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Paradoxes in Economic Analysis[1]

Accuracies and Limits of Statistics: the case of Luxembourg

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[1] This is an adapted version of the presentation provided on Wednesday 15th of November 2012 in the context of the conference cycle "Luxembourg where we came from, where we are, where lies our possible future?" organised by Sacred Heart University Luxembourg

Abstract

Statistics can help to take a more subtle and nuanced view of things, where we might otherwise make hasty judgments and be left with a very one-sided view. Statistics can also help to synthesize a number of individual cases or to dissect a particular reality and identify paradoxes. However, figures and graphs can also be misleading: 'relative versus absolute' and 'nominal versus exponential' are only two of the numerous dimensional issues to be considered. We should therefore be careful about the way we use statistics and very cautious regarding possible misuses and abuses. Against this background, this short paper provides seven paradoxes on analytical issues regarding the Luxembourg economy and society.

Introduction

Since decades we acknowledge an increasing use of statistics. This growing interest for statistical data raises also the question of an accurate interpretation of the available datasets. In this context the communication of statistics is an important issue, as it is a fact that what is delivered is not always what is received.

Recently a major policy debate on understanding statistics was run by the Royal Statistical Society, King's College London and Ipsos MORI[2]. The title of the session was "Perils of Perception: Tackling the divide between public views and the evidence". One of the outcomes of the discussion was that problems are encountered regarding "statistical literacy: people really struggle with very large and very small numbers, they find it hard to distinguish between rates and levels, they take a long time and repeated exposure to notice change". Against this background it was concluded that "[w]e need to continue to focus on statistical literacy and people's confidence to challenge a figure or a story, through education that starts in schools. We need bodies like the UK Statistics Authority to continue to challenge the misuse of statistics."[3]

But the question of the use of statistics is not only an issue in reference to the very large public. It is also a discussion point on the level of experts. One of the most famous debates relates to the use of statistics by John Maynard Keynes. A persistent literature already exists and a very recent contribution was provided by Larry Lepper in the Cambridge Journal of Economics of March 2013 "Rhetoric and

[2] http://www.ipsos-mori.com/newsevents/events/94/Perils-of-Perception-Tackling-the-divide-between-public-views-and-the-evidence.aspx

[3] http://www.newstatesman.com/politics/2013/07/muslims-benefits-and-teenage-pregnancies-perils-perception

Keynes' use of statistics in the *The Economic Consequences of the Peace*"[4]. The title of the paper makes a clear link between the use of statistics and the prose provided to comment an economic issue.

Disregarding the problems of misuses and misunderstanding of statistics, it is a fact that even an accurate use of statistics may not always provide a non-discussable message. For instance the choice of a reference year may change the trend of an evolution; similarly the determination of a reference group may lead to a specific result. 'Gross versus net', 'relative versus absolute' 'total versus per capita' or 'nominal versus exponential' are dimensions that may have an impact on the statistical analysis and may lead to paradoxical results.

In the present paper seven different statistical areas are analysed in the context of Luxembourg. For each area one specific paradox will be identified; and, for the seventh, even three in one! The following seven statistical paradoxes will be considered: population, EU institutions in Luxembourg, labour, de-industrialisation, competitiveness, export and growth.

Consequently the contribution will mainly deal with what statistics say about the Luxembourg economy. However, as economics is primarily part of social and human sciences, we will also be dealing, directly or indirectly, with human beings and social and societal issues in Luxembourg.

[4] Larry Lepper (2013) « Rhetoric and Keynes' use of statistics in *The Economic Consequences of the Peace* » in *Cambridge Journal of Economics*, 37, 403-421

1. The population paradox

Why a paradox? Dealing with the population of Luxembourg does not essentially mean dealing with the national population; the growth rate for the national population is diametrically opposed to that for the total population.

In recent years two benchmarks for Luxembourg have changed: in 2004 Luxembourg conceded its position as smallest EU member to Malta, and in 2010 it switched categories from being a very, very small country to becoming a very small country by crossing the half-a-million threshold!

On the subject of population, I would like to point to two other major issues by quoting a specific figure: **150 000**

One figure, two dimensions

That figure is the increase in the population between the end of the eighties and this year.

But it is also the number by which the working population will change overnight, that is to say between this evening and tomorrow morning.

Let us look at this, step by step.

The population of Luxembourg has increased sharply and continuously over the last quarter of a century from 370 000 at the end of the eighties to 520 000 nowadays. That is a growth rate of around 1.5% a year, whereas most Western European countries have recorded a stagnation or even a decrease. However, this increase is not the result of a significant rise in the Luxembourgish native population. which actually shows a negative growth rate. It is mainly the result of continuous immigration and of a continuing positive natural trend in the foreign resident population.

Chart 1: Evolution of the population of Luxembourg (1821-2011)

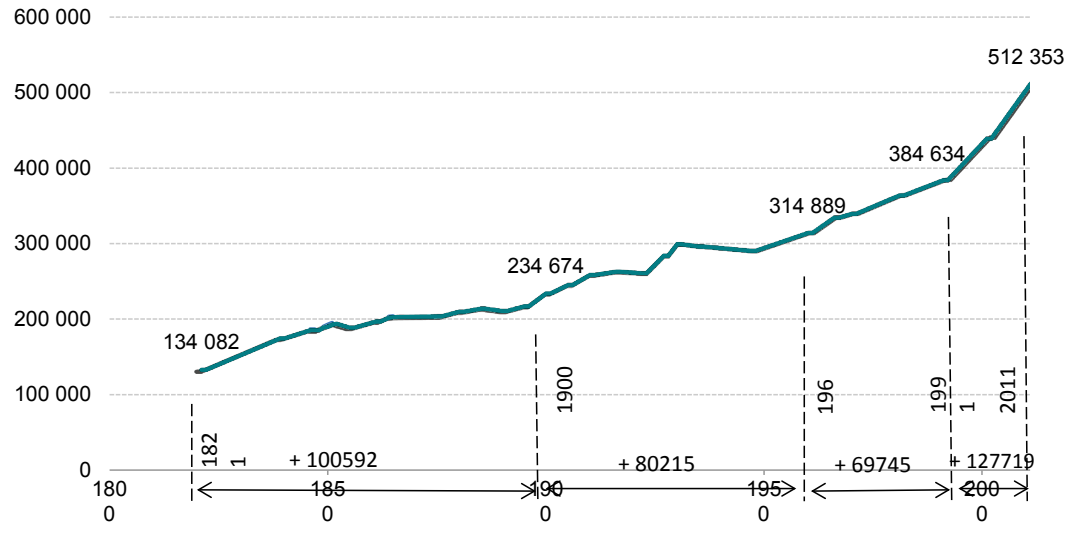
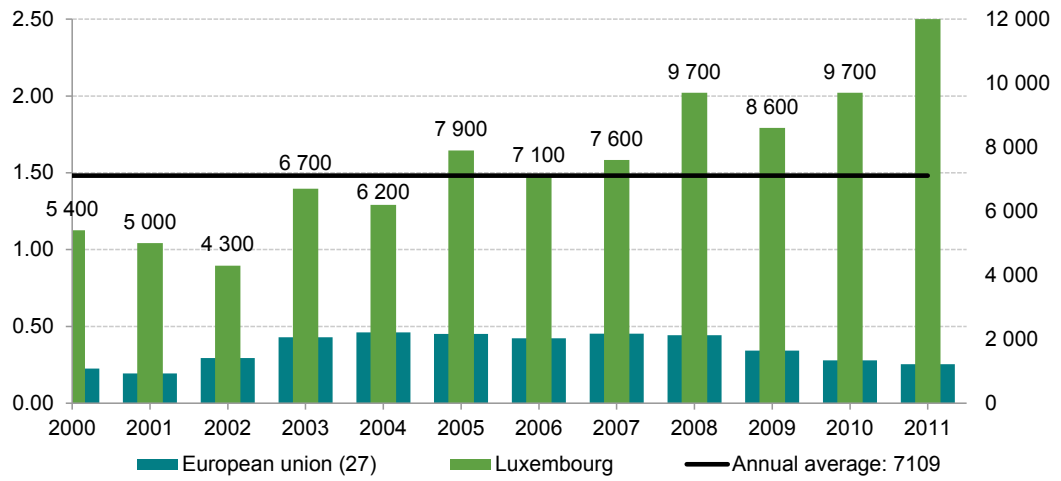


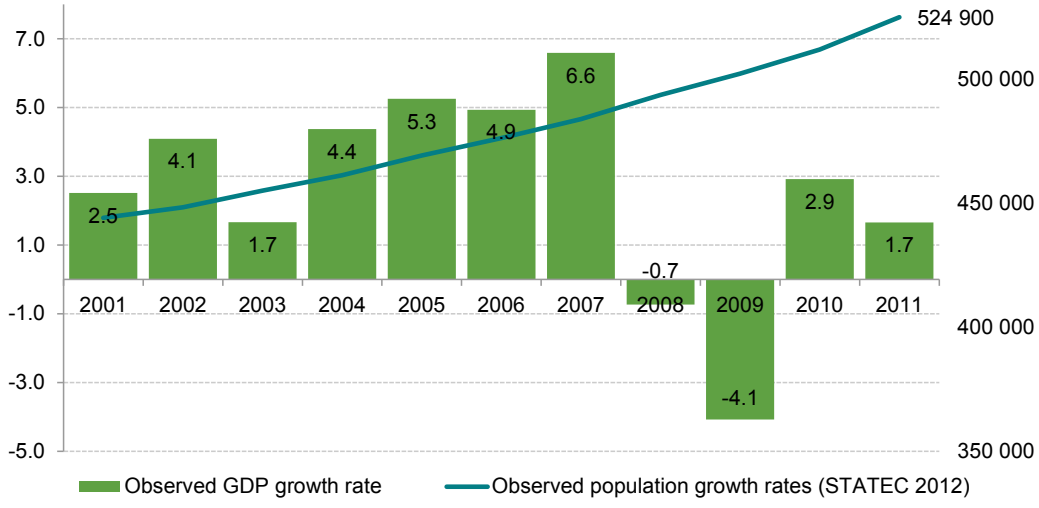
Chart 2: Annual growth rate of the population (2000-2011)



Thus, the evolution of the resident population has largely been driven by immigration, and immigration has largely been driven by economic growth. This has been the case over decades, but does not apply to the last few years. Even during and after the recent financial and economic crisis, the net immigration trend continued! A fact which raises serious questions!

Let us now look at the overnight change in the working population, which I mentioned. This change is due to the strong impact of cross-border workers, and of commuters on the labour market and the economy in general.

Chart 3: GDP versus population



They account for more than 160 000 people, that is to say nearly 40% of the working population. They come from the three neighbouring countries, predominantly from France (50%) and in roughly equal numbers from Belgium and Germany (25%). The total amount of the labour costs allocated to these countries is around 8 billion euros a year, but a survey run by Statec concluded that nearly 25% is spent in Luxembourg; furthermore, account must also be taken of an amount of 2.5 billion euros in related taxes and social security contributions.

But why did I mention 150 000 and not 160 000?

The reason is that there is also a movement in the other direction (out of Luxembourg) by 10 000 resident persons. However, these people do not cross the border to go to neighbouring countries. Those who do cross borders only account for under 1 000 people. Under the 'National Accounts and Balance of Payments' rules, requirements, the category in question is made up of officials and agents of international and, mostly, European institutions who live in Luxembourg. These institutions are considered – similarly to embassies – as 'extraterritorial'. Thus their staff are considered to be working abroad, along the same lines as the commuters from neighbouring countries but in the opposite direction. There are even more international officials and agents working in Luxembourg: the total number is actually around 13 000. This is because nearly 3 000 live in the neighbouring countries. Given that, under the 'National Accounts and Balance of Payments' classification rules, they are living and working 'abroad', they are not taken into account in the national statistics, even though you will easily bump into many of them when you are in Luxembourg!

The total labour costs registered for these 10 000 officials in the Luxembourg national accounts and balance of payments amount to 1.1 billion euros. This a good point to note when seeking to answer the question whether Luxembourg is an EU net receiver or net contributor.

2. The EU institutions paradox

Why a paradox? Because Luxembourg is both: a net receiver and a net contributor.

One question, two answers

We have one question and two possible answers, depending at which level you carry out the assessment.

If you consider only direct flows and analyse the operational budget of the Commission, Luxembourg appears as a net contributor; per capita, it is even the leading contributor.

However, if you take into account both direct and indirect flows, then Luxembourg is a net receiver. Indirect flows include the operational costs of institutions hosted in a member state. The amount set out in the Commission's presentation assumes that all spending by local staff goes into the Luxembourg economy. That is why Luxembourg ends up with a significant net income. But this approach does not consider the fact that a proportion of the spending by institutions located in Luxembourg and by resident officials and agents does not occur within the national economy, but abroad - in the form of imports of goods or services. And even products and services bought in Luxembourg – cars, computers or other products – very often have significant import content. This supplementary twofold dimension is unfortunately not considered in the Commission's figures. Admittedly, due to the lack of detailed information, it is difficult to incorporate this dimension. In the

absence of these details, we may nevertheless assume that its inclusion would not change the sign. In other words, even if we revise indirect flows, Luxembourg continues to be a net receiver, albeit by a smaller amount than indicated by EU institutions. Let us now come back to the population and, more precisely, the working population in Luxembourg.

3. The labour paradox

Why a paradox? In parallel with job creation, Luxembourg is facing an increase in unemployment.

The total working population in Luxembourg stands at about 370 000 in 2012. Basically, we can distinguish three different groups: commuters (44%), national resident workers (29%) and foreign resident workers (27%).

This means that more than 70% of people employed in Luxembourg do not hold Luxembourg citizenship and that 44% are not resident. This poses a challenge to the democratic political system since, as a result, less than one third of the working population are given an opportunity to participate in the electoral process. A political, societal and economic challenge!

Over the past three decades, overall employment figures have increased significantly. The growth rate was highest during the nineties, with an average annual rate of 3.5%, but employment has also risen in the last few years, despite the serious crisis.

Chart 4 Annual change in employment and unemployment (persons)

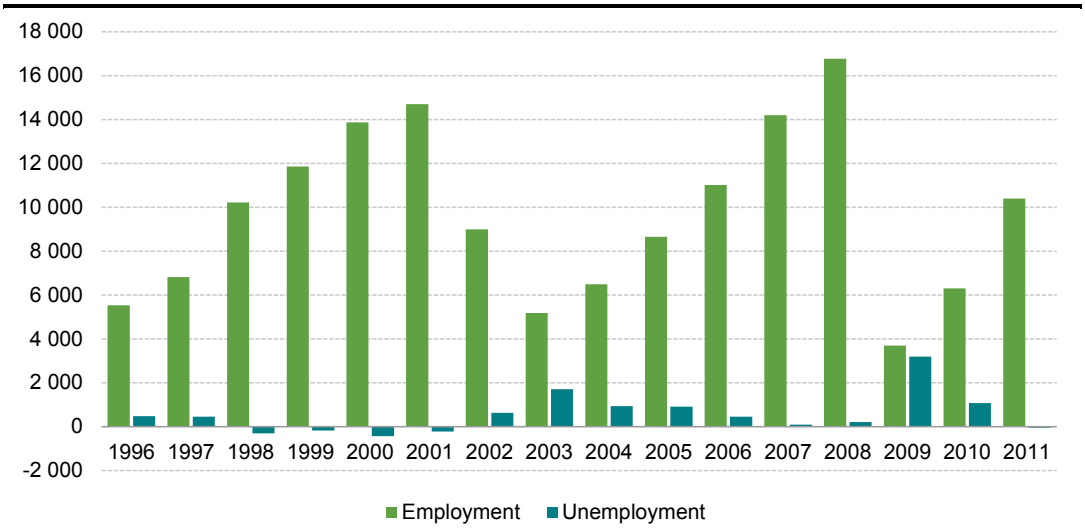
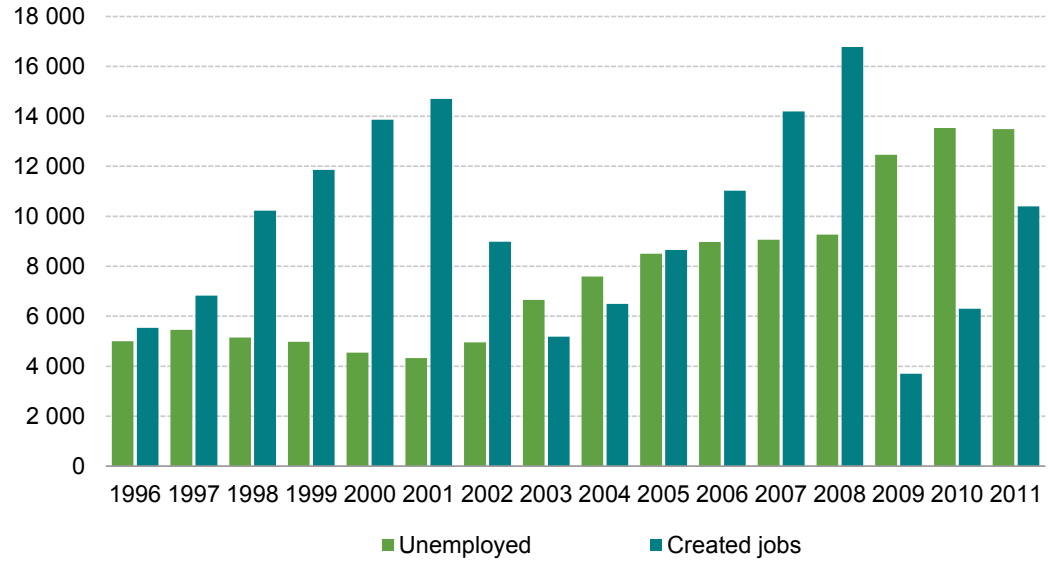


Chart 5: Unemployment and job creation (persons)



While acknowledging the steady increase in employment, we cannot ignore the fact that Luxembourg has at the same time been faced with a rise in unemployment. Even in the middle of the recent crisis (2009), total employment increased, but underemployment rose more significantly (see chart 4)! During the years 1996 to 2002 and from 2005 to 2008, the number of jobs created each year exceeded the total number of unemployed people (see chart 5). While other countries, like France, recorded a fall in the employment rate and consequently a rise in unemployment, Luxembourg was faced with a continuous increase in employment and, at the same time, an increase in unemployment. This is frequently seen as a labour market mismatch. Here again, we have an important political societal, educational and economic challenge!

Where do all the people employed in Luxembourg work?

4. The de-industrialisation paradox

Why a paradox? There is a de-industrialisation process in relative terms, but not in absolute terms when we consider employment trends over the past 15 years.

At present, more than three quarters of the workforce are employed in the service sector. This is largely comparable to other EU or OECD countries.

One issue, two approaches: relative versus absolute

It is worth noting that, at the beginning of the sixties, less than half of Luxembourg's working population was employed in the service sector, while the figure for this sector in other industrialised countries was nearly two thirds. At that time, a large proportion of Luxembourg's population was still active in industry – where the steel sector was dominant. There were still 15% in the agricultural sector. Against this background, the transition to the present service sector was rapid and far-reaching.

Like most other OECD countries, Luxembourg has seen a relative decrease in agriculture and industry and a corresponding increase in the share of its service sector, in terms of both employment and value added.

Chart 6: Employment by activity in 2000 and 2011 (% of total)

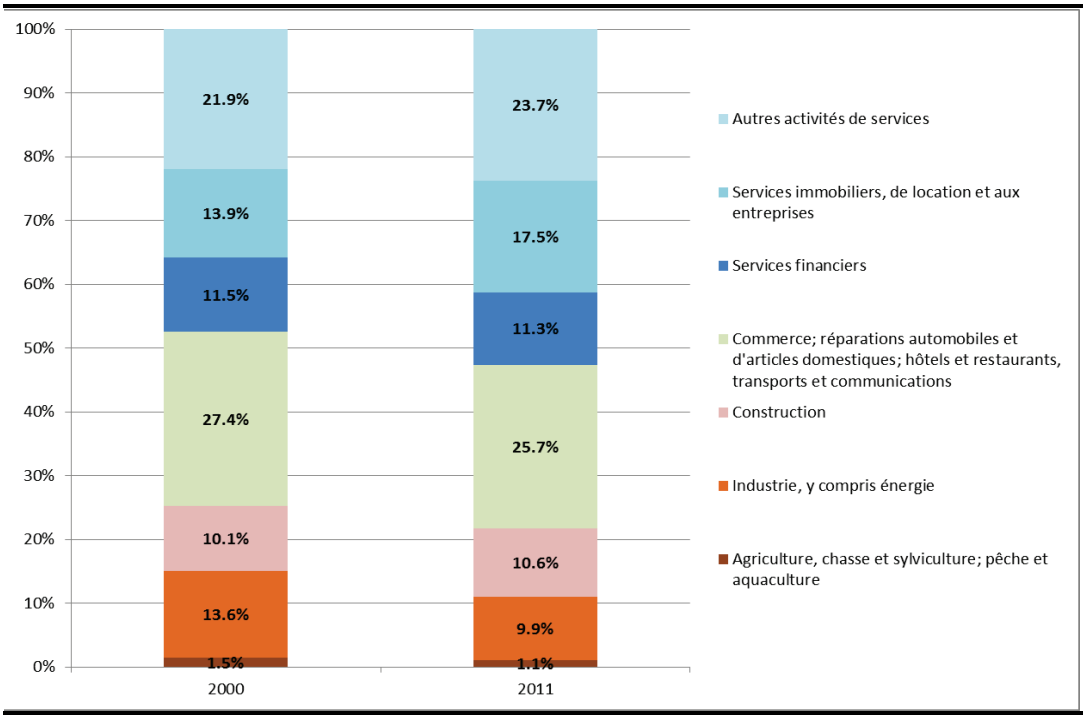
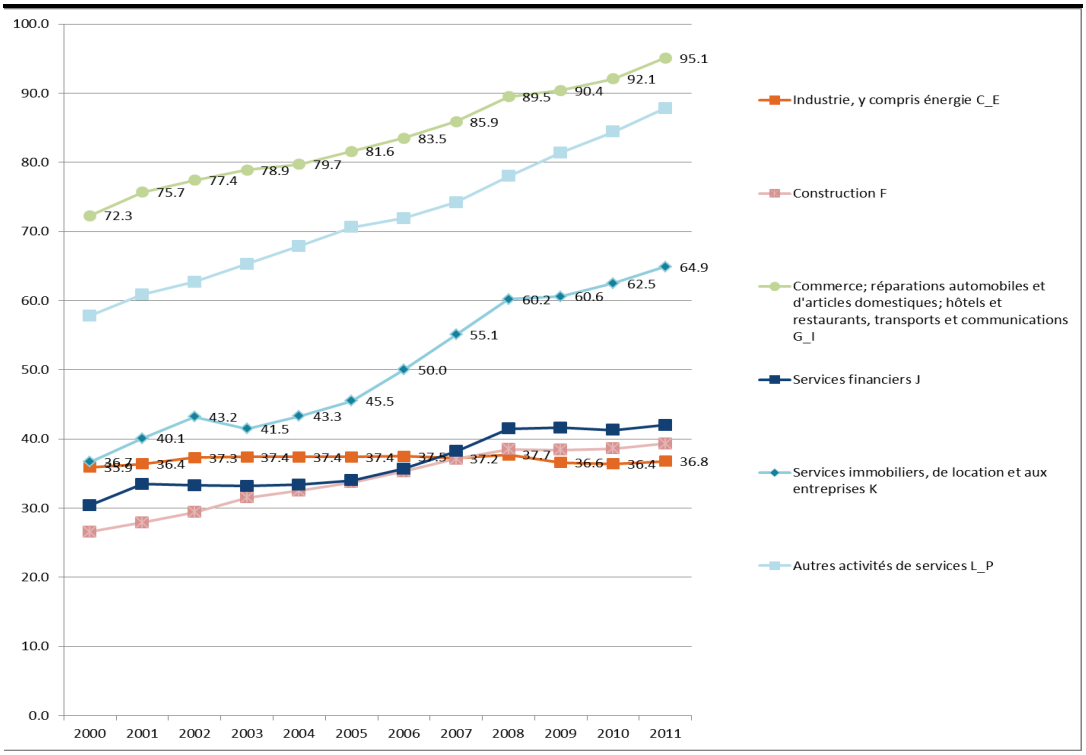


Chart 7: Employment by Activity 2000-2011 (in thousands)



Source:STATEC

What differentiates Luxembourg from most other countries is the fact that employment in industry has not decreased in absolute terms since 1995. There has, of course, been a steady and very substantial decrease in the steel industry. However, other industrial sectors have seen an increase in their activities which, even over the last fifteen years, has exceeded the decrease in the steel industry, so that the overall employment figure for industry has increased. A modest increase, I agree, and much slower than the increase in service sector jobs. Consequently, the relative evolution was negative.

Chart 8: Industry (Manufacturing, electricity, gas and construction)

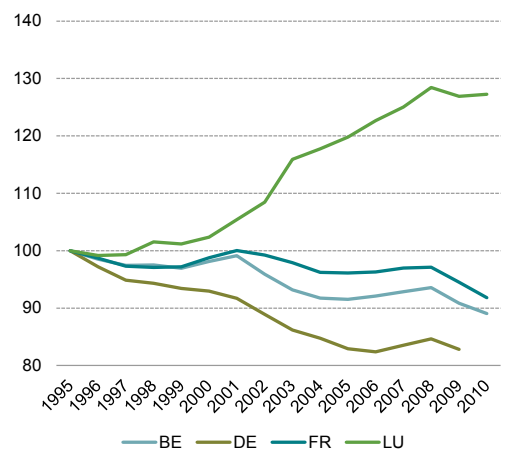


Chart 9: Manufacturing

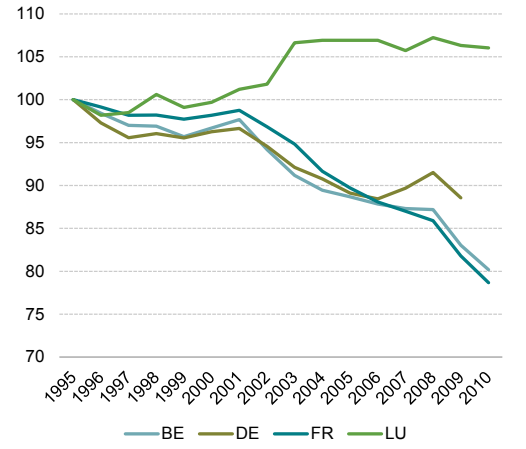


Chart 11: Services

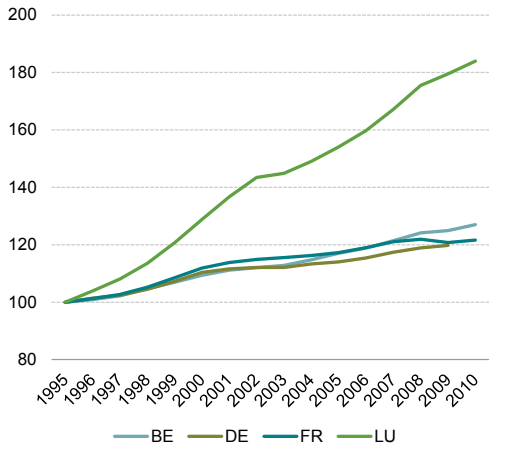
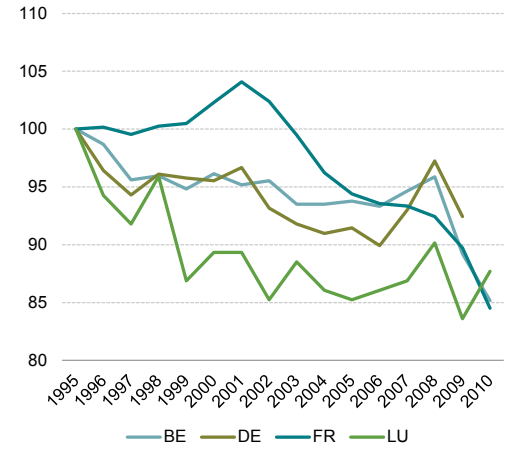


Chart 10: Manufacture of basic metals and fabricated metal products



Compared with neighbouring countries the trend in Luxembourg is quite different as there was no absolute decrease in employment in the industrial sector before the crisis.

The service sectors which have increased most are: finance, transport, communication and other enterprise services.

5. The competitiveness paradox

Why a paradox? Because macroeconomic indicators such as the net current account and export market share show positive trends, while firm perception of competitiveness is rather negative.

The current account measures a country's economic relations in basic terms, that is to say by excluding financial transactions, which are the subject of financial accounts. The net result balances out the flows on goods, services, income and current transfers.

In the case of Luxembourg, the figures show a surplus for the last five decades, with the exception of only one year (1965). This is a record among the OECD members and only Switzerland and Norway did nearly as well, with only 3 and 4 years of deficit respectively.

Textbooks tell us that countries cannot forever run a surplus. The reason for this is that one country's surplus is another's deficit. Furthermore, a current account surplus is the expression of an undervalued real exchange rate in relation to the rest of the world. It cannot last a long. However, the size of a specific country may be a significant factor here and may explain Luxembourg's consistent record.

In the EU Commission's macroeconomic imbalance procedure, countries having a surplus of more than 6 % of GDP or a deficit larger than 4 % of GDP are invited to adjust their situation and to try to achieve a more balanced situation. Nowadays Luxembourg's figure is around 6%, but for decades its surplus was above 10, 15 and even 20 %.

What activity contributed most to this exceptional result?

Between 1960 and 1974, industrial activity, and more precisely the steel sector, was the key factor. After the major structural change that occurred – with the decline of the steel sector and the emergence of a successful banking sector – the latter became mainly responsible for the positive situation. This was based on the net positive results of interest flows due to the traditional financial intermediation role of banks and, more recently, the development of financial services in relation to the management of investment funds generating significant fees.

However, the substantial diversification of the service sector – through the development of activities in communication, transport, insurance, consulting and other enterprise services – engendered large exports. Since 2003 the volume of non-financial services has exceeded the amount of goods exports. Furthermore, non-financial services transactions generate a surplus that outweighs the trade deficit in goods.

Chart 12: Current account of Luxembourg (as percentage of GDP)

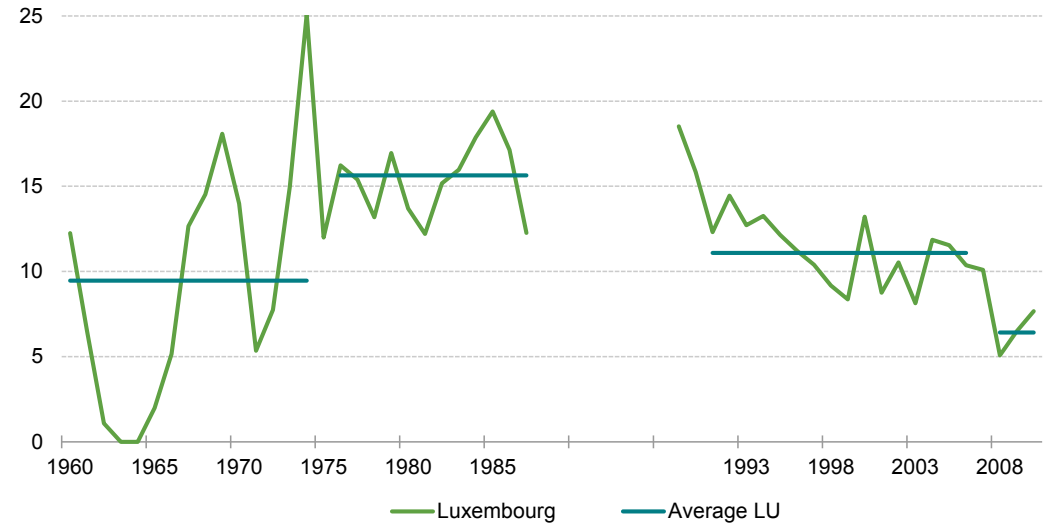
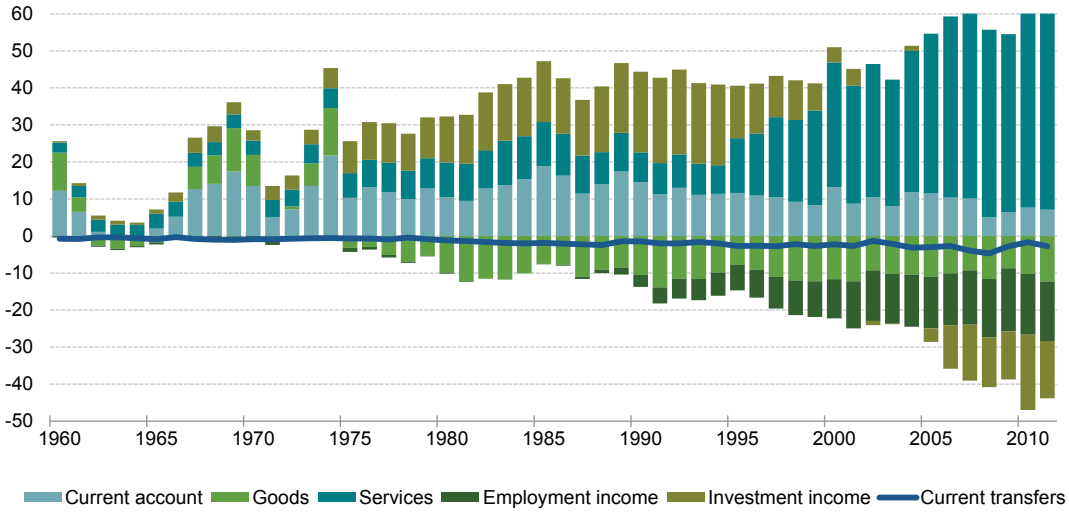


Chart 13: Composition of Luxembourg's current account (balance as a percentage of GDP)



While a breakdown of the current account shows a strong differentiation between the balance of services – with a large surplus – and all the other partial balances (goods, income of labour, income of capital and current transfers) which show a deficit, we should avoid drawing conclusions on the performance of the service sector compared to other sectors (industry or agriculture). Some examples to clear up an unduly schematic view: most service activities require capital and labour from abroad and the corresponding foreign revenues are registered under 'income' – a balance that concludes with a large deficit. Similarly, many services also condition imports of equipment goods (i.e. transport, communication and even banking and

consulting – in the form of IT and so on). They are all compiled under 'goods' and consequently deepen the structural deficit.

Thus the results of partial balances must be analysed with caution. However, the overall result of the current accounts provides a good indicator of the general external economic activity of a country. For Luxembourg this result is still positive, even if a rundown has been observed in recent years.

Furthermore it has to be acknowledged that Luxembourg's market share of service exports is relatively high (considering the size of the economy) and has increased significantly, even in the context of serious competition from the emerging markets.

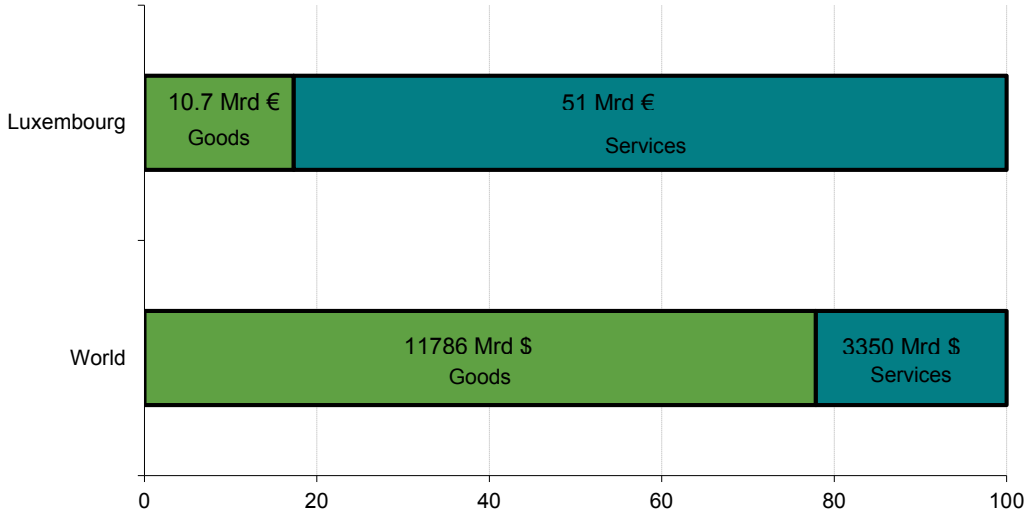
Even though goods exports have also continued to increase (except in 2009), the evolution of the market share is negative – as it is for most industrialised countries. This is due to the lightening expansion of emerging economies, predominantly the BRICs (Brazil, Russia, India and China).

6. The export paradox

Why a paradox? Luxembourg has the same production structure (in terms of goods and services) as other OECD countries, but its export product structure is the exact opposite. However, the question is whether the paradox is on the Luxembourg side or on the other side.

In this context, it should be noted that goods and service exports expanded significantly over the past decades, with a much stronger 'boost' in services. In the last couple of years, the total amount of service exports has accounted for 80% of total exports of goods and services and goods exports only 20%. At world and EU level, we find the exact opposite situation: goods are still dominating, with nearly 80%.

Chart 14: Share of goods and services on total exports

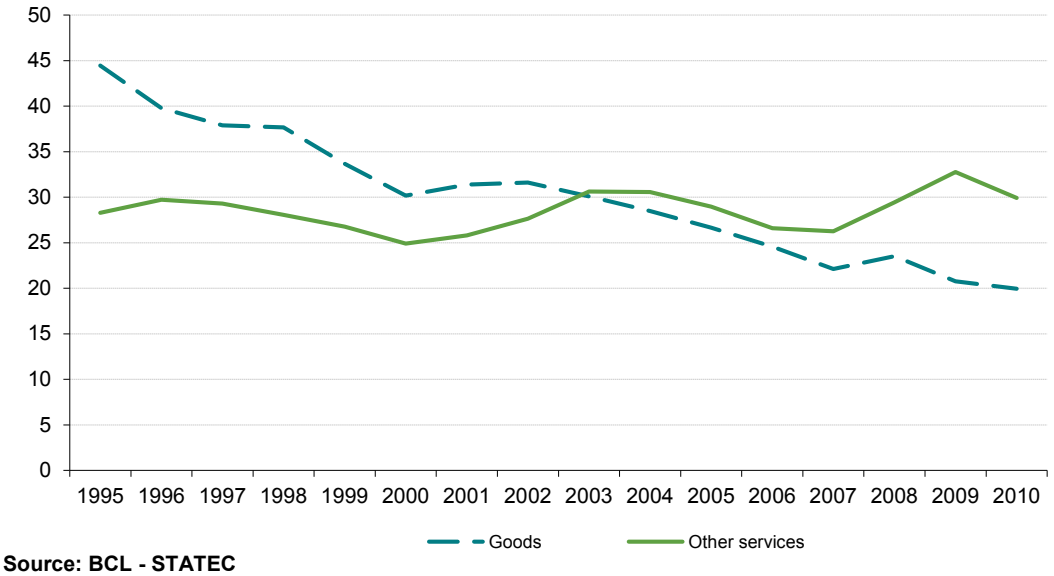


Source: WTO et STATEC; authors calculations

Similar production structure, but opposite export structure

Of course, this result is notably due to the significant share of the financial sector in the Luxembourg economy and on the export side. However, if we exclude financial service exports, the total of non-financial services exceeds the total amount of goods, and this has been true since 2003. This exceptional trend also accounts for the fact that Luxembourg is – on a gross level – among the top 20 countries as regards services exports.

Chart 15: Share of goods and services others than finance on Luxembourg's total exports



Source: BCL - STATEC

7. The growth paradox

Why a paradox? There are at least three reasons, which I will put to you in the form of questions: Should a very rich country have an exponential growth? Should we aim for an important growth rate if well-being does not improve above a certain threshold? Regarding environmental challenges, should the content of growth not have a higher priority?

The first paradox is at first glance a more technical one. It relates to the fact that Luxembourg has experienced a significant increase in its growth rate in time. This precludes an exponential growth, where most economies experience a nominal growth, that is to say an evolution with a decreasing growth rate.

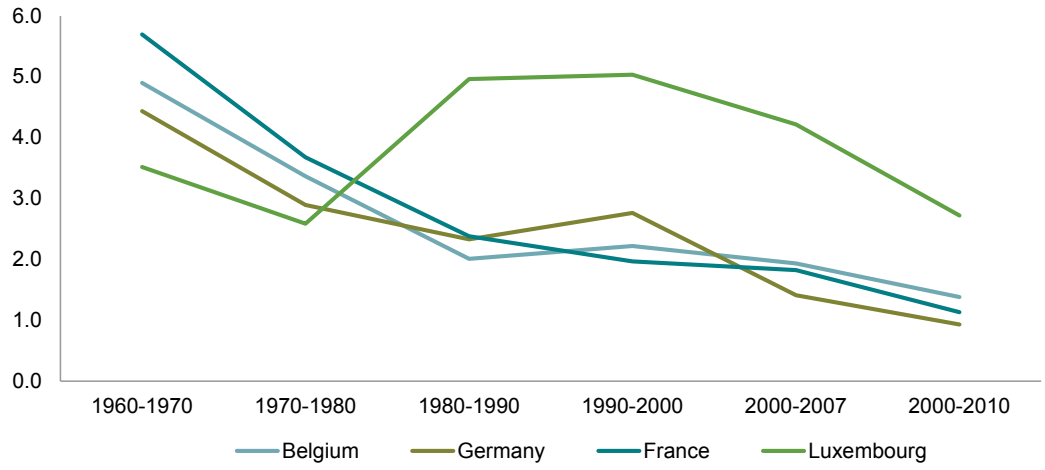
Nominal versus exponential

What has been the outcome of economic activity in Luxembourg over the last 5 decades? It has been characterised by substantial growth affecting an economy that is already relatively rich. Compared to its neighbouring countries – which are its main economic partner countries – the growth rate is 1 percentage point higher over the whole period.

A closer look at the average growth rate by decade reveals that the strongest rate in the neighbouring countries was produced in the first decades, with a progressive slowdown in the following decades. Notwithstanding other cyclical or structural effects, a gradual decrease in the growth rate seems comprehensible after a recovery period and given that the level of living standards is rising. From a more technical point of view, a decrease in the growth rate reflects the presence of nominal growth, as opposed to exponential growth if the growth rate stays constant or even increases.

This very exceptional situation arose in Luxembourg. After the sixties and seventies, when Luxembourg's growth rate lay below that of its neighbours, two decades of impressive 5% growth were recorded in Luxembourg, at a time when living standards were already relatively high.

Chart 16: Average growth rate of Gross domestic product at 2005 market prices



Source: AMECO

The main reason for this extraordinary economic development lies in the expansion and permanent diversification of the financial sector, as well as the diversification of the economy in general. The expansion of the service sector – outside the financial sector – and even of industry contributed to this economic performance.

The country's combined attractiveness for foreign capital and foreign labour was at the source of the virtuous spiral during these two decades. Indeed the setting up of businesses was largely carried out by new foreign investors and other investments in the form of extensions of established affiliates. A rough analysis of the Luxembourg output also shows that growth is somewhat more extensive than intensive. That is to say that productivity is not the only factor – and not even a dominant factor – in the growth path. Economic growth produced a significant increase in employment. As the country's natural demographic trend is negative, this could only be achieved by the immigrant population and commuters.

GDP versus GNI

Due to the significant contribution of foreign capital and labour, the Luxembourg economy's output result has to be analysed with caution when conducting an assessment per capita. In this context, the widely used indicator of GDP, or Gross Domestic Product, per capita gives a misleading picture of the situation in Luxembourg. GDP measures the total value added produced in a specific territory – by whomever: whether national or foreign actors! Thus, the numerator (GDP) includes the commuters' contribution and the income to be allocated to foreign investors. On the other hand, the denominator considers only the resident population.

A more accurate indicator to assess the income of the resident population is the GNI or Gross National Income. The difference between the GDP and the GNI is that the latter does not include the income of foreign labour (the salaries of commuters) or the income of foreign capital (the dividends and interests to be allocated to foreign investors) and adds the equivalent foreign incomes of the resident population.

For most OECD countries the difference between GDP and GNI is marginal. Over the euro area as a whole, it represents an insignificant discrepancy. In the case of large economies, it is around 1 or 2%. As those economies have large investments abroad (USA, Japan, Switzerland), the GNI is even larger than the GDP. In the case of small and very small open economies, there is a significant discrepancy in the other direction that is to say that the GNI is lower than the GDP. The largest discrepancy is to be found in Luxembourg, where the difference is nearly 30%! In the two European countries just behind Luxembourg – Iceland and Ireland – the difference is nearly 20%.

In 2010 Luxembourg had by far the highest GDP per capita (€ 79 500), followed by Norway (€ 64 500) and Switzerland (€ 51 200) – two countries with a large current account structural surplus. Unlike Luxembourg, these two countries have a GNI that is higher than their GDP. As a result, if we take GNI per capita as the criterion, Luxembourg (with € 56 500) loses its dominant position among OECD countries, behind Norway (€ 66 000€) and just ahead of Switzerland (€ 55 200).

In short, GNI definitely provides an accurate measure of income in Luxembourg and still places Luxembourg among the richest countries – but not as far ahead as the misleading GDP per capita indicator.

The second dimension of the growth paradox relates to the absence of a correlation to well-being above a certain threshold.

The Easterlin Paradox

It is generally assumed that we can measure a population's in terms of per capita GDP/GNI and its evolution. However this approach is now coming in for criticism. It is worth noting that this issue was already debated a century ago. The debate has been reactivated in the last decade. It is widely recognized by researchers that the use of so-called objective approaches to measure well-being is always indirect. An objective (indirect) way of doing so is to use the utilitarian approach, which takes as its reference private consumption. It implicitly equates material satisfaction with well-being and restricts the pursuit of well-being to the acquisition of goods and services.

However, psychologists have taken (first) a subjective approach. This has the advantage of being a direct measure applied directly to (and by) the concerned person.

The question in subjective surveys generally takes the following form: In general, are you very satisfied, somewhat satisfied, not very satisfied or very dissatisfied with the life you are leading? (Eurobarometer).

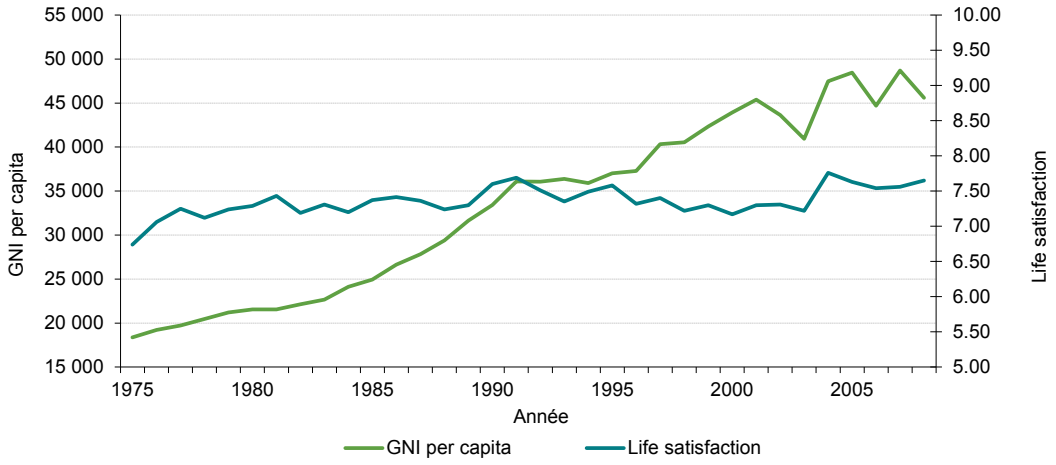
In the English-speaking world the wording is as follows: 'Taken all together, how would you say things are these days: would you say that you are very happy, pretty happy or not too happy?' (General Social Surveys)

In this type of question, the respondent is asked to judge today's well-being by considering his entire life.

A 'global' database managed by the Dutch psychologist Ruud Veenhoven allows comparisons to be made over time and/or between countries. Over thirty-five years (1975-2009), the average degree of satisfaction has not changed much for the population of Luxembourg.

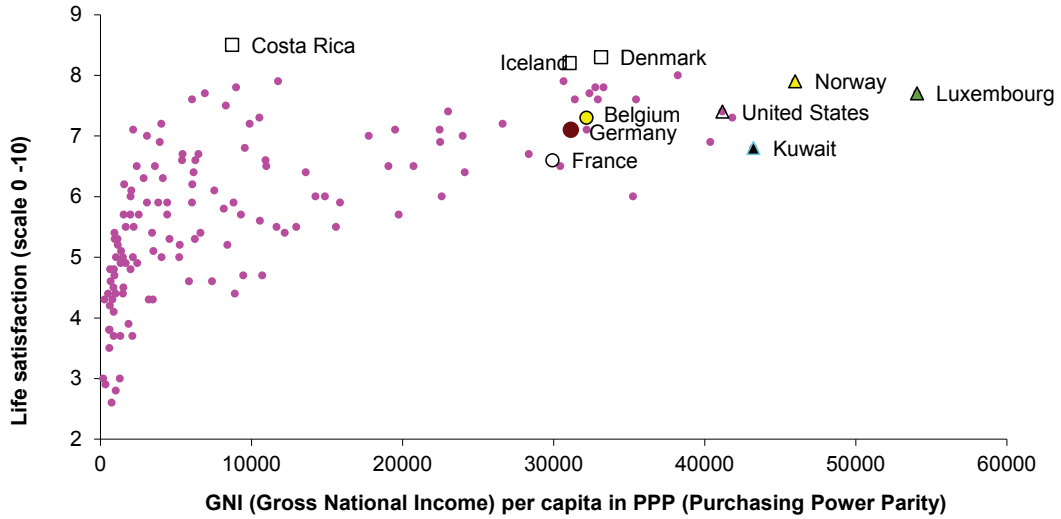
Moreover, a comparison with the results of the three neighbouring countries shows that the people in Luxembourg declare themselves to be slightly more satisfied - and this is true for virtually the entire period.

Chart 17: GNI per capita and satisfaction of life of Luxembourg 1975 -2008



Source: Satisfaction de la vie: R. Veenhoven, World Database of Happiness, collection Happiness in Nations, Nation Report Luxembourg, Assessed at 2010-07-26 from http://worlddatabaseofhappiness.eur.nl; RNB (Revenu National Brut European Commission Ameco database series OVGN, NPTN; authors own calculations

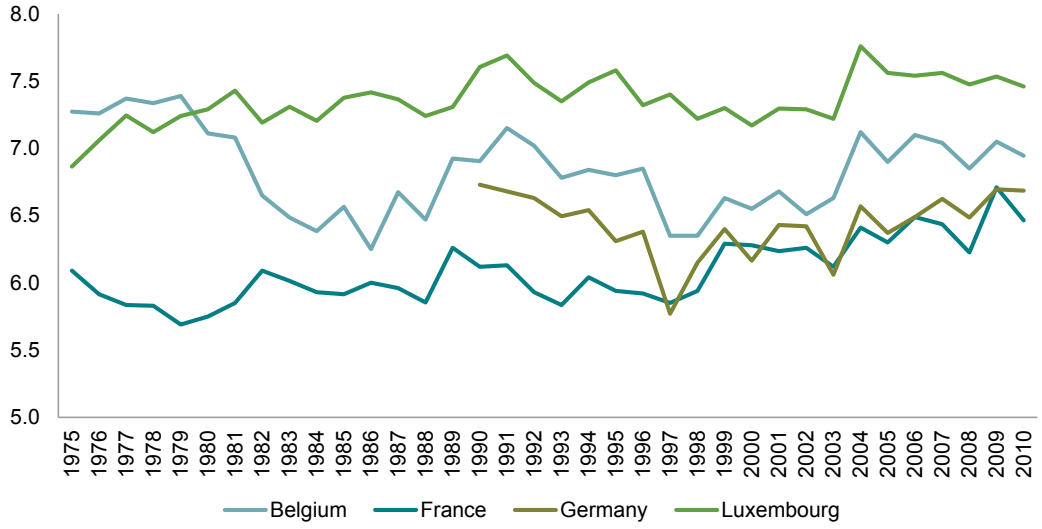
Chart 18: Relationship between Life satisfaction and GNI per capita in PPP. Average 2000 - 2009



Source: RNB par tête en PPA 2000 - 2008 World Bank database et pour 2009 World Bank publication, Moyenne calculs des auteurs; Happiness Surveys: R Veenhoven, http://worlddatabaseof happiness.eur.nl/.

Source: GNI per capita atPPP 2000 - 2008 World Bank database and for 2009 World Bank publication, authors calculations; Happiness Surveys: R Veenhoven, http://worlddatabaseof happiness.eur.nl/.

Chart 19: Well-being in Luxembourg and in the neighbouring countries



Source: R. Veenhoven, World Database of Happiness, collection Happiness in Nations, Nation Report, Belgium, France, Germany, Luxembourg Assessed at 2010-07-26 from http://worlddatabaseof happiness.eur.nl. Calculs des auteurs

In what we call developed societies, the issue of the link between 'subjective well-being' and 'material well-being' has been discussed for some time now. In these societies marked by consumerism, there appears to be a disconnection between material welfare and well-being. We see evidence of this trend in the fact that material well-being (as measured by GNI in volume) is on the increase, while subjective well-being (measured by life satisfaction or the feeling of happiness expressed in surveys) has been stagnating for decades.

It would seem that changing aspirations can explain the 'paradoxical' relationship between income and happiness. For a given aspiration, a higher income provides a higher degree of happiness. Over time income growth generates a higher level of aspirations, thus maintaining the level of happiness more or less constant, stable.

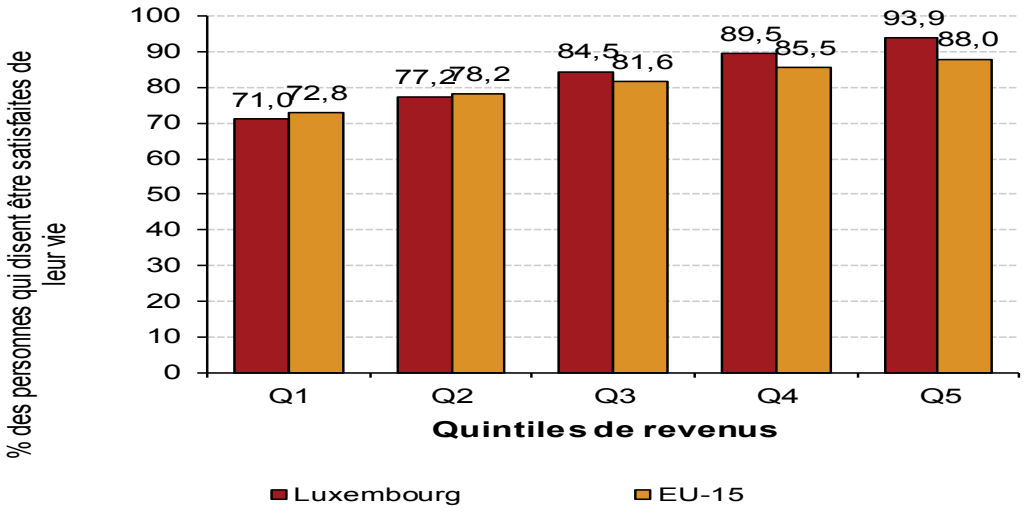
Relative income versus absolute income

Most studies seem to confirm that the correlation between material wealth and well-being is low or zero in high income brackets. And, at this level, a general increase in all incomes (a group of people or a population) does little to increase the degree of satisfaction with life. However, empirical studies have shown that an increase in individual incomes – all things being equal – (which corresponds to a relative growth of income) creates a greater sense of well-being.

Despite these nuances, however, we can observe that subjective well-being is not independent of objective living conditions. This is corroborated by the differences between social groups within countries. Subjective well-being is generally more developed among people who have a higher income than among those who have a low income.

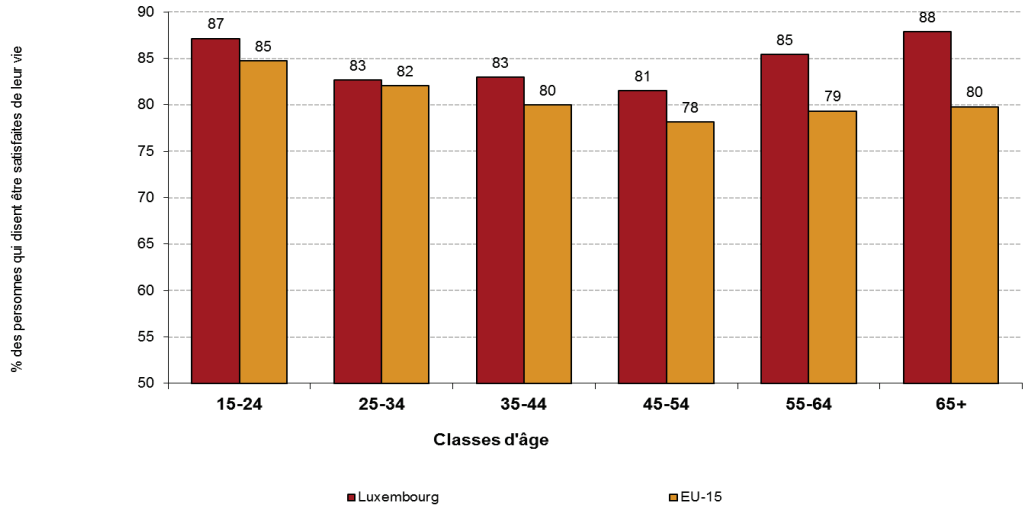
Differences in average life satisfaction according to age are fairly limited. They are not more than 5 percentage points in Luxembourg. However, life satisfaction seems to fall between the ages of 15 and 55 before stabilizing and going back up in the 55+ age groups.

Chart 20: Subjective Well Being by Income



Source: ESS 2001 - 2004

Chart 21: Subjective Well Being by age



Source: ESS 2001 - 2004

However, life satisfaction increases much more significantly in Luxembourg than in the EU-15. In Luxembourg, 81% of the 45-54 age group say they are satisfied with their lives. In the 65 + group, this percentage is 88%. In the EU-15, the corresponding percentages are 78% and 80%, an increase of only 2 points, as against 7 points in Luxembourg.

The material living conditions of pensioners are certainly one factor that explains Luxembourg's specificity. The average pension level is indeed higher in Luxembourg than in the other countries of the EU-15.

This development, which is much more pronounced in Luxembourg than in other European countries, also confirms the view of some experts that the evolution of people's perception of well-being in the course of their lives is U-shaped. Young adults, with lots of life projects, tend to show a relatively high life satisfaction. Midway through life – midlife crisis time –, doubts may disrupt people's general perception of life. Later on, they may once again take a more serene approach and be more 'satisfied' about life as a whole.

Research on the measurement of well-being and the relationship between material wealth and well-being is still in its infancy. Interaction between psychologists and economists has helped to achieve progress in this area. Nevertheless, many questions remain to be explored, especially in terms of the determinants of development. The results of this work will probably provide some clues as to the interaction with the policy-making process. In addition, this raises questions about the tendency to want 'more' wealth and the 'pursuit of happiness' (the latter being rooted in the US constitution) and to what extent these can be the ultimate goals in life. Amartya Sen (1998 Nobel Prize in Economics) is one of the people who argue that other aspects of life, such as freedom and justice, deserve a special place. Wide fields of investigation and discussion remain open on this issue.

A third dimension of the growth paradox relates to present and future aspirations in the midst of a difficult recovery, in which we fear a new recession and call for persistent growth on the BAU (business as usual) model. Unfortunately, the environmental challenges (climate change and limited natural resources) which require urgent action do not seem to be on the agenda.

Fundamental questions, such as what type of growth we need and what direction we development policy needs to take, should be priorities. Footprint calculations and other environmental statistics already exist and should be given serious consideration, given that ecosystems are under threat. Statistics, economic calculations and econometric forecasts have demonstrated that our current growth model is not sustainable. As we have seen, Luxembourg's economic growth is largely extensive, using non-renewable assets, and not predominantly intensive (i.e. using a fixed set of resources with greater efficiency). In this connection, all available statistics should be used to draw up plans for the future.

8. By way of conclusion

First of all, I must say that statistics have much more to say about Luxembourg than I could possibly set out in this short contribution. Nevertheless, I hope that this has helped to show that statistics provide a means of assessing reality more accurately and even of illustrating the complexity of a seemingly simple and, sometimes simplified, reality. Statistics can help to synthesize a number of individual cases or to dissect a particular reality and identify paradoxes. Statistics can also help to take a more subtle and nuanced view of things, where we might otherwise make hasty judgments and be left with a very one-sided view.

However, figures and graphs can also be misleading: 'relative versus absolute' and 'nominal versus exponential' are only two of the numerous dimensional issues to be considered. We should therefore be careful about the way we use statistics and very cautious regarding possible misuses and abuses.

And even as we acknowledge the important contribution of statistics to a better assessment of reality, I wish to warn against unduly high statistical expectations: not everything is measurable or can be expressed by statistics. Perhaps it is even the most important things that cannot.

If you will allow me to paraphrase Antoine de Saint Exupéry: *'It is only with the heart that you can see rightly, what is essential is invisible to the eye'*… and to statistics.

However, a number of areas can be explored and assessed more accurately with statistics. It's true: statistics do not always lie. They can us help dissect reality and provide enlightening information that enables us to discern what is at stake and take informed decisions.