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ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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Pursuant to Article 1 of the Convention signed in Paris on 14th December 1960, and which came into force on 30th September 1961, the Organisation for Economic Co-operation and Development (OECD) shall promote policies designed:

– to achieve the highest sustainable economic growth and employment and a rising standard of living in member countries, while maintaining financial stability, and thus to contribute to the development of the world economy;
– to contribute to sound economic expansion in member as well as non-member countries in the process of economic development; and
– to contribute to the expansion of world trade on a multilateral, non-discriminatory basis in accordance with international obligations.

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Publié également en français.

Table of contents

Boxes

Tables

Figures

BASIC STATISTICS OF LUXEMBOURG, 2002

THE LAND

Area (km^2)	2 586	Major city, thousand inhabitants:	
Agricultural area (km^2)	1 274	Luxembourg, 15.2.2001	76.7
Woodland (km^2)	886		

THE PEOPLE

Population (thousands)	446.2	Employment (thousands):	
Inhabitants per km^2	173	Total domestic employment	285.7
Net natural increase	1 601	Dependent employees:	268.8
Net migration	2 649	Agriculture	1.0
		Industry and construction	62.5
		Services	205.3
		Employers, self-employed persons and domestic help	16.9

PRODUCTION

Gross domestic product (million euros)	22 340.5	Gross domestic product by origin,	
Gross domestic product per head (US$)	47 185	at basic prices (per cent):	
Gross fixed investment:		Agriculture	0.7
Per cent of GDP	21.2	Industry and energy	13.0
Per head (US$)	10 020	Construction	7.0
		Other	79.4

THE GOVERNMENT

Per cent of GDP:		Composition of the Chamber	
General government consumption	18.3	(number of seats):	
General government current revenue	47.2	Christian-socials	19
General government gross debt	5.8	Socialists	13
		Democrats	15
		Others	13
		Total	60
		Last election: 12.6.1999	

THE CURRENCY

Irrevocable conversion rate	40.3399	Currency units of euro per US$, average of daily figures:	
		June 2003	0.8569
		Year 2002	1.0611

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

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The economic situation and policies of Luxembourg *were reviewed by the* Committee *on* 16 *June* 2003. *The draft report was then revised in the light of the discussions and given final approval as the agreed report by the whole* Committee *on* 25 *July* 2003.

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The Secretariat's draft report was prepared for the Committee *by* David Carey, Hubert Strauss, Gerrit van den Dool, Paul O'Brien *and* Douglas Sutherland *under the supervision of* Andreas Wörgötter.

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The previous Survey of Luxembourg *was issued in* February 2001.

Assessment and recommendations

The major challenges for Luxembourg are adjusting to lower growth prospects while continuing to assimilate inflows of foreign workers

The sharp slowdown in economic activity since 2000, which is mostly attributable to developments in the financial sector, appears to be partly structural. The exceptionally buoyant international equity market conditions that boosted growth in the 1990s are unlikely to return any time soon. Even so, trend growth is still likely to be high enough to require continued net inflows of foreign workers. This means that important issues related to high inflows of foreign labour remain in education, transport and housing policy while the authorities now also have the challenge of implementing policies that facilitate adjustment to lower growth than in the 1990s. In particular, growth in public expenditure needs to be reduced to stabilise it as a share of GDP and adjustments are required to the parameters of the pension scheme to make it sustainable. At the same time, a variety of reforms to increase participation rates and productivity growth are needed to attenuate the decline in national income growth.

Growth has fallen sharply but is projected to recover modestly

Economic growth fell from an average rate of 8¾ per cent over 1999-2000 to 1¼ per cent over 2001-02, which is lower than at any time since the mid-1980s. The severity of this slowdown is mostly attributable to the financial sector, which accounts for some one third of GDP. With equity prices stabilising and financial market volatility returning to more normal levels, a gradual recovery in the financial sector could get underway later this year. This, together with the revival of growth in the euro area should lift growth towards 3 per cent by 2004, which remains modest by historical standards. Given the significant amount of labour hoarding so far in the slowdown, employment growth is likely to be too low to stabilise the unemployment rate before late in 2003, when it is likely to have reached 4 per cent. Underlying inflation is likely to come down broadly in line with that in the euro area.

Cross-border workers make aggregate supply relatively elastic and buffer labour market shocks

Such low growth rates by historical standards do not, however, imply that an enormous output gap is building up. Aggregate supply is relatively elastic owing to the potential for rapid growth in employment of cross-border workers (accounting for some 70 per cent of employment growth in the past decade). In these circumstances, factor supply adjusts to variations in demand for the goods and services produced in the Luxembourg economy without large changes in unemployment or real product wages.

Trend growth is likely to be lower owing to less buoyant prospects for the financial sector

The key to the medium-term outlook is growth in demand for the services of Luxembourg's financial sector. Along with the rest of the global financial industry, it is almost certainly set for a period of lower growth than in the past as the exceptional conditions of the 1990s, which witnessed increases in share price-earnings ratios to record levels, are unlikely to be repeated. This will weigh on earnings growth as management fees and commissions are partly based on asset values and because the volume of transactions tends to grow more slowly in such an environment. Even so, medium-term growth in the financial sector is likely to remain higher than in other sectors as progress continues to be made in moving towards a single European market for financial services, in developing private pension saving and in applying ICT. The EU Savings Directive is unlikely to have much effect on growth. Luxembourg's bank secrecy rules do not appear to be affected in the short term by the Directive. As the ultimate objective of the Directive is effective exchange of information, Luxembourg may however find itself under continued pressure to provide more complete access to information to foreign tax authorities. Given the dominant role of the financial sector in the Luxembourg economy, medium-term GDP growth may fall back to 3-4 per cent, well below the average (5½ per cent) in the 1990s but still significantly higher than can be sustained without recourse to foreign labour.

Lower growth prospects need to be quickly integrated into public expenditure decisions

The current slowdown has taken its toll on the budget surplus, which has fallen from 6 per cent of GDP in 2000 to 2½ per cent of GDP in 2002, mainly because the decline in medium term GDP growth was not anticipated when public expenditure decisions were taken. Consequently, government expenditure (notably, social security and investment) continued to grow rapidly, rising by 6 percentage points of GDP over 2000-02 to 45 per cent of GDP. The decline in the budget surplus would have been even greater had it not been for a surge in back taxes from corporations and other lags in the effect of the slowdown on tax revenues. With economic growth again much lower than when expenditure plans were finalised, the budget surplus seems likely to virtually vanish in 2003. The government plans to sharply reduce growth in expenditure in 2004-05, in keeping with its medium-term objectives of ensuring that expenditure does not rise as a share of GDP, that the general government budget balance remains in surplus and that the central government budget is balanced. Further consolidation efforts will be required if the government is to meet these objectives.

To ensure sustainability of the general public pension scheme, the replacement rate should be reduced…

Lower trend growth could have dramatic implications for the sustainability of the general public pension scheme. While current pension benefits already exceed contributions for residents, the system has nevertheless been kept in balance thanks to the rapid growth in employment, made possible by the availability of cross-border workers, and the associated contributions. Such employment growth in effect forestalls the maturation of the pension system, generating a comfortable cash-flow balance, but also creating ever-growing deferred pension liabilities. Under the current system of actuarial reviews every seven years that automatically adjust contribution rates to those consistent with the target reserves-benefit ratio, the contribution rate will rise sequentially by a small amount if growth is 4 per cent but by one-quarter if growth averages 3 per cent over the next fifty years. The average replacement rate should be reduced to one that is more consistent with long-term balance (*i.e.* in a mature system) so as to avert the risk that future generations will have to bear large increases in taxes. This could be done within current institutional arrangements, which provide for indexing of pensions to consumer prices and discretionary increases based on real wage developments, by not fully passing on increases in real wages to pensions. In these circumstances, income adequacy could be ensured via the minimum pension. There is ample scope to make such changes as Luxembourg's general public pension scheme is extremely generous: following measures in 2001 that made it even more generous, the replacement rate for a worker earning the average wage over 40 years is 98 per cent.

… and public subsidies for early retirement should be eliminated

The required reduction in the pension replacement rate to restore long-term sustainability in the general public pension scheme would be smaller if there were less early retirement: the employment rate for older workers (aged 55-64) is just 25 per cent, one of the lowest in the OECD. Higher employment rates for older workers would also help to attenuate the slowdown in national income growth. One of the main routes to early retirement is the disability pension. A number of court rulings up to 1996 resulted in medical criteria for eligibility for disability pension being applied more severely. While this cut inflows in half, this success was offset by increased use of special early retirement programmes. Access to a general disability benefit was further tightened in late 2002 and a route was also provided for professional reintegration of partially disabled persons. These latest reforms look promising for reducing inactivity on disability pension, but success in rolling back premature withdrawal from the labour force will depend on ensuring that use of substitute routes does not grow correspondingly. A problem in this regard is that the early retirement pension (*pension de vieillesse anticipée*), which is the other main route to early retirement, gives virtually no incentive to continue working after becoming eligible for it. Early retirement pension should be reduced on an actuarial basis in relation to a pension taken at the official retirement age (65) to reflect the longer expected payment period. In addition, the ease with which imputed years of contributions can be obtained should be reduced. At the same time, the official retirement age (and the number of years of contributions required to qualify for a full pension) should be indexed to rising life expectancy. Public subsidies for early retirement through pre-retirement (*préretraite*) pensions, which are available to workers aged 57 and over who are laid off in restructuring industries but not yet eligible for the early retirement pension, should also be ended.

Benefit replacement rates and duration should be reduced to increase labour market resilience

Lower overall employment growth than in the past is likely to reduce the shock-absorber role played by cross-border workers, increasing the proportion of adjustment to adverse labour market shocks that would fall on residents. High replacement rates for unemployment benefit and social assistance (*Revenu minimum garanti*, RMG) and unlimited duration of the latter increase the probability that adverse shocks result in increases in structural unemployment. Replacement rates should be reduced to limit this risk. RMG-related unemployment and poverty traps should also be reduced. In particular, the withdrawal rate for RMG as a low-income family's income rises – the marginal effective tax rate can exceed 100 per cent – should be lowered. It will also be important to maintain the current intensive enforcement of job search obligations and follow-up of the unemployed with Active Labour Market Policies (ALMPs) so as to reduce the risk that adverse labour-market shocks lead to lasting increases in unemployment.

Improving the performance of the education system is needed to enhance integration of immigrants and boost economic growth

Another priority for attenuating the decline in growth in national income as well as reducing unemployment risks in the long term is to improve the performance of the education system. According to the PISA study, achievement of Luxembourg students ranked 30th out of 32 countries. Moreover, the gap between achievement of nationals and immigrants was the largest in the study. The main problem seems to be the multi-lingual approach to education, whereby students are taught in both German and French, not a lack of resources – expenditure per student is high by international comparison. Vocational education, which starts at age 13, is being reformed to enable children to do their studies in German or French without having to achieve a high level of competence in the other language. This should be particularly helpful for children from Romance-language homes, who were formerly taught in German. Nevertheless, Romance-language children still have the challenge of learning to read and write in German. The authorities have proposed a project that would enable children to learn to read and write in German or French, but could not find a municipality (responsible for running primary schools) willing to put it into effect. The government should take whatever steps are necessary to ensure that such programmes are offered while at the same time preserving *Lëtzebuergesch* as a tool for social integration. Other factors behind the poor PISA results seem to be that the system teaches too much material too superficially, that there are disadvantages in early selection and that students tend to have an inadequate mastery of the basics. To resolve these problems, more attention is to be paid to helping weaker students in primary school while A-level programmes are to be spread over three years instead of two. Another reform that could contribute to improved achievement would be to define performance standards nationally while giving schools greater management autonomy to achieve them and holding them accountable for outcomes.

Increasing the efficiency with which government achieves its objectives would also support national income growth…

Raising public sector efficiency, not only in education but also in other areas of public service, would also support national income growth. A starting point would be to make greater use of cost-benefit analysis, which is almost never undertaken, and of the results of cost-effectiveness analyses (which compare the costs of alternative means of achieving a given objective). Public sector management reforms that increase managerial independence and accountability are being implemented to increase efficiency, although for the time being they only concern a small part of government expenditure. The authorities are also introducing accrual accounting, which is important for holding public sector managers accountable for their actions, and are considering budgeting for programmes rather than by types of expenditures following the recent French reforms. These initiatives should be pursued. There is also scope to increase public sector efficiency by greater use of contracting out where enforceable contracts can be written relatively easily and by regulatory reform to increase competitive pressures on public sector market activities. One of the factors that would contribute to reduced costs for any given level of service would be to align public sector pay for relatively low-skilled labour more closely to comparable private sector rates.

... including by reducing the administrative burden

A number of projects are underway to reduce the administrative burden, which is relatively high in Luxembourg. These include audits of the effect of new regulation on the administrative burden for SMEs, the introduction of one-stop shops for business start-ups, simplification and harmonisation of official forms and organisational audits of public agencies. This process could be taken further by systematically subjecting new legislation to administrative burden impact assessments and assigning all firms and individuals identification numbers that could be used to centralise information in one databank to which all public sector agencies would have access. Greater use of e-government, which lags behind that in all other EU countries, would also help to reduce the administrative burden.

Climate change objectives could be met more cost effectively

Climate change policy is another field where government could achieve its objectives more efficiently by paying greater attention to the results of cost-effectiveness analysis. Despite reducing greenhouse gas emissions by around 30 per cent over the past decade, mainly due to the steel industry replacing coal blast furnaces with electric arc furnaces, trends in other sectors and new domestic gas-fired electricity capacity mean that more abatement efforts are required in order to meet Luxembourg's Kyoto Protocol related target. Yet climate change policies in place, while contributing to abatement, are highly variable in terms of the cost for each tonne of carbon abated and can reach extremely high levels of support. For example, support for renewable energy varies by a factor of 20 and schemes promoting energy efficiency in the residential sector can cost several thousand euros for each tonne of carbon abated compared with an estimated 18 euros for internationally tradable permits once such a scheme comes into effect. Climate change policy needs to be recast to achieve the Kyoto Protocol target at less cost to the economy. The introduction of an across-the-board carbon tax, as already envisaged by the authorities, would be a cost efficient way of promoting abatement. Participation in European and international emission trading schemes would also be an efficient means of achieving abatement. The authorities should also place greater emphasis on using flexible mechanisms to promote abatement in foreign countries, which could prove to be less expensive than pursuing domestic abatement alone.

Reforms to increase the efficiency of development co-operation should be extended

One area where there has been significant progress in improving the efficiency of government expenditure is the development aid programme, expenditure on which has increased to 0.7 per cent of GNI and is set to rise further to 1 per cent of GNI. This has been done by targeting priority countries and areas and by better monitoring of outcomes. But there is further to go in applying this approach. The government should continue to limit disbursements to a narrower set of target countries and programme areas. The movement to integrated and longer-term projects should be continued with better pre-evaluation of projects and within an enhanced monitoring framework. The authorities should also continue to move domestic assistance measures for agriculture to less trade-distorting measures. In this context the Luxembourg authorities support reforms to European systems of agricultural support.

Barriers to competition in the provision of broadband Internet services should be removed so as to increase access

Product market competition is an important part of an environment that stimulates productivity growth. In most cases, such competition is strong in Luxembourg given the openness of the economy. One area, however, where greater competition could pay dividends is in the provision of internet services. Broadband access, which opens up more possibilities for internet use, is one of the lowest in the OECD, while access prices are amongst the highest. The major problem seems to be a lack of competition both between DSL operators and between DSL operators and cable operators. The regulator should remove obstacles to competition among internet operators by imposing a reduction in access charges to the local loop and by considering the complete withdrawal of Luxembourg P&T, the incumbent operator, from the supply of cable internet services. This is necessary to ensure that cable Internet operators have clear incentives to develop their infrastructure to compete with DSL operators, which mainly means competing with Luxembourg P&T.

Luxembourg residents are likely to continue to benefit from inflows of foreign labour

Luxembourg has long been a magnet for foreign-owned capital and labour owing to regulatory and location advantages. This has benefited Luxembourg residents, notably through higher tax receipts, and has helped to finance very generous social benefits for residents and an expansion in well-paid public sector jobs, mostly taken by Luxembourg nationals. Even with the envisaged decline in growth relative to the average for the 1990s, continued substantial inflows of cross-border workers and immigrants are likely to be required.

This calls for reforms to increase the efficiency with which transport services are provided…

Transport infrastructure has not kept up with the associated increase in population and inflows of cross-border workers in recent years, resulting in substantial congestion problems at peak hours on trains and on the motorways that bring cross-border workers into Luxembourg. The government has reacted by stepping up investment in transport infrastructure to high levels, with a focus on encouraging sustainable mobility. An objective of almost doubling the proportion of public transport in total trips in Luxembourg by 2020 has been set in the strategy *mobilitéit.lu* and it has been decided to integrate transport and land use policies. None of these policies is subject to explicit cost-benefit analysis. This means that the authorities are not obliged to identify clearly the externalities associated with different transport choices or to adopt policy instruments best suited to internalising these externalities, as would be required for the efficient supply of transport services. The introduction of road pricing should be considered to internalise the most important external cost generated by the use of private motor cars, congestion costs. Provided that tax-deductibility of travel expenses is also abolished, road pricing would provide essential information on the social value of expanding road capacity – if the price needed to eliminate congestion on a motorway were high enough to be able to finance an additional lane, it would be efficient to construct such a lane – and reduce the need for public transport subsidies to achieve efficient relative prices for public and private transport. This would reduce the incentives for more mobility than is socially optimal provided by the current high level of public transport subsidies – ticket prices cover only 10-12 per cent of operating costs – and underpricing of the use of private motor cars, especially at peak hours.

… and reforms to reduce the impact of immigration on housing costs

High income growth associated with immigration has increased demand for housing services, pushing up prices sharply. This mainly reflects large increases in real land prices, which rose at an annual average rate of 6½ per cent during the past two decades, the highest rate of increase in the EU. While residential land owners are made better off by such price increases, this gain is at the expense of other current and future residents, who will have to pay higher rentals. It also undermines cost competitiveness, reducing the extent to which economic activity and its associated tax base can be attracted to Luxembourg. The large increase in residential land prices is indicative of a supply shortage, which the government considers to be partly caused by speculators who hold vacant sites back from the market. It has temporarily reduced capital gains tax to encourage speculators to sell such building sites. Such speculation could also be countered by introducing a land tax that rises over time on vacant building sites. Tenancy regulations, which have the effect that rents paid by sitting tenants decline rapidly relative to the market price for equivalent new rentals make the market highly illiquid and at the same time discourage landowners from developing vacant sites for rental accommodation. These regulations should be reformed so as to permit rentals for sitting tenants to be adjusted to market rates periodically. Municipalities also hold vacant land that could be subdivided but resist doing so because of the associated increase in infrastructure costs. They should increase land taxes to pay for such costs – with such high capital gains, there is ample scope to raise land taxes. Pressure could also be taken off the market for residential building sites by zoning changes that would permit more intensive development.

Summing up

The prospects for lower growth in the medium-long term will require far-reaching fiscal and structural adjustment. The authorities have made a start in reducing public expenditure growth in line with these more subdued prospects but more restraint will be necessary to meet their medium-term objectives. Adjustments to the general public pension scheme, preferably by reducing the high replacement rates, will be needed to make the scheme sustainable in the long term. The authorities have begun to tackle the early retirement problem, which will help to reduce the scale of the required adjustments to make the general public pension scheme sustainable, but more needs to be done. The reforms to the disability pension, which is one of the major routes to premature withdrawal from the labour force, should be complemented by reducing the early-retirement pension on an actuarial basis in relation to a pension taken at the official retirement age and by reducing the ease with which imputed contributions can be obtained. Lower growth will also diminish the buffering role of cross-border employment on the national labour market, increasing the risk that adverse shocks increase structural unemployment. To counter this risk, the authorities should reduce the high replacement rates for unemployment and related benefits and ease employment protection regulation. Improving the performance of the education system would also reduce unemployment risks as well as attenuating the likely decline in national income growth. The most important reform in this regard is to ensure that children can follow a French or German language stream throughout their education without having to achieve a very high level of competency in the other language. This would also help reduce the gap between the educational achievement of immigrants and nationals. The government could also contribute to attenuating the slowdown in national income growth by achieving its objectives more efficiently, notably by making greater use of cost-benefit and cost-effectiveness analysis. This could yield large dividends in climate change policy and transport policy, where pressures from the relatively high economic growth associated with inflows of foreign labour need to be addressed. Barriers to the supply of building sites also need to be removed so that immigration does not result in excessive property price increases, undermining cost competitiveness. While growth prospects are less rosy than in the 1990s, they remain nevertheless favourable by international comparison. Provided that policies are adjusted rapidly to this outlook and that progress is made in the efficiency with which foreign labour is integrated into the economy, Luxembourg can expect to remain a very prosperous economy for many years to come.

I. Economic developments and policy challenges

Economic growth has crashed in Luxembourg in the past couple of years as its financial sector, along with the rest of the global financial industry, suffered the fall-out from the deflation of the international stock market bubble that developed during the late 1990s. While conditions in the financial sector, which directly accounts for about one third of GDP, are likely to improve, they are unlikely to return to those of the 1990s. Accordingly, Luxembourg must adjust to medium-term growth that is likely to be lower than in the past, although still considerably higher than in other European countries. As in the past, most of the adjustment to changes in growth will entail variations in employment of foreign workers, notably cross-border workers. However, lower growth in the medium term also increases the likelihood that labour-market adjustment to adverse shocks will entail reductions in national employment because there will be less scope to absorb such indicators by reducing growth in cross-border employment. In these circumstances, adverse shocks could lead to higher structural unemployment given current labour-market institutions. This chapter discusses recent economic developments and prospects before turning to medium-term characteristics of the economy. Finally, the policy challenges that emerge from the medium-term outlook for the economy, bearing in mind its special features, are reviewed.

Recent developments and short-term prospects

GDP *growth*

Led by recession in the financial sector, real GDP *almost stopped growing*

With the lead sector of the economy, financial services, in difficulty, and industrial production hit by low external demand, real GDP growth averaged only 1.2 per cent per year in the period 2001-02 (Table 1), down from 8.8 per cent during 1999-2000 and slightly under-performing economic growth in the European Union. Real value added in the financial sector shrank for the first time since 1985, whereas the other sectors of the economy initially resisted the downturn well but showed increasing signs of weakness during 2002 (Figure 1). After very strong growth during the nineties, activity in directly measured financial intermediation services

Table 1. **Demand and output: recent trends and projections**
Annual percentage changes, 1995 prices

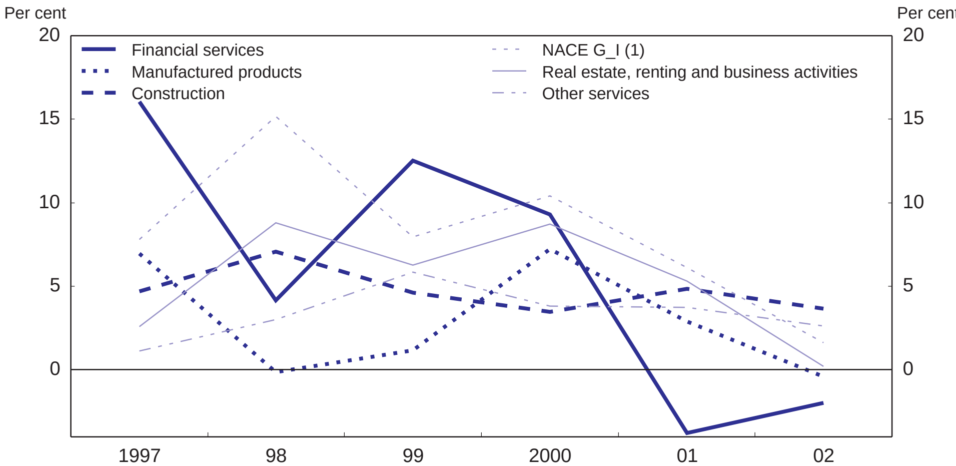
	1999 current prices		2000	2001	2002	2003[1]	2004[1]
	€ billion	Per cent of GDP					
A. Demand and output							
Private consumption	7.9	41.7	4.8	4.5	2.3	0.2	1.5
Government consumption	3.2	16.7	5.1	6.5	5.3	6.5	3.2
Gross fixed investment	4.5	23.8	–3.8	4.8	–1.7	–3.1	3.4
Final domestic demand	15.5	82.2	2.3	5.0	2.1	0.7	2.3
Stockbuilding[2]	0.1	0.7	1.1	–0.8	–1.7	0.0	0.2
Total domestic demand	15.7	83.0	3.6	3.9	0.1	0.7	2.5
Exports of goods and services	25.6	136.9	16.7	3.4	–0.5	0.1	4.8
Goods	8.1	42.9	13.0	8.0	–1.6	. .	. .
Services	17.5	93.0	18.4	1.5	0.0	. .	. .
Imports of goods and services	22.4	118.8	14.1	5.4	–1.3	0.4	5.0
Goods	10.6	56.4	6.2	6.9	–3.0	. .	. .
Services	11.8	62.5	21.1	4.2	0.1	. .	. .
Foreign balance[2]	3.2	17.0	5.5	–1.9	0.9	–0.4	0.5
GDP at constant prices	. .	. .	8.9	1.2	1.1	0.3	2.7
GDP deflator	. .	. .	3.7	2.3	0.0	0.6	2.2
GDP at current prices	18.9	100.0	12.9	3.6	1.2	0.9	5.0
Gross national income (nominal)	1.4		5.0	7.5			
B. Memorandum items:							
Private consumption deflator	. .	. .	2.6	3.1	2.4	2.2	1.4
Total employment[3]	. .	. .	5.6	5.6	3.1	0.7	1.7
Total employment[4]	. .	. .	2.8	2.6	1.6	0.3	1.4
Unit labour cost, total economy	. .	. .	1.9	8.9	5.2	3.5	1.1
Unemployment rate (per cent)	. .	. .	2.6	2.6	3.0	4.0	3.9

1. Projections.
2. Contribution to growth of GDP.
3. Domestic concept.
4. National concept.

Source: OECD and STATEC.

(FISDM, *e.g.* fees and commissions) was weakened by the sustained decline in stock-market valuations, both in real terms, as the volume of transactions is typically lower in a bear market, and even more so in nominal terms, as commissions are generally based on the price of assets traded. This is particularly true for the mutual funds industry, where nominal value added was almost 20 per cent lower in 2002 than in 2000, with the bulk of this decline occurring in 2002. In turn, nominal value added from indirectly measured financial intermediation services (FISIM), *i.e.* banks' net revenues from interest rate margins on assets other than their own, soared both in 2001 and 2002.[1, 2] As a result, nominal value added in the financial sector as a whole continued to post healthy gains, in contrast to real value added. These figures

Figure 1. **Real value added by activity**
Per cent changes from previous year



1. Retail trade, transport and communication, repair of motor vehicles, household goods and hotels and restaurants.
Source: STATEC.

have to be interpreted with care due to the missing distinction between final and intermediate consumption of FISIM under the current European system of national accounts (ESA95). Making this distinction would result in a lower increase in the financial sector's nominal value added but a stronger increase in total GDP (Box 1).

As banks cut costs, the weakness spread to other sectors before hitting imports

Banks' cost-cutting efforts were concentrated on investment in physical capital and non-staff operating expenditure. Growth in business services cooled off significantly in 2001 and came further down in 2002, with IT-related services shrinking after buoyant activity in 2000. The financial sector also managed to reduce prices for commissions paid, business services purchased *etc.*, as indicated by a 5½ per cent drop in the deflator of intermediate consumption in 2002 (following stagnation in 2001). While this helped them to cushion their losses, it exacerbated the negative impact of lower real input demand on sectors heavily dependent on demand from banks. At the same time, manufacturing followed the pattern of the business cycle in the European Union, with production decelerating in 2001, experiencing a short-lived pickup in the first half of 2002 and declining in the second. Given the weakness in key sectors (financial and business services, manufacturing), merchandise imports fell sharply by the end of 2001 and have not yet recovered (Table 4). However, more domestically-oriented activities such as construction, retail sales, and public and domestic services held up well until mid-2002.

Box 1. Measuring value added in the banking sector

Production of financial intermediation services (FIS) comprises two kinds of services: those directly measured (FISDM) consist of all services for which banks charge clients directly (*e.g.* commissions and fees); and those indirectly measured (FISIM), representing interest margins that defray banks for collecting funds and transforming their terms, thereby taking risks and generating operating surpluses. The need for indirect measurement arises because customers are generally not charged for those funds collection and term transformation services separately. The value of FISIM is measured as the total property income of financial intermediaries minus their total interest payable, excluding interest on their own funds (Table 2). A difficult issue is how to account for the use of FISIM, as it may represent final consumption (*e.g.* private consumption expenditures or exports) or intermediate consumption by other production sectors. The SNA manual (OECD *et al.*, 1993) suggests basing the allocation of FISIM on the difference between the actual rates of interest payable and receivable by each sector and a "reference rate of interest", free of risk premium and rewards for the FIS itself, *e.g.* the interbank lending rate.

Table 2. **FISIM in banks' balance sheets and national accounts**
Level in € million

	2000	2001	2002
Interest margins (balance sheets)[1]	3 633	4 407	4 157
Change in per cent	5.6	21.3	–5.7
Interest revenues from own assets	1 368	1 401	1 292
Revenues from holdings in affiliates	446	658	459
Net revenues from swap transactions	–212	–270	–1 083
FISIM (ESA95)	**2 031**	**2 618**	**3 489**
Change in per cent	–26.4	28.9	33.3

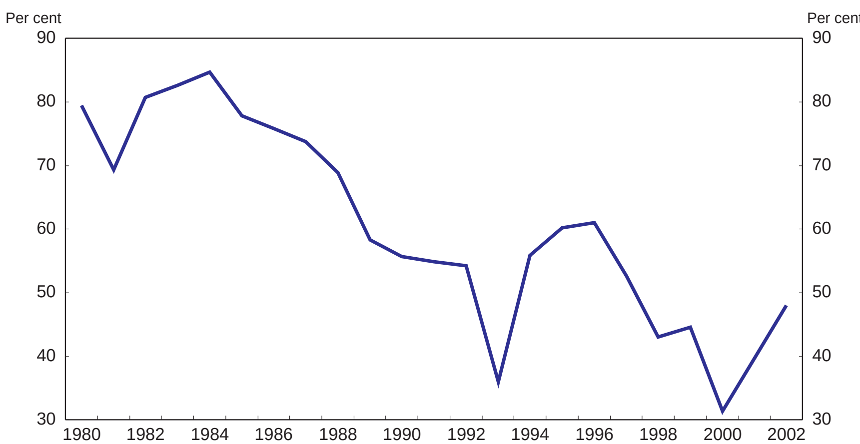
1. Excluding foreign affiliates of Luxembourg banks.
Source: BCL, STATEC.

The current ESA95 "assumes away" the issue of FISIM use, since all FISIM are considered to be intermediate consumption and are allocated to a nominal industry. This introduces a "wedge" between the sum of value added over all sectors and GDP. Moreover, it makes total GDP invariant to changes in the level of FISIM and understates the "true" level of GDP by the amount of FISIM directed to final demand. Sectoral value added is also affected, as the relative weight of "heavy" users of FISIM such as the financial sector itself is biased upwards. These errors are substantial for Luxembourg where FISIM represented 7 per cent of total production in 2002.

Box 1. Measuring value added in the banking sector (*cont.*)

As of 2005, the treatment of FISIM in ESA will change. Compilers will have to make a distinction between intermediate and final consumption of FISIM and will have to allocate the uses in production and expenditure accounts. The recalculation of GDP figures back to 1995 will affect the assessment of Luxembourg's recent economic performance. While the level of GDP is going to be higher by about 8 per cent according to government estimates (GNI will only be increased by 1 per cent as most FISIM are exported), growth rates until 2000 will be revised downwards. This is because under the current system only FISDM are taken into account, the part of banks' production that grew most dynamically over the past two decades, reflecting, *inter alia*, the trend towards financial disintermediation. By contrast, GDP growth rates for the period 2001-02 are likely to be revised up as the share of FISIM in banking production rose, from 31 per cent to 48 per cent (Figure 2). The effects of this reform on levels and growth rates of both aggregate and sectoral GDP are analysed for a stylised two-sector economy experiencing a year of stagnant production but a rise in FISIM (Table 3).

Figure 2. **Share of FISIM in banks' gross production**[1]



1. In current prices.
Source: STATEC.

Box 1. Measuring value added in the banking sector (*cont.*)

Table 3. Effects on GDP of changing levels and accounting treatments of FISIM[1]

	Production		Intermediate consumption		Value added		Effect of methodological change[2, 3]	Change in GDP over time[3]
	t	t + 1	t	t + 1	t	t + 1		
Current ESA95								
Sector 65: financial intermediation	19	20	14	14	5	6		20
Banks	7	8	2.5	2.5	4.5	5.5		22.2
of which:								
FISDM	4	4	. .	. .	. .	. .		
FISIM	3	4	. .	. .	. .	. .		
Mutual funds	12	12	11.5	11.5	0.5	0.5		0
Other sectors	33	33	16	16	17	17		0
Sum of all sectors	52	53	30	30	22	23		4.5
Intermediate consumption of FISIM	0	0	3	4	–3	–4		33.3
Total economy	**52**	**53**	**33**	**34**	**19**	**19**		**0**
ESA *reformed*: *first step*[4]								
Sector 65: financial intermediation	19	20	14	14	5	6	0	20
Banks	7	8	2.5	2.5	4.5	5.5	0	22.2
of which:								
FISDM	4	4	. .	. .	. .	. .		
FISIM	3	4	. .	. .	. .	. .		
Mutual funds	12	12	11.5	11.5	0.5	0.5	0	0
Other sectors	33	33	16	16	17	17	0	0
Sum of all sectors	52	53	30	30	22	23	0	4.5
Intermediate consumption of FISIM	0	0	1	1.33	–1	–1.33	–66.7	33.3
Total economy	**52**	**53**	**31**	**31.33**	**21**	**21.67**	**10.5**	**3.2**
ESA95 *reformed*: *second step*[5]								
Sector 65: financial intermediation	19	20	14.5	14.67	4.5	5.33	–10	18.5
Banks	7	8	2.9	3.03	4.1	4.97	–9	21.1
of which:								
FISDM	4	4	. .	. .	. .	. .		
FISIM	3	4	. .	. .	. .	. .		
Mutual funds	12	12	11.6	11.63	0.4	0.37	–20	–8.3
Other sectors	33	33	16.5	16.67	16.5	16.33	–3	–1.0
Total economy	**52**	**53**	**31**	**31.33**	**21**	**21.67**	**10.5**	**3.2**

1. In current prices. The numbers are chosen such as to fit the orders of magnitude for the Luxembourg economy in 2001 and 2002.
2. Compared to current ESA95.
3. In per cent.
4. Relaxing the assumption that 100 per cent of FISIM are intermediate consumption. By assumption two-thirds of FISIM are final consumption.
5. Sectoral breakdown of FISIM used as inputs (same treatment as all other intermediate consumption). By assumption each sector consumes half of all intermediate FISIM. Within the financial sector, banks consume 80 per cent of the sector's FISIM, mutual funds the remaining 20 per cent.

Source: OECD.

Box 1. **Measuring value added in the banking sector** (*cont.*)

Banks' profit and loss accounts – as published in the Annual Report of the BCL (2003) – provide the statistical basis for FISIM. As required by the SNA, they are corrected for banks' earnings from own assets. Moreover, net earnings from swap transactions are not taken into account in the SNA (see Table 2). Unlike interest revenues from other assets, these items showed weaker results in 2002 than in 2001, accounting for the divergence between interest margins reported in banks' aggregated balance sheets – down 5 per cent – and those reported in national accounts, up 33 per cent.

Table 4. **Current balance of payments**

€ billion

	1995	1996	1997	1998	1999	2000	2001	2002
Goods and services	1.1	1.2	1.7	1.7	2.6	4.8	4.4	5.0
Goods	–1.2	–1.5	–1.8	–2.1	–2.4	–2.6	–2.8	–2.2
Exports	6.3	6.1	6.9	7.7	8.0	9.4	10.1	10.2
Growth rate		–2.7	12.6	12.1	4.5	16.7	7.5	1.2
Imports	7.5	7.6	8.7	9.8	10.5	12.0	12.9	12.4
Growth rate		1.0	14.5	12.7	7.2	14.1	7.5	–3.2
Services	2.3	2.7	3.5	3.8	5.1	7.4	7.2	7.2
Exports	7.8	9.2	11.3	12.7	15.9	21.7	22.1	21.6
Growth rate		17.9	21.9	13.2	24.4	37.0	1.6	–2.1
Imports	5.5	6.5	7.7	8.9	10.8	14.3	14.9	14.4
Growth rate		18.7	18.4	15.6	20.9	32.9	3.9	–3.1
Income, net	1.2	1.0	0.4	0.2	–0.5	–1.4	–1.8	–2.4
Compensation of employees	–1.1	–1.2	–1.4	–1.6	–1.9	–2.3	–2.9	–3.2
Investment income[1]	2.2	2.2	1.8	1.8	1.5	0.9	1.0	0.8
Current transfers, net	–0.4	–0.4	–0.5	–0.4	–0.5	–0.5	–0.6	–0.7
Current balance, net	1.8	1.8	1.7	1.6	1.7	2.9	2.0	1.8
As a per cent of GDP	13.9	12.7	11.0	9.4	8.8	13.6	8.9	8.2

1. Including reinvested earnings.

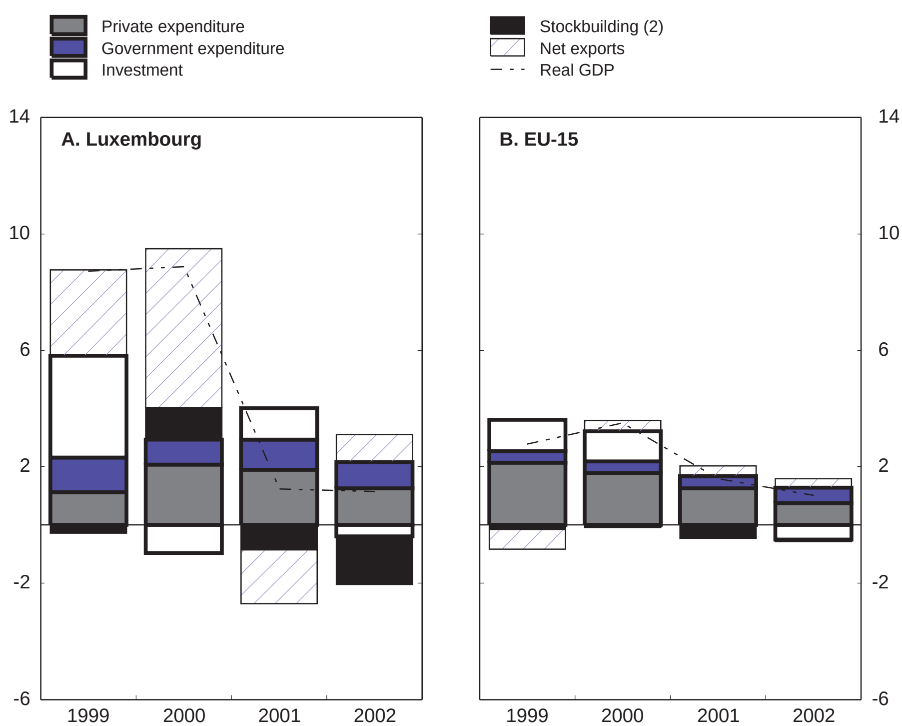
Source: STATEC and OECD.

Internal demand as a whole was affected only late in the downturn, partly due to tax cuts

The pattern of an external shock hitting at the core business of Luxembourg's open and highly specialised economy and then spreading gradually to the whole economy is clearly reflected on the expenditure side of GDP (Figure 3). In contrast to the European Union as a whole, the largest contribution to the marked deceleration in real GDP growth between 2000 and 2001 came from the external balance that swung by more than 8 per cent of GDP from a largely positive to a negative contribution due to weakness in exports but still buoyant import demand. Unlike in 2001, the further deceleration of GDP growth in 2002 was domestically-driven, while imports fell more sharply than exports. Imports of investment goods, especially ICT equipment, led the fall, reflecting plummeting

Figure 3. **Contributions to real GDP growth**[1]

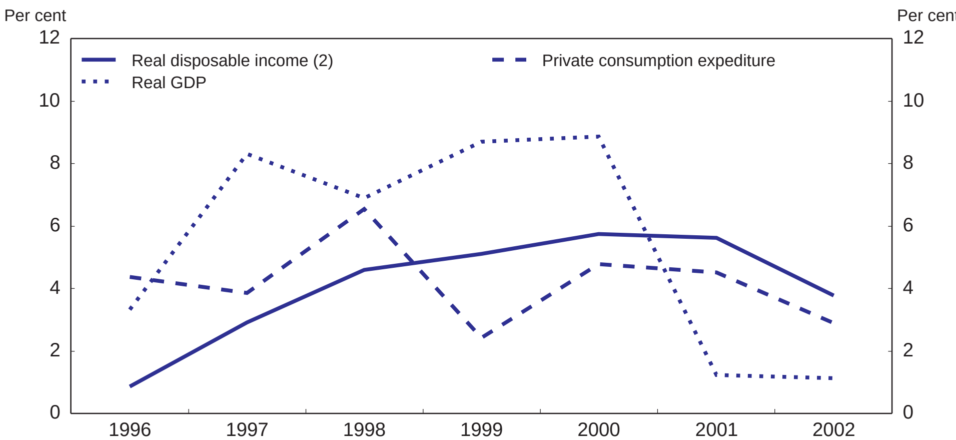
Change as a percentage of GDP in previous year



1. GDP, 1995 prices.
2. Including statistical discrepancy.

Source: STATEC and OECD.

Figure 4. **The personal income tax reform has supported private consumption**[1]



1. Year-on-year percentage change.
2. Approximated by total compensation of employees minus direct taxes on households, corrected for the ratio of domestic to national employment to focus on households of Luxembourg residents.

Source: STATEC and OECD.

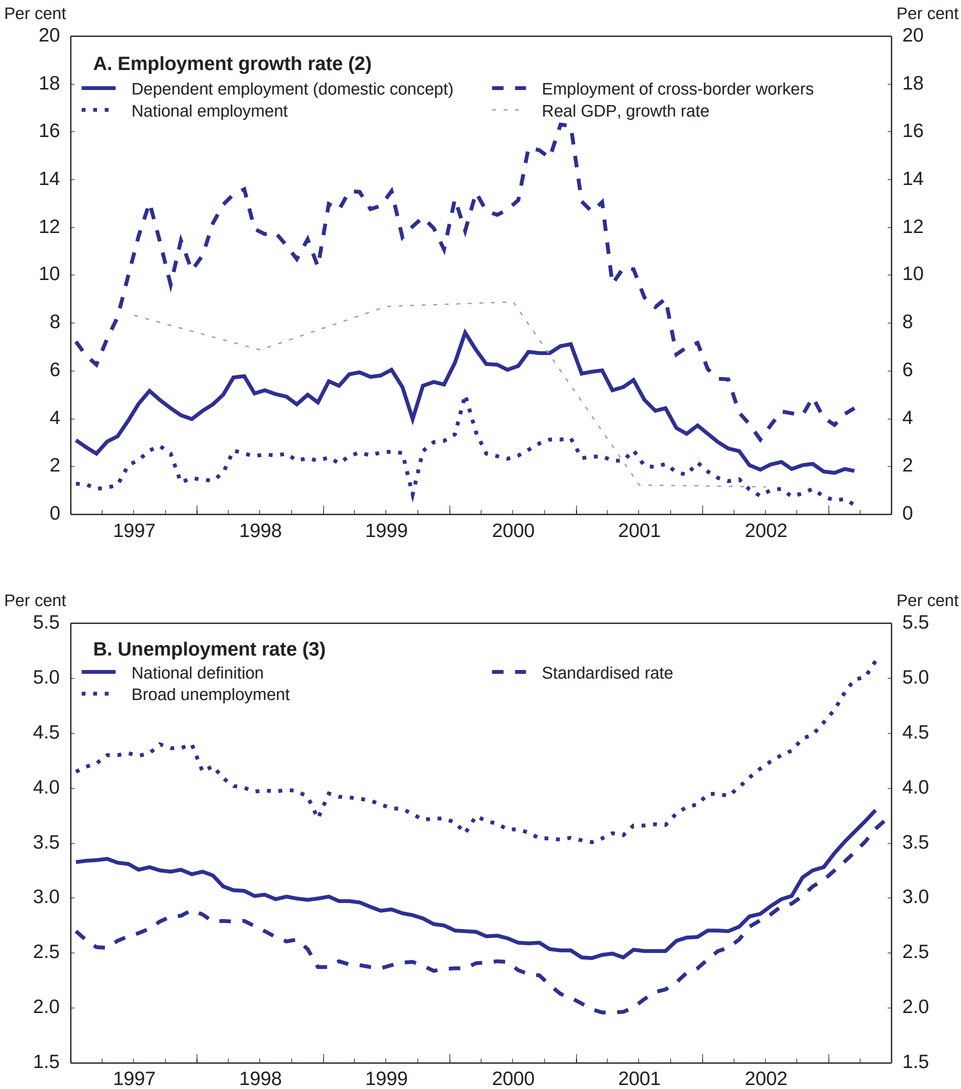
business investment. The drop in gross fixed investment in 2002 would have been much more severe had it not been for continued growth in residential investment and public demand for structures. Private consumption, albeit slowing in 2002, outpaced overall GDP growth in 2001 and 2002, as household disposable income grew very strongly in both years (Figure 4). The markedly positive difference between growth in real disposable income and real GDP growth in the period 2001-02 reflects the time lag between employment and economic activity – leading to still strong jobs growth in 2001 and even 2002 (5.6 per cent and 3.1 per cent, respectively) – high wage increases due to automatic indexation, and personal income tax cuts (which were implemented in two steps in January 2001 and 2002, each one reducing tax receipts by little more than 1 per cent of GDP). Still, given the increasing uncertainty surrounding the economic outlook, households only spent part of their additional income. On the other hand, growth in government consumption expenditure rose.

Labour market developments and inflation

Domestic employment growth has followed the economic downturn with a lag, resulting in weak productivity outcomes

Employment growth followed the economic downturn with a significant time lag, only starting to decline in the first half of 2001 (Figure 5, Panel A). While

Figure 5. **Employment and unemployment**[1]

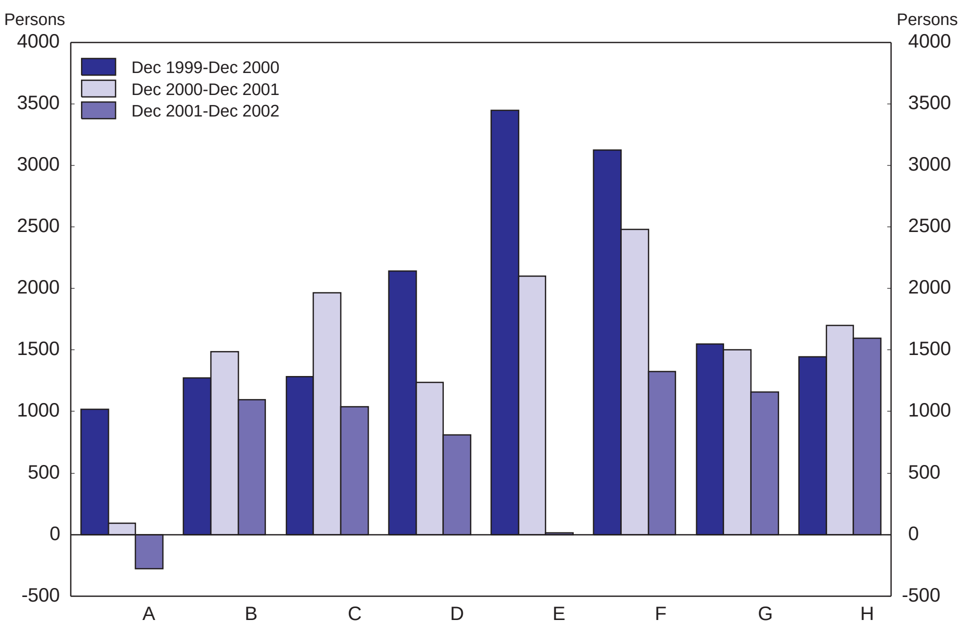


1. Seasonally adjusted.
2. 5-month centred moving average, month-on-month percentage changes at annual rates.
3. The national definition measures job seekers, registered with the national employment office. The broad concept adds to registrations persons on work schemes or enrolled in training sponsored by the employment office.

Source: STATEC and OECD.

total domestic employment still grew by as much on average in 2001 as in 2000 (5.6 per cent), reflecting rising employment growth rates in the course of 2000, it slowed significantly in 2002, to 3.1 per cent. The fading in monthly growth rates was remarkably gradual compared with the sharp drop in overall activity. Apparently, having experienced bottlenecks in the recent past, employers in a number of sectors kept filling vacancies for fear of not finding enough staff during the next upswing. Hiring went on at a brisk pace in the public sector (public administration, health care and social services) (Figure 6), not least boosted by strong increases in public expenditure (see Chapter II). By contrast, the manufacturing sector had lower employment in December 2002 than one year before and the financial sector during the second half of 2002 lost the slight employment gains it

Figure 6. **Employment by sector**



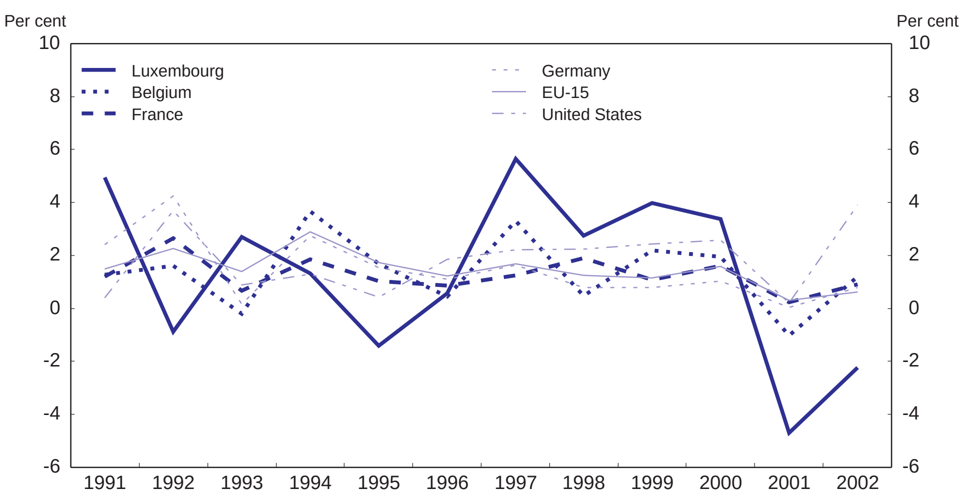
Notes: A: Manufacturing, mining and quarrying, electricity, gas and water supply (weight: 0.13).
B: Construction (weight: 0.11).
C: Trade, repair, hotels and restaurants (weight: 0.18).
D: Transport and communications (weight: 0.09).
E: Financial intermediation and insurance (weight: 0.13).
F: Real estate, renting and business activities (weight: 0.13).
G: Public administration and education (weight: 0.13).
H: Health and social work, community, social and personal services and private households with employed persons (weight: 0.10).
Source: Inspection générale de la sécurité sociale (IGSS).

accumulated earlier in the year. As at around previous cyclical turning points, growth in employment of cross-border workers has displayed more variation than that in national employment (employment of residents). It has, however, stabilised at a still robust rate of growth of about 4 per cent since spring 2002.

The counterpart of the sluggish adjustment of employment to the economic downturn has been a steep decline in labour productivity (Figure 7). Real GDP per person employed fell by more than 4 per cent in 2001, the sharpest drop since the aftermath of the first oil-price shock. With labour market adjustments gradually setting in, labour productivity shrank again in 2002, albeit to a lesser extent.[3] The pattern of stronger ups and downs in labour productivity reflects a number of factors. First, output grows more strongly on average than elsewhere and fluctuates more strongly, making it worthwhile for employers to keep workers during a period of weakness given that the subsequent upswing could be very strong and filling vacancies could be costly. This rationale is strengthened by labour market institutions granting high employment protection and discouraging the use of temporary contracts. Second, there is a high share of services in the economy which are typically characterised by non-storability. Finally, locally increasing returns to scale[4] generally tend to be greater in the production of most financial services than in most other economic activities.[5]

Figure 7. **Labour productivity in the business sector**

Per cent change over previous period



Source: OECD.

Unemployment among residents has risen

The national unemployment rate (national definition based on registrations) rose rapidly from 2.6 per cent at the end of 2001 – a level very close the all-time low – to 3.5 per cent in early 2003 (Figure 5, Panel B). Including persons on work schemes or enrolled in training sponsored by the employment office, (broad) unemployment has increased from 3½ to 5 per cent over the same period, a level not reached at any time in the past six years.

Underlying inflation has come down…

Softer labour market conditions contributed to a gradual easing of wage pressures during the past two years. In 2001 this effect was counter-balanced by pay rises related to automatic wage indexation, but in 2002 wage increases came down markedly, reflecting the deceleration in inflation during 2001 (Table 5). Indexation thresholds were breached on 1 June 2000, 1 March 2001 and 1 May 2002, leading to automatic wage increases by 2.5 per cent one month after each breach.[6] During the year 2002 headline inflation was broadly stable at a little above 2 per cent, as underlying inflation decreased and energy prices increased, and was roughly in line with the euro area average after having exceeded it in 2000. The decline in underlying inflation (HICP less food and energy), from 2.6 per cent in 2001 to 2.3 per cent in 2002, has been attenuated by the introduction of euro coins and notes, which is estimated to have added 0.7 percentage points to inflation from January 2001 to July 2002 (BCL 2003, pp. 32-35).[7] Underlying inflation has been running at an annual rate of around 2 per cent in early 2003.

Table 5. **The contribution of indexation to average wage increases**

Percentage change

	Indexation	Other	Total
1996	0.8	1.0	1.8
1997	2.3	0.6	2.9
1998	0.2	1.5	1.7
1999	1.0	2.0	3.0
2000	2.7	1.6	4.3
2001	3.1	2.4	5.5
2002	2.1	1.0	3.1
Half-years			
2001 I	3.8	2.8	6.6
2001 II	2.5	1.9	4.4
2002 I	1.7	1.2	2.9
2002 II	2.5	0.9	3.4

Source: Inspection générale de la sécurité sociale (IGSS), calculations by STATEC.

... but inflation has been outpacing that in neighbouring countries since 1999

While inflation has come down, it has been moderately but consistently outpacing that in the three neighbouring countries since 1999. On average, the harmonised index of consumer prices (HICP) rose by 2.5 per cent per year from 1999 to 2002, compared with 1.9 per cent in Belgium, 1.5 per cent in France and 1.3 per cent in Germany. Adjusting for artificially high weights of tobacco and energy products in the HICP does not qualitatively alter this finding.[8] An analysis by the Central Bank of Luxembourg (*Banque centrale du Luxembourg*, BCL) using "national" weights for the sub-components of the HICP (*i.e.* the weights reflecting residents' consumption patterns) shows that the inflation differential reflects higher underlying inflation (BCL 2003, pp. 28-30). Among the components of underlying inflation, prices for services were rising at a substantially higher pace than in the neighbouring countries, especially in 2001 and 2002 (by about 1.5 percentage points per year), whereas the positive inflation differential for manufactures and processed food faded away after having exceeded 1 percentage point in most of 2000.[9] These findings point to stronger domestic inflationary pressures than in Belgium, France and Germany, especially soaring unit labour costs. Such pressures can be passed on to consumers more easily in markets that are less directly exposed to international competition such as those for many services.

The outlook for 2003 and 2004

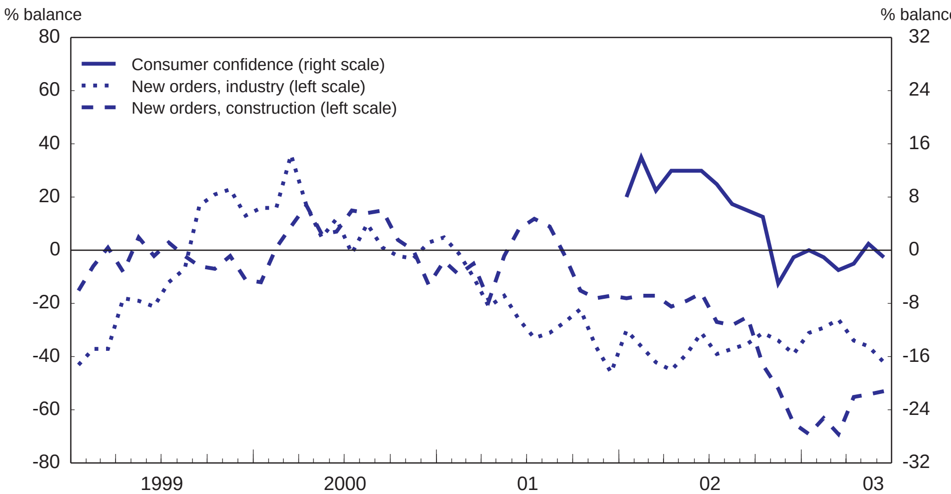
As business conditions are weak (Figure 8), firms are likely to cut investment and gradually revise labour hoarding policies, leading to a slight decline in private sector employment during the summer. Nevertheless, with equity prices stabilising and financial market volatility returning towards more normal levels, a gradual recovery in the financial sector could begin later this year. Moreover, the revival of growth in the euro area will boost goods exports. This tendency is supported by monetary conditions that are favourable for the euro area and also for Luxembourg (Figure 9). The recovery will spill over to the domestic economy in 2004. Inflation is likely to come down broadly in line with that in the euro area in the course of 2003 and even below in 2004, because of the larger weight of energy products. The Luxembourg specificity of smooth changes in the unemployment rate over time is currently undergoing a strong test: should the overall economic slack be more protracted than expected, firms in need of restoring profitability would be obliged to shed a considerable amount of labour after two years of marked declines in labour productivity.

Medium-term prospects

Elastic supply implies GDP growth in the medium term will be determined by world demand for Luxembourg products

Over the past twenty years Luxembourg has weathered the sometimes very strong increases in aggregate demand thanks to a massive increase in

Figure 8. **Confidence indicators point to weak activity**[1]

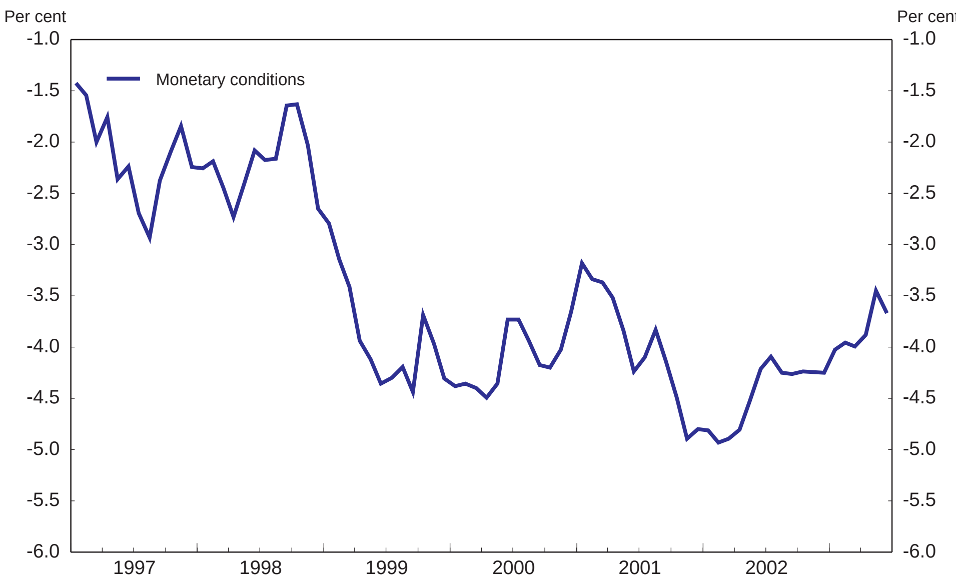


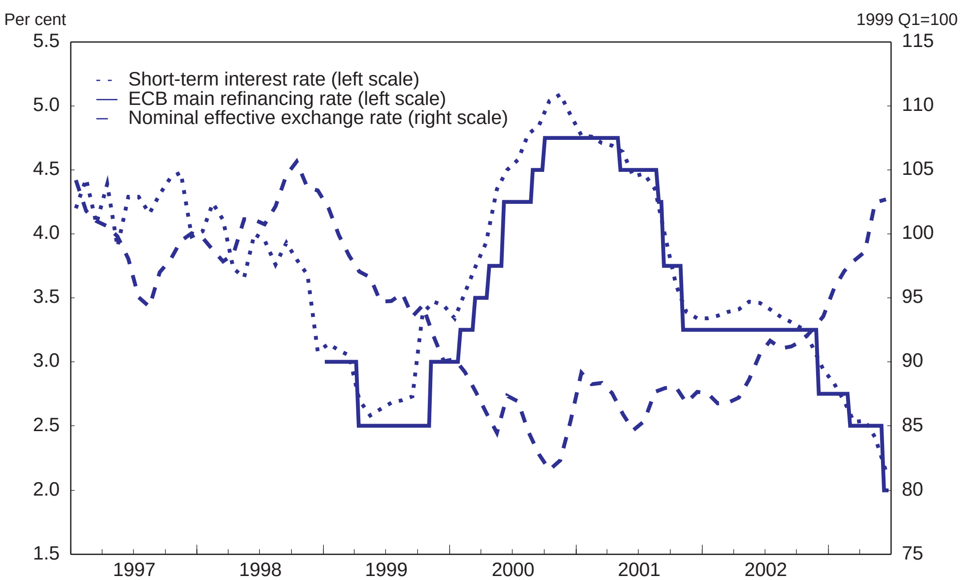
1. Balance of positive and negative replies.
Source: STATEC; Central Bank of Luxembourg and OECD.

cross-border workers and immigrants, implying elastic aggregate supply and attenuating most of the inflationary pressures that would have emerged otherwise. This is why the economy behaves almost like a "normal" EU country in terms of output gap and inflation variability despite its small size and high degree of openness (Annex I). A cross-country comparison of results from the "triangular model" of inflation (Gordon, 1997)[10] confirms Luxembourg's stronger exposure to imported inflationary shocks and weaker contributions to inflation from excess demand, reflecting a generally smaller and less volatile unemployment gap. These results confirm the capacity of the Luxembourg economy to adjust employment relatively smoothly to aggregate demand growth by drawing on foreign labour. However, this pattern of smooth adjustments has been found for an observation period (1985-2002) with high average growth. It could come under strain if medium-term growth were significantly lower in the future. This would lead to temporary downward adjustments in the level of domestic employment – rather than growth in cross-border workers falling from double-digit to small, but still positive rates – and more substantial increases in unemployment (and the NAIRU gap) than in the past. At any rate, with aggregate supply adjusting easily to the upside, medium-term growth in GDP will be determined by world demand for goods and services made in Luxembourg, notably financial services.

Figure 9. **Monetary conditions**[1]

Per cent





1. The weights underlying the index are 1 for the short-term interest rate and 0.15 for the exchange rate.
Source: European Central Bank (ECB), Monthly bulletin.

Medium-term perspectives for financial services in Luxembourg

Luxembourg's high growth rate over the past decade or so is very much due to the stellar performance of the financial sector. In nominal terms, it grew at an annual average rate of 16½ per cent in the 1990s, more than twice the rate for the rest of the economy, mainly reflecting large increases in financial service prices and hence in Luxembourg's terms of trade.[11] In real terms,[12] the average annual growth rate of the financial sector was 6 per cent, about one-fifth higher than for the rest of the economy. The financial sector directly accounted for 32 per cent of GDP in 2000, approximately the same proportion of tax receipts and 11 per cent of employment. When accounting conservatively for indirect effects,[13] *i.e.* for first-round effects of demand addressed to other sectors of the economy, the shares rise to 38 per cent of GDP, 37 per cent of tax receipts and 20 per cent of employment. At close to 20 per cent of GDP, classical banking remains by far the most important branch, whereas mutual funds, the fastest growing branch, reached 7 per cent of GDP in 2000.[14] Insurance companies and independent professional financial services total another 5 per cent. High growth in the financial sector has boosted tax revenues, enabling the government to sustain lower average tax rates on wages, business income and consumption, and thereby making location in Luxembourg attractive to other sectors as well (*e.g.* road transport).

Financial market conditions in the 1990s were exceptional and will not return any time soon

Looking forward, the financial sector seems likely to be set for a decade of much slower growth than in the 1990s as it is unlikely that similarly buoyant financial market conditions, which saw price-earnings ratios on stocks rise to record levels, will return any time soon. Even after the steep fall in stock markets in the past two years, price-earnings ratios in the United States remain considerably higher than the long-term average while they are only around historical average levels in Europe. And Japanese stocks still appear to be richly valued. With little likelihood of a repeat of the growth in stock market valuations experienced in the 1990s growth in commissions on transactions that mutual funds execute on behalf of their shareholders is likely to be more modest, as is growth in the volume of assets under management. These developments also affect private banking, which is still the most important activity for Luxembourg banks, as part of the earnings also evolve in line with the value of portfolios under management.

Progress in international tax co-operation…

Protracted discussions at the EU level about common rules for the taxation of savings resulted in a European Council Directive that considers exchange of information, on as wide a base as possible, on interest earnings by residents of other EU member states as "the ultimate objective of the EU in line with international developments".[15] The Council agreed that this Directive should be implemented into member states' national laws from 1 January 2004 and be applied from 1 January 2005. Application of the Directive is contingent on certain third countries (Switzerland, Andorra, Liechtenstein, Monaco and San Marino) applying equivalent measures and relevant dependent or associated territories applying the same measures.[16] The Directive requires EU member states to exchange information on interest payments on an automatic basis but allows three countries, Austria, Belgium and Luxembourg, not to participate in automatic information exchange during a transitional period. Instead they will apply a withholding tax to interest income accruing to individuals who are residents of other EU states at a rate of 15 per cent from 1 January 2005, 20 per cent from 1 January 2008 and 35 per cent from 1 January 2011 onwards.[17] Three-quarters of the tax withheld on such payments will have to be transferred to those other states under a revenue sharing arrangement. The Directive requires the three countries to join the automatic exchange-of-information regime[18] if and when:

- the EC enters into agreements with Switzerland, Liechtenstein, San Marino, Monaco and Andorra to exchange information upon request as defined in the 2002 OECD Agreement on Exchange of Information on Tax Matters in relation to interest payments, and to continue to apply simultaneously the withholding tax; and
- the Council agrees by unanimity that the United States is committed to exchange of information by request as defined in the 2002 OECD Agreement in relation to interest payments.

Hence, Luxembourg has preserved temporarily its bank secrecy under the EU Directive, on the condition that a withholding tax is levied on interest income accruing to individuals from other EU states.

... should not have much effect on financial sector growth

While these regulatory changes will require the financial sector to adjust, their effect may not be very great in the next few years because the withholding tax on interest payments to EU resident individuals is being phased in gradually. Although Luxembourg has provided access to information in criminal cases since October 2000,[19] it may nevertheless find itself under continued pressure to provide more complete access to information to tax authorities, consistent with the recent statement by G8 Finance Ministers (17 May 2003), namely that: "We urge all OECD countries to implement the standards set out in the OECD's 2000 report on access to bank information and to ensure effective exchange of information for tax purposes".

Pension reforms in Europe and the Single Market are drivers of above-average growth in financial services

Beyond the current bear market and taxation issues, several broad trends point towards growth in the financial sector outpacing average GDP growth even without a financial boom. More intensive use of ICT and globalisation will continue to produce efficiency gains in the industry and increase competitive pressure, reducing prices relative to those in sectors less affected by these factors and inducing higher demand for financial services. Together with locally increasing returns to scale in production, this feeds the trend towards a lower number of main financial centres in Europe. The dynamic growth of the mutual funds industry over the past decade puts Luxembourg in a good position broadly to keep pace with growth of other dynamic financial sectors because it has made the sector less dependent on private banking and the maintenance of bank secrecy and the industry has accumulated the critical mass necessary to benefit from agglomeration economies.[20, 21] Specifically in Europe with its initially lower level of integration than in the United States, markets for financial services are outpacing a global trend towards financial integration (OECD, 2003a). Ongoing efforts to reduce market segmentation due to national borders, which remains substantial in financial retail services and the insurance sector (Heinemann and Jopp, 2002) as well as in the mutual funds industry (Heinemann *et al.*, 2003), will contribute to keeping this trend alive, leading to larger minimum efficient scales at the firm and sector level.[22] The recently agreed Pensions Directive, which opens the way for companies to establish one fund for all their employees irrespective of where they work in Europe, represents an important step in this direction. Finally, the accumulation of assets to finance retirement income, one major contributor to the expansion of capital markets in the 1980s and 1990s, is set to continue over the coming decade, as younger cohorts join baby-boomers in demand for long-term saving vehicles. The reliance on private long-term saving is generally on the rise given declining replacement rates from public pensions and pension reform in more and more countries (OECD, 2003a).[23]

Growth will be lower than in the 1990s but outpace the EU average

Summing up, growth in demand for financial services in coming years is likely to fall short of the rates experienced during the 1990s, when financial market conditions were unsustainably buoyant due to unrealistic earnings expectations. Even so, growth in financial services in general, and of the Luxembourg financial sector in particular, will continue to be higher than growth in real GDP as progress continues to be made towards a single European market for services, in developing private pension saving and in applying ICT. The proposed EU savings directive is unlikely to have much effect on growth, although Luxembourg may find itself under continued pressure to provide more complete information to foreign tax authorities given than the ultimate objective of the directive is effective exchange of information. Given the dominant role of the financial sector for the economy, it is expected that GDP growth will outpace the EU average in the medium term, especially if the lower overall tax burden compared to other countries can be maintained. However, at 3 to 4 per cent per year on average, which seems the most likely range, it will be markedly lower than during the nineties, when it reached 5½ per cent.

Policy challenges

While GDP growth in the medium term is likely to be lower than in the past decade or so, owing to less favourable prospects for the financial sector, it is still likely to be high enough to require continued inflows of foreign workers. This means that in addition to the long standing challenge of efficiently integrating foreign workers into the economy, the authorities now also have the challenge of implementing policies that facilitate adjustment to lower growth in demand for the goods and services produced in Luxembourg. More specifically, the authorities face the following main challenges, which are discussed in the remainder of the *Survey*:

- Reining in expenditure growth to rates compatible with lower medium-term growth.
- Adjusting public pension parameters so that the pension system is sustainable in the long-run.
- Attenuating the decline in national income growth by:
  - increasing employment rates, especially for older workers but also by reducing the risk that adverse supply shocks result in increases in structural unemployment;
  - improving education achievement and attainment;
  - increasing the efficiency with which government achieves its objectives (including for climate change and development aid);
  - creating market conditions more favourable to Internet use.
- Efficiently integrating foreign labour into the national economy by:
  - education reforms that raise education outcomes for children without Luxembourg nationality nearer to that of nationals;
  - efficient provision of transport infrastructure; and
  - housing policy reforms that reduce the impact of high growth on house prices.

II. Fiscal policy

Overview

The budget surplus has fallen markedly during the current economic downturn, from 6 per cent of GDP in 2000 to 2½ per cent of GDP in 2002. This deterioration, which is mainly structural, is entirely attributable to continued rapid growth in government expenditure, the public expenditure ratio rising by 6 percentage points of GDP over 2000-02 to 45 per cent, just below the record registered in 1993 (Ministry of Finance, 2003a). Most of this increase is accounted for by high growth in social security and investment expenditures and can be attributed to economic growth turning out to be much lower than forecast when expenditure plans were finalised. Government revenues have increased as a share of GDP, despite tax cuts in 2001 and 2002, owing to a surge in back taxes from corporations and other lags in the effect of the downturn on tax revenues. Economic growth in 2003 is again likely to be much lower than when expenditure plans were finalised, resulting, according to the authorities, in another large deterioration in the budget balance (to a projected surplus of 0.2 per cent of GDP).

In view of the Luxembourg economy's lower medium-term growth prospects, the government plans to reduce growth in (nominal) expenditure sharply to around 3 per cent per year in 2004-05, according to their Stability Programme (Ministry of Finance, 2003b). The government could even consider a general hiring freeze on public sector employees. While reforms are underway or being considered to increase public sector efficiency, there is considerable scope to go further in this direction, thereby attenuating the pain of adjusting to lower spending growth (see Chapter III). Despite these plans, the authorities expect the budget balance to move into a small deficit in 2004 and to improve only slightly in the following year.

The authorities remain committed to maintaining general government budget surpluses (with the central government budget in balance) in the medium term and hence to the further accumulation of net financial assets, which presently stand at around 50 per cent of GDP (IMF, 2002). It is vital that further consolidation measures be taken to realise these objectives in view of the future adverse impact of the state pension system on public finances in the likely event that future growth in employment is lower than in the past and the risks related to the economy's high degree of specialisation.

Recent developments

The structural budget balance has deteriorated markedly owing to rapid expenditure growth

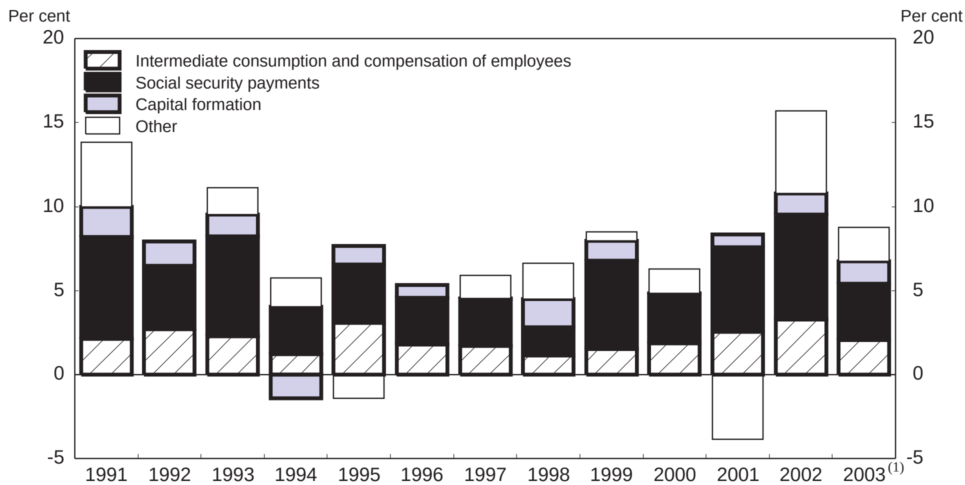
The budget surplus fell from 6 per cent of GDP in 2000 to 2½ per cent of GDP in 2002 (Table 6).[24] According to the Central Bank of Luxembourg, only 1.3 percentage points of the deterioration from 2000 to 2002 is cyclical.[25] The underlying trend in expenditure was strongly upward. Expenditure increased from 38.7 per cent of GDP in 2000 to 44.7 per cent in 2002. The rise in government outlays was only marginally related to cyclical conditions, since unemployment outlays edged up by only 0.1 percentage point of GDP and remained very low (0.3 per cent of GDP). About half of the increase in total expenditure was accounted for by higher social payments, which rose by 25 per cent (Figure 10). The retirement pension in the private sector was increased substantially, following discussions on the future of the pension system between the social partners and the government, the so-called *Rentendësch*. These increases were also aimed at bringing pensions in the private sector more into line with those for civil servants. The government also raised family allowances and introduced a new allowance for the education of children, with a budgetary cost of about 0.4 per cent of GDP. Health care spending continued to grow rapidly, reflecting an increase in the insured population and the introduction of new techniques. Compensation of

Table 6. **General government budget and debt**
As a per cent of GDP

	1997	1998	1999	2000	2001	2002
Receipts	46.5	45.1	44.6	44.7	45.3	47.2
Expenditures	43.3	42.1	41.1	38.7	39.1	44.7
Net lending						
General government	3.2	3.1	3.4	6.0	6.3	2.5
Central government	1.9	1.4	2.0	3.0	3.0	–0.1
Local government	0.5	0.3	0.2	0.6	0.2	0.3
Social security	0.8	1.4	1.2	2.5	3.0	2.3
Cyclical component	–0.9	0.0	0.2	1.2	0.8	–0.2
General government gross debt (€ million)[1]						
As a percentage of GDP	6.1	6.3	6.0	5.6	5.6	5.8

1. Maastricht definition.
Source: STATEC, Central Bank of Luxembourg and OECD.

Figure 10. **Contributions to total expenditure growth**



1. Estimates.
Source: STATEC.

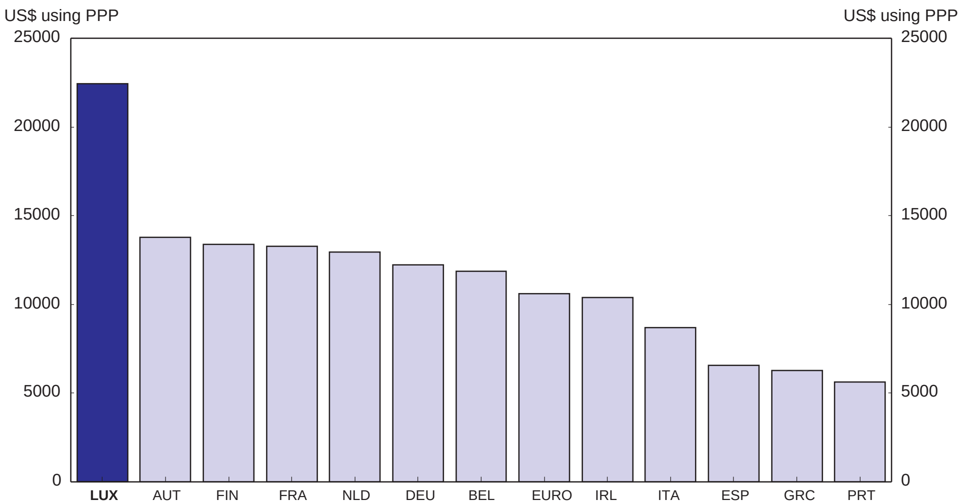
public-sector employees as a share of GDP rose by 0.7 percentage point (after having decreased during the second half of the nineties), reflecting additional hiring, a wage increase and a raise in travel allowances. Government investment also rose markedly, from 4.0 per cent of GDP in 2000 to 4.6 per cent in 2002, which is very high by international comparison. This increase reflected efforts by the authorities to expand infrastructure to reduce bottlenecks that have arisen from high growth in output and employment, notably of cross-border workers and immigrants (see Chapter IV).

Following this increase in expenditure, the gap between primary expenditure per capita (in PPP terms) in Luxembourg and in the euro zone countries has widened further (Figure 11). In 2002, even after a correction for cross-border workers, primary expenditure per capita was 75 per cent above the average for the euro zone and 33 per cent higher than in Austria, which ranked second.[26]

Revenue growth has held up well thanks to a surge in collections of back taxes

Total revenues increased from 44.7 per cent of GDP in 2000 to 47.2 per cent in 2002 despite a sharp fall in economic growth from 9 per cent in 2000 to 1 per cent in 2002. This was mainly due to high back taxes from corporations, which continued to grow strongly owing to high profits in previous years. On a cash

Figure 11. **Primary expenditure per capita in euro area countries, 2002**



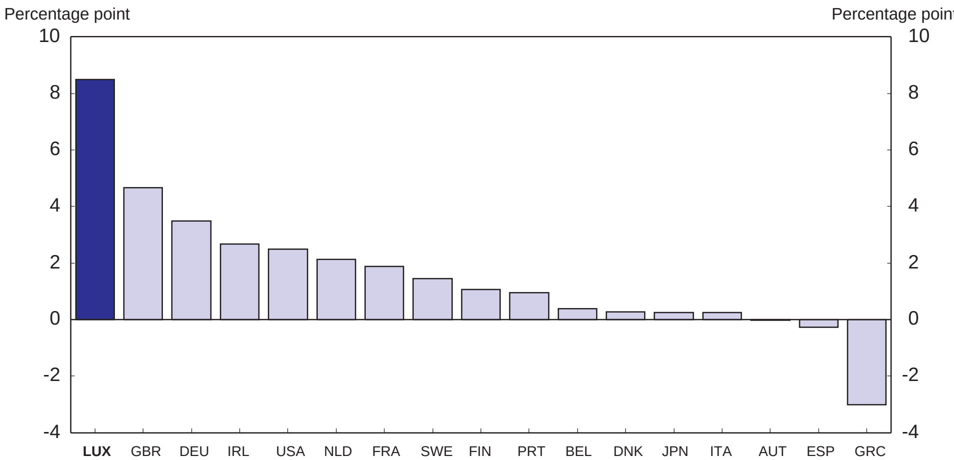
Source: Central Bank of Luxembourg.

basis, the share of corporate taxes in GDP rose from 7.3 per cent of GDP in 2000 to 8.7 per cent in 2002, despite a tax cut for enterprises of about 1½ per cent of GDP in 2002.[27] The speeding up of the corporate back taxes rose by about 2 percentage points of GDP in 2002, most of which was due to accelerated collection.[28] Social security contributions also increased by 1.7 percentage points of GDP, as employment growth remained strong and did not yet fully reflect the economic downturn. Likewise, growth in personal income taxes held up well, despite tax cuts of 1.2 and 2.0 per cent of GDP in 2001 and 2002 respectively.[29]

The budget surplus is set to almost disappear in 2003 on account of continued high expenditure growth

According to recent projections by the authorities, the budget surplus is forecast to fall from 2.5 per cent of GDP in 2002 to 0.2 per cent in 2003 (Ministry of Finance, 2003c). Again, this deterioration is entirely accounted for by rapid expenditure growth, lifting expenditure by a further 2½ per cent of GDP to 47.2 per cent and bringing the total increase since 2000 to 8½ percentage points of GDP, an increase that is high by international comparison (Figure 12). The budget for 2003 was voted in mid-2002, when economic growth was still expected to recover to some 5 per cent in 2003. Following the publication of the National Accounts

Figure 12. **Changes in total expenditure as a share of GDP**
2000-2003[1]



1. 2003: estimates.
Source: Ministry of Finance and OECD.

for 2001 in September 2002, which showed that growth had slowed much more than had previously been thought, the authorities slashed their growth forecast to 1.2 per cent in 2003 (as shown in the Stability Programme that was submitted to the European Commission in January 2003). By this time, however, it was too late to make substantial cuts in expenditure. Total expenditure was therefore projected to increase in 2003 by 4 per cent, a growth rate that increased to 9 per cent, as preliminary figures on investment expenditure in 2002 were replaced by lower final ones and projections for total expenditure in 2003 was revised upwards owing to expected increases in social security outlays.[30]

In 2003, the share of revenue in GDP is projected to remain steady, according to recent government forecasts. Revenues are expected to grow slightly less than had been foreseen in the Stability Programme but to start from a substantially higher level due to the additional revenues in 2002 (mainly back taxes) that were not taken into account in the Programme. Corporate back taxes are expected to decline as a percentage of GDP, reflecting lower profits, although the decline could be postponed in 2003 by a further acceleration in collection. Social security contributions and indirect taxes are expected to increase as a share of GDP, the latter as a result of an increase in excise taxes received by the Belgium-Luxembourg Economic Union.[31]

Medium-term prospects

Measures are planned to rein in expenditure growth in 2004-05, but further measures are needed

The Stability Programme indicates that the budget balance would decline to a deficit of 0.7 per cent of GDP in 2004 and return to balance in 2005 based on real GDP growth rising to 2.4 per cent in 2004 and 3.2 per cent in 2005. According to the authorities the improvement in the budget balance is to be achieved by lower expenditure growth, which should come down to around 3 per cent (nominal) in 2004 and 2005. Since government consumption and investment, accounting for some 35 per cent of total expenditure, would continue to grow at a relatively high rate (6¼ per cent nominal), growth in other expenditure would have to fall sharply, to an estimated 1½ per cent, thus bringing down the share of expenditure in GDP. In view of the large increases in expenditure over the past five years, these objectives seem rather ambitious. The share of revenues is also expected to decline, though to a much lesser extent.

In early 2003, as a first step in the preparation of the budget for 2004, the government announced a plan to further limit nominal growth in expenditure by the central government to 5 per cent per year in 2004-05. Other things being equal, that would imply an improvement in the budget balance of ¼ per cent of GDP. To achieve this objective, the government is introducing expenditure ceilings and could even consider a freeze on the number of civil servants.

Further measures to contain expenditure are likely to be required for the government to meet its objectives as outlined in the Stability Programme and the coalition agreement of August 1999, namely that:

- The general government should remain in surplus.
- The central government should remain in balance.
- Current expenditure of central government should increase less rapidly than total expenditure.
- Growth in total expenditure should not exceed medium-term growth in GDP.

While the general government budget may be in surplus, this is likely to continue to reflect a large social security surplus partly offset by a central government deficit (projected by the government to be 2.2 per cent of GDP in 2003). Maintaining the central government budget in balance is an objective because the authorities consider it desirable that social security surpluses be fully devoted to accumulating assets in anticipation of future social security deficits associated with lower employment growth than in the past (see below). It is unlikely that the central government deficit will turn into balance in the short term, given the persistent high growth of consumption and investment and given that direct taxes received by central government are likely to fall back further to a lower growth path. A decline in corporate taxes, reflecting lower profits in the financial sector in particular, can only be offset temporarily by an acceleration in the collection of taxes. Likewise, personal income taxes are likely to grow less rapidly in the future once employment growth has adapted to the lower demand for financial services. Caution is also warranted in the social security sector, which is likely to benefit less than in the past from the rising social security contributions arising from the persistent increases in the number of cross-border workers.

It continues to be the case that *central* government current expenditure is growing more rapidly than total government expenditure, contrary to the government's objectives. And while growth in total expenditure over the next two years may be in line with likely medium-term GDP growth (3-4 per cent), this follows very large increases as a share of GDP in recent years. Much greater expenditure restraint will be required if the expenditure-to-GDP ratio is not to show a further rise.

Sustainable retirement income

Main issues

Luxembourg has a very generous general public pension system by international comparison. It has accumulated a significant stock of assets, largely as the result of a rapid increase in the relatively young foreign-born workforce brought about by the strength of the financial sector in the past decade. However, over the long term pensions will have to be paid to such workers, straining the sustainability of the pension system. Moreover, the slower growth in the demand for the services provided by the Luxembourg economy could bring a reduction in both immigration and the inflow of cross-border workers (*i.e.* people who work but do not live in the country). Any such development would place a strain on the sustainability of the pension system. Delaying reforms to make the system sustainable increases the scale of adjustment that is eventually faced in the future. Thus, the main issue for Luxembourg is implementing timely reforms that ensure the sustainability of the pension system, without compromising other policy objectives.

Performance

Public retirement pensions account for the bulk of the income of the elderly in Luxembourg. The replacement rates guaranteed by the general public pension scheme are exceptionally high at 98 per cent of average income for a worker on average earnings with 40 years of contributions (IGSS, 2002a). The generosity has ensured that the risk of relative poverty amongst the elderly is also the lowest in the OECD area and has meant that most individuals have limited need to build up pension savings in other pension vehicles (Table 7). Furthermore, the general public

Table 7. **Performance indicators: sustainable retirement income**

	Projected increases in old age pension spending	Low income rate of the elderly[1]	Relative disposable income of the elderly[1]	Private pension funds 1999	Age of withdrawal, 1994-1999		Participation rate, 2001, per cent		
							Aged over 65	Aged 55-64	
	Change in per cent of GDP 2000-2050	Per cent of the elderly with income less than 50 per cent of median disposable income	Per cent of the disposable income of all individuals	Per cent of GDP	Male	Female		Male	Female
Australia	1.6	16.1	67.6	63.8	59.7	61.3	6.0	60.0	36.9
Austria	2.2	14.9	86.6	3.6			2.8[1]	42.1[1]	17.5[1]
Belgium	3.3	13.8	77.9	6.1			1.3	36.6	15.7
Canada	5.8	2.5	97.4	45.7	62.6	61.1	6.0	61.3	41.7
Czech Republic	6.8			3.8			4.0	55.0	24.5
Denmark	2.7	9.2	73.0	24.4	62.4	61.5	4.6	65.5	51.8
Finland	4.8	7.5	79.0	10.7	59.8	60.0	3.7	51.2	49.5
France	3.9[2]	10.7	89.7	6.3	59.3	59.8	1.2	43.8	34.1
Germany	5.0	10.4	85.6	3.2	60.5	60.8	3.0	50.6	32.4
Greece		29.2	76.8	4.6	61.7	62.2	5.0	57.0	23.6
Hungary	1.2	6.0	85.2	2.2			3.1	36.3	15.4
Iceland				86.0			19.9	92.8	81.7
Ireland		16.7	74.6	57.8			7.9	66.1	29.5
Italy	–0.3	15.3	84.1	3.0	59.3	58.4	3.4	57.8	26.6
Japan	0.6			18.7	69.1	66.0	21.8	83.4	49.2
Korea	8.0			3.2	67.1	67.5	29.6	71.3	47.9
Luxembourg	**2.0**[5]	**6.7**[3]	**98.0**[5]	**. .**			**0.0**	**38.1**	**14.3**
Mexico		32.9	85.3	2.4			30.5	80.5	27.6
Netherlands	4.8	1.9	86.3	119.3	61.6	60.1	3.1	52.0	26.9
New Zealand	5.7			. .			8.6	74.6	51.7
Norway	8.0	19.1	74.1	7.4	64.2	64.7	13.2	73.6	63.2
Poland	–2.5	8.4[3]		. .			7.5	41.5	24.1
Portugal				11.4	65.3	66.5	19.0	63.7	41.9
Slovak Republic							1.1	43.0	11.2
Spain	8.0	11.3[3]		2.3	61.1	61.1	1.6	61.4	23.6
Sweden	1.6	3.0	89.2	. .	63.3	61.8	9.4	73.5	67.4
Switzerland		8.4[3]		97.3[4]			11.4	82.4	56.1
Turkey		23.1	92.7	. .			18.1	50.8	18.4
United Kingdom	–0.7	11.6	77.8	84.1	62.0	61.2	4.8	64.4	44.6
United States	1.8	20.3	91.7	74.4	65.1	64.2	13.1	68.1	53.0

1. Förster and Pellizzari (2000).
2. Secretariat estimate in OECD (2001a). Official reports suggest a 4.4 per cent increase on unchanged labour market policies for the period 2000 = 2040 (COR, 2001).
3. Smeeding (2002).
4. 1998.
5. IGSS (2002a).

Source: Förster and Pellizzari (2000); Jesuit and Smeeding (2002), *Luxembourg Income Study*; OECD, *Labour Force Statistics*, Scherer (2002).

pension system and disability benefits have allowed the average age at which pensions are drawn to drop to one of the lowest in the OECD area, at only 57 years. Disability pensions are proportionately more important for women than men and enable them to withdraw from the labour market at the same age as men, even though they draw retirement pensions two years later than men. Expenditure on disability benefits amounted to 1.8 per cent of GDP in 2001 and the number of beneficiaries was equivalent to 7.2 per cent of the employed population in the same year.[32] Public pension expenditure accounted for 9 per cent of GDP in 2001, and is projected to rise to over 12 per cent by the middle of the century, on the assumption of 3 per cent economic growth (Bouchet, 2003).[33] By 2020, with unchanged contribution rates of 24 per cent of earnings, the financial position of the system would start to deteriorate. The principal landmarks would be a decline in the surplus of contributions over expenditure as from 2020, an overall deficit in 2041 and the elimination of all assets in 2055. It should be borne in mind that these results are conditional on a large set of hypotheses and could be considered optimistic as they imply that the labour force would increase by 67 per cent between 2001 and 2050 (*i.e.* an annual average growth rate of 1.3 per cent). Were labour force growth (holding growth in cross-border employment constant) to be lower, a net liability position would emerge earlier.

The financial health of the system for the next two decades is, moreover, subject to the substantial risk that the continued inflow of foreign workers might not persist.[34] The contributions of cross border workers were almost double the pension benefits paid to them and the difference represented nearly the entire surplus of the system in 2000.[35] Given their lower average age, that the phenomena is relatively recent and still continuing at a rapid pace, it will take several decades before the expenditure consequences of these flows become evident. In addition, continued immigration on the scale of the recent past would boost the resident population to 60 per cent above its 2000 level by 2050 in the baseline scenario. These two movements are acting as a powerful offset to the ageing of the domestic population in that period. A slow down in either the inflow of cross-border workers or net immigration would bring forward stresses in the system that, under current trends, would not otherwise become evident until the second half of the century. For example, a 50 per cent fall in cross-border worker flows from 2006 onwards would bring a fall in the surplus of the pension system of 2½ per cent of GDP by 2035.

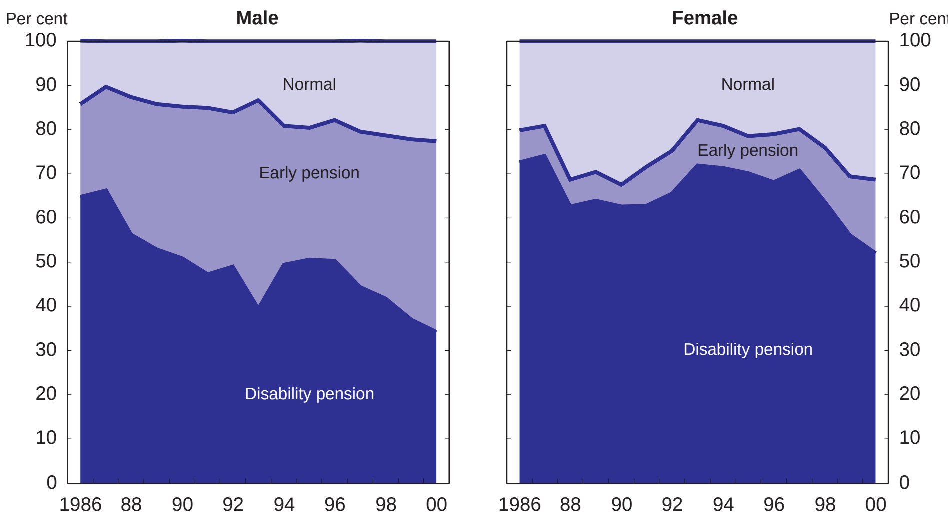
Policy

In contrast to reform efforts in many other OECD member countries, recent changes to the Luxembourg pension system have increased its generosity. In 2002, following the release of a commissioned actuarial review of the pension system (ILO, 2001), the government introduced the "*Rentendësch* reforms" (OECD, 2001). The spending increases included across-the-board increases in pension benefits, higher revaluation factors for past earnings, higher payments to widows and orphans and the introduction of an end-of-year supplement to pensions.[36] In addition, fiscal incentives were given for voluntary private pension saving. These reforms are estimated to increase spending by almost 10 per cent (0.6 per cent of GDP), resulting in deficits from the middle of the century (as noted above). The assets of the pension system may be reduced from 40 per cent of GDP in 2002 to 14 per cent of GDP in 2050 (Bouchet, 2003).

The contribution rate of the pension system is reviewed periodically but with a mechanism that leads to delayed adjustment to shocks. Every seven years, projections are made of expenditures and revenues for the following seven years. The contribution rate is then adjusted to ensure that the assets of the system are no lower than 1.5 times the annual expenditure of the system at the end of the seven-year period. Using this rule, the contribution rate will rise from 24 per cent currently to 30 per cent of GDP by 2050 with growth of 3 per cent (Bouchet, 2003, p. 40).[37] Such a rule, though, is insufficiently forward looking. The increase in the contribution rate would come only a few years before assets started to decline and would require steady increases in the contribution rate beyond that date. A more sustainable adjustment rule would be to set contribution rates at a level that ensured a stable level of assets at the end of a 75-year projection period. On that basis, and assuming average growth of 3 per cent, the contribution rate would need to be raised to 28.4 per cent immediately. Alternatively, pension expenditure could be lowered by 15 per cent. However, the extent of the needed parametric reforms could be moderated by measures encouraging greater labour force participation.

Luxembourg has considerable scope to encourage greater labour force participation amongst those close to the official retirement age (see Chapter III). Currently, the effective age of withdrawal from the labour force is around eight years before the official standard age of retirement at 65. A principal pathway to early retirement was through disability pensions, which in the mid-1990s were received by almost half of all new pensioners (Figure 13). A number of court rulings up to 1996 resulted in criteria for eligibility for this route to inactivity being applied more severely, halving the number of new pensions granted and resulting in a fall in the total number of pensions in payment from 1999. A further reform was introduced in 2002, offering a new route back to employment for partially disabled people. Another route for retiring before the standard age of retirement at 65 is the early retirement pension (*pension de vieillesse anticipée*). This pension is available after 40 years of actual contributions from age 57, or after 40 years of actual and imputed contributions from age 60.[38] It is paid at the same rate as if the retiree had taken the pension at the official standard age of retirement. This route to retirement is taken by two-thirds of all men but only one-third of women, as women have fewer years of contributions. Nonetheless, the average age at which a

Figure 13. **Type of pension for first claimant**



Source: Inspection générale de la sécurité sociale (IGSS), 2002.

long-term pension is drawn is the same for women as men, as a much higher proportion of women than men take a disability pension. Unemployment duration is also longer amongst those approaching the eligible retirement age, though the authorities are trying to help older unemployed workers to find a new job. However, achieving greater labour force participation of the elderly is proving to be difficult. A scheme introduced in 1999 to encourage older workers to work part-time as a transition to retirement failed to attract a single applicant.

Conclusion

The pension system in Luxembourg offers retirees an exceptionally generous pension, effectively eliminating any decline in resources on retirement. Over the very long term, the system would not appear to be sustainable with current contribution and benefit levels, though the scale of the required adjustment is not large provided that the economy continues to grow at 4 per cent. However, the current adjustment rules will result in a delayed adjustment and place extra burdens on future generations. The authorities should adopt a more forward-looking rule aimed at stabilising the contribution rate and asset levels of the system over a much longer time period. In this context, the pension increases, adopted in 2002, went in the wrong direction. The future of the pension is more vulnerable to shocks than most, as the economy is very specialised. This suggests a prudent view of the future should be adopted, favouring the accumulation of assets. Over time, some lowering in replacement rates might be considered, especially as income adequacy is ensured via the minimum pension. Secondly, incentives for early retirement should be eliminated by lowering early retirement pensions on an actuarial basis in relation to a pension taken at the official retirement age (to reflect the longer expected payment period) and by reducing the ease with which imputed contributions can be obtained. Thirdly, the standard retirement age (and the minimum number of years of contributions) should be indexed to rising life expectancy. The authorities should carefully monitor the recent reform of eligibility requirements for disability pensions and should act to prevent other routes being used as substitute pathways for early retirement.

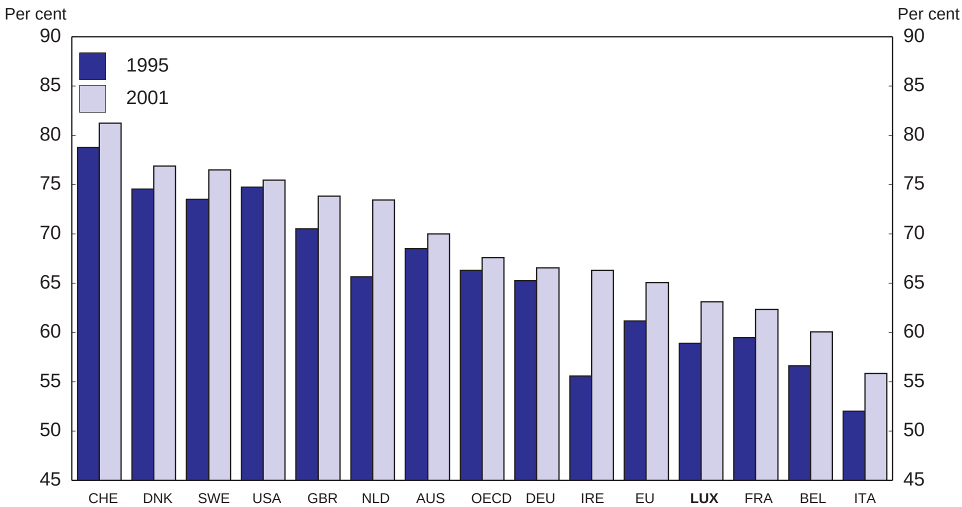
III. Policies to strengthen growth in national income

Luxembourg residents have benefited from high economic growth based on the intensive use of inputs of foreign capital and labour, which has generated tax receipts that have helped to finance very generous social benefits and an expansion in well-paid public sector jobs (see Chapter IV). In addition, high growth in cross-border employment has provided a buffer for the national (*i.e.* resident) labour market in the event of adverse economic shocks, helping to keep structural unemployment low despite labour-market institutions that in other OECD countries have contributed to large increases in structural unemployment. In the likely event that medium-term growth in the future is lower than in the past, reflecting a normalisation of prospects for the financial sector, growth in taxes will be less and a higher proportion of the burden of adjustment to adverse labour-market shocks will fall on residents. This chapter discusses policies that could help to attenuate the decline in growth in national income and facilitate national labour-market adjustment to adverse shocks. These focus on increasing the employment rate, improving the performance of the education system, increasing the efficiency with which government achieves its objectives, including sustainable development, and increasing competition in the provision of internet services.

Increasing the employment rate, especially for older workers

While the legal retirement age is 65 as in most other OECD countries, premature withdrawal from the labour force represents the rule rather than the exception (see also Chapter II). The employment rate, which is 75.7 per cent for persons aged 45-49, drops to 66.1 per cent for the age group 50-54, to 39.3 per cent for the 55-59 group to reach a meagre 8.9 per cent for persons aged 60 to 64. While the differential between the latter two age groups is mainly due to the early retirement pension (*pension de vieillesse anticipée*) becoming available to most persons after 60, the disability pension accounts for the majority of persons who stop working before age 60. Because of low employment rates for older workers the overall employment rate is below the EU average (Figure 14). To move closer to an

Figure 14. **Employment rates in selected OECD countries**



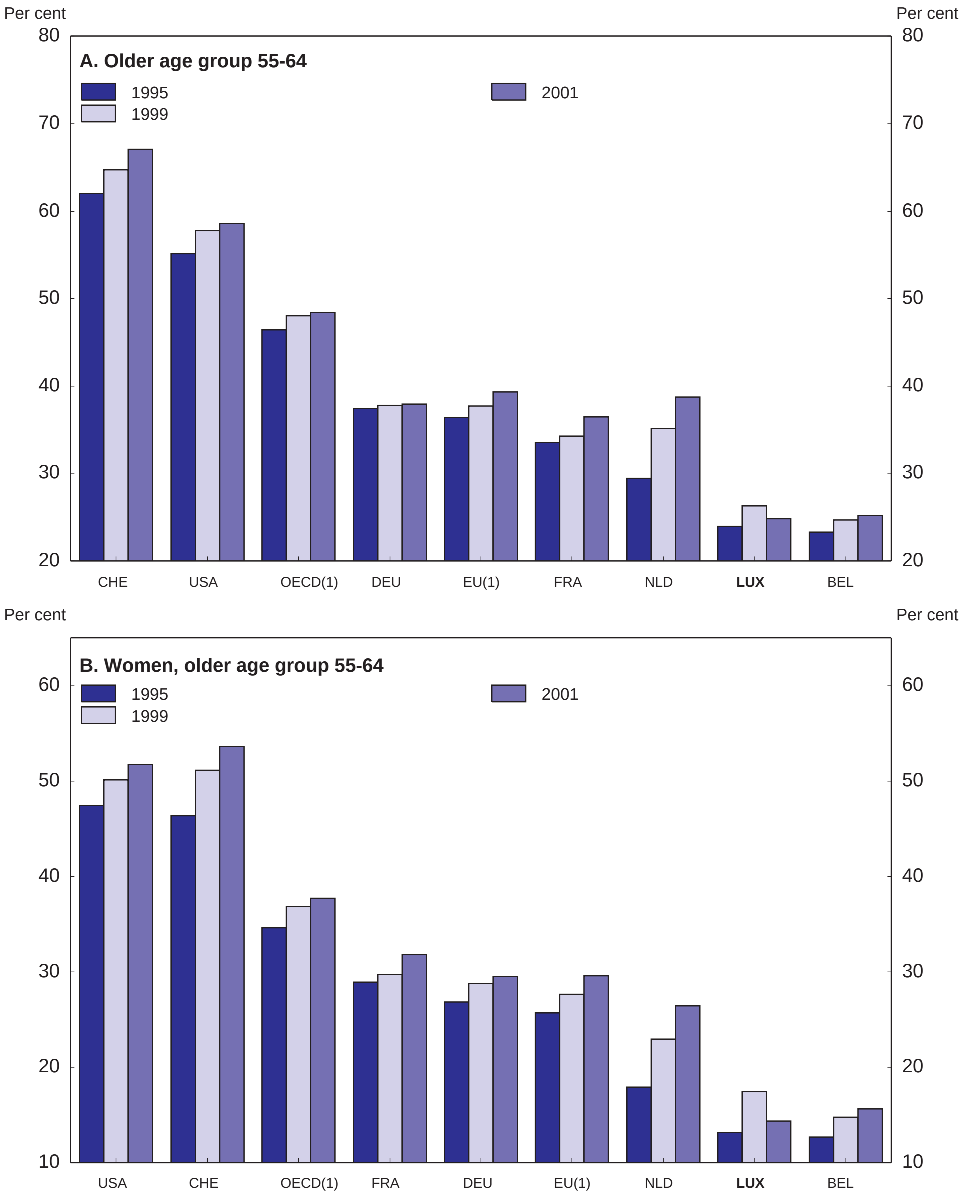
Source: OECD, *Labour Force Statistics*, Part III.

overall employment rate of 70 per cent, the target for the member states of the European Union in 2010, it will be necessary to raise the employment rates among those groups where they are particularly low today, especially among older workers. Only one out of four persons aged 55 to 64 worked in 2001 (Figure 15, Panel A). At 14 per cent, the employment rate for women in this age group was particularly low (Figure 15, Panel B), heavily contributing to the overall female employment rate falling 3½ per cent short of the EU average and about 9 per cent short of the Lisbon target of 60 per cent for the year 2010. A large part of this shortfall will disappear over time as today's prime-age women have much higher employment rates than earlier cohorts had (cohort effect).[39] Nevertheless, substantial action is required in narrowing significantly the routes to premature withdrawal from the labour market so as to move closer to another key element of the Lisbon strategy, an employment rate of 50 per cent for older workers by 2010. Compared with other laggards, Luxembourg has made little progress in this respect over the past years.[40]

Access to the disability pension has been tightened…

The share of persons taking a disability pension as the first long-term pension[41] has decreased over time, starting from extremely high levels (see

Figure 15. **Employment rates of older workers**



1. Simple average.
Source: OECD, *Labour Force Statistics*, Part III.

Chapter II). Several court rulings up to 1996 found that a person unable to carry on the occupation of the last post is not necessarily disabled in a general sense, an idea disregarded in the very generous administrative practice (Wagener, 2003).[42] Since then, disability has gone from being by far the most important route to the premature withdrawal from the labour market to being about equally as important as the early retirement pension (*pension de vieillesse anticipée*), the other main route to early retirement. Nearly 70 per cent of all beneficiaries of a disability pension were aged 55 to 64 in 2000, representing 32 per cent of the population and 1.16 times the national labour force in this age group, which is extremely high by international standards.[43] The government further reformed access to the disability pension by a law that came into force in October 2002. It makes a clearer distinction between occupational disability and general disability, making the latter a solution of last resort, and pursues two broad objectives. First, it further tightens the control procedure to prevent abusive take-up of benefits. Second, it establishes a new redeployment procedure for persons unable to continue in their last job but able to stay in the labour market (Box 2).

The 2002 reform is a major step towards limiting the abuse of the disability pension as a route to early retirement. The willingness to keep persons with reduced capacity in the labour market and the mix of incentives and supportive actions based on mutual obligations is in line with the strategy of a successful disability policy mix recommended in a recent comparative study of 20 OECD countries (OECD, 2003b), as are other elements of the reform. Specifically, major efforts are undertaken to recognise the status of disability independently from the work and income situation and from potential early-retirement motives shared between the employer and the employee. Furthermore, it involves employers in the process, promotes early intervention, makes cash benefits a flexible policy element, strengthens programme administration and shifts the focus of disability programmes from early retirement ("compensation") to active labour market policies ("integration").

After six months it is too early to assess the effectiveness of the reform in raising labour force participation of persons aged 50 and more. Nevertheless, it is important to identify potential weaknesses in the approach and to correct them, should the reform fail to bring down the inflows into disability pension significantly. First of all the medical decision that opens the door to the disability pension or keeps it closed (stage two) needs to be monitored very closely. The medical criteria of assessing general inability to work have not been changed for the time being. The substantial improvement of assistance to persons with reduced work capacity would justify a more restrictive treatment of applications for the disability pensions.[44] This would be a necessary signal to bring the number of first claims more in line with the number of persons who really have completely lost their ability to work.[45] A second concern is the number of persons in external redeployment that cannot be placed.[46] The higher it is, the higher the fiscal cost of

Box 2. The 2002 law on occupational disability and redeployment

In October 2002 a law came into force that strengthens the monitoring of persons on long-term sick leave and reforms the procedure of assessing their ability to work. It launches an ambitious redeployment procedure for claimants of a disability pension not disabled in a general sense, thereby extending the examination of claims for invalidity pension to four stages.[1] A prolonged sickness leave now leads to a compulsory medical examination by the Medical Control of the Social Security within the first four months (stage one).[2] When the worker applies for a disability pension (stage two), a second medical examination is carried out, leading to acceptance or rejection. In case of rejection, an independent medical control by the Occupational Medicine Department (Ministry of Health) determines whether or not the person can return to their last job. If he/she cannot, the new redeployment procedure is launched (stage three). Priority is given to internal redeployment: If the residual capacities of the claimant allow for it and her company has more than 25 employees, the employer has to provide him/her with another post or a smaller workload, unless he can prove that this would come at an excessive cost. A newly created Joint Commission decides on internal *versus* external redeployment and the needs of rehabilitation, vocational re-training and special equipment.[3] If internal classification is not possible, a new department in the placement agency helps workers with reduced capacity to find a suitable job in another company. During the process, the claimant receives regular unemployment benefits and has the same obligations as a regular unemployed person. If the search is not successful within the maximum benefit duration (see below), the claimant must stay ready to react to job offers and receives a waiting allowance, the amount of which equals that of the regular disability pension (stage four). Although the medical criteria for drawing an invalidity pension have not been changed, access to a general (*i.e.* full) disability benefit has been made more difficult in practice because the assessment of the general ability to work now precedes any application for a pension and because of the enhanced placement efforts under the law for partially disabled workers.

Employers and employees involved in redeployment are given financial incentives. The employee (whether on internal or external redeployment) gets a compensatory benefit (*indemnité compensatoire*) to reach exactly the same salary as before the redeployment and enjoys special protection from dismissal during one year. Employers proceeding to internal redeployment or those hiring a person with reduced work capacity enjoy the same income tax credit as when hiring an unemployed person. Moreover, outlays for additional training and equipment are reimbursed. Furthermore, reclassifications (of any kind) that offer jobs to persons with reduced capacity count against the company's employment quota for handicapped persons. This could allow employers currently paying the penalty for not fulfilling this quota to reduce or eliminate these payments. However, non-compliance with an internal redeployment obligation leads to a penalty equivalent to 50 per cent of the statutory minimum salary (*salaire social minimum*), payable for up to 24 months.

1. The text of the law is published in *Mémorial* (2002, pp. 1667-72).
2. The duration of sickness leave payments is limited to 12 months. Depending on the diagnosis, sickness leave payments may be stopped or a further examination scheduled for a later date. Depending on the diagnosis, sickness leave payments may be stopped or a further examination scheduled for a later date.
3. The documents on which these decisions are based include two medical assessments (of the residual work capacity and the feasibility of internal redeployment), an analysis of the company's general compliance with the law on the integration of handicapped persons and, where appropriate, the employer's reasons why an internal redeployment would be excessively costly. The Joint Commission is composed of representatives of insured persons, the employers, the Medical Control of the Social Security, the Occupational Medicine Department, the Ministry of Employment and Labour and the Employment Administration (*Mémorial*, 2002, pp. 2852-54).

the reform, the lower its effectiveness with respect to the employment rate and the greater the risk that ending up as a long-term unemployed with a generous waiting allowance becomes just as attractive as the current disability pension itself, given that placement offers would become less likely as search time goes by. This undesirable outcome should be avoided by strengthening the financial work incentives of potential applicants. Therefore the replacement rates should be lowered to less than the 100 per cent currently granted at all stages of the redeployment process.[47]

... but use of special pre-retirement arrangements has grown more important

Most of the successful cutbacks of inflows to the disability pension came at the cost of a more extensive use of early and pre-retirement arrangements, thereby limiting the beneficial effect of disability pension reform on the employment rate. This was partly because workers that formerly would have qualified for the disability pension met the full-career requirement of the "regular" early retirement scheme (see below) and partly because the use of special pre-retirement arrangements became more widespread. For men these cover approximately 10 per cent of the age group 55-59. These schemes are granted on grounds of structural adjustment, especially in the steel industry (*préretraite-ajustement*, 79 per cent of all beneficiaries by the end of 2001), by virtue of a collective bargaining agreement or an agreement between the company and the Ministry of Labour and Employment (*préretraite-solidarité*, 12 per cent of beneficiaries) and for night and shift workers (9 per cent).[48] All these schemes have in common that they are open to workers who require no more than three further years of contributions to qualify for an early retirement pension (*pension de vieilllesse anticipée*) and are aged at least 57. Benefits are paid by the employer but partly (*préretraite-ajustement*, *préretraite-solidarité*) or even fully reimbursed by the Employment Fund. Replacement rates for the beneficiary are 85 per cent (first year), 80 per cent (second year) and 75 per cent (third year), respectively, and are generally based on the average gross wage received by the employee during the last three months.[49]

Persisting obstacles to higher employment rates of workers aged 60 or more

While the reform of access to the disability pension and the issue of pre-retirement arrangements mainly concern persons aged 50-60, the incentives to work beyond that age remain extremely low due to very generous "regular" early retirement arrangements (*pension de vieillesse anticipée*). Persons with 40 years of social security contributions (including periods of education, childcare, *etc.*) can retire at 60. As all years spent in education from age 18 to 27 and eight years for bringing up two children (ten for three children, *etc.*) are imputable, it is generally very easy to meet the full-career requirement before the standard retirement age (65). Persons with 40 years of actual (as opposed to imputed) contributions can retire at age 57.[50] The combination of employees' and big employers' strong preference for early retirement and the ready availability of cross-border workers (making ageing-related labour shortages unlikely) makes it politically more costly than elsewhere to extend working lives through reform of the retirement system. However, other policies to achieve higher labour force participation among the elderly are bound to fail as long as there are tax-subsidised routes to early withdrawal from the labour market with present values higher than those earned when remaining employed. Hence, as the prerequisite to additional labour-market policies towards older workers, public subsidisation of pre- and early retirement should be ended by phasing out pre-retirement arrangements and by making the take-up of an early retirement pension actuarially fair in relation to a pension taken at age 65. As outlined in the last *Survey*, one such additional policy consists of preventing or cushioning the decline in productivity towards the end of the career by maintaining existing competencies and building up new ones through continuing training and education. A sufficiently long pay-off period is required to motivate employers and employees to engage in such activities, which were found to be low for persons aged 45 and over in Luxembourg. An additional way of narrowing the differential between wages and productivity for older employees consists in allowing companies to link pay rises and promotion to competence and performance rather than seniority, thereby making it more attractive for employers to keep older workers.[51] On the labour supply side, granting easier working conditions or shorter hours is only attractive if at the same time withdrawal is made unattractive. These policies should therefore be seen as complements rather than substitutes to reforming the incentives in the pension system.

Reducing the risk that increases in unemployment become structural

Increasing incentives to work for the unemployed

Lower overall employment growth than in the past would reduce the shock-absorber role played by cross-border workers (OECD, 2001a), increasing the proportion of adjustment to adverse labour market shocks that would fall on residents. In these circumstances, high replacement rates for unemployment benefit and social assistance (*Revenu minimum garanti*, RMG) and unlimited duration of the latter increase the risk that adverse shocks result in lasting increases in unemployment (Blanchard and Wolfer, 2001; IMF, 2000). Unemployment benefit is 80 per cent of the last wage up to 2.5 times the minimum statutory wage (*salaire social minimum*, SSM), falling to twice the SSM as from the seventh month. Its duration is 12 months, with a possible extension of 6-12 months for unemployed persons aged 50 or more; this is the only difference in the treatment of older unemployed. The RMG is approximately two-thirds of the statutory minimum wage, which in turn is around one-half of the average production worker wage (APW). For a single-earner couple with two children, these arrangements yield a net replacement rate of 75 per cent after five years of unemployment where the last wage was the APW and of 92 per cent where the last wage was two-thirds of APW (Table 8). These replacement rates are high by international comparison. High rates of withdrawal of RMG as income rises – the marginal effective tax rate can exceed 100 per cent[52] – also discourage the long-term unemployed from working.

Table 8. **Net replacement rates 60 months after claiming benefit, 1999**[1]

	APW-level				66.7 per cent of APW-level			
	Single	Married couple	Couple 2 children	Lone parent 2 children	Single	Married couple	Couple 2 children	Lone parent 2 children
Australia[2]	33	29	62	47	45	39	77	59
Austria[2]	55	57	72	69	58	59	78	74
Belgium[2]	45	57	68	69	60	80	84	86
Canada	24	41	62	60	35	57	81	80
Czech Republic	37	60	80	74	54	84	100	96
Denmark	60	69	80	79	85	96	102	97
Finland	53	71	89	62	73	92	100	69
France[2]	30	28	42	43	43	41	59	60
Germany[2]	54	52	65	63	63	61	71	71
Greece[2]	8	8	10	11	8	8	11	12
Hungary	28	28	38	40	28	28	39	41
Iceland	50	74	87	65	68	97	104	80
Ireland[3]	31	43	56	56	41	59	66	64
Italy[4]	0	4	18	14	0	5	21	17
Japan	33	47	68	61	49	69	87	84
Korea	6	11	18	16	9	16	27	23
Luxembourg	**50**	**67**	**75**	**59**	**70**	**92**	**93**	**82**
Netherlands	60	69	71	61	74	83	85	76
New Zealand[2]	39	53	68	64	57	79	87	79
Norway	43	52	62	58	53	73	83	69
Poland	33	50	74	56	48	72	93	81
Portugal[2]	49	60	63	64	70	86	87	87
Slovak Republic	38	62	80	60	54	90	100	100
Spain	23	28	39	37	32	40	57	51
Sweden[5]	54	71	85	49	79	102	110	70
Switzerland	54	68	75	69	78	99	100	96
United Kingdom	46	57	80	71	66	80	88	81
United States	7	12	46	38	10	17	59	48

1. After tax and including family and housing benefits for long-term benefit recipients.
2. Net replacement rates (NRRs) are based on social assistance (SA) except in Australia, Austria, France, Germany, Greece, New Zealand, and Portugal, where NRRs are based on unemployment assistance (UA), and in Belgium where unemployment insurance (UI) benefits at reduced rates are available for long-term unemployed. In Portugal, UA lasts only for 24 months after 24 months of UI benefits.
3. Housing benefits are not included due to very small number of recipients.
4. Social assistance (*Reddito Minimo di Inserimento*) is not included in NRRs due to its experimental character (on trial in 39 municipalities). NRRs are based on family benefits.
5. People in work are not entitled to social assistance.

Source: OECD tax-benefit models.

Making sound use of active labour market policies

Active labour market policies (ALMP) are quite resource-intensive, given the coverage of virtually all persons unemployed for more than six months. Yet they meet two important criteria for success: the frequency of contacts between placement services and the unemployed is high; and training measures are tailored to firms' needs. Firms are involved in the choice of contents, participants and sometimes teachers of "training workshops", which are often followed by "recruitment workshops", leading to a higher degree of commitment towards the unemployed trainees. Another pillar of ALMP in Luxembourg is the system of government-sponsored jobs on "work activation contracts" (CAT). In about two-thirds of these cases, CATs participants find a job or cease to be registered for other reasons. It will be important to maintain this approach of intensive enforcement of job search obligations and follow-up of the unemployed with ALMP so as to reduce the risk that adverse labour market shocks lead to a lasting increase in unemployment.

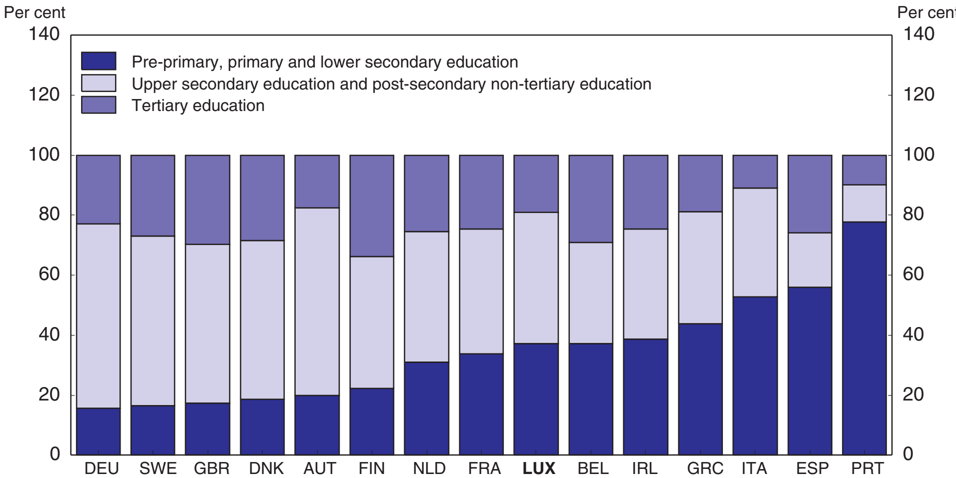
Improving the performance of the education system

Raising education achievement and attainment is a key factor in ensuring growth in national income and in improving Luxembourg's ability to adjust employment to structural change and strengthen its resilience in the event of adverse labour market shocks. There would be a considerable payoff from equipping each secondary school leaver with a set of firm reading, writing, computational, scientific and foreign language skills. For the time being, the system teaches too much material too superficially, leading to an inadequate mastery of the basics. There is an urgent need for improving student achievement, which was shown to be poor in the PISA study, where Luxembourg ranked 30th out of 32 countries in the field of reading proficiency (OECD, 2001b). At the same time the difference between high and low performers was found to be high, too, reflecting, *inter alia*, high dropout rates for students in technical secondary education (*Enseignement secondaire technique*). Low achievement and high numbers of dropouts slow down the process of raising education attainment, *i.e.*, the highest level of initial education achieved, which was traditionally low by international standards (Figure 16), partly reflecting schooling patterns of the past, when high attainment was less crucial to maintain lifelong employability.

Low average and high variance in schooling performance

The PISA study identified three major types of factors affecting the performance of 15-year-old students: the socio-economic and cultural background, school-and-classroom factors, and the efficiency in the use of resources devoted to the education system. Luxembourg will need to act on all three fronts to overcome the weaknesses raised by the study. As to socio-economic backgrounds, the

Figure 16. **Education attainment of the population aged 25-59, 2002**[1]



1. 2001 for Ireland.
Source: Eurostat, *Population and social conditions*.

education system in Luxembourg succeeds less than those in other countries in correcting inequalities in initial family conditions,[53] suggesting that it could lift its average performance if it were to mitigate the impact of the socio-economic background on student performance. At the moment, a given difference in the socio-economic and cultural background affects performance more strongly and explains more of the variance in performance than in most other OECD countries (OECD, 2001b, p. 308). Specifically, the background factors that were found to drag much more heavily on performance in Luxembourg than in the OECD on average were: being of foreign nationality (also see Chapter IV), and disposing of less educational resources as well as cultural possessions at home.[54, 55] The fact that foreign students born in Luxembourg performed only marginally better than those born abroad makes it clear that the education system needs to improve outcomes of students with unfavourable family background factors.

Reducing the school dropout rate is key to preserve long-run employability of the workforce

The challenge facing the Luxembourg education system consists in mitigating the effect of sometimes very diverse socio-economic and cultural

Box 3. Main features of the non-tertiary education system

The education system comprises a six-year primary school curriculum and a phase of secondary education broadly divided into a more academically-oriented branch (*enseignement secondaire*) and a practical/vocational branch (*enseignement secondaire technique*, EST) that is itself strongly diversified leading to five different diplomas in scientific, technical and vocational fields after five to seven years. Lower-secondary education lasts three years and, although it is already quite diversified, at the end redeployment into any other school type is possible in principle. Compulsory schooling ends at age 15 but the first vocational training diplomas are delivered after five years of secondary school at age 18, leading to a significant number of school-leavers without any diploma. The languages of education in secondary education are French and German. Although they may change from one school year to the next in the same subject, the use of French is higher in the academic branch, while the vocational branches of the EST are more tilted towards German.

backgrounds on education achievement without accepting a further decline in average performance. Secondary education, usually starting at age 13, is divided into a more academically oriented branch and a practical/vocational branch (Box 3). Failure is particularly high in the less performing streams of the first years in the vocational branch, where immigrants are over-represented, and may originate from language mismatch, as these streams use German more intensively as the instruction language. Parliament wants to maintain Luxembourg's unique multi-lingual approach to education – German and French as teaching languages and structured teaching of *Lëtzebuergesch* at the pre-school and early primary school levels – but aims at reducing the cost of this approach. A new draft regulation will introduce the option of forming classes with a single linguistic regime in the practical/vocational branch. This should be particularly helpful for students from Romance-language homes. This language-of-instruction reform is part of a more thorough overhaul of the lower vocational cycle including, *inter alia*, a reform of teaching foreign languages. One of the other issues under debate was to give less weight to writing in assessing a student's linguistic and communication skills and to base the assessment on the three aspects of understanding, talking and writing, given that this might be more representative for the basic skills required from future blue-collar workers. While this might help particularly disadvantaged children (especially non-native-speakers) to escape from dropping out under the current system, it also entails the risk of further lowering the general level of student performance in writing and reading. Given that blue-collar workers are particularly hit by technical progress and structural change, it is important to provide everyone with sound basic skills to ensure that he can adjust to changing job environments later in his life. Participation in continuing training and education, a further vehicle to ensure employability over time, is also positively correlated with the level and the quality of initial education.

Despite the recent reform in the practical/vocational branch, Romance-language children still have the challenge of learning to read and write in German. More care should be taken that difficulties associated with this do not lead to significant delays and discouragement effects. Plans of intensifying help for weaker students in primary school should be carried out without delay. It would be even better to give parents a choice between French and German as the language of alphabetisation. Such a choice would match the importance of French in economic life much better, as the overwhelming majority of private sector jobs are dominated by the use of French. More importantly, it would significantly reduce the linguistically driven performance differences between children at the end of primary school, allowing for a less excessive performance-based streaming within the practical/vocational lower-secondary stream, which have been identified as being problematic. The authorities have proposed a project that would enable children to learn to read and write in German or French, but could not find a single municipality willing to put it into effect. The central government should take the necessary steps to ensure that such programmes are offered.[56]

The institutional design of education policy should be reengineered to foster performance

Besides family background and linguistic issues, school factors and high-level institutional assignments clearly matter in the education system to get the incentives of all players right, *i.e.* to tilt them towards higher performance and lower dropout. As to school factors, PISA found intensive use of available school resources (*e.g.* libraries, computers), a not-too-high student-teaching staff ratio, not too small schools (performance is generally on the rise with school size expanding up to 1 000 students) and a high proportion of teachers with a university-level qualification in the relevant subject domain to be conducive to better student performance. Within classrooms, teacher-student relations, the disciplinary climate and teachers' pressure on student achievement, as perceived by students, were the variables affecting student results. Finally, there are elements of school policies and practice impinging on performance: For the OECD as a whole, these were teacher-related factors affecting school climate,[57] teachers' morale and commitment and school autonomy (see below). Based on these observations, the weaknesses in Luxembourg appear to lie in insufficient use of available school resources, teacher-related factors affecting the school climate, school autonomy, student-teacher relations and a lack of achievement press (Table 9).

Table 9. **School-level indices in selected OECD countries**[1]

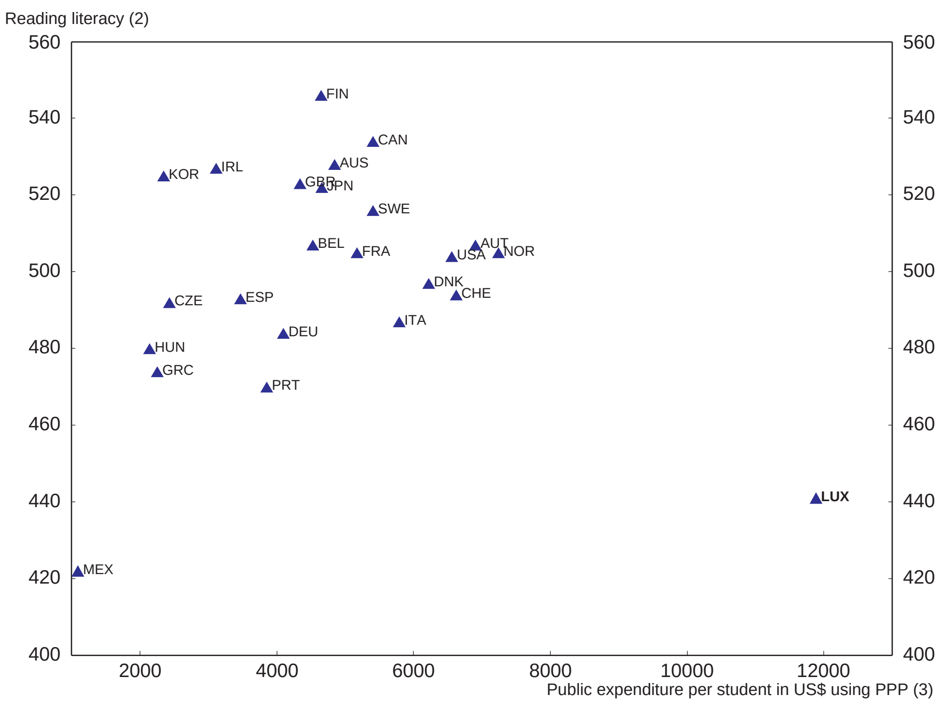
	Student-teaching staff ratio[2]	School size[3]	Tertiary-level qualification of teachers[4]	Students use of school resources[5]	Teacher-related factors affecting school climate[5]	Principals' perception of teachers' morale and commitment[5]	School autonomy[5]	Teacher-student relations[5]	Disciplinary climate[5]	Achievement press[5]
Australia	9.9	5.6	7.5	7.5	4.9	5.1	5.9	6.1	4.8	5.7
Austria	9.8	3.6	9.0	5.3	4.9	6.4	4.4	4.1	5.8	4.3
Belgium	9.8	4.5	3.1	3.9	4.8	4.5	5.8	5.2	4.5	4.3
Canada	9.7	5.2	6.8	6.5	4.9	5.2	5.7	5.8	4.3	5.9
Czech Republic	10.0	3.3	8.7	3.5	6.2	4.4	7.8	4.6	5.7	4.4
Denmark	10.0	2.8	6.0	7.9	6.5	5.0	6.2	5.8	4.2	5.2
Finland	10.0	2.4	8.3	5.0	4.6	4.9	5.3	5.7	4.4	5.7
Germany	9.9	4.2	6.3	4.4	4.4	4.9	3.9	4.0	5.3	5.0
Greece	10.0	2.0	7.0	3.0	2.9	5.7	3.1	4.3	3.4	4.3
Hungary	10.0	3.5	9.7	4.4	6.2	5.9	6.9	5.4	5.6	5.7
Iceland	10.0	2.0	2.3	6.1	5.3	5.3	6.5	5.0	5.0	6.4
Ireland	9.9	4.1	9.5	4.2	4.8	5.2	4.9	5.3	5.3	6.1
Italy	10.0	3.9	8.6	3.5	5.6	3.7	2.4	4.5	3.5	5.9
Japan	10.0	7.3	9.8	2.7	5.3	4.7	5.4	3.6	6.3	0.9
Korea	9.9	7.3	7.7	3.5	5.7	4.1	4.6	5.2	5.2	4.0
Luxembourg	**10.0**	**8.5**	**7.8**	**4.2**	**3.7**	**5.0**	**3.7**	**3.4**	**3.5**	**3.4**
Mexico	8.1	3.1	2.5	3.9	4.4	5.9	4.3	5.3	5.9	4.7
New Zealand	10.0	5.5	7.1	6.5	4.6	5.0	6.7	6.0	4.7	6.0
Norway	10.0	1.0	4.4	6.7	4.6	5.1	5.1	4.4	4.0	5.1
Poland	10.0	3.1	9.8	4.7	5.2	3.8	5.1	2.9	6.1	5.7
Portugal	10.0	5.7	9.8	4.8	4.3	4.0	1.5	6.2	4.5	5.1
Spain	9.9	5.1	7.4	3.9	5.4	4.5	3.8	5.0	4.3	5.0
Sweden	10.0	4.0	6.2	7.8	4.7	5.6	6.1	5.9	4.2	5.4
Switzerland	10.0	2.3	3.2	4.7	5.3	6.2	3.9	5.6	6.2	4.9
United Kingdom	10.0	6.8	8.0	6.4	5.3	5.4	6.5	6.1	5.3	6.3
United States	10.0	3.6	7.5	5.8	5.2	4.6	5.6	5.8	5.4	6.0
OECD average	9.9	4.3	7.1	5.0	5.0	5.0	5.0	5.0	5.0	5.1

1. For each school variable, the table shows an index value on a scale of 0 to 10, representing the average for schools in that country. Higher scores are positive, *i.e.* at the international level associated with higher student performance in PISA.
2. Student-teaching staff ratios below 25 were given an index value of 10, ratios from 25 to 27.5 a value of 9, those from 27.5 to 30 a value of 8, etc.
3. Schools with 1 000 to 2 500 students were given an index value of 10, those with 900 to 999 students a value of 9, etc.
4. Percentage of teachers in school with a university tertiary-level qualification with a major in the respective subject domain. A percentage between 90 and 100 received an index value of 10, a percentage between 80 and 90 a value of 9, etc.
5. Variable is rescaled so that OECD mean equals 5, standard deviation equals 2, and outliers are given values of 0 or 10.

Source: OECD (2001b), p. 316.

As to institutional assignments, they play a major role in understanding cross-country differences in schooling outcomes according to recent empirical studies (Woessmann, 2001; Gundlach and Woessmann, 2001; Woessmann, 2003), whereas the level of total public expenditure, which is very high in Luxembourg, is uncorrelated with performance (Figure 17). This suggests that it is not a lack in resources but low efficiency in their use that contributes to Luxembourg's poor student performance. Among the institutions found to make a difference in international comparisons are: externally set performance standards, exclusion of

Figure 17. **Public expenditure on education and student reading literacy**[1]



1. Total public expenditure on pre-primary, primary and secondary education in 1999.
2. Mean performance of 15-year old students on the combined reading literacy scale as measured by PISA 2000. Reading literacy includes "retrieving information", "interpreting texts" and "reflection and evaluation". The scores are standardised to average 500 for the OECD as a whole, with standard deviation of 100.
3. For Luxembourg, the corresponding number is not available in OECD (2002a). The assumptions underlying the estimate shown are described in Annex II.

Source: OECD, PISA 2000, p. 253; OECD, *Education at a Glance* (2002), pp. 158 and 190; STATEC and OECD calculations.

teacher unions from setting centralised curricula,[58] school autonomy in hiring teachers and determining the pattern of pay and promotions, and competition from private schools. Centralised exams make it easier to tell whether poor results are the student's or the teacher's "fault", thereby making the system more transparent for parents, future employers and the government, and resulting in greater effort by students, teachers and headmasters. Luxembourg has centralised exams at the end of upper secondary school level and the government has installed an "observatory of quality" at the ministry. However, school autonomy, which is seen as an important instrument to allow schools to react better to individual problems of students and classes, should be improved. The issue of which powers exactly should be left to schools and which others are best decided upon centrally needs to be further clarified in the current debate. From the standpoint of economic incentives, some key decisions relating to performance standards and the content of curricula should remain with the central government, supported by pedagogic experts, in order to reduce staff's temptation to use autonomy to reduce their workload. The same is true for the budget envelope because it sets the standard for efficient use of resources. At the same time, schools and even teachers should remain free in how to achieve their performance and efficiency standards, suggesting that recruitment of teachers, salary policy, purchase of books and other supply should be decided by the school.[59] A new draft bill partly follows these guidelines by granting schools an overall budget envelope to be disposed of and some administrative autonomy in organising classes through "learning quotas". On the other hand, it decentralises 10 per cent of the curriculum. Furthermore, several pilot projects have been launched to promote pedagogic autonomy and find out best practices to reduce barriers to learning. Finally, competition from the private sector is low as independent private schools do not exist and only 12 per cent of students are enrolled in government-dependent private schools. Together with all stakeholders the government should allow internationally identified best practices to spill over into national policy, be they pedagogic innovations or performance-enhancing institutional rearrangements.

Increasing the efficiency with which government achieves its objectives

Increasing the efficiency with which government achieves its objectives would help to attenuate the decline in growth in national income. Less tax revenue would be required to finance government activities to achieve these objectives and, where they are to be achieved through regulating private sector activity, the burden of such regulation would be lighter. Although Luxembourg has begun to examine ways in which government efficiency could be increased, little progress has been made to date compared with other OECD countries. In part, this may be because high growth in government revenue in recent decades took pressure off the government to find more efficient ways to achieve its objectives, a situation that is unlikely to persist in the future.

Greater use should be made of cost-benefit and cost-effectiveness analysis

Cost-benefit or at least cost-effectiveness analyses are vital tools for government to achieve its objectives efficiently. Yet neither is used to any great extent in Luxembourg. Cost-benefit analysis is almost never undertaken and the stunning differences in marginal costs of achieving given objectives, such as for climate change (see below), suggest that cost-effectiveness considerations are not given much weight either. Much greater use should be made of both tools. In doing so, the objectives that government is seeking to achieve would need to be clearly identified, providing an essential input for public sector management reforms and decisions on whether production needs to be in the public sector to achieve them.

Public sector management reforms, contracting out and privatisation

Reforms are underway or being considered to increase public sector efficiency by: shifting to accrual accounting, which is important for holding public sector managers accountable for their actions; creating units with greater managerial independence and accountability (although concerning only a small part of government expenditure); and budgeting for programmes rather than types of expenditure. These reforms represent the first building blocks in a systemic reform that would be required to increase public sector efficiency substantially.

While some progress has also been made in contracting out services for which enforceable contracts can be written relatively easily, there remains considerable scope to achieve economies through further contracting out. For example, some 70 per cent of Luxembourg City bus services are now provided privately. Further savings could be made by contracting out the remaining publicly provided services, both through strengthened incentives for efficient management and through market-determined wage rates: government sector bus drivers are paid much higher wage rates than their private sector counterparts. Community service obligations do not provide a rationale for continued public sector provision: these obligations can be included in the contracts made with private sector operators.

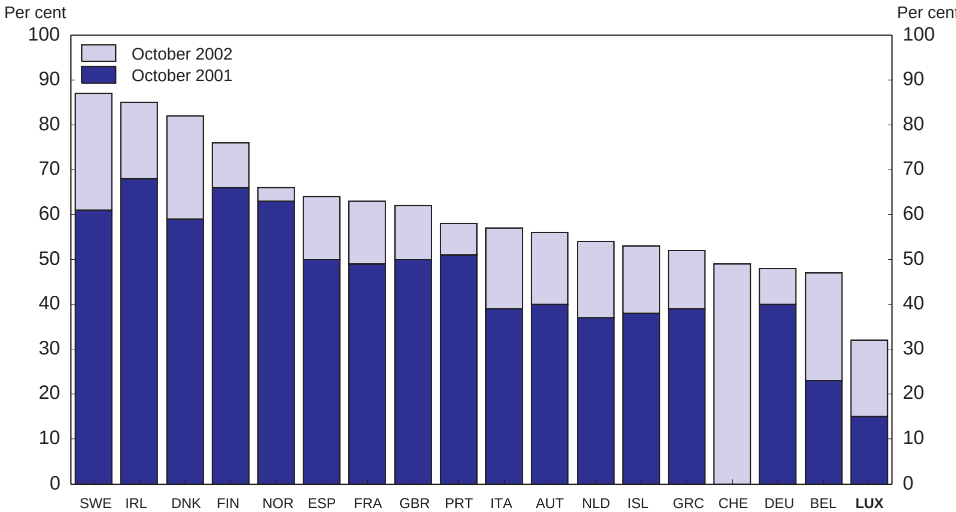
Luxembourg has not privatised former public sector monopolies, in contrast to most other OECD countries. In particular, the incumbent telecommunications operator, Luxembourg P&T, remains 100 per cent government owned. Similarly, postal services remain firmly in government ownership. It is not clear that the community service obligations that these enterprises may have necessitate public ownership to achieve them. Nor does the need to regulate a natural monopolist, as this is the responsibility of the Luxembourg Institute of Regulation (*l'Institut luxembourgeois de régulation*). One of the consequences of continued public ownership can be excessive salaries and hence costs of service provision. For example, a postman earns € 5 000 per month towards the end of his career, far in excess of salaries for workers with similar skill levels in the private sector. Another is that competition is undermined in the relevant market because public ownership confers on these enterprises a superior credit rating. The authorities would do well to clearly identify the objectives being pursued in the fields of telecommunications and postal services and to consider the most efficient means of achieving them. A problem with privatising these enterprises is that employees enjoy salaries and job security superior to what they could expect in the private sector. It could well be necessary to grandfather these advantages to advance with privatisation. At least this way, future employment contracts would not contain the substantial rent components in many current contracts.

E-*government*

E-government – defined as the use of ICTs, particularly the Internet, as a tool to achieve better government (OECD, 2003c) – provides another means for government to improve the efficiency with which it achieves its objectives, including by reducing the administrative burden (see below). Internet-based applications can generate savings on data collection and transmission, especially through greater sharing of data within and between governments, provision of information and communication with customers (*ibid.*). Luxembourg has made considerable progress in implementing e-government since its e-government project was launched in January 2001[60] but still lags all other EU countries (European Commission, 2003a) (Figure 18). On average, Luxembourg is still close to the stage of providing information, corresponding with an indicator of 25, but remains far off the higher levels that entail the exchange of information by e-mail (50 points), declarations provided with an electronic signature (75 points) or a full exploitation of all electronic possibilities (Cap Gemini Ernst and Young, 2002). In a recent government survey on e-government,[61] only a quarter of users said they were satisfied with the electronic information they got and half of the respondents said that they had problems with the readability of official information. In addition, much information was not available in the language users preferred. S*urvey* respondents said that they would be particularly interested in having on-line tax forms and the possibility to renew identity cards and register changes in their civil status electronically.

The lack of progress in implementing e-government compared with other EU governments seems to reflect a complicated consultative structure to deal with questions of responsibilities and accountability and a cautious approach to guaranteeing privacy and confidentiality. Many parties have to give their views on each plan,[62] reflecting a preference of the government for fully worked out blueprints over experiments with a less certain outcome, and arrangements to secure information adequately will not be in place until the end of 2004.[63] The sharing of competences between central government and municipalities has also been a barrier to progress in some fields, such as registering changes in civil status. An additional problem has been the lack of ICT experts to implement initiatives once they have been decided.

Figure 18. **Degree of sophistication of on-line public services**



Source: European Commission, 2003a.

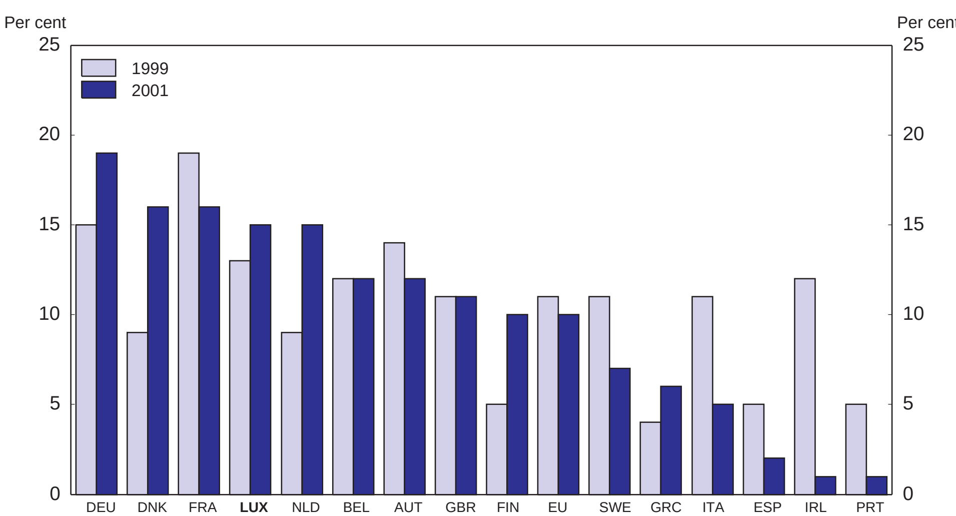
The government has raised the budget to buy hardware and software, to intensify ICT training, to develop interactive sites and to promote e-government. Every government ministry should have a home-page in line with the recently adopted templates by the end of 2003 (Ministry of public service and administrative reform, 2003). New sites are being developed for VAT, the national population register (*Registre National des personnes physiques*), government staff recruitment (*Recrutement du Personnel de l'État*), the business and company register (*Registre de Commerce et des Sociétés*), public procurement (*Marchés publics en ligne*) and job vacancies. In addition, a single-window interface for businesses is being developed (see below). The government expects that the spreading of e-government now underway, through the stages of interaction and electronic declarations, will raise the score of Luxembourg on the EU scoreboard every six months by some 10 points.

To reap efficiency gains from the more sophisticated stages of e-government that the government is now beginning to develop, it will be necessary to adopt a clear client focus and to make complementary organisational changes, as in the private sector.[64] Successful e-services require an understanding of user requirements and presentation of a seamless online service – users should not have to understand complex government structures and relationships to benefit from such services. Current frameworks based on the assumption that agencies work alone (*e.g.* performance management, accountability frameworks and the prohibition of data sharing) need to be modified so that they do not inhibit collaboration. And internal governance frameworks need to be reformed to facilitate greater teamwork, flexibility in working arrangements and remuneration and enhanced knowledge management practices. Finally, the government should consider e-government as an investment requiring new management rules and procedures, clear responsibilities and continued evaluation on the basis of user feedback [Social and Economic Council (CES), 2001a].[65]

Administrative reform

The administrative burden in Luxembourg appears to be relatively high. A higher percentage of SMEs consider that the administrative burden is a major constraint for business performance than they do in most other EU countries (Figure 19). The start-up of an enterprise – finding out which specific regulations are relevant in each case, understanding the norms, working out the specific actions they entail – requires more preparatory work in Luxembourg than in most other EU countries. In 2001, the registration of an individual enterprise took

Figure 19. **SMEs reporting administrative burdens as a major constraint on business performance**



Source: European Commission, 2001.

20 days in Luxembourg compared with 12 days on average in the European Union (European Commission, 2001a). Cost requirements for a start-up were also particularly high for individual enterprises.[66] Another factor contributing to SMEs unfavourable assessment of the administrative burden is the relatively high number of procedures required when recruiting the first and second employees.

Filling out forms still seems to be cumbersome for both enterprises and citizens. New legislation is not yet systematically subject to a so-called impact assessment, to measure the possible effects on the administrative burden. Forms are complicated and electronic tax declarations are not yet possible. In addition, many formalities seem to be unnecessarily complicated. For instance, citizens have to submit separate tax forms for income (once a year) and wealth (every three years). Furthermore, in surveys commissioned by the government itself, citizens have indicated that contacts with the administration should be improved by more flexible opening hours, forms in more languages and a more intensive use of e-mail. The government is well aware of the need for administrative reform in these and other areas where the quality of services needs to be improved (by more customer friendly helpdesks, timely responses to letters and more clearly written answers, for example).

Although the problems are evident, in Luxembourg solutions take a rather long time and are decided only after detailed studies on all aspects of a reform and after consultation of the many parties involved. Luxembourg has a special ministry for administrative reform, the Ministry of Public Service and Administrative Reform (*ministère de la Fonction publique et de la Réforme administrative*, MFPRA), which emphasizes the need to consult the citizens, to analyse thoroughly their needs and the expectations of civil servants involved, and to reconsider the rights of the government to interfere in the private lives of citizens.[67] Although this thorough approach ("*réflexion de fond*") may contribute to the quality of the solution, it is also likely to cause lags and complicate a flexible response in the future to unexpected circumstances. Another problem is that many competences are still spread across different institutions (CES, 2001b). Better co-operation is needed between the different authorities, who in several respects still operate independently from each other and have their own preferences concerning security and confidentiality. In November 2001, the MFPRA presented its new action plan for administrative reform and recognized the need for a better co-operation and a re-grouping of ministries around important issues. It also stressed the need to learn from best practices and benchmarking in other countries. The 2002 action plan for administrative reform included a large number of projects that are being prepared or implemented:

– A working group has been established to lower the administrative burden for SMEs in particular and to develop measures to check on the effect of new regulation on the administrative burden. A National Committee for the Improvement and Simplification of the Environment of Companies has also been created.[68]

– The government, in co-operation with the municipalities, also expects to take a major step towards reducing the administrative burden on business start-ups in 2003 by introducing one-stop shops (the *guichets uniques*).[69] The one-stop shop point should bundle formalities regarding aspects such as the submission of professional certificates, registration at the Chamber of commerce, payment of VAT and registration as an employer. In the future, it should be possible to handle all formalities for the start-up of an SME via the Internet.

– The government is trying to reduce the number of forms to be submitted to the tax office and the office for social security outlays. All official forms to be filled out by citizens and enterprises will be checked for readability, simplified and harmonised, and the number of additional pieces of information requested will be limited. The implementation of this project should start in 2003. On-line declarations are planned to follow later. A study is also being carried out on single data collection.

– The service whereby citizens and enterprises can use a free telephone number or the internet to contact the administration will be improved in 2003 by extra courses for civil servants. Projects are underway to introduce electronic payment and more flexible opening hours.

– Improvements in the quality of front-office services by the administration will be accompanied by an evaluation of back-office services, *i.e.* of the internal organisation of public institutions who deliver them. In 2003 the government has started to promote processes of self-evaluation.[70] By mid-2003, the MFPRA, which assists ministries that are interested in such an evaluation, is expected to report on the progress made and further steps to be taken.

In view of Luxembourg's lag in the field of administrative reform, a speeding up of procedures and the many projects that are in the pipeline is desirable, parallel to a speeding up of e-government. Priority should be given to electronic declarations as a means of lowering the administrative burden and to the application of best practices to assess the impact of legislative proposals. For both enterprises and citizens the administrative burden could be further lowered, as in Belgium, by giving them identification numbers (identification keys), which would allow the concentration of all information in one databank (a *banque carrefour*) that can be shared by different agencies within the public sector.

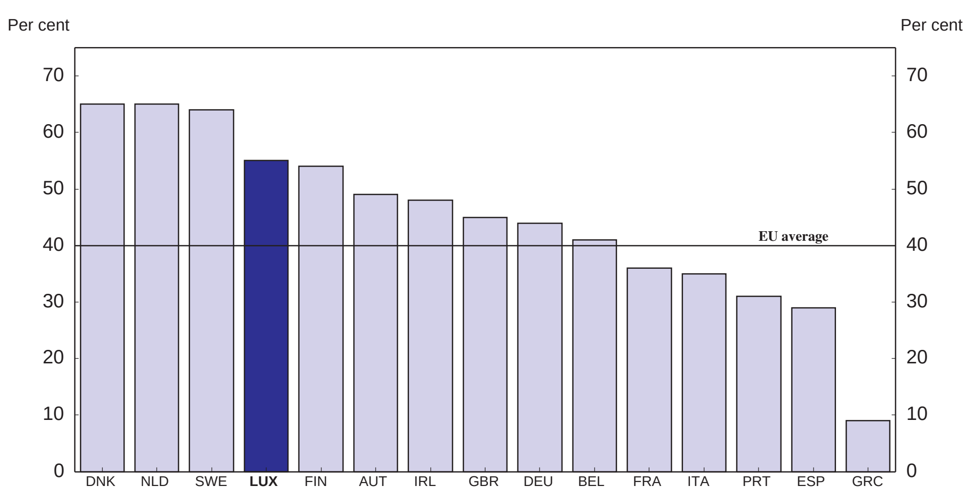
Improved broadband-internet access would help Luxembourg to reap the benefits of the knowledge economy

Use of the internet is central to efforts to reap the benefits of the knowledge economy, including by developing e-government (see above). While the percentage of households with internet access is relatively high in Luxembourg

(Figure 20), broadband access, which is associated with increased use of internet services and better quality of online experiences and capabilities of the services accessed, is one of the lowest in the OECD (Figure 21). This is mainly because broadband access prices are high (Figure 22).[71] The major problem seems to be a lack of competition both between DSL operators and between DSL and cable operators. In much of the country, only one operator (usually the incumbent telecommunications operator, Luxembourg P&T) offers DSL services. Where there is competition, competitors of the incumbent operator are constrained to charge high access prices by international comparison[72] because access prices to the local loop are high.[73] Effective competition from cable operators is limited by the fact that the incumbent telecommunications operator owns shares in the cable companies and/or jointly markets such services.[74] This has resulted in a situation where only 38 per cent of households have access to two-way cable services. Moreover, the speed of services offered [256 kilobytes per second (kbps) downstream, 64 kbps upstream] is not very high:[75] this is less than what broadband users have in most other countries and less than is available with DSL.[76] This has permitted DSL providers to offer only a low level of baseline service (256 kbps downstream and 64 kbps upstream), conforming to the international pattern of low service levels in countries where there is a lack of competition between independent cable companies and telecommunication carriers (OECD, 2003d). The

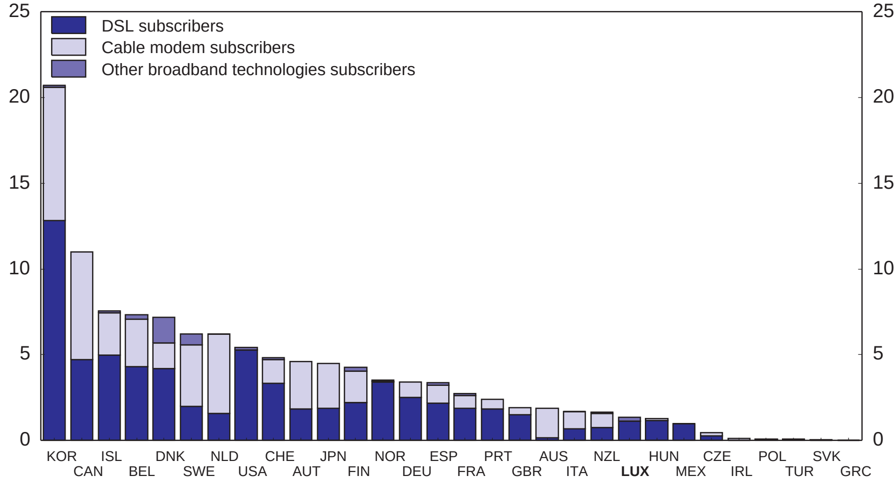
Figure 20. **Percentage of EU households with Internet access**

May-June 2002



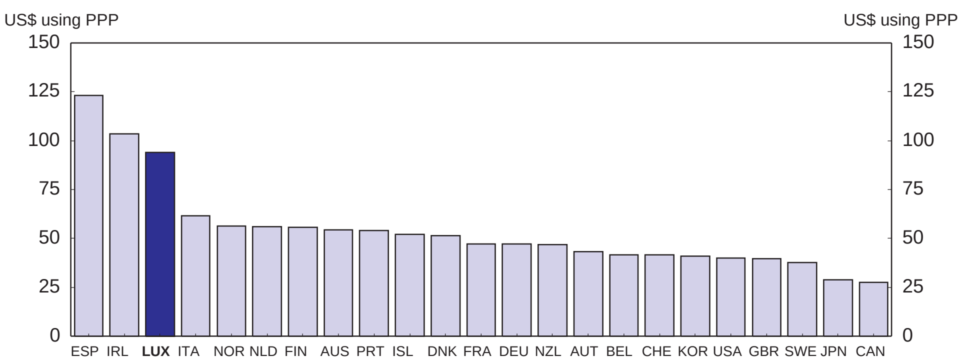
Source: Eurostat.

Figure 21. **Broadband access in OECD countries per 100 inhabitants**
December 2002



Source: OECD, Communications Outlook 2003.

Figure 22. **DSL Internet access prices in selected OECD countries**[1]
Monthly charge including VAT, September 2002



1. Speed of connection at least: downstream 500 kbps and upstream 128 kbps except for Austria and Luxembourg where the upstream speed of connection was 64 kbps. Connection speeds were significantly higher in Canada, Germany, Japan, Korea, New Zealand and the United States. There were additional usage charges (beyond a fixed number of megabytes per month) in Australia (1 000), Belgium (10 000), Canada (5 000), Hungary (0), Iceland (0), Ireland (3 000), New Zealand (500), Norway (0), Poland (0), Portugal (4 000) and Switzerland (6 000).

Source: OECD, Communications Outlook 2003.

regulator should remove obstacles to competition amongst Internet providers by imposing a reduction in access charges to the local loop and by insisting that the Luxembourg P&T withdraw completely from the supply of cable Internet services. This is necessary to ensure that cable Internet providers have clear incentives to develop their infrastructure to compete with DSL providers, which mainly means competing with Luxembourg P&T.[77]

Some aspects of sustainable development

There is a growing concern that long-run sustainable development may be compromised unless measures are taken to achieve balance between economic, environmental, and social outcomes both domestically and on a global basis. Three issues arising from the different dimension of sustainable development that are of particular importance for Luxembourg are reviewed in this *Survey*. In each case, indicators are presented to measure progress and the evolution of potential problems, and an assessment is made of government policies in that area. One of them – the fiscal and social sustainability of retirement incomes – is dealt with above (see Chapter II). The remaining themes (Luxembourg's policies in the realms of mitigating *climate change* and of *improving living standards in developing countries*) are considered below. The section also considers whether institutional arrangements are in place to integrate policy-making across the different elements of sustainable development (see Box 4).

Climate change

Main issues

Luxembourg has agreed to a cut of 28 per cent by 2008-2012 relative to 1990 under the EU agreement for the implementation of the Kyoto Protocol. This is the most ambitious abatement target of any OECD country. While there was a substantial reduction in GHG emissions in the 1990s, the main issue for Luxembourg is to ensure that climate change policies do not impose excessive costs on the economic pillar of sustainable development, given that the costs of domestic abatement are already high and set to increase in the future.

Performance

During the 1990s total GHG emissions fell by 23 per cent, the largest reduction in the OECD area over that period. This was mainly the result of one-off structural changes in the industrial sector, with the steel industry replacing coal-fired blast furnaces with more efficient electric arc processes and increased dependence on imported electricity (Table 10). By contrast, transport-related emissions of CO_2 increased significantly during the 1990s (Figure 23) and now account for the bulk of total emissions (around 60 per cent in 2000). Cross-border

Box 4. **The integration of policies across sustainable development areas***

In 1999, the government adopted a National Plan for Sustainable Development, which contains a number of indicative targets for the environmental, social, and economic aspects of sustainable development. The government is now considering adopting an accompanying law to give legal backing to targets identified in the National Plan. Policy integration is achieved on a case-by-case basis through inter-ministerial committees. The prospective creation of a National Council for Sustainable Development may assist policy integration in this area.

While environmental impact assessments are conducted in line with EC requirements, there is an absence of cost-benefit analysis of policy measures. This has contributed to the emergence of inefficient measures to meet government targets. However, the government has commissioned special studies on population increases and on transport and spatial development that analyse the impact on the environment and society. Notwithstanding these initiatives, climate change policy faces additional difficulties in meeting targets as a result of energy sector policies, raising some questions about the integration of measures across different policy domains.

* The sections in this report dealing with climate change, retirement income, and improving living standards in developing countries are inputs into the Organisation's follow up on sustainable development as mandated by the Ministerial Council decision in May 2001.

sales of fuel represent almost three-quarters of these emissions. Strong population growth has also been reflected in increases in emissions from the residential sector. Official business-as-usual projections suggest that Luxembourg would miss its Kyoto related target by 15 per cent without additional measures partly because of the construction of a new power plant that will reduce imports of electricity (Figure 24).

Policy

The national climate change strategy (*Ministry of Environment*, 2002) identifies a number of areas for further abatement, which would bring projected GHG emissions under the target (Figure 23). These include the promotion of renewable energy and cogeneration, and policies to encourage energy efficiency in the industrial and residential sectors. Prospective policy measures identified in the sustainable development plan include introducing a carbon tax that complies with EC legislation.

Table 10. **Main indicators: climate change**

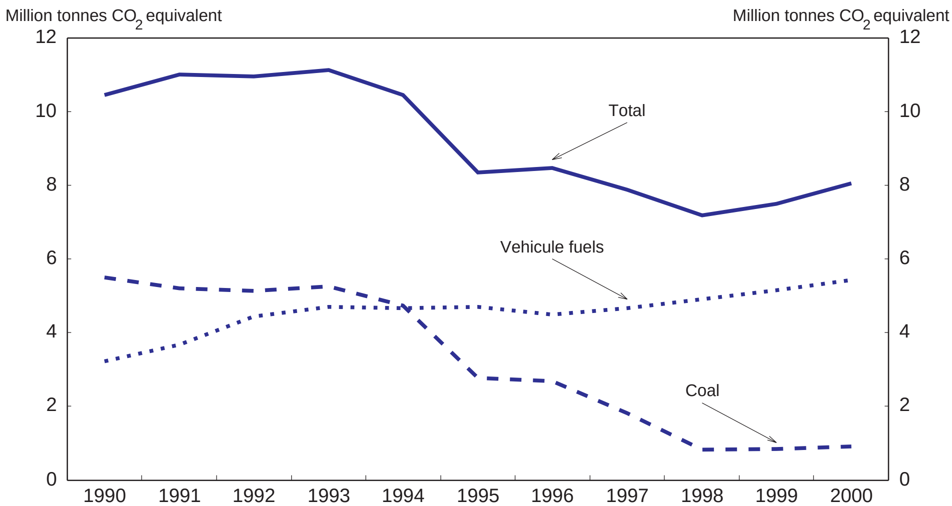
Indicators of greenhouse gas (GHG) emission intensity, grammes of CO_2 equivalent per $PPP of GDP, in 1995 prices

	Total GHG emissions	CO_2 emissions, electricity	CO_2 emissions, transport	Other GHG emissions	Total GHG emissions	CO_2 emissions, electricity	CO_2 emissions, transport	Other GHG emissions
	Level, 1999				Average annual percentage change 1990-1999			
Australia	1 053	370	155	528	–2.07	–0.21	–1.93	–3.24
Austria	419	72	91	256	–1.87	–2.75	–0.52	–2.06
Belgium	617	97	101	419	–1.36	–2.12	0.16	–1.52
Canada	893	151	193	549	–0.98	–0.12	–0.36	–1.41
Czech Republic	1 058	457	88	513	–3.05	2.55	5.53	–6.93
Denmark	549	194	94	261	–1.64	–1.43	–1.49	–1.85
Finland	652	181	105	366	–1.88	–0.02	–1.29	–2.83
France	416	32	103	280	–1.69	–2.04	0.16	–2.26
Germany	536	169	96	271	–4.00	–3.86	–0.57	–5.05
Greece	813	275	130	408	–0.24	0.07	0.74	–0.73
Hungary	786	250	84	453	–2.33	1.44	0.38	–3.74
Iceland	395	4	88	303	–1.28	0.00	–2.31	0.81
Ireland	694	165	103	426	–4.27	–2.41	0.79	–5.75
Italy	439	105	92	242	–1.05	–0.82	0.37	–1.64
Japan	432	130	82	221	–0.30	–0.03	1.24	–0.99
Luxembourg	**344**	**6**	**242**	**97**	**–11.46**	**–30.20**	**–0.45**	**–18.81**
Netherlands	573	138	82	352	–2.38	–1.03	–0.94	–3.15
New Zealand	1 096	92	175	828	–2.28	4.58	0.65	–3.32
Norway	487	4	113	369	–2.54	1.31	–1.53	–2.87
Poland	1 195	481	90	624	–4.96	–6.63	0.50	–4.12
Portugal	540	149	106	285	0.41	2.58	3.37	–1.39
Slovakia	957	200	76	680	–4.47	–1.21	3.13	–5.78
Spain	537	127	130	280	0.41	1.12	1.28	–0.26
Sweden	358	41	112	204	–1.55	0.07	–0.65	–2.30
Switzerland	276	3	79	195	–0.62	–1.96	–0.28	–0.73
United Kingdom	526	132	108	287	–3.66	–5.30	–1.38	–3.61
United States	792	278	196	318	–1.89	–0.60	–1.18	–3.28
OECD total	649	196	140	312	–1.80	–0.98	–0.38	–2.83
EU	506	120	103	283	–2.36	–2.60	–0.16	–2.95

Source: Greenhouse gas emissions: national submissions to the UNFCCC and national publications. Carbon dioxide emissions for electricity and transport: IEA (2001). GDP: OECD, SNA database.

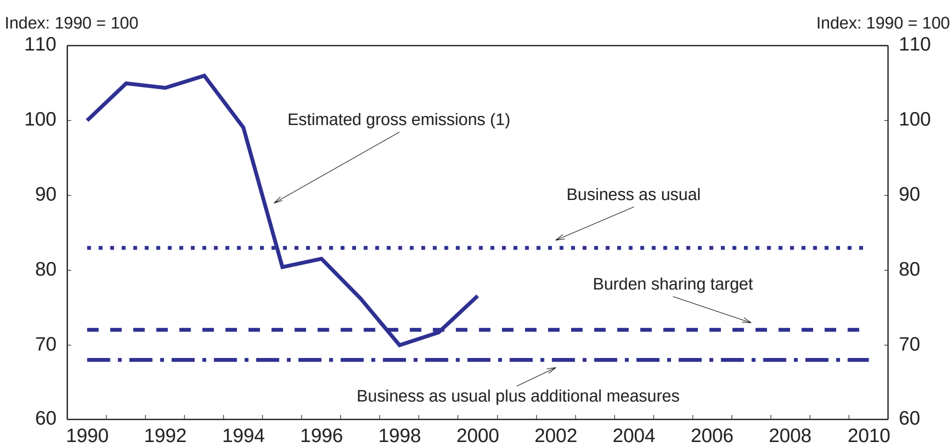
The climate change strategy and the sustainable development plan contain specific targets for the energy sector. One set of objectives to be attained by 2010 is to double the 1997 shares of co-generation in electricity consumption (to 15 per cent) and renewable energy supplied to the national grid (to 5 per cent). The scale of support to energy produced from renewable resources and co-generation has been around € 5 million annually and could, without changes,

Figure 23. **Carbon dioxide emissions**



Source: IEA.

Figure 24. **GHG emissions, targets and projections**



1. Gross emissions are derived from the IEA's estimate of carbon dioxide emissions and national data submitted to the UNFCCC for other gases. Carbon dioxide emissions submitted to the UNFCCC were adjusted for fuel sales to foreigners and electricity trade (UNFCCC, 2002).

Source: IEA and UNFCCC.

more than triple to € 17 million by 2010 (IEA, 2001). As the scale of support is very different across suppliers, so abatement costs differ significantly and give rise to significant inefficiencies. For example, the premium paid for electricity from renewable energy supplied to the national grid varies by a factor of 20,[78] resulting in costs per tonne of saved carbon emissions ranging from € 56 for most sources to € 1 200 for photovoltaic electricity.[79] Large enterprises have been exempted from the extra costs of supporting electricity from renewable energy, with the full cost being passed on as a levy on the price to small consumers.[80] At the same time as reducing national emissions through renewable energy programmes, the government is encouraging the domestic production of electricity from gas. It intends that 45 per cent of all electricity will be produced domestically by 2005.

Another important strand of climate change policy has been the promotion of energy efficiency. In this context, a voluntary agreement with industry is officially estimated to have contributed to a 14 per cent decline in energy intensity over the 1990s against a target of 10 per cent. In addition, investment subsidies and special depreciation allowances are granted to promote energy saving investments. The government has also promoted schemes to improve energy efficiency in homes and commercial premises, where the government has identified a potential to improve energy efficiency by around 30 per cent. The size of grants made under these schemes can potentially rise to as much as € 28 000 per tonne of carbon abated.[81] It is estimated that abatement achieved through one scheme, the *carnet de l'habitat*, has cost € 3 700 per tonne of carbon abated. In contrast to these specific subsidies, the general incentives for energy conservation in space-heating are weak. For example, in mid-2002, the excise tax on heating oil was equivalent to just € 7 per tonne of carbon.

In the transport sector, emissions have been rapidly reflecting both the increase in the number of vehicles, which almost doubled over the 1990s, and vehicle fuel taxes that are lower than in neighbouring countries, generating significant and rising cross-border sales.[82] The government expects that more fuel-efficient vehicles and the implementation of traffic management policies could contribute to a 12 per cent decline in emissions from the transport sector by 2010 from the business-as-usual projection (M*inistry of* E*nvironment*, 2000). Indeed, introducing road pricing could help mitigate environmental and economic externalities.

A cost-efficient programme for emission reduction should ensure that abatement costs are equalised throughout the economy. Luxembourg will participate in the EU-wide trading scheme for large emitters to be introduced in 2005 and this will be an efficient instrument. The first stage on implementing this policy will be the design of a national allocation plan for the available permits. If the permits are allocated without charge substantial windfall gains will accrue to many emitters. A levy on newly allocated permits would help both to reduce the extent of the gain and cover the costs of administering the programme. In any case, the trading scheme should act as an upper limit on the acceptable abatement costs elsewhere in the economy, as, at the margin, it is always possible to cover emission obligation outside the trading sector by purchasing permits from inside that sector. It may be the most difficult to equalise abatement costs in the transport sector, where the implied taxation of carbon is already well above permit prices. The taxation of gasoline helps internalise a number of externalities other than carbon emissions. If part of this taxation were transferred to another instrument, such as road pricing, gasoline taxation could then be lowered towards a level that aligned investment in fuel saving technology with its benefits.

Conclusion

Current climate change policy is imposing excessive costs on the economy, and it is important that the development of the climate change strategy is re-oriented to achieving abatement at least cost. This would require abatement effort to be concentrated in activities where emissions can be cut at low cost, and hence the termination of some existing high-cost programmes. The most suitable instruments for cost-efficient abatement outside the sector subject to trading would be carbon taxes, such as those proposed in the National Sustainable Development Plan. But even cost-efficient domestic abatement may still involve high costs, and Luxembourg would stand to gain from participating actively in international emission trading arrangements and using flexible mechanisms.[83]

Improving living standards in developing countries

Main issues

A reduction in poverty in the non-OECD area will contribute to the achievement of globally sustainable development. Although developing countries themselves have the major responsibility to improve their living standards, the trade and aid policies of OECD countries can help to reduce extreme poverty in the least developed and other low-income countries. Luxembourg can contribute to poverty alleviation in the non-OECD area by importing goods and services from these countries. Bilateral development co-operation is another area where Luxembourg can enhance the opportunities for developing countries to overcome obstacles to development and improve living standards.[84]

Performance

Direct imports to Luxembourg from developing countries, particularly the least developed countries, are extremely small and predominantly manufactured goods. While the recent separation of trade statistics for Luxembourg and Belgium means that longer-term trends are unavailable, imports from the least developed countries in the 2000-2002 period amounted to only 0.05 per cent of total imports,

Table 11. **Main indicators: trade and development co-operation**

A. Trade

	Least developed countries			Other low-income countries		
	Share in total imports	Composition of imports: manufactures in non-energy products	Annual growth rate	Share in total imports	Composition of imports: manufactures in non-energy products	Annual growth rate
	2001[1]	2001[1]	1990-2001[1]	2001[1]	2001[1]	1990-2001[1]
Australia	0.2	70.6	7.9	12.6	88.7	15.1
Austria	0.3	89.5	13.1	2.7	92.0	9.1
Belgium	1.6	87.1	5.7	4.5	90.6	9.9
Canada	0.1	79.7	5.1	4.8	93.1	17.0
Czech Republic	0.1	29.3	10.7	3.3	83.3	39.3
Denmark	0.3	73.3	0.3	4.4	92.6	10.9
Finland	0.5	33.5	16.6	4.5	88.4	13.7
France	0.6	59.3	1.0	5.4	87.1	11.2
Germany	0.4	72.3	4.4	5.3	88.7	10.0
Greece	0.7	67.9	7.0	5.1	88.3	13.4
Iceland	0.1	86.2	20.0	4.2	98.7	21.7
Ireland	0.3	34.4	5.6	2.9	88.8	17.9
Italy	0.4	59.2	–1.1	4.9	84.1	9.8
Japan	0.2	37.3	–4.7	24.6	81.4	14.0
Korea	0.1	45.4	–2.6	14.3	79.3	12.1
Luxembourg	**0.1**	**88.7**		**0.7**	**57.3**	
Mexico	0.0	72.0	–2.8	0.4	91.2	12.0
Netherlands	0.4	62.0	5.9	7.7	82.0	12.3
New Zealand	0.1	48.2	0.9	9.2	93.8	19.9
Norway	0.4	86.1	–17.5	4.3	93.9	14.4
Poland	0.4	70.9	12.4	4.9	81.3	22.7
Spain	0.5	34.3	3.2	5.5	79.5	13.9
Sweden	0.2	82.5	7.3	2.7	90.9	6.8
Switzerland	0.1	63.1	–1.2	2.5	89.5	10.2
Turkey	0.2	52.7	0.6	5.2	83.6	14.5
United Kingdom	0.4	78.5	6.8	4.7	87.9	9.6
United States	0.5	87.3	9.1	12.6	94.3	16.8

1. 2000 for the Czech Republic, Denmark, Germany, Mexico, New Zealand and Turkey.
Source: OECD.

which is one of the lowest rates for the OECD area.[85] The share of imports coming from other low-income countries is also one of the smallest recorded in the OECD area. In contrast to the weak trade link, Luxembourg has strongly increased its spending on development co-operation over the past decade from 0.27 per cent of gross national income (GNI) in 1990-91 and now exceeds the UN recommended target of 0.7 per cent of GNI (Table 11). With limited resources, a large share of

Table 11. **Main indicators: trade and development co-operation** (*cont.*)
B. Development co-operation

	Official development assistance		
	2001		1995-96 to 2000-01 average annual percentage change in real terms
	US$ million	Per cent of GNI	
Australia	873	0.25	0.6
Austria	533	0.29	0.2
Belgium	867	0.37	3.5
Canada	1 533	0.22	–2.6
Denmark	1 634	1.03	4.4
Finland	389	0.32	5.0
France	4 198	0.32	–6.6
Germany	4 990	0.27	–1.2
Greece	202	0.17	8.2
Ireland	287	0.33	11.9
Italy	1 627	0.15	–2.3
Japan	9 847	0.23	3.0
Luxembourg	**141**	**0.82**	**18.1**
Netherlands	3 172	0.82	5.0
New Zealand	112	0.25	5.6
Norway	1 346	0.83	1.7
Portugal	268	0.25	6.7
Spain	1 737	0.30	7.3
Sweden	1 666	0.81	4.4
Switzerland	908	0.34	3.0
United Kingdom	4 579	0.32	5.8
United States	11 429	0.11	3.2
Total DAC	**52 336**	**0.22**	**1.8**
Memorandum item:			
Average country effort		0.40	

Source: OECD.

this assistance is directed at ten priority countries, leading to a concentration of resources that is more pronounced than on average for the member countries of the OECD Development Assistance Committee (DAC). Furthermore, Luxembourg's development co-operation profile is strongly orientated to projects in the areas of health and education.

Policy

Trade policy in Luxembourg is set in the context of policy instruments that are uniform across the European Union. In 1999, average trade weighted bound tariffs for industrial goods were slightly higher in the EU than in the US and Japan

(OECD, 2003e), irrespective of whether or not preferential trading arrangements are taken into account. The situation for the least-developed countries was more favourable and is becoming somewhat more advantageous with new initiatives. Under the EU Generalised System of Preferences programme and the Cotonou agreement with African, Caribbean and Pacific countries, developing countries are granted tariff concessions on manufactured goods. Indeed, only 3 per cent of the least developed countries' exports face tariffs of above 5 per cent, while another 2 per cent of exports face a tariff of between zero and 5 per cent. Moreover, these tariffs are gradually being eliminated under the EU Everything-But-Arms initiative, though for three sensitive products, *i.e.* bananas, rice and sugar, liberalisation is being delayed until 2006 or 2009.[86] However, products from other developing countries still face tariffs and a number of textiles and clothing products are subject to import quotas at the EU level. In accordance with the Agreement on Textiles and Clothing, these quantitative restrictions will cease at the end of 2004, after which textiles and clothing will be subject to tariffs of 9 and 7 per cent, respectively for countries not included in preferential trading regimes. The EU, though, has been pursuing negotiations to completely eliminate tariffs on these products on a bilateral basis, if partner countries also lower their own tariffs.

In contrast to the industrial sector, many agricultural products faced tariffs of above fifteen per cent in 1998. In this group, consisting mainly of meat, dairy products, cereals and sugar, the average MFN tariff is over 40 per cent (Gallezot, 2002). The EU has a number of agreements granting preferential access to developing and Central and Eastern European countries. These agreements have the impact of lowering the actual tariff paid markedly below the MFN rate. For high tariff products, the average actual tariff rate is 25 per cent, against an average for the MFN rate of over 41 per cent. For all agricultural products, preferential tariffs have the impact of lowering the actual tariff to 9.7 per cent, relative to an MFN tariff of 16.5 per cent (*op. cit.*), with 40 per cent of imports entering under preferential regimes. Most of the gain from preferential treatment, in terms of tariff revenue foregone, is concentrated on a few products – notably fresh and dried fruits that account for almost one-third of foregone revenue. Community-wide subsidies also protect the EU agricultural industry from imports and such support has declined only modestly since the mid-1980s (Table 12). By contrast, domestic measures of agricultural support in Luxembourg grew quite strongly during the 1990s, reaching levels approximately equivalent to funds available from European systems of agricultural support (European Commission, 2002). The Luxembourg authorities have lent qualified support for progressive liberalisation of support measures to agriculture, stressing the importance of the multifunctional character of the sector (WTO, 2001).

Reforms of agricultural policy could raise living standards in developing countries. The abolition of all agricultural trade and subsidy barriers within OECD countries would raise total income of developing countries, but the extent of the gains would differ across country groups. Existing food exporters (notably in Latin

Table 12. **Producer support equivalents and their components**

2000 and 1987

	Total PSE	Market price	Domestic subsidies	Output	Input	Land based	Historical entitlement	Other forms of support
2000								
Australia	5.6	1.4	3.3	0.2	2.8	0.1	0.3	0.9
Canada	19.5	10.0	6.3	1.4	1.3	1.5	2.2	3.2
EU	**38.3**	**22.5**	**14.5**	**2.0**	**2.5**	**9.7**	**0.2**	**1.3**
Japan	64.1	58.3	4.6	1.8	2.8	0.0	0.0	1.2
Korea	72.6	69.6	1.8	0.0	1.8	0.0	0.0	1.2
New Zealand	0.7	0.4	0.3	0.0	0.3	0.0	0.0	0.0
Switzerland	71.4	42.2	26.2	2.8	4.0	8.0	11.3	3.0
United States	21.9	7.0	13.4	4.1	3.0	1.6	4.7	1.5
1987								
Australia	7.9	3.3	2.9	0.0	2.9	0.0	0.0	1.7
Austria	40.7	38.9	1.4	0.7	0.7	0.2	0.0	0.2
Canada	35.8	17.8	17.3	6.8	5.0	5.5	0.0	0.7
EU	**45.0**	**38.7**	**6.2**	**2.5**	**2.5**	**1.2**	**0.0**	**0.2**
Japan	67.3	61.0	4.4	1.7	2.7	0.0	0.0	1.9
Korea	69.5	68.6	0.5	0.0	0.5	0.0	0.0	0.3
New Zealand	8.9	2.4	6.2	0.0	6.2	0.0	0.0	0.3
Switzerland	73.0	59.5	11.6	1.0	6.2	4.4	0.0	1.9
United States	27.0	13.7	12.6	1.5	3.8	7.2	0.0	0.7

Source: OECD, PSE Database and Dimaranan *et al.* (2003).

America) would be the main beneficiaries of such reforms. By contrast, a number of developing countries might face small losses as a result of increases in food prices,[87] as might a number of countries that already have preferential trading agreements with developed countries. Indeed, lower-income developing countries (Anderson *et al.*, 2001) appear to gain little in absolute terms from across-the-board reduction in agricultural support in developed countries alone (Roberts *et al.*, 2002). Within developing countries, the rural sector, where poverty is concentrated, would gain most whereas losses would fall on urban populations (OECD, 2003f). However, changes in agricultural policies are likely to take place in the context of multilateral agreements covering services, manufactures and agricultural products and involving tariff concessions by developing countries themselves. In such a context, no region would experience any loss in welfare (Nagarajan, 1999).[88] In addition, a multilateral reform would be likely to result in dynamic changes to the pattern of production in developing countries, especially if development assistance is focussed on building the capacity to export.

Within the European Union, further measures to base agricultural support on farmers' income rather than their production would be a step in the direction of liberalising markets and would bring benefits to developing countries. Such restructuring of aid is envisaged in the EU Agenda 2000 programme.[89] Moreover, in the 2003 Common Agricultural Policy reform for Sustainable Agriculture it was decided partially to end supporting products in favour of supporting producers, with the introduction of a partially or fully decoupled system of payments per farm.[90] Even with an unchanged envelope of total aid to agriculture, such a programme would improve the allocation of resources while improving the efficiency of income transfers.[91] Such an orientation offers the possibility of targeting the transfers to less well off farmers or to smaller units (OECD, 2003f). The Luxembourg authorities have managed to move domestic support measures for agriculture to less trade-distorting measures.

The Luxembourg authorities are increasing development co-operation further and implementing measures to address shortcomings identified in past policy. The central commitment is to increase the amount of resources directed to development co-operation to 1 per cent of GNI by the end of the current legislative period. Policymakers have recognised that assistance was too widely dispersed in the past and have made efforts to concentrate resources by country and sector. To this end, bilateral assistance to ten "target" countries increased from 42 per cent to 55 per cent of total bilateral assistance between 1995 and 2000. Overall, the number of countries receiving assistance declined from 90 to 68 in the second half of the 1990s. As Luxembourg has concentrated assistance, it has also ensured that the withdrawal of aid is not abrupt. In Namibia, which is a middle-income country, for example, this has included an innovative approach of matching local commitments to development projects during the transition. The concentration by sector has been striking. Social infrastructures and services doubled in importance during the second half of the 1990s and now account for 82 per cent of bilateral assistance. While policy has increasingly targeted projects in the sectors of education, health, sanitation and rural development, Luxembourg has recently incorporated environment and gender equality as cross-cutting themes.

The Luxembourg authorities have recently begun to put in place systems to ensure greater effectiveness of development co-operation. This includes moving from stand-alone projects to better-integrated projects. In this process a number of indicative development frameworks have been agreed with recipient partner governments in target countries. The principal advantages offered by this approach are in ensuring coherence with target country programmes and enhancing synergies with other donors' programmes. Greater efforts are also being made in the evaluation of project plans and monitoring outcomes as well as increasing resources in regional offices, which can take greater responsibility for project implementation, policy dialogue and co-ordination.

Conclusion

Although Luxembourg's direct trade relations with the least developed countries are small, the authorities have supported further progress in multilateral trade liberalisation as a means of promoting development. The openness of Luxembourg to products from developing countries depends essentially on measures agreed at the EU level. The EU's Everything-But-Arms programme, that exempts least-developed countries from tariffs and quotas, is a welcome step even if some of the gains will be from trade diversion. For other developing countries, agricultural products still face barriers. There is an intention to continue reforming the EU system of agricultural support by moving to policies that focus on farm income rather than impacting on market prices. The Luxembourg authorities have made their own domestic agricultural support less trade distorting and further moves in this direction would be warranted. The authorities have made a considerable effort in the realm of development co-operation. However, as the amount of assistance is relatively small, it is important to limit disbursements tightly to the target countries and a limited number of programme areas. The movement to integrated projects should be continued with better appraisal of projects and within an enhanced monitoring and evaluation framework.

Follow up on OECD recommendations for structural reform

Progress in structural reform made since the last *Survey* is summarised in Box 5.

Box 5. Follow up on OECD recommendations for structural reform since 2001

Proposal	Actions since the last *Survey*	Assessment/recommendations
Labour markets		
1. Reform early retirement and disability pensions		
Enhance incentives for older workers to continue working by lowering replacement rates, making benefits an actuarially neutral function of the retirement age and by increasing the official retirement age. Evaluate the effect of the new law on disability pensions as soon as possible and take further measures if the number of disability pensioners has not declined substantially.	The 2002 law on disability and redeployment of workers with reduced capacity has restricted access to disability pension by requiring an additional independent medical exam. Persons with residual capacity to work are redeployed within their company or with another employer, helped by the placement agency. A "waiting allowance" is paid after one year if all redeployment efforts fail (same amount as regular disability pension).	The effect of the 2002 law on the number of first claims, the rate of denial of regular invalidity pensions and the number of long-term unemployed with reduced capacity should be closely monitored. The government should reduce the generous replacement rates of the invalidity pension and the waiting allowance and make the medical criteria for access tougher. To reduce incentives for early retirement, the disability pension reform should be complemented by a reduction in early retirement pension (*pension de vieillesse anticipée*) on an actuarial basis in relation to a pension taken at the official retirement age. In addition, the ease with which imputed years of contributions can be obtained should be reduced. Public subsidies for the pre-retirement pension (for workers laid off in restructuring industries) should also be terminated.
2. Reform unemployment and related benefit schemes and enhance active labour market policies		
Reduce the withdrawal rate of benefits for additional earnings under the general assistance scheme (RMG), including housing assistance.	No action taken.	The recommendation is maintained.
Encourage people on the RMG to come back to work progressively by working part time.	No action taken.	The recommendation is maintained.

Box 5. Follow up on OECD recommendations for structural reform since 2001 (*cont.*)

Proposal	Actions since the last *Survey*	Assessment/recommendations
Improve orientation, training and follow-up of unemployed persons.	As unemployment rose in 2001 and 2002, so did the number of persons directed to training and activation measures that concern all persons after six months of benefits. Placement rates of participants were high thanks to frequent contacts with placement services and measures being tailored to the need of firms which are closely involved in the organisation of training workshops and recruitment workshops.	No further expansion of active labour market policies (ALMP) is needed as placement perspectives are limited by the number of vacancies. The government should reduce the need for active labour market policies by relying on stronger financial incentives for the unemployed, *i.e.* by reducing the very generous replacement rate. This would leave more resources for ALMP in favour of specific groups such as older workers, persons with reduced capacity, RMG beneficiaries and persons wishing to return to the labour market after long absences.
3. *Increase employment flexibility*		
Remove the remaining rigidities that dissuade employers from offering part-time jobs.	No action taken.	The recommendation is maintained.
Relax regulations on temporary employment.	No action taken.	The recommendation is maintained.
Make rules on dismissals and the use of fixed-term contracts less strict.	A bill is currently before Parliament to make the law on collective redundancies stricter.	Employment protection regulation should be eased, not increased as proposed in the Bill before Parliament. Procedures for terminating employment contracts in SMEs should be simplified to reduce legal costs.
4. *Increase wage and labour cost flexibility*		
Improve flexibility in wage bargaining by allowing for lower wages for older workers, to enable them to remain employed despite a decline in productivity. Modify wage indexation to exclude energy from the index.	No action taken.	The recommendation is maintained.

Box 5. **Follow up on OECD recommendations for structural reform since 2001** (*cont.*)

Proposal	Actions since the last *Survey*	Assessment/recommendations
Increase employment of low-skilled or inexperienced workers by relying more on a combination of minimum wages and targeted in-work benefits for income redistribution objectives.	No action taken.	The authorities should examine the approach to reducing labour costs for low skilled workers while maintaining socially acceptable levels of disposable income for such persons that is best suited to Luxembourg's special circumstances. If an earned-income credit system were to be introduced, it should replace the existing patchwork of in-work benefits; otherwise employment traps could become more severe. The most suitable instrument may be a reduction in employers' social security contributions for low-income workers.
Raise the female employment ratio by shifting from the household as the relevant unit for income tax to the individual.	No action taken.	The recommendation is maintained. The government should also envisage providing more childcare facilities and reviewing the very generous imputation arrangements for education and childcare in the pension system as they reduce work incentives for prime-age women and make their return to employment after age 45 more difficult.
5. *Education*		
New.		To provide more equal opportunities to all students and increase overall school performance, the authorities should consider supplementing the multi-lingual approach to education by the possibility of choosing between a German and a French stream with the instruction language not chosen being taught intensively as a foreign language and *Lëtzebuergesch* also being learnt in each stream.

Box 5. Follow up on OECD recommendations for structural reform since 2001 (*cont.*)

Proposal	Actions since the last *Survey*	Assessment/recommendations
New.		Institutional arrangements in the education system should be overhauled to make reasons for success and failure more transparent and raise overall performance by: • defining and enforcing quality and efficiency standards (centralised curricula, exams and school budgets); • leaving more autonomy to schools in how to achieve these standards and how to allocate budgets on teachers (free hiring) and support material; • allowing for more competition from private schools; and • strongly supporting headmasters and teachers through effective transmission of internationally-identified best teaching and management practices.
New.		The future "University of Luxembourg" should be enabled to provide high-quality tertiary education to compete with the universities in the neighbouring regions. This entails international recruitment of students and scholars and both internal and external evaluation. Existing tertiary institutions should be integrated to achieve synergy effects. The new university should focus on Luxembourg's strengths (financial markets, engineering, media and communication, migration and linguistic research). Young Luxembourg residents should be made fit to meet the quality standards of the new university through better secondary education. At the same time the grant system for studying abroad should be maintained.

Box 5. Follow up on OECD recommendations for structural reform since 2001 (*cont.*)

Proposal	Actions since the last *Survey*	Assessment/recommendations
New.		The government should focus financial incentives for continuing education and training on groups that are not covered by private sector initiatives, *e.g.* unemployed and older workers. A pre-requisite for supporting the latter is a significant increase in the effective retirement age to ensure social benefits from training measures.
Continue to build an effective system of continuing education and training on the foundations that have been established.	No further actions taken.	The recommendation is maintained.
Product markets and the knowledge-based economy		
Maintain progress in implementing EU Single Market legislation in a timely manner.	The rate of transposition of Single Market rules was 97.7 per cent in March 2002, less than the target (98.5 per cent). A competition bill is being discussed which should install a Competition Council. A new regime on state aid is being prepared. No action has been taken to abolish fixed and monitored prices. No action has been taken to set up a single legislative framework for public procurement.	Raise the transposition rate to achieve the target. The Competition Council should be established and adequately resourced so as to facilitate the effective enforcement of EC competition rules. The new regime on state aid should be put in place quickly. Fixed and monitored prices should be abolished. Set up a single legislative framework for public procurement.
New.		Implement reforms to increase the availability of residential building sites, including an increase in land taxes to discourage speculation and finance infrastructure development, allowing rentals for sitting tenants to be adjusted to market rates at regular intervals to encourage investment in rental accommodation and zoning changes to allow more dense residential development.

Box 5. Follow up on OECD recommendations for structural reform since 2001 (*cont.*)

Proposal	Actions since the last *Survey*	Assessment/recommendations
New.		Introduce road pricing to ease congestion and as a guide to the value of expanding capacity, notably on the motorways used by cross-border workers.
New.		Remove obstacles to competition amongst broadband-internet operators by imposing a reduction in access charges and by insisting that Luxembourg P&T withdraw completely from the supply of cable internet services.
Continue to develop the legal framework necessary to support the development of electronic commerce.	The necessary legal framework has been created.	No further action is needed.
Public sector		
New.		Make greater use of cost-benefit analysis or of cost-effectiveness analysis to reallocate expenditures towards the most valued ends or at least to ensure that objectives are achieved in the least costly way.
New.		Take public sector management reforms that increase managerial independence and accountability further.
New.		Make greater use of contracting out where enforceable contracts can be written relatively easily.
New.		Privatise enterprises where public ownership is no longer necessary for regulating monopoly power, notably the incumbent telecommunications operator.
New.		Make rapid progress in developing e-government through the stages of interaction and electronic declarations. In doing so, adopt a clear client focus, presenting a seamless on-line service, and make complementary organisational changes.

Box 5. **Follow up on OECD recommendations for structural reform since 2001** (*cont.*)

Proposal	Actions since the last *Survey*	Assessment/recommendations
New.		Reduce the administrative burden by systematically subjecting new legislation to administrative burden impact assessments and by assigning all firms and individuals identification numbers that could be used to centralise information in one databank to which all public sector agencies would have access.
Reduce the costs of moral hazard in health care		
Support the proposal for GPs (general practitioners) to centralise their patients' medical files.	No action taken.	The recommendation is maintained.
Consider changing remuneration of medical practitioners to reduce the fee-for-service component.	No action taken.	The recommendation is maintained.
Consider increasing co-payments further insofar as the benefits of reducing the costs of moral hazard are judged to outweigh the costs of declining equity in access to health care.	Homeopathic medicines are not reimbursed any more since the end of 2002. The extent to which alternative medical practices should be authorised and/or reimbursed is currently being debated in parliament.	The issues of authorisation and reimbursement should be discussed separately as the spectrum of services authorised might be larger than that of treatments paid. Reimbursement should be made contingent on medical efficacy as proven by international scientific studies or in current practice.
Develop the information and accounting system of the hospitals so that Diagnostic Related Groups (DRGs) can be introduced.	No action taken.	The recommendation is maintained.
New.		The health insurer is not involved in decisions affecting its financial equilibrium (*e.g.* medical fees, reimbursement rules), which is at odds with its statutory management autonomy (CES, 2003). Any such decision should be preceded by a cost analysis provided by the health insurer.

Box 5. **Follow up on OECD recommendations for structural reform since 2001** (*cont.*)

Proposal	Actions since the last *Survey*	Assessment/recommendations
New.		Capital-intensive medical applications should be brought in line with demand and centralised whenever the saving in average cost and improvement of service quality outweighs the loss of proximity for patients in rural areas (CES, 2003).
Sustainable development		
New.		Reduce the average state pension replacement rate to one that is consistent with long-term balance so as to avert the risk that future generations have to bear large increases in taxes and/or even greater reductions in the replacement rate. The authorities should also index the official retirement age (and the number of years required to qualify for a full pension) to rising life expectancy.
New.		Recast climate change policy to achieve the Kyoto target at less cost to the economy by using instruments to the point where marginal abatement costs are equal. Consistent with this approach, an across-the-board carbon tax should be introduced and Luxembourg should participate in European and international emission trading schemes. The authorities should also place greater emphasis on using flexible mechanisms to promote abatement in (non-OECD) foreign countries.
New.		Continue to improve the efficiency of development aid by targeting priority countries and areas more tightly and to better monitor effectiveness. Continue to support reform of the Common Agricultural Policy so that it becomes less trade distorting.

Source: OECD.

IV. The economic impact of migration in Luxembourg

Introduction

Luxembourg stands out in international comparisons as having a much higher proportion of foreigners in its population than any other OECD country; about 37 per cent of its population and 65 per cent of employees are foreigners.[92] This is partly a function of size, since Luxembourg is a small country located in a large economic area. Hence movement over relatively small distances that would be internal migration in Luxembourg's much larger neighbours, France and Germany as well as Belgium, is recorded as international migration. Indeed, approximately the same number of people as there are foreigners resident in Luxembourg – about one-third of the labour force – cross from neighbouring countries to work in Luxembourg every day and are known as cross-border workers ("*frontaliers*").[93] But most of Luxembourg's foreign resident population comes from much further away – in particular Portugal and Italy – than its neighbouring "G*rande région*", so the phenomenon is not merely local. While *frontaliers* might not be strictly defined as a migration issue, in the case of Luxembourg it is very much part of the same set of economic phenomena: reducing labour market constraints and allowing the economy to grow independently of locally available skills.

This chapter begins with an explanation of the historical and structural aspects of migration in Luxembourg, which are important for the understanding of the current sectoral and skill-specific pattern dominating the foreign labour force. With immigration policy largely accommodating labour market requirements the emerging labour flows have been following specialisation needs of the Luxembourg economy, which led to a labour market triad segmenting the Luxembourgers, resident foreigners and cross border workers. This raises a number of policy challenges, most importantly the integration and schooling capacity of foreigners, but also ensuring overall that rapid growth of demand for transport services and housing are satisfied efficiently.

Immigration in Luxembourg

Origins and recent trends

Luxembourg does not have a continuous history of immigration, but has rather experienced three distinct major immigration movements: of Italians from the late nineteenth century up to the 1950s, of Portuguese in the 1960s and 1970s. Since then immigrants have come from a larger set of countries, not the least because the emerging specialisation in financial services has encouraged a number of highly skilled experts – many of them from the United Kingdom or the United States – to settle in Luxembourg. The more recent phenomenon of very rapidly growing numbers of *frontaliers*[94] has a close relationship with migration through the labour market (Table 13).

Immigration of Italians into Luxembourg was stimulated by the development of the iron and steel industry in the late nineteenth century and continued up to the 1960s, with the number of Italians in the population peaking in 1966. In that year, the total population of just over 330 000 included 42 000 foreigners (12 per cent of the population), of which 25 000 were Italian. Many Italians did not settle permanently, however, partly because Luxembourg immigration policy of that period made it difficult to bring family members into the country, but were part of a system of "rotation" where they came as single men for a few months or years. Their numbers tended to vary quite significantly as a function of the economic situation.[95] There remains nevertheless a significant population of Italian origin.

While the number of Italians increased no further after the mid-1960s, the foreign population continued to grow, with most new immigrants being Portuguese and working mainly in low wage jobs in services and construction. Initially the residence rights of these immigrants, as of the Italians before them, were limited to holders of work permits, with very limited rights to bring in spouses or other family members. These restrictions were progressively relaxed in the 1970s and became irrelevant for most immigrants in the wake of the accession of Portugal to the European Union. Consequently, the impact of this wave of migration on population growth has thus probably been greater than that of the earlier immigration, especially as non-Luxembourgers have somewhat higher fertility rates than nationals.[96] Indeed, the net natural increase of the population is entirely due to foreigners, among whom live births are around five times as high as deaths, whereas among Luxembourgers deaths exceed births. This reflects the younger age structure of the foreign population.

There are still legal restrictions for immigrants from non-EU countries to bring in spouses, and on the rights to work for non-EU spouses of Luxembourg and EU nationals. Furthermore, Luxembourg nationality law is based on parentage rather than on country of birth. Hence the children of immigrant parents do not have citizenship unless they apply for naturalisation.[97] Since Luxembourg law

Table 13. **Sectoral employment shares: Luxembourgers, resident foreigners and *frontaliers*, 2002**[1]

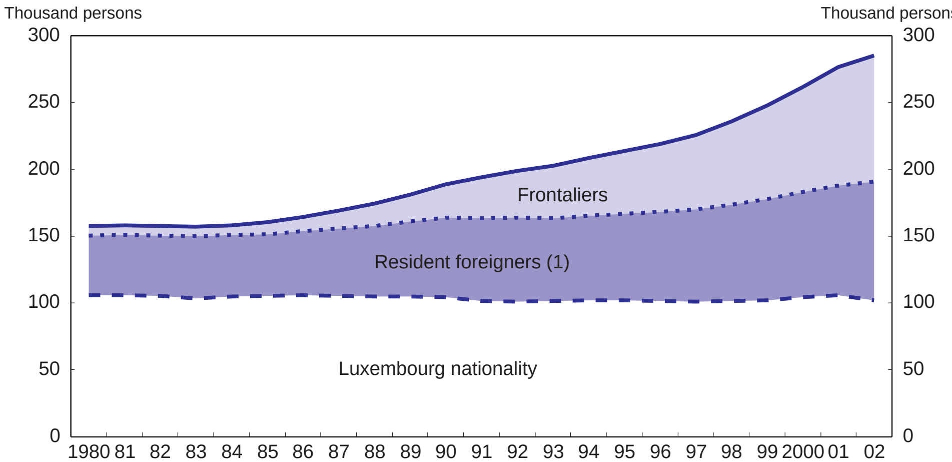
Sector (NACE classification)	Number				In per cent of sectoral employment		
	Nationals	Resident foreigners	Frontaliers	Total	Nationals	Resident foreigners	Frontaliers
Agriculture, hunting and fishing (A + B)	359	535	341	1 235	29.1	43.3	27.6
Manufacturing and mining (D + C)	10 525	6 720	17 721	34 966	30.1	19.2	50.7
Construction (F)	3 346	12 696	12 585	28 627	11.7	44.3	44.0
Public administration (L)	29 317	2 665	697	32 679	89.7	8.2	2.1
Electricity, gas and water supply (E)	878	50	59	987	89.0	5.1	6.0
Transport, storage and communications (I)	9 437	4 753	9 264	23 454	40.2	20.3	39.5
Public services (M + N + O)[2]	10 907	6 263	6 529	23 699	46.0	26.4	27.5
Consumer services (G + H)[3]	11 749	15 630	19 436	46 815	25.1	33.4	41.5
Business services (J + K)[4]	15 584	20 001	33 594	69 179	22.5	28.9	48.6
Private household services and other (P)	904	3 701	1 395	6 000	15.1	61.7	23.3
Total	**93 006**	**73 014**	**101 621**	**267 641**	**34.8**	**27.3**	**38.0**
	In per cent of employment group						
Agriculture, hunting and fishing (A + B)	0.4	0.7	0.3	0.5			
Manufacturing and mining (D + C)	11.3	9.2	17.4	13.1			
Construction (F)	3.6	17.4	12.4	10.7			
Public administration (L)	31.5	3.6	0.7	12.2			
Electricity, gas and water supply (E)	0.9	0.1	0.1	0.4			
Transport, storage and communications (I)	10.1	6.5	9.1	8.8			
Public services (M + N + O)[2]	11.7	8.6	6.4	8.9			
Consumer services (G + H)[3]	12.6	21.4	19.1	17.5			
Business services (J + K)[4]	16.8	27.4	33.1	25.8			
Private household services and other (P)	1.0	5.1	1.4	2.2			

1. As of March 2002.
2. Education + health and social work + other community, social and personal services.
3. Trade, repair of motor vehicles and household goods + hotels and restaurants.
4. Financial intermediation + real estate, renting and business activities.

Source: IGSS, OECD calculations.

does not allow for dual nationality, few immigrants (who are eligible after five years of residence) apply for citizenship, not wanting to give up citizenship in their country of origin.[98] This accounts for the relatively low proportion of immigrants – and their children – who acquire Luxembourg nationality.[99]

Figure 25. **Employment: Luxembourgers, resident foreigners and *frontaliers***
1980-2002

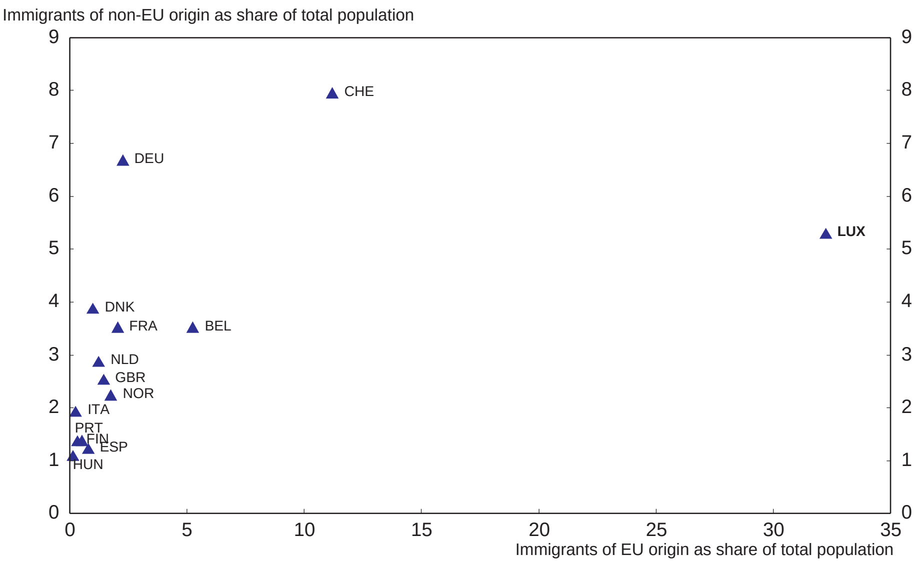


1. Estimates for 2002.
Source: STATEC.

Since the mid-1980s the participation of foreigners in the labour force has increased even faster than the share of foreigners in the population, which itself increased considerably (Figure 25). This is due to the very rapid increase in the number of *frontaliers*. Again, many of these people are not travelling very far to work compared with large numbers of commuters in larger countries who do not cross an international border. Some of them do, however, and an increasing number are migrants in the wider sense, in that they have moved from other countries or other regions in order to work in Luxembourg, but have chosen to take up residence in the neighbouring country rather than Luxembourg itself. This is frequently due either to housing costs or education facilities, both discussed further below. While resident immigrants and *frontaliers* are responding to similar economic causes, their fiscal implications as well as "integration" issues are distinctly different.

Although Luxembourg stands out as having a very high share of foreigners in its population, they are overwhelmingly Europeans from other EU member countries. Compared with many other European countries, the share of those with non-EU origins in the total immigrant population is quite low. Nevertheless in recent years the proportion of non-EU residents in Luxembourg has been somewhat above the European average as a proportion of the total population

Figure 26. **Foreign population of EU and non-EU origin, in selected countries**



Source: STATEC.

(Figure 26). An influx of refugees in the wake of the Balkan wars, but also the need to hire financial sector specialists worldwide, are important factors in this respect. In early 2002, nearly half of the non-EU origin residents were from the countries of former Yugoslavia, and measures were taken in late 2002 to expel many of these who were admitted on a temporary basis and had been refused full refugee status.

Immigration policy

As a very small country and a member of the European Union, Luxembourg now has no administrative control over most of its immigration flows because they concern people from within the EU. For non-EU immigrants the basic condition for eligibility for a residence permit is that applicants should have the means to support themselves in Luxembourg. Other than for asylum seekers and tightly regulated family reunion[100] this essentially means having an offer of employment and a work permit. In turn, the grant of a work permit[101] is in principle quite straightforward for someone with an offer of employment, or – in the case of prolongation – already in the country with a job. In most cases, therefore, admission is determined by labour market demand. In practice, the office in the labour ministry which issues work permits has a degree of latitude in deciding policy, notably being concerned to avoid "social dumping", a term used in the public debate to address an undercutting of local wages which is considered to be unfair.[102] For example, a rule of thumb was developed which defines a skilled employee as one earning at least four times the minimum wage. Consequently, an employer offering less than this to a foreigner for a skilled job may be refused a work permit on the grounds that a person willing to take such a wage cannot be sufficiently skilled.

With the lack of direct control over inflows, the future of migration in Luxembourg is a matter of considerable public debate. Two of the main issues in this debate are concerns about Luxembourg's identity on the one hand, and economic viability, notably the question of the link to the viability of the pension system, on the other. The first is linked with the potential threat for the sustainability of *Lëtzebuergesch* (the Luxembourg language) being established as an official language only in 1984, with a large number of residents – and at least to some extent future citizens – having apparently limited preferences for communicating in this language. This may become a real problem, because it seems to be contributing to segmentation in the labour market for public sector workers. On the other hand, the inflow of foreign labour is seen as vital for high growth, which is necessary to finance Luxembourg's generous social welfare system, including its exclusively public pension system. This argument has been recently put forward in a report from the International Labour Office (ILO, 2001), where it is argued that with its current parameters, the Luxembourg pension system will be unsustainable unless population grows at around 1 per cent per year, so that it exceeds 700 000 by 2050.[103] This pace of population growth could only be achieved by continuing high rates of immigration, so the two issues of migration – threats to cultural identity and economic advantages – have become quite strongly linked. Other important issues related to migration concern the integration of foreign-born children through the education system, efficient transport services for the cross border workers and cost-effective housing supply for a growing population.

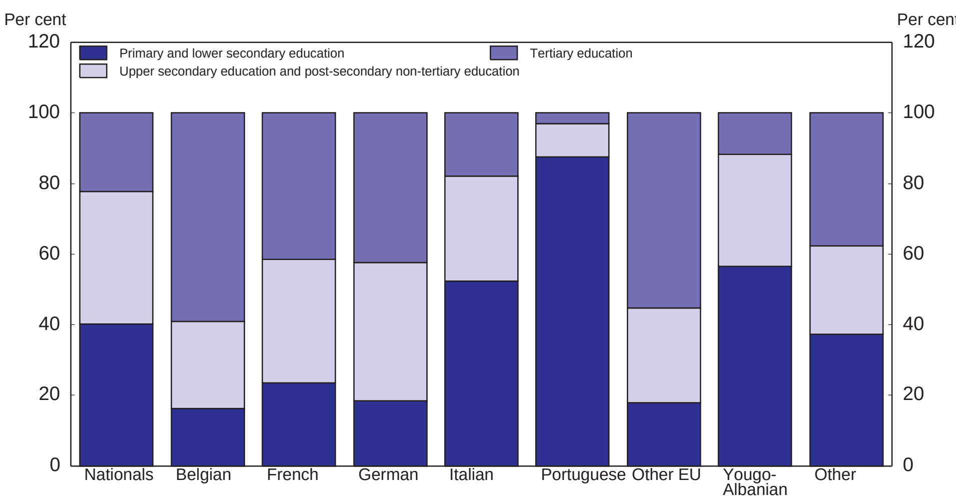
In recent years, with the recorded unemployment rate quite low, growth of the economy itself has also been seen to depend on foreign labour. Hence policy-makers have been concerned with potential exhaustion of the "pool" of labour available in the regions immediately surrounding Luxembourg. If the pool is defined as labour resources in what is known as "La Grande région",[104] it is premature to think of it as being exhausted. Its population is 11 million and even the number of unemployed in this region exceeds the expected employment level in Luxembourg for the coming 50 years. The concern is perhaps implicitly with looking for a source of lower wage labour. At any rate, policy discussions now include the question of where future migrants, if they were to be needed, should come from, while in earlier immigration episodes this was left to the decisions of the potential migrants and their employers.

Migrants in the Luxembourg economy

The expansion of service industries, notably financial services and media-related companies, has continued a tendency for immigrants to be disproportionately represented both in low-skilled, especially manual, jobs and in high-skilled jobs.[105] This was already evident with the first waves of unskilled immigration from Italy, as in the early days of the Luxembourg steel industry many of the skilled workers and managers were Germans, Belgians or French. As a pattern, immigrants are associated with certain industries, and in some cases particular nationalities with particular industries – for example Portuguese in the public works and construction industries. Educational attainment also differs considerably among the various nationalities resident in Luxembourg (Figure 27).

Figure 27. **Luxembourg residents: education attainment by nationality**

Population aged 25-59, 2001



Source: STATEC.

The counterpart of this pattern of immigrant employment is the fact that Luxemburgers are concentrated in middle management and administrative jobs, especially in the public sector.[106] The preponderance of Luxembourgers in public sector jobs is due in considerable part to restrictions on recruitment of non-citizens. European law prevents explicit bans on recruiting EU citizens to most public sector jobs, but the legacy of former restrictions can still be seen. In many cases, moreover, the nationality-based criteria have been replaced by a requirement of fluency in *Lëtzebuergesch*. As a result migrants and frontaliers make up as much as 80 per cent of private sector workers, while in the public sector workforce it is Luxembourgers that make up 80 per cent.

Given the large increase of employment in recent years described above, it would be expected that foreign savings would provide a significant proportion of the required capital stock. The share of total employment accounted for by foreign-owned firms is less than the share of immigrants and frontaliers in the labour force, though in some sectors – most notably financial services, but also in industry – it is clear that companies with significant foreign capital dominate (Table 14). Since many of the sectors in which foreign capital is involved have high levels of per capita output, the "foreign" share of private sector GDP is probably higher than suggested by the employment numbers, which only represent the direct effect of FDI. A considerable indirect effect is hidden in domestic supplies, in particular business and personal services, which provide inputs for the foreign owned enterprises and their employees.[107] Foreign investment is therefore important to help Luxembourg maintaining high rates of growth of GDP and employment.

Table 14. **Employment in foreign-owned enterprises, 1998**

Sector	Total employment	Employment in FDI firms	In per cent
Total, excluding non-market services	175 701	51 727	29.4
Banks	19 000	17 447	91.8
Insurance	1 600	1 383	86.4
Manufacturing	31 698	21 206	66.9
Other	123 403	11 691	10.6

Source: STATEC.

Luxembourg-resident[108] enterprises also have significant investments abroad. Excluding the foreign investments of the Luxembourg banking sector, this amounts to about two-thirds of the national value of inward investment, though in the banking sector it is only a fraction. But while there thus appears to be a two-way relationship of capital and enterprise links, this is much less evident as far as migration is concerned. Relatively few Luxembourgers emigrate, and those residents who leave are frequently immigrants returning to their countries of origin. One important outflow is of students who leave to study at university (usually in Belgium or France), since there is no full university in Luxembourg; most of these return when their studies are completed. For *frontaliers*, the asymmetry is very striking: while nearly 100 000 people cross the border daily to work in Luxembourg, only about 700 Luxembourg residents commute to work in neighbouring countries.

The physical presence of natural resources lay behind the earlier inward movements of capital and labour in creating and developing the iron and steel industry, with its legacy still apparent in manufacturing (both in terms of the presence of foreign companies and of immigrant workers). The more recent inflows of foreign companies and accompanying migration are to a considerable extent a combination of regulatory and tax advantages of locating in Luxembourg. Building on a history of bank secrecy dating back from before WW II and enjoying a liberal regulatory environment, it was possible to generate a virtuous circle of capital and labour inflows – further strengthened by agglomeration effects, increased government revenues permitting lower taxation, and this in turn increasing the attractiveness of locating in Luxembourg. These attractions do not apply only to employers; for given pre-tax earnings, take-home pay after taxes is significantly higher in Luxembourg than in any of the neighbouring countries, and social security deductions are lower.

A *three-sector labour market*?

Although this virtuous circle process of labour and capital inflows could have occurred to some extent also with lower labour force growth, immigration and the inflows of frontaliers have permitted faster overall output growth and probably sustained it for longer without being constrained by labour market bottlenecks (see Annex I). One issue is whether it has permitted faster *per capita* growth, another is how the benefits from the effect of immigration are distributed, among the immigrants themselves and among existing residents. Overall, the answer to the first question is clear: Net National Income (NNI) per inhabitant increased nearly fivefold between 1985 and 2000. Developments on the labour market suggest that immigrants and frontaliers have prevented any supply shortages of labour arising from the strong expansion of Luxembourg enterprises, which implies that the improved overall per capita output was not fuelling inflation. Existing residents are likely to have benefited from this additional growth through various channels: employment opportunities in the public sector, lower taxes, a high level of public transfers and services, and – insofar as they are property owners – through higher property prices. Negative effects are harder to quantify and mainly consist of congestion costs. Migrants must have benefited, because they preferred employment in Luxembourg to staying in their original location.

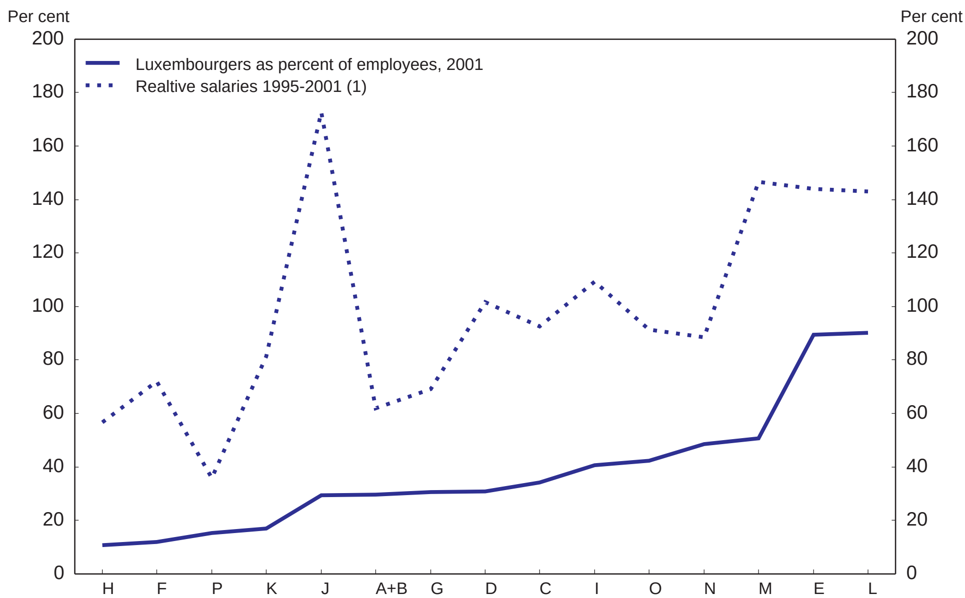
Besides the reduction of structural labour market bottlenecks with the help of foreign labour Luxembourg is also benefiting from migration smoothing the cycle. Analysis by the Secretariat for the 2001 Luxembourg *Economic Survey* suggested that frontaliers provide a "buffer" against cyclical fluctuations, with variation in employment of frontaliers being significantly greater than for Luxembourg residents. This analysis covered a period of rapid growth in employment. It implies that employers are benefiting from a more flexible labour market to maintain higher output and total productivity. The steady growth in the number of frontaliers over the last twenty years (see Figure 25) implies that the size of this benefit has been continually increasing over this period. Some econometric evidence also corroborates the idea that frontaliers – and potential frontaliers resident in the neighbouring regions – have to be considered as an integral part of the Luxembourg labour market. Models attempting to explain Luxembourg inflation using unemployment tend to work better if also the regions around Luxembourg are taken into account. It appears likely that frontaliers would also provide a buffer in the case of a severe downturn in the labour market, although feedback mechanisms might complicate the picture. Cyclical unemployment often becomes structural – in particular when unemployment and related benefit replacement rates are high – so avoiding cyclical unemployment could confer long-lasting benefits for Luxembourg. As mentioned above, the sectoral distribution of Luxembourgers, resident foreigners and frontaliers is quite different (see Table 13), which suggests that cross-sectoral substitution opportunities are limited and layoffs would mainly affect employees in the sectors experiencing a crisis. Residents, employed either in the public sector or in construction and personal services, would suffer in a second round of adjustments to an adverse labour market shock as declining government revenues and private incomes would reduce the demand for their services.

At the same time, more flexible work contracts have also become more widespread. Temporary work contracts are rare in Luxembourg, due to the rigidities of the labour code, but they do exist. Most of them are taken by immigrants or frontaliers (available data cannot distinguish between them). In 2000 there were about 6 000 workers with such contracts, but only 3 per cent were Luxembourgers. Portuguese and Italians, who can be presumed to be mostly Luxembourg residents, accounted for over 12 per cent and nearly 3 per cent respectively; 7 per cent were Belgians and 69 per cent French, many of whom were probably frontaliers.[109] To the extent that this may be occurring as a result of pressure from the more flexible cross-border workforce, it may be here that there is some adverse effect on certain residents, who may face a choice between less secure working conditions or their job being taken by a frontalier.

Frontaliers may provide a more flexible workforce, but they do not seem to have lower wages than equivalent residents – once certain labour market characteristics have been taken into account. STATEC (1995) observes that average wages among frontaliers in 1993 were some 16 per cent below those of residents[110] but that when comparing groups of similar age, economic sector and status (blue-collar, salaried or civil servant) there were not significant differences. Also more recent labour market data do not suggest the existence of discrimination against frontaliers.

A distinction may need to be made in this analysis between existing residents who are immigrants and the Luxembourg nationals themselves. Over 40 per cent of the employed Luxembourg nationals work in the public sector or closely related sectors.[111] These workers are largely protected from any immediate competition in the labour market from either frontaliers or resident immigrants. As to other sectors, Luxembourg nationals are under-represented in hotels and catering, construction, property and personal services, sectors that are generally speaking relatively low-paid (Figure 28).

Figure 28. **Relative salaries and employment shares of Luxembourg nationals, by sector**

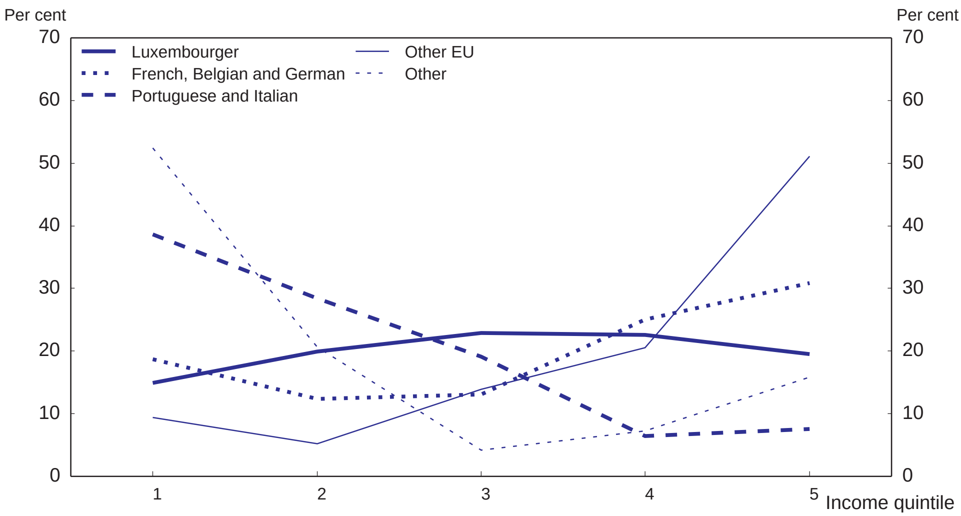


Notes: A + B: Agriculture, hunting and fishing.
C: Mining and quarrying.
D: Manufacturing.
E: Electricity, gas and water supply.
F: Construction
G: Trade; repair of motor vehicles and households goods.
H: Hotels and restaurants.
I: Transports, storage and communications.
J: Financial intermediation.
K: Real estate, renting and business activities.
L: Public administration.
M: Education.
N: Health and social work.
O: Other community, social and personal service activities.
P: Private households with employed persons.

1. Salaries in sector as a percentage of average salaries.

Source: STATEC and OECD calculations.

Figure 29. **Luxembourg residents: household income distribution by nationality**



Source: STATEC *et al.* (2000), *Population et emploi nº 1*.

This analysis, though not conclusive, suggests that for a significant proportion of Luxembourg nationals – the over 40 per cent of nationals who work in the public sector – their comparatively high earnings are linked to government revenues depending on high employment growth rates. This indicates that the necessary expansion of the foreign labour force is a complement for high public sector employment. Those nationals who do not work in the public sector work relatively rarely in low-paid sectors. Income distribution data by nationality shows that certain immigrants tend to have much higher proportions of low-income households than nationals, while others have relatively more high-income households. This could reflect a process whereby foreigners either fill low-paid jobs with which Luxembourgers do no want to compete, or fill high-skilled or specialised highly-paid jobs for which there are insufficient numbers of qualified nationals (Figure 29).

Fiscal impacts

The lack of comprehensive studies, which measure the fiscal impact of migration in Luxembourg, makes it difficult to assess policy in this respect. For other countries it has been found that the two major determinants are participation and unemployment rates in the short as well as the long run, and for the longer run effect the way pension provisions affect immigrants is crucial.[112] Since migrants have high participation rates on average and access to unemployment benefits is limited,[113] it seems likely that net non-pension costs to public budgets are low or even negative. The short run budgetary impact of frontaliers is similar to that of employed immigrants (for given skill levels and types of employment), since employment in Luxembourg gives similar rights to public transfers and services for both groups, except for access to active and passive labour market measures and social assistance. These benefits are financed by a levy (currently 2.15 per cent) on wages, paid equally by the employers of frontaliers, even though they would draw on unemployment benefits in (and financed by) their country of residence; social security payments by frontaliers consequently exceed benefits received by them. In the longer term, the fiscal costs of frontaliers are likely to continue to be lower than those of migrants since their children do not use the Luxembourg education system. Furthermore, their rights to any social benefits in Luxembourg once they cease to work there are limited (though their pension rights are vested after one year[114]). As regards health benefits, much will depend where retired frontaliers are consuming them. As this is a relatively recent phenomenon, not much can be said about it. To the extent that the tax/benefit system is redistributive, relatively unskilled migrants may impose a net budgetary cost, but this is likely to be balanced by net contributions from the significant number of highly skilled immigrants.

As for the very generous public pension scheme, the previous *Economic Survey* of Luxembourg has noted the need for reform despite the existence of a large reserve fund[115] and this issue is taken up elsewhere in this *Survey* (see Chapter II). Immigration – but especially and more recently, increased numbers of frontaliers – has helped so far to maintain pension payments without an increase in contributions. Relying on it to do so also in the future is becoming more and more risky. A study by the International Labour Organisation (ILO, 2001) calculated that only under a very optimistic assumption of an average employment growth over the next 50 years of 2 per cent[116] – most of which would have to be supplied by net inflows of frontaliers or immigrants – could the reserve fund be expected to be in balance by 2050. However, in the absence of stabilising measures the fund would be diminishing rapidly at the end of the period, even after having grown considerably in the first place.

In either case, it might be unwise to rely on inflows of migrants or frontaliers as solutions to the problem of sustainability of the pension system. This would require that the favourable economic conditions in Luxembourg (and unfavourable ones in neighbouring regions) that have encouraged the inflows during the past decade continue into the long term, which is quite unlikely (see Chapter I). It is difficult to quantify exactly the equivalent increase of contribution rates in comparison to the necessary additional number of immigrants and frontaliers to ensure sustainability, but one way to look at it is to consider the increase in contribution rates necessary to keep the reserve fund in balance. Bouchet (2003) calculates that an annual inflow of migrants/frontaliers of 11 000 until 2050 (extrapolating approximately what was experienced in the 1990s) is equivalent to a change in the pension contribution rate of about 10 percentage points (the rate is currently 24 per cent), which is indicating the volume of a necessary pension reform.[117]

Migration policy challenges

Integration

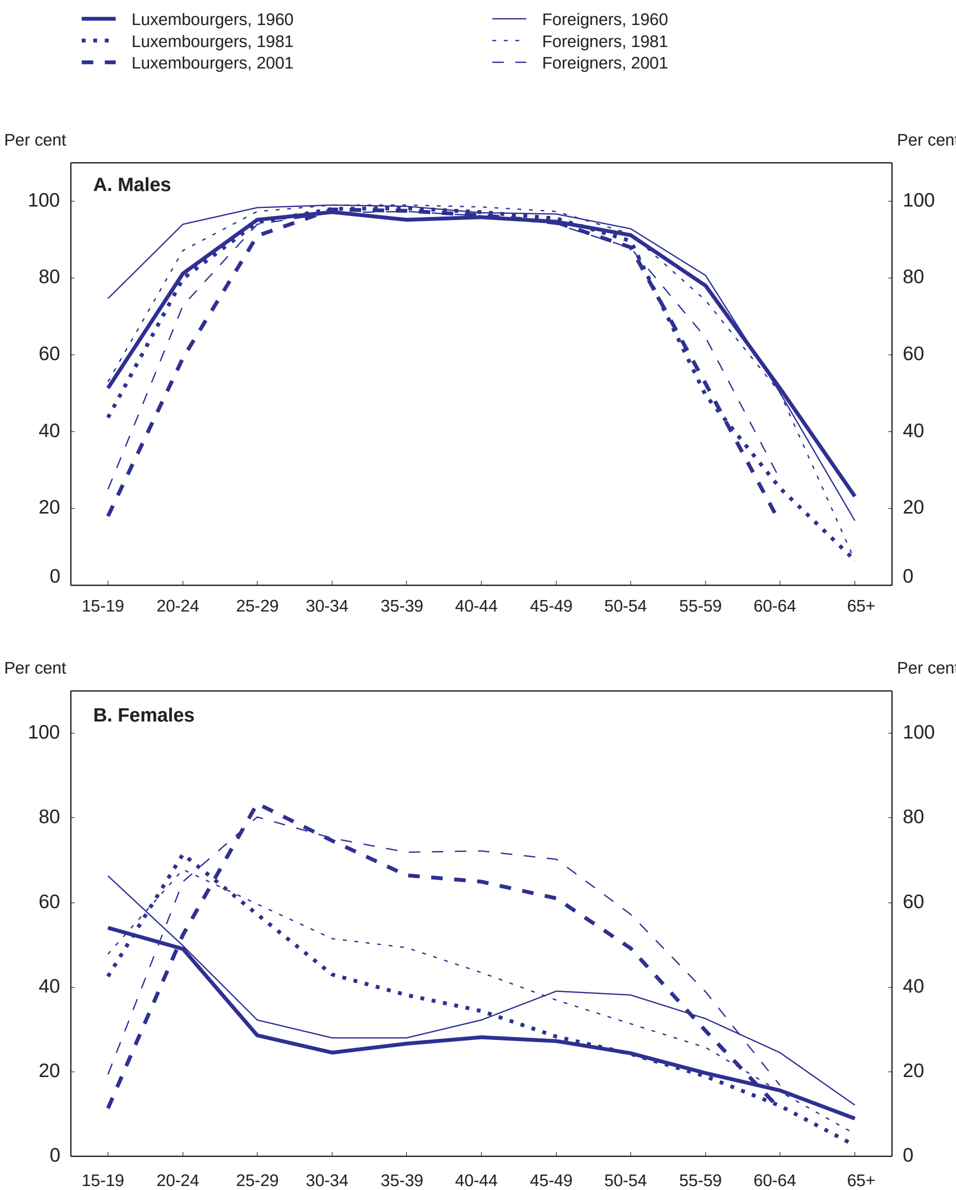
An important test of the "success" of migration policy is how well immigrants are integrated in the host country. As far as the economic aspects of integration are concerned, important measures are activity and unemployment rates among immigrants compared with nationals. Of concern in the longer term is whether the career profiles of those of immigrant origin tend to converge towards those of nationals, which in particular implies an appropriate accumulation of labour market relevant skills.

On the unemployment measure, immigrants integrate well in the labour market. Although unemployment rates among immigrants are somewhat higher than those for natives, they remain low, at around 3.7 per cent in 2000 for Portuguese for example, compared with an overall rate of 2.7 per cent. Much of this gap may well be due to the higher proportion of relatively unskilled foreigners, rather than to the fact that they are foreign. With the current weakness in the economy persisting for the third year and the overall measure of unemployment rising significantly, this measure of integration is being exposed to a strong test.

Although immigrants have somewhat higher unemployment rates than native Luxembourgers, a higher proportion of them are actually in employment, since their participation rates at all ages are higher than those of nationals (Figure 30). Over the past few decades immigrant and national participation rates have evolved rather in parallel. Male participation rates have fallen slightly in the 25-54 age groups, and substantially in the younger and older groups. Female rates have also declined at the upper and lower end of the age range, but have risen substantially in the 25-54 age groups.

The higher participation rates indicate that the labour market successfully absorbs immigrants when they arrive (not particularly surprising for non-EU arrivals since they tend to be admitted only when they already hold jobs or job offers) and over time. However, there appears to be a strong tendency for immigrants as a group, perhaps with the exception of those from the neighbouring countries, to remain in lower paid jobs and in certain sectors. In other countries where immigrants are both a large proportion of the population and where there is an active integration policy, particularly in terms of language training (notably Australia, New Zealand, Canada), there is a much greater tendency for convergence of skill levels and hence pay scales, although this may also reflect the greater scope that these countries have to select immigrants on the basis of their skills. In these

Figure 30. **Participation rates**



Source: STATEC.

countries, convergence occurs to a considerable extent among immigrants themselves, but perhaps more importantly, among their children, as the education system reduces some of the disadvantages faced by newly arrived immigrants.

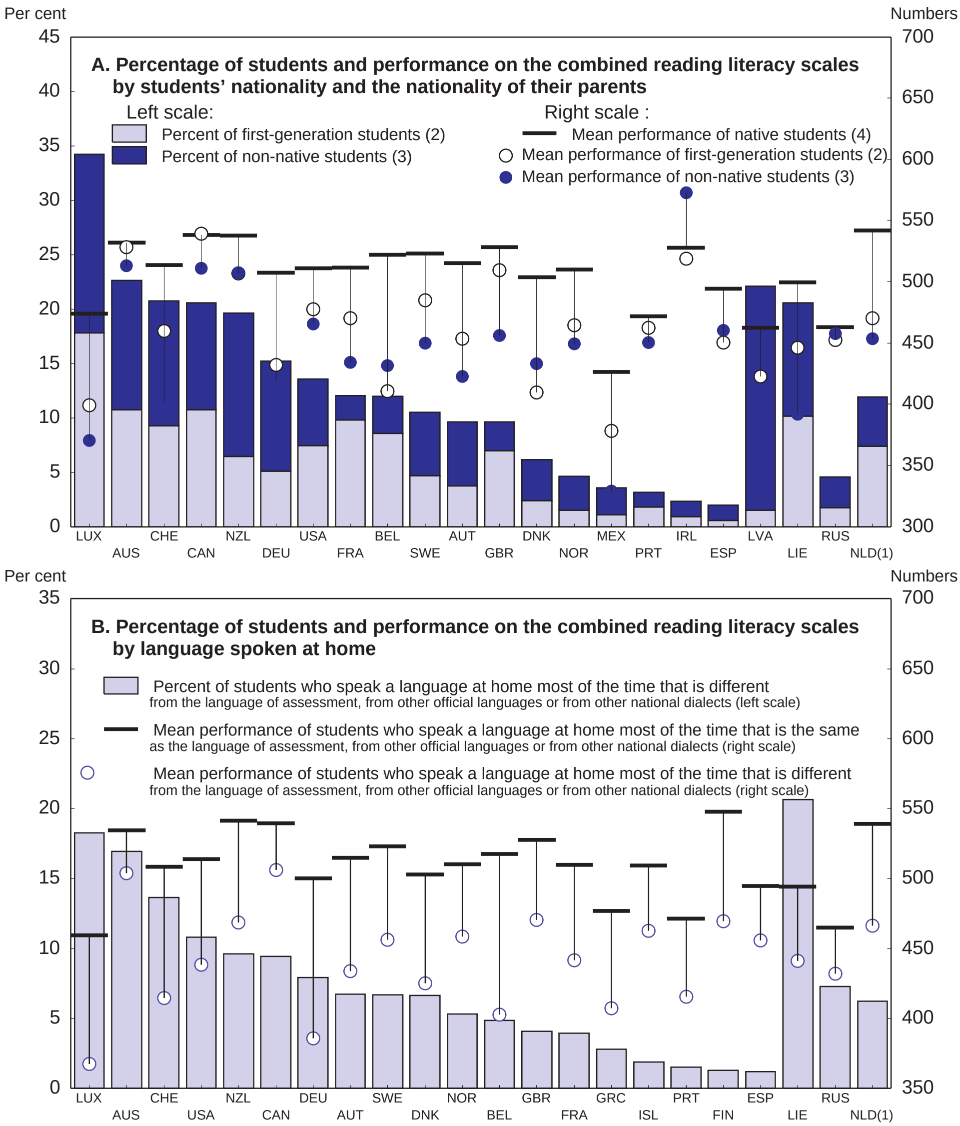
The education system

In Luxembourg the education system does not appear to achieve this. Both the international comparisons in the Program for International Student Assessment (known as the PISA study)[118] and domestic analyses show that educational outcomes at secondary level among children of immigrants are poor. In the comparisons carried out in 2000, Luxembourg showed relatively poor results overall (see Chapter III) and, more relevant in this context, the gap between performance for children of immigrants and children of nationals was the largest of any of the countries surveyed[119] (Figure 31).[120] This relatively poor performance in international comparisons is corroborated by the fact that children of immigrants are found disproportionately in the technical (non-academic) stream of the secondary education system and, furthermore, they are disproportionately likely to fail to complete secondary education. The result is that few children of resident immigrants arrive on the labour market with a high level of academic qualifications (only a very small proportion reaches tertiary education), and many are without any vocational qualifications either, so that without further training they are likely to be restricted to unskilled jobs. This reveals an apparent tendency for the educational system to perpetuate the skill divide between immigrants and nationals into the next generation.

Although a tendency to reproduce the skills divide does not preclude some improvement between generations, a more detailed analysis of results taking account of the aspects of parents' backgrounds other than nationality or linguistic factors would be needed to assess this. Furthermore, certain sections of the immigrant population and some Luxembourgers educate their children in neighbouring countries; these are likely to be children of more economically successful parents, which may bias down the results for groups educated in Luxembourg.

However, one of the reasons that some parents seek to avoid the Luxembourg education system appears to be its linguistic complications. Since language is known to be one of the most important aspects of immigrant integration,[121] this may be relevant. The Luxembourg education curriculum is essentially tri-lingual. Early and pre-school education is mostly conducted in *Lëtzebuergesch*, children are then taught to read and write in German, learning French as a foreign language in early primary school; secondary education is largely bilingual in French and German.[122] If one allows for the importance of English as an additional language for a student to be highly successful in many domains and of *Lëtzebuergesch* for many public sector positions, this means that children from a background without one of the three national languages spoken at home have to know four "second" languages[123] by the time they leave school if they are to be

Figure 31. **Relative performance of immigrants and national secondary school students**



1. Response rate is too low to ensure comparability.
2. Students who were born in the country of assessment but parents were foreign-born.
3. Students who were foreign-born and whose parents were also foreign-born.
4. Students who were born in the country of assessment with at least one of their parents born in the same country.

Source: OECD, PISA 2000.

"successful". Although there are arguments that bilingual education can be good for some children, it is questionable that such a degree of compulsory multilingualism will serve the best interests of the majority. On the contrary, there are some arguments that the fact that children learn to read and write in German is particularly disadvantageous to the main non-Luxembourger linguistic group, the Portuguese.[124] Although the authorities argue that they provide resources to support educationally disadvantaged children, there do not appear to be systematic or universally available programmes.[125]

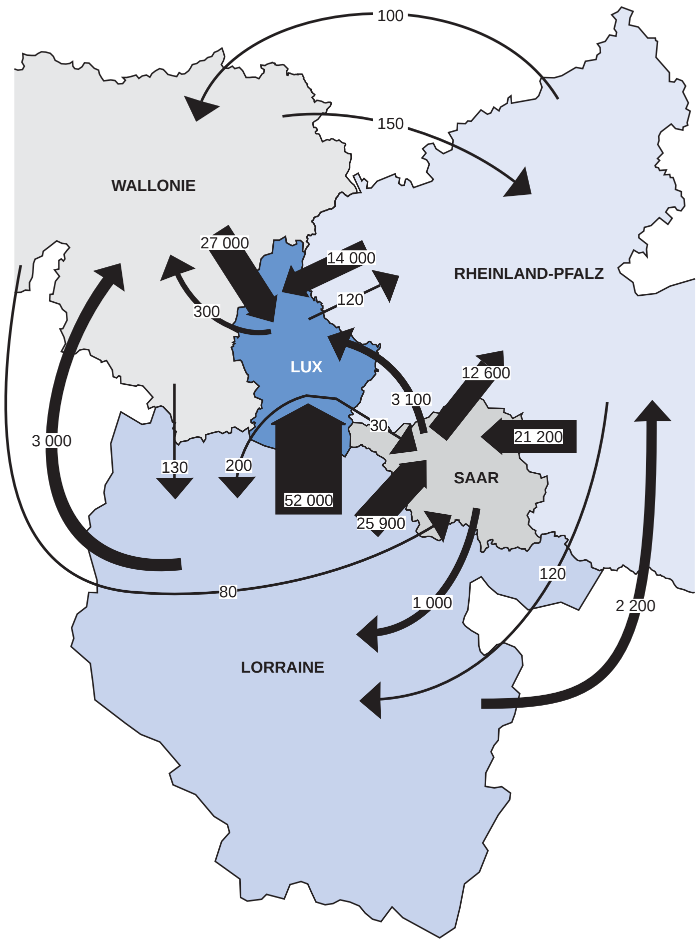
More careful analysis is needed to understand fully the problems of the education sector overall, and the particular needs of children of different origins. The Luxembourg authorities are in the final stages of presenting a program for a thorough overhaul of the educational system including the establishment of a university. Improving the education outcomes overall and in particular for foreign children is seen as the major policy challenge. Streamlining language education in a way that facilitates the attainment of basic skills is crucial in this respect.

Another aspect of the Luxembourg educational system is its lack of a fully-fledged degree-awarding university, though some tertiary institutions do exist. Students from Luxembourg have to study abroad to acquire an academic tertiary qualification, frequently at universities in Belgium or in neighbouring regions of France. As re-migration of graduates is only incomplete at best – also because of relatively high dropout rates, this relative lack of educational facilities might be one of the reasons for the "bimodal" skill pattern among migrants, with migrants frequently occupying both high skilled and low skilled jobs. But it is also true that attractive salaries in the public sector, where competition from non-citizens is limited, and low unemployment reduce the incentive for Luxembourg nationals to invest in tertiary education. Nevertheless, perhaps partly with this in mind, there are plans to develop certain existing institutions of higher education and research into a full university.

Improving the efficiency of transport services

Transport infrastructure has not kept up with economic growth, and the associated increase in population and flows of cross-border workers, in recent years (Figure 32). There are substantial congestion problems at peak hours on the motorways that bring cross-border workers into Luxembourg, at the entrances to the larger cities and on trains.[126] The government has reacted by stepping up investment in transport infrastructure to high levels.[127] Central government investment in transport infrastructure has increased by an average rate of 13 per cent since 2000 to reach 1.3 per cent of GDP in 2003, with especially large increases occurring in rail investment (the average increase over 2000-03 was 32 per cent) (Ministry of Finance, 2002, p. 39). Further large increases in rail investment are planned whereas road investment is set to decline slightly over 2003-05. Looking

Figure 32. **Cross-border flows in the *Grande région*, 2001**



Source: Statisches Landesamt Saarland *et al.* (2002), p. 5.

further ahead, transport capacity will need to double by 2020 to satisfy the demand for mobility associated with high economic growth and inflows of cross-border workers. The government aims to increase the modal split in favour of public transport from 12 per cent of all motorised trips (14 per cent of trips within Luxembourg and 7 per cent of cross-border trips) today to 25 per cent by 2020 so as to promote sustainable mobility. In addition to expanding rail capacity, which includes building new railway lines, railway stations, buying new rolling stock and introducing tram-train services, park 'n' ride schemes are being developed to promote public transport. These will provide parking for commuters at the Luxembourg border and outside the main centres and high frequency public transport connections to the main centres. Priority lanes for buses are also being developed to make such transport faster and hence, more attractive. The government approved the first part ("railway infrastructure") of the strategy *mobilitéit.lu* in January 2002, which represents an integrated national concept of transport policy. This strategy affects not only the resident population but also takes into account the mobility demands created by the more than 100 000 cross-border workers employed in Luxembourg. The government also decided in January 2002 to prepare an integrated project for transport and land use in order to co-ordinate policies in these domains better. A High Council for sustainable development is to be created that will take over the responsibilities currently assumed by the High Council on land use. This reform should result in zoning policies that encourage more intensive residential development, especially located near social infrastructure (such as places of work, shops and cultural and sporting amenities), reducing demand for mobility (see below).

While there are many good ideas in the government's approach to solving transport problems, little weight has been given to the efficiency of the solutions adopted. Cost-benefit analysis is not used to assess alternative solutions. This means that the authorities are not obliged to identify clearly the externalities associated with different transport choices or to adopt policy instruments best suited to internalising these externalities, a necessary condition for efficient supply of transport services. If such an approach were to be adopted, the starting point would be to identify the external costs generated by the use of private motor cars. By far the most important such cost is congestion at peak times (see for example Proost *et al.*, 2002). The next most important external costs arise from accidents and air pollution. This suggests levying road user charges (using telemetric equipment) based on road conditions at the time of use, emissions characteristics of the vehicle being used and its contribution to accident and road maintenance costs.[128] Such an approach would reduce road transport bottlenecks and encourage greater use of public transport. It would also provide essential information on the social value of expanding road capacity. For example, if the price needed to eliminate congestion on a motorway were high enough to be able to finance an additional lane, it would be efficient to do so. The current approach of simply not expanding capacity to encourage an arbitrary modal split is not efficient.[129] Road pricing would also contribute to reducing incentives for excessive mobility (*i.e.* a degree of mobility such that marginal social costs exceed the marginal social benefits). It would do this directly by raising the cost of private transport, notably at peak times, and indirectly by lowering the subsidies for public transport required to bring its relative price closer to relative marginal social costs. Ending income tax deductions for commuting costs would have a similar effect.[130]

No analysis is available to judge whether the current level of public transport subsidies – ticket prices only cover 10-12 per cent of operating costs – is efficient (in the sense of achieving a price for public transport relative to that for private transport that reflects relative social costs). Subsidies are certainly very high by international comparison.[131] A factor that could warrant high subsidies without encouraging excessive mobility is inefficient production of public transport services. Some 30 per cent of bus services are still provided by the public sector at much higher cost than those provided (under contract) by the private sector. The government is to consider reducing these subsidies and encouraging the contracting out of the remaining bus services provided by the public sector. All rail passenger services continue to be provided by public sector employees. An important factor explaining the high cost structure of publicly provided transport services is that public employees are paid much higher salaries than their private sector counterparts. Obviously, it would be preferable to increase efficiency in the production of public transport services by contracting out services and reducing subsidies accordingly.

Reforms are required to reduce the impact of immigration on housing costs

Immigration increases population growth and hence demand for housing services. This increases real house prices mainly because the price elasticity of residential land supply is low. Real house prices[132] have increased at an annual average rate of 2.6 per cent over the past two decades, a rate only exceeded among the 11 EU countries with data available since 1981 in the United Kingdom and Ireland (Table 15).[133] This increase mainly reflects a large rise in real land prices, which rose at an annual average rate of 6.3 per cent, the highest in the 9 EU

Table 15. **Real house prices, construction costs and land prices**

	Belgium 1981-2001	Denmark 1980-2001	Germany 1980-2001	Greece 1994-2001	Spain 1987-2001	France 1980-2001	Ireland 1980-2001	Italy 1980-2001
House prices	1.2	1.0	0.5	3.5	4.2	1.4	3.7	1.2
Construction costs	–0.5	0.0	0.1	0.1	–0.8	–0.7	1.5	–0.6
Land prices	1.8	1.2	1.1					

	Luxembourg 1981-2001	Netherlands 1980-2001	Austria 1980-2001	Portugal 1994-2001	Finland 1987-2001	Sweden 1980-2001	United Kingdom 1980-2001
House prices	2.6	2.3	3.5	0.4	1.9	–0.2	3.0
Construction costs	0.3	0.0	1.2	0.7	1.1	–0.4	1.4
Land prices	6.3	1.9	3.1	2.9	–	1.3	5.2

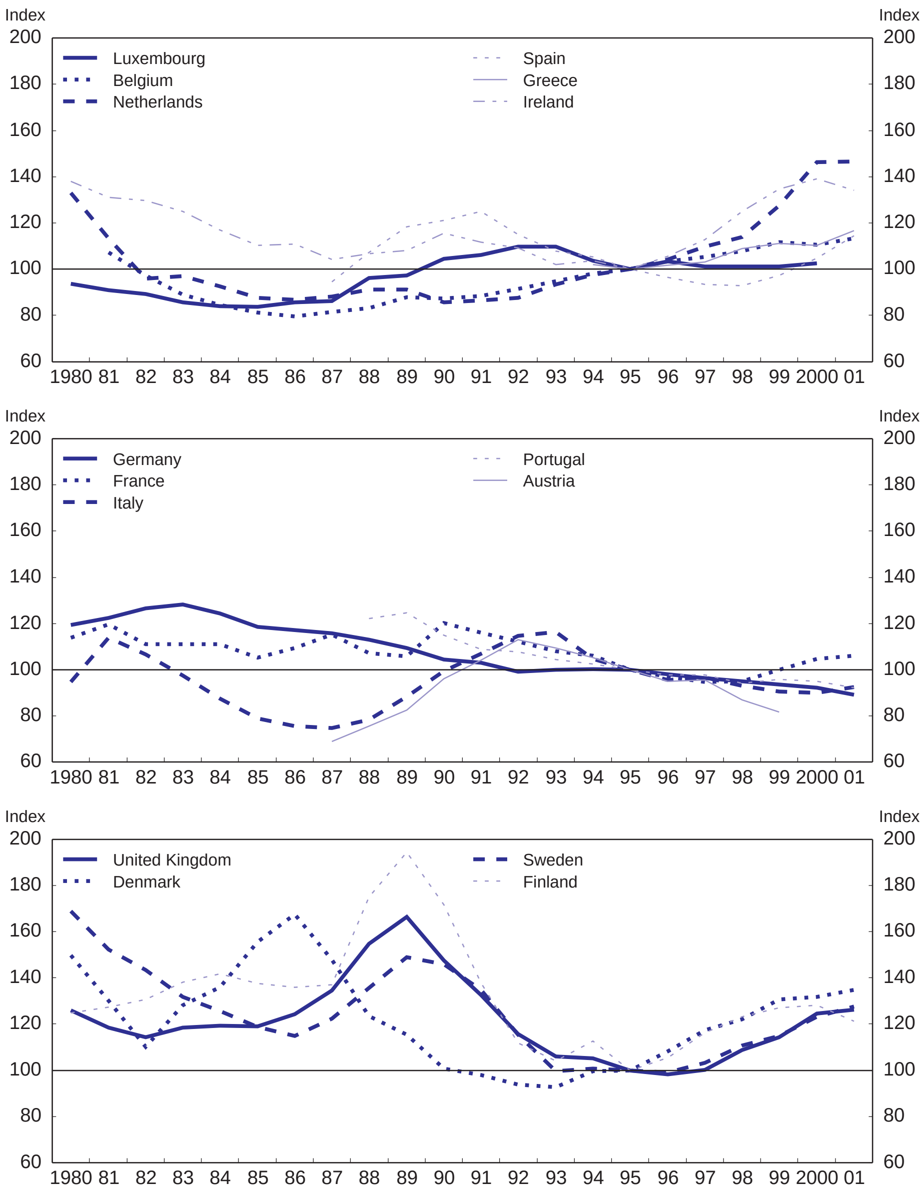
Notes: All variables are deflated with the private consumption deflator. Land prices refer to the following periods: 1990-1999 in the case of the Netherlands; 1990-1999 in that of Austria; 1980-1998 in that of Sweden; and 1981-2000 in that of the United Kingdom. In the case of Portugal, construction costs refer to the period from 1994 to 2001. Germany refers to West Germany.
Source: ECB, 2003.

countries with available data. Real construction prices only increased at annual rate of 0.3 per cent, suggesting that the industry is subject to strong competitive pressures. While residential landowners are made better off by such price increases, this gain is at the expense of other current and future residents who will have to pay higher rentals. Moreover, it undermines cost competitiveness, reducing the extent to which economic activity and its associated tax base can be attracted to Luxembourg. The challenge for the authorities is to ensure that high immigration does not result in unduly large increases in housing costs and hence undermine economic activity and create wealth transfers that could create equity concerns.

The long-run elasticity of house prices with respect to household disposable income is close to or slightly below unity in most countries according to empirical studies (ECB, 2003, p. 22). House prices grow with income because income growth, including through immigration, generates more demand for space, increasing the price of land for construction. Whereas house prices have indeed been stable or declining in most EU countries relative to disposable income, meaning that housing affordability has been stable or increasing, they appear to have increased somewhat in Luxembourg (Figure 33).[134] This suggests that the real increase in land prices in Luxembourg is high even after allowing for the high growth in household disposable income associated with high immigration, pointing to shortages of residential construction land. This factor undoubtedly underlies the relatively small effect of housing stock supply in restraining increases in real house prices by international comparison (Box 6).

The government considers that the shortage of building sites is in part caused by speculators who hold vacant sites back from the market. This enables them to earn a respectable return (as noted above, a real return of 6½ per cent per annum over the past two decades and much more in many agglomerations) without being subject to the constraints of restrictive tenancy legislation (see below) if they were to develop their land to provide rental accommodation. So as to encourage speculators to sell such building sites, the government has reduced capital gains tax by three quarters in 2003-04 and issued a warning that capital gains will be taxed more heavily in the future if this measure does not work. Another possibility to discourage such speculation would be to introduce a land tax that rises over time on vacant building sites, as practised in Belgium and suggested in a recent Luxembourg parliamentary report (*Chambre des députés*, 2003). Municipalities also hold vacant land that could be subdivided but resist doing so partly because the extra taxes that they would collect from an increased population are insufficient to pay for the associated increase in infrastructure costs. The parliamentary report suggests that the central government could remove this obstacle by providing municipalities with greater financial assistance for infrastructure costs. Municipalities should also consider raising local taxes to pay for such costs. With such high capital gains on land, there is ample scope to raise land taxes – just ensuring that values remain up to date would provide a very dynamic revenue source at unchanged tax rates.

Figure 33. **Ratio of house prices to disposable income**
Index 1995 = 100



Source: European Central Bank (ECB), Structural factors in the EU housing markets, March 2003.

Box 6. Determinants of real house prices

Following Meen (2002), real house prices (G) are assumed to be positively related to real household disposable income (RY) and negatively related to the real stock of dwellings (H) and the real interest rate (RR).[1] Estimating this relationship as an error correction model, all explanatory variables have the expected signs and, with the exception of the real interest rate, are statistically significant (Table 16). The long-run elasticity of real house prices with respect to the housing stock (–1.10) is low compared with those obtained by Meen (*ibid.*) for the United Kingdom (–1.91) and especially for the United States (–7.64).[2] By contrast, the long-run elasticity of real house prices with respect to real disposable income (2.55) is similar to those for the United Kingdom (2.51) and the United States (2.71). These results point to a weak supply response in Luxembourg contributing to high growth in real house prices relative to real disposable income, especially compared with the United States.

Table 16. An error correction model of real house prices

Constant	–6.314	(–3.1)
$\ln(G)_{-1}$	–0.899	(–3.8)
$\ln(RY)_{-1}$	2.291	(3.5)
$\ln(H)_{-1}$	–0.991	(–3.1)
RR_{-1}	–0.013	(–1.0)
$\bar{R}^2$	0.744	
Standard error of estimation	0.027	
DW	1.85	

Note: The dependent variable is ln(G); t-values are given in brackets. The estimation period is 1986-2000 (annual data).
Source: OECD.

1. Nominal variables were deflated by the private consumption deflator to obtain real variables. Household disposable income was proxied by total compensation of employees (WSSS). The housing stock was estimated from investment data using a perpetual inventory model with a one per cent depreciation rate. The interest rate series is for mortgage rates.
2. Meen's estimation periods are 1969(3)-1996(1) for the UK and 1981(3)-1998(2) for the US.

Another factor considered to restrict the supply of building sites is that municipalities are unwilling to use their power to expropriate a landowner that is blocking a subdivision. The parliamentary report recommends transferring this power to central government to reduce the local landowner's power to influence the decision. Another reform that could increase the supply of building sites, especially during periods when the real estate market is particularly tight, is to simplify and accelerate administrative procedures for approving subdivisions (CES, 2002).[135]

Housing development in Luxembourg is also considered to use excessive amounts of land (CES, 2002). Much development concerns individual houses on lots that are unnecessarily large. This approach to housing is contributing to an unsustainable rise in the proportion of the national territory that is built on.[136] The government has announced its intention to create a High Council for Sustainable Development that would be responsible for land use and transport issues, among other things, with a view to enhancing policy integration. This should certainly help to redirect land-planning policy in a way that would make more economical use of building sites. Specific measures that could help in this regard that the CES has proposed include increasing maximum permitted construction heights in city centres, reducing the minimum size of building sites for individual houses and making vacant sites and sites with unused buildings inside agglomerations more attractive for development.

As noted above, restrictive tenancy laws may encourage some landowners to hold vacant land rather than developing it for rental accommodation. Rents may not be increased during the life of the lease without the tenant's consent and leases are effectively for an indefinite duration. In view of the high rate at which real property prices rise, this means that rental yields for sitting tenants rapidly decline to very low rates.[137] Landlords are restricted in their scope to compensate for this risk by charging new tenants very high rents by a regulation that limits rental yields to 5 per cent of the purchase price of the property indexed to consumer price inflation. While these regulations undoubtedly offset some of the wealth transfers from tenants to landlords that would otherwise occur in the face of rising demand for housing services, they have also contributed to a sharp fall in the share of rented accommodation in the total stock of housing to one of the lowest rates in the EU (Table 17). Allowing rentals for sitting tenant to be adjusted to market rates at regular intervals, such as every three years, would make owning

Table 17. **Shares of rental dwellings in the total stock of housing**

In per cent

Period	Belgium	Denmark	Germany	Greece	Spain	France	Ireland	Italy
Around 1980	38	49	61	25	21	45	24	39
Around 1990	33	45	61	20	15	42	18	25
Around 2000	28	40	60	20	10	42	16	19

Period	Luxembourg	Netherlands	Austria	Portugal	Finland	Sweden	United Kingdom
Around 1980	39	58	43	39	31	42	42
Around 1990	30	55	41	28	27	44	25
Around 2000	26	47	41	28	32	41	32

Notes: For Germany, 1980 and 1990 figures refer to West Germany. In the 1990s, the share of rented dwellings decreased by around 1.5 percentage points in West Germany and by more than 5 percentage points in eastern Germany.

Source: ECB, 2003.

rental accommodation much more attractive, increasing the supply and reducing incentives to hold vacant sites. Finland provides an encouraging example of the impact that lifting most rent controls can have in raising the share of rental accommodation (ECB, 2003). At the same time, income distribution concerns about the transfer of wealth from tenants to landowners, which in any case would be reduced by the increased price elasticity of supply of building sites, could be more efficiently met by increasing land taxes and reducing other taxes.

Conclusions

Immigration and the growth in frontaliers appear to be part of a process that has yielded substantial material benefits to Luxembourg citizens. This is most visible in allowing the private sector to continue expansion beyond the constraints of national labour supply growth while simultaneously allowing the public sector to absorb an increasing part of the resident labour force with Luxembourg nationality on attractive terms. This expansion relies on strong growth of government revenues that have benefited existing citizens also through generous transfers even where they may not have directly benefited through the labour or other markets.

Part of Luxembourg's success in attracting inflows of capital and labour has been a willingness to tune its regulatory and fiscal environment as far as possible to suit existing and potential foreign investors. This success probably benefits not only the Luxembourg economy but also the neighbouring regions, with direct effects from the earnings of frontaliers and indirect effects from local demand from Luxembourg for goods and services. However, public services, such as education, and transfer payments, such as unemployment insurance benefit in downturns, are financed by the central budgets of those countries.[138] The impact of this asymmetry on the neighbouring economies is small given their relative size, but may be quite significant for Luxembourg, where unemployment insurance for residents is being financed by a levy on wages.

In order to fully benefit from the high presence of foreign labour, Luxembourg must address the poor performance of the education system documented by the PISA study, which signals serious integration deficiencies. Consideration should be given to replacing the current compulsory mixture of French and German by a system allowing school students a choice of a single language, while teaching the other one and *Lëtzebuergesch* as foreign languages to meet integration goals. Given particularly poor achievement among children of non-nationals, effort should be made to eliminate the disadvantage caused by the use of *Lëtzebuergesch* for instruction in pre-school and primary school education. To ensure that performance standards are adequate, they should be defined and enforced nationally.

High inflows of foreign labour, especially cross-border workers have necessitated a vast expansion of transport services. This has, however, lagged behind growth in cross-border employment: there is chronic congestion on the motorways that bring cross-border workers into Luxembourg and overcrowding on trains. A lot of public funds are being spent on developing public transport, including park 'n' ride arrangements, another train line to Lorraine and the introduction of tram-train services. In addition, subsidies for public transport are very high by international comparison: ticket sales only cover a small share of operating costs. Cost-benefit analysis should be used to increase the efficiency with which public funds are spent on transport infrastructure and public transport subsidies. Road pricing should be introduced to ease congestion problems, finance an expansion of motorway capacity if warranted and reduce the need for public transport subsidies to achieve efficient relative prices for public and private transport.

High immigration has contributed to large increases in property prices: the average annual real increase in residential land prices was 6.3 per cent over 1980-2000. Ongoing reforms should be complemented by a relaxation of rental regulations designed to protect tenants: they have the perverse effect of making it difficult for many people to become tenants at all. In particular, it should be possible to adjust rentals to market rates at regular intervals (*e.g.*, every two or three years). The 5 per cent yield limit, which is not considered to be binding, should also be abolished.

Notes

1. Banks' net revenues from their own assets are not production in the definition of national accounts. These revenues fell sharply in 2002, accounting for the decrease in revenues from interest rate margins as a whole.
2. In real terms, FISIM increased in 2001 but decreased in 2002.
3. Non-financial sector real value added per person employed fell by less in 2001 and 2002 (by 0.4 per cent and 2.1 per cent, respectively), as real value added declined and staff numbers soared markedly in the financial sector. However, real value added numbers in the financial sector are quite erratic and should be interpreted with caution due to measurement problems such as accounting for intermediate consumption of FISIM (see Box 1) and calculating appropriate deflators of production and intermediate consumption in the financial sector.
4. Locally increasing returns to scale occur when an increase in output by x per cent can be achieved with less-than-x per cent increases in labour inputs and capital utilisation, as long as the latter has not reached limits of the capacity installed.
5. Higher variance of economy-wide labour productivity in Luxembourg does not, however, stem from the erratic behaviour of financial sector productivity as the peaks and troughs in the latter do not necessarily coincide with those in non-financial sectors. Over the period 1986-2002, the standard deviation of labour productivity in the non-financial economy (3.0 percentage points) was barely higher than in all sectors taken together (2.8) despite the much higher standard deviation in the financial sector (6.7).
6. The threshold is considered as being breached in the month when the six-month moving average of the national index of consumer prices (index 1 January 1948 = 100) exceeds the previous threshold by 2.5 per cent or more for the first time.
7. This estimate ought to be seen as an upper bound, as it assumes that all conversions from attractive prices in LUF into attractive prices in euro (38 per cent of all attractive prices by July 2002) were driven by the currency changeover alone, unless different information is available.
8. Owing to tax differentials, cross-border workers and tourists spend heavily on tobacco and vehicle fuels, boosting the share of these items in the HICP. The national index of consumer prices is based on residents' consumption patterns and therefore displays less steep an increase during periods of rising oil prices. Changes in taxation of tobacco also affect the two indices differently (STATEC 2000, p. 7).
9. Such fluctuations in the interregional inflation differential for processed food are not unusual because of the leading role played by one single wholesale trading company.

10. The triangle model of inflation relates the level of inflation to past inflation, the unemployment gap and the change thereof (as an expression of excess demand), and to a set of supply shock variables.
11. As discussed in Box 1, growth in valued added of the financial sector is overstated because intermediate consumption of interest rate margins (FISIM) is not deducted but overall GDP growth is understated because all interest rate margins are treated as intermediate consumption. These problems will be corrected when new ESA95 rules come into effect in 2005.
12. Disaggregating directly measured financial intermediation services (FISDM) where billing is linked to financial markets (this accounts for most FISDM value added) into price and volume components is fraught with difficulty as service volumes are not directly observable. STATEC deflates such value added by share or bond-market prices, as appropriate, adjusted for new share issues and share buybacks, and for increases in the Luxembourg CPI. This means that increases in commissions resulting from rising share values are classified as price increases, not volume increases. One potential problem with this approach is that increases in equity values associated with retained earnings pass into the price deflator whereas increases from new share issues do not. More generally, it should be kept in mind when interpreting real growth in financial services that there is a great deal of uncertainty about how to construct certain FISDM deflators.
13. For example, demand for hotel and restaurant services originating in the financial sector were completely ignored.
14. See Commission for Financial Sector Supervision (2001) (C*ommission de* S*urveillance du* S*ecteur* F*inancier*, CSSF) for the calculation of indirect demand effects originating in the financial sector. The latest study available refers to the year 2000. The reported figure for mutual funds, which covers funds whether managed by banks or by independent professionals, is based on the net surplus generated by mutual fund activities plus taxes on profits and labour costs. It is therefore significantly higher than what is suggested by sector NACE 65.230 of the national income accounts (2 per cent of nominal GDP).
15. The Directive covers a very wide range of interest earnings accruing to individuals. Besides cash deposits and security in the form of money, the definition of interest payments encompasses income from bonds (also those carrying a right to participate in the debtor's profits), debentures and similar negotiable debt securities. Accrued or capitalised interest realised on the sale or redemption of debt claims is included. Also included is income distributed by undertakings for collective investment (UCITS) insofar as such income derives from interest payments realised at the sale, refund or redemption of shares or units in UCITS that have invested more than 40 per cent of the assets in debt claims. By contrast, life insurances and equity funds as well as derivatives are not concerned.
16. The Channel Islands, the Isle of Man and the dependent or associated territories in the Caribbean must apply automatic exchange or, during the transitional period, a withholding tax under the terms set out in the Directive.
17. The three countries will also have to provide a mechanism enabling residents of other member states to avoid the application of the withholding tax by declaring their savings interest in the member state of residence or by authorising their banks to report the interest payments to the tax authorities (so-called voluntary disclosure).
18. The three countries have the possibility of moving to automatic exchange of information on a voluntary basis before the end of the transitional period.

19. Luxembourg's Parliament ratified the additional Protocol on tax matters to the European Convention on Mutual Assistance in Criminal Matters in October 2000. This enables signatories to the Convention that have also ratified the additional protocol to request information including bank information, from other signatories for the investigation and prosecution of criminal tax matters. Parliament also ratified the US Mutual Legal Assistance Treaty with the United States in October 2000. This treaty provides for exchange of information in criminal cases, including fraud cases.
20. Agglomeration economies arise when a firm locates near others with the same or related activities, reducing average production costs in that location. This may be because there are spatial external benefits, such as attracting a larger pool of specialised labour and enhanced diffusion of knowledge and/or savings on transaction costs.
21. Two years ago, the mutual funds industry had the largest amount of assets under management in Europe. In 2002 it came in second, falling slightly behind France. Private sector studies show that a high level of know-how has contributed to improving Luxembourg's competitive position both for mutual funds (Deloitte and Touche, 2002) and for private banking (Moody's, 2003).
22. Additional costs for banks from "Basle II" risk-management requirements further contribute to this trend.
23. The demand for financial advice is also set to rise as pension risks are gradually being shifted to individuals. This favours places with a tradition of private portfolio management.
24. In 2001 the surplus increased, despite the onset of the economic downturn, on account of the sale of satellite parking rights, which resulted in a one-off increase in the surplus by 2 percentage points of GDP.
25. The cyclical component declined from 1.2 percentage points of GDP in 2000 to –0.2 percentage points in 2002. It is estimated on the basis of the ESCB method for the calculation of cyclically adjusted budget balances. In this method cyclical components in government receipts and expenditure are not derived from the output gap, but directly from the cyclical components in (un)employment, wages, the operating surplus and private consumption. Since these components are estimated with an HP-filter, they are sensitive to the way series have been extended beyond 2002 to allow for the calculation of centred weighted moving averages in recent years. This problem is of particular importance in Luxembourg, where structural changes are likely to have taken place but cannot yet be assessed with any precision.
26. This estimate was made by the Central Bank of Luxembourg, based on a breakdown of social outlays paid to inhabitants and cross-border workers, the attribution of compensation of civil servants to residents and an attribution of 35 per cent of other government spending to cross-border workers (no adjustment was made for the fact that it is mainly residents who benefit from education outlays).
27. The central government corporate tax rate was reduced from 30 to 22 per cent, to improve the competitive position of Luxembourg and to stimulate investment. Including the municipal tax on corporate income, the *impôt commercial communal*, and the contribution to the employment fund, the "all-in" rate fell from 37.5 to 30.9 per cent. The gross effect of this measure was partly offset by a broadening of the corporate tax base through the abolition of the deductibility of the *impôt commercial communal*.
28. On an accruals basis, growth in corporate taxes would probably have slowed instead, since about 35 per cent of government revenues in Luxembourg is accounted for by the financial sector, which was severely hit by both the economic slowdown and the passing of the stock market bubble.

29. The tax cuts comprised a substantial increase in the exemption threshold in personal income taxes and a reduction in tax rates and in the maximum (marginal) tax rate, in order to create additional incentives for the working-age population to participate in the labour force.
30. Government investment turned out to have been weaker in 2002, but the government maintained its original projection of investment in 2003, implying an increase by 13 per cent. Compensation of government employees and social security outlays are projected to grow by around 7 per cent in 2003.
31. Excise taxes are redistributed on the basis of an agreement between both countries.
32. Expenditure on such benefits fell by 3 per cent in real terms between 1995 and 2001 from 2.6 to 1.8 per cent of GDP.
33. The main assumptions underlying the central scenario are reproduced in the table below. Bouchet (2003, p. 8) points out that many of them are favourable to stability of the pension system. In particular, female-labour-force participation rises, inflows of cross-border workers and immigrants remain high and the mortality rate only declines by 0.3 per cent per year, which is less than in recent years.

Assumption underling the central scenario

	Inflation rate	Growth of real wage rates	Labour productivity growth
		Per cent	
2002	2.1	1.4	–2.2
2003	1.4	1.3	1.9
2004	1.7	1.4	1.7
2005-85	1.9	2.0	2.0
Births	Fertility rate stable at level observed in 2000		
Death rate	Gradual reduction of the death rate (–22 per cent from 2001 to 2085)		
Immigration	Net inflow of 4 000 immigrants per year		
Cross-border workers	Net inflow of 6 700 cross-border workers in 2002, 4 000 in 2003, 3 300 in 2004, 5 000 in 2005 and 7 000 per year from 2006 to 2085		
Labour force participation rate	Gradual increase for women, stability for men. Consequently, women represent 45 per cent of the labour force in 2085, compared with 39 per cent in 2001		
Pensions	Includes measures discussed at the *Rentendësch*. The contribution rate is held at 24 per cent of gross income		

Source: OECD.

34. Between 1990 and 2000, the increase in employment of foreigners accounted for most of the increase in employment. Total employment rose 7 500 persons per year against a net annual inflow of 6 000 cross-border workers, with most of the remaining growth coming from immigration. To attain average economic growth of 3 per cent, net cross-border inflows averaging 7 000 per year and an annual immigrant flow (not all of whom become economically active) of 4 000 would be necessary.

35. Contributions were 31 per cent of the total, while expenditures represented 17 per cent of the total.
36. Other measures included increasing the revaluation factor for contributions made after the age of 55 for those people with 38 years contributions in order to compensate people who entered the labour force at an early age. Some part of the increase in outlays from this measure could be offset by people staying longer at work. The early payment of pensions is not, however, subject to any actuarial reduction for the longer period for which the pensions are paid.
37. If the economy grew at 4 per cent, the contributions would rise to 27 per cent but would reach 50 per cent if growth averaged 2 per cent (IGSS, 2002b).
38. This rule allows the average man to retire at 61.
39. In the 25-34 age group 75 per cent of women are employed (men: 92 per cent), while employment rates in the 35-44 and the 45-54 groups are 65 and 51 per cent, respectively (men: 96 and 90 per cent). The employment rate for women aged 25-34 is significantly higher than the EU average, suggesting a relatively strong cohort effect to come in Luxembourg.
40. Intertemporal comparisons involving specific age groups of a given gender are subject to more severe problems of sampling error in Luxembourg than in other countries due to very small sample size.
41. Long-term pensions include the retirement pension, the early retirement pension, pre-retirement pensions, the disability pension and the survivor's pension.
42. Article 187 of the 1987 law on social security already defined a disabled person as one who has become unable to carry on the occupation of her last post or another occupation suited to her capacity.
43. These shares overstate the incidence of disability in the population and the labour force because some disability pensioners are non-residents. A factor diminishing the extent of this over statement, however, is that cross-border workers are under-represented in the disability scheme owing to their younger age profile.
44. The new law paves the way towards this choice as it introduces the possibility for the government of specifying the medical criteria in assessing the state of disability by simple regulation.
45. The effect of the reform on the number of applications relative to the labour force is unclear. On the one hand, potential applicants could anticipate external redeployment and – depending on the probability of being placed – dislike the uncertainty surrounding the process. But on the other hand, being redeployed within the enterprise or working fewer hours while maintaining one's income level makes applying for a disability pension even more attractive than in the past. However, the failure of the government programme on subsidised gradual part time for older workers points to early retirement rather than reduction of the workload as being the main motive of many disability pension applications. Consequently, the number of first applications could come slightly down even without strengthening the medical criteria.
46. According to the authorities, only a few firms asked for permission to refrain from internal redeployment during the first months under the new regime but organisational innovations to adjust workplaces to reduced capacity appear to be limited so far.
47. As for the replacement rate of retirement pensions and early retirement benefits, this would also contribute to the sustainability of the pension system.
48. A fourth variant (*préretraite progressive*) failed to attract applicants, as noted above.

49. The basis is extended to the average of the last 12 (in exceptional cases even 18 months) if this is more advantageous for the employee (IGSS, 2002b, p. 226).
50. This mainly concerns blue-collar workers with often-difficult work conditions.
51. The last *Survey* pointed out that unlike in most other countries, average earnings for men kept rising until the very highest age group (60-64).
52. The RMG is reduced on a one for one basis, as net income rises. This results in a net withdrawal rate in excess of 100 per cent because employee social security contributions are deducted from net earnings but not from the RMG.
53. Three dimensions matter in assessing the impact of socio-economic conditions on performance: the *slope* is stronger than in the OECD on average (a given difference in the socio-economic background affects performance more strongly), as is the *strength* of the relationship, suggesting that exceptions from the general finding that better socio-economic conditions are associated with higher performance are less frequent. Finally, the initial inequality that schooling has to correct is more marked than in the OECD on average, implying that the challenge is particularly high.
54. In Luxembourg, 52 per cent of mothers of participants in PISA only completed primary or lower secondary education, compared with 29 per cent for the OECD total.
55. Other factors had no significant or a below-average impact on student performance: single-parent family, number of siblings, and parents' occupational status and years of schooling (OECD, 2001b, p. 309).
56. Primary schools are run by the municipalities. While there are advantages associated with management responsibilities placed at lower hierarchy levels (see below), the choice of the language of instruction is of strategic importance for the overall performance of the national education system and should therefore be taken by the central government.
57. Teacher-related factors affecting school climate are the extent to which students are encouraged to achieve their full potential, to which their specific needs are met, student-teacher relations in general, staff resistance to change, and teacher absenteeism (OECD, 2001b, p. 168).
58. This would imply confining the role of unions to questions of general work conditions such as minimum salary and hours worked.
59. The PISA study provides an overview over several aspects of autonomy that are or are not delegated to the school level (OECD, 2001, p. 305). The only information available for Luxembourg was that there is some autonomy in formulating the school budget, deciding on budget allocation within the school and approving students for admittance.
60. Luxembourg's e-government project, which aims to put government services on line, was launched in the context of e-Luxembourg, a multi-annual programme to make better use in Luxembourg of the opportunities offered by the information society which was adopted in 2000 following the European Summit in Feira on the knowledge economy. At present, the main public institutions or bodies with an own site are the government, (some) ministries, parliament, the national library, the Chamber of Commerce, and the national statistical office (STATEC). Also, all legislation is now available on the internet.
61. A telephone survey on e-government and the need for it is undertaken every six months by the ILReS, the *Institut Luxembourgeois de Recherches Sociales et d'études de marché* on behalf of the government. Results are published in the national scoreboard (*Tableau de bord e-Luxembourg*).

62. The deputy Minister of public service and administrative reform (of the *ministère de la Fonction publique et de la Réforme administrative*) defines the policy objectives of e-government. He is helped by the e-government working group, which has broken down the process of the introduction of e-government into many aspects, steps and sub-steps. The e-government working group has installed several other working groups. These groups in turn are helped by the e-Luxembourg task force and get advice and comments from the *Centre informatique de l'État*.
63. By the end of 2004 the exchange of all information between public sector bodies should be encrypted and firewalls should be installed. Rules have already been introduced which govern the use of Internet on the RACINE network of the State.
64. Many studies have found that organisational changes are needed for private sector firms to increase productivity through ICT investment. See for example Arnal *et al.*, 2001, concerning US manufacturing firms, and Van der Wiel (2001) concerning the business services sector in the Netherlands. This paragraph draws on OECD (2003c).
65. Within the public sector changes in responsibilities will be needed depending on the outcome of the two programmes the government distinguishes: horizontal programmes (between public agencies) and vertical sub-programmes (within government bodies). The former will be given priority. The Social and Economic Council has emphasized that e-government services need no longer precisely reflect the organisation of the public sector.
66. The heavy administrative burden was not the only factor behind the low number of start-ups in Luxembourg. In 2001, Luxembourg was the EU country where people were least inclined to accept the risk of failure (European Commission, 2001b). According to the authorities this would even be the main problem as regards start-ups (Grand-Duchy of Luxembourg 2001). However, one of the three main recommendations made by the European Commission for Luxembourg was to take measures to reduce the administrative constraints and to develop on-line administration.
67. Two surveys were carried out in 2002, one by the MFPRA, the employers organisation (FEDIL) and the Centre of Public Sector Research Henri Tudor (to evaluate the relationship between the administration and citizens and enterprises) and the other by the *Institut Luxembourgeois de Recherches Sociales et d'études de marché* (ILReS) (to investigate the needs of citizens).
68. Since September 1998, any new legislation must be accompanied by an "impact on SME" report. Since early 1999 a Formalities Centre is operational at the Chamber of Commerce. It is responsible for the collection of documentation necessary for the setting up of new companies and their transfer to the relevant authorities.
69. Another ministry involved is the *ministère des Classes moyennes*, charged with the distribution of permits to shops and other SME's. In 2002, the waiting periods have already become somewhat shorter, but progress with introduction of the one-stop shop was limited.
70. Organisational audits have already been done, on the basis of the Common Assessment Framework developed by the European Commission, in the Ministry of Transport (2000), the *Administration des Eaux et Forêts* (2001) and the *Centre des Imprimés et des Fournitures de Bureau de l'État* (2002).
71. Luxembourg P&T monthly charges (including VAT) for DSL access are € 60.38 for 256 kilobytes per second (kbps) downstream and 64 kbps upstream, € 86.25 for 512 kbps downstream and 128 kbps upstream and € 132.25 for 1 024 kbps downstream and 128 kbps upstream. These prices are the same as those for September 2002 that underlie Figure 22.

72. Tiscali charges a monthly fee (including VAT) of € 80.50 for 512 kbps downstream and 128 kbps upstream but installation charges (€ 346.15 including VAT) are significantly higher than for Luxembourg P&T (€ 149.50 including VAT). The other main competitor, Cegecom, charges a monthly fee (including VAT) of € 84.78 for such access but has lower installation charges (€ 139.13, including VAT).
73. The prices approved by the Luxembourg Institute of Regulation (l'Institut luxembourgeois de régulation) are high, whether it be for unbundled access or shared access (European Commission, 2002a).
74. Work is underway to increase the proportion of households with access to two-way cable services to 78 per cent.
75. The price for such access (€ 61.49) is almost the same as for comparable DSL access (€ 60.38) through Luxembourg P&T.
76. Speeds of up to 1 024 (kbps) downstream and 128 kbps upstream are available with DSL.
77. Belgium provides a good example of the stimulus that inter-modal competition gives to infrastructure development. In response to the offer of the largest cable company (Telenet) of a download speed of 4 Mbps, Belgacom now has a target of 3 Mbps for all DSL offers. Many countries now have broadband Internet speeds far in excess of those available in Luxembourg.
78. The premium ranges from EUR 0.025 to EUR 0.55 per kilowatt-hour (M*inistry of* E*nvironment*, 2001).
79. These estimates assume that the marginal alternative fuel source being replaced is coal for domestic heating. This assumes that the calorific value of one tonne of coal is 30 gigajoules, the energy conversion efficiency is 20 per cent, and the carbon content of one tonne of coal is 746 kilograms. The investment subsidy available is not included. Notwithstanding its high cost, an expansion of photovoltaic electricity is set to play an important role in achieving the target for renewable energy.
80. The consumption of companies that purchase electricity at a voltage of above 65 kV is excluded from the base used to calculate the levy until 2006.
81. *www.gouvernement.lu/salle_presse/actualite/*2002/03/18*goeberger/*
82. The emissions from these sales should be included in the Luxembourg total, according to internationally-agreed guidelines.
83. These types of abatement are Clean Development Mechanisms and Joint Implementation. The Clean Development Mechanism allows part of the reduction in GHG emissions as a consequence of an investment in a developing country to be counted as national emission abatement. Joint Implementation is similar, but applies to two countries with emission reduction targets. In this case, the abatement is split between the two countries to prevent double counting.
84. For a far fuller analysis of development co-operation policies see OECD (2003e).
85. Luxembourg's trade statistics capture only direct trade between partner counties. Imports from the least developed countries are also very unstable. They jumped tenfold in 2001 relative to 2000. However, preliminary data for 2002, reporting a fall of nearly 90 per cent, suggests that there has been no sustained increase in imports from these countries.
86. Welfare gains flowing from the reduction in tariff barriers by the European Union as a whole are estimated to exceed 1 per cent of GDP in countries such as Malawi and Tanzania (UNCTAD *and Commonwealth Secretariat*, 2001).

87. In the presence of a large degree of distortion in developing country agricultural markets, the small terms-of-trade loss could be transformed into a welfare gain, even if the domestic distortions are not ended.
88. This result is conditional on the particular assumptions used in the simulations, notably that are imperfectly competitive sectors that exhibit increasing returns to scale.
89. Fischler (2001).
90. European Commission, 2002c.
91. The key element of the new, reformed CAP is introducing a single farm payment for EU farmers, independent from production, although limited coupled elements may be maintained to avoid abandonment of production. Further details about the reform can be found at: *http://europa.eu.int/comm/agriculture/mtr/index_en.htm*
92. In addition, international comparisons need to be made with care. Luxembourg shares with a number of other European countries, such as Germany, a statistical methodology and nationality policy which combine to make estimates of the immigrant population higher than some other methods. Notably, Luxembourg counts those with foreign nationality, rather than those born abroad. At the same time, its nationality policy means that children born in Luxembourg to the significant share of parents without Luxembourg nationality are counted as foreigners themselves (see below).
93. Luxembourg is (together with Germany) the second most important destination of frontaliers in Europe, only outperformed by Switzerland (Tibesar-Chomard, 2002).
94. Nearly all of the frontaliers (94 per cent) are citizens of the neighbouring countries (Belgium, France and Germany).
95. For example, in the recession of the early 1930s the share of foreigners in the population fell considerably, from nearly 19 per cent in 1930 to 13 per cent in 1935.
96. In the 1990s, the difference was not large, and it has varied in size (and occasionally in sign) over time. Over the three decades since 1969, the fertility rate among foreigners has averaged just over 64 births per thousand females aged 15-44, compared with 54 for nationals. In 1996-98 the figures were 62 and 58 respectively.
97. According to the 2001 census, of about 59 000 Luxembourg residents (of all ages) with Portuguese nationality, almost 16 000 (27 per cent) were born in Luxembourg. For Italian nationality, the corresponding figures were 19 000 and 7 000 (37 per cent). The average across all non-Luxembourg citizens was 23 per cent.
98. The law provides for acquisition of nationality by naturalisation or by "option", the latter applying mainly to children; the text uses "naturalisation" to cover both procedures. In the year 2000 there were 684 naturalisations or options. By comparison, the gross migration inflow was 11 765 and the net inflow was 3 644 in the same year. This rate of naturalisation is equivalent to about 0.3 per cent of the immigrant population, which is low compared with rates in other countries: the Netherlands (9.5 per cent), Denmark (4.8), France (4.2), Germany (4.0),Belgium (2.7), the UK (2.3), Spain (2.0), Switzerland (1.5), Italy (0.9), Portugal (0.5).
99. This may exaggerate the share of "immigrants" in the population compared with other countries where immigrants take up citizenship more readily, thereby ceasing to be a "foreigner", and/or where nationality is acquired by birth.
100. Family reunion (of non-EU citizens) is limited to dependent children and spouses of immigrants with work permits valid for at least four years, and where adequate accommodation is available. Adult children and parents of immigrants may have the right to enter provided the applicant has been their only means of support for two years, and

has suitable accommodation for them. Luxembourg legislation enshrines these rights only for citizens of Luxembourg and the European Union, but in practice appears to extend them to all immigrants (Council of Europe, 2002).

101. Three types of work permit, known as A, B and C, are issued. A is valid for only one year, and generally ties the employee to a specific job with a specific sector. B (valid four years) and C (valid indefinitely) allow free movement between sectors; in both cases successful visa applicants are entitled to a residence permit, renewable every five years.

102. The European Commission has recently started a case against Luxembourg in the European Court, in respect of its refusal to grant work permits automatically to non-EU employees of companies from other EU countries where these companies wish to use their non-EU employees for contracts in Luxembourg. Luxembourg subjects these cases to a labour market test, which is inadmissible according to the Commission, which also criticises the manner in which bank guarantees may be demanded of foreign workers. Austria has also been cited by the Commission for similar practices, as were Belgium and Germany in 2002.

103. For a more comprehensive discussion of the policy challenges faced by Luxembourg's pension system and solutions beyond high population growth, see Chapter II.

104. This includes Lorraine in France, Wallonie in Belgium, Saar and Rhineland-Palatine in Germany.

105. Professions in which foreign resident employees are over-represented include construction workers, unskilled sales personnel and household and security services on the one hand and intellectual and scientific workers other than in education and company directors and management executives on the other (STATEC, 2002c).

106. All sectors in which Luxembourg citizens occupy an above proportional share of jobs have a public sector orientation: Public Administration (90 per cent), Public Utilities (66 per cent) and Public Services (41 per cent) while Luxembourgers are underrepresented in Consumer (19 per cent) and Business Services (24 per cent).

107. In the case of financial services the indirect effect is estimated to be about one-quarter of the direct effect.

108. Available figures do not distinguish the *ownership* of these companies.

109. Figures from IGSS quoted in Fondation européenne pour l'amélioration des conditions de travail (2002), "Le travail intérimaire : rapport national, Luxembourg". *www.eurofound.ie/publications/files/*EF0231FR.*pdf*

110. Among frontaliers, Belgians averaged about the same hourly wages as residents while German workers earned about 8 per cent less, and French workers about 20 per cent less.

111. The public sector (public administration, education, health and social services) share of total employment is 21 per cent (see Table 13). Public sector jobs – in particular in administration – are therefore heavily over-represented among Luxembourgers.

112. OECD (2002b).

113. Immigrant employment amounts to 72 per cent of the (resident) immigrant population aged 20-64, compared with 67 per cent for the corresponding ratio for the population with Luxembourg nationality.

114. According to European Union regulations, cross border workers receive their pension from the country where they retire with the pension calculated on a pro-rata basis.

Luxembourg public pensions tend to be higher than in the surrounding countries, hence the fiscal burden for Luxembourg will be reduced if some of the cross border workers retire outside Luxembourg.

115. There is a reserve fund, which stood at between two and three times annual pension expenditure at the end of the year 2002.
116. Compatible with a 1 per cent per annum population increase over the same period.
117. Bouchet (2003) makes this calculation as at the year 2050 in the context of a simulation that varies immigration and frontalier flows after that date to keep the population from exceeding 700 000. It is thus a suggestion of an order of magnitude rather than a good estimate of the current contribution of immigration or frontaliers.
118. The PISA study presents a series of standardised tests of linguistic and mathematical ability carried out in a large number of OECD countries.
119. Most OECD countries participated in PISA 2000, along with Brazil, Latvia, Liechtenstein and Russia. Only a few of these countries have a large gap between the children of nationals and those of immigrants, Germany and Switzerland coming closest.
120. The PISA study allows children to be distinguished either by the nationality of their parents, or by the main language spoken at home. Whichever distinction is used, the gap in Luxembourg between natives (or native language speakers) and foreigners (or foreign language speakers) is of the same magnitude, and is larger than for all other countries (OECD, 2001b).
121. See Chiswick *et al.* (1998, 1999, 2001, 2003).
122. For example, a child may be taught science in French in some years and in German in other years.
123. *Lëtzebuergesch* is in fact closely related to German, and would have a similar status to many other near-German dialects, if it were not for the fact that Luxembourg is an independent country. There are similarities with the status of Swiss-German in Switzerland, with the notable difference that education in the German-speaking part of Switzerland does not use Swiss German at any stage, rather concentrating on high German. German was in fact the official language in Luxembourg up to WWII. *Lëtzebuergesch* became an official language only in 1984.
124. The argument is based on the non-similarity of the relation between sounds and spelling rules in Germanic and Romance languages. A child with a non-Germanic language at home will not understand things that will be relatively obvious to children with *Lëtzebuergesch*-speaking parents. The resulting delay in learning to read and write can result in poor performance in other subjects.
125. Of 1 266 employees in the education sector in 2001, 80 were Portuguese, where the concentration of language difficulties would be expected to be the greatest. There were 196 Belgians, 216 French and 57 Germans.
126. The busiest motorways – in the direction of Arlon, Metz and Trèves – are at full capacity. The least incident leads to big traffic jams. (Motorways represent only four per cent of the road network but carry 25 per cent of the annual traffic). There are bottlenecks at the entrance to Luxembourg City, Esch/Alzette and Ettelbruck-Diekirch. Concerning passenger rail transport, capacity is insufficient at peak hours owing to the large increase in cross-border workers in recent years. Despite an increase of 23 per cent in the number of passengers per week since 1996, the number of seats has not increased since 1995. This situation is unlikely to improve for several years owing to the delays in delivering rolling stock on order and in expanding network capacity. The

line from Luxembourg to Bettembourg and on to the French border is already at full capacity, making it impossible to expand services to satisfy demand (CES, 2002, pp. 40-41).

127. While the CES supports action to deal with these infrastructure shortages, it is critical of the way that infrastructure policies have been reactive rather than proactive (CES, 2002). In view of the prospective pressures from immigration and future inflows of cross-border workers, the CES strongly urges the government to adopt a more pro-active approach.

128. As road pricing is unlikely to be applied on all roads, the external costs of greenhouse gas (GHG) emissions should be internalised by a carbon tax on fuel set at the same rate for all emitters (*e.g.* including heating of buildings). This would minimise the cost of reducing emissions by equalising abatement costs for all emitters (see the section on climate change in Chapter III).

129. This is also partly attributable to weaknesses in the decision making process in general (*i.e.*, not just concerning road infrastructure) (CES, 2001b, p. 57). The CES argues that the decision making process could be made more efficient and rapid by:
   - greater involvement of all interested parties in the public decisions, with it being understood that the public interest takes precedence over private interests;
   - simplification of administrative procedures at all levels; and
   - a regrouping of municipalities into entities big enough to satisfy the general interests of citizens efficiently.

130. These deductions are high. For example, someone commuting 38 kilometres is entitled to an annual tax deduction of € 1 980.

131. By way of comparison, ticket sales cover 30 per cent and 70 per cent, respectively, of the operating costs of the Paris Métro and the London Underground. Indeed, the Luxembourg subsidies are so high that ticket sales provide little revenue after taking into account collection costs.

132. House prices deflated by the consumption deflator.

133. These data come from non-harmonised national data sources. Consequently, caution is required when making international comparisons.

134. Caution is required in interpreting the results for Luxembourg as household disposable income has had to be approximated using labour income data. Specifically, compensation of employees (WSSS) was grossed up to cover self-employed workers (on the assumption that their average labour income is the same as for employees) but reduced [by multiplying the result by resident employment (ET) divided by domestic employment (ETNIA)] to reflect the fact that part of these earnings are attributable to cross-border workers.

135. The government is also considering reducing administrative delays in granting building permits. This would increase the speed with which the housing supply could rise in response to an increase in demand, reducing price pressures when demand is rising strongly.

136. The percentage of the national territory covered by buildings or roads rose from 7.4 per cent in 1999 to 10.0 per cent in 1999 (ministère de l'Environnement, 2002). The objective in the National Sustainable Development Plan is to stabilise the annual increase in the amount of territory covered by buildings and roads by 2005 and to reduce this increase by 50 per cent by 2010 (*ibid.*).

137. Overall, rental yields have fallen since the mid-1980s – real rentals increased by 64 per cent over 1985-2000 whereas real housing prices rose by 87 per cent, indicating a decline in rental yields of 13 per cent (OECD calculations based on data in ECB, 2003). Given the rental regulations in place, the decline in rental yields for sitting tenants would have been much greater.

138. Frontaliers generally have the right to public health care both in Luxembourg and their country of residence. *Ad hoc* agreements have been made between Luxembourg and neighbours for co-financing some infrastructure projects, such as improved road and rail connections, but there remain complaints among frontaliers that transport links are underdeveloped.

List of acronyms

APW	Average Production Worker
ALMP	Active labour market policies
BCL	Central Bank of Luxembourg (*Banque centrale du Luxembourg*)
CAT	Work activation contracts (Contrat d'activation au travail)
CES	Social and Economic Council (*Conseil économique et social*)
CEPS/INSTEAD	Centre for Population, Poverty and Public Policy Studies/International Networks for Studies in Technology, Environment, Alternatives, Development
CFL	*Société Nationale des Chemins de fer luxembourgeois* (National Railway Company)
CO_2	Carbone dioxyde
CSSF	Commission of Financial Sector Supervision (*Commission de Surveillance du Secteur financier*)
DAC	Development Assistance Committee of the OECD
DSL	Digital Subscriber Line
ECB	European Central Bank
ESA95	European System of National Accounts, version of 1995
FDI	Foreign Direct Investment
FEDIL	Luxembourg's Employers Assocation
FISDM	Financial intermediation services directly measured
FISIM	Financial intermediation services indirectly measured (interest margin)
frontalier	Cross-border worker
FTE	Full time equivalents
GHG	Greenhouse gas
GNI	Gross national income
Grande région	Greater region (including Luxembourg, Lorraine, Wallonia, Rhineland-Palatine, and the Saarland)
HICP	Harmonised index of consumer prices
ICT	Information and communications technology
IEA	International Energy Agency
IGSS	Inspection générale de la sécurité sociale
ILO	International Labour Office
ILR	Luxembourg Institute of Regulation (*Institut luxembourgeois de régulation*)
IMF	International Monetary Fund
INSEE	*Institut national de la Statistique et des Études économiques* (France)
ISCED	International standard classification of education
MFN	Most favoured nation

MFPRA	Ministry of Public Service and Administrative Reform (*ministère de la* Fonction *publique et de la* Réforme *administrative*)
NNI	Net national income
PPP	Purchasing power parities
PSTN	Public Switched Telephone Network
SME	Small-and-medium-sized enterprises
SNA	System of National Accounts
SSM	Statutory minimum wage (salaire social minimum)
STATEC	*Service central de la statistique et des études économiques* (Luxembourg's Statistical Office)
TFP	Total factor productivity
UNCTAD	United Nations Committee for Trade and Development
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value added tax
WTO	World Trade Organisation
WW II	World War Two

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Annex I

Output gaps, unemployment gaps, and the Phillips curve

The availability of cross-border workers makes aggregate supply elastic…

Strong growth prior to 2000 did not result in huge excess demand because of massive hiring of additional cross-border workers, the growth rate of which averaged 9.2 per cent during the past ten years. This pool of labour can be mobilised quite easily due to higher net wages in Luxembourg and high unemployment in the neighbouring regions.[1] Such recourse to cross-border workers appears to underlie the simultaneous observation of substantial ups and downs in real GDP growth on the one hand and changes in inflation generally in line with that in other euro area countries on the other. Indeed, the standard deviation of inflation from 1985 to 2002 was 1.2, the same as for France and the euro area average, 1.1 for Belgium and 1.4 for Germany.[2] Recent research on output gaps, Phillips curves and the NAIRU also points in this direction. These contributions, briefly outlined in the following, use an unemployment concept, the unemployment rate *Grande région*, which extends beyond the national territory to reflect Luxembourg's openness to cross-border workers (Box A1).

Guarda (2002) applies various procedures to decompose Luxembourg's real GDP into trend and cycle (linear deterministic trend, Hodrick-Prescott filter, univariate unobserved component (UC) model, two variants of multivariate UC models, and production function) and reviews them critically.[3] One key conclusion is that the uncertainties in assessing the output gap are generally so huge (due to the difficult delimitation of the labour supply[4] and the non-availability of quarterly national accounts) that no single de-trending method should be uniformly preferred over others. Nevertheless, the multivariate UC models all in all yield more plausible estimates for the output gap than other approaches. Moreover, they appear to be less subject to methodological criticisms than most of the other techniques in the Luxembourg context.[5]

One of the UC models is based on Apel and Jansson (1999) and determines the output gap and the relevant unemployment gap (or NAIRU gap) simultaneously using Okun's law and Gordon's (1997) "triangle model" of inflation. Both gap terms give the same indication (inflationary or disinflationary pressure) at virtually any point in time as they change signs in the same periods, 1988, 1994, and 1999 (Figure A1, comparing Panels A and B). In 2002, however, unemployment was still slightly below the NAIRU, whereas the output gap already dipped into negative territory, underlining the lagged and relatively weak reaction of employment to the downturn. The coefficients suggest that an unemployment gap of one per cent is associated with a fall in the output gap by a little over 3 per cent after two years and leads to a reduction in the inflation rate by 2.7 per cent. The other UC model presented by Guarda (2002) is based on Kuttner (1994). In a simultaneous approach it decomposes GDP into trend and cycle and uses the cyclical component as the excess-demand term in a simple inflation equation. The differences between the two measures of the output gap in the

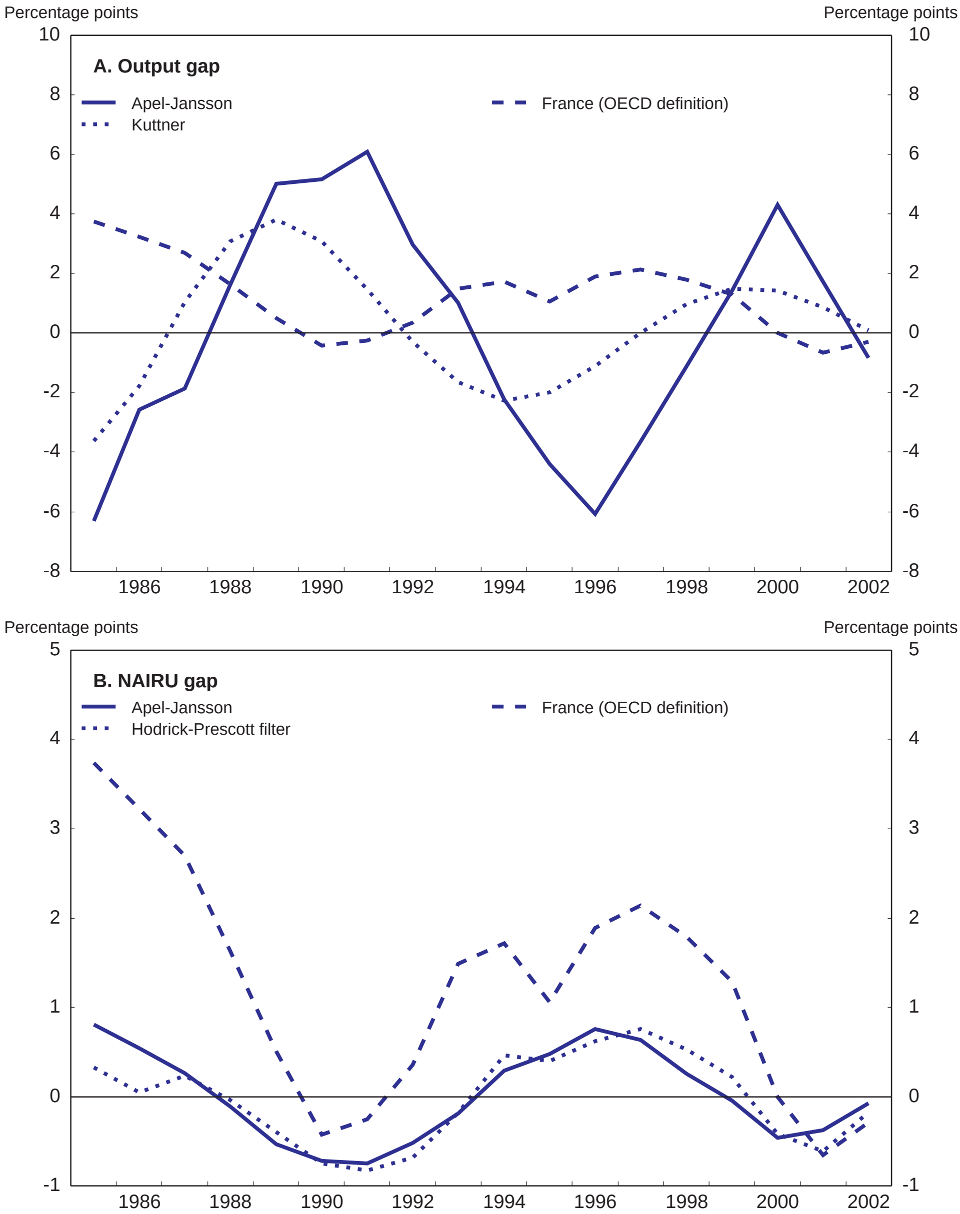
Box A1. **The unemployment rate *Grande région***

Given that the national unemployment rate is economically not very meaningful as a measure of excess demand, national researchers have developed a Luxembourg-specific measure of unemployment in the larger economic area, the *Grande région*. As a forum for various co-operation initiatives, the *Grande région* includes Luxembourg and the neighbouring regions, Lorraine, the Walloon region, the Saarland and Rhineland-Palatine. Yet for the construction of the *Grande région* unemployment rate, only the six provinces that supply over 90 per cent of all cross-border workers are included. These provinces are the French Meurte-et-Moselle and Moselle, the Belgian Luxembourg and Liège, the German Saarland and Trier. The unemployment rate *Grande région* is an average of the rates prevailing in Luxembourg and each of the six provinces, weighted with the relative share of workers from each area in Luxembourg's domestic employment. It has been used to derive a non-accelerating-inflation rate of unemployment (NAIRU) that feeds into empirical assessments of the output gap and the Phillips curve. Ways of deriving the NAIRU from the unemployment rate *Grande région* include univariate filtering (*e.g.* the Hodrick Prescott filter, STATEC 2002b), multivariate filtering in the context of unobserved component models (Durand, 2002 and Guarda, 2002) and system estimation (Guarda, 1999). An unavoidable feature of this measure is an upward trend over and above that observed in the national unemployment rate as the importance of crossborder workers increases. This is because of the higher unemployment rates in the neighbouring provinces. Due to the small size of the Luxembourg labour force compared with the non-Luxembourg one, the positive effect of huge increases in cross-border workers on the regional weights in the measure has outweighed the negative effect of a declining differential in unemployment rates.

nineties are most likely due to the supply shock variables added and the co-movement between the unemployment and the output gap in the Apel-Jansson approach. The sharp increase in the regional unemployment rate in the mid-nineties partly makes up for the more negative output gap captured in the Apel-Jansson approach.[6]

The output gap estimates obtained from the Cobb-Douglas production function with constant returns to scale come quite close to those obtained from the Apel-Jansson UC model while being somewhat more erratic (Guarda 2002, p. 42). First the parameters of the production function are obtained by system estimation (seemingly unrelated regression) using various cross-equation restrictions derived from optimising behaviour of firms.[7] These estimates enter the computation of the Solow residual that is decomposed into trend and cyclical components using the Hodrick-Prescott filter.[8] Adam (2003) also presents potential output and output gap estimates derived from a Cobb-Douglas production function. Unlike Guarda (2002) he directly uses the observed share of wages in GDP as the coefficient of labour and restricts the trend contribution of TFP (1.4 percentage points) to be constant by using the linear trend since 1970. This tends to smooth the estimate of potential growth. Nevertheless, his output gaps are not more volatile than Guarda's, suggesting some

Figure A1. **Output and unemployment gaps**



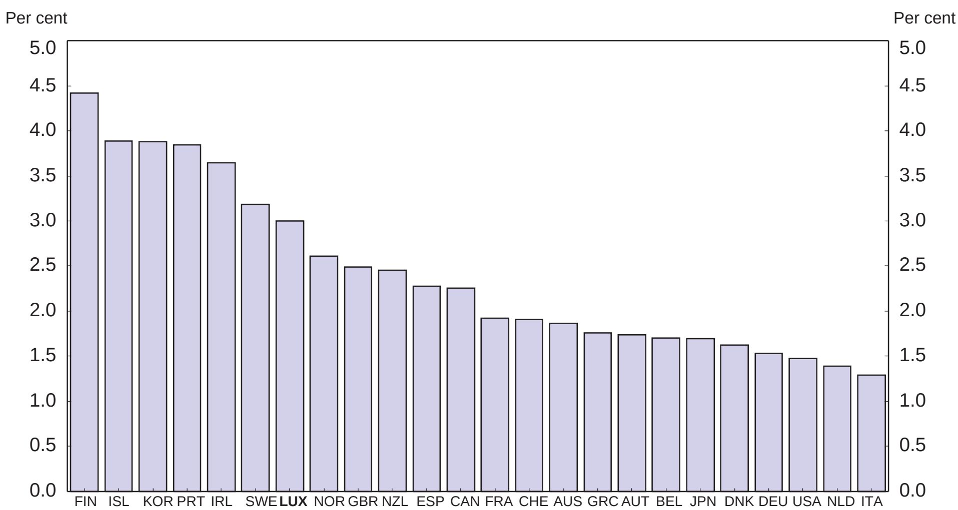
Source: Guarda (2002); Central Bank of Luxembourg; STATEC and OECD.

offsetting between the cyclical components of TFP and labour. The results in Adam (2003) enable four episodes in Luxembourg's recent economic history to be distinguished, two with positive output gaps (1985-1991 and 1997-2000) and two with negative output gaps (1992-1996 and 2001-2002, forecast to extend into 2005). The results appear to be plausible insofar as the mark-up (measured as the inverted share of wages in GDP) reaches its peak (trough) relatively early in a phase of positive (negative) output gaps, in line with the well-known anti-cyclical behaviour of the share of wages in domestic income. Furthermore, using the same episodes, actual TFP growth appears to peak early in the expansion, suggesting that most efficiency gains are made as capacity idleness is reduced and before additional staff are hired.[9]

… resulting in output gap variability almost in line with that of most OECD countries

Fluctuations in the output gap estimated by Guarda (2002) are more in line with those observed in other OECD countries than fluctuations in real GDP growth, corroborating the hypothesis of relatively elastic aggregate supply in Luxembourg. The standard deviation of the output gap is 3 per cent compared with 2.3 per cent for the non-weighted average of 23 other non-emerging OECD economies for the period 1985-2002. Standard deviations of actual growth in real GDP differ more strongly (Luxembourg: 3.2 per cent, 23 OECD countries: 2.0 per cent). Although Luxembourg is the second smallest economy in the OECD in terms of GDP, there are six other countries with higher fluctuations in the output gap (Figure A2).[10] It is true that the output gap tends to fluctuate more strongly in small open economies – the Pearsson rank correlation coefficient between real GDP and the standard deviation of the output gap is –0.56 for the 24 countries analysed. Nevertheless, cross-country differences in

Figure A2. **Standard deviation of output gaps**
1985-2002



Source: OECD.

supply conditions may explain why the standard deviation for a country like Iceland is higher than for Luxembourg.[11] Both economies produce about one-fourth of their value added in the dominant sector, respectively fishery and financial services, but differ in their ability to respond swiftly to increases in aggregate demand by drawing in additional labour. The estimates for Luxembourg show that a large output gap has not built up over the past two years despite very low growth, reflecting the high elasticity of aggregate supply and the fact that output was significantly above trend in 2000. Reflecting the role of elastic labour supply in making aggregate supply elastic, *Grande région* NAIRU gaps derived from various national studies (Adam 2002, Durand 2002, Guarda 2002) display much smaller fluctuations compared with those of larger countries such as France.[12] Combined with output gap variance roughly in line with that in most other countries, this means that in Luxembourg a given change in the unemployment gap implies stronger swings in the output gap.

Domestic excess demand is less important than in other countries for changes in inflation

The evidence of output gap amplitudes broadly in line with that of other euro area countries and of smaller NAIRU gaps may explain why the variability of inflation in Luxembourg is close to the euro-area average. But this finding hides substantial differences as to the relative importance of the "drivers" of inflation identified in the "triangle" model, *i.e.* excess demand and supply shocks.[13] Excess demand contributes less to inflation, as the much smaller variance in the NAIRU gap is not compensated by the higher coefficient of this gap in the inflation equation. As implied by a comparison of "sacrifice ratios" (expressing the NAIRU gap required during one year to bring inflation down by one per cent),[14] the evidence for a higher coefficient of the NAIRU gap in inflation equations for Luxembourg is weak at best.[15] The sacrifice ratios obtained from results using the *Grande région* unemployment gap for Luxembourg [1.7 (Adam 2002), 1.3 (Durand 2002), 0.7 (Guarda 2002)] lie comfortably in the range spanned by the sacrifice ratios for 21 OECD countries estimated in Turner *et al.* (2001). In turn, the set of supply shock variables has a stronger influence than in other countries, in line with Luxembourg's high degree of openness and the higher share of energy products in domestic consumption, leading to stronger repercussions of changes in import and oil prices, respectively. In his inflation equations, Adam (2002) finds the highest import price coefficients for Luxembourg, Norway and New Zealand.

Notes

1. The number of unemployed in Lorraine, Wallonia, Saarland and Rhineland-Palatine totalled 493 000 in 2001 and was much higher than total employment in Luxembourg (277 000).
2. The comparison uses the HICP for the available periods and national definitions for the years before.
3. Guarda (2002) also discusses structural vector autoregression (VAR) models that combine the advantages of using economic theory to set long-run restrictions and allowing for flexibility in dynamic adjustments after shocks. However, they are usually characterised by large confidence intervals around point estimates, a problem aggravated in Luxembourg due to the small sample size.
4. On the one hand, assuming that only the unemployed of the neighbouring provinces are available and willing to work in Luxembourg is too narrow a vision of the phenomenon of cross-border workers. On the other hand, it is unrealistic to assume that, for instance, all Saarlanders employed and unemployed are potential candidates for work in Luxembourg. These extreme assumptions span an interval ranging from twice to seventeen times domestic employment in Luxembourg.
5. The linear deterministic trend is almost meaningless given the evidence of GDP not being trend-stationary and the high variance in innovations of its trend component. The Hodrick-Prescott filter, besides its endpoint problem, performs poorly in adjusting for fluctuations at business-cycle frequency when data are annual and the sample is short. According to Guarda (2002, p. 18), the production function approach suffers from the drawback that the necessary conditions (constant returns to scale, homogeneity of factors of production, a reliable measure of the capital stock, and weak separability of capital and labour from intermediate consumption), are almost certainly violated. However, this might also be true for a number of other countries and does not necessarily invalidate the usefulness of output gaps as indicators for fiscal and monetary policy.
6. The fact that the set of supply shock variables is not the same in both models may also contribute to differences in the output gap estimates.
7. The estimated labour elasticity of output comes very close to the observed share of wages in GDP.
8. The latter also serves to derive trend participation and employment rates of the resident working-age population and the trend in the number of cross-border workers.
9. In turn, TFP growth plummets early the downturn, pointing to hoarding in factors of production.

10. The comparison is based on the output gap resulting from the Apel-Jansson approach for Luxembourg (Guarda 2002) and OECD output gap numbers for the other countries (OECD, 2003g). Taking the output gaps derived from the production function approach and the Kuttner (1994) unobserved components model, which display very similar standard deviations (2.9 per cent and 2.8 per cent, respectively, Guarda 2002), would not change Luxembourg's relative position. The output gaps based on the production function approach in Adam (2003) also display a standard deviation of 2.9 per cent.
11. In terms of real GDP (in PPP dollars) Luxembourg has about twice the size of Iceland.
12. In part this finding may be a technical artefact stemming from the size of Luxembourg, as even huge percentage changes in the number of cross-border workers have only a limited effect on the unemployment rate. However, NAIRU gaps based on the national unemployment rate, albeit somewhat more volatile, are also small by international standards. It may be that the national unemployment rate repeatedly hit a floor during the period under consideration (1985-2002) due to high economic growth.
13. The triangle model of inflation relates the level of inflation to past inflation, the unemployment gap and the change thereof, and to a set of supply shock variables (Gordon, 1997).
14. NAIRU gap coefficients are not comparable across countries because they differ in terms of inflation persistence. To overcome this problem and obtain a straightforward economic interpretation, coefficients of the lagged dependent variable and the NAIRU gap coefficient are combined to compute the sacrifice ratio (Turner *et al.* 2001). Its reciprocal value illustrates the amount of inflationary pressure resulting from an unemployment rate one per cent below the NAIRU.
15. Adam (2002) estimates "triangular" CPI inflation models for 23 OECD countries using four different unemployment concepts for Luxembourg. Among the 15 countries for which significant coefficients for both lagged inflation and the NAIRU gap [NAIRU resulting from Hodrick-Prescott (100) filter] are obtained, the estimated NAIRU gap parameter based on the unemployment rate G*rande région* is the fifth-biggest (after Austria, Denmark, Greece, and Switzerland), implying comparatively low sacrifice ratios. Durand (2002) derives the NAIRU G*rande région* from the Kuttner UC approach and – unlike Adam and Guarda – includes the mark-up of prices over unit labour costs in the set of supply shock variables.

Annex II

Sources and methods underlying the calculation of public expenditure per student in Luxembourg

The section on the performance of the education system in Chapter III points out that Luxembourg should improve the efficiency with which it provides education services. In Figure 17, 15-year-old students' reading literacy is correlated with public expenditure per student in US$ at PPP. While data on reading literacy are available (results from PISA 2000), internationally comparable data on public expenditure on education – be it per student or as a share of GDP[1] – are not available for Luxembourg within the set of indicators published in E*ducation at a glance* (OECD 2002a). National sources do not report education expenditure per student either, whereas for most other OECD countries this indicator is available by level of education (pre-primary, primary, secondary, post-secondary and tertiary education). With the computations described below it is possible to obtain government per-student expenditure on pre-primary, primary, lower secondary and upper secondary education taken together, *i.e.* levels 0 to 3 in the International Standard Classification of Education (ISCED). This implies a "top-down" approach for Luxembourg and a "bottom-up" approach for the other 23 countries in the sample.

Aggregation of public expenditure per student over levels of education for partner countries

For the 23 OECD countries in the sample other than Luxembourg expenditure on educational institutions per student is published for education levels pre-primary, primary and all secondary (OECD, 2002a, p. 158, columns 1, 2 and 5). These numbers include both private and public sources, so they have to be multiplied by the relative proportion of the public sector at the respective level, taken from OECD (2002a), p. 190 (left half of table).[2] The three numbers obtained are weighted together, using the share of each level in total student enrolment from pre-primary to the end of secondary education as weights. As for some countries there are many different school types and for some institutions enrolment numbers are missing, the computational effort is simplified by "translating" the enrolment shares of the predominant institutions into a "typical" duration of each ISCED level.[3] While virtually all children of the corresponding age are enrolled in primary and lower-secondary education, account has to be taken of the fact that in pre-primary and upper-secondary enrolment may be less than 100 per cent of inhabitants of the age group concerned. Moreover, unlike in primary and lower secondary, different programmes with different durations coexist in upper secondary education, requiring some averaging with the help of enrolment figures.[4] The necessary information on education institutions is taken from OECD (1999). The representative duration of each of the three levels – pre-primary (ISCED 0), primary (ISCED 1) and all secondary (ISCED 2 and 3) – is divided by the sum of these durations to obtain the weights for averaging public expenditure on educational institutions per student at each level concerned.

Estimating public expenditure per student for Luxembourg

Reducing total pubic expenditure on education by…

For Luxembourg total public expenditure on education is taken from Table C.420 (last column, T*otal des dépenses*) of the national accounts, as published in STATEC, 2002a, p. C.44 (revised figures are taken from the office's website). In 1999, general government spent € 912.3 million on education,[5] equalling $927.9 million in PPP terms. Using the functional public expenditure item (*dépenses par fonction*) from the national accounts is more meaningful than focusing on current expenditure of the Ministry of Education because many education-related outlays are carried out by other ministries.[6] To isolate the expenditure share for post-secondary education (to be subtracted from total expenditure) the duration of a resident's representative education career in full time equivalents (FTE) must be estimated. Then expenditure per student on ISCED 0 to 3 can be computed using enrolment data.

… the shares of post-secondary education…

To assess the time a representative resident spends at levels ISCED 4 and 5, institutional details from OECD (1999) and data from STATEC (2002a, Chapter S) are used. In Luxembourg there is one institution of post-secondary education (ISCED 4) providing a master craftsman's diploma at the end of a three-year curriculum and which had a little more than 800 persons enrolled in 1999 (OECD 1999). The number of students in tertiary education institutions was little more than 2 437 in 1999, among which 1 400 in one-year programmes at the Luxembourg University Centre (CUNLUX), about 200 in two-year curricula granting higher technician certificates (BTS) and another 800 in three different institutions training technical engineers (ITS), (pre-)primary teachers (ISERP) and graduate educators (IEES). Moreover, between 7 000 and 8 000 Luxembourg students were enrolled in foreign universities and had access to university grants (based on parents' income), interest-subsidised loans or incentive premiums (for obtaining the final diploma in time). Taking the middle of this interval and summing up, Luxembourg had a total of 10,700 full-time students enrolled in programmes lasting 3.9 years on average in 1999. Given that students are typically aged 19 to 27, the share of persons attending education at ISCED 4 or 5 in the total population of that age was approximately one-quarter.[7] As a result, the expected duration of post-secondary education for a representative Luxembourg resident in the age of attending such education was a rounded 1.0 year in 1999.

… and adult learning

Enrolment figures are also used to assess the time a representative resident spends on adult learning (STATEC 2002a, Table S.500). There are two types of evening classes (*cours du soir*): language classes on the one hand; and classes aiming at an upper-secondary diploma for former school leavers and providing continuing training (*e.g.* IT training, accounting) on the other. Assuming an average programme duration of two years and a FTE factor of 0.1[8] for the 8 400 or so students enrolled in language classes and three years and 0.4 factor for the 1 300 students enrolled in the other classes translates into 840 FTE students in two-year programmes and 520 FTE students in three-year programmes. Thus the sum of FTE students in adult learning is 1 360 and the average time (FTE) spent amounts to about 2.4 years. However, the fraction of the adult population covered by these programmes was small in 1999. The about 9 700 persons enrolled in either type of evening classes represented only 3.7 per cent of the population aged 20 to 65. Therefore the expected duration of adult learning for a Luxembourg resident chosen randomly in that age group was a rounded 0.1 year. This adds to the 1.0 year in ISCED 4 and 5. In total, the education career of a representative Luxembourg resident after the end of secondary education lasted 1.1 years in 1999.

Average duration of education up to the end of secondary education

To compute the average length of the educational career up to the end of upper secondary, the following institutional features are taken into account (OECD 1999). Pre-primary education lasts two years and covers virtually every child. Primary education lasts six years and lower secondary three years, totalling 11 years. The duration of upper secondary education depends both on the branch and the stream a pupil falls into. In the academically oriented branch (*Enseignement secondaire*) and the two technical streams of the technical/vocational branch (*Enseignement secondaire technique*) it is four years (three-quarters of all students in upper secondary), whereas it is three years in the vocational streams.[9] This brings the average duration of upper secondary education to 3¾ years. So the school career of a representative Luxembourg resident up to the end of secondary school lasts a rounded 14.8 years.[10] Summing up, the total duration of education over all levels (including continuing education) gives 15.9 years for a representative resident.

In Luxembourg tertiary education is not more expensive than other levels

In most OECD countries tertiary education per student costs approximately twice as much as the earlier levels.[11] As disaggregated data on expenditure per student on each level of education are not available, it is difficult to verify the validity of this ratio with any precision for Luxembourg. At any rate, however, it does not appear reasonable to assume higher expenditure per student in tertiary education as is the case for other countries. First, practically oriented tertiary studies with shorter curricula (ISCED 5B), which are predominant in Luxembourg, tend to cost significantly less than academic education and research (ISECD 5A) (2002a, p. 158). Second, and more importantly, most tertiary students are enrolled in foreign – usually free public – universities and the main public expenditure item required for them is the set of grants and interest subsidies mentioned above. The amounts involved are very modest and far below the per-student cost of running a full university.[12] For the computations leading to Figure 17 it is assumed that ISCED levels 0 to 3 taken together are simply as costly in per-student terms as the remaining subset including ISCED levels 4 and 5 and adult learning. As a consequence, no particular weighing is needed for the block ISCED 0 to 3 (lasting 14.8 years) and the remaining block of all remaining levels (lasting 1.1 years). Therefore the fraction of total public expenditure falling on the levels of interest here is 93 per cent (14.8/15.9).

Public expenditure per student on education up to the end of secondary

Thus the numerator of the fraction "total public expenditure" to "number of students" becomes 0.93 × US$ 927.9 million = US$ 863.7 million (at PPP). The total number of students enrolled in 1999 was 72,642.[13] The final result is $11,890 at PPP per student in the year 1999, as shown in Figure 17. This makes Luxembourg a strong outlier among all OECD countries for which the computations described could be made. Due to the limitations in comparability of Luxembourg data and data for other countries correlation coefficients are not reported in Figure 17. Excluding Luxembourg from the sample makes the correlation coefficient switch from –0.40 to +0.40. Taking out the other outlier, Mexico, that combines low public expenditure with poor reading literacy, brings the correlation coefficient to 0.17. This lends support to the claim in the literature that institutional arrangements make more of a difference to the performance of education systems than the volume of public expenditure.

Notes

1. Education expenditure per student in PPP terms is more closely related to resource inputs that could affect education outcomes than education expenditure as a share of GDP. While use of one or the other indicator of resource inputs is unlikely to change international rankings for most countries, this is not so for Luxembourg because of the high number of cross-border workers whose children in most cases attend schools outside Luxembourg. This implies that for a given expenditure to GDP ratio a Luxembourg student gets more funds than a student in another OECD country.

2. It is assumed that the shares of the public sector in primary, secondary and post-secondary education (ISCED 2, 3, and 4) are the same because the information is only available for these levels lumped together. The share of the private sector is generally higher and more variable across countries in pre-primary (more than two-thirds in Korea and Ireland, more than one-third in Australia and Germany) than in primary and secondary education.

3. The size of student cohorts is assumed to be constant.

4. For example, if only 90 per cent of students attend upper secondary education after completion of lower secondary and there are three streams lasting two, three, and four years and attracting 20, 50 and 20 per cent of lower-secondary leavers, respectively, the average duration of upper secondary education is 2.7 years. This duration is added to that of lower secondary education to obtain the representative duration of secondary education for the country.

5. From 1999 to 2002, expenditure on education rose by 8.5 per cent per year on average.

6. The central government accounts for about 80 per cent of the functional spending item "education" according to national accounts. According to the 2003 Budget, current expenditure of the Ministry of Education is expected to be € 662 million, that of tertiary education and research € 86 million (nearly 80 per cent of which can be considered as related to education). Education-related family allowances (*allocation de rentrée scolaire*, *allocation d'éducation*) will reach close to € 100 million and at least € 45 million from the Ministry of Transport's budget are devoted to free public transport for children and/or students. Out of the € 662 million spent by the ministry of education, the shares of lower-than-secondary education and on the technical/vocational branch of secondary education are roughly one-third each, the share of academically oriented secondary education is about one-quarter and that of vocational education and training is about 6 per cent. These budget details show the predominance of the pre-primary, primary and secondary levels in total expenditure on education, as do the assumptions-based computations described below.

7. Population data are only available in five-year cohorts (data used are from the 2002 edition of the OECD's Labour Force Statistics). The population concerned approximates the number of 20-24 year-old plus half the number of 25-29 year-old. This gives 42 767 persons.
8. This means that participants spend 10 per cent of a full-time student's time in these language classes (*i.e.* three to four hours a week), which may be considered as an upper bound.
9. There is one two-year stream leading to the *Certificat d'initiation technique et professionnelle* (CITP) that actually takes most students 2-4 years. For the computation an average of three years is assumed.
10. For school dropouts it is assumed that they also spend three years in upper secondary as they may have to repeat one or several years.
11. For the OECD as a whole, expenditure per student on tertiary education is 2.2 times as high as expenditure on secondary education and about 2.5 times as high as the average over ISCED levels 0 to 3 (OECD 2002a, p. 158). This has to be corrected for the fact that the share of public funding is lower in tertiary (79 per cent) than at earlier levels of education (primary and secondary: 92 per cent). These shares are only available for the unweighted country mean, not for the OECD total (OECD 2002a, p. 190). As three G7 countries (United States, Japan, and United Kingdom) had shares of public funding in tertiary education significantly below 79 per cent, the corresponding share for the OECD total is probably below 79 per cent.
12. See Ministry of Finance (2002, p. 3305) for a list of public expenditure related to Luxembourg students enrolled in foreign universities. A total amount of € 15.1 million is to be spent on loan interest subsidies (30 per cent), means-tested grants (42 per cent) and incentive premiums (28 per cent). On average, a Luxembourg student abroad receives € 2 000 per year (€ 167 per month).
13. 10 704 students in pre-primary, 30 475 in primary, 30 603 in secondary education and 860 students with special needs (*Éducation différenciée*).

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