact is all the more crucial when the information is imperfect, always changing and hard to codify, which is the case of a lot of financing activities which are dependent on relations of trust. The geographical fragmentation of the banking and financial production process is also liable to increased operational risk related to internal procedural, personnel or systemic failures. In the Basel II agreement, the supervisory authorities are placing ever increasing emphasis on this type of risk. Fear of seeing operational risks increase as a result of externalisation is cited by 40% of the European banks surveyed (Pujals, 2005). With respect to Luxembourg more specifically, fear of confidentiality not being respected is a factor that inhibits outsourcing.

As regards the possibility of "moving-up" the production chain, Luxembourg has certain handicaps. The Luxembourg centre does not host front-line financial centre activities and headquarters. In particular, there are very few investment banks located in Luxembourg. Because of its modest size, the city of Luxembourg is not as attractive to top investment fund managers and other talent as the major European and North American cities. On the other hand, the sector specific knowledge in administration, domiciliation and depository bank activities could form the basis for moving up the production chain in stages. Using the existing structures (conventional funds), asset management in Luxembourg is beginning to move towards more complex products (private equity, SICARs, hedge funds) taking advantage of the fact that middle- and back-office operations for such products are already performed in Luxembourg. This first step could serve as the basis on which to develop risk management and asset management activities, although such a move is particularly demanding in terms of qualified human resources. In this respect, financial institutions in Luxembourg have to compete with the salaries (and non-pecuniary benefits associated with location) paid in capitals such as London, New York and Dublin if they are to attract more experienced staff. In this respect, it is important to implement the proposals to make working permit and visa rules more flexible and less bureaucratic (Box 2.4). This constraint with regard to attractiveness and skilled human resource training must not be underestimated when considering product differentiation strategies and, more generally, the development of innovative activities.

Box 2.4. **Rules and regulation for foreigners in Luxembourg**

The current rules for employing workers from outside the EU are complicated and time consuming and governed by a 1972 law. Workers from outside the EU must obtain a work permit before applying for a residence permit. Moreover, a labour market test is in place (as in other EU countries) where employers have to advertise their vacancy at the labour office (Administration pour l'Emploi – ADEM) and proves they were unable to find anyone in the EU to fill the position. Requests for new work permits and renewals must be submitted by the employer. The requests are transmitted by the ADEM to a labour market commission for an opinion statement, while the final decision is taken by the Ministry of Immigration. Once a request is granted, the applicant can apply for a visa at a Luxembourg Embassy. There are four different types of work permits in place: Type A (valid for one year, one profession, and one employer); Type B (valid for four years, one profession, and any employer); Type C (valid for five years, all professions, and any employer); and Type D (for traineeships).

Entrepreneurs are exposed to even greater hurdles. Entry is permitted upon the presentation of the following documentation: professional qualification certificate; visa; a Luxembourg trade authorisation; a certificate copy of the statutes of their company; a copy of the travel ticket; a bank guarantee of euro 12 350 per family member from a bank approved in Luxembourg and deposited in favour of the Ministry of Foreign Affairs Moreover, such entry permits are only valid for one year and can only be renewed if the enterprises generates sufficient revenue.

To obtain a residence permit the applicant must present an application at the local municipality containing the following documentation: valid travel document; certified copies of the work permit, birth and marriage certificates; job contracts or other justification of means of existence; medical certificate (including a radiological exam); justification of adequate housing (rental contract); and criminal records or "good moral" certificates. In general the duration of the residence permit does not exceed that of the working permit.

The government has presented a draft law to parliament to simplify work and entry permits for workers and entrepreneurs. In the proposal, work and residence permits are merged into one permit and applications have to be initiated by the workers, but the labour market test remains in place. In addition, the proposal incorporates European Law's notion of a Community preference, whereby applicants from the EU will receive preferential treatment. An additional element is that special residence permits for highly skilled workers and scientists are envisaged.

Box 2.4. **Rules and regulation for foreigners in Luxembourg** *(cont.)*

Double nationality is presently not permitted in Luxembourg, but foreigners can become nationals on the conditions that they: were born in Luxembourg; or are married to a Luxembourger; or had compulsory schooling in Luxembourg. The conditions that have to be fulfilled include; residency in Luxembourg during the past year and for at least five consecutive years; relinquishing the nationality of origin; some knowledge of at least one of the three official languages and a basic knowledge of Luxembourgish.

A law proposal is opening up for the possibility of having dual citizenship and is redefining the criteria for acquiring Luxembourg nationality to include: residency of at least seven years; a knowledge of institutions and fundamental rights in Luxembourg (including following special courses); a sufficient knowledge of spoken Luxemburgish; and an honorability condition that specifies that candidates cannot have been condemned to prison sentences of more than two years.

Development of the financial centre: challenges and strategies

The high reliance on the financial sector is a concern as it makes the economy vulnerable to external shocks and eventually international competition may remove the comparative advantages of placing financial institutions in Luxembourg. Yet, implementing a diversification strategy is not easy for a small economy, for obvious reasons of demand (limited home market size) but also because of limited resources (Armstrong and Read, 1998; Easterly and Kray, 2000).[24] Moreover, the relatively limited potential in terms of productive resources means that a small economy cannot go for all-out expansion of very varied sectors of activity (extensive inter-branch diversification). In view of these constraints, an "intra-industry" diversification could offer the economy some protection against external shocks.[25] Such an approach offers the advantage of consuming fewer resources, because it is rooted in an existing pillar of the Luxembourg economy. Moreover, such a strategy also carries less risk, because it is based on a high degree of specialisation and not on hazardous industrial-policy choices. For instance, the considerable growth of investment-fund administration did not stem directly from an entirely external choice, but rather from a skilful shaping of the national legislative and regulatory framework in response to shifting international financial trends. But a dynamic intra-financial industry diversification strategy hinges on the potential for adjustment and innovation on the part of financial-market players, which depends both on internal market forces and on conditions outside the market (such as the education system and Luxembourg's attractiveness for talent).

For an intra-industry diversification strategy to be successful, it must be assured that there are no bottlenecks in terms of human resources. This requires that the capacity to attract foreign human resources remains in place and that the education system can provide necessary qualifications to a sufficient number of graduates. Currently, the latter seems quite unlikely, as only 500 students (15% of total enrolment) at the University of Luxembourg are enrolled in studies of Economics, Management and Finance and in the private Luxembourg School of Finance (under the University of Luxembourg) the enrolment is only 32 graduate students (of which very few are Luxembourgers). A contributing factor might be a tuition fee of Euro 17 500. The constant increase in cross-border workers is likely in the medium term to require considerable investments in transport infrastructure. Moreover, foreign workers will only settle in Luxembourg if the quality of life is sufficiently good. This requires well developed public policies in areas such as infrastructure investments, housing policies, and the provision of high quality public goods and services (including education and health services).

Such measures to improve the attractiveness of working in Luxembourg have to be tailored to various non-resident groups. Maintaining a steadily increasing inflow of cross-border workers will depend on expanding transportation infrastructures as recommended recently in the *OECD Territorial Review of Luxembourg* (2008) (Annex 2.A2). Attracting high-skilled talent from outside the European Economic Area is hampered by the current strict and bureaucratic working permit and visa rules. As planned, making these rules less bureaucratic and more flexible will allow them to better reflect labour market needs. Likewise, allowing dual nationality with less strict language requirements, such as only requiring knowledge of one of the official language, would make it more attractive for talented individuals to make long-term commitments in Luxembourg. Alternatively, talent could be developed locally, but this requires that the education sector aims more at fulfilling labour market demands, including bolstering higher education in finance and other areas of interest for the financial sector.

The provision of high quality services should also include the strategic role of the legislative and regulatory framework for the financial sector.[26] A financial centre such as Luxembourg, which has almost no local market and is highly integrated in the European economy, is forced to make more of a competitive effort to secure higher returns and lower taxation than its major competitors. Where banking and finance are concerned, regulations can provide part of the measures to address distortions in (asymmetric) information and to protect savers' rights of ownership. In addition, a financial centre's guarantee of stability is appearing more and more to be the key issue to its attractiveness. The forming of the legislative and regulatory framework must take place within the context of the international regulatory context and the pressures that it generates, especially from the point of view of investor protection and information and risk management, including operational risk. So the response to regulatory constraints can result in a qualitative "best value", rather than in minimalist strategies.

With the Basel II Accord, there is a move towards prudential regulations based on prevention of the main financial risks, as regulatory capital requirements are more closely aligned with the underlying risks that banks face. It would seem that the regulatory authorities are gaining a degree of independence with regard to assessing what is needed in terms of protecting against risks and so can differentiate themselves in relation to the minimum level.[27] These international rules could tempt so-called offshore centres to opt for a minimalist strategy or even seek to circumvent them. A "best value" strategy, on the other hand, can act as a means of differentiation by accentuating the guarantees given to the investor with respect to the security of his assets, transparency as regards how funds are invested, monitoring possibilities, etc. All of these characteristics of contracts (guaranteeing of property rights and giving savers greater security) help to reduce risk and the information asymmetry problems to which remote investors are especially sensitive. This concern is particularly obvious in the new investment funds sector (venture capital, private equity, etc.). In the context of this strategy, taxation is more the price to be paid for gains in terms of risk reduction and having fewer information problems. The European Union's MiFID Directive in the financial sector provides a recent example of this "best value" possibility.[28] In this connection, industry sources in Luxembourg's banking sector point out that compliance is not necessarily a burden, but instead can be used to create a decisive competitive advantage (Pitton, 2007). The advantages for private individuals and "small" investors include a better quality and bigger range of services and products (including tailor-made services) while providing for a much higher level of protection.

The legislative and regulatory adjustment process has been a key factor in the financial innovation process in Luxembourg. It stems from a process of legal and regulatory engineering involving collaboration between the public authorities and financial-sector professionals aimed at shaping the development of new products. So far, these efforts have mostly arisen from external pressures, but their general aim is to create the sort of conditions that will prove conducive to the emergence of new products and new activities. This shared interest has to be viewed in the context of international competition between locations, where authorities seek to adapt their institutional frameworks to attract mobile international clients and resources. In this context, analysis of the size of different economies (especially Streeten, 1993; Easterly, W. and A. Kray, 2000) shows that, despite major handicaps inherent in being small, there is a natural source of institutional comparative advantage deriving, in particular, from there being more consensus in favour of change and adjustment and fewer impediments to public decision making. Where Luxembourg's financial centre is concerned, venture capital funds, the law on securitisation and pan-European pension funds are examples of this sharing of innovation between the public authorities and private players. But such complementary efforts must be sustained and not occasional. They require that the public authorities put in sufficient institutional and human resources, which is justified in terms of their likely effect on tax revenues.

The main challenges for maintaining a dynamic financial sector are to maintain and expand the attractiveness of investing and working in Luxembourg. Preserving the attractiveness of investing in Luxembourg depends on the continued good supervision of the sector. In this respect, the special study by the financial supervisory authority (*Commission de Surveillance du Secteur Financier*) on the potential exposure of financial institutions to (subprime) mortgage-related risk was an important step in reassuring market participants. The authorities should continue to foster financial soundness by continuous adaptation of their careful regulatory framework – for example in compliance with the Basel II agreement to adopt more prudential regulations to safeguard the reputational attraction of the financial sector – and pursue their quest for financial stability by repeating such exercises at regular intervals as well as fostering greater transparency about the situation of the financial system. A summary of policy recommendations can be found in Box 2.5.

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Box 2.5. Summary of policy recommendations for the financial sector

- To foster financial soundness, the authorities should continue to improve their regulatory framework, for example in compliance with the Basel II agreement to adopt more prudential regulations to safeguard the reputational attraction of the financial sector.
- The special investigation on subprime mortgage assets was welcome, and the supervisors should pursue their quest for financial stability by repeating such exercises at regular intervals as well as fostering greater transparency about stability of the financial system.
- To facilitate a growing number of cross-border workers, transport infrastructures should be expanded further.
- To attract highly-skilled international talent, immigration laws for non-EU workers should, as planned, be made more flexible. In addition, the current proposal to allow dual nationality should be implemented, but the strict language requirement should be eased to only requiring knowledge of one of the official languages.
- To develop highly-skilled talent locally, the education sector should aim more at better meeting labour market demands, including bolstering higher-education in finance and other areas of interest for the financial sector at the University of Luxembourg.

Notes

1. In addition, there are intersectoral effects leading to important growth dynamics, such as knowledge spillovers, labour-market pooling, and supply of intermediate goods.
2. Net bank provisions increased by 308% in 1997 and by 71% in 1998 (see annual reports of the Banque centrale du Luxembourg).
3. The Act of 2 August 2003 reorganised the PFS sector, which is why uniform data for it are available only from 2004.
4. A 10% drop in the quarterly growth rate of euro zone GDP for the previous quarter is estimated to trigger a 4.33% increase in provisions.
5. Net-interest income can be procyclical in relation to rising interest rates if rates are more rigid on bank liabilities than on bank assets. In such cases, rising interest rates increase the spread on bank intermediation. In Rouabah's study (2006), parameters concerning variations in interest rates are not significant in all of the estimations, whether static or dynamic, probably reflecting a tendency to act quickly to adjust rates on commitments in response to changing returns on assets.
6. Non-interest income accounts for 55% of total bank revenue, and institutions other than banks are also active in transactions closely tied to international stock market.
7. Testing for the nonlinearity of the relationship between bank income and stock market development and for the possible presence of multiple regimes in their joint evolution tend to perform better than a linear model (Annex 2.A1). In addition, a regime change is confirmed by the statistical tests. A first regime spans the period 1994-1998/1, for which the correlation obtained is higher (correlation coefficient: 0.89) than for the second regime (0.26), from 1998/2 until 2007/3, which includes the phase with sharper variations. This econometric measurement mitigates the conclusion of a strong dependence between bank income and stock market performance, although it does not cast doubt on the existence thereof.
8. CSSF press release of 18 January 2008 on provisional profit and loss accounts at 31 December 2007.
9. Where mutual legal assistance is concerned, some countries apply the double incrimination principle. For mutual assistance to be given to the requesting country, it must be established that the act that is the subject of the inquiry would be a criminal offence under the law of the requested country if it were to occur in that country. Where tax matters are concerned, Luxembourg and Switzerland have been identified (OECD, 2003) as countries in which a restrictive definition of tax evasion, combined with the application of the double incrimination principle, substantially limits

the possibility of exchanging information in tax cases of a criminal nature with the vast majority of OECD countries.

10. Under these new regulations, every Member State has to inform its European partners of the amount of interest paid by a financial institution domiciled in its territory to non-residents from the European Union. This is the automatic exchange of information principle; on the basis of this information, non-resident (European) savers are taxed in their country of residence on their interest income from abroad.
11. Over the period 2003-07, the average amount of assets per client rose by 28% to EUR 1 million, while portfolios of over EUR 10 million constituted the fastest growing segment. At the same time, banks with average assets per client in excess of EUR 1 million had a profitability that was twice the size of their competitors with smaller clients.
12. In 2002, the government transposed the UCITS 3 Directive, extending the range of products with the European passport to include more complex and risk-oriented products for strategic investment purposes. Product innovation introduced a range of new investment vehicles, such as *multiple compartment funds; funds of funds; capital guaranteed or protected funds; click funds; redistributive funds; dedicated funds, etc.*
13. SEPCAVs are based on the American model, *i.e.* only the subscriber's contribution is set in advance, the capital paid out in the end depending solely on the results achieved by the asset managers. ASSEPs work on the defined benefit principle, *i.e.* the European model. In the majority of cases, the final payment is defined in advance, contributions being set in such a way as to cover requirements when the time comes to pay the supplementary pension.
14. The 1929 holding (H29) was a vehicle for holding capital and enjoyed a favourable tax regime, in return for which its range of activities was confined to taking participations in other companies, managing bond loans, and managing patents and licences under certain conditions. The holding was not allowed to engage in any commercial activities, failing which it would forfeit its tax regime. In 2006 the European Commission found the new H29 tax regime to be non-compliant with European legislation on State aid, leading to the government decision to phase out the scheme by 2010. H29s were excluded from double taxation treaties and were not allowed to benefit from the tax regime common to parent companies and their subsidiaries resident in the European Union. This characteristic therefore restricted the use of H29s as vehicles in international acquisition structures. These structures were in fact mainly used by private individuals as wealth management products.
15. The exemption from withholding tax applies to the dividends if the following conditions are fulfilled: *a)* the subsidiary is a collective entity that is a fully taxable resident (in particular a resident taxable stock corporation); *b)* the parent is a fully taxable collective entity that is a resident of Luxembourg, a resident company of the EU whose legal form falls within the scope of Article 2 of the Parent-Subsidiary Directive, a permanent establishment of a company that falls within the scope of Article 2 of the Parent-Subsidiary Directive, a domestic permanent establishment or a stock corporation resident of a state with which Luxembourg has concluded a double tax treaty, a Swiss resident capital company that is subject to corporate income tax without benefiting from a tax exemption; *c)* the parent has held, or commits to hold, during an uninterrupted period of at least 12 months, a shareholding of at least 10% in the capital of the subsidiary or of a purchase price of at least EUR 1 200 million.
16. The tax exemption depends on the parent company being a joint stock company resident in Luxembourg and holding or having held for a minimum of 12 months a minimum participation amounting to 10% in the capital of the subsidiary or totalling EUR 1 250 million. The subsidiary has for its part to be a resident or foreign company liable to comparable income tax.
17. SOPARFIs are only liable to the capital duty tax of 0.5% when setting up, a flat rate minimum wealth tax (EUR 62 for a limited company and EUR 25 for a limited liability company), and VAT on operating costs.
18. No capital contribution tax, but a fixed charge of EUR 1 250; exemption from wealth tax; benefits from the parent-subsidiary privilege; the income from transferable securities (dividends, capital gains, liquidation profits, etc.) are exempt from Luxembourg income tax; dividend distributions to investors are completely exempt from withholding tax, whether the investors are resident or not, are natural or legal persons or not, are EU residents or not, come from a country with which Luxembourg has signed treaties or not; non-residents are exempt from Luxembourg income tax with respect to income from holding SICAR shares; SICAR managers are exempt from VAT. On the other hand, the European Private Equity and Venture Capital Association notes in its 2006 annual report that, compared to SICARs, few tax incentives have been introduced for R&D expenditure and technology

transfers by young innovative firms (Indicators of Tax and Legal Environments Favouring the Development of Private Equity and Venture Capital and Entrepreneurship in Europe, Dec. 2006).

19. Securitisation is the process by which a company or a natural person transfers certain assets to a securitisation vehicle so as no longer to assume the management risk involved. Assets that can be securitised include trade receivables, mortgages, current accounts, shares, debenture loans, any financial asset, any immovable asset, which are all characterised by having a certain value or a future income stream.
20. The New Economic Geography literature identifies two significant centripetal forces: technological spillovers and pecuniary spillovers (M. Fujita, P. Krugman and A. Venables, 1999; Fujita and Thisse, 2002; and Scitovsky, 1954).
21. The approach follows Midelfart-Knarvik and Steen (1999), which is based on the work by Caballero and Lyons (1990).
22. In the other direction, the effects from a similar sized shock in the business sector and the IT sector on the financial sector are 1.8% and 2.3%, respectively, which is probably related to lower intermediate input prices relative to the prices of financial services and a diversification of inputs in the financial sector.
23. The loss of a competitive tax or regulatory advantage can induce outsourcing. Recently, some of Luxembourg's tax advantages appeared vulnerable to international pressure.The European Union has agreed in 2007 that VAT should be collected on services in the countries where they are consumed. This new regime (coming into force in 2015) may jeopardize the location in Luxembourg of subsidiaries of Internet operators such as eBay and Amazon.
24. The high export-intensity of an economy that lacks a domestic market opens the door to economies of scale, but such a strategy could be risky given the potential exposure of the sector's competitive advantages to international upheavals. Indeed, there is a highly robust inverse relationship between an economy's size and its business-cycle volatility (Furceri and Karras, 2008).
25. "Diversification" is used here to signify a shift towards lesser correlation between respective income from the activities in question.
26. The role of the institutional and regulatory framework as a factor of attractiveness is admittedly not peculiar to the financial sector (Glaeser *et al.*, 2004), but it does seem stronger in that context with financial activities being so dependent on saver and investor confidence.
27. For example, the Directive 2005/60/EC of the European Parliament and of the Council of 26 October 2005 on the prevention of the use of the financial system for the purpose of money laundering and terrorist financing draws directly on the "know your customer" principle drawn up by the Basel Committee, recommends adapting anti-laundering systems to customer types in order to gain in efficiency (BIS, 2003).
28. Markets in Financial Instruments Directive which came into force on 1 November 2007. Over and above the objective of harmonising the rules governing investment services and the exercise of investment activities (with the introduction of a single passport at European Union level), the Directive is designed in particular to improve investor protection through the application of a whole series of formalities and to comply with criteria regarding transparency and the information to be given to clients.

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ANNEX 2.A1

Nonlinear model of the relationship between European stock index/bank income and regime-change detection

Figure 2.4 in the main text showed the varied trends for banking net income and European stock markets, suggesting different regimes for certain sub-periods.

One way to identify any such breaks in the series trend is to apply Chow tests; however, these tests assume both that the parameters of the model remain constant over time, and that break dates are known in advance. But structural change is an irreversible instability affecting process parameters, and when such changes in trend are present in the series, estimations made in this way may be specified incorrectly.

To remedy this deficiency, a sample is often cut into sub-periods on the basis of presumed break dates, but this method diminishes the sample, especially if the time series involved are very short. Moreover, in most cases structural changes can be recurrent and require another, more general type of model such as Markov's regime-change models (see Hamilton, 1989; and Krolzig, 1997 and 2001). The advantage of these models is that they require neither prior knowledge of break dates nor division of the period of the study. The generating model is that of Hamilton (1989), originally applied to quarterly GDP growth in the United States. Hamilton's (1989) univariate method was generalised to a switching vector autoregression (VAR) model so that multiple series subject to regime change could be modelled (see Krolzig, 1997).

Method: Nonlinear model

Hamilton's (1989) generating model is a fourth-order univariate autoregression model:

$$\Delta y_t - \mu(s_t) = \alpha_1(\Delta y_{t-1} - \mu(s_{t-1})) + \alpha_2(\Delta y_{t-2} - \mu(s_{t-2})) + \cdots + \alpha_p(\Delta y_{t-p} - \mu(s_{t-p})) + u_t$$

with $u_t \sim NID(0,\sigma^2)$.

The conditional mean $\mu(s_t)$ varies between two states,

$$\mu(s_t) = \begin{cases} \mu_2 > 0 & si \;\; s_t = 2 \;\; ('expansion', 'boom') \\ \mu_1 < 0 & si \;\; s_t = 1 \;\; ('contraction', 'recession') \end{cases}$$

The regime-generation process is assumed to follow a two-state Markov chain such that p_{21} is the probability of transition from expansion to contraction and p_{12} the probability of leaving the contraction regime for an expansion regime.

Hamilton's univariate method was generalised (see Krolzig, 1997) to the switching VAR model, noted MS-VAR. These multivariate models make it possible to model multiple series subject to regime changes. In the specifications for an MS-VAR model, all autoregressive parameters can be conditioned by state s_t of the Markov chain.

In Hamilton's univariate model as well as the subsequent multivariate models, the regime-generation process is an ergodic Markov chain having a finite number of states $s_t = 1, \ldots, M$ which are defined by the transition probabilities:

$$p_{ij} = \Pr\left(s_{t+1} = j \middle| s_t = i\right), \quad \sum_{j=1}^{M} p_{ij} = 1 \quad \forall\, i, j \in \{1, \cdots, M\}$$

More specifically, it is assumed that s_t follows an ergodic Markovian process having M states with an irreducible transition matrix P such that:

$$P = \begin{pmatrix} p_{11} & p_{12} & \cdots & p_{1M} \\ p_{21} & p_{22} & \cdots & p_{2M} \\ \vdots & \vdots & \ddots & \vdots \\ p_{M1} & p_{M2} & \cdots & p_{MM} \end{pmatrix},$$

Where $p_{iM} = 1 - p_{i1} - \ldots - p_{i,\,M-1}$ for $i = 1, \ldots, M$. This law can be used to infer how the regimes will evolve from the data.

These models can be estimated by the maximum-likelihood method based on the expectation-maximisation (EM) algorithm discussed in Krolzig (1997). This estimation technique makes it possible to obtain autoregressive parameters as well as the transition probabilities governing the Markov chain of the unobserved states. If q stands for the vector of the parameters, in the Hamilton model, then $q = (\mu_s, \alpha_1, \ldots, \alpha_4, \sigma_2, p_{11}, p_{12})$. The parameter q is chosen to maximise the likelihood of observations Y_t.

Results of the estimation of the nonlinear VAR model:

We estimated the dynamic of the relationship between income (in Log and seasonally adjusted) "LSARev_net" and the European stock market index "Ldje_50" using this bivariate nonlinear model.

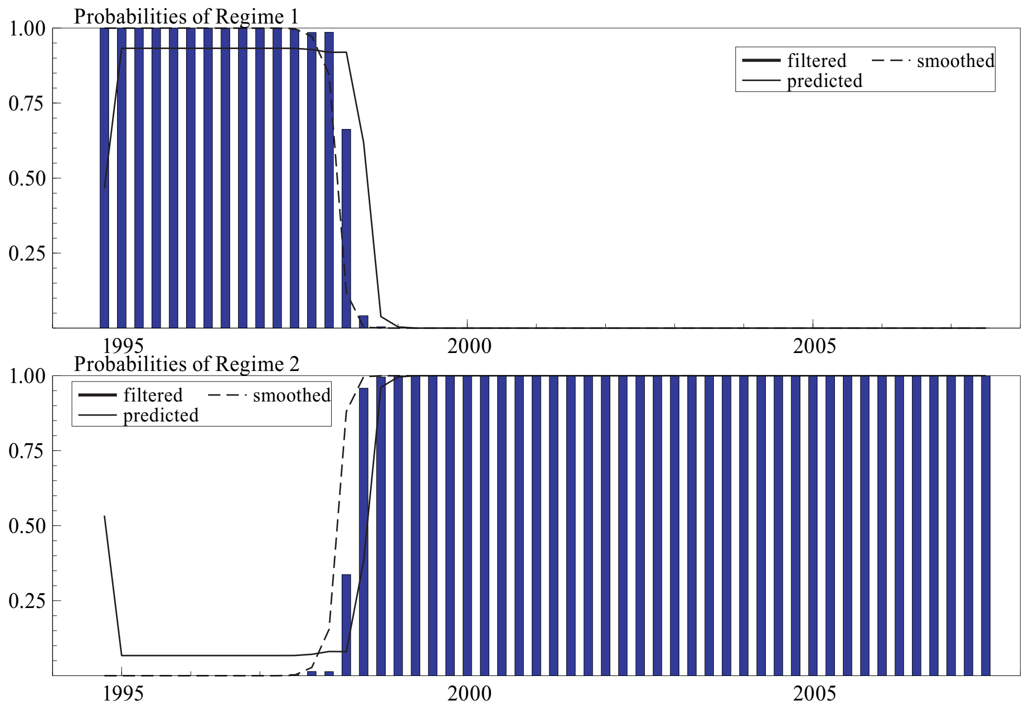
This estimation confirms the nonlinear nature of the relationship between the variables LSARev_net and Ldje_50, insofar as the log-likelihood of the nonlinear model (17.9555) is greater than that of the linear model (–21.7236). This nonlinearity justifies an estimation with regime change.

The results confirm a regime change in the joint evolution of the two variables and make it possible to distinguish and classify two main periods – Regime 1, stretching from 1994/4 to 1998/1; and Regime 2, from 1998/2 until 2007/3. These highly persistent regimes ($p_{11} = 0.9328$ and $p_{22} = 1$) are illustrated by the figure below, which indicates the probability that each observation will belong to Regimes 1 or 2.

The usual statistical tests (LR, AIC, HQ, SC) show that this model reflects the structure of the relationship between the two variables better than a linear model. The *MC* matrix below shows that the strong correlation (0.89) between the two variables (LSARev_net, Ldje_50) during the first period declines in Regime 2 to only 0.26.

$$MC = \begin{bmatrix} LSA\mathrm{Re}v\_net & 0.2599 \\ 0.8922 & Ldje\_50 \end{bmatrix}$$

Model (LSARev_net, Ldje_50)



Note: We should like to thank F.B. Aka (CREA, Université du Luxembourg) for performing these calculations.

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ANNEX 2.A2

Main recommendations in the OECD territorial review of Luxembourg

Housing measures:

- Extend monitoring and forecasting of land and housing markets to the "Greater Region" level so as to derive a better measure of the impact of this sector on cross-border traffic.
- Conduct an awareness campaign among local officials to ensure that national strategic priorities are taken properly into account in the PAGs.
- Restore expropriation for public purposes as an operational tool.
- Consider creating a public land agency with broad powers, endowed with the right of pre-emption.
- Create a true property tax to encourage sale of building lots.

Commuting measures:

- Harmonise fuel taxes so as to discourage foreign drivers from using their car in Luxembourg, where prices at the pump are well below those in neighbouring countries.
- Evaluate and explain the technical, financial and organisational means needed to achieve the IVL objectives, so as to contribute to integration of sector policies.
- Conceive the future master plan for infrastructure, using a multimodal concept and with quantified objectives, taking due account of truck traffic, which adds to congestion and is an important source of greenhouse gas emissions.
- Establish a multiyear financing schedule, following identified and integrated priorities.
- Take advantage of the national umbrella structure for transportation called for in the Master Programme to strengthen co-operation with adjacent regions by creating a supra-regional transport agency.

Territorial planning measures:

- Consolidate the role of the Centres of Development and Attraction, establishing an urban hierarchy around which the other municipalities can organise themselves. To this end, adopt a public investment policy that recognises each CDA's role in a given region.
- Continue and build upon the dynamics created by the co-operation agreements between the State and certain urban groupings (Southwest Luxembourg Metropolitan Area,

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Nordstad) and extend this approach to other territories (Capital Region Northwest, South Region).

- Consider a regional map vying to achieve economies of scale, due to dimensions of the territory, by regrouping the smallest regions into a single region centred on the Nordstad.

Mobilising human and financial resources:

- To associate local elected officials more closely to the conception and definition of the above-mentioned policies so as to facilitate their translation into urban planning decisions at the local level.
- To adequately consult associations and citizens, in particular since civil society plays an important role in the elaboration of urban planning documents. This would permit to situate the choices established around the PAGs in a wider context while facilitating the implementation of Public Private Partnerships (PPPs) contributing towards the implementation of the measures considered.
- To give priority to the mobilisation of the means necessary for the deployment of these strategies. The staffing and budgetary means allocated to the Directorate for Territorial Planning (DATer), which assumes numerous inter-ministerial and "Greater Region" co-ordination tasks, do not seem sufficient for this purpose. New competencies from the University of Luxembourg could be called upon for this.
- To give a strong translation both in governance terms and in means, by establishing an inter ministerial fund with multi-annual financing, that would help to leverage the projects of a multi-sector character.

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OECD Economic Surveys: Luxembourg

Chapter 3

Adapting fiscal policies to slower tax revenues

In recent years, budget outcomes have tended to be better than expected, reflecting dynamic revenues and slightly stronger-than-anticipated growth in spending. As a result, the current fiscal position is better than in many other OECD countries. In the short-term, the mildly expansive fiscal stance is appropriate in view of the deteriorating economic outlook. On the other hand, the already substantial estimate of the fiscal sustainability gap is being revised upwards, reflecting updated OECD estimations of future health care spending. Addressing the gap requires a broad-based strategy, including prefunding, contribution base broadening, and controlling ageing-related costs. Particularly important is early action to avoid a snowball effect in public debt. To improve the link between short-term budget developments and long-term fiscal challenges, the government should strengthen the framework for fiscal policy, including a clearer separation between statistics compilation, macroeconomic projections and budget preparation, and introduce multi-year spending ceilings. Future tax revenues will be less dynamic, which requires an improvement in public sector efficiency to maintain present public service standards.

Public finances are in a better shape than in most other OECD countries. There is a substantial surplus on the general government balance and the public debt-to-GDP ratio is very low. The budget surplus is mostly the result of dynamic tax revenues, originating in the large financial sector. In the short term, the financial sector will slow as the turmoil on the international financial markets takes its toll, but also in the medium- to long-term it is likely that the sector will expand at a lesser pace due to competition and new technologies as discussed in Chapter 2. As an implication, tax revenues will become less dynamic. Adding to this trend is the (likely) absence of future large revenue surprises, one-off revenues resulting from the merger between Arcelor and Mittal , and the temporary nature of some revenue streams, such as VAT on e-commerce. The slowing of revenue growth is happening at the same time as fiscal policy need to be put on track towards securing fiscal sustainability. This challenge was already identified in the last *Survey*, but estimates of the fiscal sustainability gap are being adjusted upwards to take into account new up-to-date OECD projections of future health and long-term care spending. Given the size of the problem, a broad-based strategy is required with a particular emphasis on early action to avoid a snowball effect in public debt. The chapter commences by assessing short-term budget developments, before considering long-term fiscal sustainability issues. Thereafter, issues concerning the fiscal framework are discussed. Finally, the link between public sector human resources practices and public sector efficiency is considered in some detail.

Budgets in recent years have benefited from dynamic revenues

Following the shift of the fiscal balance into deficit for some years, a budget surplus has returned. In 2006, the government and the social partners reached an agreement to restore a balanced budget position and to enhance the competitiveness of the Luxembourg economy, with the main measure being a modulation and postponement of the automatic wage indexation mechanism (Box 3.1). Although most of the measures had full effect only the following year, a general government surplus of 1.3% of GDP was secured in 2006 on the back of a stronger-than-expected economy and one-off revenues associated with the merger between Arcelor and Mittal.[1] In 2007, the general government accounts recorded a surplus of 3.1% of GDP, which is more than 3½ percentage points better than expected when the budget was presented to Parliament in the autumn 2006 (Table 3.1). The measures in the tripartite agreement are estimated to have contributed with an improvement of 1.1% of GDP (Ministère des Finances, 2008a). In addition there was a strong base linked to revisions of the 2006 public finance data and stronger-than-projected economic growth. Masked behind this positive overall outcome was somewhat stronger growth in real general government consumption than projected in the recent stability programme.

Recent budget developments have been characterised by revenue upside surprises. This hard-to-predict volatility in budget receipts can be ascribed to the fact that Luxembourg is a small open economy where a large share of revenues comes from the financial sector (accounting for 40% of corporate tax revenues and 25% of income tax revenues) which is highly cyclical and depends on international developments. Other

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Box 3.1. **The 2006 Tripartite Agreement**

The tripartite agreement's main measure was the postponement of the automatic wage indexation to slow down wage developments. This also reduced growth in public expenditures as allowances and pensions are adjusted by the same indexation mechanism. In addition, other public expenditures on personnel and investment were moderated. Measures were also implemented on the revenue side, including an increase in the long-term care insurance contribution rate and the VAT rate on certain services (Ministère des Finances, 2007). The combined effect of these measures and the strong growth in nominal GDP was to reduce the public spending-to-GDP ratio over the period 2006-07 by 1½ percentage points.

Table 3.1. **General government expenditure, receipts and financial balance**

As a per cent of nominal GDP

	2005	2006	2007	2008	2009
Government total disbursements	41.8	38.7	38.0	38.9	39.1
Government final consumption expenditure	16.8	15.5	15.4	15.6	15.4
Interest paid	–0.3	0.1	–0.2	–0.2	–0.1
Subsidies	1.7	1.5	1.6	1.6	1.6
Social security benefits in cash	14.6	13.6	13.2	13.5	13.5
Other current payments	4.5	4.3	4.2	4.2	4.2
Gross capital formation	4.5	3.6	3.8	4.2	4.5
Government total receipts	41.7	40.0	41.0	40.6	40.5
Total direct taxes	13.7	13.1	13.5	13.0	13.0
Social security contributions received	11.4	10.8	11.1	11.1	11.0
Indirect taxes	13.2	12.6	12.8	12.8	12.8
Property income received	1.4	1.7	1.8	1.9	1.9
Other current receipts	1.7	1.7	1.6	1.6	1.6
Capital tax and transfer receipts	0.2	0.2	0.2	0.2	0.2
Net lending	–0.1	1.3	3.0	1.7	1.3
Cyclically adjusted government net lending	0.5	1.7	3.4	2.5	2.3
Cyclically adjusted government primary balance	–0.2	1.0	2.7	1.8	1.7
General government gross debt	6.1	6.6	6.9	6.0	5.4

Source: OECD Economic Outlook 83 database.

factors behind the recurrent budget surprises include relatively long delays in terminating corporate tax assessments which in partly related to the administration of such matters. Furthermore, unexpected one-off taxes, such as in connection with the Arcelor-Mittal merger, have added to projection imprecision. Looking ahead, a number of taxes are becoming temporary in nature. For example, internet-related VAT revenues are set to diminish over time as the European Commission's VAT directive is replacing the point-of-sale principle with the end-user country principle for purchases made over the Internet, which is likely to reduce the importance of Luxembourg as the preferred place for headquarters for firms like e-bay, Amazon, etc. Another example is the capital duty (typically on the issuing of share capital) which was reduced from 1% to 0.5% on 1 January 2008, and which, will be abolished by 1 January 2009.[2]

The 2008 budget is mildly expansionary

The 2008 Budget projects a general government financial surplus that is about ¼ per cent of GDP lower than the year before as economic growth is expected to slow in face of the continued international financial turmoil and the lowering of tax revenues associated with the 2008 tax measures (Box 3.2). The personal income tax brackets are increased by 6% to partly compensate for the non-indexation of these brackets since 2002 (over the same period prices have increased three times faster). Moreover, the child related tax credit will be replaced by a child bonus, so households with income below the taxable minimum will receive child support. The change should not affect the disposable income of other households. The combined budgetary cost of these two measures is estimated to be around 0.8-0.9% of GDP. Nevertheless, revenues are expected to increase by some 7½ per cent, in line with the budget's projected increase in nominal GDP. Spending is set to rise by around 5½ per cent, with the wage agreement in the government sector expected to add ¾ and 1¾ percentage points wage growth to wage indexation in 2008 and 2009, respectively. Another area with faster-than-average growth is public R&D spending.

Box 3.2. **The 2008 tax measures**

The 2008 tax measures include two main elements. Firstly, each of the income brackets for personal taxes has been increased by 6% after having been unchanged since 2002. Thus, this adjustment is a partial (about one third) adjustment to inflation developments since then. As a result, the lowest marginal tax rate of 8% is applied to incomes above EUR 10 335 and this rate is increased by 2 percentage points for every EUR 1 749 increase in income until the highest marginal rate of 38% is reached for annual incomes above EUR 36 570 (ministère des Finances, 2008b).

The second element is the introduction of a child bonus of EUR 922.50 per year for tax-exempt households. The background for this measure is that an increasing number of low-income households pay no or little income tax, implying that they did not benefit from the existing tax credit. Thus, the tax credit has been changed into a child bonus. At the same time, the income tax has been raised by the difference between the after-tax value of the previous tax credit and the new bonus. This implies that the after-tax value of the child bonus has not changed for those families that used to receive the child tax credit, while low income households have seen an increase in their disposable income that is equivalent to the value of the child bonus.

Other elements include the introduction of joint taxation for civil partnership couples to align their situation with married couples and that non-residents (who have chosen to be subject to taxation in Luxembourg) now have to include all income and expenses accrued abroad, implying, for example, that their mortgage interest payments become deductible and their capital income abroad becomes taxable.

As part of the reform to unify the health insurance systems for blue and white collar workers, overtime remuneration was fully tax exempted (formerly only the overtime supplement was exempted from taxation). In addition, overtime remuneration was set to 140% of normal pay and the duration of pay during sickness was extended for blue collar workers. As the reform is not fully financed, there will be a slight deterioration in the social security budget surplus (BCL, 2007a).

Effective from 1 January, the capital duty was lowered from 1% to 0.5%.

The economic slowdown will sharply reduce revenue growth and according to OECD projections lead to a surplus that is nearly 1½ percentage points lower than in 2007. A prolonged period with slow growth may even raise the prospect of a deficit for the first time since 2005. This opens the question of whether fiscal policy should be adjusted in view of the changing macroeconomic background. The 2008 budget is already mildly expansionary, mainly reflecting tax measures, and the additional budgetary deterioration is related to a temporary slowdown in tax revenues, *i.e.* reflecting automatic stabilisers. The conjunctural part of these developments gives no reasons to adjust fiscal policy. A more expansive fiscal policy stance, on the other hand, would not be very effective in stimulating Luxembourg's small open economy; furthermore with the large volatility of tax revenues a large fiscal stimulus combined with a prolonged economic slowdown may even open up the prospect of a significant deterioration of the general government balance. An acceleration of spending is unavoidable as the increase in inflation adds further pressure in public spending from 2010 onwards, when the automatic wage adjustment mechanism again is applied in full to public wages and transfer payments. To avoid such effects, the current postponement of the application of the wage indexation mechanism should be reinforced as a short-term measure. As this mechanism hampers a downwards adjustment in public spending, it should eventually be fully abolished. An additional measure to make the budget less sensitive to the cycle would be to diversify the sources of tax revenues. In this respect, higher taxes on fossil energy may achieve the double dividend of helping to reach post-Kyoto emission abatement objectives and diversifying the tax structure.

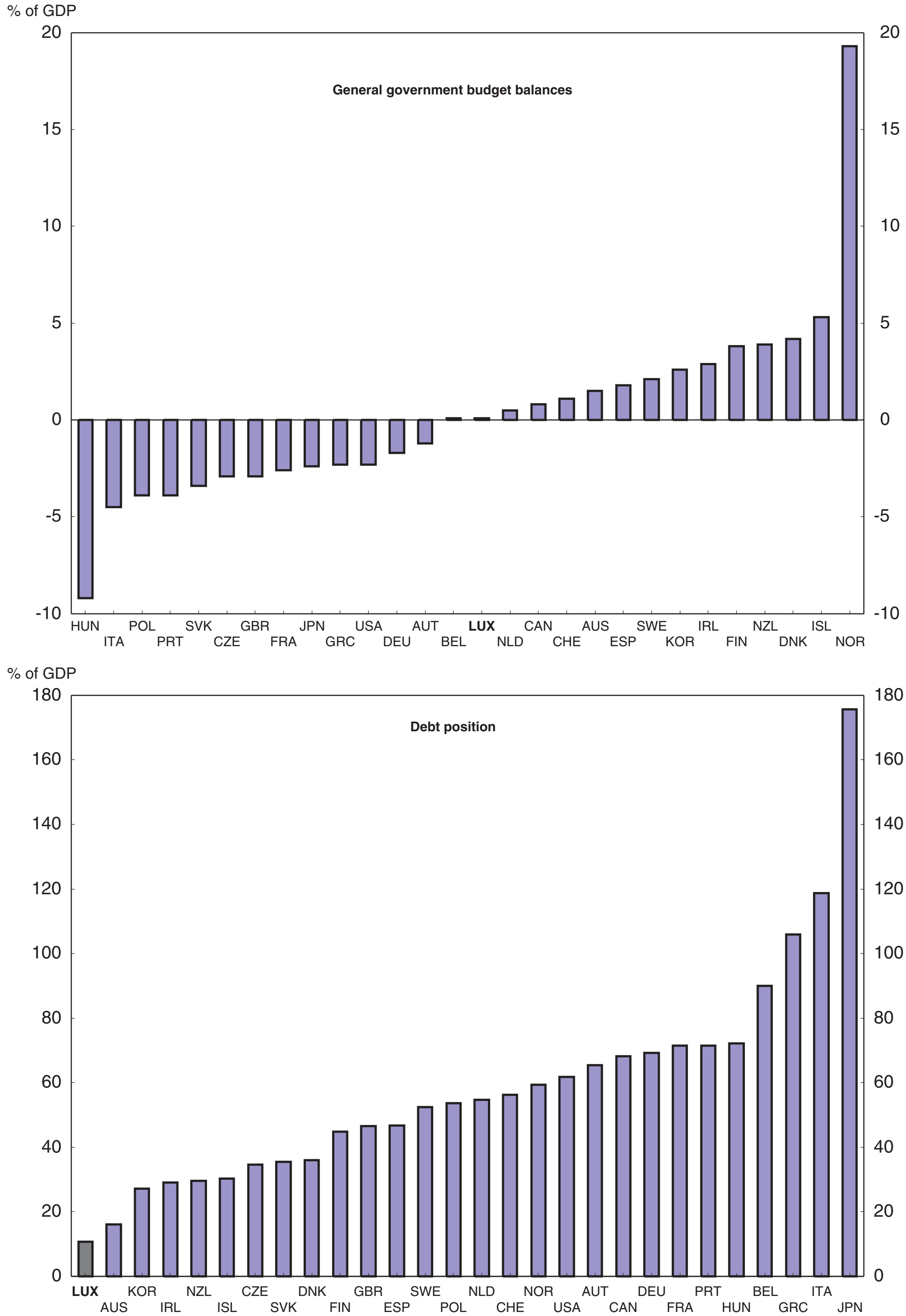
The budget contains no medium-term fiscal plans. These can be found in the stability programme that is published shortly after the presentation of the budget. According to these plans, the government aims at improving the budget surplus by nearly ½ per cent of GDP by 2010 through an increase in the structural budget balance of about ¾ per cent of GDP (mainly through lower spending growth). However, the tightening is deferred until 2010, and the structural balance will deteriorate somewhat in the short term. The revenue-to-GDP ratio is projected to remain roughly constant, implying continued dynamic growth in revenues on the back of a nominal GDP that is projected to maintain most of its present momentum. Thus, even with the projected tightening of spending growth, there is still scope for continued strong real expenditure growth of 2½-3 per cent per year. The medium-term fiscal plans imply a step towards securing long-term fiscal sustainability, but more has to be done.

Securing the long-term sustainability of public finances

The current fiscal position is in a more favourably starting block to tackle the fiscal challenges associated with ageing than in most of other OECD countries (Figure 3.1). Within the time horizon of the stability programme, this situation is not expected to change much (Ministère des Finances, 2007).[3] Moreover, ageing-related spending will only increase moderately over the next decade. Thereafter, however, there will be such a sharp increase in public ageing-related expenditures that long-term sustainability problems are larger than in most other European countries (Table 3.2). According to the European Commission and as discussed in the previous *Survey*, public pension spending is projected to increase by 7½ per cent of GDP by 2050. This is more than in almost all other European countries (European Commission, 2006).[4] The other large component of ageing-related costs is health spending (including long-term care) which is projected by the European Commission to increase by 1¾ percentage points of GDP by 2050 – on average a bit less

Figure 3.1. **General government balances and public debt positions in the OECD countries**

In per cent of GDP, 2006



Source: OECD, *Analytical Database.*

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Table 3.2. **Long-term age-related expenditure**

% of GDP

	2004	2010	2020	2030	2040	2050	Change 2010-50
Total age-related spending	19.5	19.4	21.6	25.0	27.4	27.8	8.2
Pensions	10.0	9.8	11.9	15.0	17.0	17.4	7.4
Healthcare	5.1	5.3	5.6	5.9	6.2	6.3	1.2
Long-term care	0.9	1.0	1.0	1.1	1.3	1.5	0.6
Education	3.3	3.1	2.8	2.7	2.6	2.4	–0.9
Unemployment benefits	0.3	0.3	0.3	0.3	0.2	0.2	–0.1

Source: European Commission (2008), Luxembourg: Macro Fiscal Assessment, An analysis of the October 2007 update of the stability programme.

than in other EU countries.[5] However, the European Commission's estimate for health care spending looks conservative and should be considered as a lower bound estimate. An updated OECD estimate for health and long-term care spending increases (presented in Chapter 4) indicates that the share of GDP devoted to health and long-term care spending will almost double by 2050, reaching 14% of GDP – by then an internationally high share. Nonetheless, even this new estimate represents a lower bound. The estimate (just like that of the European Commission) includes only demographic developments. Thus, these estimates leave out the increasing number of cross-border workers with life-time careers in Luxembourg, who will be eligible for health insurance coverage during their retirement (see Chapter 1). The number of cross-border pensioners is already increasing rapidly, although from a low base. This indicates that a more realistic lower-bound estimate of the fiscal sustainability gap should be at least 1½ percentage point of GDP higher.

The main drivers behind the increase in public pension spending are a generous replacement rate, maturing of the system, and the increase in longevity. The public pension system is essentially a PAYG system (with a prefunding element via its reserve fund) and is characterised by having many more contributors (mostly reflecting the high number of cross-border workers) than beneficiaries (Box 3.3). As the system matures, the contribution base will shrink relative to the outlays, reflecting the relative increase in pensioners, larger number of pensioners with a full contribution career, and increases in longevity. The longer contribution careers imply that the benefit ratio (average pensions relative to average incomes) is set to increase – an unusual situation in Europe. The relatively slow ageing process means that pension outlays will only have increased by 2 percentage points of GDP in 2020, but thereafter they will increase sharply. Hence, reserves of the pension system will be exhausted by 2035 and debt in the system will reach 100% of GDP by 2050, when social security contributions will only cover 58% of pensions costs as compared with roughly balance today.

The size of the problems can be summarised in terms of the sustainability gap, which is the surplus that is required to finance future ageing-related costs without abrupt changes to current revenue and spending policies. According to the European Commission, if the current low debt-to-GDP position is to be kept unchanged, the sustainability gap amounts to some 8 per cent of GDP, which is more than twice the size of the average gap in the European Union. On the other hand, if public debt is allowed to rise to 60% of GDP by 2050, the sustainability gap is considerably lower at 3% of GDP (European Commission, 2006 and 2008).[6] The new OECD estimate of future health and long-term care spending implies that these gaps would be at least 1½ percentage points higher, *i.e.* 4½ per cent of

Box 3.3. **The Luxembourg public pension system**

The Luxembourgish public pension system is essentially a pay-as-you-go system, where current contributors pay for the current pensioners (a special regime is in place for public sector employees and only a few sectors have occupational pension schemes). The official retirement age is 65 years, which has been unchanged since 1925. With an insurance period of at least 480 months, and of which 120 months have been under the compulsory insurance scheme, retirement can be taken at 60. If the 480 months have all been under the compulsory insurance scheme, retirement can be taken at 57. Together with the pathways into earlier retirement described in the previous *Survey* (OECD, 2006a), the system has reduced the effective retirement age to 59.4 and the employment rate of older workers (+55 years) is one of the lowest in the OECD (Figure 3.2). The system covers everyone who has worked in Luxembourg, and with the increasing number of immigrants and cross-border workers, the number of non-residents pensioners have tripled since 1985. They now account for about 40% of all pensioners, although the share of transferred pensions is smaller (nearly 20% of pension spending) reflecting that many of the non-resident pensioners have not obtained full pension rights.

Private sector pension benefits consist of a lump sum of a maximum EUR 490 for a 480-month insurance period and an annual income-related element, which is calculated as 1.85% of the labour market related income during the insurance period (calculated using 1984 as base year and adjusted for subsequent consumer price inflation and real wage increases). Moreover, pensions are adjusted for inflation developments (using the same automatic inflation indexation mechanism as wages) and to real wage developments (every two years). Finally, minimum and maximum levels for pensions are currently set at EUR 1 387 and EUR 56 421 per month, respectively (European Commission, 2008).* In addition, there is a legal reserve requirement of 1.5 times annual expenditures – considerably less than the current reserves of about a quarter of GDP.

In all, the generosity of the public pension system means that replacement rates are high for lower incomes (may even exceed 100% in special cases) leading to an internationally high benefit ratio (measured as the average pension relative to average wages). Thus, despite the fifth lowest number of pensioners relative to contributors in the EU-25, the total public pension spending of 10% of GDP is only slightly lower than the EU average. As the pension system matures with increasing number of pensioners relative to contributors and with more of them gaining full pension rights, spending on public pensions are set to increase sharply to some 17½ per cent of GDP in 2050 – or nearly 4½ percentage points higher than the EU average.

The last major reform of the public pension system was in mid 2002, when public pensions became more generous. Both the fixed and variable elements were increased by 11.9% and by 0.07 percentage points, respectively. To encourage continued work for older workers, the variable element was further increased by 0.01 percentage point for every year worked after 55 to a maximum of 2.05%. In addition, all pensioners benefited from an additional allowance of nearly EUR 15 per year of affiliation and the minimum pension was raised by 7% to EUR 1 185.57 per month to align it with the minimum wage. Lastly, dependants' pensions were adjusted upwards to be at least equal with the minimum pension. The immediate impact was estimated to be an 10% increase in public pension spending, but the long-term impact (including higher interest payments arising from higher borrowing requirements) is estimated to be some 26% of GDP in 2050 (and nearly 50% by 2085) (Bouchet, 2003).

* Pension benefits are subject personal income taxation and to health and long-term care contributions.

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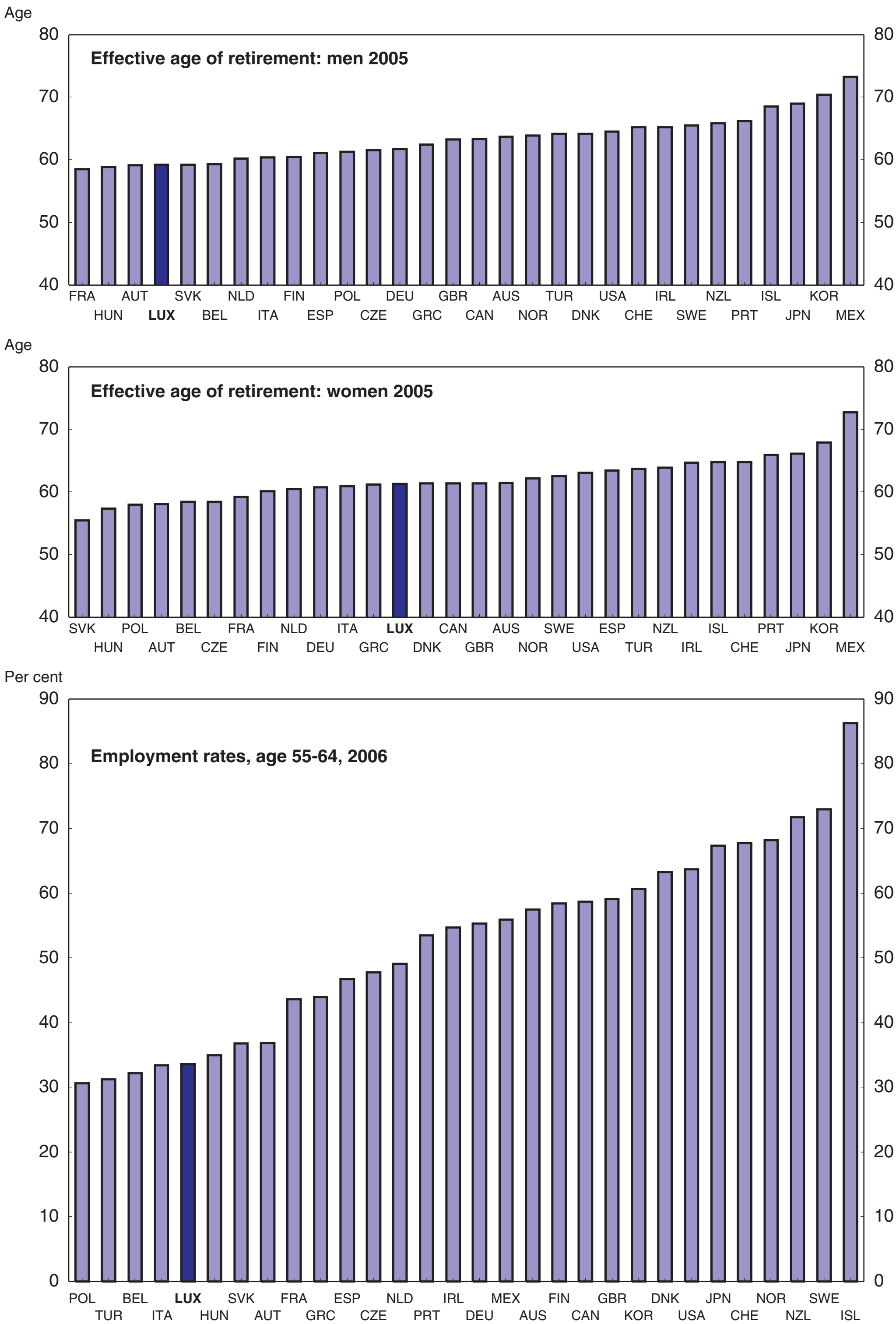
Figure 3.2. **Effective retirement age and employment rates**

For older workers in the OECD



Source: OECD estimates, derived from the European and national labour force surveys, *OECD Labour Force Statistics*.

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GDP. In 2007, there was a structural balance surplus of 3¼ per cent of GDP, but the planned medium-term fiscal easing and lower estimates for potential growth mean that in 2009 the structural budget surplus will be nearly 2½ per cent of GDP. Thus, by then a tightening of fiscal policy in the order of 2% of GDP is required to close the fiscal sustainability gap.

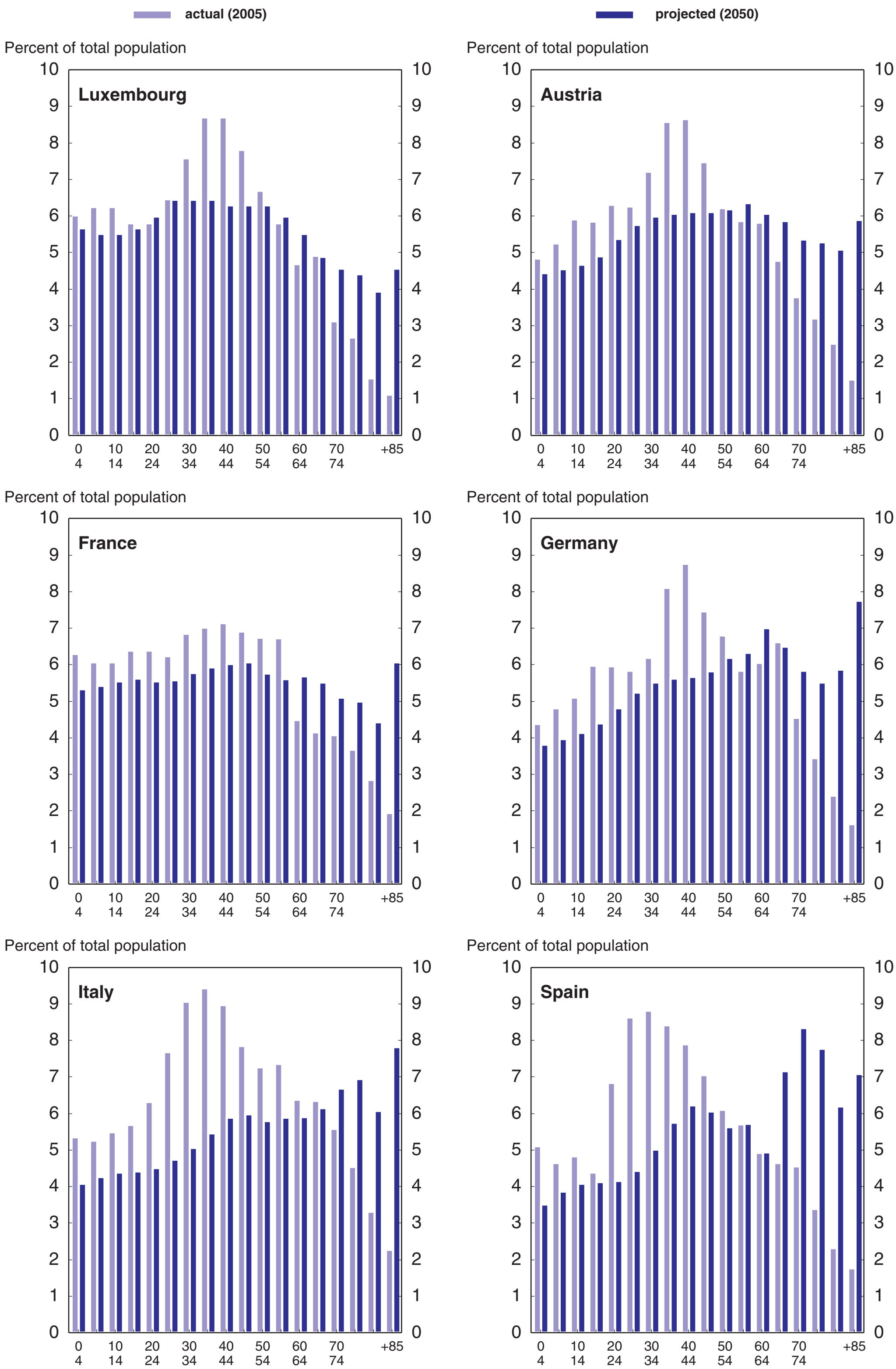
An important aspect of securing fiscal sustainability is that the benefits of early action are relatively high. For example, the sustainability gap is reduced by about 1 percentage point if the current stability programme is achieved in full.[7] Conversely, postponing the budgetary adjustment by five years increases the gap by ½ percentage point of GDP. So far the prospects of early action are somewhat dimmed. For example, in April 2006, the Tripartite Coordinating Committee created a discussion group on how to secure the long-term sustainability of the pension system, but the first meeting of this group only took place in late 2007.[8]

Measures to address the fiscal sustainability problem

The ageing effect of the baby-boomers is to a large extent off-set by the high inflow of relatively young immigrants and cross-border workers, implying that the baby-boom related increase in public pensions is not only transitory, but also relatively small as the old-age dependency ratio increases by 1½ percentage point less than in the EU (Figure 3.3).[9] The cost of ageing is mostly related to the generous parameters in the public pension system, which makes the increase in longevity and maturing of the system very costly. The increase in longevity has a permanent and substantial impact on the public pension system through the lengthening of the period during which the pension is paid. The maturing of the system implies a lasting change in the ratio between contributors and beneficiaries, which is again to a large degree related to the rapid increase in non-resident pensioners entitled to a complete pension.[10] Thus, the large permanent impact of ageing on the public pension system indicates that solutions to the fiscal sustainability problem should mostly be found within the parameters of the public pension system. Another issue is whether the underlying growth assumptions are plausible. This appears to be the case. The macroeconomic assumptions underlying the fiscal sustainability calculations are that GDP growth will decelerate from 4% to 3% after 2010, underpinned by an 80% increase in employment by 2050. The labour demand is assumed to be filled by a cumulative net immigration of 30%, one and a half time higher number of cross-border workers, and an increase in participation among residents. The growth projection still leaves Luxembourg as one of the fastest expanding economies in the EU and implies that the financial sector will continue to be a main engine of economic growth. Perhaps a greater concern is that the assumed increases in immigration and cross-border workers will require quite substantial investments in transport infrastructures and housing to materialise. Nevertheless, it is often suggested that developments outside the public pension system can solve the fiscal sustainability problem through, for example, faster growth, more immigration, increased fertility, etc.

These measures, however, constitute a set of non-solutions (Elmeskov, 2004). Higher growth achieved through faster expansion of labour productivity would have little impact on fiscal sustainability as pensions are adjusted in line with productivity growth and employees in the health sector will also benefit from higher real wages. Increased growth through even higher numbers of immigrants and cross-border workers would temporarily boost the contribution base. However, with time these non-nationals would also become eligible for public pensions and healthcare rights, implying that such a development at best constitutes a postponement of the maturing of the pension system (and would depend on

Figure 3.3. **Age pyramids in the OECD**



Source: OECD, *Employment Labour and Social Affairs Database*, 2007.

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immigrants and their descendants become well-integrated). In a similar manner, higher fertility could provide a temporary boost to the contribution rate, although such a development would have to materialise soon to have a significant impact on public finances before 2050 and would in the interim period induce higher spending in other areas, such as health care and education.

Thus, the solution to the fiscal sustainability problems lies with developments within the system. There are three main channels that can be used to solve the problems: *a)* prefunding, *i.e* building up assets to fund future ageing-related cost increases; *b)* expanding the funding base through increased labour market participation, and *c)* controlling growth in ageing-related spending (mainly pension and health and long-term care). Prefunding requires sustaining large budget surpluses over prolonged periods of time, which raises important political economy issues as such surpluses tend to induce demands for alternative public spending. Such political economy issues could be overcome by tying the prefunding to specific ageing-related costs. In this context, the current strategy of securing the viability of the pension system within a seven-year time horizon is a step in the right direction. However, the time horizon should be extended to include at least 2050. This implies that the current reserves of about 25% of GDP should be three to four times higher, as argued in the previous *Survey*. Also, given the special circumstances with respect to the large number of cross-border workers who will become eligible for health insurance coverage during their retirement, there is a need to broaden the scope of the reserve fund in the health insurance system (currently about 10% annual expenditures) to include prefunding of future health liabilities, for example with the objective of stabilising health insurance contribution rates (see also Chapter 4). Precise estimates of such health care prefunding are difficult to establish not least because of the issue of coverage of cross-border workers. However, given that the increase in health and long-term spending is likely to be in the same order of magnitude as the increase in pension spending, the required health care prefunding could be similar to that in the pension system. Either way, as noted above, with current policies there is a need for a fiscal tightening of 2¾ per cent of GDP to secure a sufficiently large surplus on the structural balance. Moreover, the earlier this is achieved the smaller is the required surplus.

The precise amount of appropriate prefunding depends on the implementation of other measures to secure fiscal sustainability. There is considerable scope for increasing the funding base as the average labour market participation rate is below the OECD average, reflecting mostly very low rates for older workers (see Chapter 1 and Figure 3.2). The labour market participation rate is likely to increase somewhat over time as the result of a cohort effect, reflecting that younger women have higher participation than older women. But boosting the participation of older workers has the dual effect of increasing the contribution period and reducing the benefit period, going to the core of controlling the pension part of the increase in ageing-related costs. Measures to control the ageing related increases in health care spending are discussed in Chapter 4. Many different measures can be used to boost the labour market participation of older workers, particularly closing down pathways to early retirement, as discussed in the previous *Survey* (OECD, 2006a). In the current context, this would mean moving the public pension system towards an actuarially-neutral basis. This can be achieved by increasing the retirement age or reducing the replacement rate. The official retirement age should, in preannounced planned steps, be increased by, for example, two years to partly reflect the 10-year increase in life expectancy since 1960, and thereafter link the official retirement age to developments in life expectancy. The latter would make the decision less dependent on political discussions and would thus be a more robust measure than discrete increases. Lowering the replacement rate raises important equity issues, which can only be addressed by having a long implementation horizon to allow people to adjust their savings and labour market participation decisions (Elmeskov, 2004). Currently, pensions are linked to wages. Reducing replacement rates over a sufficiently long time horizon could be achieved by linking pensions to price developments. Some improvements in living standards could be secured by having an additional partial adjustment to real wage developments, as recently implemented in Norway.

The fiscal policy framework needs to be strengthened

The favourable fiscal position could be taken as a sign that there a few important short-term concerns with respect to fiscal policy. However, the position has emerged on the back of favourable economic trends. As argued in Chapter 1, the economy is likely to slow down both for conjunctural and structural reasons, implying that tax revenues will become less dynamic. Adding to this process is the temporary nature of some tax revenues, as discussed above. At the same time, it is imperative to close the fiscal sustainability gap. To illustrate the task at hand, then in the absence of measures to boost the contribution base or control ageing-related cost increases, overall spending growth has to be curbed sufficiently to secure a surplus on the structural balance in excess of 4½ per cent of GDP. The current input-based budget process is unlikely to provide a sufficiently strong framework to meet this challenge (Box 3.4).

Box 3.4. **The budgetary framework**

The budgetary procedures start in spring when the Minister for the Treasury and the Budget circulates political and technical guidelines to ministerial departments, including objectives and growth ceilings on various categories of public expenditures that should be observed when drawing up their departmental budgetary proposals. Later in the spring, the Prime Minister then presents the government's broad social and economic policy guidelines to Parliament. In August and September, ministers finalise the draft budget taking into account departmental spending priorities and the government's budget objectives, and it is presented to Parliament in October.

Over the years a number of improvements in the budget process and control have been implemented to enhance transparency. In 2004, approval of the draft budget was postponed from August to October, which improved the quality of the budgetary projections and reduced the need for budgetary amendments, thus concentrating available resources on the budget.

Public investment projects have since 2005 been subjected to cost analysis – further pursued through the launch of public-private partnership pilot schemes – and more regular reporting about cost developments to Parliament. In addition, large-scale infrastructure projects have come under additional control as significant changes in such projects or budgetary overruns in excess of 5% require a new government bill. The benefits of public investment projects, on the other hand, are not assessed in a systematic manner, implying that standard use of cost/benefit analysis is currently not applied in Luxembourg.

Box 3.4. **The budgetary framework** *(cont.)*

From the 2008 budget onwards, the budget is also being presented on an accruals basis (using the European Systems of Accounts – ESA95) thereby making the link between the cash based presentation of the budget and the national accounts. This also facilitates linking the short-term horizon in the budget and the medium-term budget outlook presented in the annual updates of the Stability Programme. To further this process, the delay between the presentation of the budget and of the programme was shortened. Transparency was further enhanced by presenting the multi-annual capital spending programme simultaneously with the draft budget.

Outside the formal budget procedures, the central bank began a couple of years ago to issue written comments on the draft budgets. Making the budget subject to an assessment by an external and independent institution is likely to enhance the transparency and the credibility of the process.

A recurrent problem is that projecting trends in revenues and spending has been more difficult than in many of the other European countries (BCL, 2007b and European Commission, 2008). This is to a large degree related to difficulties in projecting macroeconomic trends, but also because at times some spending and revenue assumptions have appeared overly conservative in view of historical trends (BCL, 2006). A recent example of these difficulties is that at the time of the 2006 tripartite agreement, a substantial budget deficit (around 1¾ per cent of GDP) was expected, whereas the 2006 outcome was a 1.3% of GDP surplus, mostly related to the unusually strong 12% growth in nominal GDP. An additional issue in this respect is that final budget data tend to be published relatively late the following year. Large disparities between projections and outcomes reflect to a large degree the volatility of the Luxembourg economy, although pinpointing the exact projection error is difficult as statistics compilation, macroeconomic projections, and budget preparations are all provided by the government. Furthermore, better-than-projected budget outcomes tend to fuel the already strong demand for additional spending. The budgetary process has been improved over the years (Box 3.4). In the 2008 budget, a new measure to improve transparency was to present the budget not only in its traditional cash basis, but also on an accrual basis (national accounts standard).

Thus, measures aimed at improving the fiscal policy framework need to link the short-term budget with a long-term strategy to secure fiscal sustainability. This would require that a restructuring of the budget process from being mostly input-based to becoming outcome oriented. The first budget decision should be to determine an overall spending ceiling that is compatible with the projections for macroeconomic and revenue developments as well as with long-term budget objectives. This implies that, if the fiscal sustainability gap is to be closed over a five years period through a fiscal tightening of 2 per cent of GDP under the assumption that the revenue-to-GDP ratio remains constant, then the ceiling on growth in spending would be 1½ percentage points less than nominal GDP growth. Once the overall spending ceiling has been determined, the political process should concentrate on distributing the ceiling between various budget lines. Within each budget line, output budgeting should then become the norm so as to focus on how to achieve desired outputs with available resources, *i.e.* emphasising spending efficiency.

Making the spending ceilings multi-annual would improve planning and transparency. An additional measure to improve budgetary discipline would be to exempt

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one-off and temporary revenues outside the calculation of overall spending ceiling. This would be particularly relevant for VAT receipts from e-commerce, which could be sharply reduced when the EU's VAT directive implements the "place of destination" principle in 2011. To make the budget process transparent and credible, there needs to be a clearer separation of statistics compilation, macroeconomic projections, and budget preparation. Other countries, such as Austria, Belgium, Canada, the Netherlands and Sweden, have gone one step further by creating independent institutions to provide the underlying macroeconomic projections and, in some cases, assessments of the projected spending and revenue trends [for a more detailed discussion, see for example Jourmard and André (2008) and Annett *et al.* (2005)]. To further improve the transparency of the process, a mid-budget year evaluation could be put in place to assess whether budget developments are on track.

Modern public human resource management can improve public sector efficiency

Measuring public sector efficiency is a complex task due to heterogeneity of public activities (administration, education, health, infrastructures, etc.) and the government's more "Musgravian" activities in terms of resource allocation, income distribution and economic stabilisation. In an international comparison, Afonso *et al.* (2003) found that public sector efficiency in the health sector was below the average of the other countries and in the education sector was the lowest among all the OECD member countries. Health care is an important part of the ageing-related cost increases and the main issue in this area is to secure the efficient provision of health care services, which is dealt with in Chapter 4. In education, the two main concerns are whether the provision of education is cost-efficient and geared to the needs of the labour market, which are increasingly oriented towards skilled workers in the financial sector.[11] These issues are considered in Chapter 5. In the following, common features of the human resource management and its effect on public sector efficiency are discussed in some detail.[12]

Since 2000, public sector employment has expanded by some 2¼ per cent per year.[13] An implication of this rapid expansion is that one-third of all employed Luxembourgers work in the public sector. Besides obvious labour market issues, this raises the question of whether public human resource management systems can cope with such a robust expansion of employment and maintain service standards at reasonable levels of efficiency. Another issue is whether human resource management practises (recruitment, employment protection and remuneration policies) are promoting the most efficient provision of public services.

Recruitment of most civil servants in the public sector (the central government, municipalities and public services, such as pension insurance funds) is carried out through a centralised competitive examination system. These exams are organised several times per year. The general requirements are that candidates have Luxembourg nationality, the required educational background, and master the three official languages.[14] Typically, most of the emphasis in the exams is on general issues, with about a third of the final test score given in the language tests, another third for tests of general aptitude and general knowledge of concurrent issues, and the remainder of the score for the (general) questions related to the required qualifications. The exact weighting depends on the grade of the vacancy. Upon successful examination, the candidate is put on a waiting list from which the Ministry of Public Functions and the relevant administration draw to fill vacancies.[15]

A hired candidate enters a two year probation period after which that person is effectively hired for life. Dismissals are very rare and typically related to inappropriate conduct.

The selection process is considered as an egalitarian approach to secure the most able candidates. However, the general nature of the competitive exams tends to favour candidates with relatively good educational and social backgrounds, creating a risk of social bias without identifying the best candidate to the specific job, particularly where job functions require specific and non-formal skills. An additional concern is that the juries (nominated by the Ministry of Public Functions) evaluating the tests are composed of teachers (who have no prior experience of the general work requirements) and civil servants (who do not necessarily have prior experience of the specific work requirements). Moreover, the relatively favourable wage conditions (see below) means that candidates with high educational attainment may even apply for posts with less strict educational requirements, leading to resource misallocation and a squeeze on candidates with less favourable educational attainment. In other countries, like France, that use similar selection procedures, these are increasingly being questioned (Desforges and de Chalvron, 2008) (Box 3.5). Moreover, the required qualifications of applicants may unnecessarily restrict the available supply of qualified workers (for example, the language requirements

Box 3.5. **Are general entry exams optimal for selecting public servants?**

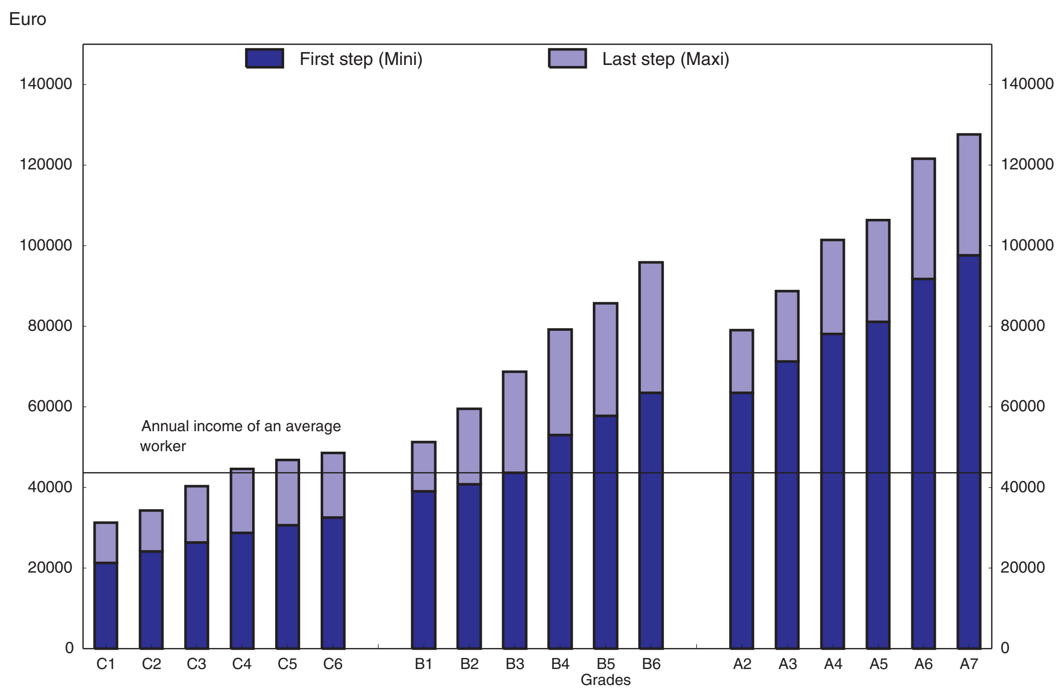
Recruitment in the public sector is likely to be a growing concern in many European OECD countries over the coming decades as relatively large shares of the public workforce will retire at the same time as the new cohorts entering the labour market will be relatively small (Høj and Toly, 2005). In Luxembourg, the ageing of the public workforce is less of a concern than in other countries due to its relatively recent expansion and relatively small size. Furthermore, future cohorts entering the labour market are relatively large as the total number of new born is today some 12% higher than in 1990. However, this reflects an increase in the number of new born with foreign parents. Indeed, the number of new born Luxembourgers has fallen by 25% over the same period, implying that the pool of applicants with the right set of pre-qualifications will be shrinking. Thus, there will be a growing need for matching candidates' qualifications with the requirements of the vacancies. In this respect, the current exam system can be criticised on a number of points:

- The entire process is initiated by the departure of an employee and little analysis is put into evaluating the real needs of the organisation, implying that the selection process does not reflect the objectives of the organisation.
- The vacancy advertisement tends to contain formal job requirements, but little information about the professional capacities or profiles required to exercise and fulfil the associated job duties, implying that the process is not focusing on the competences of the candidates.
- The content of the exams is based on the educational background of the candidates and not according to the needs of the administration. For example, it is unlikely that all public positions require the language capabilities that are tested in the 2-3 written foreign language tests.
- The quality of the recruitment process is evaluated through its selectivity rather than through the quality of the output, *i.e.* the candidates passing the exams.
- There are no practical tests of candidates (except for craftsmen), implying that there is no evaluation of the candidate's aptitudes with respect to the vacant post.

may be excessive and unnecessary for French and German language teachers). In a similar way, the nationality requirement prevents the composition of the police force from reflecting that of the society – considerations that are emphasised in other countries, like the UK and the Netherlands.[16] Thus, to better match the qualifications of new hire with the job requirements of vacancy, the authorities should consider introducing a more decentralised recruitment process where public administrations define their needs in terms of educational and professional background and organise their own hiring procedures with an increased derogation from the formal qualification requirements.

Civil servants are organised in three career grades according to length of study. The highest grade is for candidates with at least four years of university study; the mid-level career grade requires an upper secondary education and up to three years of further studies; access to the low-level grade generally demands a primary education certificate, although a number of years of secondary schooling may be required in specific cases. Starting salaries in the public sector are relatively high, particularly for lower level careers – for example the entry wage for a low level career post is 15% above the legal minimum wage (Figure 3.4). Moreover, the remuneration for all three career categories includes regular seniority based wage increases (typically in the order of 1½ to 2 per cent per year). In addition, public wages are subject to the general indexation of wages and transfers. Finally, general wage increases are negotiated during the regular wage rounds, amounting to an average 1¼ per cent real wage increase over the past ten years.[17] So even abstracting from the increased remuneration associated with promotion to a higher ladder within the career category, regular annual real wage increases are substantial.[18] Compared with the

Figure 3.4. **Starting and final annual income in the public sector compared with an average worker without children in the private sector**



Source: Secretariat calculations; OECD, *Taxing Wages*, 2006/07.

StatLink http://dx.doi.org/10.1787/380617827471

private labour market, this implies that public sector wages for low- and mid-level careers are very competitive and less so for high-level careers. In addition, job security is higher in the public sector, implying that public employees are less likely than the private counterparts to see interruptions in their income streams.

The favourable income situation in the public sector is likely to attract high calibre candidates for vacancies in the sector. However, once hired, the rigid wage seniority based scales are not encouraging additional work effort – a particular problem for older employees with limited career perspectives – which has a dampening impact on public sector efficiency.[19] For performance or merit pay systems in the public sector to have a positive effect on efficiency depends on the establishment of objective multi-dimensional performance indicators (that separate out individual efforts) and greater managerial autonomy. At the same time, such systems have to be transparent, focussed and lead to significant rewards. Such a reform takes time to implement and may have to be tailor-made to individual sectors, depending on such issues as the importance of collective efforts. An intermediate first step could be to make the seniority-based step increases partially dependent on performance. Moreover, to emphasise the performance enhancing element of such a reform, the current system of wage negotiations should be kept in the form of negotiated wage sum increases, but where individual wage increases are distributed according to performance.

To sum up, there are few short-term concerns with respect to fiscal policy. On the other hand, updated estimates of the fiscal sustainability gap are higher than previously thought. Thus, there is a need for immediate action over a broad range of policies to finance ageing-related spending increases to avoid abrupt increases in tax rates or reductions in other spending areas. The implementation of such measures would be facilitated by a strengthening of the fiscal policy framework to link short-term budget developments to longer term objectives as well as to focus on the budget on achieving the efficient delivery of desired outcomes. More general, public sector efficiency should be pursued through both general measures, such as public sector human management policy as well as through sector specific measures as dealt with in the following chapters. A summary of the policy recommendations in this chapter is presented in Box 3.6.

Box 3.6. **Summary of fiscal policy recommendations**

Measures to securing fiscal sustainability

- If no other policies measures to close fiscal sustainability gap are implemented and the public debt-to-GDP ratio is allowed to increase to 60%, then by 2009 fiscal policy needs to be tightened by 2% of GDP to close the gap. In this respect, early action is important to avoid a snowball effect in public debt.
- *Prefunding* should be linked to specific ageing-related cost increases. In the public pension system, the time horizon of the pension reserve fund should be extended from seven years to include at least 2050 and the current reserves should be three to four times higher.
- In the health care system, the role of the reserve fund should be expanded to include prefunding, requiring a substantial increase of the current reserves, possible to levels similar to those in the pension reserve fund.
- The *funding base* should be broadened through higher labour market participation of older workers by closing down existing pathways to early retirement and moving the public pension system towards an actuarially-neutral basis.
- The retirement age should be increased to reflect past gains in life expectancy and should thereafter be linked to further developments in life expectancy.
- A lowering of the replacement rate should be phased in over a long time horizon to allow workers to adjust their working and savings decisions to avoid negative equity concerns. This can be achieved by linking pensions to developments in prices and preserve some improvements in living standards by having an additional partial adjustment to real wage developments.
- These measures in the pension system would also contribute to *control ageing-related cost increases*. Reforms in the health sector, the other area with substantial increases in ageing-related costs, should also be introduced as outlined in Chapter 4.

The fiscal framework should be improved

- The link between short-term budgets and the long-term strategy to secure fiscal sustainability should be strengthened.
- Transparency in the budget process should be improved by clearer separation of statistics compilation, the production of macroeconomic projections, and budget preparation. The credibility of such separation measures would be enhanced by having an independent institution to provide macroeconomic projections and assessments of spending and revenue trends, including a mid-year budget review.
- The budget process should be based on establishing (preferably multi-annual) spending ceilings that are subject to short- and long-term fiscal considerations and which exclude one-off and temporary revenues.
- Within individual budget lines, output-based budgeting should become the norm to emphasise the efficient provision of public services.

Public human resource management should be oriented towards efficiency

- To improve the match between qualifications of new hire and job requirement, a more decentralised recruitment process should be introduced, where public administrations define their needs in terms of educational and professional background as well as organise their own hiring procedures with an increased derogation from the current strict qualification requirements.
- To link wages to public sector efficiency, multi-dimensional performance or merit-based pay systems should be introduced alongside greater managerial autonomy. An intermediate step would be to make the current seniority based step increases partially dependent on performance. In addition, the distribution of wage increases following the regular wage rounds should be distributed according to performance.

Notes

1. Capital income revenues were about 0.3% of GDP higher than expected in 2006 as Arcelor S.A. paid out markedly higher dividends in connection with the take over battle, which eventually resulted in the merger between Arcelor S.A. and Mittal Steel. In connection with the merger, the government obtained EUR 408 million (about 1.2% of GDP) as a result of the exchange of Arcelor shares against Mittal cash and shares.
2. The capital duty revenue amounted to EUR 106.3 million in 2007 (Le Gouvernement du Grand-Duché de Luxembourg, 2008).
3. The general government has large financial assets, amounting to 33.9% of GDP in 2007. Reserves in the pension system amount to about 27 % of GDP and the central government holds assets (budgetary reserves and reserves of the special funds) for about 5.7 % of GDP.
4. The increase in ageing-related spending is mostly related to an increase in the number of +80 years as only a modest increase in the cohort of 65-80 years is expected. Indeed, due to an expected continuation of the high immigration flow, Luxembourg will in 2050 be one of the few European countries with a larger working-age population than in 2003. The increased ageing-related spending is partly offset by lower spending on other items. The fall in spending associated with unemployment is relatively limited whereas the fall in education spending is somewhat larger than in other countries.
5. As observed in Chapter 1, a substantial part of ageing in Luxembourg consists of an increase in the share of very old people, which will drive up long-term care costs. This development will weight on the overall cost of health care because the “cost disease” in health care is more acute in the long-term care because of its labour intensive activities (OECD, 2006b).
6. Another way of assessing the sustainability problems is to consider the implied development in government debt if policies are not implemented to address the issue, and which for Luxembourg will reach 268% of GDP in 2050. European Commission (2006) “The long-term sustainability of public finances in the European Union”, European Economy, No. 4/2006.
7. Another way of expressing this is that if no action is taken, the government debt-to-GDP ratio is set to reach 200% of GDP if the stability programme is not achieved and 150% of GDP if achieved. Another issue, is that if Luxembourg is to avoid breaching the deficit limit of 3% of GDP, a structural surplus in excess of 1% of GDP is needed because of the high volatility of the fiscal balances (BCL, 2006b).
8. Pension contributions equal 24% of gross wages with an upper ceiling five times the social minimum wage; this is co-financed with an equal split between the employee, the employer and the state. Contributions are deductible from income taxes. By law the pension systems must have a minimum reserve of 1½ time the yearly expenditure on pension benefits.
9. The number of pensioners will be about 160% higher by 2050, while the increase of contributors is about half as large, implying an increase in the ratio of pensioners to contributors from 42 to 62, which is low compared with the EU increase from 10 to 86.
10. The importance of the maturing of the system and the absence of measures to reduce ageing-related increases in pensions mean that the increase in the take-up and the benefit ratios will add about 4½ percentage points of GDP by 2050, whereas reforms in other European countries mean that the same factors for the EU 25 will lower pension spending by 5 percentage points of GDP. An additional issue is that the pensions of the non-resident pensioners are not consumed in Luxembourg, thus reducing the overall financing base.
11. Surveys indicate a lack of 2-3 000 highly qualified specialists.
12. The government programme from summer 2004 includes a pledge to reform and modernise the public sector. Discussions of how to re-orientate budgets from being input based to output evaluated have already taking place within Luxembourg, see for example Krecké (2007). An action plan originating from the European CAF programme (Common Assessment Framework) is being put in place to improve public services, including the introduction of e-government measures, public opinion polls (of services delivered), satisfaction inquiries, the development of codes of conduct and human resources, and public administration modernisation measures, etc.
13. In the 2000s, employment creation in central and local governments has had equal strength, while the number of employees in the railways has been reduced modestly. Moreover, employment creation in the private sector was somewhat stronger during the period, implying that public sector employment as a share of total employment has fallen by nearly 1½ percentage points to about 10%.
14. The nationality requirement is waived for applicants from the other EU states for the following sectors: research and education, health, land transport, post and telecommunication, and utilities. The language requirement is waived in cases where the vacancy does not require it. This rule is likely to be changed following a recent EU ruling that the general trilingual requirement is excessive and that the language requirement of each individual job must be evaluated.

15. Formerly, the candidates with the best scores were allowed to choose which vacancy they wanted to fill.
16. Nationals of other EU countries can become low-level policy officers provided that they fulfil the language requirements. However, all other posts are reserved for Luxembourg nationals – a requirement that sharply reduce the attractiveness for non-nationals of pursuing careers in the police force.
17. Recently, public sector employees received a one-off bonus amounting to 0.9% of their gross wage in December 2007, which will be repeated and again in December 2008. In 2009, public wages are set to increase by 1.5% (BCL, 2007).
18. In addition, for the first four levels within each grade *ad personam* promotions can be obtained by passing promotion exams, implying that the civil servant continue to carry out the same function, but at a higher wage. The promotion exams are organised locally. Test of the language requirement are less vigorous. Moreover, the promotion exams are often taken after the candidate has completed training courses at the Natioinal Institute of Public Administration. Part of the test may include written reports about career specific themes or even practical tests.
19. Pilot studies are being implemented to introduce evaluations of public employees by their hieratical superior, including assessment of work quality, professional developments, training needs, future responsibilities and work objectives. These evaluations, however, are not linked to remuneration issues.

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Chapter 4

Healthy and wise: enhancing cost efficiency in health care

Luxembourg devotes large financial resources to health care, offering nearly unrestrained access to a modern medical system. Despite comprehensive coverage, the health status of the population is only average by international comparison. Quality indicators also lag behind those of best-performing countries and patients do not appear overly satisfied. At present, the health care insurance system is close to financial balance, thanks to rising prime-age cross-border workers, who rejuvenate the demographic structure by around three years. Yet, spending growth is set to accelerate with the graying of the population. Between 2005 and 2050, health and long-term care public spending is projected to increase from 7% of GDP to almost 14% of GDP in the absence of restraining measures, which would put Luxembourg among the largest health care spenders in the OECD. Therefore, the challenges facing policymakers are both to increase the quality and the cost efficiency of health services. There is no simple policy to address these challenges and reforms in various directions will be needed, such as more preventive care. A policy that is likely to bring significant payoffs is to encourage the sickness funds to act as "wise" buyers of services, rather than mere payers. For instance, they should make more frequent use of cost-efficiency analyses of services rendered and encourage accountability in order to allow patients to make more informed choices and to seek care in hospitals or ambulatory care where quality is combined with cost consciousness. This would imply removing barriers to seeking care from hospitals in neighbouring countries, which have generally lower costs. Paying for hospital services on the basis of output-related activity would go in this direction. Finally, patients could become more responsible users of health care services if their co-payments were raised where appropriate.

Luxembourg has a modern health care sector. Average waiting times are short, health care insurance covers virtually all residents irrespective of income and the average distance to hospitals and other providers is small. The flip side is that cost pressures have been mounting considerably, with total health care spending per insured person growing at almost 6% annually in real terms over the past 10 years (7.8% p.a. when measured in per capita terms), one of the highest rates among OECD countries. Luxembourg is a rich country and it can certainly afford to spend a lot on health care if it wishes to do so. However, despite high spending, the health status of the population has not improved more than in other countries and is only average by international comparison. The health insurance system has so far been able to finance the large increase in spending without resorting to significant hikes in contribution rates, as the large influx of prime-age cross-border workers contribute considerably more than they demand. However, the ageing of the covered population points to substantially larger spending pressure in the future, rendering it difficult to maintain current arrangements. Hence, it will become more and more important to realise efficiency gains and seek better value for money, as argued below. The chapter first briefly describes the health care services provided, the health status of the population and the health insurance arrangements. Possible reforms to enhance spending efficiency in the various sectors are then discussed and a list of policy recommendations is provided.

Health care services

The health care sector supplies a broad variety of medical services to Luxembourg's patients. There is ample supply of hospital care, with five general hospitals and six specialised institutions. Both public and private providers operate in the hospital sector, some hospitals being public establishments, others run by clerical associations, and some private clinics. The capacity of hospital beds relative to the population is high by international standards, while the density of general physicians and specialists is close to the OECD average (Table 4.1). Patients are free to visit doctors, subject to a moderate ceiling on the number of consultations per month (12 visits per 6-month period). With the exception of those employed by the main public hospital, the *Centre hospitalier de Luxembourg,*[1] doctors (including hospital doctors) are generally remunerated on a fee-for-service basis and work independently. Doctors' fees are above the international average, in particular for specialists (Figure 4.1). Despite the *de facto* external consultant status of hospital doctors, they are not obliged to pay rental fees for the use of hospital equipment. While there is in principle a freedom of establishment in Luxembourg for all health care providers, a prior official agreement by the Ministry of Health is necessary. In the case of doctors, authorisation must be sought from the Ministry, which is advised by the *Collège des Médecins*, a self-regulating body that verifies the competence level of the candidate, including language competences.

Health status

Despite ample supply of care and widespread insurance coverage, the aggregate health status of the population is only around the OECD average. Health-adjusted life

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Table 4.1. **Density of GPs, specialists and dentists (2006)**

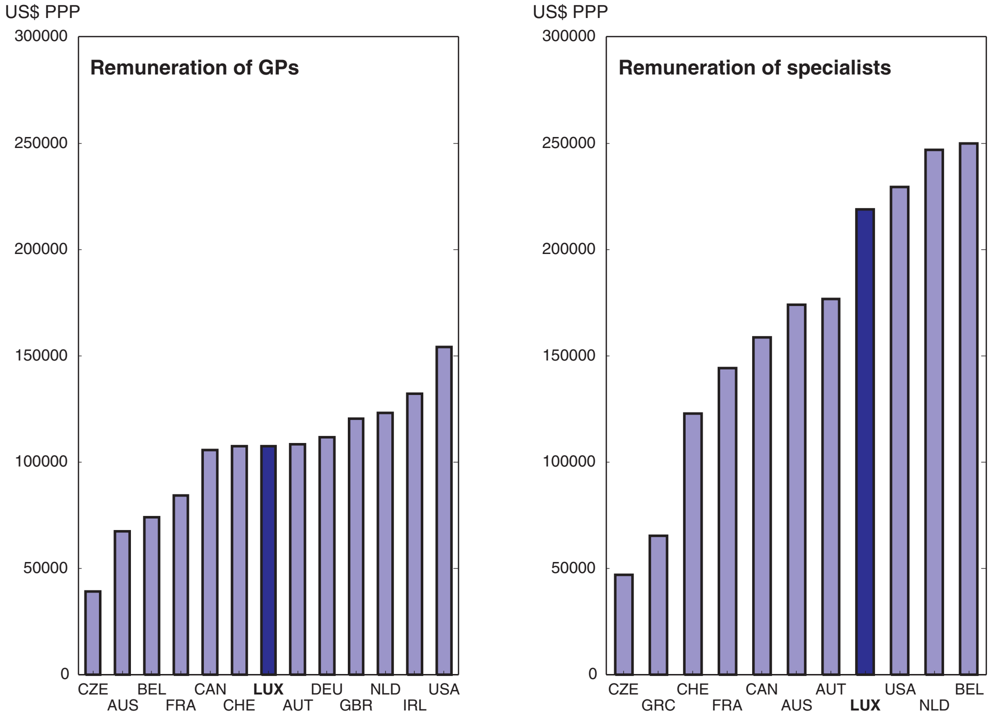
Per 1 000 persons

	General practitioners			Practising specialists			Dentists		
	1990	2000	2006	1990	2000	2006	1990	2000	2006
Australia	1.3	1.4	1.4	0.9	1.1	1.3	0.4	0.5	0.5
Austria	1.1	1.3	1.5	1.1	1.8	2.1	0.4	0.5	0.5
Belgium	1.9	2.1	2.1	1.4	1.8	1.9	0.7	0.8	0.8
Canada	1.1	1.0	1.0	1.0	1.1	1.1	0.5	0.6	0.6
Czech Republic	–	0.7	0.7	–	2.6	2.8	0.5	0.6	0.7
Denmark	0.8	0.7	0.8	0.9	2.1	2.3	1.0	1.0	1.0
Finland	0.6	0.7	0.7	1.1	1.4	1.4	0.9	0.9	0.9
France	1.6	1.6	1.7	1.4	1.7	1.7	0.7	0.7	0.7
Germany	–	1.1	1.0	–	2.2	2.4	–	0.8	0.8
Greece	–	0.3	0.3	2.2	3.1	3.3	1.0	1.1	1.2
Hungary	0.6	0.7	0.7	2.0	2.3	2.0	0.4	0.5	0.5
Iceland	0.6	0.7	0.8	–	–	2.2	0.9	1.0	1.0
Ireland	–	0.5	0.5	–	–	0.7	0.4	0.5	0.6
Italy	–	0.9	0.9	–	–	–	–	0.6	0.6
Japan	–	–	–	–	–	–	0.6	0.7	0.7
Korea	–	–	0.6	–	–	1.0	0.2	0.3	0.4
Luxembourg	**0.8**	**0.6**	**0.7**	**1.2**	**1.5**	**1.8**	**0.5**	**0.6**	**0.7**
Mexico	0.5	0.6	0.6	0.5	1.0	1.2	0.1	0.1	0.1
Netherlands	0.4	0.5	0.5	0.9	1.0	1.0	0.5	0.5	0.5
New Zealand	0.7	0.8	0.7	0.6	0.7	0.7	0.4	0.4	–
Norway	0.7	0.8	0.8	–	2.0	2.1	0.8	0.8	0.8
Poland	–	0.1	0.1	–	1.8	1.6	0.5	0.3	0.3
Portugal	2.0	1.5	1.6	0.8	1.6	1.7	0.2	0.4	0.6
Slovak Republic	–	0.4	0.4	–	2.4	2.3	–	0.5	0.5
Spain	–	–	0.9	–	1.8	1.9	0.3	0.4	0.5
Sweden	–	0.5	0.6	–	1.7	1.9	1.0	0.8	0.8
Switzerland	0.4	0.4	0.5	1.4	2.1	2.6	0.5	0.5	0.5
Turkey	0.5	0.7	0.7	0.4	0.6	0.7	0.2	0.2	0.3
United Kingdom	0.6	0.6	0.7	1.0	1.3	1.7	0.4	0.4	0.5
United States	–	0.9	1.0	–	1.4	1.5	0.6	0.6	–
OECD average	0.9	0.8	0.8	1.1	1.7	1.7	0.5	0.6	0.6

Note: Density of general practitioners, specialists and dentists per 1 000 population.
Source: OECD, *Health data*, 2007.

expectancy measured at birth is slightly higher than the OECD average, but life expectancy at age 65 is below the average (Figures 4.2 and 4.3). In part, this reflects above-average mortality rates of patients with diseases of the respiratory system (pneumonia, bronchitis); while mortality rates of patients with cancer and diseases of the circulatory system (stroke, heart disease) are average (Table 4.2). Thus, it would appear that, for patients suffering from these diseases, the health care system does not perform very satisfactorily, despite high spending. Of course, the health status of the population also depends on factors that are not directly related to medical services, such as lifestyle. In this regard, the high number of road accidents (partly related to the high intensity of commuting by automobiles) appears to have a relatively large effect on life expectancy (Table 4.3). Also, the high incidence of obesity is worrying and may point to further spending pressures in the future, when related long-term health problems will manifest themselves more strongly.[2] In addition, consumption of alcohol is high, even if part of this high consumption may be related to cross-border trade due to lower excise taxes (Balia and Jones, 2008). As a

Figure 4.1. **Remuneration of GPs and specialists (2004)**



Source: OECD, *Health data*, 2007.

StatLink http://dx.doi.org/10.1787/380624171644

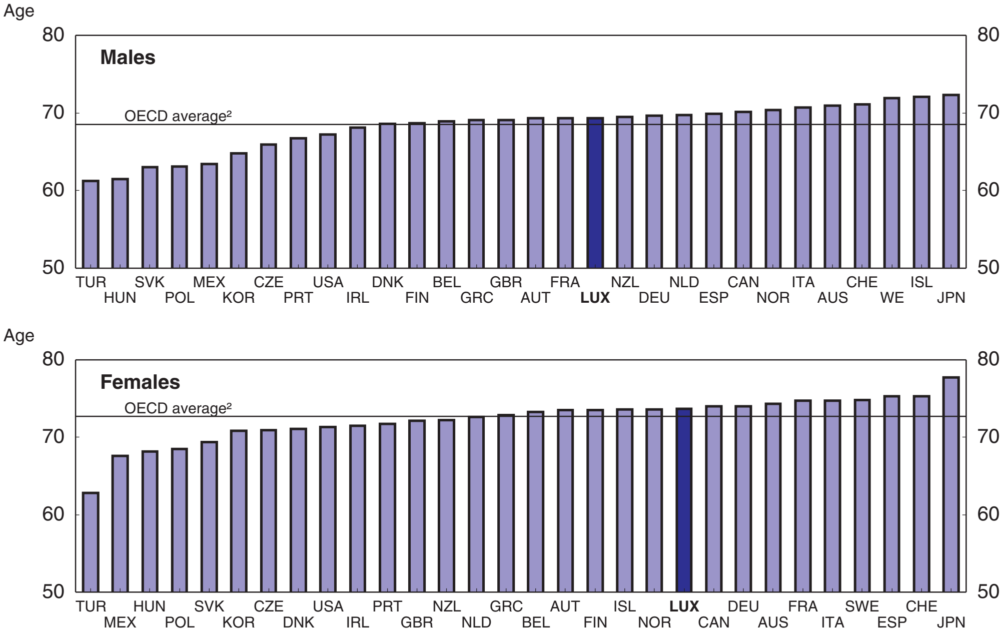
result, the incidence of liver diseases and cirrhosis is higher than in other European countries (WHO, 2006).

Quality indicators allow for a more direct performance assessment of specific areas of the health care system than a simple comparison of health spending and mortality, notably because they are less affected by differences in lifestyle and accident rates. A frequently-used indicator is the incidence of mortality among patients admitted in hospitals with a heart attack (*acute myocardial infarction*). In this respect, the performance of Luxembourg is average (fatality rate of close to 10%, similar to the international average) (Table 4.4). An alternative measure of medical performance is the avoidable mortality rate for cancer, in particular for those forms of cancer where the quality of medical screening and treatment (such as skin and different forms of uterus cancer) is more important than factors related to lifestyle (such as lung cancer). Again, the Luxembourg health care system does not perform significantly above the international average with respect to these indicators.

A complementary indicator for the quality of the health care system can be derived from survey evidence on patient satisfaction. Even though these opinion polls suffer from a number of drawbacks – including sample selection bias and lack of consistent data – they may still provide additional information on how users of the health care system value the scale and scope of services rendered. In this regard, Luxembourg patients appear to be less satisfied with their health care system than patients in many other Western European countries (Figure 4.4). In addition, a relatively high number of respondents in opinion polls indicate that they need additional health care services. As these survey results also show, access is not an issue. Rather, the lack of quality and of information on alternative

Figure 4.2. **International comparison of health-adjusted life expectancy at birth**[1]

2002

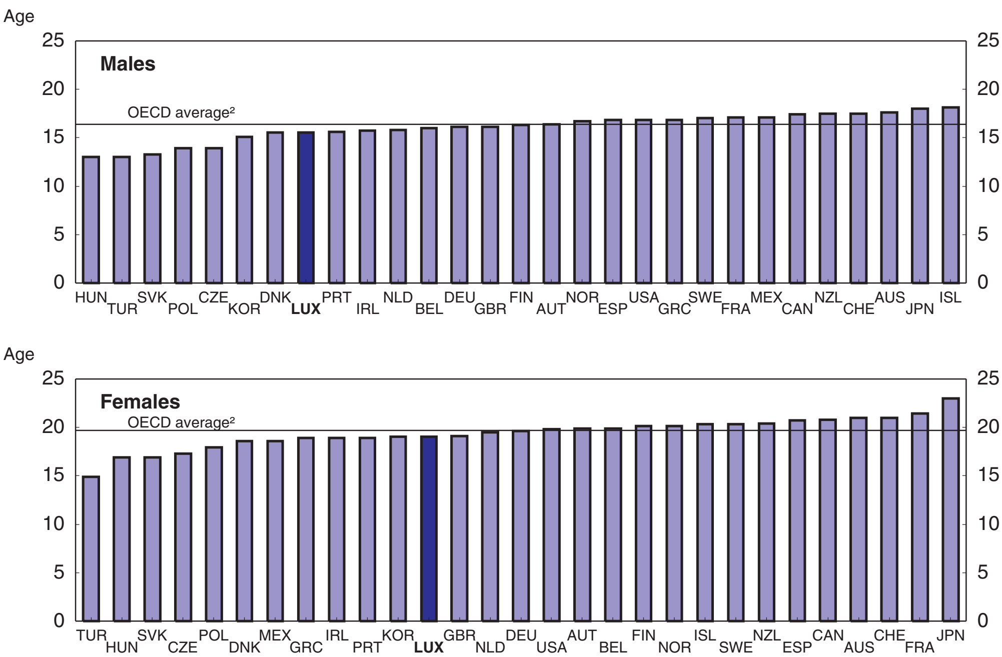


1. Health adjusted life expectancy refers to life expectancy adjusted for years of sickness, weighted by the degree of sickness.
2. Population-weighted average.

Source: OECD, *Health data*, 2007.

StatLink http://dx.doi.org/10.1787/380656834610

Figure 4.3. **International comparison of life expectancy at age 65**[1]



1. 2003, France, Spain and the United Kingdom: 2002.
2. Population weighted average.

Source: OECD, *Health data*, 2007.

StatLink http://dx.doi.org/10.1787/380657538388

Table 4.2. **Mortality rates for different diseases**

Deaths per 100 000 people; average 2000-05

	Mortality from diseases of the respiratory system	Mortality from diseases of the circulatory system	Mortality from cancer
Australia	43.7	185.5	159.4
Austria	32.6	258.6	161.5
Canada	43.0	183.0	174.4
Czech Republic	37.3	431.1	221.3
Denmark	64.9	237.1	210.9
Finland	45.4	256.5	141.3
France	32.0	152.4	172.9
Germany	37.3	265.8	166.4
Greece	44.6	305.5	154.3
Hungary	35.8	482.7	246.0
Iceland	40.7	201.4	159.2
Ireland	95.0	254.4	184.5
Italy	32.3	213.9	170.6
Japan	56.7	130.9	147.5
Korea	50.1	179.9	166.3
Luxembourg	**51.8**	**232.5**	**166.6**
Netherlands	58.6	207.3	185.0
New Zealand	48.1	233.5	180.9
Norway	51.2	214.9	164.9
Poland	39.2	399.4	203.1
Portugal	58.2	250.9	152.3
Slovak Republic	51.2	507.5	206.9
Spain	55.9	176.3	159.0
Sweden	35.7	235.6	150.3
Switzerland	31.7	178.8	146.9
United Kingdom	74.8	233.4	180.4
United States	61.2	233.4	165.9
OECD average	48.5	253.4	174.0

Note: The table presents mortality rates from diseases of the respiratory system (*e.g.* bronchitis, pneumonia), of the circulatory system (*e.g.* stroke, heart disease) and from cancers. The mortality rates are age-standardised taking the age structure of OECD countries in 1980 in order to allow inter-temporal and cross-country comparisons. No data are available for Belgium, Mexico and Turkey.

Source: OECD, *Health data*, 2007.

treatments outside Luxembourg seems to be the main factor explaining dissatisfaction of Luxembourg patients (Health Consumer Powerhouse, 2007).

Healthcare insurance

The entire population[3] is covered by a public health insurance system, with financing coming from the government, employers and insured individuals. The law mandates that all economically-active persons contribute to the health insurance system, with social security contributions being subject to a ceiling (for incomes that are above five times the "minimum guaranteed income"). Individuals with income below the minimum guaranteed income (typically those receiving social benefits) have their contribution paid by the government. The contributions of pensioners are calculated in a similar way. The social security contribution rates applied to workers and employers are set yearly by the Union of Sickness Funds (*Union des Caisses de Maladie*, UCM), taking into account the discussions in the quadripartite meeting (bringing employers, employees, the government and health care providers together). The state contribution rates ("*contribution de l'État*") are fixed by law to an

Table 4.3. **Differences in life-style and road accidents across the OECD**

	Alcohol consumption[1]	Pollution	Overweight population[2]	Obese population	Road accidents
Australia	9.8	86.0	58.4	21.7	7.7
Austria	11.1	25.0	46.1	9.1	8.8
Belgium	10.7	28.0	44.1	12.7	10.2
Canada	7.9	78.0	49.9	18.0	9.1
Czech Republic	12.1	31.0	52.0	17.0	10.4
Denmark	11.5	36.0	44.6	11.4	5.4
Finland	9.3	41.0	49.2	14.1	6.4
France	13.4	23.0	34.6	9.5	7.7
Germany	10.2	17.0	49.6	13.6	6.2
Greece	9.0	29.0	57.1	21.9	14.9
Hungary	13.2	18.0	52.8	18.8	12.7
Iceland	6.5	91.0	48.3	12.4	10.3
Ireland	13.5	31.0	47.0	13.0	9.3
Italy	8.1	22.0	44.6	9.9	9.7
Japan	7.6	16.0	23.3	3.0	5.7
Korea	8.6	–	30.5	3.5	13.2
Luxembourg	**15.5**	**38.0**	**53.3**	**18.6**	**9.9**
Mexico	4.6	–	69.2	30.2	–
Netherlands	9.7	27.0	44.9	10.7	4.5
New Zealand	8.9	52.0	56.2	20.9	9.4
Norway	6.0	47.0	43.0	9.0	5.2
Poland	8.1	21.0	45.3	12.5	13.8
Portugal	11.4	28.0	49.6	12.8	11.8
Slovak Republic	7.4	19.0	47.6	15.4	–
Spain	11.7	35.0	48.4	13.1	9.3
Sweden	7.0	27.0	44.0	10.7	4.9
Switzerland	10.8	12.0	37.1	7.7	5
Turkey	1.5	–	43.4	12.0	–
United Kingdom	11.2	27.0	60.0	23.0	5.4
United States	8.4	65.0	66.3	32.2	14.7
OECD average	9.5	35.9	48.0	14.6	8.9

Note: The table presents alcohol consumption (litres per capita), tobacco consumption (population share of daily smokers), pollution (Nitrogen oxide emissions in kg per capita), overweight population (population share with body mass index > 25 kg/m^2), obese population (population share with body mass index > 30 kg/m^2) and road fatalities (per 100 000 population). Road accident data refer to 2006, all other variables to 2005.

1. In the case of Luxembourg, per capita alcohol consumption is likely to overstate the true level of consumption due to high cross border consumption following low excise taxes.
2. Luxembourg obesity data are based on information from occupational medical services.

Source: OECD, *Health data*, 2007; *International Road Traffic Accident Database*, 2007.

upper limit and differ between the various types of risk that are covered by social security: direct contributions are highest for long-term and maternity care and lowest for accident insurance.[4] The UCM collects these financial resources and pays for all care services directly provided by doctors and hospitals. Nine sickness funds,[5] which affiliates insured persons on the basis of their professional occupation, reimburse patients for their certified expenditure on goods and services. A partial merger of these nine funds is underway, but the authorities should consider merging all remaining insurance funds into one administration to fully benefit from economies of scale (Box 4.1). The system also provides replacement income during prolonged sickness leave periods.[6] Unit prices for service providers are determined in two steps: A committee (*Commission de Nomenclature*) advises the Ministry of Health on the list of reimbursed items (*e.g.* medical treatment, drugs, prostheses, etc.) and the relative (unit) price of each item ("lettre-clé"). The UCM, on the other hand, (re-)negotiates at regular

Table 4.4. **Treatment success in international comparison**

	Hospital case-fatality for AMI[1]	Avoidable mortality[2]			
		Skin melanoma	Breast cancer	Cervical cancer	Other forms of uterine cancer
Australia	6.4	–	–	–	–
Austria	12.0	1.5	15.3	2.0	2.2
Belgium	–	–	22.6	2.2	1.8
Canada	9.3	–	–	–	–
Czech Republic	8.9	1.6	14.9	4.6	3.0
Denmark	6.4	–	23.5	3.5	1.8
Finland	11.1	1.2	14.4	1.1	1.2
France	7.6	1.1	17.4	1.5	2.1
Germany	11.9	1.1	17.3	2.5	1.3
Greece	–	0.6	13.0	1.2	1.6
Hungary	–	1.6	19.5	6.0	2.6
Iceland	6.4	0.7	12.2	2.4	1.7
Ireland	11.3	1.1	22.2	3.3	1.0
Italy	9.2	1.2	15.8	0.7	2.4
Japan	10.5	–	–	–	–
Korea	18.6	–	–	–	–
Luxembourg	**9.7**	**1.5**	**15.4**	**2.2**	**1.9**
Netherlands	8.4	1.8	21.7	1.7	1.3
New Zealand	5.4	–	–	–	–
Norway	8.0	2.5	15.2	3	1.3
Poland	8.0	–	15.4	7.5	2.8
Portugal	11.8	0.7	14.9	2.9	2.3
Slovak Republic	12.0	1.8	15.5	5.4	3.0
Spain	10.3	0.9	13.8	1.8	1.6
Sweden	8.3	1.7	14.4	1.7	1.4
Switzerland	8.1	1.5	15.8	1.2	1.1
United Kingdom	11.8	1.4	20.6	2.7	1.2
Average	9.6	1.3	16.9	2.8	1.8

Note: The table presents two categories of medical quality indicators: *i)* Hospital survival rates after admission with a heart attack; and *ii)* avoidable mortality rates of those diseases for which mortality rates depend particularly on screening and the quality of medical intervention.

1. Hospital case-fatality rates of patients with an acute myocardial infarction (AMI; heart attack) within 30 days after hospital admission; data refer to 2003, except for Luxembourg where an average between 2004 and 2006 has been taken.
2. Evitable mortality rates in 100 000 persons that are between 0 and 64 years; data refer to an average 1998-2002.

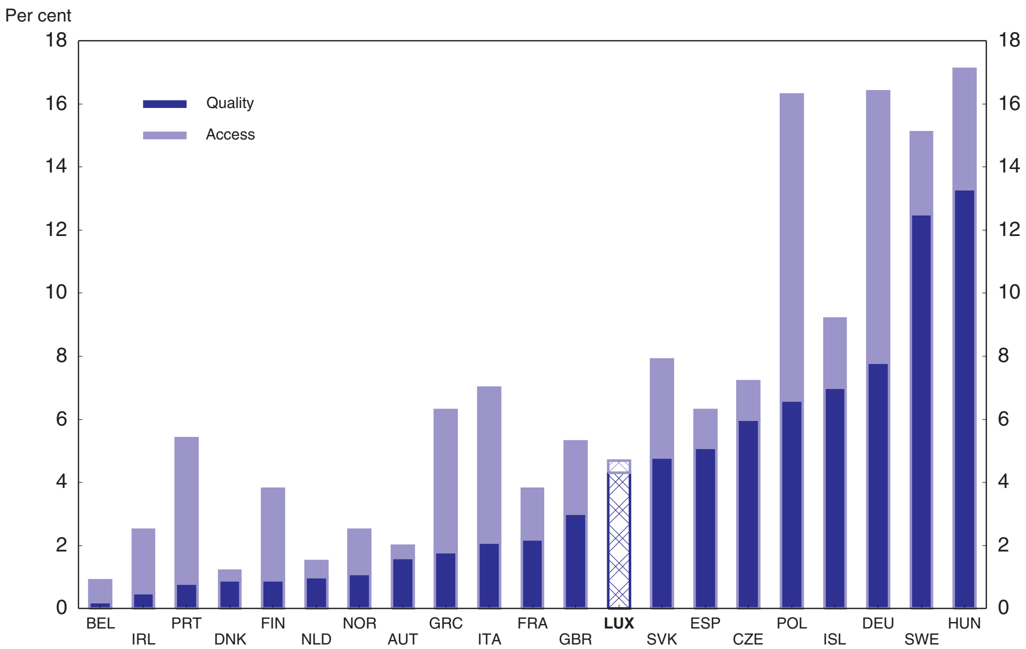
Source: OECD, *Health data*, 2007; IGSS; WHO, Rapport sur la santé en Europe, 2005.

intervals (yearly or bi-annually) the price parameters which are used to transposed the relative prices into monetary units. The benchmark for these negotiations is largely based on past cost developments in Luxembourg, while cost-savings developments in other countries are not systematically taken into account (by using, for instance, comparative-efficiency tests). To strengthen the bargaining position of the UCM, it should be encouraged to act as a "wise" buyer of health care services, making more frequent use of cost-efficiency analyses and, when appropriate, comparative international benchmarks.

The government plays an important role in health insurance, reflecting the large share of current receipts coming from general tax revenue (for sickness and maternity current receipts: 31.4% in 1980, rising to 38.1% in 2006). Moreover, the Ministry of Health must authorize the most important capital outlays that arise from the hospital plan and are financed by the state from general revenues. This concerns mainly major decisions regarding the construction of facilities or the purchase of expensive medical equipment, which requires the Ministry's approval.

Figure 4.4. **Patients dissatisfaction in the EU (2005)**[1]

In % of all patients



1. The figure presents the share of patients declaring to face unmet medical needs, either due to difficulties of access (light shaded) or due to quality concerns and lack of information (dark shaded).

Source: Eurostat.

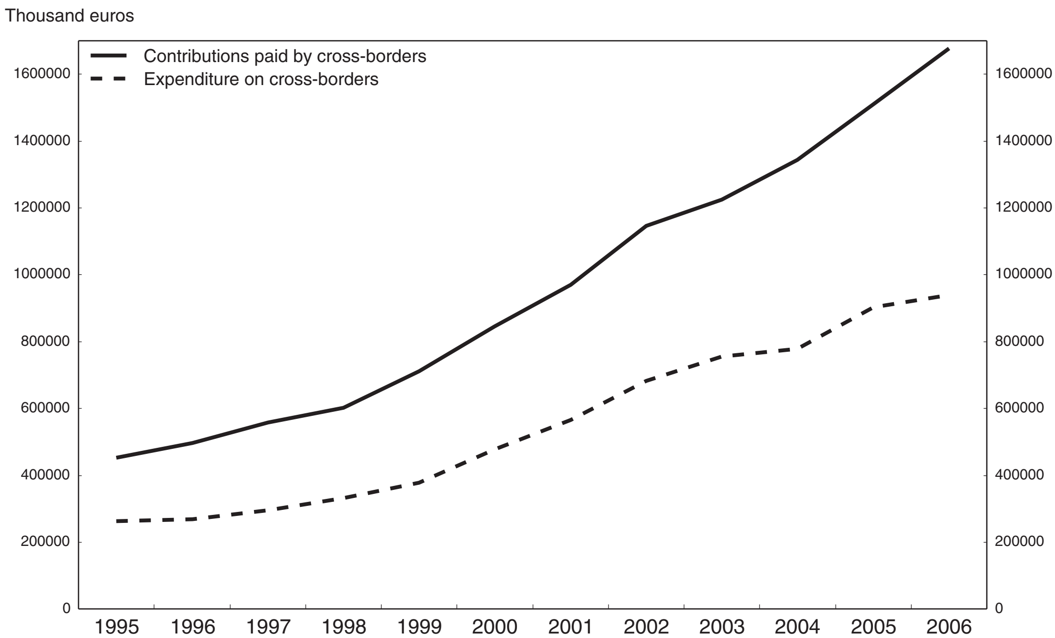
StatLink http://dx.doi.org/10.1787/380668056325

By law the health care insurance system is required to remain in balance, but may draw on a reserve fund to cover unexpected shortfalls. This reserve fund has to be maintained at a minimum of 10% of total expenditure at all times, but may not exceed 20%, and is built up through yearly contributions. If the reserve falls below the minimum limit, specific actions are mandated – *e.g.* increase of contribution rates, or regulation of the volume of consultations and services. If substantial spending increases are expected at the beginning of a year, the UCM can decide to reduce the number and quality level of reimbursed health care services or to increase contribution rates or co-payments. Since 2000, health spending has increased faster than contributions, with a cumulated negative balance expected to emerge from the accounts of 2007 (IGSS, 2007), potentially leading to the reserve falling again below the threshold level of 10% (as had already been the case in 2005).

The financial situation of the system benefits from the rising contributions made by cross-border workers, with little demand of health care services (Figure 4.5). The surplus of contributions over benefits for the group of cross-border workers is estimated to have reached around EUR 400 million in 2006, the equivalent of approximately 6% of total social security spending (Allegrezza *et al.*, 2005). Even though the dynamic increase in the number of prime-age insured people would allow for a rapid increase in reserves, the insurance system does not generate sufficient surpluses to achieve this goal. This surplus is likely to shrink in the future as trend employment growth slows down, which will mechanically increase the average age of cross-border workers and hence the share of those reaching an age where their demand for health care services is high. In addition, there will be a rising share of cross-border workers having spent their full working life in Luxembourg, entitling

Figure 4.5. **Cross-border financing of social security in Luxembourg**[1]

Social security contributions and taxes *vs.* social security spending paid by cross-border workers



1. The bold line represents the sum of social security contributions and taxes paid by cross-border workers; the dashed line represents social security spending paid to cross-border workers (both in 1 000 euro).

Source: IGSS, STATEC 2007.

StatLink http://dx.doi.org/10.1787/380713384134

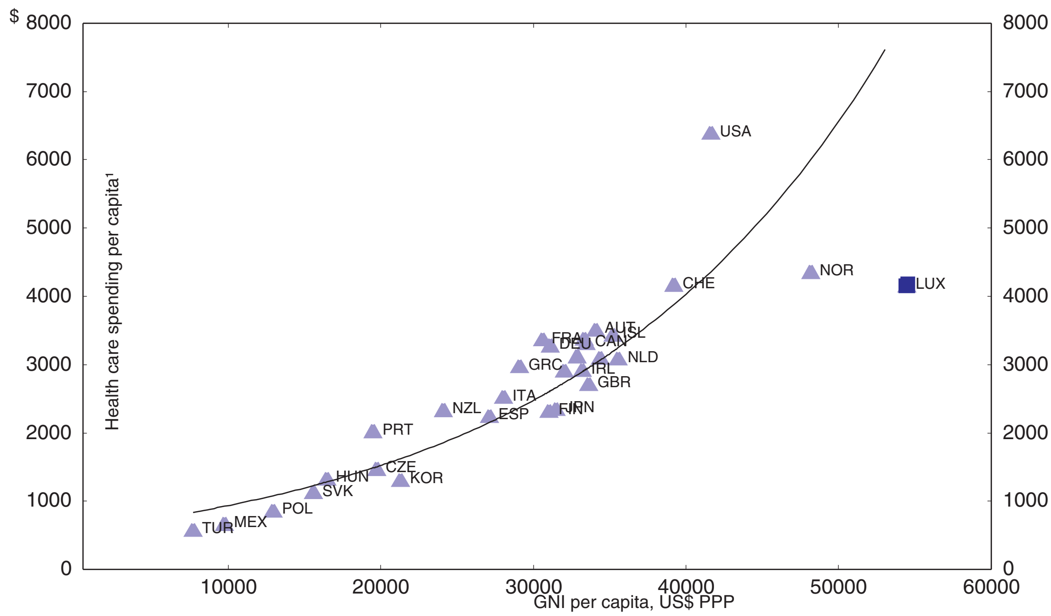
them to benefit from the country's health insurance system during their retirement.[7] Moreover, in reaction to administrative barriers in seeking health services outside Luxembourg, cross-border workers increasingly seek health care services in Luxembourg, which tend to be more expensive than in neighbouring countries. The present balanced position thus appears to be vulnerable and, with unchanged contribution rates, imbalances could very well emerge in the near-term future.

Given the special circumstances with respect to the large number of cross-border workers also that will become eligible for health insurance coverage during their retirement (see Chapter 1), which are even not included in the projected substantial spending rise (see below), the authorities should consider pre-funding at least some of the future health care spending growth, particularly the expected rise in health expenditure stemming from the increased number of covered retirees (see also the discussion in Chapter 3). This could be done by expanding the role of the health reserve fund, which currently is limited to covering short-term liquidity shortages arising during the budget period only. Even though the fund can hold up to 20% of health expenditure, its current reserves are at the lower end (close to 10%), which may not even be sufficient to cover all temporary emergency spending. In addition, the fund is clearly not large enough to cope with rising expenditure due to population ageing and a lower inflow of cross-border workers, implying a need for increasing contribution rates. Thus to keep contribution rates stable, there is a need to *prefund* future health care liabilities. This could be done, for example, by gradually rising the fund's minimum reserve requirements – for instance by 1 percentage point per year. While such a goal would add to transparency in the system and would have pedagogical effects, it is not attainable without a restraint in spending trends. For this purpose, the focus of policymakers needs to put on the cost efficiency of the system.

Improving spending efficiency

Luxembourg's health care system is expensive by international comparison. Total expenditure on health *per capita* reached USD 5 563 at purchasing power parity in 2005, which put the country at the second rank in the OECD after the United States (OECD, 2007). This number is however, distorted by the fact the covered population, which includes cross-border workers and expatriate residents, is much larger than the resident population. Relative to the covered population, health expenditure per person was lower (USD 4 164 in 2005), but nevertheless still high in the OECD, equivalent to Norway and Switzerland. Of course, Luxembourg is a rich country, and richer countries tend to spend proportionally more on health care as patients aim at getting access to the latest technology (Hall and Jones, 2004). Indeed, a significant correlation can be observed between income *per capita* and health care consumption across countries. In this regard, Luxembourg is currently spending less than its income level would suggest in Figure 4.6. This reflects the favourable demographic situation mentioned above, notably the rejuvenation of the covered population by prime-age cross-border workers, who – on average – are 9 years younger than residents.[8] In 2005, covered non-residents (cross-border workers and their dependents) represented 25% of the total insured population; of those

Figure 4.6. **Total health care spending per capita *vs.* GNI per capita, 2005**



1. The figure displays GNI per capita with respect to total health care spending per capita. A non-linear regression line has been included that suggests that health care spending may increase more than proportionally with rising income. For Luxembourg, total health care spending is set in relation to the covered population. 2005, except for Australia, Hungary, Japan and Netherlands: 2004.

Source: OECD, *Health data*, 2007.

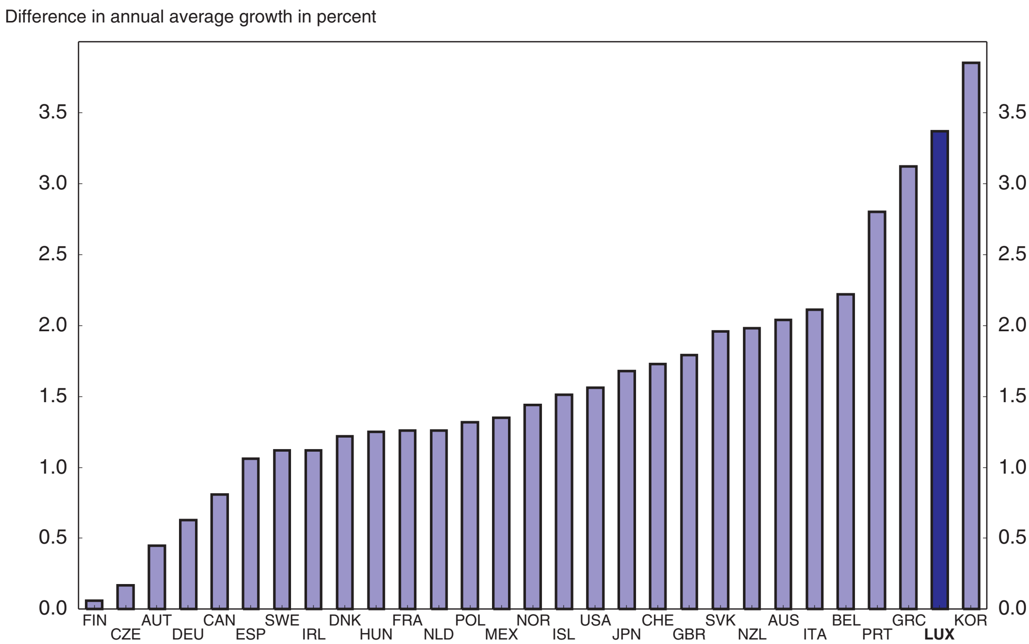
StatLink http://dx.doi.org/10.1787/380774644787

only 1.6% were older than 65 years (IGSS, 2006). Preliminary estimates indicate that if cross-border workers had consumed as much health care services as residents, total real health care spending per insured person in 2005 would have been 15% higher.

Health care real spending has expanded substantially faster than real GDP over the past 10 years, with the "excess" health care spending growth (difference between spending growth and GDP growth) at the higher end among of OECD countries (Figure 4.7). Looking ahead, even though there is some uncertainty as to the exact path of long-term demographic trends, it looks inevitable that the greying of the population will lead to a further acceleration of health care expenditures (Figure 4.8). In part, this is related to the fact that an ageing population requires new services and infrastructure, such as homes for long-term care. As well, the rapid intake of cross-border workers constitutes an important additional source of future spending increases as health care spending patterns between residents and non-residents are set to converge.

Figure 4.7. **Excess health care spending growth (1995-2005)**[1]

In percentage points



1. The figure presents the difference between real total health care spending growth p.a. and real GDP growth p.a. between 1995 and 2005 as a measure of excess health care spending growth.

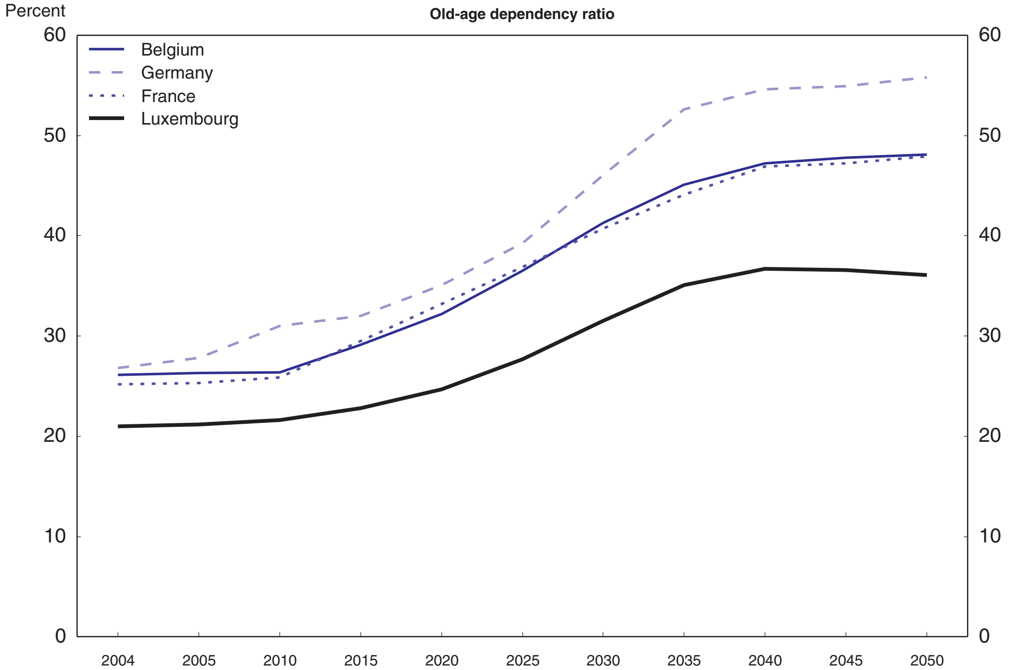
Source: OECD, *Health data*, 2007.

StatLink http://dx.doi.org/10.1787/380784101187

Despite the favourable old-age dependency ratio, long-term care already constitutes an important spending item in total health care expenditure (Figure 4.9). The introduction of the long-term care insurance (*assurance dépendance*) in 1999 has helped to increase transparency and cost-efficiency of the system by separating financing and provision of long-term care from health care. Before the reform, long-term care patients had been accommodated in regular hospitals; these beds are now continuously transferred to specialised, less expensive nursing homes. Nevertheless, the rapid increase in the capacity of these care facilities has led to a significant deterioration of the financial balance of this new insurance system (Table 4.5). Since 2004, current spending exceeded receipts, leading to

Figure 4.8. **Projections of age-dependency ratios for residents**

% of people older than 65 years to working-age population

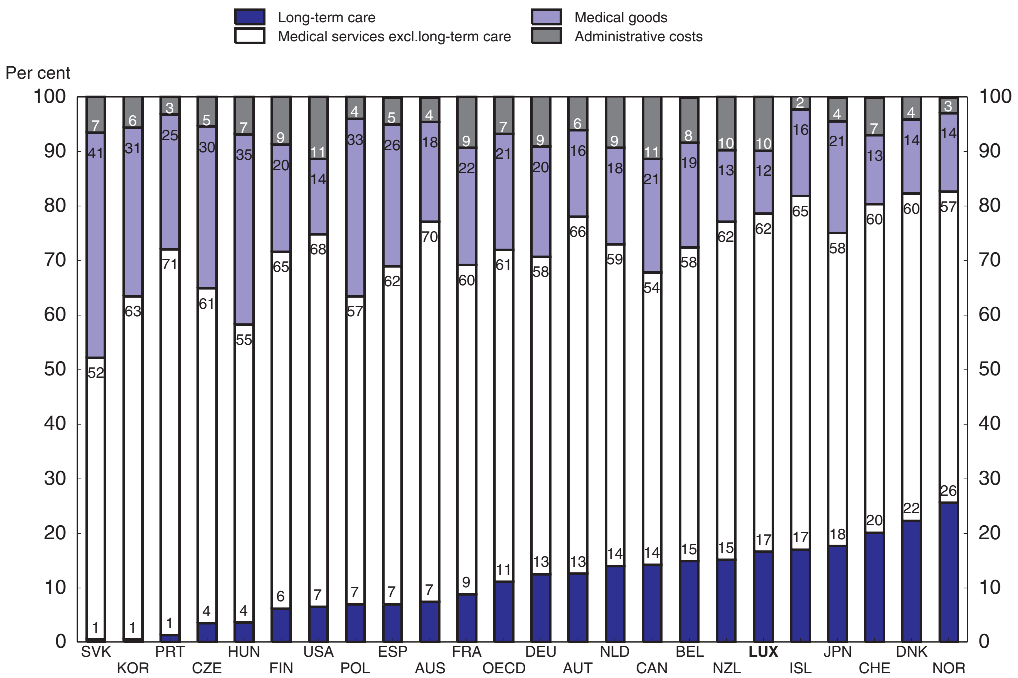


Source: Eurostat.

StatLink http://dx.doi.org/10.1787/380800766723

Figure 4.9. **Current health expenditure by function of health care, 2005**

In % of total current health expenditure



Source: OECD, *Health data*, 2007.

StatLink http://dx.doi.org/10.1787/380810586783

Table 4.5. **Long-term care beds in nursing homes**

In % of population aged 65 years or older

	2000	2005
Australia	35.9	37.5
Czech Republic	10.6	14.9
Denmark	42.9	25.5
Finland	31.2	26.1
Germany	–	47.8
Hungary	48.4	53.1
Iceland	51.4	61.0
Ireland	37.8	41.4
Japan	10.6	11.6
Luxembourg	**26.4**	**43.4**
Netherlands	26.9	–
Norway	63.0	60.3
Poland	–	18.3
Spain	–	18.9
Sweden	82.7	69.9
Switzerland	74.1	71.7
United Kingdom	22.0	18.7
United States	43.6	43.1
OECD average	40.5	40.0

Note: The table shows the number of long-term care beds in nursing homes (as opposed to beds in hospitals) as a percentage of the population aged 65 years and over. For Australia and Switzerland, data refer to 2000 and 2004.
Source: OECD, *Health data*, 2007.

a continuous reduction of financial reserves of the *assurance dépendance* and making the system as it is currently set up financially unsustainable already in the medium-term (IGSS, 2007). As discussed in Chapter 3, the demographic developments over the coming decades lead to an increase in the number of older people and particularly of the cohort above 80 years, implying a growing demand for long-term care. Thus, measures to secure the sustainability of the long-term care insurance system should be implemented, including the building up of reserves to avoid future abrupt increases in contribution rates as well as the further development of less costly care facilities for the elderly, such as home care. The authorities currently plan to publish a financial analysis of the system in Spring 2009.

Under these conditions and on the basis of current demographic projections (but excluding projected developments in covered non-residents), Secretariat calculations show Luxembourg to be likely to have one of the fastest increases in the public health care spending-to-GDP ratio over the next three decades (Table 4.6). Under unchanged policies and with medical innovations fuelling public health care spending growth by an additional 1 percentage point per year (the cost-pressure scenario), public health care and long-term care spending would rise by almost 7 percentage points of GDP by 2050. Even if policy settings were adjusted to limit spending increases to demographic and income effects only (the cost-containment scenario), public expenditure on health care would still increase by close to 4 percentage points of GDP. In either case, these estimates are fairly conservative and do not include spending on covered non-residents. In both scenarios, Luxembourg would have to make difficult choices between raising the tax burden and restraining public spending priorities, so as to allow this continuous growth in spending. A different approach, discussed in the rest of this chapter, would be to change the existing set of

Table 4.6. **Public health and long-term care expenditure projections**

In % of GDP

	Health care			Long-term care			Total		
	2005	2050		2005	2050		2005	2050	
		Cost-pressure	Cost-containment		Cost-pressure	Cost-containment		Cost-pressure	Cost-containment
Australia	5.6	9.6	7.8	0.9	2.8	1.9	6.5	12.4	9.8
Austria	6.4	10.0	8.3	1.3	3.2	2.4	7.7	13.2	10.7
Belgium	5.9	9.1	7.4	1.5	3.3	2.5	7.4	12.4	9.9
Canada	5.8	9.7	8.0	1.1	3.1	2.3	6.9	12.8	10.2
Czech Republic	6.1	10.1	8.3	0.3	1.9	1.2	6.4	12.0	9.6
Denmark	5.1	8.5	6.8	2.6	4.0	3.2	7.7	12.5	10.0
Finland	3.1	6.7	4.9	2.8	5.0	4.0	5.9	11.6	8.9
France	7.8	11.2	9.4	1.1	2.7	2.0	8.9	13.9	11.4
Germany	7.3	10.7	9.0	1.0	2.7	2.1	8.2	13.5	11.1
Greece	4.1	7.9	6.1	0.2	2.7	1.9	4.3	10.5	8.0
Hungary	5.7	9.2	7.4	0.2	2.2	0.9	5.9	11.4	8.3
Iceland	5.5	9.3	7.6	2.4	3.9	2.9	7.9	13.2	10.5
Ireland	5.1	9.0	7.3	0.7	4.3	2.9	5.8	13.3	10.2
Italy	6.1	9.8	8.0	0.7	3.4	2.7	6.8	13.2	10.8
Japan	5.9	10.0	8.3	0.8	2.9	2.3	6.7	12.9	10.5
Korea	2.9	7.6	5.8	0.3	3.8	2.9	3.2	11.4	8.8
Luxembourg	**6.4**	**10.0**	**8.2**	**0.7**	**3.7**	**2.5**	**7.1**	**13.7**	**10.7**
Mexico	2.8	7.1	5.4	0.1	4.0	2.9	2.9	11.1	8.2
Netherlands	4.7	8.3	6.6	1.7	3.5	2.8	6.3	11.9	9.4
New Zealand	6.4	10.4	8.6	0.5	2.4	1.7	6.9	12.8	10.3
Norway	5.6	8.9	7.1	2.0	3.7	2.9	7.6	12.5	10.0
Poland	3.9	7.9	6.1	0.4	3.5	1.6	4.3	11.3	7.8
Portugal	7.2	11.3	9.5	0.2	2.1	1.2	7.4	13.4	10.8
Slovak Republic	5.0	9.4	7.7	0.3	2.5	1.5	5.3	11.9	9.1
Spain	5.7	9.7	7.9	0.2	2.4	1.8	5.9	12.1	9.7
Sweden	4.7	7.8	6.1	3.0	4.0	3.1	7.7	11.8	9.2
Switzerland	5.8	9.1	7.4	1.1	2.5	1.8	6.9	11.6	9.1
Turkey	5.3	9.2	7.4	0.1	1.7	0.8	5.4	10.9	8.2
United Kingdom	6.1	9.6	7.8	1.1	2.9	2.1	7.2	12.5	9.9
United States	6.0	9.3	7.6	0.9	2.5	1.7	6.9	11.9	9.3
OECD average	5.5	9.2	7.5	1.0	3.1	2.2	6.5	12.3	9.7

Note: The table presents increases in public spending on health care that arise if the central UN projection of population dynamics materialise between 2005 and 2050. The cost-containment scenario assumes that health care spending growth is exclusively determined by demographic and income effects, while the cost-pressure scenario makes the assumption that due to the introduction of new medical technologies and drugs, real health care spending grows by an additional 1 percentage point per year.

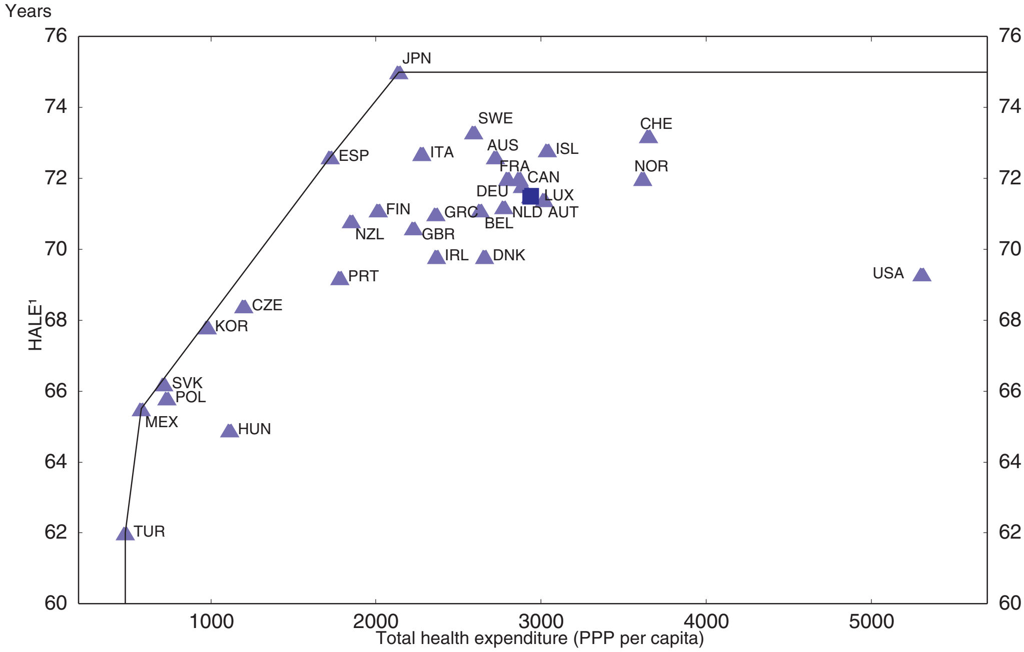
Source: Secretariat's calculations based on Oliveira Martins and de la Maisonneuve (2006) using OECD, *Health data* (2007).

incentives, so that all actors in the field of health care adapt their behaviour and seek a greater spending efficiency from health care providers.

Despite their limitations, even simple measures of spending efficiency are helpful to take a broad view of public spending programmes, evaluating the value for money that a country receives for its spending. One technique increasingly used to assess spending efficiency consists in an international comparison of the relation between inputs and outputs.[9] In the case of health care, this implies comparing public health care spending and, for instance, health-adjusted life expectancy. Countries that provide the best combination of inputs and outputs define the "efficiency frontier". While being on the efficiency frontier may not be optimal from an economic welfare point of view (*e.g.* for countries combining low spending and low life expectancy), this approach is instructive in informing policymakers about what is achieved elsewhere. For other countries, the distance from the frontier can be evaluated either in terms of output efficiency (achieving better outcomes with the same amount of money) or input efficiency (lowering spending while keeping outcomes at their current level).This approach has admittedly a number of limitations, but it is instructive to illustrate the potential for efficiency gains. In this respect, it appears that Luxembourg is further away from the efficiency frontier than many other OECD countries, both in terms of health-adjusted life expectancy and life expectancy at the age of 65 (Figures 4.10 and 4.11). Thus, efficiency losses seem to occur in the current setting, even when correcting for the large intake of cross-border workers and differences in the cost of living, and disregarding public or total health care spending.

Figure 4.10. **Health care spending and health-adjusted life expectancy**

2002



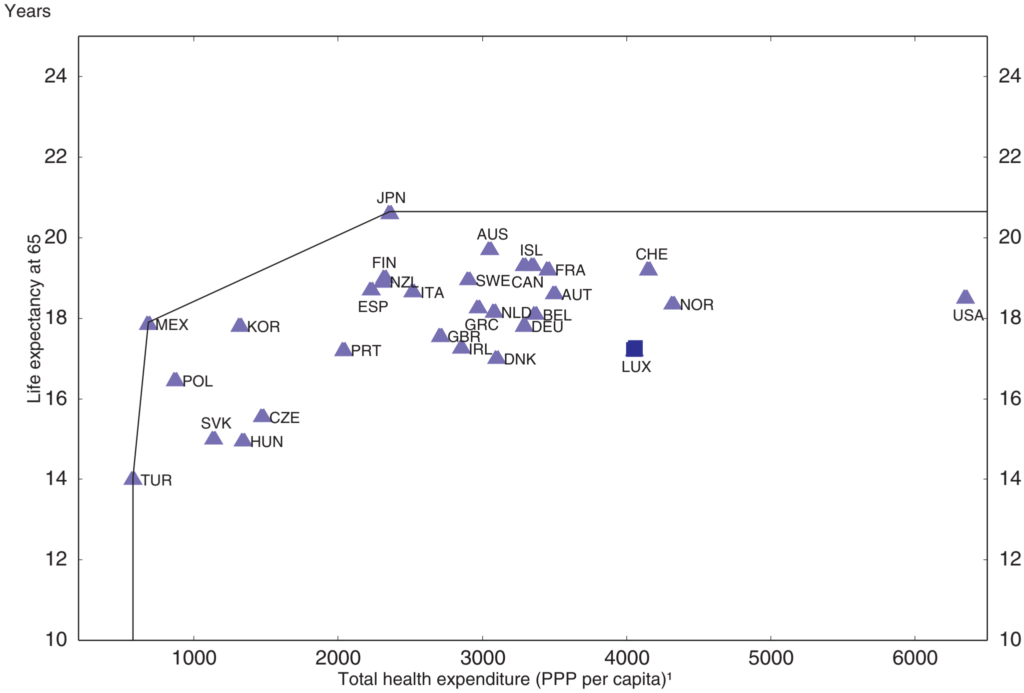
1. Health-adjusted life expectancy (HALE) refers to life expectancy adjusted for years of sickness, weighted by the degree of sickness. For Luxembourg, total health expenditure is set in relation to the covered population.

Source: OECD, *Health data*, 2007.

StatLink http://dx.doi.org/10.1787/380841347563

Ultimately, increasing efficiency and effectiveness will be the main way of reconciling fast-rising demands for health care with financing constraints. As mentioned, there appears to be a significant potential for efficiency gain in the healthcare system, by correcting misallocation of spending or excess investment in capacity. In addition, as in other countries, there is undoubtedly a certain amount of wasted resources and missed opportunities. Authorities are aware of these efficiency losses and have enacted several reforms in recent years to address them (Box 4.1). Nevertheless, in order to put the system on a sustainable footing, further changing the set of incentives facing healthcare consumers and providers is necessary so as to modify behaviour. The system of healthcare insurance in Luxembourg is still too much based on the principle of cost reimbursement. Health insurance has become a way to pre-pay healthcare services, rather than to protect

Figure 4.11. **Health care spending and life expectancy at 65 (2005)**



1. 2005, except for Australia, Hungary, Japan and Netherlands: 2004.

Source: OECD, *Health data*, 2007.

StatLink http://dx.doi.org/10.1787/380872005572

individuals against health risks. There are potential gains to be realised by encouraging sickness funds to act as "*wise and enlightened buyers*", rather than mainly as "*passive payers*".

Internationally, efforts to distinguish the roles of healthcare purchasers and providers, so as to allow markets to function and generate efficiencies from competition, have proved generally effective. Efficiency-oriented management can mean using technology assessment programmes to compare the effectiveness of various treatments proposed by the healthcare industry, taking into account the effects of a new technology on patient outcomes and costs. Research on comparative effectiveness of medical procedures holds the potential to reduce health care costs over the long term – possibly by substantial amounts if it is done rigorously and if its results are ultimately tied to changes in financial incentives for providers and consumers. Because the government and the sickness funds will ultimately bear responsibility for ensuring the sustainable financing of healthcare spending, they have a vested interested in generating such evaluations of the effectiveness of different approaches. Obviously, it would make sense for a small country like Luxembourg to share this burden with neighbouring countries and seek enhanced cooperation on healthcare services inside the *Grande Région*.

Hospitals

Spending on hospital care has been the main contributor to aggregate health care spending, and hospital spending per insured person is now one of the highest in the OECD (Figure 4.12). In the recent past, the authorities have encouraged the mergers of small local hospitals, so as to establish larger units, but there are still 2 300 beds, *i.e.* more than 5 for

Box 4.1. **Recent reforms of the health care sector**

In order to restrain spending and improve the quality of health care services, authorities have implemented several reforms and measures in recent years:

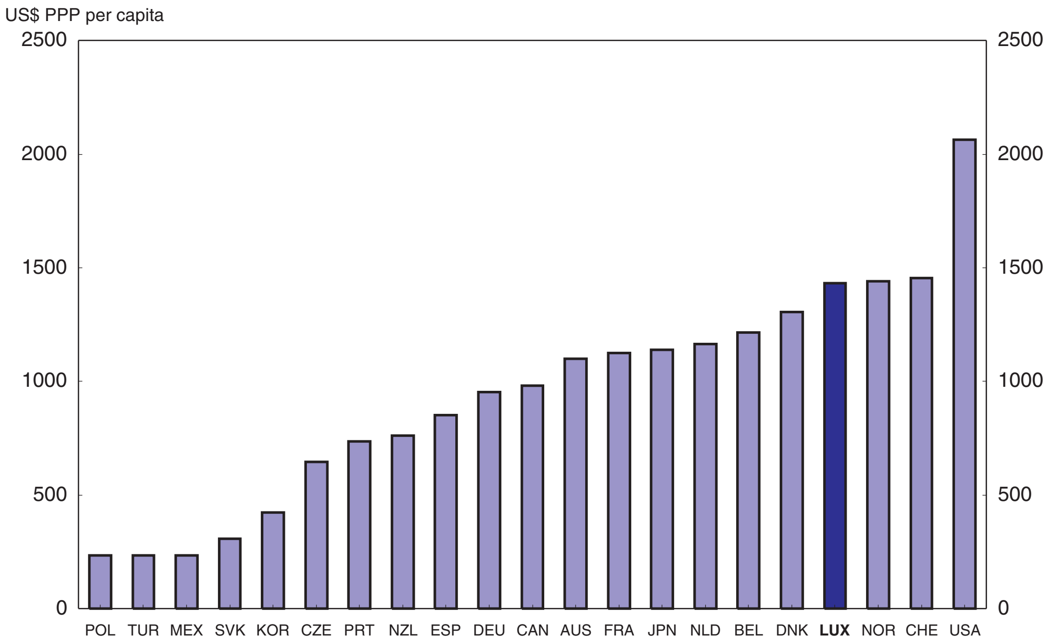
- Since 1998, several reforms have been implemented to modernise hospitals and to increase their quality. Part of the budget funding has been made subject to attaining certain quality standards, which is being assessed by an external committee. Since 2006, hospitals have been taking part in the European evaluation model EFQM to use an external benchmark for quality improvements.
- In 1999, a long-term care insurance system was set up to improve transparency regarding spending on long-term and health care and to improve cost-efficiency by setting up specialised, cheaper long-term care nursing homes.
- As part of the Tripartite agreement in 2006, the indexation of sickness benefits (*prestations en espèces*) has been temporarily postponed to reduce spending growth.
- Medical control of the prescription practice in ambulatory care has been improved using regular evaluations since 2001. Each health provider is being informed about its own prescription profile, but no sanctions have yet been envisaged.
- The use of generics has been promoted more thoroughly since 2006.
- Co-payments for doctor consultations have been increased from 5% to 10% of the cost of a medical visit.
- Since 2004, sickness benefits are no longer granted after ten weeks of sickness leave without medical examination (*Contrôle medical de la sécurité sociale*).
- A scientific council has been established in the health sector to identify and diffuse best practices for high-quality health services and to guide health professionals in picking up these best practices.

every thousand residents – one of the highest densities in the OECD (Table 4.7).[10, 11] As a result, occupancy rates are low and have actually declined since 1998 when they stood at 67.8% of all acute care beds. Further reorganisation of the hospital sector might be beneficial, but the existence of three hospital regions has precluded a more pronounced restructuring of the sector. In addition, the frequency of both in-patient and ambulatory surgery procedures is well above other OECD countries. Even when accounting for the fact that some of the cross-border workers seek surgery in Luxembourg, a substantial gap remains and shows no signs of closing. Past spending growth has been inflated by the modernisation of infrastructure and the replacement of outdated equipment, and such investment should be substantially lower in the coming years. But these large investments do not seem to have led to the sort of efficiency improvements seen in other countries, most notably in terms of the number of beds and the average length of stay (OECD, 2007).

The high cost hospital sector is partly related to the remuneration scheme of doctors who, apart from the *Centre hospitalier de Luxembourg* (CHL), are hired by the hospitals on a fee-for-service basis, making them independent with respect to the hospital management both in terms of their level of activity and selection of medical practices. The remuneration of doctors is determined through the fee-for-service regulation and the price parameters negotiated between the UCM and the doctors' association. Moreover, doctors are free to use medical equipment in hospitals following their own medical standards. Hospital investment and large capital outlays for medical equipment are determined on the basis of

Figure 4.12. **Hospital spending in the OECD**[1]

US$ PPP per capita



1. Hospital spending on all hospital services, including inpatient, outpatient, and day-care. For Luxembourg, hospital spending is divided by the covered population. 2005, except for Australia, Japan and Norway: 2004.

Source: OECD, *Health data*, 2007.

StatLink http://dx.doi.org/10.1787/380881447032

advice that the Ministry has to take from the Hospital Planning Committee, leaving the hospital management with little discretion over the decision process. As a result of the budgeting system, there is little autonomy for the hospitals' management and, therefore, little encouragement to try to exploit potential efficiency gains. At a minimum, authorities should consider granting more autonomy to hospital management, while holding them accountable for health and efficiency outcomes. A better balance in hospital legislation would help strengthen their position *vis-à-vis* medical staff. Moreover, in order to restrict excessive use of hospital's medical equipment, doctors should be charged a rental fee.

Spending efficiency in the hospital sector can also be enhanced through activity-based funding. The current funding system provides hospitals with a global budget based on the projected number of treatment acts that are being carried out over the budget period. As an incentive to improve quality, up to 2% of the overall hospital budget can be attributed to individual hospitals on the basis of achieving quality improvements, first in a number of specific areas (such as the rate of nosocomial/hospital infections or mammography quality) and since 2006 following total quality management procedures (such as EFQM). These improvements are evaluated on a yearly basis by an external expert committee.[12] Following budget negotiations, normal treatment acts are remunerated on the basis of a hypothetical benchmark calculated from historical comparisons, reduced by a target efficiency gain of around 15%.[13] Such a "cost-plus" regulation of hospital budgets aims at improving the efficiency of each task, and is an improvement over the older fee-for-service system that was in place until 1993. However, the system lacks incentives to improve efficiency of the system to carry out the minimum necessary number of treatment acts in the most cost-efficient sequence. Hence, in order to strengthen incentives for cost

Table 4.7. **Hospital capacity and incidence of surgery in the OECD (2004)**

	Acute care beds (per 1 000 population)	Acute care beds occupancy ratio (in % of available beds)	Surgery procedures (in-patient cases per 1 000 population)	Surgery procedures (day-cases per 1 000 population)
Australia	3.6	70.6	51.3	45.6
Austria	6.1	79.0	135.3	–
Belgium	4.4	–	62.1	45.7
Canada	2.9	90.0	44.7	81.6
Czech Republic	5.7	74.7	67.0	
Denmark	3.1	–	75.9	71.0
Finland	2.9	–	60.1	37.2
France	3.7	74.9	–	–
Germany	6.4	75.5	79.4	15.9
Greece	3.8	–	–	–
Hungary	5.5	76.6	228.6	4.8
Ireland	2.8	85.5	31.3	13.1
Italy	3.3	76.4	53.3	28.5
Japan	8.2	79.3	–	–
Korea	6.5	–	–	–
Luxembourg	**5.2**	**64.4**	**136.8**	**80.5**
Mexico	1.0	59.8	31.2	5.9
Netherlands	3.1	63.7	39.8	37.1
New Zealand	–	–	29.2	15.9
Norway	3.0	86.4	–	–
Poland	4.7	–		
Portugal	3.0	69.8	51.9	8.5
Slovak Republic	5.0	67.7	–	–
Spain	2.6	78.8	50.8	21.8
Sweden	2.2	–	61.6	–
Switzerland	3.6	86.3	103.9	20.6
Turkey	2.0	64.9	38.1	–
United Kingdom	3.1	83.8	62.9	75.9
United States	2.7	66.9	89.9	–
OECD average	3.9	75.0	72.1	35.9

Note: The table presents hospital capacity as measured by acute care beds per 1 000 residents and acute care bed occupancy ratio as well as the incidence of surgery procedures. Day-case surgery procedures lead to a discharge of the patient at the same day. For Luxembourg surgery procedures (both in-patient and day cases) refer only to in-patient cases of the resident population. No data are available for Iceland.
Source: OECD, *Health data*, 2007.

efficiency, the authorities should consider introducing a diagnosis-related group (DRG) system including remuneration of hospital doctors. In such a system, patients are grouped according to the extent to which their particular diseases make use of specific hospital resources (typically into around 500 different groups). Hospitals, in turn, are then remunerated on the basis of their patient case mix according to a pre-defined benchmark for each DRG (Box 4.2). Such a system could make use of the already existing analytical accounting system whereby hospital activity is accounted for by the different interventions rather than purely on the basis of inputs related to the number of hospital staff, equipment and beds. Moreover, it should make use of existing DRG systems in neighbouring countries when defining disease groups and funding rates. A DRG system would not only help to improve task efficiency as the current system does, but also strengthen system efficiency by rewarding the most efficient use of different hospital services for a given disease pattern. Moreover, it would strengthen the role of the UCM as a buyer of medical services in comparison to its current much more limited role in negotiating global budgets.

Box 4.2. **Activity-based funding using DRG systems**

Traditionally, hospital budgets have been determined on the basis of inputs such as the number of staff, medical equipment, and number of beds. In order to enhance hospital management and evaluation, Fetter and Thompson in the United States developed a patient classification system in the 1970s that would allow hospitals to assess their activity level based on the patient case mix (Fetter and Thompson, 1975). The system groups the more than 10 000 different disease types of the International Classification of Diseases into a substantially smaller number of diagnosis-related groups (DRG), which are expected to have similar hospital resource use and activity requirements. The system was further developed to enhance control over cost developments by linking the DRGs to different funding levels, depending on their relative use of hospital resources.

DRG systems have become increasingly widely used and are by now used in various forms in several OECD countries (among them the United States, Australia, Canada, Germany, France, the Netherlands, Switzerland, the United Kingdom and Scandinavian countries). Their common denominator is an increased accountability of the hospital management and, as a consequence, a greater control over doctors and their medical practices as well as less professional autonomy for the medical profession, which tends to be the source of tensions (Davis and Harrison, 2003). The system brings certain benefits as incentives for cost control are strengthened by linking funding levels to external benchmarks that push hospitals to adopt best practices and which requires regular evaluation of scientific developments of medical technology and practice.

Empirical studies regarding the effects on cost-efficiency of DRG systems around the world has so far produced mixed evidence (Böcking *et al.,* 2005). Average length of stay seems to have decreased in most cases, but often with the side-effect of premature discharges, leading to frequent re-admissions, which tend to increase the costs for the hospital system as a whole. Nevertheless, most studies seem to confirm a tendency to cost reduction or a slowdown in cost increase, even though hospitals show signs of "up-coding", whereby patients are classified according to a different, more expensive DRG than what their medical status would suggest.

Aligning medical treatment and practices in hospitals to validated international professional recommendations through clinical guidelines and pathways (also known as integrated care pathways) provides an additional instrument to increase efficiency and the quality of care within hospitals (Box 4.3). Similarly to a gatekeeper system in ambulatory care (see below), a clinical guideline identifies a certain number of tests and medical interventions specific to a patient's clinical situation, whereas a pathway identifies the sequences of the medical interventions. This avoids a situation in which several services compete for the same patient to carry out parallel tests and interventions that at best are cost-inefficient and at worst may even have adverse medical consequences for the patient. These organisational innovations have become increasingly widespread across the OECD, even though they lack commonly agreed standards across hospitals for the moment (Vanhaecht *et al.,* 2006). In order to introduce clinical pathways, a user-friendly electronic access to validated and selected references and a pathway template needs to be set up that combines the general clinical knowledge in a multi-disciplinary effort to determine the most appropriate combination of hospital care. Empirical evidence indicates that the introduction of such pathways helps improve the quality of clinical treatment (making it less dependent on idiosyncratic circumstances) and reducing the average length of

Box 4.3. **Clinical pathways in hospitals**

Clinical pathways provide an instrument to standardise medical treatment for patients with a specific clinical problem. They consist of care plans across different hospital services that display the optimal sequence and timing of treatment (medication, staff action) of this patient for best-possible recovery. One particular goal is to reduce variation of treatment between patients with the same disease pattern. Moreover, standardisation of treatment procedures is also meant to allow for a more rapid diffusion of best-practices within hospitals. Overall, quality of treatment and hence health outcomes are expected to increase, even if this comes at some fixed setup costs, such as building up infrastructure for reviewing data or creating interdisciplinary teams of medical staff (*i.e.* an improvement of output-efficiency, not necessarily of input-efficiency).

Implementing such pathways may not always be optimal, as for instance for patients with complicated and infrequent diseases which may require more personalised treatment (Dy *et al.,* 2005). Moreover, hospital management needs to be involved in the process in order to improve enforcement of these pathways and to guarantee consistency of concepts and methodologies used across different pathways. Nevertheless, empirical evidence so far shows that when clinical pathways are used there appears to be a reduction in treatment variation, as well as an improvement in certain hospital outcome indicators (such as average length of stay and mortality rates of patients with heart attack) (Panella *et al.,* 2003).

hospital stay, thereby raising cost-efficiency (Panella *et al.,* 2003). The authorities should therefore consider taking advantage of the international momentum that is currently building up in hospital care to encourage hospitals introducing these organisational innovations. This would require to introduce mandatory standardised health records accessible to each doctor, containing information on a patient's treatment history, both in hospital and ambulatory care. Moreover, it would make necessary to limit competition among hospital doctors for patients by replacing part of their fee-for-service remuneration by a salary or a capitation system, whereby doctors are paid according to the number of patients enrolled in their service. Moreover, to strengthen incentives to collaborate across services, which is essential for clinical pathways to be successful, such a remuneration package would need to contain a variable element to reflect the individual effort in working with colleagues and contributing to good clinical outcomes.

Both DRG systems and clinical pathways are sophisticated ways of remunerating hospitals and ensuring medical best-practice that could build on existing elements in the Luxembourg hospital sector. A recurrent problem in this regard is related to declining standards and revolving door effects (premature discharges). To counter such issues, health insurance funds may consider reimbursing a lower rate for certain DRGs if specific minimum standards have not been applied (*e.g.* a minimum number of hospital days). Also, for a small country, a typical problem with DRG systems concern the lack of an appropriate benchmark, in particular if hospitals are bound to specialise in certain areas as recommended below. In addition, an external audit system is necessary to allow for the continuous development of standards and the introduction of the latest technological advancements that help achieving cost-efficiency. This can be addressed using the existing external expert committee that already supervises quality standards in certain areas. It should, however, be further developed, possibly by linking it up with DRG audit systems that have been developed in neighbouring countries. Authorities should also consider introducing certification for best-practices in specific medical areas or using certification practices available on the European level, which would strengthen the incentives for hospitals to improve their medical practice and would provide a useful yardstick for patients when selecting the most appropriate hospital for their needs.

Cost-efficiency could be improved through further consolidation of the hospital sector. With five general hospitals, the number of beds per hospital is low and the frequency of surgery intervention per bed is lower than in hospitals in neighbouring countries, with potential consequences for the quality of infrequent interventions (Ministry of Health Care, 1998). For such cases, the possibility of closer cooperation with hospitals in neighbouring regions should be considered. Already today, for certain types of interventions patients are regularly operated in hospitals in neighbouring regions (*e.g.* rheumatism, cancer or eye surgery), reflecting that Luxembourg hospitals do not have the capacity to offer medical services in certain specialised areas. This process should be encouraged further, pushing general hospitals to specialise in certain areas of surgery. At a minimum, the distinction between the three hospital regions should be dropped to allow more cooperation between hospitals across regions. This would also allow a reduction in the number of emergency units (currently seven, even though only one per hospital region is required by law).[14] Given the size of the country, transportation of urgent cases can be assured in an acceptable time even with only one or two emergency units for the entire country.

Improvements in cost-efficiency could also be achieved through enhanced competition among hospitals and nursing homes for long-term care in the *Grande Region* and beyond. Currently, patients who request treatment in neighbouring countries need to seek prior authorisation from the UCM (Box 4.4). In practice, the responsible doctor needs to justify why treatment is not carried out in Luxembourg. In a medical system with strong corporatist ties between doctors, this is likely to result in encouraging the patient to seek treatment in Luxembourg rather than in other countries, even though solutions that are cost-efficient and/or of better quality may be available across the border. Such incentives for a strong inward orientation of the system should, in principle, lead to requests for treatment abroad only in very rare cases where it is absolutely justified. Nevertheless, there are still more than 4% of all patients that do not receive authorisation. Indeed, there seems to be a lack of information regarding the services available outside the country's borders, which will make doctors reluctant to provide the necessary justification. Hence, in order to enhance patient choices by making a larger array of hospital services available, authorities should consider introducing the "money-follows-the-user" policy.

In order for hospitals to be able to specialise, their investment plans need to adjust accordingly. Hospitals, however, have only limited control regarding capital outlays, which are determined and financed directly through the Ministry of Health, *via* the Hospital Planning Committee, in which only two hospital representatives out of 12 members are participating.[15] Moreover, the Ministry has some scope as to how regularly it updates the hospital plan: currently a five-year period is advised but the Ministry has already accumulated a backlog of two years for updating the most recent one. This limits the capacity of hospitals to adjust to competitive forces and to specialise in their areas of comparative advantage through a multi-year framework. As a first step, therefore, the representation of different groups of the health care system could become more balanced, reflecting the interests of a broader range of hospitals. At the same time, in order to provide a clear multi-year guideline for the development of the hospital sector, the Ministry of

Box 4.4. **Provisions for seeking care abroad**

Luxembourg's health insurance system covers around 175 000 non-residents (cross-border workers and their dependents, pensioners living outside the country) who typically purchase health care services in their home country. Prior authorisation is required for residents before seeking health care services outside Luxembourg, putting an important burden on those who desire to be treated in a neighbouring country.

In addition, for medical purchases in foreign countries, a separate reimbursement procedure applies to ambulatory care and pharmaceuticals for non-residents. In the country of residence, cross-border workers can be enrolled in a local health insurance fund to simplify administrative procedures with Luxembourg funds. With regard to hospital care, prior authorization is still required, except in case of an emergency or accident. In addition, hospital services and surgery will only be reimbursed to the extent that they also would be in Luxembourg. The burden of proof that the services purchased abroad correspond to items on the reimbursement list in Luxembourg falls onto the insured person, *i.e.* reimbursement of medical goods and services are only guaranteed for those items that can be easily identified within the Luxembourg system.* Finally, if hospital care is taken in a country which has not signed a bilateral agreement with Luxembourg, costs are paid only up to the average cost of hospitalization in Luxembourg.

Regarding ambulatory care and drugs, the reimbursement procedure depends on whether a bilateral agreement exists (such as in the case of EU member countries) or not. In the former case, reimbursement is granted according to the tariffs applicable in the country where treatment is provided. Any additional co-payments required in the foreign country will not be covered by the insurance fund (*e.g.* the German "Praxisgebühr", a 10 euro fee that patients have to pay for the first doctor visit in any three month period). Moreover, if an insured person seeks treatment abroad, foreign health care providers are not necessarily bound by the tariffs agreed with their national insurance scheme. They typically will apply higher prices, which will only be partially reimbursed by Luxembourg insurance funds.

* This is a particular problem for rare pathologies for which no corresponding item exists in the Luxembourg reimbursement system. Following an EU Court Decision, a patient can nevertheless get reimbursed once prior authorisation is given during which the doctor demonstrates *a)* the medical necessity of the treatment and *b)* to which existing treatment it can be affiliated.

Health should be legally required to present a hospital plan at pre-defined intervals. Moreover, a system of cost-benefit analysis should be installed to strengthen cost-efficiency in investment decisions and to avoid over-investment in new medical equipment. In a more evolved system, authorities should also consider including capital depreciation in the DRG remuneration rates that they negotiate with the hospitals, increasing transparency for decision makers to determine where and by how much to expand hospital capacity.

Ambulatory care

Currently patients are free to seek ambulatory care with whoever they choose, raising the issue of multiplications and overlaps of treatments. In order to enhance cost-efficiency in the ambulatory care and to contribute to standardisation of ambulatory health care services, the authorities should consider introducing a gatekeeper system. In such a system, every patient has a single GP who is responsible for determining which medical procedure or pathway to apply (ambulatory care with a specialist, hospitalisation, etc.).

Patients who nevertheless seek directly the advice of a specialist should see a substantial increase in their co-payment. Such a system would ensure that most patients first contact their GP, thereby allowing standardised medical procedures to be applied, which could be agreed upon within the quadripartite negotiation system. In order to facilitate transmission of relevant medical information between doctors, such a system should be supplemented by harmonising the electronic patient dossier across different health care providers as currently discussed.

The current system embodies incentives for excessive use of ambulatory services that could be lowered by introducing elements of a capitation system. In such a system either part of or the total of a doctor's remuneration depends on the number of enrolled patients (as is the case, for instance, in Ireland and the Netherlands). Capitation remuneration has the advantage of dampening doctors' incentives for over-treatment and unnecessary interventions. However, it may reduce their incentives to follow highest quality standards as they would not be remunerated for additional effort to deliver high-quality services. This can be typically avoided in a system that mixes fee-for-service elements for certain services with capitation (such as in Austria or Denmark).[16] Hence, the authorities should consider introducing a remuneration system for doctors in the ambulatory care system that mixes both capitation and fee-for-services (in line with changes to remuneration of hospital doctors, see above). At the same time, and in order to enhance patient choices, the authorities should consider granting authorisation to practice as a doctor exclusively on the basis of medical qualifications, disregarding any language requirements.

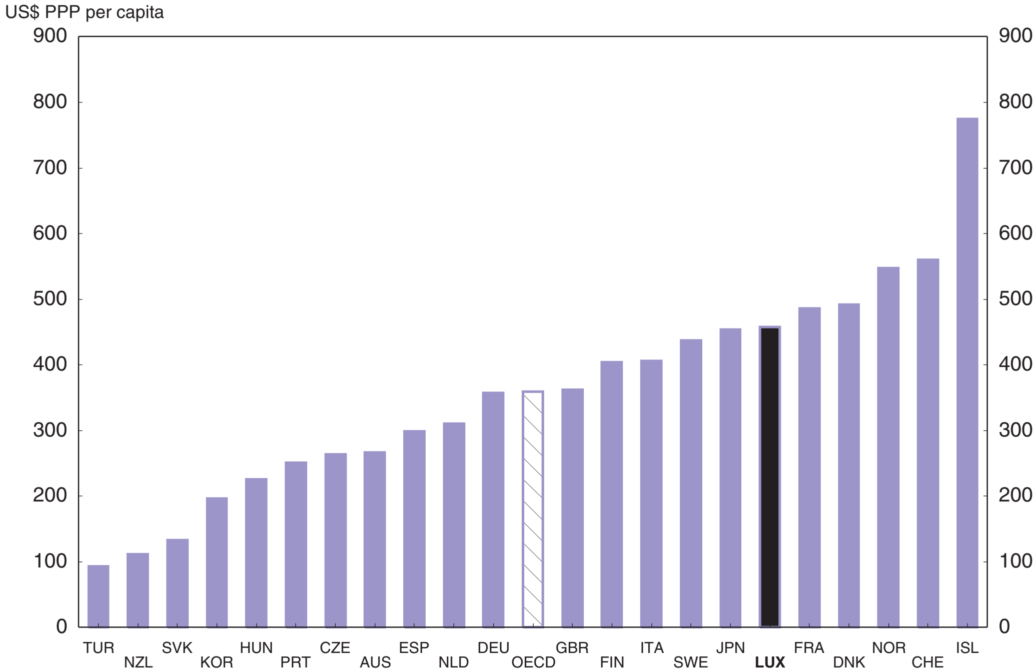
Medication and pharmacies

Detailed reimbursement rates and prescription requirements are regulated through a positive list that contains a limited section of recommended drugs. Doctors are free to prescribe any of the drugs on this positive list. Together with overall low co-payments, this has led to a drug consumption that is high in international comparison, in particular regarding psycho-pharmaceuticals and antibiotics (Figure 4.13). Doctors' prescription practices are barely monitored and only in cases where a doctor's prescription rates are well in excess of average rates will the UCM be alerted. Hence, prescriptions should be more closely monitored and deviations from the average be notified more strictly and possibly sanctioned. Moreover, the authorities should consider increasing the part of those drugs for which they issue prescription recommendations in order to encourage doctors to pick particular drugs. This could be combined with a further differentiated reimbursement system which would provide patients with incentives for using the most cost-efficient drugs.

The authorities should also consider a regular updating of their positive list. Currently, the time it takes before a drug is put on the positive list (the "time-to-subsidy") is at the higher end among OECD countries (Health Consumer Powerhouse, 2007), limiting the benefits of introducing technological advancement in the pharmaceutical market. To avoid that a more rapid introduction of new drugs leads to an increase of new but inefficient drugs on the prescription list, authorities should consider taking advantage of comparative-effectiveness tests that are already common practice in other OECD countries (such as in Sweden and the UK). This should lead to different reimbursement rates, depending on the relative degree of effectiveness. In the likely case that such tests are too expensive to be carried out in Luxembourg alone, the authorities should consider funding external expertise, maybe linking up with laboratories in those countries where such tests are done on a regular basis.

Figure 4.13. **Pharmaceutical spending in the OECD (2003)**[1]

US$ PPP per capita



1. Pharmaceutical spending for Luxembourg does not include reimbursements for purchases by cross-border workers outside Luxembourg.

Source: OECD, *Health data*, 2007.

StatLink http://dx.doi.org/10.1787/380881730033

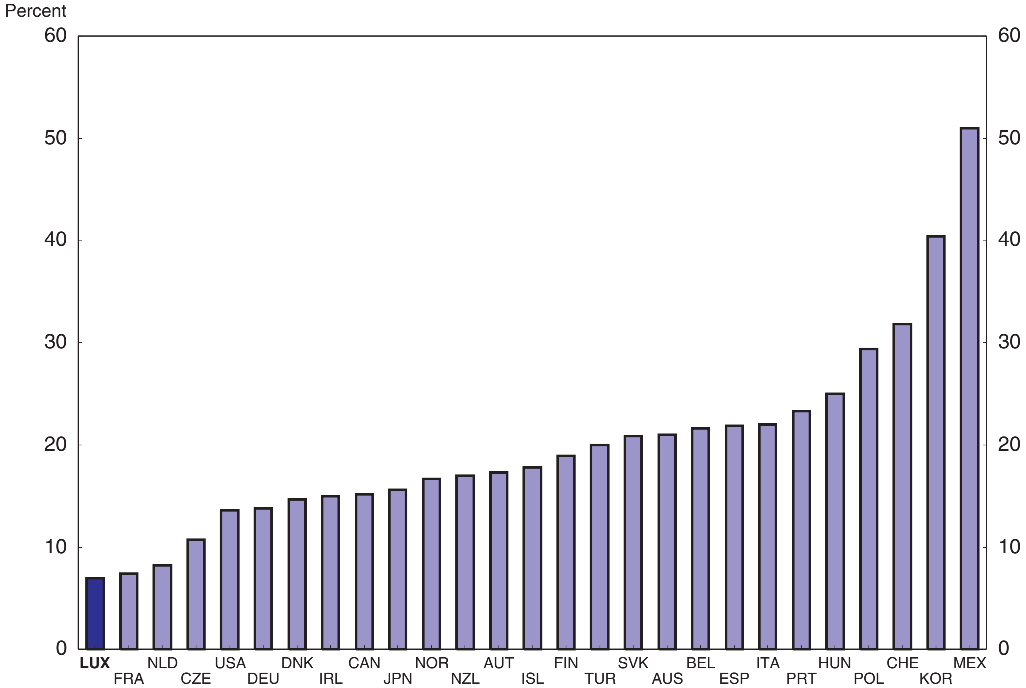
The market for pharmacies is currently constrained by high barriers to entry, thereby limiting competition. The number of pharmacies is strictly regulated, limited to one pharmacy per 5 000 residents. More than half of all pharmacies are state-owned, run by independent pharmacists on a concession, which are awarded on the basis of seniority.[17] The remainder are private, but need prior authorisation. A new pharmacy can only open when the municipality demonstrates that there is demand for it, filing their request to the Pharmacy Division at the Health Ministry. In addition, a pharmacist is not allowed to offer alternative, equally efficient drugs than those prescribed. Partly, this accounts for the slow spread of generics despite their availability for several years. At a minimum, therefore, the authorities should consider lifting this restriction on pharmacists in order to widen patients' choices. Moreover, in order to increase the low competitive pressures in the sector, the authorities should consider lifting the statutory limit on the number of pharmacies so as to open up for new entry. Similarly, internet pharmacies should be allowed to sell drugs to customers in Luxembourg, which is currently not the case. Finally, the authorities should also consider increasing the share of non-reimbursed drugs to be sold over-the-counter outside pharmacies, such as painkillers and treatment for lighter forms of stomach and intestinal problems.

Out-of-pocket payments

Out-of-pocket payments remain limited, even though they have been increased over time in a reaction to rising health care expenditure. Nevertheless, they are still the lowest among OECD countries (Figure 4.14). First consultations of a GP are reimbursed at 90% and

Figure 4.14. **Out-of-pocket payments in the OECD (2004)**

In % of total current health care spending



Source: OECD, *Health data*, 2007.

StatLink http://dx.doi.org/10.1787/381005425782

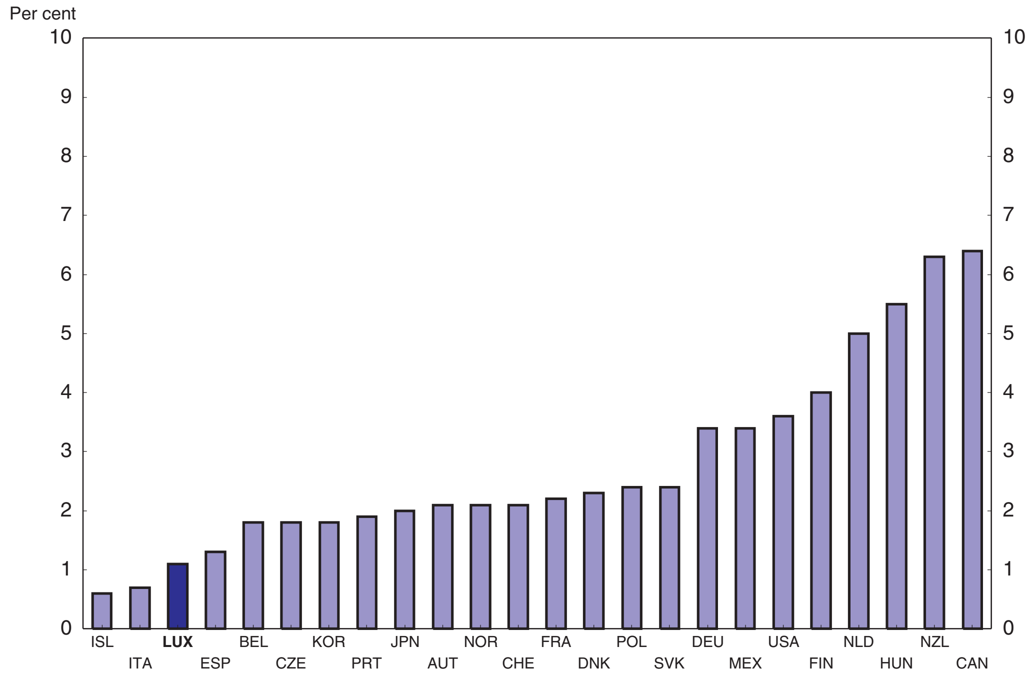
any follow-up visits within a 28 days period are fully covered. Visits for dental care are reimbursed at 95% of the health insurance fee, which may, however, not reflect to full charge covered by the patient as dentists can determine freely the bill for certain services. Dental prostheses are fully reimbursed provided the patient has been visiting the dentist at least once a year. As well, most prescribed drugs are reimbursed at 80%. Increasing out-of-pocket payments, therefore, should be considered a cost-efficient way to strengthen incentives for reducing excessive medical and pharmaceutical consumption. In particular, follow-up visits should be reimbursed at a lower rate. Moreover, it should be noted that for these increases in co-payments to produce a lasting and sizeable effect, they have to increase significantly as suggested by international evidence (Verhoeven *et al.,* 2007). In order to limit the extent to which such increases in co-payments create poverty traps for poorer households, they may be combined with a tax credit that finances part or all of health co-payments up to a certain income limit.[18]

Preventive care

Available indicators suggest that Luxembourg spends relatively little on preventive care, even though it can be a cost-efficient measure to improve health outcomes (Figure 4.15). These indicators are likely to underestimate the true effort that public authorities and other health providers undertake to screen and prevent sickness as part of public information campaigns, school and workplace medical examinations and screening programmes are financed outside the health budget, such as by municipalities or through other budget items such as educational spending or may not even involve spending, as in

Figure 4.15. **Total expenditure on preventive care**[1]

% of total health expenditure



1. Data refers to 2005, except Japan, Hungary and Netherlands: 2004. Data for Luxembourg is not fully comparable to other countries as spending on preventing care refers mainly to residents while total health expenditure also includes non-residents.

Source: OECD, *Health data*, 2007.

StatLink http://dx.doi.org/10.1787/381013851070

the case of the recent ban on smoking in public places. The authorities are currently reviewing this and believe that the total share of preventive care taking into account these items is around 2% of total public health care spending, which is still below the OECD average. Moreover, in certain areas, additional effort seems to be necessary to catch up with best performing countries, such as in influenza vaccination of the elderly and measles immunisation of children (Table 4.8).

Conclusion

The health care system is only delivering average results in comparison with the substantial resources mobilised. Lack of patient satisfaction is likely to keep further spending pressure high. The system also lacks financial sustainability in the long-run, with spending increasing by almost 7 percentage points of GDP by 2050 in the absence of any restraining measures. To address these issues, cost-efficiency in the hospital sector needs to be enhanced by concentrating resources and strengthening competitive forces. In ambulatory care, incentives to reduce spending could be strengthened through a gatekeeper system and larger private contributions. Finally, health insurance could be provided more efficiently through the proposed merger of the different health insurance funds. A more detailed set of recommendations is presented in Box 4.5.

Table 4.8. **Immunisation and screening rates in the OECD**

In % of relevant population

	Cervical cancer screening	Mammography screening	Influenza immunisation	Measles immunisation	DTP immunisation
Australia	60.5	55.6	79.1	93.5	92.3
Austria	–	–	–	74.0	83.0
Belgium	63.1	56.0	65.0	82.0	95.0
Canada	74.1	70.6	62.4	94.0	78.0
Czech Republic	38.8	26.6	16.5	96.9	99.4
Denmark	–	–	50.8	96.0	95.0
Finland	71.5	87.7	46.0	97.0	97.0
France	74.9	72.8	68.0	87.1	98.0
Germany	55.9	–	48.0	93.3	97.7
Greece	–	–	–	88.0	88.0
Hungary	28.1	55.1	37.9	99.9	99.8
Iceland	73.0	61.0	–	94.0	97.0
Ireland	65.5	77.1	61.4	81.0	89.0
Italy	–	59.0	66.6	85.7	94.0
Japan	23.7	4.1	48.0	94.0	93.0
Korea	–	–	75.7	–	–
Luxembourg	**39.6**	**60.8**	**51.0**	**91.0**	**98.0**
Mexico	38.9	–	29.1	96.4	98.1
Netherlands	68.9	81.7	73.0	95.8	95.3
New Zealand	72.0	63.0	49.2	85.0	–
Norway	72.5	98.0	–	88.0	91.0
Poland	49.0	15.4	–	97.0	99.0
Portugal	–	–	39.0	94.8	97.8
Slovak Republic	–	14.8	22.9	99.6	99.3
Spain	–	–	68.6	97.3	96.6
Sweden	72.0	83.6	–	94.0	99.0
Switzerland	–	27.0	57.0	82.0	95.0
Turkey	–	–	–	81.0	85.0
United Kingdom	70.3	69.0	71.0	80.7	91.5
United States	82.6	60.8	64.6	93.0	85.5
OECD average	59.7	57.1	54.4	90.8	93.8

Note: DTP refers to diphteria, tetanus, and pertussis. Immunisation and screening rates are measured regarding the relevant population, *i.e.* women in the case of cervical cancer and mammography screening, children regarding measles and DTP immunisation and people above 65 regarding influenza immunisation.
Source: OECD, *Health data*, 2007.

Box 4.5. **Summary of recommendations**

Reforming health care insurance

The *Union des Caisses de Maladie* should be encouraged to act as "wise" buyer of health care services, using more frequently comparative cost-efficiency analyses of services rendered and, when appropriate, comparative international benchmarks.

The role of the health care reserve funds should be expanded and its scope should be increased beyond the existing limit of 20% of annual spending, so as to pre-fund future health care liabilities.

Where appropriate, out-of-pocket payments for ambulatory care should be increased substantially. To address equity concerns, tax credits for poorer households could be introduced.

Box 4.5. **Summary of recommendations** *(cont.)*

The authorities should seek to maximise the benefits of the current merger of insurance funds, notably productivity gains stemming from economies of scale, which will imply reducing the number of employees working for these funds. Further economies of scale could be obtained by merging the remaining four funds.

Improving hospital efficiency

Hospital managers should be made accountable for their outcome and budget decisions. This could be achieved by introducing activity-based funding through a DRG system. Such a DRG-based funding should also include capital depreciation to improve decision-making on hospital investment as well as remuneration of hospital doctors. When introducing a DRG system, the authorities should take stock of experience in neighbouring countries when defining disease groups and funding rates.

Medical treatment and services should be increasingly standardized within hospitals. This could be achieved by introducing clinical guidelines and pathways and making doctors accountable for being compliant to these recommendations, thus introducing a form of hospital gate-keeping to prevent over-treatment and excessive medication.

The distinction between three hospital regions should be dropped. This would allow for further consolidation of the hospital sector and for hospitals to specialise in areas of their expertise, for instance by closing some units that are in over-supply, such as emergency units.

The possibilities, based on valid information on hospital outcomes, for patients to seek treatment abroad should be facilitated. In particular, the administrative burden for surgery outside Luxembourg should be lowered and the "money-follows-the-user" principle should be introduced. This would strengthen competition between hospitals in a wider geographical area, preventing monopolistic tendencies that could arise from hospital specialisation.

Raising cost-efficiency in ambulatory care

A gatekeeper system should be introduced in ambulatory care. To facilitate the information exchange between different health care providers the use of a harmonized electronic patient dossier should be further promoted.

Doctors' remuneration should be based on a system mixing capitation and for-services fees. This would allow incentives for excessive medication to be reduced while at the same time keeping up quality of treatment.

Strengthening incentives for the use of cheaper medication, in particular generics

Doctors should be encouraged more strongly to prescribe recommended drugs; drug prescriptions per doctor should be closely monitored and doctors that do not follow good prescription practices should possibly be sanctioned.

In order to enhance access to cheaper and/or more efficient drugs, the positive drug list should be updated more regularly. In order to further stimulate cost-efficiency in medication, differentiation of reimbursement rates should be based on the relative effectiveness and price of a drug.

Competition should be introduced in the market for pharmacies by lifting the statutory barrier on the number of pharmacies. In addition, pharmacists should be permitted to offer substitute drugs that are cheaper but as efficient as the prescribed ones, in particular regarding generics.

Notes

1. At the Centre, doctors receive part of their remuneration in form of a salary, the rest being determined on the basis of the sum of fees received by all doctors.
2. Luxembourg data on obesity may not be fully comparable to that from other countries as the incidence of overweight and obesity is assessed on the basis of information from workplace medical doctors.
3. Only staff of European and international organisations is excluded, representing less than 1% of total residents.
4. Direct contribution rates of general government spending as a share of total health spending are fixed at: 37% for the *assurance maladie (prestation en nature)*, 10% at the *assurance maladie (prestations en espèce)*, 100% for the *assurance maternité* and € 140 million (about 40%) for the *assurance dépendance* (since 2007).
5. The UCM and the nine sickness funds are administratively integrated public services. They are not separate legal entities and their recruitment procedures are governed by the general entry competition for civil servants and public sector employees.
6. For employees, the first three months of sickness leave fall onto the employer, afterwards the health insurance system is providing replacement income. For workers, the health insurance system is providing replacement income from the first day of sickness on.
7. European regulation of social security systems requires the country of residence of a pensioner to guarantee health care insurance, except for those cases where the pensioner has formerly worked the entire working-life in a different country.
8. In addition, health care consumption of non-residents tends to cheaper as they often receive health care in their home countries, where it is less expensive than in Luxembourg.
9. The graphical presentation of such efficiency measures in this chapter is a simplified version of a more sophisticated technique called "Data envelopment analysis" (DEA). DEA is typically applied in multiple-inputs, multiple-outputs context to assess how efficiently inputs are combined to achieve multiple objectives (see OECD (2008) for such a more elaborate version and detailed discussion of pros and cons). A drawback of this technique is that efficiency measures are prone to substantial variations when the number of inputs and/or outputs is changed. Moreover, in the context of international comparison – where this technique is not widely used (see Aubyn and Alfonso, 2005, for a recent exception) – additional problems arise from the fact that countries differ in a number of aspects (economic development, size, etc.) that affect the production function, especially when (local) economies of scale are present. See Häkkinen and Joumard (2007) for a discussion of some of the efficiency indicators in health care.
10. This corresponds to 3.5 beds per 1 000 regarding the covered population. In the context of in-patient care, however, the relevant measure needs to include all hospitals available in the Grande Region (*i.e.* including Wallonia/Belgium, Lorraine/France and Rheinland-Pfalz and Saarland/both Germany).
11. The general hospitals are differentiated into 6 larger general hospitals with between 200 and 580 beds and 2 smaller ones (82 and 118 beds) that offer only a reduced service in terms of medical interventions.
12. Since 2006, quality management is based on the European EFQM standard that will eventually allow benchmarking of hospitals at the national and international level.
13. Intensive treatment is remunerated on a variable basis between 90 to 110 per cent of past costs.
14. Effective emergency units require that a broad range of support and follow-up treatment services are available, which typically can only be provided by large general hospitals.
15. Hospitals communicate their capital needs through individual hospital plans to the Committee.
16. An overview of incentives built in different remuneration systems for ambulatory care; see Chawla *et al.*, 1997.
17. Concessions become vacant either because the current holder returns it or automatically when its current holder reaches the age of 70.
18. The annual sum of co-payments for ambulatory health care and of the hospital daily fee is limited to a maximum of 2.5% of the part of the annual income that is subject to social security contributions. For low-income earners or recipients of social assistance, any co-payments will be entirely reimbursed.

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Chapter 5

Educated and successful: increasing student abilities by giving schools more autonomy

A heterogeneous student population with more than a third of all pupils having foreign citizenship presents a major challenge to the education system. The resulting difficulties in allocating resources according to local school conditions continue to weigh on educational performance in international comparison. Relative to the OECD average, Luxembourg students have accumulated a lag of almost half a year of schooling at the end of lower secondary education, partly due to the strong focus on German and French language education. As indicated in the previous Survey, curricula focus strongly on language competencies, but even in this core area of the education system students do not perform satisfactorily. The failure to achieve a better educational performance imposes a substantial cost on young people. First, school leavers have increasingly difficulties in finding a job. Second, the rate of early school leavers remains high, reflecting the low expectations of students themselves of integrating into the labour market. Also, disparities across students are large with those with an immigration or a low socio-economic background performing particularly poorly. The authorities have started to address some of these problems. School curricula are currently being reworked and early tracking is being eased. However, in order to allow schools to adapt to local conditions of their student population, they need to be held accountable for their results and have sufficient autonomy to select their own instruments to achieve these results. Moreover, incentives for high-quality teaching need to be strengthened, linking part of the wage progression to regular performance evaluations.

Addressing the challenges of a heterogeneous student population and the resulting difficulties of the school system in raising educational achievement has been a major policy goal of Luxembourg authorities in recent years. Notably, the reform effort has been stepped up since the last *Survey* identified these difficulties. International educational tests have repeatedly demonstrated that 15-year old students are lagging behind the OECD average. At the same time, public expenditure on (non-tertiary) educational institutions is above the OECD average, both as a share of GDP and – more importantly – by student. The limited effectiveness of educational spending on raising educational achievement has started to leave marks on the labour market performance of young people, who have seen a three-fold rise in their unemployment rate since the beginning of the decade, much faster than for adults. The previous *Survey* pointed out that part of their difficulties in successfully completing school and integrating into the labour market is related to the strong focus on a trilingual education, which proved particularly challenging for children with weak socio-economic or immigration background. In addition, it has led to educational deficits in areas that Luxembourg employers appear to emphasise increasingly, such as quantitative skills. The previous *Survey* also pointed to the early age at which students are selected into different tracks and the widespread recourse to non-certified teachers as additional factors contributing to the sub-par educational performance.

The authorities have started to address these problems, testing some reform proposals in pilot projects to validate their beneficial effects. However, these measures do not address the key problem, which is that the centrally-steered school system has difficulties in adjusting its educational services to the heterogeneous background of students. Individualising educational services requires that schools have greater autonomy and transparency. This chapter therefore argues that, in order to strengthen the impact of these policy changes on educational achievement, schools need to become stakeholders of the reforms. This can be achieved by increasing school accountability and promoting stronger incentives for teaching students how to become successful after school. The chapter also points to further reform areas in teachers' education and language education. It starts by documenting the current level of student abilities and the consequences for their labour market success. This is followed by a discussion of recent reforms of the school system and their contribution to improving educational outcomes, in particular regarding the progress in language education and teaching quality that have been made since the last *Survey*. The chapter then discusses further reforms that would help to address the heterogeneity of the student population, in particular increases in school accountability and autonomy. The chapter concludes with a summary box on the main recommendations.

Student abilities and labour market performance

At the age of 15 years and even though they show good performance when younger, Luxembourg students lag behind their peers in other OECD countries regarding their educational abilities. In comparison to the PISA test scores in 2003, students have – on

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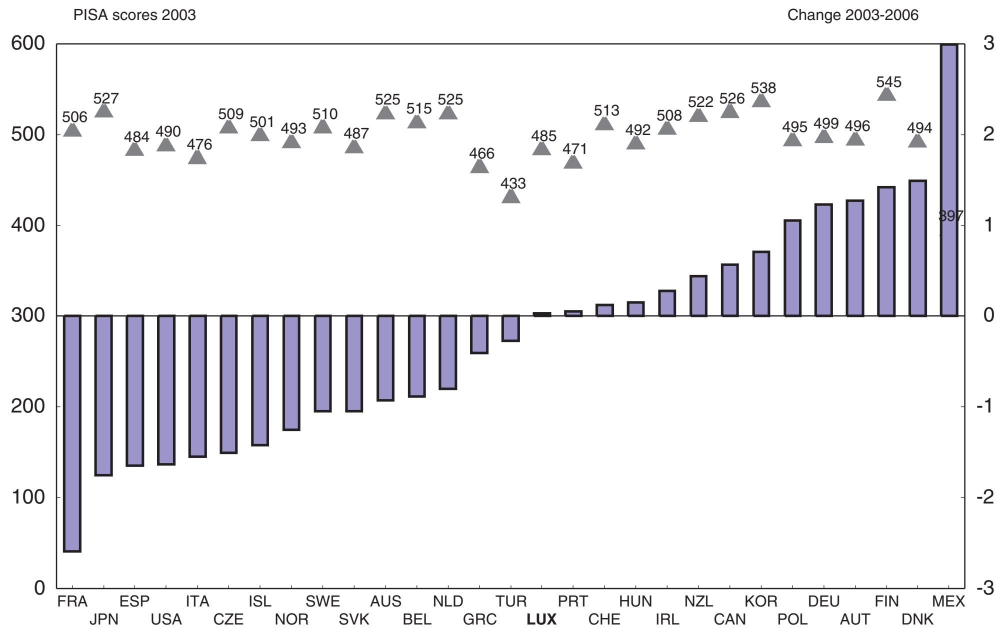
average across all four fields that are covered by PISA – not managed to improve their performance (Figure 5.1). The lag in educational achievement that Luxembourg students have accumulated amounts to almost half a school year with respect to the OECD average (OECD, 2007).

Figure 5.1. **PISA performance**[1]

Change between 2003 and 2006, in %



1. The figure presents the difference (in %) between the average test results of PISA 2003 and PISA 2006 across the three subfields “mathematics”, “reading” and “science”. The blue triangles represent the reference value of PISA 2003 (left hand scale).

Source: OECD, PISA 2003 and 2006.

StatLink http://dx.doi.org/10.1787/381057305653

The school system is not providing many students with sufficient skills to allow them to integrate quickly into the labour market as demonstrated by low employment rates for young people. Moreover, unemployment rates for young people have increased substantially in the early 2000s and not fallen back to earlier, low, levels, even though employment continued to expand at more than 2% each year. Moreover, the school system is not particularly good at promoting the employment chances of children of immigrants, who represent around 40% of the resident working-age population but have an unemployment risk that is much higher than for nationals (Table 5.1). These developments seem to have discouraged students from continuing their secondary education in Luxembourg: around 8% of children in secondary education prefer to go to a school in one of the neighbouring countries, most of them in Belgium (where there is less emphasis on language education), against only 1% of children having residence outside Luxembourg (Ministère de l’Éducation, 2005). Some others are even so discouraged that they prefer to quit school earlier than in other countries, even though drop-out rates have decreased somewhat recently (Figure 5.2).

As a country with three official languages, Luxembourg puts a strong emphasis on language education. This may be a valuable policy objective to strengthen social cohesion

Table 5.1. **Employment and unemployment rates by age and nationality (2006)**

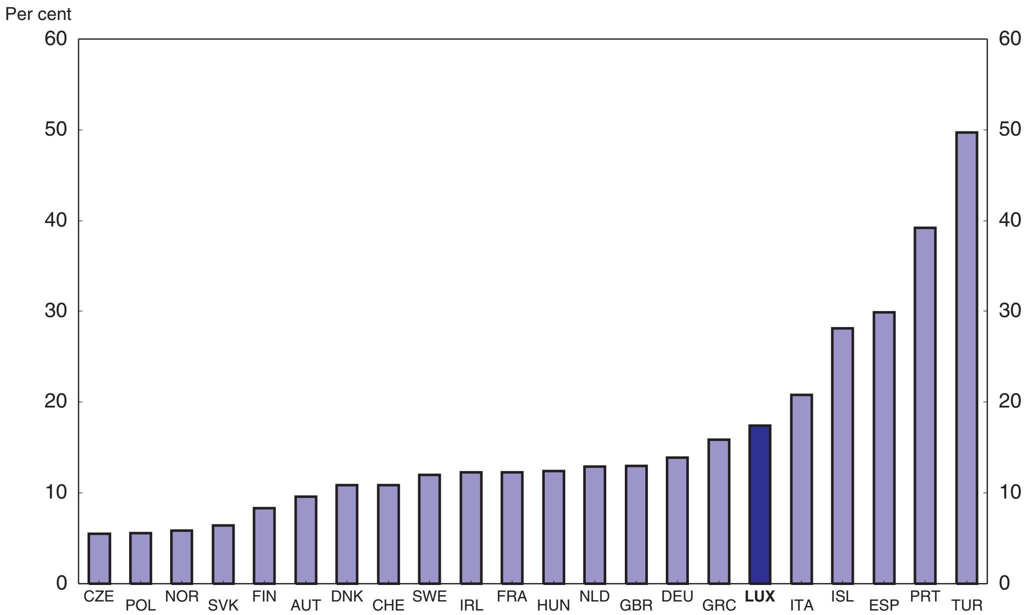
	Employment rate		Unemployment rate	
	Nationals	Non-nationals	Nationals	Non-nationals
Total	60.9	67.2	3.1	6.8
Young	22.3	25.1	14.1	19
Prime-age	81.5	80.4	2.3	6.3

1. The employment rate is expressed in per cent of the resident working-age population; the unemployment rate in per cent of the resident labour force.

Source: STATEC.

Figure 5.2. **Early school leavers**[1]

In % of total population 18-24 with at most secondary education and no longer in education; 2006



1. Early school leavers refers to persons aged 18 to 24 with at most upper secondary education and declaring not having received any education or training during the four weeks preceding the survey. Data are shown in per cent of the total population of 18-24 years old.

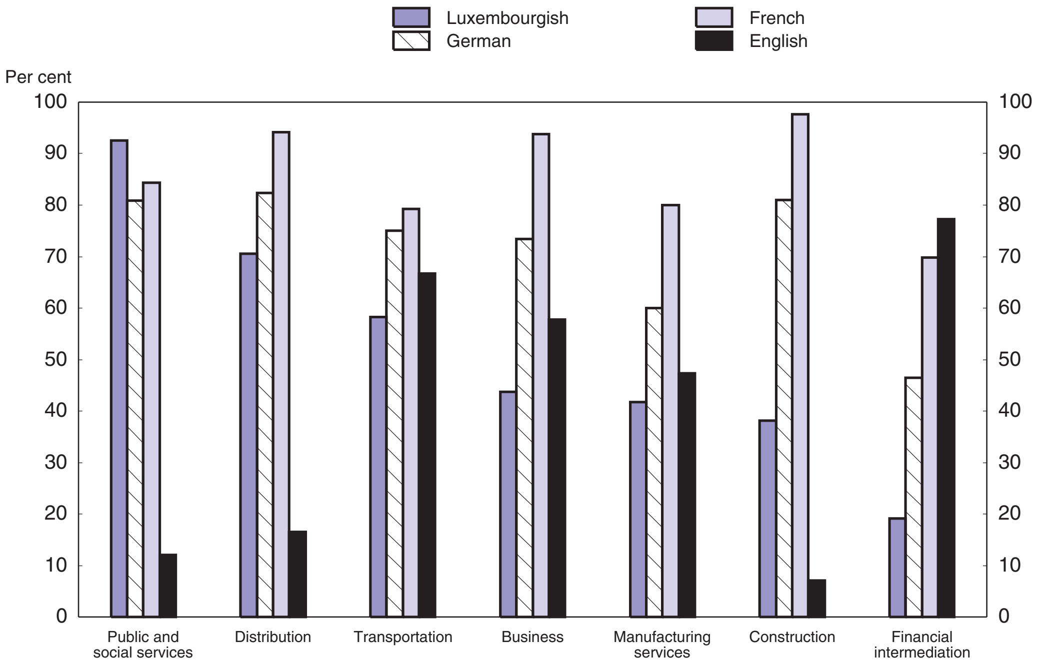
Source: Eurostat.

StatLink http://dx.doi.org/10.1787/381060866607

or to address equity concerns and to foster national identity. However, it does not seem to have improved labour market chances for young people. Looking at the rapid intake of cross-border workers in the labour force, the capacity to speak the three official languages does not seem to constitute a particular advantage. Empirical studies on the required languages in Luxembourg job vacancy notes are even indicating that a command of the three official languages is less important than English language competencies for jobs in the important financial sector (Pigeron-Piroth and Fehlen, 2005 and Figure 5.3). In addition, with the exception of public administration, the education sector and some health professions, no explicit language requirements exist for job applicants. Relevant skills and a high educational attainment are, however, important for the often high-wage jobs in the rapidly expanding financial sector, in business services and in part of the public services (such as health care and education) where demand is mainly for high-skilled workers

Figure 5.3. **Language requirements by sector**[1]

In % of all vacancy notes



1. The figure presents the frequency of language requirements in a sample of vacancy notes as published by national newspapers in 2004.

Source: Pigeron-Piroth and Fehlen, 2005.

StatLink http://dx.doi.org/10.1787/381132151625

(Table 5.2). One implication is a rising skill mismatch between labour demand and supply whereby people with only upper secondary education have less chance of finding employment in these fast expanding sectors. Moreover, a internationally high share of pupils does not fulfil the nationality requirements in the public sector.

Table 5.2. **Youth employment by sector and skill level**

In % of total employment per sector, 2006

	Low-skilled	Medium-skilled	High-skilled
Manufacturing	27	62	12
Construction	43	51	7
Distribution	27	63	10
Hotels and restaurants	31	58	10
Transport and communication	8	76	17
Financial intermediation	3	52	44
Business services	15	42	44
Public administration	23	63	14
Education	4	21	76
Health services	13	53	32
Other social and personal services	18	45	37

1. The table presents employment shares by skill level across sectors for young people (15-29 years).

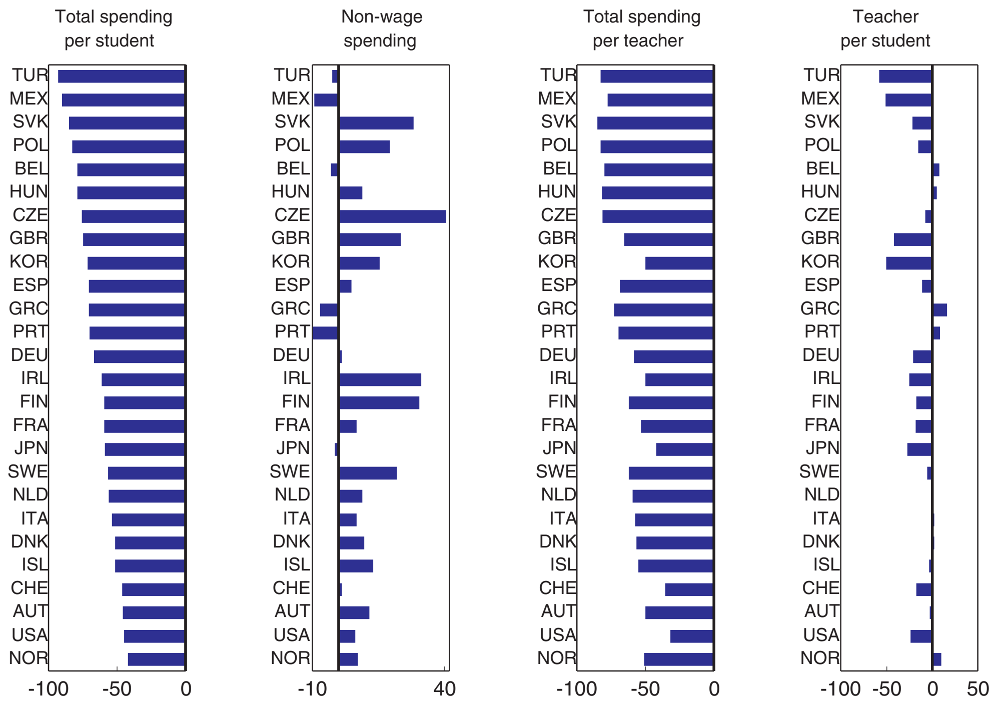
Source: STATEC.

Educational expenditure and efficiency

The Luxembourg school system appears to be among the most expensive in the OECD when measured in terms of spending per student. This is mainly related to the fact that teachers' salaries are the highest in international comparison, reflecting the high level of per capita income, but also a public wage scale that is strongly seniority-based (see Chapter 3). In addition, school classes are smaller than in most other OECD countries (Figure 5.4). A particular problem facing the Luxembourg school system is the heterogeneity of the pupils as one third of them have an immigration background (ministère de l'Éducation, 2007).

Figure 5.4. **Spending accounting in the school system**

Deviation in per cent of Luxembourg spending levels

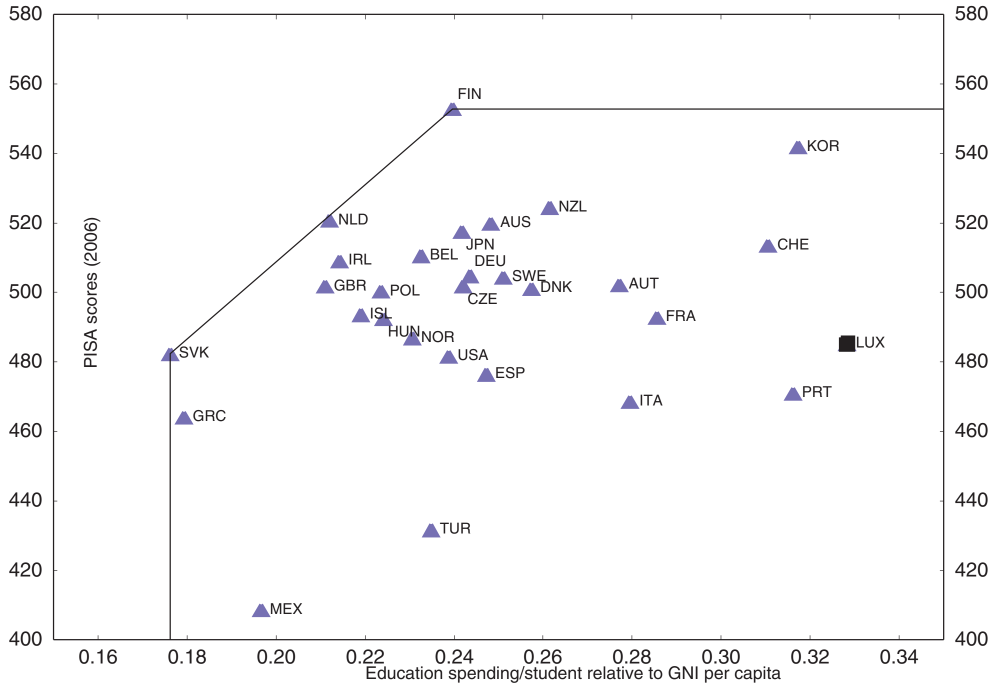


Source: OECD, *Education at a Glance*, 2007.

StatLink http://dx.doi.org/10.1787/381140444003

When comparing spending on education with educational performance, sizeable inefficiencies appear. In international comparison, those countries that achieve the highest educational performance at a given spending level or have the lowest spending per student at a given performance level define the efficiency frontier (Figure 5.5). In this respect, Luxembourg compares poorly. Not only are students performing less well than in most other countries, but spending is also among the highest in the OECD. Furthermore, educational spending tends to target areas that do not seem to improve educational performance. Small class size, in particular, does not seem to be related to educational performance, suggesting that the average class size could increase in Luxembourg without foregoing any improvements in educational performance (Figure 5.6).

Figure 5.5. **Educational spending and performance**



Source: OECD, *Education at a Glance*, 2007; PISA 2006.

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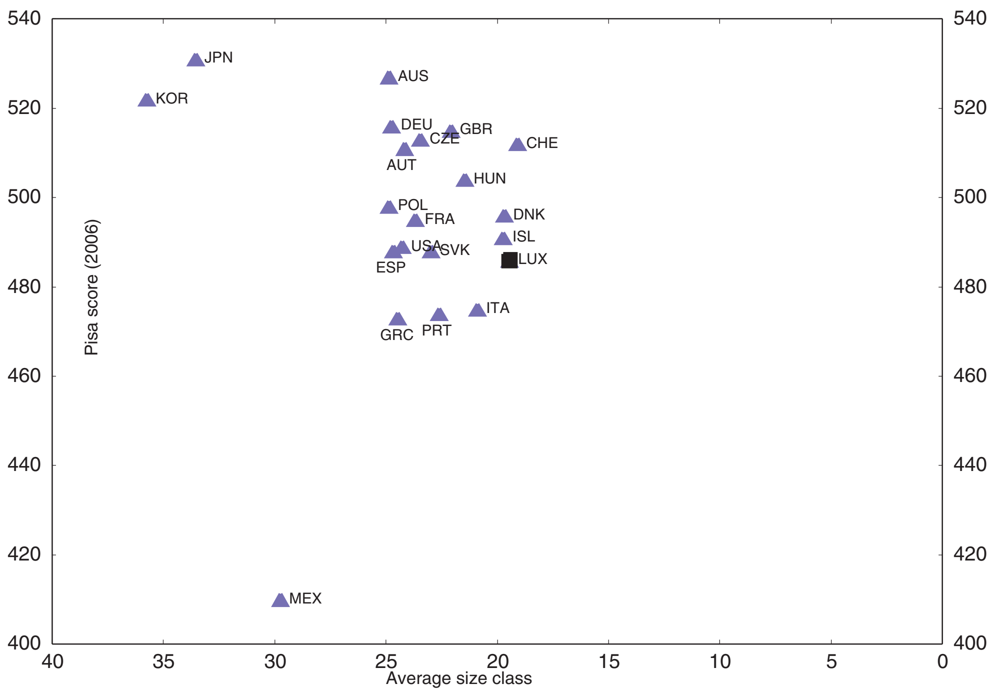
Figure 5.6. **Class size and educational performance**



Source: OECD, *Education at a Glance*, 2007; PISA 2006.

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Recent school reforms

Pupils in primary education perform well…

In international comparison, Luxembourg pupils in primary education are among the group of best-performers, as shown by the international study on reading and literacy capabilities of 9/10 years old (PIRLS). Partly, this can be explained by the relatively young obligatory school age at which pupils in Luxembourg enter pre-school and then primary education. Despite these encouraging results, the authorities have initiated some reforms in this educational segment to tackle remaining problems such as the high incidence of class repetition already in first grade. In particular, a new organisation of primary education is planned around three bi-annual learning cycles that fixes a pupil's minimum learning advancement only after two years. This is a welcome step to further improve the organisation of primary education.

… and problems start in secondary education

As discussed in the previous *Survey*, the Luxembourg educational problems are concentrated in secondary education, a system that is characterised by early tracking[1] and frequent class repetition to group students according to their ability level.[2] Tracking decisions are taken by an Orientation Board that is composed of the primary teacher of the child, an inspector, two teachers from secondary education and – if requested by the parents – a psychologist. The decision of this board is compulsory, even though parents have the possibility to contest, which they rarely do given the limited chances to influence the final outcome. In addition, the school decision to separate students into particular tracks is often based on a student's performance in a very limited number of subjects (German, French and mathematics). Moreover, remedial courses do not occupy a central role in the school system. Rather students with difficulties in certain areas have to repeat an entire class or have to change tracks to a lower level. Blackboard teaching is the predominant form; project work and studies where students develop their skills independently or with only light supervision are rare but are used more intensively in two pilot schools. In 2002, a pilot project was put in place in several schools to reduce tracking at lower secondary education, keeping students in the same class throughout the first three years of secondary education (PROCI, Box 5.1). Students in this programme are more successful in recent PISA tests than their peers in the traditional programme, with a gain of close to half a school year. In the light of such encouraging results, authorities should continue reducing the extent to which they track students and extend the current pilot project to the remaining schools. More generally, the authorities should consider postponing the first tracking decision to a more advanced age. This would allow basing the tracking decision on the student's abilities in a larger variety of fields and would be particularly helpful for students with a weak socio-economic or immigrant background.

The Ministry of Education enacted several reforms in response to the 2003 PISA results that are currently being implemented (Box 5.2). A main focus of these reforms has been put on reworking the language education, including an adjustment of language curricula and offering additional language support courses. A second priority has been reforming the structure of the current education system, trying to avoid higher spending. In addition to attempts to reduce the extent of tracking and lowering class repetition, pilot projects with new school types (see below) are currently being put in place. Some of the reforms are awaiting full implementation in the remaining schools; others are only being introduced

Box 5.1. **The PROCI Programme**

A pilot project was launched in the school year 2003-04 in technical secondary education (around 14% of students in lower secondary education) to address frequent class repetition and track changes. The programme defines some minimum curriculum standards, but otherwise leaves autonomy to teachers and schools regarding teaching methods and programmes. The learning objectives are set up in terms of competences a student has to achieve rather than contents. The progress of students towards these competences is assessed by a pedagogical team that provides regular feedback. Finally, students take standardised tests in 9th grade (age 14-15) before entering upper secondary education.

A first evaluation of the project shows mixed results. Students that are part of the program tend to be oriented towards lower tracks in upper secondary education than students involved in the traditional programme. Furthermore, class repetition as well as the number of early school leavers (after the 9th grade) tends to be slightly more important for students involved in this pilot project. On the other hand, this evaluation also shows that the project might have had a positive impact on students' performances, with first visible signs in the most recent PISA test where the PROCI-students performed better than other Luxembourg students in lower secondary education.

Box 5.2. **Recent reforms in the Luxembourg school system**

Under the impression of unsatisfactory educational outcomes, the Ministry of Education has enacted a series of reforms, in particular to address weaknesses in language education, frequent class repetition and early tracking:

- In primary education, three bi-annual competence cycles have been introduced to lower the frequency of class repetition.
- In the technical branch of lower secondary education, the PROCI-programme has been introduced in selected schools (see Box 5.1).
- Two school projects have been started since 2005: The Neie Lycée in secondary education and Eis Schoul for children in primary school. Both school projects introduce full-day schooling and interdisciplinary learning. Pupils are being followed by a pedagogical team that evaluates their performance in attaining competence levels collectively.
- Language education is currently being reworked on the basis of the "Plan d'action pour le réajustement de l'enseignement des langues". The main principles of this plan are increased language support, even during non-language hours, and a re-definition of language curricula, introducing competence levels for each grade.
- Teaching time has been increased in 2007 by 5%.

from the next school year on, making it difficult to evaluate their full effect. These reform efforts are welcome and the authorities should implement them as quickly as possible. Nevertheless, reforms of the school structure alone will not be sufficient to raise educational achievement. The language requirements and the heterogeneous nature of the student population due to their different language backgrounds makes it necessary to mobilise local actors and their competences more thoroughly to adjust to the specific circumstances in their school, requiring greater school accountability and autonomy.

Continuous reworking of school curricula

As discussed in the last *Survey*, the Luxembourg education system puts a strong emphasis on language education. Partly, this is related to the geographical situation of Luxembourg, giving the country three official languages. More importantly, it is an explicit goal of public policies to promote these three languages among all students, with the intention to raise labour market chances of young school-leavers.[3] However, this comes at a substantial cost in educational achievement, as some other subjects are taught at a much later stage than in other OECD countries. Moreover, despite the importance that language education receives in the Luxembourg school system, the variation of languages taught is rather limited; instead, besides English, the possibilities to choose other, non-official languages in the school curriculum are rather limited, even though variation has increased over time (European Commission, 2007). The authorities have started to rework the curricula, increasing the importance of science and mathematics at the expense of language teaching, in particular in French. This is a welcome first step that should be implemented as soon as possible. In addition, the variety of languages from which students can choose should be increased. Nevertheless, rebalancing the different subjects is unlikely to improve educational achievement substantially if the methods of teaching are not reformed.

German and French are used as language of instruction at the same time as they are taught as foreign languages, constituting the main challenge for students in the Luxembourg school system. As German is used as the unique language of instruction in primary and lower secondary education, this puts students from romance language background at a particular disadvantage, creating a wide disparity of educational achievement across students (OECD, 2007). These students face an additional difficulty as German is the main language of instruction in the technical and vocational tracks of the education system, towards which they tend to be oriented. In addition, the current system fails to provide students with a sufficiently good language background. A study by the Ministry documents that even students in the academic-oriented track at the end of upper secondary education have insufficient language competences in French, despite having it as a language of instruction for the preceding four school years (Ministère de l'Éducation, 2006). At a minimum, therefore, the authorities should reinforce support for language teaching. This could be implemented through combining language instruction with non-language courses as currently planned by the "Plan Reajustement" or *via* additional remedial courses. In any case, the different linguistic backgrounds of pupils need to be better reflected in the provision of language teaching, for instance by providing more options for children with deficits in one or both languages of instruction to attain the necessary level.

Strengthening incentives for high-quality teaching

Similar to other civil servants, teachers' salary increases follow the typical seniority-based career path after their certification. This involves annual wage increases unrelated to performance, implying that wages are unlikely to enter teachers' motivation for high-quality teaching. In addition, headmasters in the current system have no incentives for performance evaluation of teachers other than for bureaucratic reasons. However, such evaluations are important if only to provide feedback on personal professional progress and difficulties. Furthermore, international evidence demonstrates that much can be gained from linking at least part of the annual wage increase to performance evaluations carried out by the school headmaster (Figlio and Kenny, 2007). Critiques of such performance evaluations in teaching point out the difficulties for headmasters to identify

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properly the value-added a teacher has on educational achievement of the students. However, empirical studies have established that headmasters do have the means to properly evaluate teaching effectiveness, particularly at the two extremes of the teaching quality (Jacob and Lefgren, 2008). One alternative to linking wage increases to performance evaluations could therefore be merit-pay, whereby particularly good performance is rewarded either by an exceptional bonus (which could be awarded in form of additional training possibilities) or by a more rapid career progression. As a first step authorities should consider granting the autonomy to headmasters to carry out annual performance evaluations. This should be followed by a step to link at least part of the wage increase to the annual evaluation, for instance by making each seniority step increase dependent on a positive evaluation. In addition, in order to allow for a more differentiated career path, additional hierarchical levels such as heads of mathematics, science or language sections should be (formally) introduced in schools.[4]

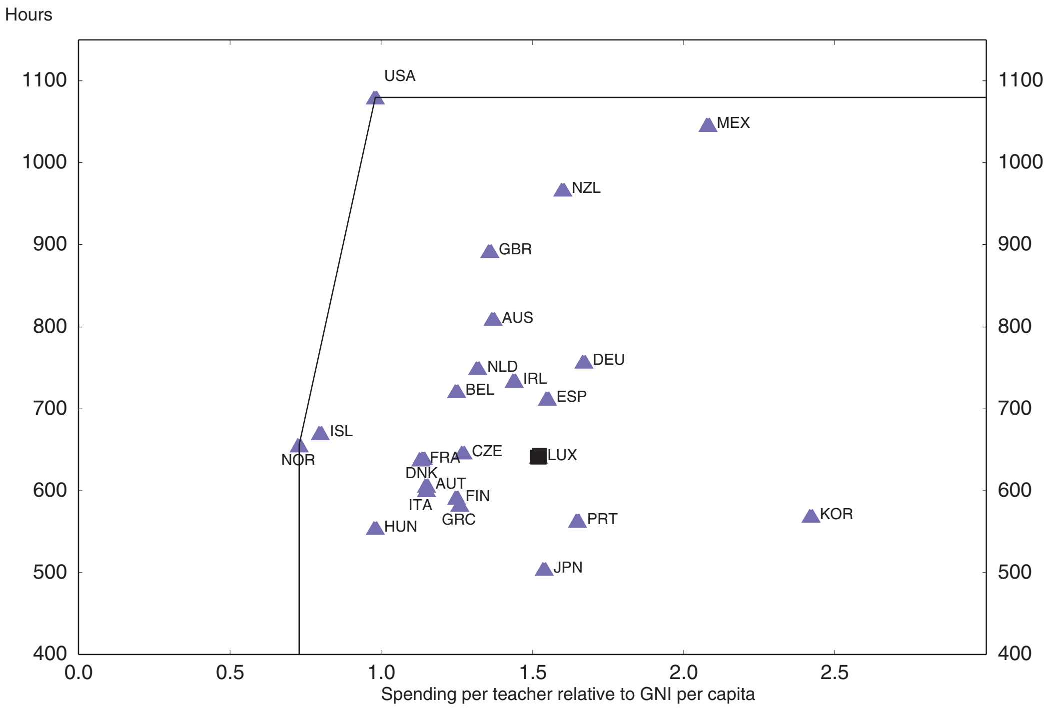
Teaching quality could also be enhanced by strengthening pedagogical training. Currently, teachers' education strongly focuses on expert skills in only one particular field and that at the expense of more pedagogical qualifications (Box 5.3). In addition, the procedure to become a certified teacher is overly lengthy due to the fact that pedagogical and technical training are not better intertwined. As a result of the strong focus on technical skills, the expert status of teachers makes multi-disciplinary work in schools more difficult and creates a strong corporatist reaction to any changes regarding the school curricula as witnessed by the recent debates on rebalancing language education (see below). Finally, the final decision to hire a candidate remains with the Ministry and not with the school at which the teacher-to-be is going to start his/her career. At a minimum, the authorities should consider rebalancing practical pedagogical work and deemphasize theoretical and technical education. In addition, as the University of Luxembourg is expanding its capacity in training teacher candidates, such candidates could already be accepted in the teaching certification programme without a completed university degree, offering them both pedagogical and technical training at an early stage. Alternatively, the authorities should consider accepting pedagogical degrees that can be received in other countries as equivalent to the certification process. Finally, the authorities should consider reinforcing the role of the headmaster by strengthening his/her role in the hiring process, thereby selecting candidates that fit in the existing school-specific learning environment.

Box 5.3. **Teacher certification process**

To become a teacher in secondary education, candidates need to have a university diploma with a minimum length of four years before entering a two years training programme. Only one field of specialisation is necessary to apply. Candidates have to pass a language test in all three official languages and an entry exam before joining the programme during which the candidates are paid. This programme includes pedagogical training at the University of Luxembourg and some practical class-room teaching both in general and technical secondary education schools and under supervision from tutors. Tutors are full-time teachers with reduced teaching-load and who council and supervise the teacher candidates. The training programme ends with a final examination, evaluating both the technical and the pedagogical skills of the candidate. After successfully completing the exam, the candidates have to finalise their applications consisting of a technical dissertation in their field of speciality.

Teaching hours are short and decline with seniority. A paradox in this regard is that although there are important learning-by-doing effects in the teaching profession, the best teachers spend relatively less time with students. By consequence, such a short teaching time has adverse effects on educational achievement through at least two channels: On the one hand, teachers are less in regular contact with their class than in other countries, reducing the possibilities of exchange and of adapting the teaching programme to the specific needs of the class or of individual students. In addition, less time is left for extra-curriculum work, a lack that is also felt by teachers themselves who would like to have more time with their students to work on particular projects that are not part of the official school programme. The authorities should, therefore, consider further increasing net teaching time, by introducing and expanding obligatory extra-curriculum activities. This would help to improve cost-efficiency in the education sector (Figure 5.7).

Figure 5.7. **Net teaching time and education spending**[1]



1. Teacher salaries in lower secondary education after 15 years of experience.

Source: OECD, *Education at a Glance*, 2007.

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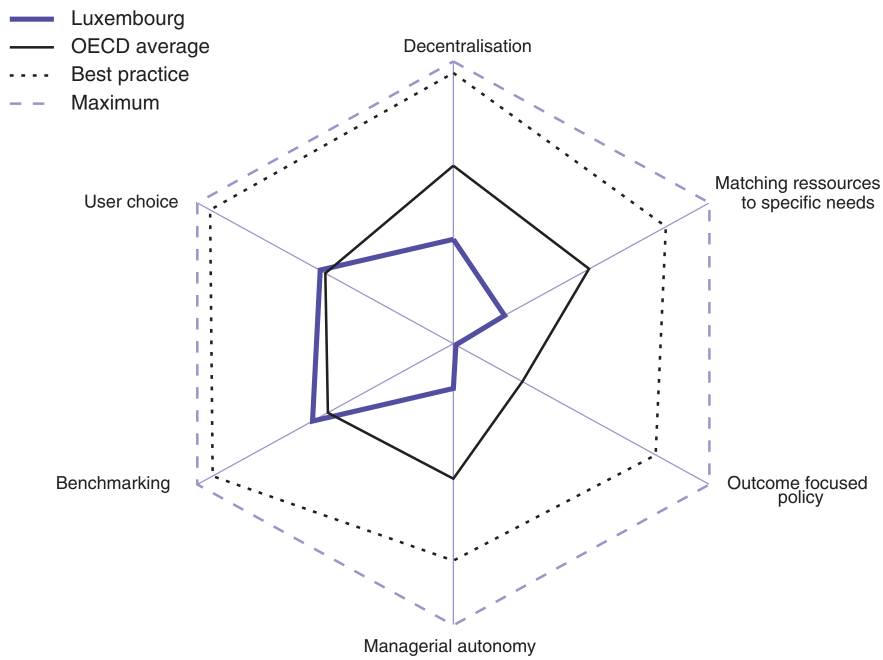
Improving school accountability and autonomy

A key element in raising spending efficiency in education amounts to providing schools with the incentives and the capacity to apply local solutions to the heterogeneity of their student population. This requires that schools can make more deliberate choices on how to allocate resources to achieve results, *i.e.* schools need to be autonomous in their decisions and accountable for their performance (Wößmann *et al.*, 2007). In both aspects, Luxembourg needs to strengthen its current framework (Gonand *et al.*, 2007 and Figure 5.8). School decisions regarding budget and resource allocation are taken centrally by the Ministry of Education. At the same time, the Ministry is also evaluating through the school inspectorate to what extent schools achieve their goals. While this allows the close

Figure 5.8. **The Governance spider web**



Source: Gonand *et al.*, 2007.

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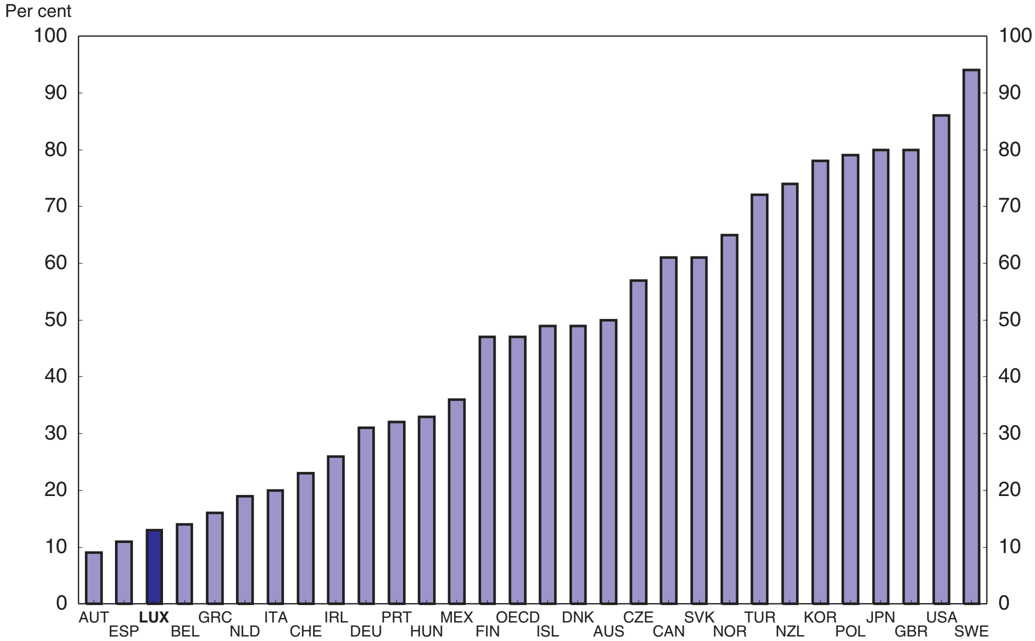
verification of directives being implemented as intended, the lack of independence between the evaluator (the school inspectorate) and the Ministry creates a conflict of interest, at the expense of improved school accountability. Training and selection of teachers are also carried out in a centralised manner, with schools providing little more than a first on-the-job experience that is required for the candidate's certification decision by the Ministry. Finally, school choice is regulated by the "carte scolaire" and limited to specific areas: it is absent in primary education and exists in secondary education only to the extent that there is spare capacity in the alternative school.

Reinforcing school accountability is a first step to raising educational performance. Currently, comparable tests across schools are only available at the end of secondary education ("baccalauréat"), but are not published nation-wide. Tracking decisions at the end of primary education are (partly) based on standardised tests while those between lower and upper secondary education are entirely based on the annual performance assessment of the student by his or her school teachers. In addition, annual success rates of students at these standardised tests and school leaving exams are only available on an individual basis and comparison with a national benchmark is not available publicly, preventing parents from making informed choices about the institution to which they would like to send their children (Figure 5.9). As a first step, therefore, the authorities should consider making publicly available the results from these standardised tests. The publication of these test scores need to be corrected for exogenous factors such as the socio-economic background of students, such as to publish the "value-added" of each school. In addition, authorities should consider introducing more nationwide tests to improve transparency regarding school quality. Such tests should be made mandatory at each level at which a tracking decision

Figure 5.9. **Public availability of comparison in test results**[1]

In % of all students



1. The data per cent the percentage of students in schools where the principal reported that the school provided information to parents on student performance relative to a national or regional benchmark.

Source: OECD, PISA 2006.

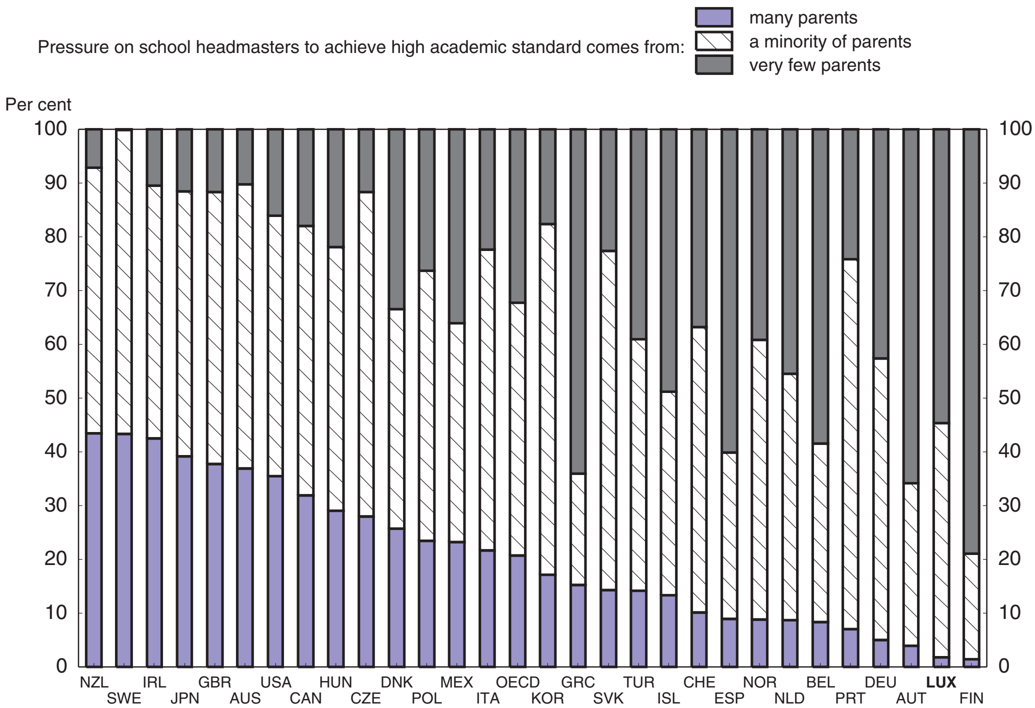
StatLink http://dx.doi.org/10.1787/381280056563

needs to be taken. Alternatively, as currently planned standardised tests could be introduced every three years, starting as early as primary education. This would also help to detect individual learning and school problems early and allow for a more rapid remedial intervention. Standardised tests are also useful for school management to detect educational problems and to allocate additional resources to problem areas, provided that headmasters have sufficient budgetary autonomy (see below).

School accountability could be further enhanced by strengthening the role of parents in the school system. Currently, parents play almost no role in important decisions regarding the school life of their children. Tracking decisions are the exclusive matter of teachers, even though parents have a consulting role. Similarly, decisions regarding class repetition and switching schools do not involve parents. Such a lack of parent involvement in key decisions tends to make them feel less implicated in other school-relevant activities, such as electing their school representatives, participating in extra-curricular activities, providing home work support or pressuring headmasters for improved school outcomes (Figure 5.10). Such activities of parents, however, have been shown to be valuable for improving student performance (Hendersen and Mapp, 2002). In particular, parent involvement with their children's literacy capacities is improving educational success substantially (Clark, 2007). Therefore, the authorities should consider strengthening the role of parents in school, for instance by giving them a greater say in tracking decisions. This would encourage them to get more involved in the learning environment of their children, contributing substantially to better educational performance. Greater interaction between schools and parents would also provide schools with valuable access to information about the requirements of the labour market.

Figure 5.10. **Parental pressure for high academic standards in school**

2006



Source: OECD, PISA 2006.

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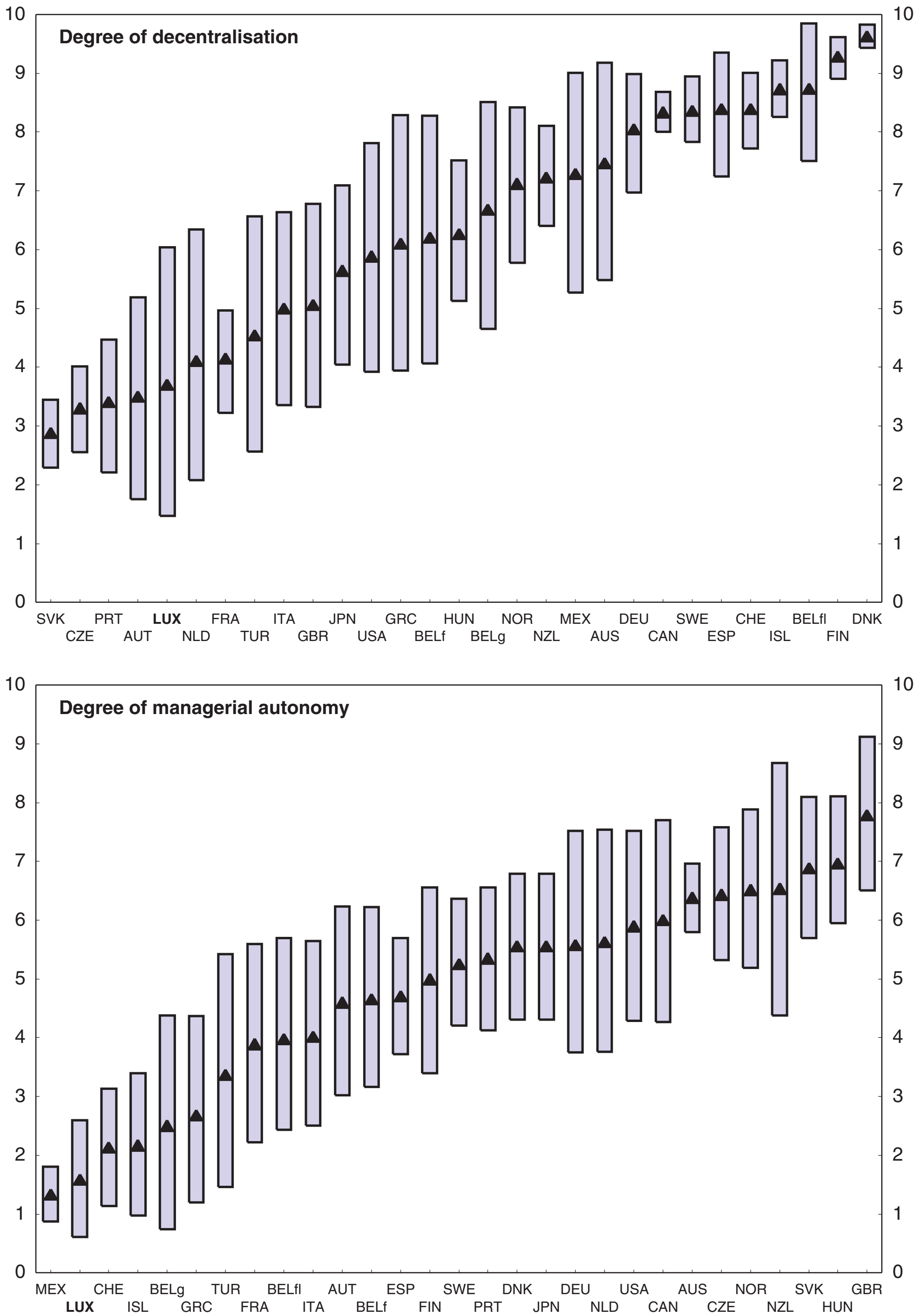
Schools are not autonomous, neither regarding their budget decision nor regarding personal matters. School headmasters have only limited possibilities to select their teachers, who have to be taken from the pool of certified candidates. Firing is only possible in rare cases – typically concerning inappropriate conduct – and is seldom related to lack of performance. Teaching material and instruction methods are also not part of the school responsibility. Decisions regarding resource allocation are taken centrally, not reflecting outcome-objectives at the school level. In addition, school headmasters – appointed to their position for life – lack the incentives to use the little autonomy they have. In total, schools have less autonomy and are less accountable than in most other OECD countries (Figure 5.11). This severely impedes the possibilities of schools to adjust to local circumstances and to provide the most appropriate learning environment for their students. Authorities have started to react to this situation by appointing headmasters only on a fixed-term contract in order to strengthen their accountability. This is a welcome first step, which should be extended as soon as new headmaster positions become vacant. Moreover, in line with an increase in accountability, the authorities should consider giving more autonomy to schools in setting their educational priorities, hiring appropriate staff and negotiating their budget with the Ministry.

Conclusion

Despite high spending on education, the school system does not perform well in international comparison. The failure to achieve a better educational performance has left marks on the labour market performance of young people. School leavers have increasing difficulties in finding a job after leaving school, in particular if they have an immigration

Figure 5.11. **School autonomy and accountability in the OECD**[1, 2]



1. The figures present the degree of decentralisation and managerial autonomy at school level based on an aggregation of a selection of 21 subindicators, using random weights. The variances of these indicators are derived from 1 000 random draws of these weights. A higher score represents a larger degree of decentralisation/managerial autonomy respectively.
2. BELf refers to french community in Belgium, BELg to the German community and BELfl to the Flemish community.

Source: Gonand *et al.*, 2007.

StatLink http://dx.doi.org/10.1787/381342730366

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background. To address these issues, the current reforms of reworking school curricula and reorganising school tracks are unlikely to be sufficient unless combined with increased school accountability and autonomy to find local solutions to the challenge of a heterogeneous student population. As well, incentives for high-quality teaching need to be strengthened, linking part of the wage progression to regular performance evaluations. Finally, in reworking the school curricula a particular focus should be on language education and sufficient resources to guarantee that students dispose of the appropriate language skills to use them as languages of instruction. A more detailed set of recommendations is presented in Box 5.4.

Box 5.4. **Summary of recommendation: Raising public spending efficiency in education**

Improving the integration of immigrant students

The authorities should establish the objective that students build up their human capital and achieve competencies that are in greater demand by the labour market. This would imply continuing reworking school curricula, deemphasising language education and increasing the weight of other subjects that are demanded by the labour market. In addition, they could consider increasing the variety of languages available to students, as suggested by a recent report by the European Commission (2007). Moreover, language education needs to focus more on bringing students up to an appropriate level in the languages of instruction. This could be achieved by putting more emphasis on remedial language courses and – as currently planned – providing language support during non-language courses.

First pilot projects on restricting the extent of tracking in lower secondary education should be extended to all schools. Further efforts should be undertaken to shift the tracking decision to a more advanced age, which would increase chances of students from weak socio-economic or immigrant background to achieve a higher educational attainment.

Increasing school autonomy and accountability

Schools need to be made accountable for their educational results. This requires publishing current tests and increasing their number. Published test results need to be corrected for socio-economic background variables in order to reveal the value-added of the school.

The role of parents in the school needs to be enhanced. This could be achieved by giving parents a greater say in the tracking decision. Also school choice should be facilitated through greater transparency about school performance.

Schools should become autonomous, setting their educational priorities and obtaining greater influence in hiring and firing of teachers and selecting instruction material. This would require strengthening the role of the headmaster by giving more decisional freedom and rewarding well-performing school leaders through contract renewal of otherwise fixed-term contracts.

Teacher's salaries or career paths should include merit-based elements, instead of being based purely on seniority. In particular, part of the annual wage increase should be based on a positive performance evaluation. Moreover, teaching hours should be expanded to allow more room for interactions between teachers and students and to have more possibilities for extra-curriculum work and remedial courses.

Notes

1. Tracking (streaming, ability grouping) refers to the practice of placing students in different groups or school types, according to their educational performance. In Luxembourg, a first tracking decision is taken after the 6th grade to select students into the classical lyceum, the technical lyceum or special education. Further tracking decisions are taken at more advanced ages, differentiating the students according to their abilities in mathematics and languages.
2. A first selection of students into different tracks occurs at age 12, further differentiation is taking place at each subsequent school year until students are differentiated across 6 different tracks at the age of 15. In addition, in upper secondary education, students are further selected into different types of school leaving exams (19 in total across different tracks) that determine their main field of specialisation during the last four years.
3. The Luxembourg objective of teaching all students all three official languages is more ambitious than in other multilingual OECD countries, such as Belgium, Canada and Switzerland.
4. Currently, teaching is being coordinated in each branch by one of the teachers in most schools. These teachers are also representing the school in the particular branch in national committees. The role is, however, not formalised and depends on the discretion of each individual headmaster.

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