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Efficiency and effectiveness of public expenditure on tertiary education in the EU

**Joint Report by the Economic Policy Committee
(Quality of Public Finances)
and the Directorate-General for Economic and Financial Affairs**

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Executive summary

Following the mandate of the Economic Policy Committee, the Working Group on Quality of Public Finances and the European Commission have worked on the efficiency and effectiveness of expenditure on tertiary education. The starting point of the work is a *quantitative analysis* of the main determinants of efficiency and effectiveness of public expenditure. It was carried out by a team led by Professor St. Aubyn, in cooperation with the European Commission.¹

This analysis was used at the peer review carried out over the period October 2008 to May 2009, to discuss the main tertiary education policy issues on the basis of country fiches² prepared by Member States on their tertiary education systems (involving co-operation mainly between Finance and Education Ministries). The peer review brought in *qualitative* and *country-specific* elements to the analysis. The present report presents the fruit of this collaborative work.

The report starts by drawing the main lessons from the economic literature on education. It then reviews the main trends in tertiary education, based on the statistical information available. The third chapter presents the institutions of tertiary education systems across the EU and draws the lessons from country experience. The final chapter presents policy challenges on tertiary education.

Broad policy challenges

Three broad challenges are of policy concern across the EU:

- *Mass opening versus quality*: how to support mass access to tertiary education, and an increasingly diversified body of students, while achieving excellence in teaching performance?
- *Education versus research*: how to overcome the trade offs, and exploit synergies, between teaching and research. Ultimately, economic policy makers' concern is to ensure that students acquire relevant skills and that scientific production is vibrant, so that both can contribute to the economy and society as a whole. Policies to stimulate research excellence might lead to a neglect of students if the appropriate safeguards are not in place.
- *Autonomy versus accountability*: with public funding of tertiary education come a number of conditions. Change is underway from Government's direct control to supervision of tertiary education institutions, but how to strike the right balance between autonomy of tertiary education institutions and the accountability for their use of public resources?

Why a focus on efficiency and effectiveness?

¹ St. Aubyn, M., Pina, A., Garcia, F., and J. Pais (2009), [Study on the efficiency and effectiveness of public spending on tertiary education](#), European Economy, Economic Paper No. 390.

² See Country Fiches on the Efficiency and Effectiveness of public expenditure on tertiary education.

For economic policy makers, the main rationale to improve the quality of public expenditure on education stems from the connection with innovation and growth: in short, developed societies need educated people and research laboratories are key to technological progress. Education, however, is not only about growth. It can and should contribute to society at large and the education of citizens.

Efficient spending matters for labour and total factor productivity. The analysis in St. Aubyn (2009) suggests that the link between the resources used in tertiary education systems and broader outcomes, like productivity, goes *through efficiency*. This is evidence in favour of the greater importance of efficiency in higher education spending, as it is not only a matter of public finance but also a way of promoting innovation and growth. Efficient spending also matters for employability. The employability of graduates increases where tertiary education is more efficient and this evidence is stronger when young graduates are considered.

Public finance consolidation efforts across the EU compound the urgency to improve the quality of public expenditure and increased scrutiny is required on the way public funds to tertiary education are spent. The policy stance is diverse across the EU with some governments sparing while others reducing public expenditure on education, but the public finance situation strengthens the duty to increase efficiency and define priorities so that when public expenditure cuts are made, they concern non-essential areas.

How to improve the efficiency and effectiveness of public expenditure on tertiary education?

First, policy makers need to nurture earlier levels of education, also for the sake of tertiary education systems. Earlier levels of education lay the foundations needed by students to advance to, and progress in, tertiary education. The quality of secondary education, as measured by results of PISA surveys, is found to have a positive impact on the efficiency of tertiary education systems. The difficulties in basic reading skills among 15-year-olds are not easy to remedy in upper secondary school and beyond. These students will find it difficult to advance to tertiary education and, if they do so, their education will not add skills in the same way as for students who have acquired more solid skills earlier on. Talented students (and faculty) are the backbone of tertiary education systems.

Second, tertiary education systems need to be further adapted. This will maximise the impact of public expenditure, which currently accounts for the bulk of resources devoted to tertiary education. In a nutshell, expenditure can be more efficient if tertiary education institutions are allowed to allocate their resources efficiently. An increasing number of EU member states are reforming their university systems. Policy changes to adapt institutions are numerous and aim at improving governance, giving more autonomy and improving incentives to deliver teaching and research of high quality.

However, tertiary education institutions in many Member States still operate under parameters which they may have insufficient autonomy to set. For example, the majority of institutions cannot select students, so applicants who have passed the national exam may not be refused. Institutions in many Member States cannot dismiss staff easily, nor do they have sufficient

ability to attract the academic staff of their choice. Subsidies per student and tuition fees are in most cases set by government. At the same time, tertiary education institutions are expected to respond to changes in demand for tertiary education and engage in competition. The main policy challenges emerging from the peer review of tertiary education systems and the review of the literature are summarised in the box below.

Basic autonomy and flexibility, within the right conditions

There is a great deal of variance across Member States as regards tertiary education governance and different dimensions of autonomy and accountability are not necessarily correlated. Still, important governance aspects are shared by the most efficient tertiary education systems as identified by St. Aubyn et al. (2009): tertiary education institutions have basic autonomy and flexibility, in particular staff policy autonomy and financial autonomy, as well as more autonomy to select students and their academic communities.

Autonomous tertiary education institutions can contribute to educational attainment and research productivity in their countries, within the right conditions, such as financial incentives, sufficient ability to attract and retain qualified staff, sufficient capacity to meet demand and adequate levels of resources (public and private sources combined).

Higher efficiency is a necessary condition, but it will probably not suffice to achieve excellence in the long run if adequate funding is not ensured. A comparison shows that expenditure on higher education in the EU accounts for less than 1.5 percent of GDP, against more than three percent in the US (where both public and private funds are of importance). In terms of expenditure per student, the gap with the US is wider still, with annual spending more than three times higher in the US. Quality of education and research is costly.

Member States recognise a strong need for highly qualified labour. The Europe 2020 strategy includes a benchmark to increase the share of population having completed tertiary education. Tertiary attainment rates are set to improve as Member States implement the Bologna system.³ In terms of policy objectives, in the horizon to 2020 the policy focus should be on *increasing the success rate* without lowering academic standards and *reducing graduation time*. This would contribute to increasing rates of attainment of tertiary education. Beyond the emphasis on educational attainment, maintaining and improving the *quality of tertiary teaching is essential*: research shows that what matters is that tertiary education adds valuable skills. A third main policy objective as concerns teaching would be broadening the access to tertiary education to those from less favourable family background - their limited access to tertiary education is unlikely to be fully remedied by a policy of free access (no tuition fees) because they often tend to lack the pre-requisite skills to access tertiary education, hence the need to intervene within the compulsory strand of education.

³ The implementation of the Bologna process has led to the adoption of a three-cycle higher education system (Bachelor-Master-Doctorate); whilst the length of programmes is not rigidly set by Bologna, the overall effect has been towards a shortening of time to graduate – particularly in countries where no Bachelor-level qualification previously existed, and a consequent increase in attainment rates.

Tertiary education financing

Population ageing may entail additional pressure on tertiary education financing for two main reasons. First, it raises the need for periodic education and retraining, as working lives gradually lengthen. Second, productivity growth will be more needed than ever because it would become the main source of growth in coming decades, according to the projections in the 2009 Ageing report: as the working age population becomes smaller in size, productivity increases will become crucial to maintain living standards. Will they, however, be sufficient?

Finally, future costs of tertiary education are probably set to increase further if only due to technical progress which lags behind other sectors in the economy (Baumol cost disease). Future increases in enrolment can also be expected, come from "traditional" age groups in the population and/or also from people already in the labour market.

The extent of public funding varies across the EU, but it remains key also in the few tertiary education systems where private funding is more important. The case for an increase in private funding sources is related to the extent to which limited public funding may either *ration the number of students* or *reduce spending per student* to levels which risk jeopardising the quality of teaching and the acquisition of skills by students.

The balance between *private* and *social* returns to tertiary education indicates the (large) degree of public subsidisation of higher education. Private returns to tertiary education tend to be high, although they vary across disciplines, institutions and gender. Social returns also tend to be high and they would be higher still if externalities were properly taken into account. Typically, though, social returns are smaller than private returns. The size of the private returns to education indicates that part of any increased funding could come from private sources.

A private contribution to the costs of tertiary education is generally justified by the high private returns that accrue to individuals and many economists in fact view public funding of tertiary education as regressive because access to tertiary is socially biased as students come from a higher socio-economic status relative to the rest of the population. If tertiary education funding were to come from higher student fees, it is critical that a well-functioning system of grants and/or loans is set up to help poorer students. Grants only are unlikely to suffice, or require that poorer students are *very* good. Concerns for equality of access to tertiary education are best addressed earlier on, at primary and secondary levels of education, and are unlikely to be addressed solely by policies to subsidise tuition fees at tertiary level only (also in absence of system of loans to cover living expenses during the tertiary education period).

The box below summarises the main *policy challenges* emerging from the peer review of tertiary education systems, as presented in the report to the Economic Policy Committee:

Policy challenges

- Take into account the multiple missions of institutions: teaching, research, contribution to lifelong learning, and contribution to society; the peer review highlighted that most tertiary education systems face trade-offs between teaching and research.

Governance and staff policy issues:

- Raise tertiary education institutions' autonomy in what concerns staff policy, namely their ability to hire and dismiss staff and to set wages.
- Promote the accountability of tertiary education institutions, with careful and fair evaluation ensured by independent bodies.
- Encourage rationalisation and collaboration (use of shared facilities).

Funding rules:

- Ensure some stability in funding: institutions need time to adjust, in particular when they have limited autonomy e.g. to hire, dismiss or adapt the wages of staff.
- In designing financial schemes, relate funding to the institutions' performance in output terms, rather than relying only in inputs used or in historical trends. A balance between input and output indicators can help to avoid trade offs and perverse incentives such as grade inflation (if output based) or incentives to keep students in the education system (when funding is based on the number of students).

Funding sources:

- An increase in private funding sources can be a realistic way forward to cope with a mounting need for resources, especially when the number of students expands and the quality of teaching needs to be maintained and preferably improved.
- The rationale for private contributions (especially tuition fees) to the cost of tertiary education rests on the appropriation by individuals (and firms) of large returns on their education investment at tertiary level, although with large differences across programmes and disciplines. Private rates of return estimated at above 12% on average, and social returns a bit lower (close to 8%) argue for a private contribution from students to the cost of education, as they are generally the main beneficiaries of their degrees. Such contributions would need to go hand in hand with appropriate mechanisms to relieve credit constraints, so as to ensure an equitable outcome where access to higher education of qualified individuals does not depend on parental income.
- Student support systems appear piecemeal and complex in many Member States. The systems could usefully be simplified, which would also make them compatible with increased mobility. Loans and grants with possibilities to shift say part of a loan to a grant if graduation takes place within the nominal time so as to strengthen incentives for speedy graduation and loan systems with income contingent repayments should be considered, including coverage of living costs in addition to subsidising tuition costs; public support of the full costs targeted to fewer students would appear more effective than a modest support generalised to most students.

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(Box continued)

- Public funding ought to be related to the benefits brought to society by different tertiary education programmes. Programmes where the private returns are much below the social returns should receive more support than programmes with a lower external return, as a major argument in favour of the public funding of education is the positive externalities generated. Fees could also be differentiated by cost of education, and the link with quality assurance should be strengthened in order to ensure that relevant and high-quality programmes receive adequate support.

Access to, and success in, tertiary education

- The public policy challenge of delivering equality of opportunity in tertiary education is sizable, and goes beyond the scope of the tertiary education system itself, reaching back to pre-schooling and into compulsory and upper-secondary education. Implicit barriers to access to tertiary programmes (such as lower levels of basic skills for individuals from disadvantaged backgrounds, information issues and liquidity constraints) may be more important than explicit ones (tuition fees). Policies specifically targeted at these problems may be warranted, rather than further decreases to (generally) already low tuition charges that imply a large subsidy for relatively privileged groups who typically access tertiary education. The peer review also highlighted that, in a number of Member States, tuition fees are perceived as curtailing access by people from disadvantaged background, even though these are separate issues. Possibilities to disconnect the issues of tuition and access ought to be explored.
- The peer review confirmed that information policies could improve access to, and success in, tertiary education. A better orientation could reduce failure rates, which are particularly large in the first year in a number of countries. More specifically, information policies could include orientation and future possibilities brought by different tertiary education programmes, transparency of graduation/success by different programmes and institutions or employability of graduates in different programmes and institutions.
- The peer review showed that some students remain too long in the system, for a number of reasons including a generous treatment of non-studying students. Consideration should be given to provide incentives to graduate within the nominal time, for example by reducing the public subsidies, as it is already the case in a number of Member States;

Strategic sectors in the economy

- The policy concerns about strategic sectors in the economy (Science, Technology, Engineering, Mathematics) and how to give incentives to study these disciplines need to be addressed from compulsory and upper-secondary education till tertiary education and the connection with the labour market.

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Labour market policies

- Labour market and education policies are closely intertwined: returns to education are lower when labour markets are less rewarding of high skills, even though these skills may be in high need. This reduces the incentives to enrol in tertiary education, and possibly also to conclude graduation. Other labour market institutions, such as the diffusion of temporary contracts and the limited conversion of temporary contracts into permanent contracts, also reduce the returns to tertiary education, weakening incentives to enrol and/or graduate. Attractive student work contract may also introduce distortions in the education system. It is important to get the policies right: their main purpose is to provide work experience, rather than being used as a flexible tool for companies.

Mobility

- Student mobility across tertiary education institutions (at national and EU level) should be encouraged; there is a strong demand for Universities established in the area where the family lives in a number of countries, a;

Life-long learning

- Tertiary education institutions' role in lifelong learning is an area where more should be done in most Member States; few countries have significant numbers of students enrolling during their working life, or with strong links between tertiary education institutions and the labour market. The peer review has not looked into lifelong learning policies specifically, or their efficiency and effectiveness, however a general principle is that lifelong learning policies which allow tertiary education institutions to cater for the needs of the working population are essential in view of ageing populations; indeed the bulk of education continues to take place before the mid-20s and at the same time people are expected to remain active for longer; furthermore, the United Kingdom example highlights that the access of mature students makes up for some of the imbalance in access by socio-economic background.

1. Introduction

Two important features of education stand out: it has a strong influence on economic growth (increasing average education in the population by one year would raise the *level* of output per capita by between 3 and 6 percent in the long-run or lead to one percentage point faster *growth* if the effect on productivity growth is also taken into account, see Veugelers and van der Ploeg, 2008) and it accounts for a sizable share of public expenditure: over 5% of GDP for education as a whole, of which the tertiary level accounts for 22% in the EU as a whole.

Education is at the core of the Europe 2020 strategy. Member States recognise a strong need for highly qualified labour. Several Member States have explicit policies to raise participation rates in higher education and all have agreed an EU level target for attainment rate of 40% of the 30 to 34 years-old. The ageing of populations compounds the need for periodic education and training: as the labour force shrinks, raising labour productivity increasingly becomes the efficient way to maintain standards of living. The working-age population is projected to shrink after 2020 in the EU as a whole, acting as a drag on growth and productivity would become the dominant source of growth.⁴ Productivity growth, however, can only be expected to partially alleviate the need to reduce and contain costs in order to safeguard sustainable public finances.

At the same time, it has become more urgent to improve the quality of public finances in view of the need for budget consolidation across the EU. Increased scrutiny is required to monitor the efficiency and effectiveness of public expenditure and assist in the definition of priorities, notably to identify areas that may enhance future growth. Although the policy stance across the EU is diverse, the public finance situation increases the responsibility for increased efficiency, and effectiveness, of public expenditure on education across the board.⁵ Member States should use all available tools to ensure that the consolidation of public finances is accompanied by improving government services.

Following the mandate of the Economic Policy Committee, the Working Group on Quality of Public Finances and the European Commission have focused on the efficiency and effectiveness of expenditure on tertiary education. The approach includes both quantitative and qualitative aspects. The starting point is a quantitative analysis to highlight the determinants of efficiency and effectiveness of public expenditure, which was carried out by a team led by Professor St. Aubyn, in cooperation with the European Commission.⁶ This analysis was then used to discuss tertiary education policy issues, on a country-by-country basis: a peer review was carried out over the period October 2008 to May 2009, on the basis of country fiches prepared by Member States on their tertiary education systems (involving

⁴ See European Commission (2009), 2009 Ageing Report: Economic and budgetary projections for the EU-27 Member States (2008-2060), European Economy 2/2009.

⁵ Moreover, future costs of tertiary education are probably set to increase further only due to technical progress which lags behind other sectors in the economy (Baumol cost disease), ignoring future increases in enrolment from different age groups in the population.

⁶ St. Aubyn, M., Pina, A., Garcia, F. and J. Pais (2009), [Study on the efficiency and effectiveness of public spending on tertiary education](http://ec.europa.eu/economy_finance/publications/publication_summary16265_en.htm), European Economy. Economic Papers. 390. November. Available at http://ec.europa.eu/economy_finance/publications/publication_summary16265_en.htm.

co-operation mainly between Finance and Education Ministries). The peer review brought qualitative and country-specific elements to the analysis of tertiary education systems. This report presents the fruit and policy conclusions of this collaborative work.

The report starts by drawing the main lessons from the economic literature on education. It then reviews trends in tertiary education, based on the statistical information available. The third chapter presents the institutions of tertiary education systems across the EU and draws some lessons from country experience. The final chapter presents policy conclusions on tertiary education.

2. Lessons from the literature

2.1. *The economic impact of education*

The literature provides evidence of the benefits of education to individuals and society. For the individual, education attainment is a key determinant of earnings and has a significant effect on labour market outcomes (de la Fuente, 2003, CHEPS, 2010). Moreover, the returns to the individual have increased strongly in the past few decades in many countries, contributing to wider income inequalities between people with different education attainment.⁷

Investment in education is a critical factor for aggregate productivity and economic growth. This is because growth is based on technical advances that demand more skilled and qualified workers. Investment in education also delivers non-monetary benefits, such as higher life-expectancy for more educated people, greater participation in civic and social life, enhanced social cohesion and reduced crime⁸ (see Woessmann, 2006).

Box 1: Working definitions on the rates of return to education (*adapted from Psacharopoulos and Patrinos (2004) and the Centre for the Study of Higher Education Management (2007)*)

The **private rate of return** compares the costs and benefits of education to the individual student: how much the student actually pays out of pocket to attend a tertiary education institution, and the opportunity cost of the student's time, relative to what he/she gets in terms of increased earnings, after taxes. The comparison is made relative to a control group of secondary school graduates who did not pursue tertiary education studies. Private rates of return are used to explain the behaviour of students regarding the demand for different levels and types of education, or the equity effects of state subsidies to education.

The **social rate of return** compares the costs and benefits for the country as a whole. They refer to what education really costs, rather than to what students actually pay out of pocket. It helps to design policies regarding the expansion or contraction of different levels and types of education. Ideally, social rates of return should be based on productivity differentials, rather than earnings. They should also include the *external effects of education*, e.g. a higher education graduate spilling benefits to others by means of being more educated.

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⁷ The increase in earnings inequality over the period 1973 to 2005 in the United States is attributed to the increase in the returns to investment in higher education that, in turn, is due to the increased demand for skilled workers, see Psacharopoulos (2009).

⁸ Lochner (2010) discusses the relationship between education and crime from an economic perspective, with a focus on the crime-reduction effects of early childhood programs, policies that encourage schooling, and job training programs for low-skill adolescents and young adults in the United States.

(Box continued)

While data on social costs tend to be available (the full cost of the provision of education and the opportunity cost of having people in education and not participating in the production of output), information about the full range of social benefits is less readily available (the increased productivity associated with the investment in education and a host of possible non-economic benefits such as better health, lower crime and more social cohesion). Mainly due to the scarcity of suitable data to measure externalities, the social rate of return is typically understood as either: (i) a *narrow social return*, which is a private rate of return adjusted for the full cost of education or (ii) a *wide social return* that is including *externalities*. **Social returns** are those over and above the returns to the individual.

The social returns suggest whether the investment in human capital formation is adequate from the social point of view, taking into account the externalities as human capital is a public good. When social returns exceed private returns, investment in higher education tends to be too low from a social perspective. When the government provides substantial financial support to the higher education sector, subsidies to higher education may in fact be so high that individuals invest beyond the socially optimal level (i.e. private returns exceed social returns to schooling).

Fiscal returns to education are based on a narrow measure of costs and benefits – those relating to the public purse. They relate to the country's public finances and are not estimated as widely as the private and social rates.

In economic theory, education has a key role in economic growth – especially so in modern growth theory. Estimates of education externalities and impacts on economic growth however are very difficult to make and the empirical evidence on the private returns to education is firmer than as concerns its social returns.

The empirical literature, indeed, is faced with a number of difficulties. Since both levels of education and levels of GDP per capita in any given year are closely related to those in earlier and later years, it is difficult to disentangle the ways in which GDP and education are interconnected. The measurement of education is also surrounded by difficulties, in particular how to account for differences in the quality of education.

While there is consensus in the literature on robust correlations, the need to resolve the empirical question of causality remains one of the major challenges faced by studies linking education and economic performance, both at the individual level and at the aggregate level. Evidence strongly supports the human capital explanation that education raises productivity (Sianesi and Van Reenen, 2003).

In recent literature, a further step was made from using quantitative measures of education, such as average years of schooling or education attainment, to analysing the impact of the acquisition of skills, mostly using test scores as a proxy. Heckman et al. (2007, 2009) further refine the analysis of education and study the impact of skills acquired, covering both cognitive and non-cognitive skills.

The economic literature on education has a strong emphasis on the early stages of education, which are associated with relatively large benefits (albeit they accrue over a very long period of time). There is an abundant literature on schools and recent empirical work stresses the key role of early (pre-primary) education.

The literature on schools mostly concerns the United States; see Wossman (2006) for a review. It has notably studied the consequences of changes in class size, the implications of greater school choice and increased competition among schools or the implications of various forms of testing of students. Detailed studies show that smaller class sizes do result in higher

student achievement for some students and some classes, however further analysis of the costs and benefits of such use of resources are needed (Averett and Mc Lennan, 2004). As regards school reforms, the available evidence supports to focus the incentives of all actors on increasing the performance of students. This could be achieved for example through a combination of accountability and school autonomy. It is essential to couple accountability and autonomy, as evidence suggests that local decision-making without external examinations is detrimental for student performance. How to design school autonomy in practice is however difficult. Caution should be exercised in designing and implementing proper accountability systems, as there are risks of strategic responses of teachers and schools.

Recently, studies have focused on the tertiary level of education. Some influential studies converge on similar messages on the role of governance and funding for research performance, as well as on the need for increased competition, see Aghion et al. (2007, 2008, 2009) and Van der Ploeg and Veugelers (2008).

Country-specific and comparative (cross-country) empirical assessments are still necessary to evaluate the impact of specific policies on the efficiency of tertiary education. Too little is known on the specificities of EU tertiary education systems. There is still a glaring lack of data and of rigorous empirical evaluation of policy interventions, to create and share the knowledge of what works and what does not work; the peer review on tertiary education recently carried out can make a contribution, by creating and sharing knowledge as well as exchanging examples of good practice.

The next sections review the literature on the private and social returns to education. The private return to education indicates whether the adequate level of education is being provided: are individuals' private investment decisions in education optimal? The social returns indicate whether education subsidy levels are optimal, thus suggesting how that level of education should be funded (Harmon et al., 2001). Externalities matter, as they can lead to sub-optimal investment decisions by individuals for society at large. They matter especially if social returns are above the returns to the individual. The private returns to education are easier to estimate than the social returns and more estimates are available.

2.1.1. The economic impact of education on the individual

This section covers all education levels and examines the returns to the individual, or private returns. Traditional human capital theory stresses the central role of education (see Psacharopoulos and Patrinos, 2004, for a review of the work by Becker, 1964, Schultz, 1971 and Mincer, 1974).

The main idea is that education by an individual can be regarded as an investment in human capital. Similarly, training or medical treatment are investments in human capital. As any investment, the investment in human capital entails costs and yields future benefits, and an internal rate of return to the investment can be calculated. Costs cover direct expenditure and the opportunity cost of the student's time, notably the foregone earnings as the student is not working. The investment is expected to yield future benefits to the individual, in terms of higher productivity, which will command higher earnings, and also the quality of his or her

employment as educated workers tend to have higher wages, greater employment stability, and greater upward mobility in income, relative to less-educated workers (Mincer, 1993). Just as with all investments, the outcome is subject to considerable uncertainty, especially at the individual level.

In addition, benefits will accrue to society at large, such as the increase in the total output of goods and services produced through the increased productivity of the individual, an increased rate of productivity growth in the economy, and additional benefits to society such as more informed and socially-involved citizens and in better health.

Building on traditional human capital theory, Cunha and Heckman (2009) have developed a perspective to assess education policies over the life cycle of an individual. An investment in education matters in so far as skills are successfully acquired. In a nutshell, skills acquired over the life cycle are complementary, with two important features. The first one can be best summarised by Heckman's words: "*skills beget skills*". This is because already acquired skills are an *input* to the acquisition of further skills. The second feature is that the acquisition of skills is *more productive* when skills were acquired earlier on. These features result in a "*skill multiplier*", by which an investment in education at one stage raises the skills attained at that stage but, also, the productivity of the transformation of future educational investments into skills.

If education at secondary level is of insufficient quality, then the productivity with which investments in education at tertiary level are translated into valuable skills will be negatively affected. Investments in secondary level education in turn are more productive if the young have acquired earlier skills, in primary, pre-primary education institutions and, of course, in the home.

In the context of the efficiency of public expenditure, earlier public interventions are key to make investments in tertiary education productive. A productive tertiary education system requires sound learning foundations acquired by students at earlier stages, unless it relies on attracting talented students (and faculty) from abroad. Empirical analysis, mostly for the United States, shows that education is indeed such a life-cycle process. There is also European evidence supporting this view, although far less developed (see Woessmann, 2006).

There is an abundant empirical literature on the private returns to education; however there are very few cross-country comparative studies. Card (1999) surveys the literature and finds a very robust positive association between education and individual earnings in the labour market.

The economic literature also considers signalling and screening models to explain the link between education and productivity. Such models stress the role that education plays to *signal* the productivity of the individual, which is seen as an innate ability.⁹ In contrast, human

⁹ For example, ability to progress in education may be correlated with ability to succeed in the labour market. There is also an effect of credentials on wages: a pay premium may be associated with years in education, as employers use educational attainment to screen for ability.

capital models stress the role of education in *raising* individuals' productivity, which is rewarded in the labour market by higher earnings.

There are some challenges in the estimation of returns because education may, at least partly, reflect a pre-existing ability. Thus the earnings differential does not only reflect the skills acquired via educational attainment, but would also result from the way employers use educational attainment to screen for ability. Furthermore, there are many technical issues surrounding the estimation of the return to schooling, especially related to the measurement of human capital.¹⁰

Despite this inherent difficulty, most authors support the human capital explanation (Woessman, 2006). In particular, Sianesi and van Reenen (2003) provide evidence that education is productivity-enhancing rather than a mere device used by individuals to signal their level of ability to their employer. Ciccone and de la Fuente (2002, 2004) also confirm causation from education to productivity.

Most studies on rates of return to schooling do not explicitly distinguish between primary, secondary and tertiary education. Furthermore, returns to education can vary across the population and the marginal return to schooling is a decreasing function of schooling (Card, 1999).

Harmon et al. (2001) evaluate the relationship between education and wages across the EU using a common methodology.¹¹ Their estimates of wage effects of schooling are substantial, so that each additional year of education is associated with more than an 8% increase in wages on average, see [Table 2-1](#). The impact is significantly higher than average in the United Kingdom and Ireland (between 10 and 14 %). In contrast, it is lower in Sweden, Denmark and Norway (between 4 and 6 %). Harmon et al. (2003) conclude that participation in education has an unambiguously positive effect on the earnings of an individual. Moreover, the size of the effect seems large relative to the returns on other investments.

De la Fuente (2003) finds estimates of the private return to education across 14 EU countries between 8 and 10% for most countries. Returns are larger in Ireland, Germany and Austria (above 10%) and in Portugal and the United Kingdom (between 10 and 12%). The returns are the smallest in Sweden (about 6%). De la Fuente and Jimeno (2005) compute private returns which range between 4.3% (Sweden) and above 12% (United Kingdom) with an average of 8.8%. Furthermore, micro-evidence suggests that more educated people are more successful in obtaining non-wage remuneration, in particular benefits such as insurance or childcare provided by the employer, see survey by Woessman and Schütz (2006).

¹⁰ See de la Fuente (2007) on measurement errors and studies using improved data series or econometric techniques to address the bias in measurement.

¹¹ Wages reflect labour market institutions as well as relative productivities, hence caution needs to be exercised when interpreting the impact on wages as a measure of the contribution of schooling to productivity.

Table 2-1 – Estimates of wage effects and private returns to schooling

	Harmon et al. (2001)	de la Fuente (2003)	de la Fuente and Jimeno (2004)
BE	.	8.6	7.5
DK	5.7	8.9	8.0
DE	8.7	10.4	9.1
IE	10.9	10.4	11.0
GR	8.2	9.8	9.2
ES	8.2	9.4	7.5
FR	7.8	9.6	8.6
IT	7.9	8.6	8.4
NL	7	8.0	6.6
AT	8.6	10.5	8.5
PT	9.7	12.3	10.3
FI	8.7	9.6	10.0
SE	4	6.1	4.3
UK	10.3	13.9	12.3

Source: Commission compilation

Note: Harmon et al. (2001) calculate wage effects. De la Fuente (2003) and de la Fuente and Jimeno (2004) calculate private rates of return.

2.1.2. The impact of education on growth

The education of individuals may benefit others in current and future generations, over and above the private benefits that are taken into account by individuals in making their decisions to invest in education. Such externality benefits are the main rationale, on efficiency grounds, for the public support of education. Unfortunately, compared to the *private* returns to education, much less is known about the *social* returns to education, which mainly take the form of human capital externalities. The data suitable for the measurement of externalities are scarce. Better estimates of education externalities are very important to obtain.

Theory suggests that increases in the overall level of education can benefit society in ways that are not fully reflected in the wages of educated workers (also due to labour and product market imperfections). Human capital spillovers may increase productivity over and above the direct effect of education on individual productivity.

Furthermore, increases in education also may reduce criminal participation and improve voters' political behaviour. Higher levels of education may also result in better health for educated individuals and their children. If parental education indeed improves child health, then the total benefits of human capital accumulation are not captured by estimates of the private (monetary) returns.

Economic theory is very positive as regards the impact of education on economic growth. The augmented neo-classical model includes human capital as an additional input in the production function. The model is estimated for the economy as a whole and takes into account of human capital externalities that increase the level of output.

The endogenous growth approach argues that there should be an *additional* effect of human capital, over and above the static effect on the level of output. Economies richer in human capital would have a higher rate of innovation, therefore increasing the *level* of human capital is expected to have an effect on the growth rate of *productivity*. This occurs through two main mechanisms. The first is the creation of new knowledge: growth is attributable to increases in

human capital, as more highly educated individuals work to increase the stock of knowledge through the development of new processes and technologies. The second way that education affects economic growth is through the diffusion and transmission of knowledge.

Human capital externalities may arise if the presence of educated workers makes other workers more productive, for example by creating learning opportunities through social and professional interactions. Another possible channel is that there may be spill over effects from technical progress or knowledge accumulation resulting from investments in human capital. Mobility of personnel is an important mechanism to facilitate knowledge spillovers and the transfer of knowledge. Knowledge is a public good that spills over the economy in the form of externalities and allows output to grow *beyond the measurable inputs*.

A large theoretical literature has built on this idea, proposing models where human capital externalities are the main engine of economic growth, especially the so-called endogenous growth theories and recent neoclassical growth theories by Romer and Lucas (reviewed by Psacharopoulos and Patrinos, 2004). Lucas (1988) argues that human capital externalities in the form of learning spillovers may explain long-run income differences between rich and poor countries. Human capital may continue increasing even *without further increases in educational attainment*, because human capital adds to a public body of knowledge.

Romer (1990) assumes that the growth of productivity depends on the stock of human capital (the existing stock of ideas and the number of people employed in the R&D sector, devoting their time to the accumulation of new ideas). The human capital used in the R&D sector to stimulate innovations is especially relevant to the countries at the technology possibility frontier, while in other countries, the average level of education available to facilitate the dissemination of technology is likely to be much more relevant.

Education also has an indirect effect on productivity and employment through the quality of institutions that may be considered a component of social capital and well-being of individuals and societies (de la Fuente and Ciccone, 2002).

Moving from economic theory to empirical work, growth accounting provides a simple framework to study the effects of education on growth. Increases in education of the workforce raise effective labour supply, which results in an increase in output.¹² If, however, the rate of growth of total factor productivity is exogenous, rather than depending on the change in educational attainment, then growth accounting would understate the contribution of education to economic growth. The growth accounting framework also implies that the effect of human capital depends on the *expansion of educational attainment* and hence there is a limit to its contribution to growth.

A vast literature of cross-country growth regressions tends to find a significant positive association between quantitative measures of schooling and economic growth, mostly using the internationally comparable data on average years of schooling provided by Barro and Lee (1993, 2001). Some studies estimate that increasing average education in the population by

one year would raise the level of output per capita by between 3 and 6 percent, as the stock of human capital affects the long-run level of the economy while it would lead to an over one percentage point faster growth according to the new growth theories as education affects the long-run growth rate of the economy (Veugelers and van der Ploeg, 2008 a).

The literature also examines the magnitude of the effect of *education levels* and their *improvements* on output growth. There is debate on whether a rapid growth rate can be expected from a high *level* of education or only if the *stock* of educated labour force is expanded.

The recent empirical growth literature emphasises the investment activities of firms, households and the government in both R&D and education as being essential for enhancing the level of technology in an economy and the closer to the technology frontier, the larger the returns to tertiary education – especially at Masters level. Aghion et al. (2007) stress the role of higher education in fostering economy-wide growth. Empirical evidence for the United States reviewed by Moretti (2004) indicates that learning spillovers may be important in some high-tech industries, as evidenced by patent citations more likely to come from the same state or metropolitan area as the originating patent and the role of human capital in the entry decision of new biotechnology firms, as measured by the number of relevant academic publications. Moretti (2004) estimates the magnitude of human capital spillovers from tertiary education on the productivity of manufacturing firms in United States cities. He finds that a one percent increase in the city share of college graduates is associated with a 0.5-0.6 percentage point increase in output.

De la Fuente (2003) estimates that an additional year of average school attainment raises productivity in the average EU country by 6.2% and by a further 3.1% in the long-run through the contribution of faster technical progress. Nicoletti et al. (2003) find that higher skill levels have a positive impact on total factor productivity (TFP) growth, although the effect is not always significant. Vandebussche et al. (2007) show that high-skilled human capital has a positive effect on TFP growth and the effect is stronger the closer a country is to the world technology frontier.

Van der Ploeg and Veugelers (2008) review economic studies showing the importance of basic research for innovation and economic growth. In science-based industries, such as biotechnology, pharmaceuticals, tissue engineering or nanotechnology, the link between science and innovation is direct. Others industries which are not science-based still benefit from basic research resources, such as the training of researchers helping to increase the absorptive capacity of industry.

Afonso and St. Aubyn (2010) estimate that the human capital contribution to growth is usually positive, but it is not always significant from a statistical point of view. Some countries, even if they are close to or at the efficiency frontier (such as Portugal and Spain), are probably limited in their growth prospects by their relative human capital scarcity.

¹² The size of the increase in output depends on the labour share. Furthermore, countries with high levels of education are also likely to have more capital per worker.

The World Economic Forum (WEF) compiles an annual Global Competitiveness Index where higher education is considered as one of the pillars enabling economies to sustain economic growth and long-term prosperity. The score on "higher education and training" is measured by secondary and tertiary enrolment rates, as well as the quality of education as assessed by the business community through an annual Executive Opinion Survey. The extent of staff training is also taken into consideration because of the importance of vocational and continuous on-the-job training for ensuring a constant upgrading of workers' skills to the changing needs of the economy. The score on "innovation" includes expenditure on R&D, especially from the private sector, high-quality scientific research institutes, collaboration between universities and industries and protection of intellectual property. The ranking information suggests a positive link between higher education, innovation and growth. The top 15 countries in the Global Competitiveness Ranking also have high scores on "higher education and training" and "innovation".¹³ It also suggests that this link is country-specific.

Empirical analysis developed in the past ten years uses *qualitative* measures of education, such as test scores, and finds higher earnings returns compared to measures of educational quantity, see Woessman and Schütz (2006) for a review. This significantly alters the assessment of the role of education in the process of economic development. Using data from the international student achievement tests to build a measure of cognitive skills, Hanushek and Kimko (2000) find a statistically and economically significant positive effect of cognitive skills on economic growth in the period 1960 to 1990 that "dwarfs the association between years of schooling and growth".¹⁴ The simple conclusion from the combined evidence is that differences in cognitive skills lead to economically significant differences in economic growth.

A number of studies document that cognitive ability, usually measured by an achievement test at school, is a powerful predictor of wages and schooling, but also participation in crime, health and success in many other aspects of economic and social life. Heckman et al. (2006) present estimates of the causal effect of ability on diverse outcomes. Recent econometric analysis carried out by the OECD (2010) shows that once information is included on cognitive skills, school attainment bears no relation to economic growth. In other words, added years of schooling affect growth insofar as they raise the skills. More recently, non-cognitive abilities have been shown to be important predictors of the same outcomes. Non-cognitive traits include perseverance, motivation, self-esteem, self-control, conscientiousness, and forward-looking behaviour (Cunha and Heckman, 2009).

The Share project brings evidence on the impact of education on health. Within all countries, there is a strong link between health behaviour and socioeconomic status. Individuals with lower levels of education are 70 percent more likely to be physically inactive and 50 percent

¹³ Sweden, Denmark, Finland, Germany, Netherlands and the United Kingdom are in the top 15 countries in the Global Competitiveness Ranking. They all score high or very high on higher education and innovation, with the exception of Germany and the UK (the result for the UK is surprising given the UK's performance on other rankings).

¹⁴ Furthermore "the effect of years of schooling is greatly reduced by including cognitive skills, leaving it mostly insignificant, while adding a variety of other factors leaves the effects of cognitive skills basically unchanged".

more likely to be obese than individuals with more years of education. The strong relation between health and socioeconomic status also holds for mental health. Cross-national differences in depression rates resemble patterns of cross-country differences in education. Within countries, persons with low income or low wealth suffer more frequently from depression, particularly in Europe's North. Eurostat (2010) identifies a systematic relationship between educational attainment and mortality: at any age, life expectancy is less among persons with the lowest educational attainment and increases with educational level. The evidence suggests that life expectancy by educational attainment is a very important indicator of socio-economic inequalities in health. Woessman (2006) reviews evidence on education externalities in terms of reduced crime and increased civic participation.

2.1.3. The returns to tertiary education on the individual and the society

Tertiary education is generally associated with higher earnings and employability. In the last two decades of the twentieth century, there was a strong shift in labour demand towards highly-skilled workers in the majority of industrialised countries. This was mostly driven by a technological change bias towards highly skilled tasks and by employers seeming to be increasingly demanding workers with graduate qualifications (Woessmann 2006). Boarini and Strauss (2007) estimate the employability premium from tertiary education relative to upper secondary education and find an average value of roughly two percentage points. Biagi and Lucifora (2008) study the impact of education on unemployment using data from Labour Force Surveys for 10 EU countries and conclude that higher educational attainment (measured by the share of those with more than primary education) reduces unemployment rates, both for less educated and (especially) for more educated groups.

An issue to explore is the impact of larger segments of the population with tertiary educational attainment on their labour market returns. In recent decades, most EU countries have faced a massive quantitative expansion of education systems, particularly at the tertiary level of education, mostly driven by demand. The question arises whether the increasing supply of higher-educated labour been matched by the rise in demand for graduate skills – and high-paying jobs. It is conceivable that at least some new graduates are doing jobs that do not require graduate skills, thus crowding-out some less well qualified workers. This may be associated with a relative rise in unemployment among people with low qualifications, but also potentially with a reduction in the pay premium associated with tertiary qualifications. The OECD (2007) suggests that the expansion of tertiary education has had a positive impact for individuals and economies and that there are, as yet, no signs of an “inflation” of the labour-market value of qualifications.

There are substantial difficulties in calculating true social returns to education. Moreover, it is difficult to compare the results of the studies available, because they use different data sources and methodologies. The estimation of social returns should ideally include the external effects, that is, the benefits tertiary education graduates spill over other members of society, thus distinguishing between "narrow" and "wider" social benefits.

The OECD (2002) calculates the internal returns to tertiary (and upper secondary) education for a few countries, see [Table 2-2](#). Overall, human capital investment appears attractive relative to alternative assets, both from the individual and from the social perspectives. It is however important to stress the variability of returns, especially according to area of studies, prestige of the tertiary education institution and gender. The average private returns are large and three groups of countries can be identified: (i) the United Kingdom stands out with very high returns from tertiary education, (ii) Denmark, France, the Netherlands and Sweden have relatively high internal rates of return, ranging from 10 to 15 per cent and (iii) Italy and Germany have rates below 9 per cent.

Countries with strong private incentives to invest in tertiary education are characterised by high earnings differentials and/or relatively short education programmes, and *vice versa*, see the return based on pre-tax earnings and the length of studies. The influence of policy factors does, however, generate notable exceptions to this general pattern. The contributions of these factors are conditional on the pre-tax earnings and the length of education. The calculated high rates of return in Sweden, the Netherlands and especially Denmark are strongly influenced by a comparatively large public student support, in the form of public student grant and loan arrangements, despite relatively narrow wage differentials and long study periods.

The impact of taxes is particularly strong in the United Kingdom and the Netherlands. Unemployment risk differentials have a positive, but relatively small effect on the internal rates of return of tertiary education. Tuition fees apply in many parts of the United Kingdom resulting in reduced rates of return to tertiary education in the United Kingdom. Public student grant and loan arrangements at the tertiary level give a significant boost to incentives, adding on average 2½ to 3 percentage points to the internal rates of return in the countries under review, compared with rates of returns excluding such support. The impact is particularly strong in Denmark, while it is weak in France, and absent in Italy.

The calculated social rates of return do not include externalities or non-economic effects and are thus biased downwards. Typically, private returns exceed social returns, reflecting that the social cost of education is much larger than the private cost. This suggests that individuals (and firms) are probably better placed to capture the benefits from higher education. Furthermore, when taking into account the non-market returns to education and its benefits for social cohesion, human capital becomes a rather attractive investment alternative from a social point of view.

OECD (2008), estimates the highest private returns in the Czech republic, Poland and Hungary and private returns exceed social returns by a margin of 4.4 percentage points on average, see [Table 2-3](#). Social returns to tertiary education are highest in Portugal, Poland, Hungary, Belgium, Ireland and Germany, while they are relatively lower in France, Spain, Finland, the United Kingdom, Denmark and Sweden. CHEPS (2010) estimates average private returns to 10.2% and social returns to 7.9%.

Table 2-2 – Internal rates of return to tertiary education, 1999-2000, in percentage.

Return on tertiary education (1999-2000)																	
Social return			Private return (comprehensive)		Return based on pre-tax earnings and length of studies				Impact on private return of:								
									Length of studies		Taxes		Unemployment risk		Tuition fees		Public student support
Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
DK	6.3	4.2	13.9	10.1	7.9	6	7.9	5.7	-0.4	-1	1.1	0.7	-0.1	-0.2	5.4	4.9	
FR	13.2	13.1	12.2	11.7	13.3	12.1	13.3	12.1	-1.6	-1.7	0.4	1.2	-0.8	-0.9	0.9	1	
DE	6.5	6.9	9	8.3	7.1	7	7.1	7	-1.5	-1.6	1.1	0.6	-0.3	-0.6	2.6	2.9	
IT	7	:	6.5	:	6.7	:	6.7	:	:	:	0.5	:	-0.7	:	:	:	
NL	10	6.3	12	12.3	11.7	9.4	11.7	9.4	-2	-1	:	0.7	-0.6	-0.7	2.9	3.9	
SE	7.5	5.7	11.4	10.8	9.4	7.4	9.4	7.4	-1.5	-0.7	1.2	1.6	-0.7	-0.8	3	3.3	
UK	15.2	13.6	17.3	15.2	18.1	16.4	18.1	16.4	-2.1	-2.3	0.7	0.7	-2.4	-2.3	3	2.7	

Source: OECD (2002)

Note: The rates of return to tertiary education are calculated by comparing the benefits and costs with those of upper-secondary education. The impact of the length of studies on the private return on tertiary education is larger in the United Kingdom, France and the Netherlands, where education programmes are relatively short and smaller on Denmark, Germany, Italy and Sweden, where the length of studies tends to be larger.

Table 2-3 – Internal returns to tertiary education, in percentage.

	Social return	Private return
BE	10.6	12.7
CZ	8.9	26.5
DK	1.5	4.3
FI	6.9	10
FR	7.4	7.9
DE	8.4	6.4
HU	16	16.8
IE	11.3	11
PL	14.6	20.7
PT	11.2	22.7
ES	5.8	8.2
SE	3.7	4.7
UK	6.5	14.4
<i>Average</i>	7.9	12.3

Source: OECD (2008)

A report by the Centre for the Study of Higher Education Management (2007) analyses evidence on returns to tertiary education and confirms that private returns to higher education in developed countries are positive and substantial. Estimation results point out that the "narrow" social rates (without externalities) are also positive, but lower than the private rates. The evidence on the "wider" social returns (with externalities) is much more limited because of the difficulties to conceptualize and calculate the social externalities of higher education.

The following basic patterns emerge: (i) the private returns exceed the social returns – which reflects the public subsidization of higher education; (ii) the returns to higher education have been rising in most dynamic economies in recent years – a reflection of the increased demand for educated labour force to complement technological progress; and (iii) there is wide differentiation of the returns by university faculty – a reflection of the relative demand and supply for graduates. Stevens and Weale (2004) point that social returns decrease with the amount of education received by individuals and also that they decrease with the income of the county concerned (and this, it may be assumed, with the abundance of educated labour).

Psacharopoulos and Patrinos (2004) calculate internal rates of return (IRR) for a very large sample of countries including many non-OECD countries and find average IRR to higher education of 11.6% for OECD countries. OECD (2006) finds relatively low returns to tertiary

education for both men and women in Spain, Italy, the Netherlands, Sweden and Belgium. The results are driven by below-average wage and employability *premia*, which more than offset low (direct or opportunity) costs. Hungary, although with very high wage *premia*, also displays relatively low returns due to very high marginal taxes. The highest returns are found in Ireland, the United Kingdom and Portugal because of high wage *premia*, reinforced either by high employability *premia* and/or low costs of education. Other countries display either moderate returns or significant differences by gender. In most cases, this is because wage and employability *premia* are just around average or they are offset by high direct costs of education.

Boarini and Strauss (2007) provide estimates of the private IRR to tertiary education for women and men in 21 OECD countries, for the period 1991 to 2005, using comparable individual-level data. IRR are computed by estimating labour market *premia* and adjusting for fiscal factors and education cost. Returns to an additional year of tertiary education are, on average, above 8% and vary in a range from 4 to 15%. Low average returns are found (by ascending order) for Italy, Spain, Sweden, the Netherlands, Germany, Austria, Hungary, Belgium, Greece and Finland. IRR are moderate in France, Poland and Denmark (between 9 and 10%). Luxembourg, the United Kingdom, Portugal, and Ireland record the highest returns, above 10%. The highest returns, close to 12%, are found in Ireland and the UK.

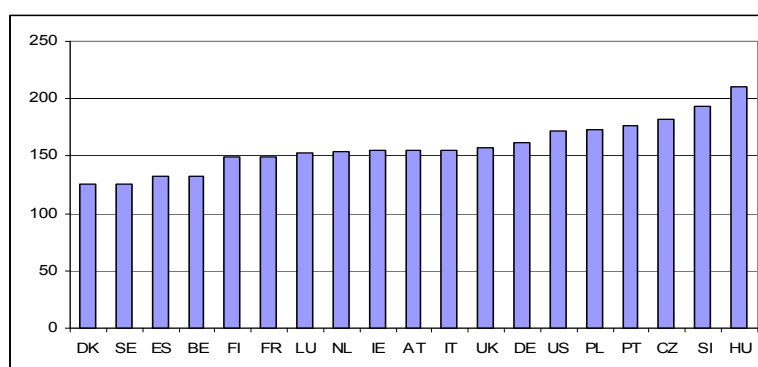
Table 2-4 – Private rates of return to tertiary education

	OECD (2004)		Strauss and Boarini (2007)	
	Men	Women	Men	Women
BE	11.3	14.0	6.9	6.4
CZ	29.1	23.8	:	:
DK	4.4	4.1	9.6	8.7
FI	10.7	9.3	8.6	7.1
FR	8.4	7.4	9.1	9
IT	:	:	6.1	4.2
DE	8.0	4.8	6.2	6.4
GR	:	:	6	8.3
LU	:	:	10.2	9.9
HU	19.8	13.8	:	:
IE	10.2	11.8	11.8	14.4
NL	:	:	6	6.5
AT	:	:	7.8	5
PL	22.8	18.6	6.5	:
PT	23.9	21.5	11.2	13.3
ES	7.6	8.7	4.9	6.5
SE	5.1	4.2	6.4	5.4
UK	14.3	14.5	11.8	12.3

Source: OECD (2004), Boarini and Strauss (2007)

Since IRR are most sensitive to gross wage *premia*, countries with moderate wage differentiation may gain in terms of tertiary education incentives from allowing for stronger differentiation, see [Graph 2-1](#). Finally, differences between countries in the proportion of graduates of each university faculty do not help to explain the cross-country differences in returns to higher education.

Graph 2-1 – Relative earnings of 25-64 year-olds with tertiary educational attainment (upper secondary and post-secondary non-tertiary education = 100)



Source: OECD

The OECD (2009) calculates the economic returns to tertiary education in terms of net present value (and not internal rate of return, as previously done). Private investment costs include after-tax foregone earnings adjusted for the probability of finding a job and direct private expenditure on education. The largest net financial returns over the working life are found in the Czech Republic, Hungary, Ireland, Italy, Poland, and Portugal. United Kingdom figures were not included. Rewards are substantially lower in Denmark, France and Sweden.

OECD (2009) identifies a trade-off between taxes and the direct costs of education (tuition fees). Countries with low or no tuition fees typically allow individuals to pay back public subsidies later in life through progressive tax schemes. In countries where a larger share of the investment falls on the individual (in the form of tuition fees), a larger portion of the earnings differential is also accrued by the individual.

The salary differences between major fields of study argue for a more in-depth analysis of tertiary education graduates. Having a tertiary degree ignores qualitative differences between both institutions and areas of study. Individuals receiving different degrees from the same institution face different demands for their skills and different market prices for their labour. Thus, individuals with similar ability levels in different fields can have significantly different earnings.

Finally, non-financial returns to higher education add to the already substantial financial returns. Non-financial returns refer to non-wage labour market remuneration, own and spouse's health, consumer choice efficiency, labour market search efficiency, attainment of desired family size, children level of education and cognitive development and health, charitable giving and savings (Wolfe and Haveman, 2000). These non-financial returns are more difficult to measure, but substantial: conservative estimates of the value of non-labour market influences are in the same order of magnitude as estimates of the annual financial rate of return to schooling.

2.2. Tertiary education funding

The economic literature establishes that public intervention in tertiary education is warranted due to cases of market failure: the existence of externalities, information asymmetry or monopoly powers:

- On *externalities*: individuals making decisions on investing in tertiary education may not take into account the fact that their training will affect the well-being of others in a positive way and the same may hold for firms investing in research (R&D); both examples point to an under-supply of higher education and research from the point of view of the society.
- On *information asymmetry*: it is difficult to assess the outcome of the efforts of academic staff and students, in particular the quality of education provided; tertiary education is an *experience* good as students can only determine the quality through consumption; applicants rarely possess the information or time to explore all the possibilities offered and they have a limited basis for making comparisons so they may register to institutions even though they may receive a mediocre education; there is also information asymmetry in the market for student loans.
- On *monopoly power*: market power may be concentrated in a number of education institutions, with risks of strategic behaviour emerging.

The role for public tertiary education funding is clear, and undisputed. The literature suggests there is a case for (an increase in) private funding, as a limited public funding may result in a rationing of the number of students or in levels of spending per student which may jeopardise the quality of teaching and the acquisition of skills by students.

A number of different trends would argue for reform tertiary education funding, in particular:

- more human capital is needed to cope with labour market trends (in particular technological change, trade and relocation of low-skilled jobs) and with the ageing of populations; indeed raising the productivity of the labour force will increasingly become the efficient way to maintain standards of living in a context of ageing populations (Barr, 2004). Demographic changes would lead to a reduction in the working-age population in the EU as a whole after 2020, according to the projections in the 2009 Ageing Report. This will act as a drag on growth and productivity would become the dominant source of growth. If tertiary education is expanded, more resources may be required if quality is to be preserved or improved;
- Baumol's cost disease applied to higher education would suggest that productivity gains in universities lag behind those in manufacturing (Jacobs and van der Ploeg, 2006);

- There is evidence of a decline in spending per student real terms in many EU countries; Barr (2004) suggests that available margins tend to be used to support basic education as well as the needs of the elderly in terms of public pensions and healthcare.
- The reduction in the number of students relative to the working population in the future could drive a decline in public expenditure on education. The 2009 Ageing Report suggests the change would be small, from 4.3% of GDP in 2007 to 4.1% of GDP in 2060 (primary, secondary and tertiary levels combined), see annex. The projection assesses the direct impact of smaller numbers of students in coming decades and it assumes no policy change. A number of policies, however, could lead to increased public expenditure on education as a share of GDP, such as policies to improve the quality of education, increase the attainment level of education of future generations, implement life long learning initiatives or to prevent the outflow of qualified staff by offering a faster growth in salaries.
- Current objectives on education policy and targets in EU Member States, such as the Europe 2020 benchmarks to improve education levels suggest that educational spending could well increase, in particular with the aim to increase the share of 30 to 34 years-old having completed tertiary or equivalent education from 31% to at least 40% in 2020 and to reduce school drop-out rates from the current 15% to under 10%, as one of headline targets for smart, sustainable and inclusive growth.¹⁵

The economic literature on the financing of tertiary education argues for an increase in private funding, and in particular for the introduction of fees, coupled with well designed student loans and grants. The latter would ensure that able students from disadvantaged family backgrounds are provided with proper financial means to cover tuition and living costs during the period of study. Indeed, equity considerations suggest that educational outcome should be a function of effort, not circumstances such as the socio-economic background. The tuition fee of students from low-income families could be subsidised, rather than having tuition free for all students. Psacharopoulos (2005) argues that public provision of tertiary education for free leads to inefficiencies in terms of excess demand and quality problems.

Barr (2004) advances theoretical arguments based on the economics of information to argue that support for the generality of students should derive from a mix of tax funding and income-contingent loans, which is loans with repayment calculated as a per cent of the subsequent earnings of the borrower. This approach would lead to a more generous public support where an individual derives less financial benefit from his or her degree and would be correct for well-informed people. There is however an unequal access to information so that children from disadvantaged families may not even think of going to university and then, it may be required to support people from disadvantaged families via tax funding.

¹⁵ See European Council conclusions of 17 June 2010.

Barr focuses on the finance of teaching, thus setting to one side the issues raised by research funding. In standard tax-financed systems of tertiary education, all tax-paying households contribute to the public financing of tertiary education. In terms of access, however, the tertiary level of education differs from earlier, compulsory levels, in that there is self-selection with children from professional backgrounds much more likely to access university than children from manual backgrounds. Therefore, unless there is very strong tax progression, tax funding may be viewed as unequal insofar as part of the funding of higher education may come from groups with little opportunities to access it. Blöndal et al. (2002) find that students in higher education still tend to come from a relatively favoured background, notwithstanding the expansion of enrolments in tertiary education in recent decades. Higher education is different from school education and health care, in so far as it is not consumed by everyone. Barr further argues that if students are to be economically better off in the future due to their studying, it seems fair that they should make contributions to the cost of their tertiary education; at least once they have entered the labour market and command high earnings.

The literature gives a lot of attention to the design of loans and grants systems. Greenaway et al. (2004) note the excess of private over social rates of return and the socioeconomic mix of students in Universities which means that subsidies being transferred are likely to be regressive, and conclude that both justify a shift towards greater financial commitment coming from beneficiaries, also on equity grounds. They examine alternative sources of funding (increased tax payer contributions via enhanced grant allocations, introduction of a graduate tax, education vouchers, deregulation of fees and income-contingent loans) and conclude that a system of higher education where beneficiaries contribute deferred tuition fees repaid through an income-contingent loan system are potentially the most effective and efficient system available. In their view, this allows overcoming credit constraints, as well as coping with the uncertainty of the outcome of the education investment. The State bears most of the uncertainty of the investment in the sense that reimbursement of the loan is deferred until the beneficiary completes his or her studies and is employed and, in the case of income-contingent loans, reimbursement is a function of earnings so there is an insurance against the inability to repay the loan. There are, however, issues of implementation of income-contingent loans, in particular related to tax evasion in countries with a large informal sector and a limited capacity to collect income tax, and also linked to increasing labour mobility.

In a study about English universities, Shephard (2009) suggests universities should be allowed to charge their graduating students additional "deferred" fees if their teaching costs are not met by the current total tuition payment. Graduates could pay the "deferred" fees later once their income rises above a defined threshold and once their national maintenance and tuition loans are repaid. If the graduate's income is not sufficient to make the repayments during their career, then the fee is forgiven. Van der Ploeg and Veugelers (2008) suggest that with a carefully designed social loans system of the type implemented in Australia,¹⁶ it may

¹⁶ Australia introduced an income-contingent loan system in January 1989 (the Higher Education Contribution Scheme). The scheme consists of a charge which each student is liable to pay towards the cost of study. He can pay it to the institution at the time of enrolment or re-enrolment or he may opt to pay later through the taxation

well be possible to raise private funds from higher tuition fees without sacrificing accessibility to higher education. Teaching assistantships are proposed in PhD programmes when there is less scope for loans (Aghion et al., 2008).

Credit constraints could lead to an inefficiently low private spending on tertiary education, if families do not have the means to finance the tertiary education of their children at the time of taking the decision to invest on tertiary education. However, the evidence for the United States suggests that credit constraints are not binding in the access to tertiary education in the vast majority of cases (Woessmann, 2006).

Students from disadvantaged family backgrounds do have a much lower probability of entering university, but the cause seems to be a lack of basic prerequisites to advance to university, due to insufficient earlier educational investments, rather than credit constraints. Evidence for the United States again suggests that credit constraints are almost irrelevant, and the lowest for Blacks and Hispanics. Evidence for the United Kingdom suggests that a major determinant of degree performance in Universities is students' performance on A-level/ Scottish Highers scores at school (Woessmann, 2006). Thus, the main reason of inequality of access by children from relatively disadvantaged background would not be that tuition fees are unaffordable, but rather that they do not have the prerequisite educational qualifications to access tertiary education.

Information plays a role, as shown by the work of Sacerdote (2009) in the United States to coach students through the application procedure to college. Children in some secondary schools are not well-informed about the reasons to go to college and the precise steps to take to apply and there is a role for guidance and counselling, besides getting more and/ or better teachers in secondary schools.

The impact of credit constraints on higher education graduation should however not be underestimated as credit constraints may harden study conditions. Some studies have tackled the issue of working students with conclusions varying from no impact of working on the probability of success at the final exam to a significantly negative impact; see Beffy et al. (2009). Overall, there seems to be a non-linear impact of the weekly hours worked, with a threshold between 10 and 20 hours. Working less than 20 hours appears to have no effect neither on the probability of success or on the probability to continue studies. But over 20 hours, the impact on studies is often negative. Some recent work by Hübner (2009) highlights some possibly negative effects of tuition fees. The author finds a small but significant effect of tuition fees on the enrolment behaviour of German high-school graduates after the introduction of tuition fees in seven out of the sixteen German states in 2007.

system when earning an income. Those students who defer payment until earning an income will eventually make payments through the Australian tax office automatically when the individual's income reaches a threshold. The office will stop collecting the payment if taxable income falls below the threshold and/or when the liability has been paid. An indexing process is applied to the debt to ensure that the amount the student is required to repay will stay constant in real terms. At the threshold income, payment will begin at 1 per cent of taxable income and this percentage will increase as income increases.

Evidence from Finland, Norway, Denmark and Sweden, for example, shows that the absence of fees does not help to boost participation of students with low socio-economic status (Teixera et al. 2006). Moreover, tuition fees are seen as raising the incentives of students to study more efficiently (OECD).

2.3. Tertiary education governance, efficiency and effectiveness

The OECD Thematic Review of Tertiary Education¹⁷ (2008) identified the main trends on higher education policies as follows:

- the expansion of higher education systems,
- the diversification of provision,
- the increased heterogeneity of student bodies,
- the introduction of new funding arrangements (more performance- and competition-based funding, more private contributions, expanding student support mechanisms),
- an increasing focus on accountability and performance,
- new forms of institutional governance,
- increased global networking, mobility and collaboration.

Boarini et al. (2008) find that graduation ratios increase with private returns to tertiary education, as well as with the autonomy and accountability of the supply of education. Thus governance matters for the performance of tertiary education. Furthermore, a lack or insufficient financial help to students enrolled in tertiary education negatively affects graduation ratios.

Some studies assess the changes in the governance of tertiary education institutions. CHEPS (2006) finds significant changes: increased emphasis on competition, new funding arrangements and increased attention paid to quality assurance in all countries. Governance through agreement of objectives and evaluation of performance is developing across Europe. There is a tendency to enhance autonomy, albeit not in all aspects. There is also significant heterogeneity across Member States.

Estermann and Nokkala (2009) explore university autonomy along four main dimensions (organisational, financial, staffing and academic) and conclude there is a general increase in university autonomy. However, they stress that a large number of countries do not grant their universities enough autonomy, thereby limiting their performance. There are also cases where previously granted autonomy has been reduced. Quite often, there is a gap between formal autonomy and the real degree of universities' ability to act with certain independence. In some cases, a significant increase in accountability measures has effectively curtailed university autonomy.

CHEPS (2010) identify the expansion of the autonomy of tertiary education institutions as the most significant trend in most countries, gradually moving away from detailed government control. The autonomy of institutions is also widening from the use of financial and physical

¹⁷ The analysis covers 24 OECD members, including 12 EU Member States.

capital to greater autonomy in personnel matters. An increase in the participation of external stakeholders in the internal governance is also observed.

Eurydice (2008) stresses the diversity in higher education governance across the EU. Universities have been granted wider autonomy in areas such as staff management and funding, and they are trying to balance autonomy and accountability. Financial autonomy has generally increased across the EU, with a variety of performance-based models and quality assurance mechanisms.

There are different dimensions to governance: accountability and the degree of autonomy in critical decisions such as university budget level and allocation, tuition fees, hiring professors, pay, promotion and tenure, or admissions policy. Countries have a different balance of governance characteristics and the next section will present the various institutional arrangements along the main dimensions.

Oliveira Martins et al. (2007) construct indicators on the basis of information provided by OECD Member countries through a questionnaire and reflecting the situation in 2006.¹⁸ Since then, many countries have implemented reforms so the indicators would need to be taken as a lower bound. They cover the following three categories:

- *Input flexibility* includes criteria for the selection of students, the autonomy of tertiary education institutions to decide on the sources and structure of funding (e.g. level of tuition fees), and staff policy (including hiring and firing rules and wage setting).
- *Accountability* covers features of evaluation and funding. Relevant aspects of evaluation include the type of evaluation (for example whether it is carried out by an independent agency) and the public availability of evaluation reports. Funding rules can be output-based (e.g. based on graduation or quality measures) or based on grand-fathering or inputs (e.g. number of students). Information on the types of private entities that provide funding (e.g. households, businesses) is also covered.
- *Output flexibility* includes the possibility of tertiary education institutions to decide on course content, product diversity (short-term, part-time, distant learning studies), existing regional restrictions to access universities (captured by the degree of regional mobility of students) and the existence of *numerus clausus* for the number of diplomas attributed each year.

The results of the questionnaire were used in St. Aubyn et al. (2009) and they are presented in [Table 2-5](#). The indicators are measured in a scale ranging from 0 to 10 and the higher the value of indicator, the higher the flexibility and accountability of the system.

¹⁸ For Belgium the answers were provided by region/province and the country level indicator is a simple average of the Flemish and Francophone regions.

Table 2-5 – Indicators of governance

	Input Flexibility			of which:		Output Flexibility	Accountability	of which:	
	Selection of Students	Budget Autonomy	Staff Policy	Evaluation	Funding Rules				
BE	5.2	2.5	6.1	7.0	7.4	5.6	5.4	5.8	
BG	:	:	:	:	:	:	:	:	
CZ	7.9	7.5	6.3	10.0	8.2	5.3	6.6	4.0	
DK	7.7	7.0	6.2	10.0	7.3	5.0	4.6	5.3	
DE	5.8	2.8	7.2	7.5	3.0	6.1	6.9	5.2	
EE	:	:	:	:	:	:	:	:	
IE	7.8	5.5	10.0	7.9	6.6	6.3	6.7	5.9	
EL	1.9	1.7	0.9	3.2	3.6	3.5	2.3	4.6	
ES	7.6	10.0	7.9	4.9	5.7	5.7	6.5	4.8	
FR	3.8	2.8	6.8	1.8	6.4	6.1	5.6	6.6	
IT	6.2	3.7	7.0	7.9	6.4	6.0	6.8	5.2	
CY	:	:	:	:	:	:	:	:	
LV	:	:	:	:	:	:	:	:	
LT	:	:	:	:	:	:	:	:	
LU	:	:	:	:	:	:	:	:	
HU	6.8	8.9	8.5	3.2	7.3	6.3	8.3	4.3	
MT	:	:	:	:	:	:	:	:	
NL	6.3	1.3	7.7	10.0	5.9	6.3	7.5	5.1	
AT	6.8	2.8	7.7	10.0	6.6	5.3	5.1	5.5	
PL	:	:	:	:	:	:	:	:	
PT	6.2	3.9	7.2	7.4	7.3	6.2	4.6	7.8	
RO	6.9	6.6	5.8	8.3	5.0	4.2	5.3	3.1	
SI	:	:	:	:	:	:	:	:	
SK	8.4	6.7	8.5	10.0	8.2	4.7	6.5	2.9	
FI	7.4	7.1	7.7	7.5	8.4	5.1	4.0	6.2	
SE	8.4	8.9	6.2	10.0	5.5	5.6	6.5	4.6	
UK	7.8	6.7	6.8	10.0	8.2	6.6	7.7	5.5	
EU	6.6	5.4	6.9	7.6	6.5	5.6	5.9	5.1	

Source: Oliveira Martins et al. (2007)

Note: The information is drawn from a questionnaire addressed by the OECD Secretariat to OECD Member States. The EU average is not weighted.

Tertiary education institutions have three main missions: teaching, research and the transfer or exchange of knowledge, and these can be substitutes or complements. Most studies focus on one of the activities, thus ignoring the interactions between the different tasks carried out by universities, and education institutions in general. Moreover, institutions produce graduates in a variety of different fields and at a variety of different levels. They are also increasingly asked to reach out to more diverse students and cater to life-long learning, so that students of all ages participate in tertiary education and can access it at various points in their lives. Finally, there is a social dimension involving the impact of research and knowledge creation and diffusion on society at large, as well as equity in access independently of the socio-economic background.

Dill and Soo (2004) find incentives in place for faculty members to value research over teaching. This would limit their time investment in teaching first degree students to maximise their time investment in research and graduate teaching and it represents a market failure, as tax payers (and consumers) pay a "higher" price for a university education of a given quality than they would if perfect competition would force academic faculty members and their institutions to continually improve the teaching quality of their programmes. Remler and Pema (2009) review the global trend of tertiary education institutions increasingly emphasising research, with faculty being promoted and rewarded more and more on the basis of research. The rewards apply to faculty engaged in both funded and unfunded research.

Thus, a number of authors argue that higher education is neglecting teaching in favour of research and this is to the detriment of students' education, as faculty time is a limited resource. Others argue, however, that research and teaching are mutually sustaining. One theory is that researchers teach higher-order skills more effectively, and therefore increase

student human capital more, as compared to non-researchers. Further research is needed to establish the relative magnitudes of the effects of emphasising research activity on teaching quality, in particular to address what employers seek from graduates from tertiary education and to assess the validity of available measures of teaching quality.

A number of authors have assessed the efficiency of tertiary education institutions. However, differences in the subject-mix across tertiary education institutions and systems are typically not taken into account. Teixeira et al. (2009) show that a part of institutional differences on efficiency in the case of Portugal are due to differences in the composition of subjects: some institutions are more technical, while others are more focused on social sciences.

Joumady and Ris (2005) compare universities in 8 countries: Italy, Spain, France, Austria, Germany, the Netherlands, the United Kingdom, and Finland. They focus on teaching and evaluate the adequacy of the skills of recent graduates from different universities to the labour market requirements.¹⁹ They define efficiency as the ability to, first, generate human capital competencies and, second, to match the competencies provided with the competencies required. They compute average efficiency scores and distinguish between three groups of countries, (i) the United Kingdom, Netherlands, and Austria, that have relatively good performance, (ii) France and Germany, that are located on an average level of efficiency, and (iii) Spain, Finland, and Italy, that exhibit the worst performances.

Two techniques have emerged that allow an analysis of cost-efficiency: data envelopment analysis (DEA) and stochastic frontier analysis (SFA). St. Aubyn et al. (2009) consider both the teaching and research activities of institutions. Their efficiency analysis helps informing a number of questions, in particular whether a tertiary education system could obtain better results using the same resources, or achieve the same results with lower expenses. Based on data for the period 1998 to 2005, they estimate the relative cost-efficiency of tertiary education systems in the EU, using the two alternative models: data envelopment analysis (DEA) and estimating stochastic frontiers (SFA). First, they estimate output efficiency scores for EU Member States and in a second step they carry out a logit analysis to explain efficiency scores. A strong correlation between the results of two models indicates the analysis is robust.

They measure cross-country efficiency and identify a core of more efficient countries (the UK, the Netherlands, Ireland, Sweden, Finland and Denmark), while important inefficiencies are recognised in other countries, see [Graph 2-2](#).²⁰ Countries with secondary education systems of good quality and where tertiary education is organised along certain lines (in terms of staff policy autonomy and flexibility, of independent and public evaluation of institutions, and of output oriented funding rules) tend to obtain better results in education and research from the resources used. Moreover, they provide evidence that public spending on tertiary

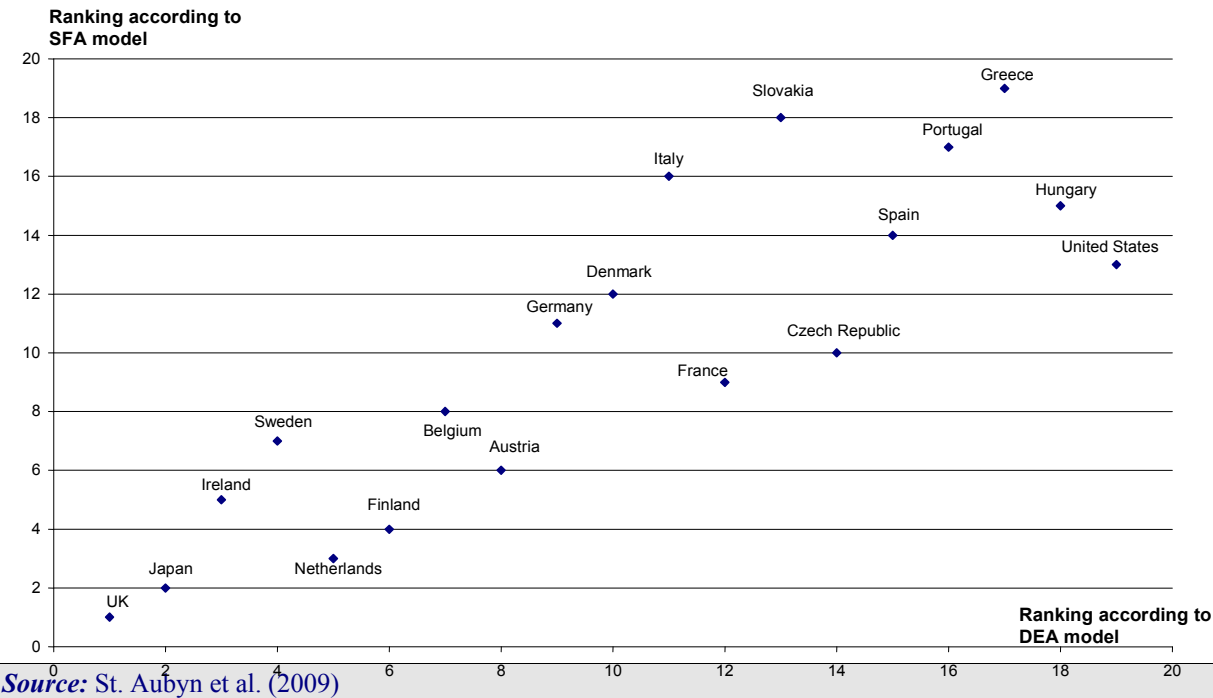
¹⁹ In some cases, the labour market does not require a very skilled labour force.

²⁰ The efficiency analysis in St. Aubyn does not take into account the relative "costs of graduation", which vary across subjects (e.g. more expensive studies like physics or medicine in contrast to economics or social sciences studies). In Germany, the so-called "dual system" is in place whereby vocational training is not taught at

education is more effective in what concerns labour productivity growth and employability when it is coupled with efficiency. Efficient tertiary education systems share a number of characteristics, but there are also a number of differences, for example in the degree of autonomy to select students, of financial autonomy, or of staff policy autonomy. There is a larger variation as regards accountability among the best performers than as regards autonomy. Less efficient performers tend to have relatively low levels of autonomy. The main indicators of the tertiary education efficiency by St.Aubyn et al.(2009) are presented in Table 2-6. The analysis covers the period 1998 to 2005.

Knott and Payne (2004) study State governance structures of boards of higher education across the United States and conclude that they matter, insofar as they influence choices of resource allocation and sources of revenue. However, they note that differences in political cultures and economic conditions "can play a more important role in determining the features of university performance than governance structures".

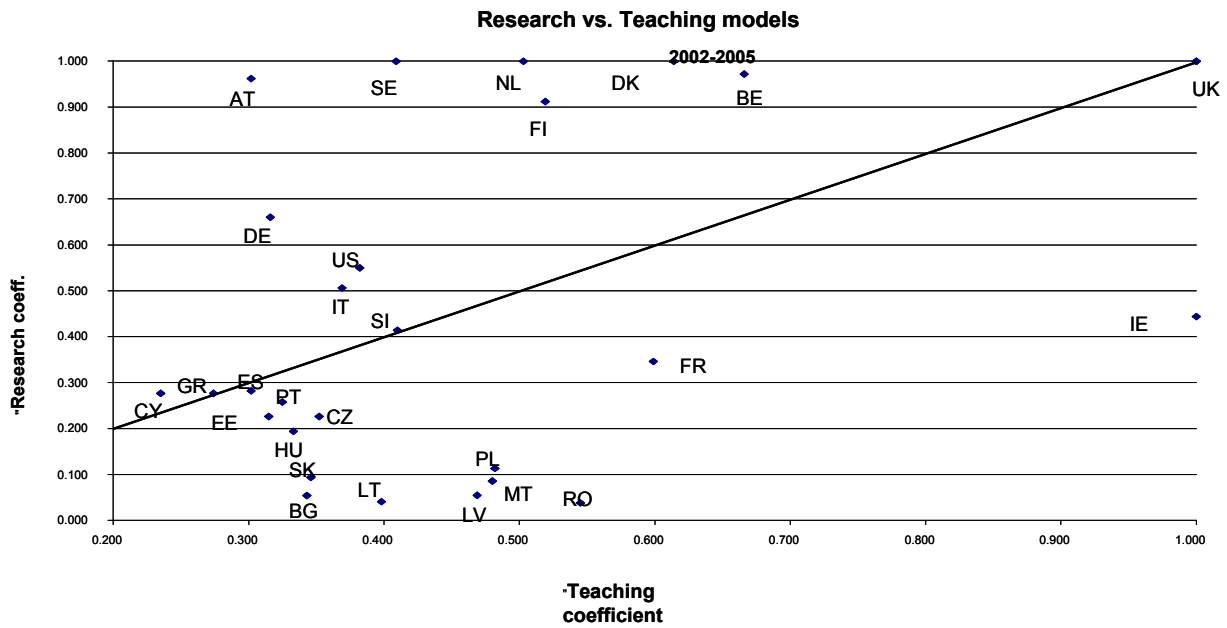
Graph 2-2 – Rankings according to the efficiency scores in the Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis (SFA) in St. Aubyn (2009)



Note: The United States tertiary education system comes out as quite inefficient in the analysis due to the fact that only the public sector is considered and private institutions are important. In particular, some of the more research-oriented universities are private and were excluded from the analysis. The academic staff is below average, however, the number of enrolled students is high and above average, and, on the other hand, graduations are not very high. Scientific production is slightly above average, but clearly below levels that characterize more productive countries (the UK and the Nordic countries).

universities. A number of the "lower-cost subjects" are thus not included in the analysis for Germany. This should reduce the "measured efficiency" compared to other countries.

Graph 2-3 – Relative efficiency in research and teaching activities, according to the efficiency scores in the Data Envelopment Analysis (DEA) in St. Aubyn (2009)



Note: Countries above and to the left of the straight line are more efficient in research than in teaching, while the opposite is true for countries below and to the right of the line.

Table 2-6 – Main indicators of efficiency

	Funding rules		Staff policy		Evaluation		PISA	
	Score	Rank	Score	Rank	Score	Rank	Score 2000*	Rank
BE	5.80	5	7.0	14	5.4	12	508	7
BG	:	:	:	:	:	:	:	:
CZ	4.00	16	10.0	1	6.6	7	500	9
DK	5.30	8	10.0	1	4.6	15	497	10
DE	5.20	9	7.5	11	6.9	4	487	12
EE	:	:	:	:	:	:	:	:
IE	5.90	4	7.9	9	6.7	6	514	5
GR	4.60	13	3.2	16	2.3	18	460	16
ES	4.80	12	4.9	15	6.5	8	487	12
FR	6.60	2	1.8	18	5.6	11	507	8
IT	5.20	10	7.9	10	6.8	5	473	15
CY	:	:	:	:	:	:	:	:
LV	:	:	:	:	:	:	:	:
LT	:	:	:	:	:	:	:	:
LU	:	:	:	:	:	:	:	:
HU	4.30	15	3.2	17	8.3	1	488	11
MT	:	:	:	:	:	:	:	:
NL	5.10	11	10.0	1	7.5	3	525	3
AT	5.50	6	10.0	1	5.1	14	514	4
PL	:	:	:	:	:	:	:	:
PT	7.80	1	7.4	13	4.6	16	456	17
RO	3.10	17	8.3	8	5.3	13	410	18
SI	:	:	:	:	:	:	:	:
SK	2.90	18	10.0	1	6.5	8	482	14
FI	6.20	3	7.5	11	4.0	17	540	1
SE	4.60	14	10.0	1	6.5	8	513	6
UK	5.50	7	10.0	1	7.7	2	528	2
EU27	5.29		7.6		5.9		492	
best	PT	1	CZ, DK, NL, AT, SK, SE, UK		HU	1	FI	1
worst	SK	18	FR	18	GR	18	RO	18

Source: St.Aubyn et al. (2009), compiled from Oliveira Martins et al. (2007) and OECD.

Note: Scores for funding rules range from 2.90 to 7.80. Scores for staff policy range from 1.8 to 10. Scores for evaluation range from 2.3 to 8.3. PISA scores range from 410 to 540.

A few influential studies have investigated the relationship between governance and performance of tertiary education systems. Similar conclusions emerge from these studies, which highlight the role of governance and autonomy, and the need for increased funding and increased competition, see Aghion et al. (2007, 2008, 2009), Van der Ploeg and Veugelers (2008), Jacobs and van der Ploeg (2005). These studies suggest that funding and governance ought to be tackled together. They also suggest that governance changes, in terms of more autonomy to education institutions, are beneficial, but that more detailed analysis is needed at country level.

Aghion et al. (2007, 2008, 2009) study the research performance of Universities. Their analysis is done at University level. Their analysis suggests that university performance in research is positively correlated with University autonomy and the level of funding. As regards governance (autonomy to decide academic, financial, and research questions), they find budget autonomy is the only significant indicator. Size as well as age (reputation effect) matter for research performance, as measured by the Universities position in the Shanghai ranking. Moreover, there is more than one model of university system that appears to work.

They also find that governance and funding are complementary: the positive effects of funding on performance (higher budgets per student) are higher if institutions have a higher degree of budget autonomy. This is a key finding which suggests that reforms will be more effective if they are taken in a comprehensive way, rather than choosing certain components of reform only. They also suggest a positive relationship between competition for research

grants and Universities output, in terms of their position in the Shanghai ranking. To test the causality of these relationships, the authors use United States data on the number of patents and they suggest a causal relationship between university autonomy and competition on the one hand, and research output in terms of patents on the other hand. The authors argue for more autonomy, in particular with regards to budgets, hiring, remuneration, course design and student selection, particularly at Master's level.

Vandenbussche et al. (2007) find that the impact of higher (particularly graduate) education on growth increases when countries approach the technology frontier. This suggests that caution should be exercised for countries that are far from the technology frontier because giving autonomy and introducing competition among tertiary education institutions may be ineffective (at this stage). Indeed, productivity growth can be generated either by imitation or frontier innovation and innovation becomes increasingly important for growth as countries get closer to the world technology frontier.

Van der Ploeg and Veugelers (2008) also use international rankings, both the Shanghai ranking and the Times Higher Education Supplement ranking. They conclude that enhancing competition and governance are the key aspects of potential reform. They also suggest that there is no unique optimal governance model but they do find indications that a number of the better performing countries have high levels of autonomy while weak performing countries tend to be low on autonomy, although there is a large dispersion of governance characteristics. Perhaps their most important recommendation is to invest in more data and analysis to support evidence-based reform.

Box 2: A note on international rankings

The literature uses the results of two main rankings: The Times Higher Education Supplement (THES) and the Shanghai Jiao Tong University Ranking. The rankings are used as proxies for the performance of Universities.

It is important to bear in mind a number of caveats, especially because these rankings are very influential. They compress the information used into a single indicator, and this is at the same time the strength and one of the main weaknesses of rankings. Rankings are very useful for analysis, however one needs to bear in mind that they provide only an *indication* of the performance of entire institutions, where differences across individual faculties and/or disciplines are wide. Rankings also fail to capture all the dimensions of quality.

The Shanghai Ranking provides information on the research performance of universities. It does not take into account the quality of teaching. It is computed using publicly available information. Scholars at the Institute of Higher Education of the Shanghai Jiao Tong University started compiling the data on the research performance of the world's universities in order to give guidance about where to send Chinese students. The Shanghai Ranking favours Universities with Sciences Departments and is biased against humanities and social sciences. The ranking is thus better suited to analyse the link with research and development. Another drawback is that a number of research institutions such as the Centre National de la Recherche Scientifique (CNRS) in France or the Karolinska Institutet in Sweden do not feature. Some argue that rankings would seem to favour Anglo-Saxon Universities. However, a number of Swedish, Dutch or Belgian Universities feature relatively high in league tables.

The THES ranking takes into account the quality of teaching. A main weakness is that it is partly based on surveys. This is an imperfect measure in so far as it is difficult to expect experts have a deep knowledge of several institutions and their performance across a wide range of disciplines across the world.

Contrary to common belief, Mensah et al. (2003) find a positive relationship between the degree of financial flexibility and cost inefficiencies for all types of *private* higher education institutions, using evidence for the United States. They suggest that financial rigidity, such as line item budgeting, is effective. Typically though, moving from line item to lump sum

budgeting is considered efficient because it provides more financial autonomy to tertiary education institutions to improve their performance.

Over the last decade, many countries have experienced dramatic increases in university enrolment, which, when not matched by compensating increases in other inputs, have resulted in larger class sizes. The effect of increasing class size in tertiary education, however, is not well understood. Bandiera et al. (2010) analyse the effects of class size on students' test scores, using administrative records from a leading UK university. The effect of class size on students' exam performance is negative and differs across students and across class sizes. Across students, the effect is almost four times larger for the best students in the top 10% than for the average student. Across class sizes, the effect of class size is large and negative in the smallest (between 10 and 30 students) and largest classes (above 100 students), but no impact is found in a wide intermediate range of class size between 30 and 100 students.

The channels for the reduction of students' performance are at least two-fold: larger class sizes bring deterioration in classroom conditions (which would affect all students) and a reduction in tutoring activity (with a stronger impact on the performance of the best students). The best students tend to benefit the most from tutoring activity, in terms of learning and motivation, and that explains why they are most affected by increases in class size.

Box 3: Ongoing research

Aquameth (Advanced Quantitative methods for the Evaluation of the Performance of Public Sector Research) is a project carried out under the network of Excellence PRIME (6th Framework Programme). A new detailed database is built that, for the first time, integrates micro information available at the level of individual universities in 11 European countries on a census base, over the period 1994-2005. The database will serve as the feasibility for future statistical systems on micro-data on universities. The project is coordinated by A. Bonaccorsi.

Science, Innovation, Firms and markets in a GLObalized World (SCIFI-GLOW) is a collaborative project to examine simultaneously the organization of the 'knowledge sector' and the behaviour of firms and markets. The project is supported by the European Commission's Seventh Research Framework Programme. It is running since July 2008 and will end in July 2011. For more details, see <http://scifiglow.cepr.org/>

A part of this project analyzes the productivity of the science sector, its funding and organization and the 'market for scientists' and covers the following topics:

Topic 1: The organization of basic and applied research and innovation

The mechanisms that most efficiently allocate resources in science are not yet well understood: there exists so far little systematic evidence on which funding regimes are most beneficial for the advancement of knowledge. The project aims at developing the understanding of the relation between funding and research productivity. European universities are progressively adopting regimes that award research funds to the best or most promising scientists or research teams ('excellence funding'). This evolution - while having the benefit of eliciting top performance - raises a number of potential problems, such as the preclusion of teams without a strong past performance record from opportunities to expand their resources. For example, Kelchtermans and Veugelers (2005) examine top performance in research and its persistence over time and show evidence of accumulative advantage effects for 'star researchers'. The system that tends to reinforce individual or collective success by awarding to "winners" the means for their future success. How does this type of mechanism influence the use of talent and the performance of the resulting research? And does it permit the identification and inclusion of the best researchers?

Topic 2: Networks of collaborations in HER institutions

A second line of research addresses the effect of collaboration on research productivity. Past research has argued that characteristics of academic labs, as opposed to individual researchers, may be critical to explain performance levels (e.g. Carayol and Matt 2004; Mairesse J. and Turner 2002; Stephan and Levin 1997). Collaboration also concerns universities and industry. Indeed, while being recognized as a key agent in the innovation process (Aghion and Cohen, [2004]), universities are also urged to work more closely with the private sector (Link and Scott, [2005]). This raises the question of how to organize such collaborations.

(Continued on the next page)

(Box continued)

Various institutional arrangements are conceivable but given the differences between partners' objectives and constraints, the structure of the cooperative agreements are likely to require more flexibility than "usual" Research Joint Venture. In addition, given financing constraints (in Europe, in particular), universities face incentives to collaborate among themselves, in addition to collaboration with the private sector in the fields of research. European authorities actually strongly encourage them to increase such collaborations with the ultimate objective of forming networks of research excellence. As a result, universities are likely to engage into the formation of complex networks of research collaboration with both private and public partners.

Topic 3: Internationalization of the market for researchers.

Part of the research will seek to evaluate programmes in a number of countries in Europe but also elsewhere to attract or retain top university researchers. In the literature, it is often recognized that movement of personnel is an important mechanism to facilitate knowledge spillovers transfer of knowledge. People carry ideas around with them and the knowledge of the ideas generated in the previous company can be a great benefit to an employee's new firm. Indeed, the high mobility of workers in the US could be a way of effectively spreading best practices much more efficiently than the standard routes. Of course, there may be no externality if all the benefits of the past employer's R&D efforts are embodied in the remuneration paid to the new worker. But the wage may not fully reflect this value as it will depend upon the nature of competition in the labour and product markets.

If mobility is important for spreading knowledge then this has important implications for rigidities that reduce the ability of scientists and other personnel to move between firms and countries. Creating a "single labour market" for EU scientists and researchers would facilitate the growth of European productivity through enhancing spillovers. Mobility, between firms even over smaller areas could also improve the development of "clusters" which some see as vital for economic success (e.g. Porter, 2003).

Topic 4: Reforming universities and research institutes

The various subtopics discussed above will partly help us derive policy recommendations concerning the needed reforms of European universities and research institutes. This topic will be further addressed thanks to earlier work by Aghion et al. (2007), which stresses the need for Europe to have more top universities. Indeed, while according to the "Shanghai ranking" of universities worldwide (in terms of basic research performance), there are around 200 universities in the top 500, very few of them belong to the top 50, where America really reigns. Some countries do relatively better however, like Scandinavia, Switzerland, the Netherlands, Belgium or the United Kingdom. Preliminary evidence suggests that both funding and autonomy help research performance, and even that there is a complementarity between the two. The project will further investigate these issues, will put them in an international perspective and will derive recommendations that also take into account the other mission of universities, namely human capital formation.

2.4. Summary

The private returns to education are by now fairly well delineated: the impact of education on individual earnings and employability is well established, and there are non-monetary returns, such as an improved health status. The private returns are on average 12.3% and range between 4.5% and 26.5%. The differences across Member States are large and stem primarily from earnings differentials and the length of education. **The empirical evidence on the social returns to education is less firm than for private returns, but the literature finds evidence of externalities of education.** It is much more difficult to measure the social returns of education and the impact of education on growth at the aggregate level than at the level of the individual. The social returns average 7.9%, ranging between 1.5% and 16% (OECD, 2008). Private returns exceed the social returns by 4.4 percentage points on average. Tertiary education remains a profitable investment opportunity, both from the private and social points of view.

The investment activities of firms, households and the government in both R&D and education are essential for enhancing the level of technology in an economy and the closer to the technology frontier, the larger the returns to tertiary education – especially at Masters level. Investment in education is a critical factor for aggregate productivity and economic

growth, as technological change mostly increases the need for skilled labour, and also the need for periodic education and training.

The ageing of populations compounds this need for periodic education and training because, as the labour force gradually shrinks, raising labour productivity will increasingly become the efficient way to maintain standards of living. Productivity is indeed expected to become the dominant source of growth as of 2020, according to the Ageing Report (2009). In light of this, it would appear desirable to expand more flexible provision so as to encourage more people to consider tertiary education as an option. This would go some way in meeting the needs of employed workers and of their employers. Raising the productivity of the labour force, however, may only partially help to contain the cost pressures to maintain welfare.

While it is difficult to draw firm conclusions on optimal participation rates to tertiary education, economic analysis would suggest that enrolment ought to progress as long as there are positive returns. Estimates of the private returns to tertiary education about 10 percent on average explain the demand for entry into tertiary education. Furthermore, when taking into account the non-market returns to education and its benefits for social cohesion, human capital becomes a rather attractive investment alternative from a social point of view. Indeed, all returns, whether private or social, exceed 5% which can be considered a reasonable opportunity cost of capital. The size of private returns would argue for increased private funding of education.

A private participation to the costs of tertiary study is generally considered justified by the high private returns that accrue to such education, as long as mechanisms are in place to relieve credit constraints and ensure that able students are not excluded from tertiary education on economic grounds. When further increases in tertiary enrolments are considered desirable, it may be more important to eliminate implicit barriers to access to tertiary programmes (such as credit or liquidity constraints and lower levels of basic skills for individuals from disadvantaged backgrounds) through policies specifically targeted at these problems

There is abundant literature providing guidance on student fees and grant and loans design, in particular on income-contingent loans to ensure that tertiary education is free at the point of entry. The State would bear most of the risk as reimbursements start when revenues rise above a certain threshold. The "payback time" of former students can be extended over a relatively long period of time and it can be made dependent on financial ability to reimburse. This would provide additional resources to maintain or increase the quality of education, while at the same time reducing the regressive aspects of its financing. Moreover, this is relevant in view of a possible policy concern about accessibility of higher education, as potential students might be deterred by the prospect of building up private debt at a stage of life without significant revenue.

What matters are the skills acquired through education. Heckman and colleagues view the acquisition of skills as a life-cycle process where skills acquired during life are complementary. If the education attained at secondary level is of low quality, then the

productivity with which investments in education at tertiary level are translated into valuable skills will be negatively affected. Investments in secondary level education in turn are more productive if the young has acquired earlier skills, in primary and pre-primary education institutions. Tertiary education systems require sound learning foundations acquired by students at earlier stages, unless they mostly rely on attracting talented students (and faculty) from abroad.

Furthermore, the available evidence for compulsory education suggests that an improvement in the quality in schools might have a considerably larger impact on economic growth than a proportionate increase in the average years of schooling. Thus, a focus on quality, going beyond quantitative measures of educational attainment, would appear warranted.

The tertiary tier of the education system operates under very specific mechanisms, especially due to the **diverse missions of institutions: teaching, research and knowledge transfer**. A fourth mission is the contribution to the local economy. The literature finds that incentives are in place for faculty members to overvalue research at the expense of teaching, which could mean that the teaching quality does not improve or may deteriorate. Some argue, however, that research and teaching are mutually sustaining. Further research is needed to establish the relative magnitudes of the effects of emphasising research activity on teaching quality, in particular to address what employers seek from graduates from tertiary education and to assess the validity of available measures of teaching quality.

A small number of recent, and very influential studies, converge on similar messages on the role of governance and funding for *research* performance, as well as on the need for increased competition between institutions. A number of lessons can be learned from the empirical evidence emerging: (i) size matters, in particular for research; (ii) age matters too (through a reputation effect); and (iii) financial autonomy of institutions and increased funding are promising avenues to enhance research performance. Moreover, governance and funding are complementary: the positive effects of funding on performance (higher budgets per student) are higher if institutions have a higher degree of budget autonomy. This suggests that reforms will be more effective if they are taken in a comprehensive way, rather than choosing certain components of reform only. However, perhaps not too much, nor too quickly, should be expected from some governance changes *only*. And, finally, there is more than one model of university system that appears to work.

A consensus on the general principle to improve the governance of tertiary education institutions, as well as the outcomes of secondary level education institutions, provides a very useful starting point. Country-specific and comparative (cross-country) empirical assessments are still necessary to evaluate the impact of specific policies on the efficiency of tertiary education. The peer review on tertiary education can make a (timely) contribution to the policy debate, with the exchange of experience and good practice between Member States.

3. Main trends and performance in tertiary education

This chapter presents selected indicators in tertiary education. It provides a background for the discussion in the next chapter, which outlines the lessons from country experience learned during the peer review. Comparative indicators are crucial for the analysis. However, they are not always sufficient to draw firm conclusions. They have a number of drawbacks and they need to be complemented with detailed qualitative knowledge at the country level.

Moreover, while indicators of inputs to the tertiary education system, such as student numbers or the amount of spending per student are reasonably well covered, this is not the case as concerns the outputs of tertiary education systems. For example, comparable measures related to performance such as drop out rates, enrolment durations and student per staff ratios, or indicators of the effectiveness of tertiary education across countries, such as the employability of graduates, the number of scientific publications or the impact of scientific work in terms of citations, are only available for a few years or countries. Finally, the measurement of the acquisition of skills by students, in terms of learning outcomes and their quality, is problematic.

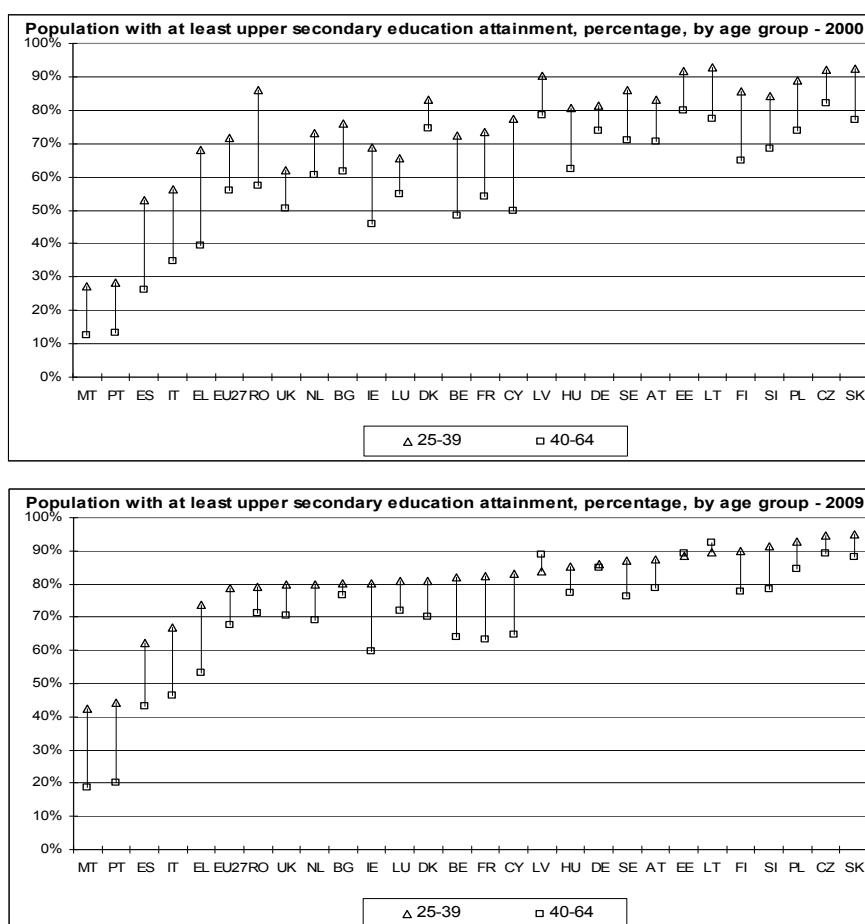
3.1. Attainment and graduation

This section starts by examining the percentage of the population who has successfully completed upper secondary education, as this is the minimum requirement to access undergraduate education. In most EU Member States, more than 80% of the population aged 25 to 39 has upper secondary education attainment in 2009, with the exceptions of Malta, Portugal, Spain, Italy and Greece, see [Graph 3-1](#).²¹

Upper secondary education attainment is highest in Estonia, Lithuania, Finland, Slovenia, Poland, the Czech Republic and Slovakia. Past increases in secondary education attainment are considerable in Malta, Portugal, Spain and Italy, as well as in Belgium, France and Cyprus, as shown by the difference in educational attainment between the population aged 25 to 39 years and that aged between 40 and 64. Countries where attainment rates are the lowest are showing the more rapid improvements over the period 2000 to 2009, especially among the population aged between 25 and 39.

²¹ Educational attainment is defined as the highest grade completed within the most advanced level attended in the educational system; see OECD Glossary for Statistical Terms at <http://stats.oecd.org/glossary/index.htm>.

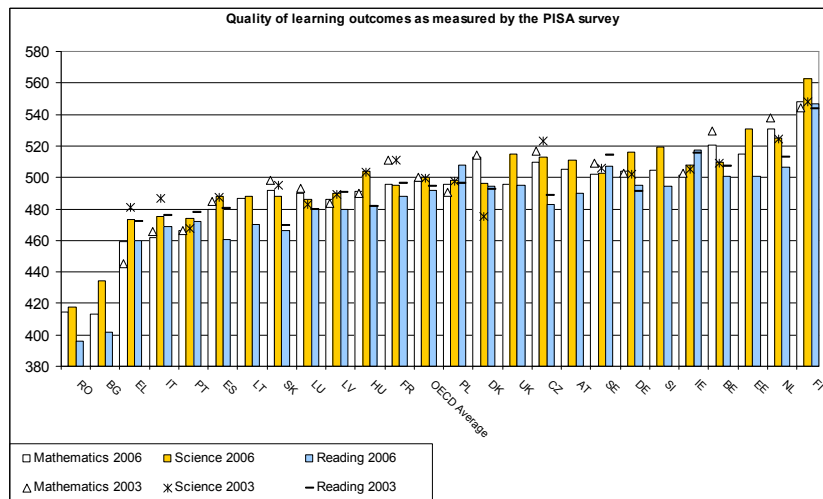
Graph 3-1 – Population with at least upper secondary education attainment, 2000 and 2009, percentage, by age group



Source: Eurostat Labour Force Survey

The quality of secondary education varies a great deal from country to country (and also within countries). Graph 3-2 presents information on the quality of learning outcomes, drawn from the results of the PISA 3003 and PISA 2006 surveys. The graph distinguishes average scores in mathematics, science and reading and countries are ranked by increasing average score in reading – indeed students with low scores in reading achievement can be expected to face severe difficulties in advancing and progressing to tertiary education. Average scores should be interpreted with care, as they may represent widely different distributions of results across Member States. In particular, the proportions of 15-year olds who reach different levels of performance or the average scores by socio-economic background vary across countries.

Graph 3-2 – Quality of learning outcomes as measured by the PISA surveys (2003 and 2006)

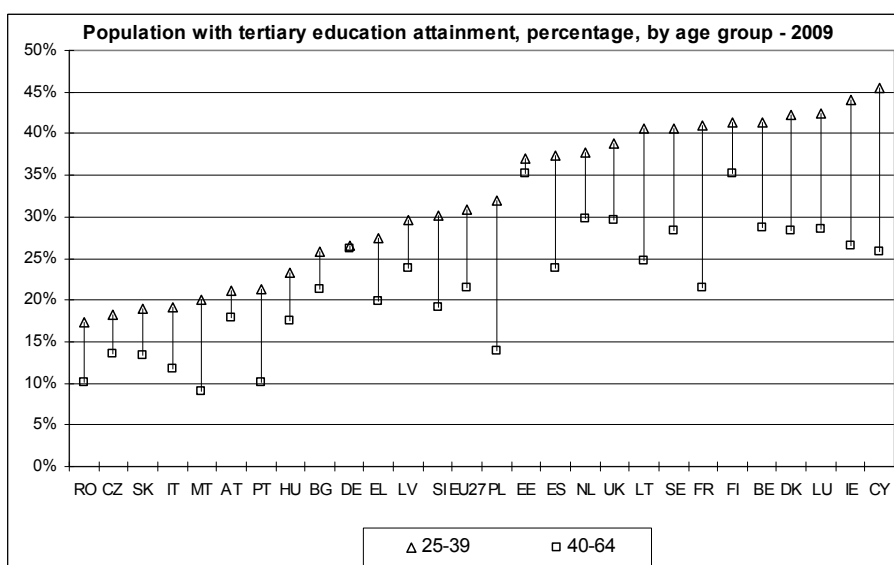
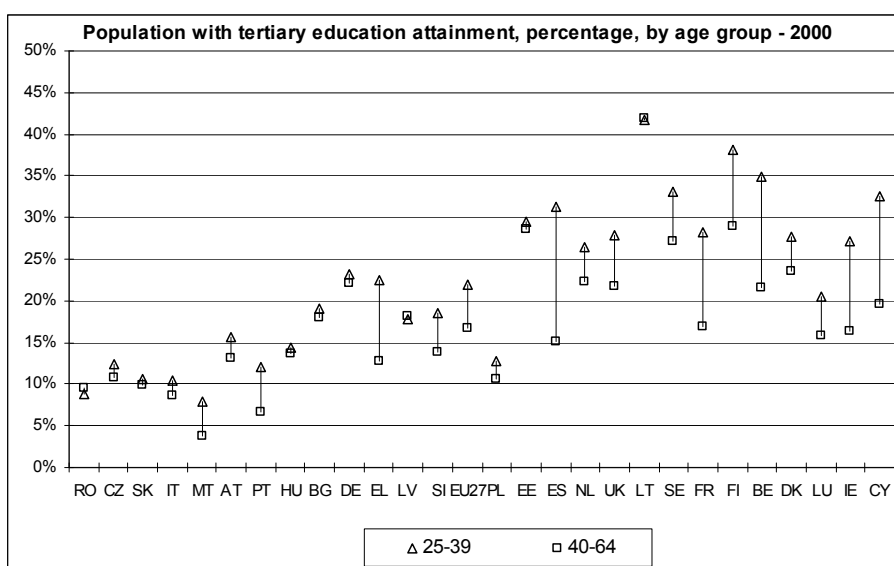


Source: OECD

The EU average share of the total population with tertiary education attainment is 24%. An increasing trend can also be observed, as shown in Graph 3-3. For the population aged 25 to 39, the share of those with a higher education qualification reaches 30% in 2008. The share exceeds 40% in a few countries, Belgium, Finland, Denmark, Ireland and Cyprus, while it is below 20% in Romania, the Czech Republic, Slovakia, Italy and Austria. Tertiary education attainment receives particular attention in the context of the Europe 2020 strategy.

Average attainment in the workforce tends to grow as better-educated younger cohorts replace those who retire. This effect is set to play more strongly in countries where mass education took off more recently and where younger workers are much better educated than their older colleagues. In nearly all countries, the proportion of population with tertiary attainment is higher for the age group 25 to 39 relative to the age group 40 to 64, showing the expansion in tertiary education during the past decades, with Germany and Estonia being exceptions. There was a sharp increase in tertiary attainment rates in the last decades in Cyprus, Ireland, France and Poland, when comparing people aged 25 to 39 relative to those aged 40 to 64.

Graph 3-3 – Population with at least tertiary education attainment, percentage, by age group



Source: Eurostat Labour Force Survey

Note: In Luxembourg, reliance on labour force from neighbouring EU countries contributes to a relatively high share of the population with tertiary education attainment.

Tertiary attainment depends on a number of factors such as the number of students enrolled, their graduation and drop-out rates and the length of studies. A faster completion of graduation means there are fewer students and more graduates at any point in time. A faster completion may be due to shorter study programmes or to students concluding graduation within the normal time.

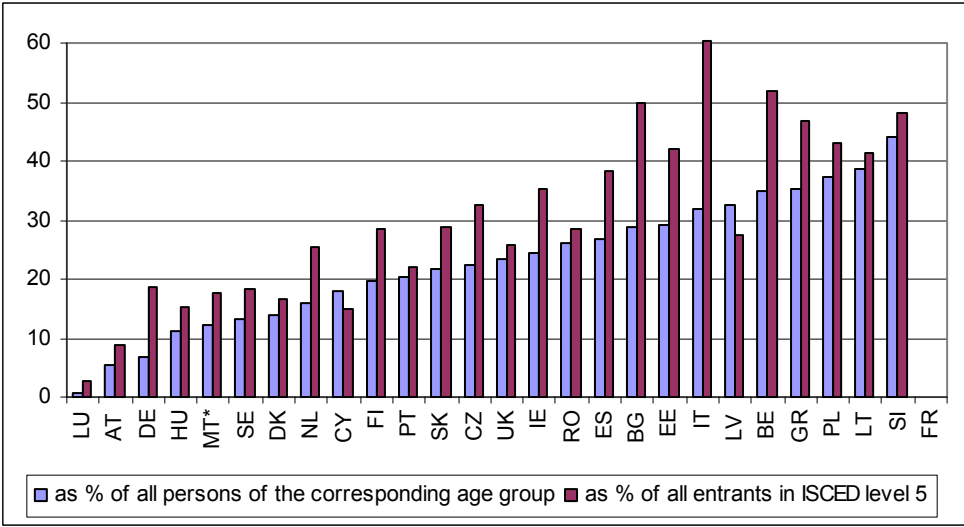
As reforms to reduce the length of tertiary studies are gradually implemented, with the length of BA programs usually shortened to 3 years, an effect of raising and then flattening tertiary attainment rates can be expected to materialise across the EU. Improvements to secondary education, in terms of enhanced quality as well as reduced numbers of early school leavers,

can also have a positive impact on tertiary attainment, in addition to improvements in the quality of tertiary education teaching.

Education attainment does not take into consideration differences in qualitative aspects of education, such as quality of education, contents of curricula, or formal requirements to obtain a diploma. Alone, it does not allow disentangling whether increased attainment has been achieved through improving quality of education, lowering exam requirements or admitting more students in tertiary education institutions. It is important to bear in mind a drawback with attainment rates in a cross-country context. It implicitly assumes the same quality across education systems, although students in diverse education systems across countries receive different educational benefits. It is essential to supplement analysis with indicators of quality, especially so as available evidence suggests that quality has a bigger impact than attainment (or years of schooling), as seen in the first chapter.

Relatively few young people in the EU as a whole enrol in tertiary education, see [Graph 3-4](#).²² In most countries, less than 30% of the corresponding age group enter tertiary education. The figure is between 30 and 40% in Greece, Italy, Belgium, Lithuania and Poland and above 40% in Slovenia. The graph also suggests that the age distribution of new entrants differs across the EU.

Graph 3-4– Entrants at theoretical starting age in ISCED level 5, 2008



Source: Eurostat

However, enrolment is growing strongly in many countries. [Table 7-2](#) in the statistical annex shows enrolment statistics for the period 1999 to 2007. A few Member States are characterised by large increases in enrolment, in absolute terms (the Czech Republic, Denmark, Cyprus, Lithuania, Romania, Slovenia and Slovakia). Despite low birth rates in the 1980s, the number of students enrolled is increasing as a result of growth in enrolment rates. Vocational qualifications which outside of the scope of the tertiary level of education are

²² When interpreting and comparing cross-country data, it is important to bear in mind that statistics on enrolment and attainment are disconnected. Enrolment statistics are collected from reports by education institutions. Attainment rates are obtained from surveys of workers who are asked about the highest degree they have attained.

attractive in Austria and Germany and partly explain the small number of participants in tertiary education as compared to other Member States.

Table 3-1 shows the distribution of students by age. Students in Belgium, Ireland, France, Cyprus, Malta or the UK typically enrol at younger ages than in Germany, Austria, Sweden, Finland or Denmark.

Table 3-1 – Distribution of students by age, in %, in 2008

	18	19	20-24	25-29	30-34	18-24	18-34
EU-27	4.7	10.1	48.2	17.1	8.5	62.9	88.5
BE	9.7	14.8	52.0	11.6	4.7	76.5	92.8
BG	0.8	12.3	58.9	15.7	5.9	71.9	93.5
CZ	0.3	7.6	55.9	16.8	7.0	63.8	87.5
DK	0.1	1.4	38.6	29.9	12.7	40.1	82.8
DE	1.2	4.5	48.5	29.6	8.4	54.1	92.1
EE	2.4	11.7	48.9	15.7	9.4	63.0	88.1
IE	10.7	14.2	42.6	14.8	15.9	67.5	98.2
GR	8.3	10.1	42.0	16.0	22.1	60.3	98.4
ES	7.7	9.9	44.4	19.5	8.6	61.9	90.0
FR	10.8	15.2	53.5	10.9	8.8	79.4	99.2
IT	0.8	10.4	48.2	16.8	6.2	59.4	82.4
CY	10.0	12.6	50.0	16.8	4.2	72.6	93.6
LV	0.8	10.0	48.1	14.6	9.1	59.0	82.6
LT	1.9	12.0	55.8	13.6	7.5	69.6	90.8
LU	1.5	9.6	62.6	15.7	4.7	73.7	94.1
HU	3.7	9.9	49.6	17.2	9.4	63.2	89.8
MT*	9.4	14.8	48.5	10.9	6.0	72.7	89.6
NL	7.1	10.2	52.5	15.3	4.1	69.8	89.2
AT	1.9	5.4	44.9	25.6	9.6	52.2	87.3
PL	0.3	10.2	60.2	11.1	8.8	70.7	90.5
PT	6.6	9.6	43.9	18.0	9.2	60.0	87.1
RO	5.8	12.0	48.3	19.1	5.3	66.1	90.5
SI	1.0	10.9	54.7	18.4	6.1	66.6	91.1
SK	1.2	9.0	54.3	15.0	8.2	64.5	87.6
FI	0.1	4.3	41.4	25.2	11.4	45.8	82.4
SE	0.7	4.4	37.1	22.2	11.4	42.1	75.7
UK	8.5	11.9	35.4	12.6	7.8	55.8	76.2

*2007 data

Source: Eurostat.

There are different indicators of the graduation output. The number of graduates in a given year can be divided by the population at the "typical graduation age" (graduation rate), or by the number of new entrants in the education system (survival rates). Survival rates are more suitable to assess the graduation performance of the system, but they are available for fewer countries because comparable cohort data are required (they can also be estimated using a cross-section method).

The graduation rate is calculated as the ratio between graduates in a given year and the population at the "typical graduation age". Graduation rates in the EU are shown in Table 3-2. Graduation rates are relatively high in Denmark, Ireland, Netherlands, Poland, Portugal, Slovakia, Finland, Sweden and the UK, also compared to the OECD average. Graduation rates in advanced research programmes (PhD or equivalent) are higher in the EU19 compared to the OECD average.

Table 3-2 – Graduation rates in tertiary education, in 2000 and 2008

	Graduation rates				
	2000		2008		
	Tertiary-type A	Tertiary-type B	Tertiary-type A		Tertiary-type B
			All programmes	Advanced research programmes (PhD or equivalent)	
BE	:	:	:	1.3	:
CZ	14	5	36	1.4	5
DK	37	10	47	1.5	11
DE	18	11	25	2.5	10
EE	:	:	:	0.9	:
IE	30	15	46	1.3	26
GR	15	6	18*	0.9	12*
ES	30	8	33	0.9	14
FR	:	:	:	1.4	:
IT	19	:	33	1.3*	1
LU	:	:	5	0.1	0
HU	:	:	30	0.7	4
NL	35	:	41	1.6	0
AT	15	:	25	1.9	8
PL	34	:	50	0.9	0
PT	23	8	45	3.0	2
SI	:	:	20	1.3	26
SK	:	2	57	1.9	1
FI	41	7	63	2.3	0
SE	28	4	40	3.0	6
UK	37	:	35	2.0	16
<i>average</i>	27	8	37	1.5	8
<i>OECD average</i>	28	9	38	1.4	8

* 2007 data

Source: OECD

Note: The graduation rate is calculated as the percentage of graduates to the population at the typical age of graduation. *Tertiary-type A programmes* (ISCED 5A) are largely theory-based and are designed to provide sufficient qualifications for entry to advanced research programmes and professions with high skill requirements, such as medicine, dentistry or architecture. Tertiary-type A programmes have a minimum cumulative theoretical duration (at tertiary level) of three years' full-time equivalent, although they typically last four or more years. These programmes are not exclusively offered at universities.

Tertiary-type B programmes (ISCED 5B) are typically shorter than those of tertiary-type A and focus on practical, technical or occupational skills for direct entry into the labour market, although some theoretical foundations may be covered in the respective programmes. They have a minimum duration of two years full-time equivalent at the tertiary level.

Survival rate at the tertiary level is defined as the proportion of new entrants to the specified level of education who successfully complete a first qualification. Survival rates are calculated dividing the number of graduates by the number of new entrants at the typical age of entrance.²³

It is important to understand the factors driving the survival rates, in order to assess whether there is an issue with the graduation output. For example, the low figure in Sweden could be explained by large numbers of people who register to individual courses – as part of lifelong learning programmes – and are thereby statistically counted as new entrants, although some of them may not intend to graduate with a formal degree. Furthermore, graduates are counted in the year when they collect their diploma, which may happen sometime after the studies were completed.²⁴

²³ The survival rate is calculated as the ratio of the number of students who are awarded an initial degree to the number of new entrants to the level n years before, n being the number of years of full-time study required to complete the degree (OECD, 2002).

²⁴ In Sweden, graduation rates in disciplines where it is required to show the diploma before gaining employment, such as medicine, are very high, while graduation rates in other disciplines, where the diploma does not need to be shown, are much lower.

Table 3-3 – Survival rates in tertiary education, in 2000 and 2008

	Survival rates			
	2000		2008	
	Tertiary-type A	Tertiary-type B	Tertiary-type A	Tertiary-type B
BE*	60	88	72	80
CZ	61	77	70	:
DK	69	84	82	77
DE	70	75	67	80
IE	85	50	:	:
ES	77	74	79	70
FR	:	:	64	78
IT	42	51	45**	:
HU	:	:	57**	44**
NL	69	58	72	:
AT	59	:	64	:
PL	:	84	61	73
PT	:	:	86	17
SI	:	:	64	67
SK	:	:	63	68
FI	75	:	72	:
SE	48	85	49	52
UK	83	:	81	45
<i>average</i>	<i>66</i>	<i>73</i>	<i>70</i>	<i>64</i>

*Flanders

**2005 data

Source: OECD

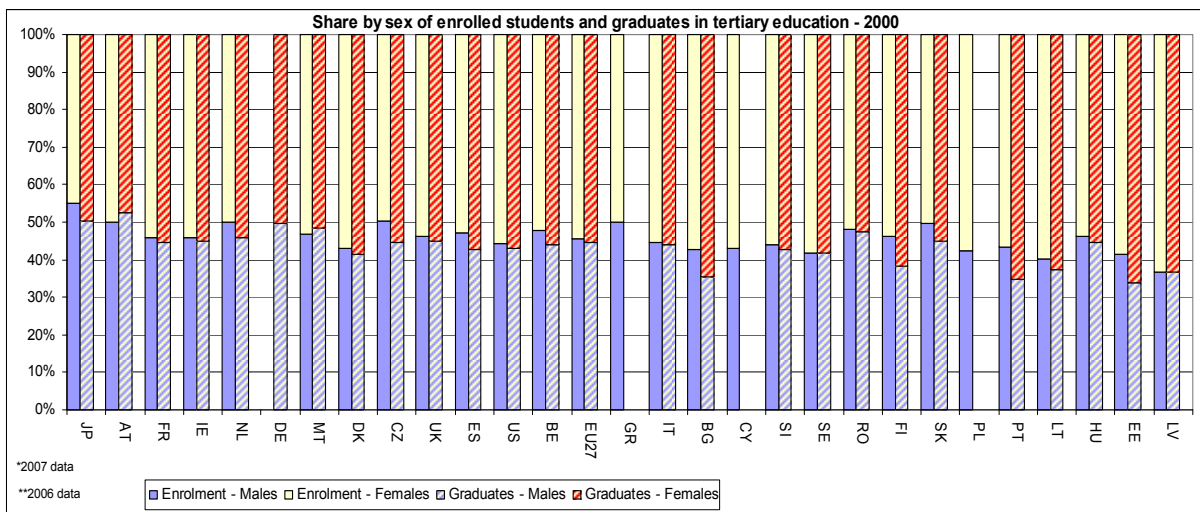
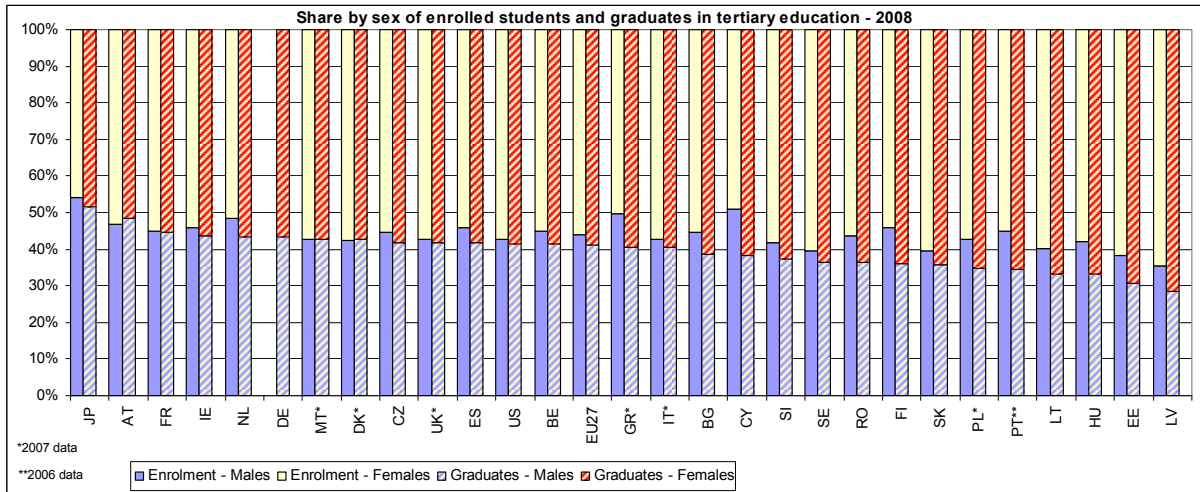
Note: The survival rate is calculated as the ratio of the number of students who are awarded an initial degree to the number of new entrants to the level n years before, n being the number of years of full-time study required to complete the degree (OECD, 2002). It is available for a few countries only.

On average, among the Member States for which data are available, about 70% of tertiary students succeed to complete a programme in 2005. The rates differ widely across countries, in Italy only 45% of those who enter a tertiary programme leave with a qualification (type A) and less than 60% in Hungary (either type A or type B). In contrast, the figures are above 75% in Belgium (Flemish Community), Denmark, the United Kingdom and Germany.

Students may leave tertiary educational programmes before their completion for a great variety of reasons - they may realise that they have chosen the wrong subject or programme, they may fail to meet the standards required by their educational institution, or they may want to work before completing their programme. Nevertheless, high dropout rates provide a rough indication that the tertiary education system is not meeting the needs or expectations of students enrolled.

Women account for 50% or more of the number of enrolled students and graduates in 2008 and they typically account for a bigger share of graduates relative to enrolled students.

Graph 3-5 – Breakdown of enrolled students and graduates by gender, in %, 2008 and 2000

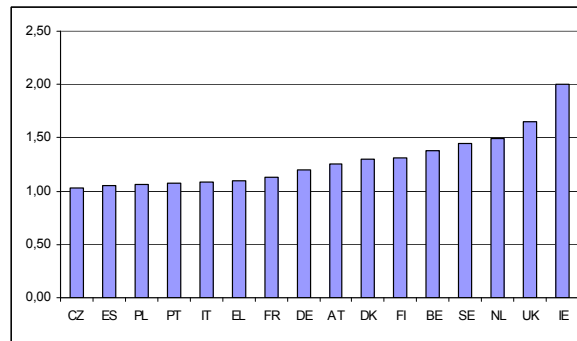


Source: Eurostat

Graph 3-6 and Graph 3-7 show the recruiter review index, which reflects graduate employability, and the score of the peer review index, which reflects the ranking of Universities, provide indications on the quality of tertiary education, as calculated by St. Aubyn et al. (2009).²⁵ The output indicators (number of graduates and number of publications) are scaled by the quality indicators.

²⁵ Both indicators are derived from the THES-QS World University Rankings database, adjusted for country size. The recruiter review index is based on the results of the recruiter survey, while peer review index is constructed as the sum of points assigned for all given country's universities present in the ranking.

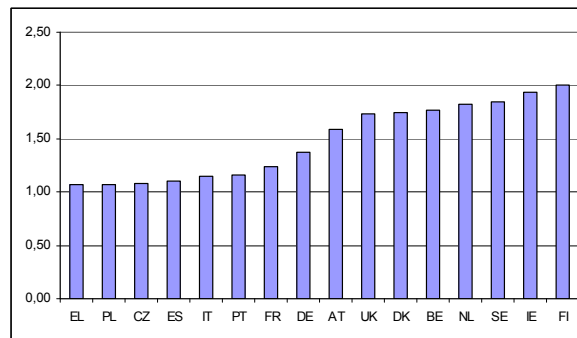
Graph 3-6 – Recruiter review index



Source: St. Aubyn et al. (2009)

Note: The recruiter review index and the peer review index are calculated on the basis of the classification of world universities by Times Higher Education Survey – QS (THES – QS). The recruiter review index is calculated according to results from a survey filled by recruiters from all over the world (2005, 2006 and 2007) and concerning the employability of graduates. For further details, please refer to St. Aubyn et al. (2009).

Graph 3-7 – Peer review index

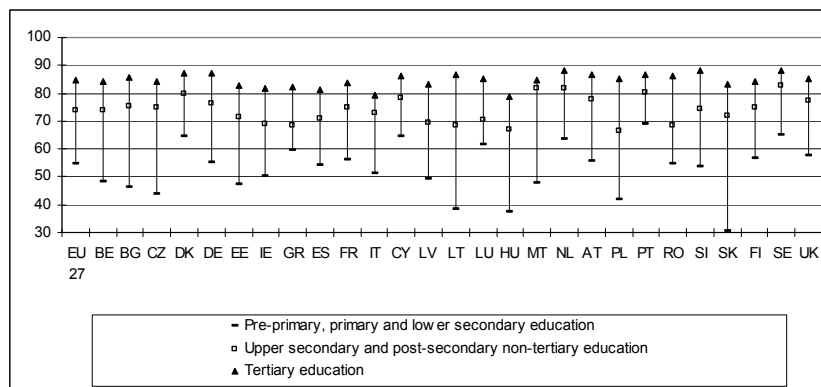


Source: St. Aubyn et al. (2009)

Note: The recruiter review index and the peer review index are calculated on the basis of the classification of world universities by Times Higher Education Survey – QS (THES – QS). The peer review index is calculated on the basis of the survey filled by academics from all over the world (2005, 2006 and 2007). For further details, please refer to St. Aubyn et al. (2009).

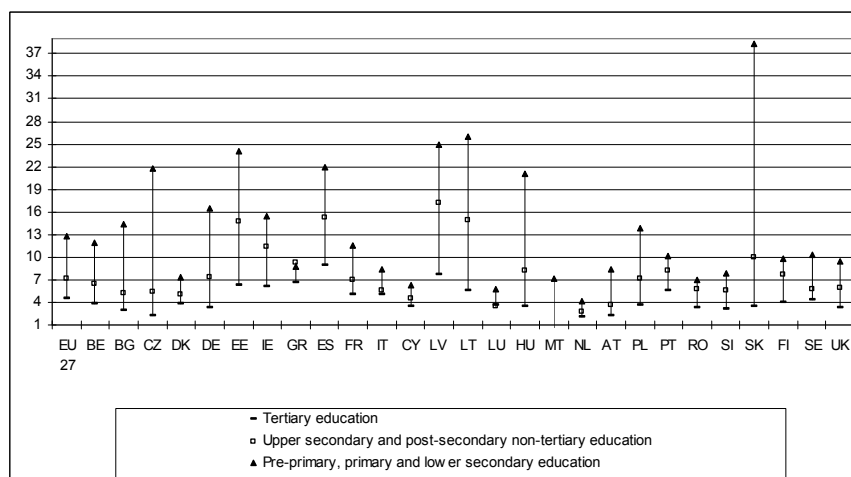
The transition into the labour market provides an indicator to educational success, as examination results are not available at tertiary level on a comparative basis (such as in secondary education). Graphs 1 and 2 below illustrate the benefits of education to the individual in terms of employability. The gains are particularly large in Bulgaria, the Czech Republic, Lithuania, Hungary, Malta, Poland or Slovakia.

Graph 3-8 – Employment rates by highest level of education attained (2009), age 25-64



Source: Eurostat

Graph 3-9 – Unemployment rates by highest level of education attained (2009), age 25-64



Source: Eurostat

Finally, student mobility is of importance in the EU context. Table 3-4 suggests that student outgoing mobility is low, with a couple of exceptions, notably Cyprus, Malta, Ireland and Slovakia. Incoming mobile students study mostly in Austria, the United Kingdom, Belgium and Germany. Luxembourg is a particular case as internationalisation and mobility are part of its history.²⁶ Incoming students from abroad are increasing in Luxembourg and France (national data submitted at the peer review). The picture of mobility changes when international movements, beyond the EU, are considered, notably in Italy.

²⁶ The first University was created in 2003 and since then, most students continue to study abroad. At the same time, the University does attract students from abroad (33% of the foreign students are coming from abroad to study, while the rest had previously studied in Luxembourg).

Table 3-4 – Tertiary students studying in or coming from another EU27 Member State, as % of total students in the country

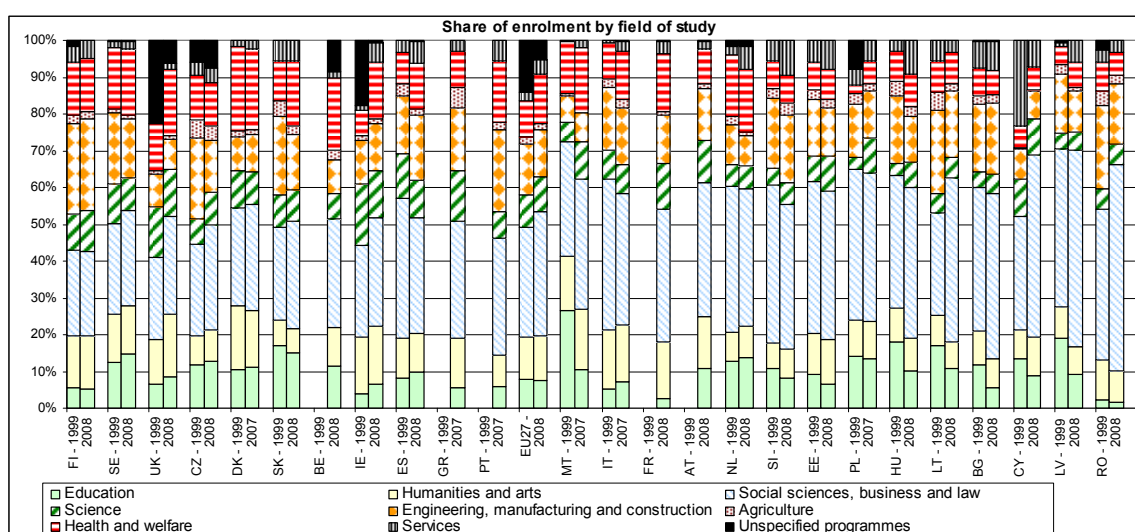
	Tertiary students studying in another EU-27		Inflow of tertiary students from EU-27	
	2006	2007	2006	2007
BE	2,5	2,6	8,1	8,1
BG	8,9	8,3	2,8	2,8
CZ	2,0	2,1	5,0	5,3
DK	2,6	2,5	4,5	4,9
DE	2,8	3,1	5,6	5,4
EE	4,1	4,5	1,1	1,2
IE	13,8	14,2	2,5	3,2
GR	5,5	5,8	1,6	2,2
ES	1,3	1,4	0,8	0,9
FR	2,4	2,5	2,3	2,3
IT	1,7	1,8	0,8	0,9
CY	53,2	56,9	4,6	5,1
LV	2,2	2,5	0,6	0,5
LT	3,0	3,3	0,3	0,5
LU	80,8	:	38,5	:
HU	1,7	1,8	2,1	2,2
MT	10,0	9,9	2,2	2,1
NL	2,1	2,1	3,9	4,3
AT	4,6	4,7	12,1	13,0
PL	1,6	1,8	0,1	0,2
PT	3,7	4,0	0,8	0,8
RO	2,2	2,2	0,2	0,2
SI	2,1	2,1	0,8	0,9
SK	10,2	10,2	0,5	0,5
FI	3,0	2,9	1,1	1,2
SE	2,7	3,0	4,8	5,0
UK	0,7	0,7	8,4	9,0
EU 27	2,6	2,8	2,9	3,1

Source: Eurostat

Note: Students from or studying in EEA or Candidate countries are also included.

Social sciences, business and law is the field of study with the largest share of enrolment across the EU, with few exceptions (mainly engineering, manufacturing and construction in Finland). Different tertiary education institutions/systems offer different mixes of subjects and the production function and associated costs vary from field to field (e.g. Medicine and Law); this should be taken into account when making comparisons across tertiary education systems.

Graph 3-10 – Share of enrolment by field of study, 1999 and 2007



Source: Unesco

3.2. Performance indicators

Table 3-5 shows descriptive indicators of the main inputs and outputs of tertiary education systems used in St. Aubyn (2009). There is considerable variation across Member States as regards most of the indicators. The first four columns in the table show indicators per capita (academic staff, students, graduates and publications), and the next three columns show numbers per academic staff. The last column shows the ratio of graduates per 100 students.

Finland and Sweden have a comparatively large academic staff per capita and, in contrast, the Czech Republic, Italy, Latvia and Romania have small numbers of academic staff. Finland, Greece, Slovenia and Hungary stand out with very large numbers of students per capita. Gross numbers of students are high when they remain a comparatively long time in the tertiary education system. Students may take longer to graduate when they work part-time; this is the case in Finland and in Slovenia.²⁷ The United Kingdom, Ireland and Lithuania have the largest numbers of graduates per capita, well above the EU average, while the numbers are comparatively small in Cyprus, Germany, Austria, Bulgaria and the Czech Republic. The number of publications per capita is highest in Sweden and Finland, while it is in the lower bound in Bulgaria, Latvia and Romania.

²⁷ In Slovenia, 95% of those with the secondary leave certificate are going to University, and the generosity of student benefits plays a role. Furthermore, the tax relief on student work is very attractive for employers and leads to registered students who are not studying but working. Finally, the *Absolvent* status of those who have not finished their studies in time and keep their student status for 1 year also explains the large number of students.

Table 3-5 – Indicators of main inputs and outputs of tertiary education systems

	Academic staff	Students	Graduates	Publications	Students	Graduates	Publications	Graduates
		<i>per capita</i>				<i>per academic staff</i>		<i>per 100 student</i>
BE	1,7	37,2	7,8	1,0	21,8	4,5	0,56	21
BG	1,8	25,8	5,0	0,1	14,7	2,9	0,05	19
CZ	1,5	29,9	5,1	0,3	20,3	3,5	0,21	17
DK	.	38,4	9,4	1,0	.	.	.	24
DE	2,0	25,2	4,1	0,6	12,9	2,1	0,30	16
EE	2,7	39,6	7,0	0,5	14,9	2,6	0,19	18
IE	2,3	41,6	13,5	0,8	18,0	5,8	0,34	32
GR	1,9	58,3	5,5	0,5	30,5	2,9	0,28	9
ES	2,5	36,1	5,9	0,5	14,6	2,4	0,2	16
FR	1,8	29,1	9,0	0,3	16,5	5,1	0,19	31
IT	1,5	32,2	6,2	0,5	21,8	4,2	0,33	19
CY	1,6	8,5	1,6	0,2	5,4	1,0	0,15	18
LV	1,5	41	8,2	0,1	27,7	5,5	0,07	20
LT	2,8	53	11,2	0,2	19,1	4,1	0,07	21
LU
HU	2,1	43,2	7,4	0,3	20,6	3,5	0,15	17
MT	1,7	23,4	6,8	0,1	14,0	4,1	0,08	29
NL	2,2	34,6	6,7	1,0	15,9	3,1	0,44	19
AT	1,9	29,7	4,3	0,9	16,1	2,3	0,47	14
PL	2,2	39,2	9,4	0,2	18,2	4,3	0,11	24
PT	2,0	26,8	5,2	0,4	13,3	2,6	0,21	19
RO	1,1	26,7	5,7	0,1	24,3	5,1	0,06	21
SI	1,6	53,5	5,6	0,7	34,5	3,6	0,46	11
SK	2,1	33,7	6,9	0,2	16,4	3,4	0,1	21
FI	3,4	58,3	7,9	1,3	17,1	2,3	0,37	13
SE	3,7	47,3	6,7	1,5	12,9	1,8	0,42	14
UK	1,6	38	10,5	0,9	24,5	6,8	0,59	28
EU27	1,9	33,65	7,1	0,6	17,8	3,7	0,26	20

Source: St. Aubyn et al. (2009)

Note: For Belgium the indicators are aggregated for the Flemish and Francophone regions.

The ratio of students per academic staff suggests that some Member States, such as Greece or Italy, have more extensive teaching systems, while others such as Sweden and Spain have more intensive teaching. A lower student per staff ratio can be expected to contribute to the quality of the learning experience for students, however, some countries with extensive teaching systems such as the United Kingdom²⁸ or Ireland achieve a large production of graduates on average while other countries such as Spain achieve a relatively small graduation output with small average ratios of students per academic staff. The number of academic staff in Germany is comparatively large relative to the number of students but a significant share of the academic staff is carrying out research financed by third-party and has no teaching obligations. Average students per staff ratios mask considerable diversity within different programmes and institutions at national level. The qualification of the academic staff is also important to explain the performance of different systems.

Some countries may have a low number of graduates relative to their academic staff in part because the time to complete degrees is on average longer (due to the organisation of the study in longer programmes or to the fact that students take longer than the normative length of study), and/or because many students drop out before concluding graduation. The graduation output matters for the efficiency of public expenditure, as shown by St. Aubyn et al. (2009) who find a number of Member States are located below the efficiency frontier mainly due to a small number of graduations compared to the average. Longer time to graduate leads to larger numbers of students at any point in time.

The United Kingdom and Ireland have the largest numbers of graduates relative to the academic staff. Boarini et al. (2008) suggests a connection between graduation rates and the

²⁸ The United Kingdom teaching methods are characterised by extensive personal work by students, which contributes to explain the relatively large ratio of students per academic staff.

estimated private returns to tertiary education, which are also the highest. France, Belgium, Latvia and Romania also have comparatively large numbers of graduates per academic staff.

The length of studies has an impact on gross graduation rates. Short programmes contribute to high average gross graduation rates, for example in France. The average time for students to obtain a Bachelor of Arts (BA) degree is only available for a few countries. Average shorter times are found in Luxemburg (6.62 semesters) and Malta, whereas longer periods are more common, in particular in Denmark, Finland, Sweden, Slovenia, Italy, the Netherlands and Hungary.²⁹ Average long study durations are associated with higher costs for society.

The experience in a number of Member States (United Kingdom, Germany) may suggest that tuition fees play a role in the motivation of students to conclude their studies in a speedy manner, although other factors are important. For example, a few Member States (Malta, Luxembourg or Ireland) have no tuition fees in place and average graduation is within the nominal period.

The peer review highlighted that the success rate in Universities is a source of policy concern in a number of Member States. The experience of Germany suggests that supervision of students in the first semester can play a major role. In France, measures adopted include 5 additional hours of weekly supervision per student and per year, as well as an obligation of prior information before registering to University.

As regards research, St. Aubyn et al. (2009) suggest that the countries with the highest production *per capita* (Finland and Sweden) are also countries with a large academic staff. Productivity of the academic staff is above average. Some countries achieve above average production *per capita* (the Netherlands and the UK), essentially due to a high academic staff productivity, while displaying a smaller than average academic staff. A third group of countries, while employing an above average academic staff, produces below average. This group includes Spain, Portugal, Hungary, Slovakia, Estonia, Poland, and Bulgaria. Finally, some countries have lower productivity of academic staff, and also have a relatively small academic staff. This is the case of Romania, Latvia, Malta, Cyprus, and the Czech Republic.

The peer review of Romania highlighted that the development of research is part of the transformation of the economy. It is relatively more difficult to achieve excellence in research than in teaching. In a number of Member States, there is limited cooperation to date between research institutions and economic agents because the culture to use innovation is not very widespread, especially so among small and medium enterprises.

²⁹ In Italy, only 57% of graduates have obtained their degree within the nominal time. The average duration in the Netherlands, is 55 months for Universities of Applied Science, against nominal course duration of 48 months, and 74 months for research Universities, against nominal course duration of 48 to 60 months. In Hungary, public support ends after 16 semesters but students may stay in the tertiary education system for an unlimited period of time.

3.3. Quality

The focus on quantitative measures of education, as they are more readily available, should not distract from the more elusive quality dimension. Indeed, it is crucial to focus on the *outcomes* and not only on the *inputs* of education systems, because the engines of growth are knowledge and innovation rather than education attainment per se. Measuring the quality of tertiary education is very challenging even for Member States where data tends to be good. For example, there is very limited comparable information on the educational quality of different tertiary education programmes and institutions within Member States.

Rankings are sometimes used as indicators of research and education performance. The interpretation of rankings needs to be careful and balanced. They take into account inputs, activities and research outputs, such as resources used, classes taught, and articles published. The Shanghai Jiao Tong University Ranking and the Times Higher Education world university rankings are very well-known, see Box 2. Each ranking has advantages and drawbacks. The Shanghai ranking provides an indication of research performance, but it does not take into account the teaching and life-long learning missions of tertiary education institutions. The Times Higher Education ranking takes into account the quality of teaching on the basis of opinion surveys. The European Commission Directorate-General for Education and Culture is investigating the feasibility of an alternative, multi-dimensional global ranking. The interpretation of ranking results needs to be careful and balanced.

Currently available rankings do not use information on student learning outcomes. One can use proxies such as occupational statistics. Some Member States for example have data on employment outcomes 6 months after graduation. Arguably however, the life-long employment status is of higher interest.

Current assessment methods are not fully adequate to appraise the outcomes, and quality, of teaching. The OECD launched an initiative to assess learning outcomes, called Assessment of Higher Education Learning Outcomes - AHELO), to create internationally comparable measures. The project would contribute to assess how to make tertiary education of better quality and not only more available. A study is to determine whether the creation of a full-scale AHELO would be possible and feasible.³⁰ St. Aubyn (2009) has constructed an average citation index to capture the impact of research, shown in [Graph 3-11](#).

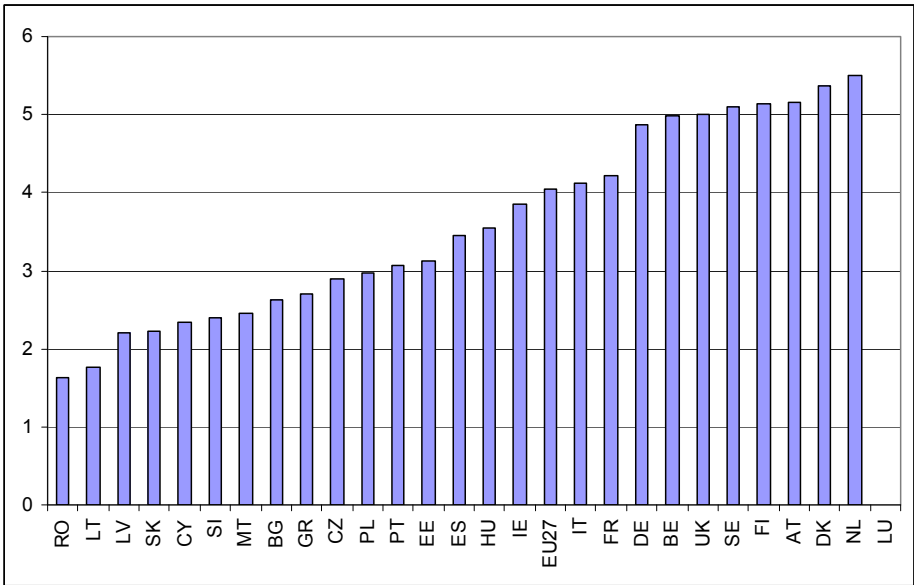
Comparative indicators are crucial to analyse the issues of performance, efficiency and effectiveness of public expenditure in tertiary education. However, they are not sufficient to conclude the discussions and they need to be complemented with detailed knowledge at the country level. Moreover, the use of a combination of indicators is warranted.

³⁰ There are doubts as to whether it is feasible to measure learning outcomes across higher education institutions of very different types, and in countries with different cultures and languages. In order to answer this question, a number of international experts have been consulted since 2007. The main conclusion of the experts was that while it might be both desirable in terms of public policy and theoretically possible to assess and compare central components of education outcomes, it would be necessary to conduct a feasibility study to test this proposition before undertaking a more systematic assessment and check whether it is scientifically possible to devise an assessment and whether it can be implemented.

For example, the ratio of graduates per academic staff provides an indication of efficiency, but it needs to be complemented by indicators of drop-out and rates of failure.

Given the tension in tertiary education policies between broadening access and maintaining or enhancing quality, there is a key role for Quality assurance institutions. Quality assurance is of particular importance in tertiary education systems where incentives to increase graduation are introduced (in particular in funding rules) to avoid grade inflation. The peer review of the United Kingdom also highlighted a large involvement of students to give feedback to courses, which seems to play a role in the quality of teaching.

Graph 3-11 – Citation index



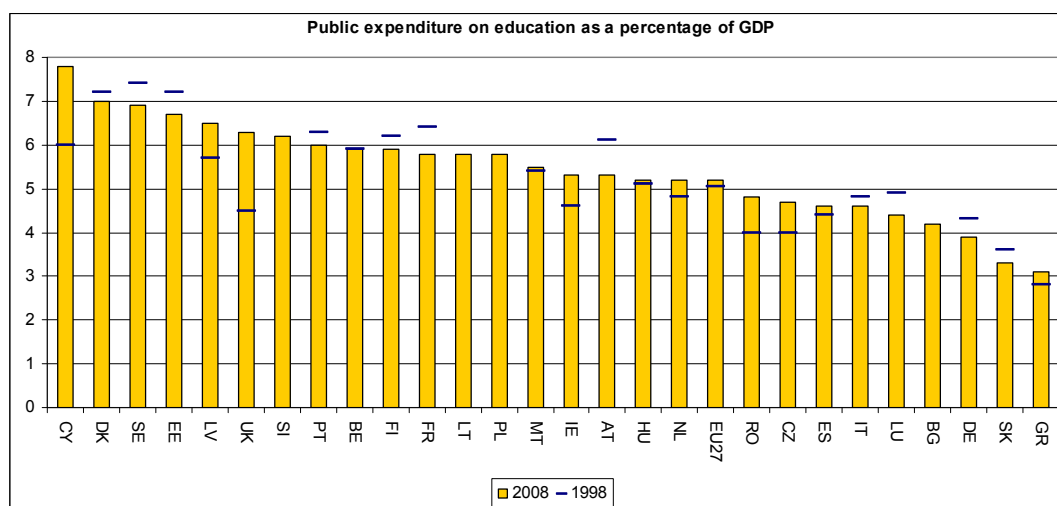
Source: St. Aubyn et al. (2009)

Note: The citation index is calculated on the basis of the number of citations of articles published and cited within a five-year period with at least one author affiliated to a given country's institution and included in the ISI Web of Science database. For further details, please refer to St. Aubyn et al. (2009).

3.4. Funding

Public expenditure on education accounts for about 5% of GDP in the EU as a whole (primary, secondary and tertiary levels combined), see Graph 3-12. Public expenditure on education accounts for 7% of GDP or above in Sweden, Denmark and Cyprus, while it is less than 4% in Germany, Slovakia and Greece. Between 1998 and 2008, the share of expenditure as a percentage of GDP has fallen in some Member States while it has increased in others.

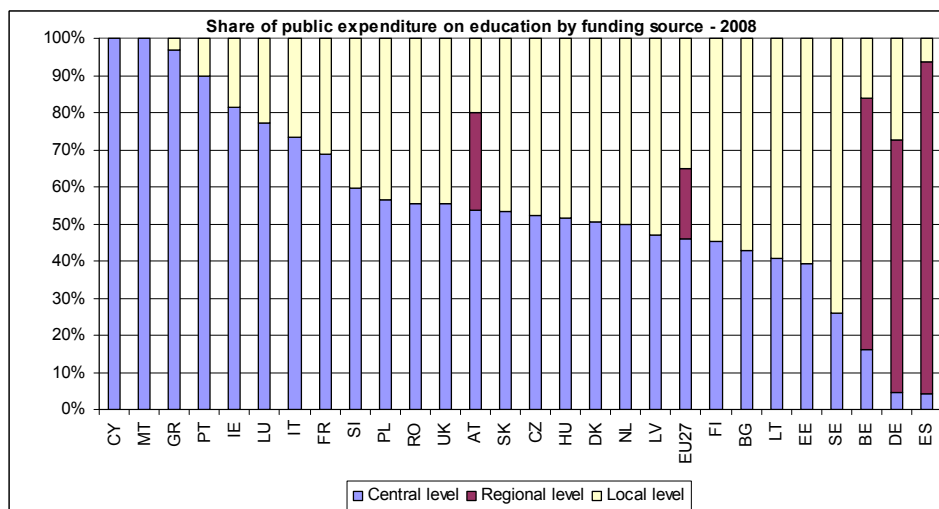
Graph 3-12 – Public expenditure on education³¹, % of GDP



Source: Eurostat - General government expenditure by function (COFOG) GF09 Education

Local authorities play a significant role in funding education in a large number of Member States. Cyprus, Malta and Greece are characterised by (nearly) exclusive central level financing while the regional level accounts for the bulk of expenditure on education in Belgium, Germany and Spain.

Graph 3-13 – Public expenditure on education, breakdown by funding source, in %

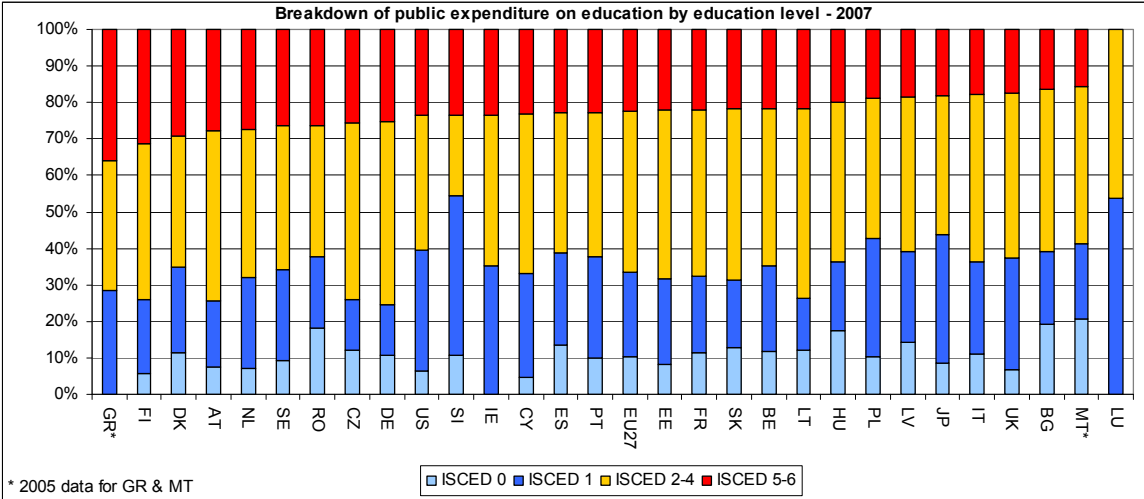


Source: Eurostat – Central, regional and local government expenditure by function (COFOG) GF09 Education

³¹ The functional breakdown of government expenditure is based on COFOG (Classification of Functions of Government) which was developed by the OECD and adopted as a standard in national accounts. Eurostat collects and publishes COFOG data from European countries based on the harmonised accounting principles in the European System of Accounts 1995 (ESA95).

Graph 3-14 shows the breakdown of public expenditure by education level. In 2007, public expenditure on tertiary education accounted for about 22% of the total, with shares about 30% or above in Denmark, Finland and Greece.

Graph 3-14 – Public expenditure on education, breakdown by education level



Note – Level 0: pre-primary education; level 1: primary education (or first stage of basic education); level 2: lower secondary (or second stage of basic education); level 3: upper secondary education; level 4: post-secondary non tertiary education; level 5: first stage of tertiary education; level 6: second stage of tertiary education.

Source: Eurostat

Table 3-6 shows public expenditure on tertiary education as a percentage of GDP, which varies between 0.5% of GDP in Italy and 1.5%-1.6% in Portugal, Poland, Romania, Estonia and Finland. A number of caveats can be mentioned:

- (i) The definition of General Government - in some countries, university education is provided by private universities or by state universities which have enough autonomy so that they are considered as non-profit institutions (this is notably the case in the UK and Ireland);
- (ii) there is a level (9.5 Education not definable by level) which is intended for vocational training in particular. Some countries with high levels of apprenticeships (e.g. Germany and Austria) may have substantial expenditures allocated to that level.
- (iii) Sometimes, other (supporting) services and activities might be added under tertiary education (or not), for example subsidised transport and catering. But it is clear from the definition that support for students (grants etc) should be included under tertiary education, so the impact of the others can probably be expected to be small.

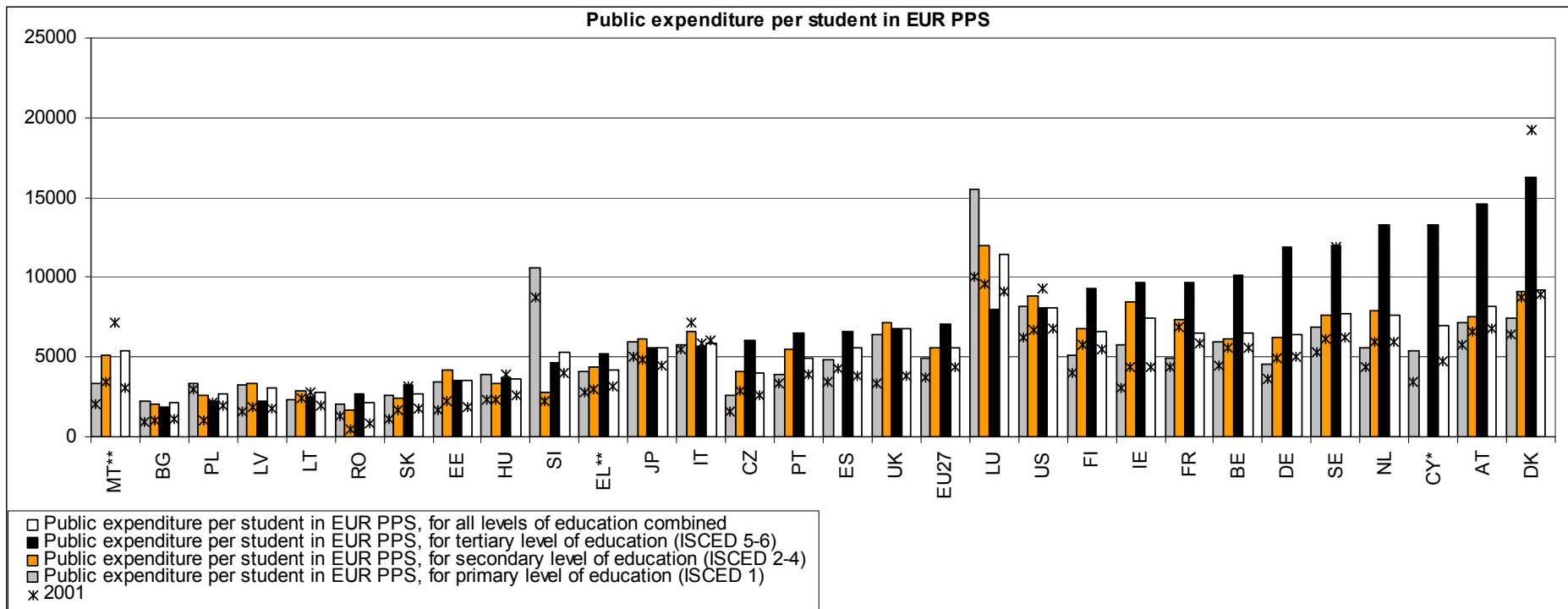
Table 3-6 – Total general government expenditure on tertiary education, as a percentage of GDP

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
BE	:	:	:	:	:	:	:	:	:	:	:	:	:	:
BG	:	:	:	:	:	1	0.8	0.8	1	0.9	0.8	0.9	0.8	0.9
CZ	1.3	1.1	1.1	1	1.1	1.2	1.1	1.4	1	1.1	1	1	1.1	1
DK	1.2	1.3	1.3	1.3	1.4	1.4	1.3	1.4	1.4	1.4	1.2	1.1	1.1	1.3
DE	:	:	:	:	:	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7
EE	1.9	1.7	1.7	1.8	1.8	1.3	1.3	1.3	1.3	1.2	1.2	1.3	1.2	1.6
IE	1.3	1.3	1.3	1.2	1.1	1.1	1.2	1.1	1.1	1	1.1	1.1	1.1	1.2
GR	:	:	:	:	:	:	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.7
ES	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.9
FR	:	:	:	:	:	:	:	:	:	:	:	:	:	:
IT	:	:	:	:	:	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5
CY	1	1	0.9	1	1	1	1	1.1	1.4	1.2	1.3	1.3	1.4	1.5
LV	:	:	:	:	:	:	:	:	:	:	:	:	0.8	0.9
LT	:	:	:	:	:	0.8	0.9	1.1	1	1.1	1	1.2	1.1	1.1
LU	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
HU	0.9	0.8	0.7	1	0.9	1	1	1.1	1.1	1	1	1	0.9	0.9
MT	-	-	-	-	-	-	1.1	1.1	0.9	0.9	0.8	0.8	0.8	0.8
NL	:	:	:	:	:	:	:	:	:	:	:	:	:	:
AT	1.2	1.2	1.3	1.3	1.3	1.2	1.2	1.2	1.3	1.3	1.4	0.8	0.8	0.8
PL	:	:	:	:	:	:	:	1.4	1.4	1.4	1.7	1.7	1.6	1.6
PT	0.9	1	1	1.1	1.2	1.2	1.2	1.2	1.2	1.3	1.4	1.2	1.2	1.5
RO	:	:	:	:	:	:	:	:	:	:	:	:	0.8	1.5
SI	:	:	:	:	:	1.1	1.1	1.1	1.1	1.1	1.2	1.1	1.1	1.1
SK	:	:	:	:	:	:	:	:	:	:	:	:	:	:
FI	:	:	:	:	:	:	:	1.8	1.8	1.8	1.8	1.7	1.6	1.6
SE	:	:	:	:	:	:	1.7	1.5	1.5	1.5	1.4	1.4	1.3	1.3
UK	:	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7

Source: COFOG (Classification of the functions of Government)

Graph 3-15 shows public expenditure per student in 2007. Countries are ranked in ascending order by public expenditure per student on tertiary education (in black). Public expenditure per student on tertiary education is above 10,000 EUR PPS in Germany, Sweden, the Netherlands, Cyprus, Austria and Denmark, and close to 10,000 EUR PPS in Finland, Ireland, France and Belgium. It is below (and close to) the EU average in Italy, the Czech Republic, Portugal, Spain and the United Kingdom. In the other Member States, public expenditure per student is below 5,000 (and below 3,000 in Bulgaria, Poland, Latvia, Lithuania and Romania).

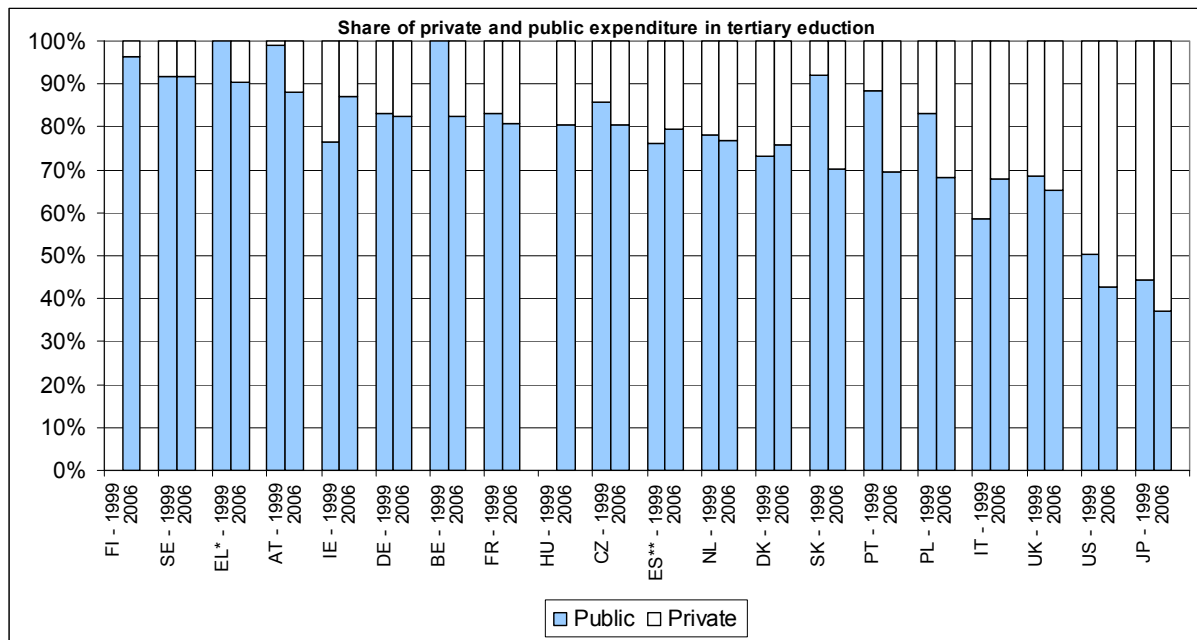
Graph 3-15 – Public expenditure on education, per student³²



Source: Eurostat

³² Public expenditure per pupil/student is defined as the total public current expenditure by level of education divided by the number pupils enrolled in each corresponding level of education. Public expenditure

Graph 3-16 – Public and private sources of funds on tertiary education institutions



Source: OECD – Education expenditures by funding source and transaction type

Public expenditure accounts for the bulk of funds to tertiary education institutions, above 80% in Finland, Sweden, Greece, Austria, Ireland, Germany, Belgium, France, Hungary and the Czech Republic. It is about 65% in Italy and the United Kingdom.

Table in the statistical annex shows the financial aid to pupils as a percentage of public education expenditure, by educational level.

3.5. Summary

Education attainment rates are increasing across the EU. Secondary education is virtually universal with some exceptions: Malta, Portugal, Spain, Italy, and Greece, where the percentage of the population with upper secondary education attainment is below or well below the EU average. The EU average share of the total population with tertiary education attainment is 24%. For the population aged 25 to 39, the share of those with a higher education qualification reaches 30% in 2008. The share exceeds 40% in a few countries, Belgium, Finland, Denmark, Ireland and Cyprus, while it is below 20% in Romania, the Czech Republic, Slovakia, Italy and Austria. Relatively few young people in the EU as a whole enrol in tertiary education. In most countries, less than 30% of the corresponding age group enter tertiary education. The figure is between 30 and 40% in Greece, Italy, Belgium, Lithuania and Poland and above 40% in Slovenia.

On average, about 70% of tertiary students succeed to complete a programme. The rates differ widely across countries, in Italy only 45% of those who enter a tertiary programme leave with a qualification (type A) and less than 60% in Hungary. In contrast, the figures are above 75% in Belgium (Flemish Community), Denmark, the United Kingdom and Germany.

Public expenditure accounts for the bulk of funds to tertiary education institutions. In 2007, public expenditure on tertiary education accounted for about 22% of the total public expenditure for education, with shares about 30% or above in Denmark, Finland and Greece. Public expenditure per student is above 10,000 EUR PPS in Germany, Sweden, the Netherlands, Cyprus, Austria and Denmark, and close to 10,000 EUR PPS in Finland, Ireland, France and Belgium. It is below (and close to) the EU average in Italy, the Czech Republic, Portugal, Spain and the United Kingdom. In the other Member States, public expenditure per student is below 5,000 (and below 3,000 in Bulgaria, Poland, Latvia, Lithuania and Romania).

There are two main types of performance indicators: based on inputs to the tertiary education system and based on measures of the output of the system. There is reasonable coverage of input indicators, such as student numbers or the amount of spending per student. However, the outputs of tertiary education systems are less well covered. Measures related to performance, such as drop out rates, enrolment durations and student per staff ratios are only available for a few years or countries. Private and social returns to tertiary education can only be estimated. Comparable statistics on the effectiveness of tertiary education across countries are less well covered, such as the employability of graduates e.g. the employment rate 6 months after graduation, the number of scientific publications or the impact of scientific work in terms of citations. Finally, the measurement of the acquisition of skills by students, in terms of learning outcomes and their quality, is problematic.

4. Mapping performance with institutions: lessons from country experience

4.1. The nature of tertiary education systems

Tertiary education systems have deeply changed in recent decades and the diversification of provision of tertiary education is one of the trends that stand out. While a few decades ago tertiary education mostly concerned University education, tertiary education institutions have become more diverse with the emergence of new types of institutions such as colleges, Universities of Applied Sciences or Polytechnics.³³

In some countries, non-Universities play a relatively large role with enrolments exceeding 20% of total higher education enrolments: Belgium, Denmark, Germany, Estonia, Ireland, Lithuania, the Netherlands, Portugal and Finland (CHEPS, 2010). Few Member States have the same regulation in place for the two types of institutions (for example Sweden).

To expand supply further, private provision of tertiary education has expanded in some Member States. This instils a certain competition, although the impact of private institutions is not yet clear. The differences across the EU are very large: the number of private institutions in Romania, the Netherlands, Hungary, the Czech Republic, Portugal or Slovenia is large, while private Universities are banned in Greece. Quality assurance has a significant role to play in a diversified institutional landscape.

³³ Non University higher education institutions include institutions such as Universities of Applied Sciences (Austria, Germany, and the Netherlands), Polytechnics (Finland), Higher Schools (Italy), professional colleges (Slovenia) or the technological sector (Greece).

Mergers have taken place in a few Member States (e.g. the Netherlands, Denmark, Belgium, Hungary, Sweden and Finland) and a number of other Member States encourage merging of institutions. Still, many Member States have relatively large numbers of institutions, many of which are likely too small to reach a critical mass for research excellence. Thus, scale increases and mergers may be advised in some cases. This can be considered in countries where research performance is relatively weak and there are large numbers of institutions of small size. The peer review highlighted the experience of the Netherlands, one of the top performers in research identified by St. Aubyn (2009), where the policy of research with sufficient critical mass started in the 1990s. However there are competition issues, and if scale increases induce monopolistic practices among education institutions, there are risks of adverse incentives on university management, such as increases in the allocation of resources to overhead costs at the expense of resources spent on the primary process of teaching and/or research. Small countries face a particular situation of restricted competition, with a limited number of institutions and a risk of oligopoly collusion. The risk of local monopolies becoming inefficient may be outweighed by the increasing international competition for good students.

Table 4-1 – Number of tertiary education institutions

	Number of tertiary education institutions			Enrolment 2007 in 000s	
	Total	of which:			
		Universities	Non-Universities	Private institutions	
BE	56	15*	41		394
BG	51	28	23	14	259
CZ	72	29	43	44	363
DK	29	8	21		232
DE	381	127	203	91	1941
EE	n.a.	n.a.	n.a.	n.a.	69
IE	21	7	14		190
GR	23	23		0	603
ES	77	77		27	1777
FR	4686	79	4406	n.a.	2180
IT	95	89	6		2034
CY	6			3	22
LV	24	6	18		129
LT	49	22	27	19	200
LU		1			
HU	70	26	44	41	432
MT		2			10
NL	114	14	100*	60	590
AT	53	34	19	12	261
PL					2147
PT	137	26	111	97	367
RO	117			61	928
SI	18	4	14	14	116
SK	33	23	10	10	218
FI	41	16	25		309
SE	39	14	25	3	414
UK	166	116	50	1	2363

Source: Commission elaboration on the basis of country fiches prepared by Member States; enrolment figures from Eurostat.

Note: In Belgium, there are 15 Universities according to the law, although they are not all listed. In Germany, there are 51 colleges of arts and music (some of which also have university status) which are included in the first column (total number of tertiary education institutions) but their breakdown between Universities and non-Universities is not provided. In France, there are 201 higher education institutions depending from the universities (including 115 University Institutes of Technology, 59 Schools of Engineering, 27 Institutes of Teacher's training) and 4406 higher education institutions independent from the universities (including 2182 Higher technical Education Sections, 422 Preparatory classes for the "grandes écoles", 172 Schools of Engineering, 206 Business, Accounting and Management Schools and 1421 others. In Italy there are 28 non-State Universities that are public legal persons, and are included into the general government sector, despite their funders may be private. In the Netherlands, the non-University sector is composed of 40 Universities of Applied Sciences, which are publicly funded, and 60 privately funded institutions, which are recognised but do not receive public funding.

A number of Member States have a policy to ensure high accessibility in terms of spreading institutions across the country, in particular Italy, Spain and Germany, which are characterised by large numbers of tertiary education institutions. Portugal, Lithuania and France also have relatively large numbers of tertiary education institutions compared to total students enrolled.

The growth in the participation rate in tertiary education is accompanied by a diversification of student bodies. A widening diversity in the backgrounds, and needs, of those willing to undertake tertiary studies demands new types of provision. Tertiary institutions need to adapt, not only in terms of expanding capabilities, but also in adapting programmes and teaching to

match the growing diversity of students.³⁴ Most Member States have relatively low shares of mature students accessing tertiary education.

Furthermore, not enough is known about the socio-economic status of students. Psacharopoulos (2009) reports that higher education students come from a higher socio-economic status relative to the population and that the returns to higher education generally increase with the level of socio-economic background. The peer review found that the socio-economic status of students remains biased in a number of Member States. In the United Kingdom, there is some evidence that access of more mature students compensates for the unequal access by socio-economic group to some extent (although it is very difficult to measure).

4.2. Governance

There are many different dimensions of institutional autonomy; we focus on autonomy to:

- select students,
- select staff and set staff policy,
- decide on internal governance structures.

Funding rules, and the autonomy to decide on allocation of funds, to diversify sources of income for example through tuition fees or to borrow funds from the capital market, are discussed in the next section. Member States have given different degrees of autonomy to tertiary education institutions on different dimensions.

4.2.1. Selection of students

Typically, tertiary education institutions have to accept all those holding a secondary education qualification. Tertiary education institutions have the autonomy to select students in few Member States: the United Kingdom, Sweden, Finland, Slovakia, the Czech Republic, Poland and the "*grandes écoles*" in France. When education institutions cannot select their students, a "de facto" selection may take place after the first year, via the failure rate: students change orientation of studies, drop out or start again. In Belgium and France in particular, the failure rate at the end of the first year can be over 50%, which is associated with high costs.

Table 4-2 summarises the main arrangements as regards the selection of students. Restrictions in most Member States typically concern professional degree programmes for which there is a very high demand and which are expensive to fund, including medicine, dentistry or veterinary. In Germany, there is a policy to enable institutions to admit more students, as the high demand for study places cannot be satisfied in all cases. Tertiary education systems in Greece, Cyprus and Finland face excess demand for study places and select students. In Greece and Cyprus, the Ministry of Education organises a national exam centrally to determine access to tertiary education. Selection is done by tertiary education institutions in Finland.

³⁴ The Netherlands highlighted the difficulties to meet the diverse needs of the student body during the peer review.

Table 4-2 – Selection of students

	Selection indicator	Selection criteria	Numerus clausus
BE fr BE vl	2.5	School leaving examination; examination for specific studies	Numerus clausus rule in medicine and dentistry is temporarily not applied No
BG	:	Diploma for completed secondary education. Entrance examination for students and doctoral candidates. Academic Board may allow institutions to admit applicants without any entrance examination provided that the applicants have successfully passed the state matriculation exams. There are also existing easier terms and conditions for enrollment.	Government determines the maximum number of students in each tertiary education institution annually
CZ	7.5	Secondary school-leaving exam and entrance examination by tertiary education institution	No. However, Ministry negotiates with representation of HEIs each year the number of students that will be included into the formula funding which influences the amount of public funding to the individual HEIs that year for teaching activities. HEIs have the right to admit students beyond the agreed numbers, but usually the number of students admitted is based on the amount of available state funding.
DK	7.0	The available places are divided into two quota systems: (i) 90% of all places on the universities are distributed on the basis of the grade average in the Danish and equivalent upper secondary school leaving certificates and (ii) 10% of places are given to applicants on the basis of individual assessment by the institution. Admission to programmes in certain fields such as art and music requires an entrance examination based on talent.	Possible in certain fields of study (medicine, odontology, veterinary medicine, bachelor in public health, human biology and chiropractic)
DE	2.8	Certificate of entrance qualification (under half of all courses have no entry restrictions)	Yes. The number of applicants exceeds the number of places available for about half of the courses. These courses can vary from semester to semester (in 2008/2009: medicine, veterinary medicine, dentistry, pharmacy, biology (Diplom courses) and psychology (Diplom courses)).
IE	5.5	Leaving Certificate examination at the end of secondary school. The majority of institutions have developed entry routes and quotas of reserved places for mature students.	Medicine, architecture, pharmacy, veterinary and dentistry
GR	1.7	Exam organised by Ministry of Education	Yes
ES	10	School leaving examination	Medicine
FR	2.8	Universities are open to all with school leaving examination but a very selective exam takes place at the end of the 1st year of the medical tracks; University Institutes of Technology, Higher Technical Education and <i>grandes écoles</i> have previous selection procedures in place.	Medical and paramedical professions, teaching and public administration
IT	3.7	School leaving examination	Numerus clausus in medicine and surgery, dentistry, veterinary, architecture and primary education services.
CY	:	Exam organised by Ministry of Education	Yes
LV	:	Certificates and diplomas of the general secondary education or vocational secondary education. However, the higher education institutions are free to set specific admission requirements, e.g. additional subjects that need to be taken at the school level to qualify for admission to a particular programme.	The number of state budget study places is limited; higher education institutions have the right to set extra study places with a set study fee.
LT	:		Government sets the number of 'student vouchers' to cover tuition costs and institutions are free to decide the numbers of students who pay tuition fees.
LU	:	School leaving examination	
HU	8.9	Results at a central test determine which students have State-funded study places; public funding follows the student so tertiary education institutions compete for these students	The Government specifies the number of students admissible to the first year of state-funded programmes. Higher education institutions decide on the number of fee-paying students according to their capacities concerning the trainings and staff, accredited by the Hungarian Accreditation Committee.
MT	:	Matriculation certificate	Medical studies, sometimes accountancy.
NL	1.3	Secondary school leaving certificate and higher education certificate	Medical studies and some courses in art and psychology
AT	2.8	Open to all with school leaving examination, additional exams for selected branches	Medical studies
PL	:	School leaving examination and exam organised by tertiary education institution	Medical studies
PT	3.9	Admission to state-run higher education level studies requires a secondary school credential given after twelve study years. This credential allows for the student to take a national exam organized by the state. Further admission criteria may be established by higher education institutions. Alternatively, an extraordinary exam process is available to anyone aged 23 or older. Admission to private institutions is at the total discretion of each school.	Yes
RO	6.6	Selection procedures in place as demand exceeds the number of places in a number of areas (e.g. geography or psychology)	Yes
SI	:	School leaving examination; plans to change and introduce an interview	Yes, at level of institutions
SK	6.7	HEIs are free to set the admission procedure (estimated number of admitted students, the minimum score for admission, evaluation of previous study results, etc.) Completion of secondary education is the minimum requirement for admission and law requires HEIs to choose a selection procedure that will ensure the admission of those applicants who have the best qualifications for participation in a given study programme.	No
FI	7.1	Universities select their students independently (taking into account grades in the matriculation examination and/or upper secondary school leaving certificate and/or results of an entrance examination set by the institution); some fields may place additional emphasis on other factors such as work experience, studies or practical training.	Yes
SE	8.9	The institutions have full autonomy to decide the numbers of students (within basic conditions for eligibility and specific qualifications required)	The Government determines the total number of study places by setting a ceiling on the total allocation of state funds based on the number of students. If the ceiling is exceeded, the institution can sometimes use funding from previous years (they may save 10% of the funding each year to be used at a time when the number of students is higher).
UK	6.7	Admission criteria by tertiary education institutions	Some areas (especially those connected to the major public sector professions e.g. medicine, or teaching)

Source: Commission elaboration on the basis of country fiches prepared by Member States

4.2.2. Staff policy

Staff policy covers the conditions for hiring and firing, as well as the ability to set wages. As in other areas, a diverse picture emerges.

Table 4-3 shows the main staff policy arrangements. The first column shows the staff policy indicator calculated by the OECD (which takes into account reforms implemented until 2005) and the other columns present up-to-date information, which allows qualifying the staff policy indicator when recent reforms have been implemented.

Only a few Member States have implemented reforms to give tertiary education institutions more autonomy on staff policy matters. A large number of Member States do not allow institutions the freedom to hire and fire. Academic staff are civil servants in a number of Member States, with very low probability to be fired. In Italy for example, institutions face constraints to hire the staff needed due to regulations in place. Furthermore, civil servant status often requires heavy procedures and may thus be an unattractive option. Reforms in Italy allow for the possibility to recruit academic staff by direct call on an exceptional basis.³⁵

In many Member States, pay scales are regulated by the Government. Therefore, even when institutions have autonomy to select staff, restrictions in their ability to set wages may hamper staff recruitment. In Sweden, the autonomy on recruitment also extends to setting salary levels. Many Member States have introduced some flexibility in the ability of institutions to set wages, e.g. bonuses and different *premia* are added to the main component of the wage, which is set by law. These are gradual changes within the systems and their effectiveness will need to be assessed.

Romania has reduced the autonomy of tertiary education institutions to decide on staff matters, introducing a fix wage schedule where there was the possibility to differentiate wages. Temporary versus permanent staff is an issue in a number of Member States (Spain, France). The 2007 law in France provides for a better remuneration of the temporary staff, especially for foreign teachers-researchers.

Wages are key to attract the desired staff, especially so for excellent Professors and researchers. However, they are not the sole factor and it also matters how attractive it is to work in tertiary education institutions. The peer review highlighted the experience of Luxembourg in creating a new University from scratch in 2003. High-level Professors recruited report that wages are an important factor, but not a decisive one and that they value the possibility to start new programmes in a flexible organisation.

Table 4-3 shows the main staff policy arrangements. The first column shows the staff policy indicator calculated by the OECD (which takes into account reforms implemented until 2005) and the other columns present up-to-date information, which allows qualifying the staff policy indicator when recent reforms have been implemented.

Table 4-3 – Staff policy

	Staff policy indicator	Hiring/firing	Wages	Filling of vacancies
BE fr	7.0	Autonomy within the framework of national employment laws	Wage scales	
BE vl			Wage scales with exceptions for top international researchers	
BG	:	Autonomy	The Council of Ministers adopts the rules to determine the remuneration of persons working at public higher schools.	
CZ	10.0	Autonomy	Autonomy	
DK	10.0	Autonomy	The Minister of Finance negotiates collective agreements on behalf of the public sector employers, including the universities. For employees (academic, technical and administrative staff) the collective agreements fix a base pay and the universities are free to offer both permanent pay supplements and one-off bonuses. For staff in high-ranking positions, the collective agreements fix the base pay and also a limit to the permanent pay supplements permitted on average. A one-off bonus can be granted without any limitations. The salaries paid to the employees are negotiated between the university and the employees trade union representatives. High-ranking academic staff, administrative and academic managers and similar high-ranking employees negotiate their own salaries with the university.	Professorships and associate professorships must be advertised internationally and assessment committees must be appointed.
DE	7.5	Länder civil servant status of Professors and Junior Professors (temporary status when they start, then for life)	Basic salary set by Länder; variable component negotiated by institutions based on performance (achievement bonus)	
EE	:			
IE	7.9	Autonomy within the framework of national employment laws	Approved levels of remuneration, fees, allowances and expenses (public colleges). However, there is an Agreed Framework between the universities and the HEA for departures from these levels in exceptional circumstances.	
GR	3.2	Civil servant status	Set by Ministry of Economy and Finance and Ministry of Education	
ES	4.9	Civil servant status (employed by the regional government)/ hired staff (hired by universities). Greater autonomy since the 2007 reform to choose staff.	For civil servants: the central government establishes single pay (basic salary, seniority, teaching bonus, research bonus) and regional governments set a bonus based on merit; for hired staff, the regional governments set pay scales.	Since 2007, on the basis of an accreditation based on merit.
FR	1.8	A variety of statuses with different recruitment schemes: 75% of staff are tenured civil servants, 25% are hired on a temporary basis.	A variety of compensation schemes; Compensation is based on a base salary, progress to different classes (based on merit) and to different grades (based on seniority). There are research and teaching bonuses and possible additional bonuses (on account of scientific excellence, administrative or teaching responsibilities)	Concerning permanent (tenured research lecturer) staff, recruitment procedures are based on competition between candidates previously registered on a qualification list. In legal, economic, political and management disciplines, a national competition (the "Agrégation") can replace local selection (both qualification list and competitive exams are open to foreign candidates). The recruitment of temporary teaching staff is the responsibility of the HEIs.
IT	7.9	Civil servant status, some private labour law contracts are possible	Regulated by law with biennial updates set in specific ministerial decrees according to results negotiated in other public sectors. Possibility for Non-State Universities to complement basic level set by ministerial decree.	By public competition regulated by law with reference to the composition of the recruiting commission and recruitment criteria.
CY	:	Regulated by the respective legislation for each public HEI	At public Universities and at public institutions of higher education, at non-university level, wages are set by the relevant scheme of service which is published in the Official Gazette of the Republic of Cyprus.	
LV	:	Autonomy	Autonomy	
LT	:	Teaching and research staff recruited through an open competition for a five-year term of tenure. An employment contract of unlimited duration should be established after a person won the competition for the same position for the second time. A performance evaluation of staff members shall be carried out every five years and a person who fails the performance evaluation shall be dismissed from the position.	Categories of salaries are defined according the qualification or level of administrative position and connected with the "basic monthly salary" set by the Government, as well as possible conditions of the bonuses and other extra payments related with particular achievements. Higher education institutions may decide within the limits of these conditions.	Open competition
LU	:	Private labour law regulations	Autonomy to set wages and incentive schemes	
HU	3.2			
MT	:	Universities have autonomy to hire/dismiss and decide nature and duration of the contracts subject to prior autorisation by the Ministry.		
NL	10.0	Autonomy	The branch organisations of the institutions negotiate periodically with employee-organisations over wages, resulting in collective labour agreements. The act on Higher Education (WHW) provides a salary-structure.	
AT	10.0	Autonomy	Autonomy; wages must be consistent with the "collective agreement" which functions as a minimum standard.	
PL	:	n.a.	n.a.	
PT	7.4	At public universities: civil servant status	At public universities: set and regulated by law	Through public competitions, with a national/ international scope.
RO	8.3	Difficult to dismiss full-tenured staff	set by fixed schedule	
SI	:	Civil servant status	set by salary system in Public Sector Act	
SK	10.0	HEIs are fully autonomous in concluding, terminating and amending employment contracts. The duration of contracts is restricted by law in some cases only.	Wage tariffs and levels, as well as bonuses and remuneration method, governed by Act on remuneration of employees performing work in the public interest governing. Performance-based incentives.	
FI	7.5	Employee status	Performance-based salary system in Universities	competitive (for permanent posts)
SE	10.0	Autonomy	Autonomy, salaries determined together with the teacher trade union. Salaries are not based on a scale and there is no direct link between years of employment and salary level, although more experienced teachers typically have a higher salary.	
UK	10.0	Autonomy within the framework of national employment laws	Wages set by Universities. A sector agreed national scale is used by the majority of universities below the Professorial level.	Autonomy within the framework of national employment laws

Source: Commission elaboration on the basis of country fiches prepared by Member States

³⁵ In the case of excellence and/or return to Italy from abroad in a brain drain programme.

4.2.3. Governance structures

Boards of Directors with external stakeholder membership are established, to take into account the needs of society in the formulation of decisions. In Luxembourg, the Board is composed with external members.³⁶ In Denmark, there is an external majority in the management board; in Austria, 40 to 60% of the Board are from the business sector, in Finland at least 40 % of the members of the board must be external (chair and vice-chair) outsiders in the Boards of Universities in Finland and in France 50% should be external.. A Financial Board supports decision-making and audits the execution of decisions in tertiary education institutions in Hungary (it is optional for non-public institutions). Very few Member States have autonomy to decide on internal governance structures. Sweden has notably taken steps to markedly increase the autonomy on internal governance in a recent bill.

4.3. Funding arrangements

Market-type mechanisms are introduced in tertiary education policy making, especially in the area of funding. Voucher systems have emerged in a few Member States, where governments require tertiary education institutions to compete for students. The model is an extension of the recommendation by Friedman (1962) to use market mechanisms in education; he proposed a system of *vouchers* where government funding flows directly to students and from them to institutions. His model was primarily aimed at basic education and he argued that the system would create more competition between institutions and would lead to a more efficient use of resources. Such model was extended to tertiary education in Hungary³⁷ and Latvia. Students compete for the State-funded places and institutions compete to attract students, because the State-funded places are allocated to the institution selected by the student.

Tertiary education institutions are increasingly competing for funding for academic research³⁸ across the EU, and States increasingly finance research projects. In many Member States, tertiary education institutions are funded on the basis of contracts or performance agreements, which use output targets such as completion rates. New funding arrangements cover more performance-based funding, more private sources, and the expansion of student support systems in some Member States.

Funding is an area of rapid change in many Member States. Traditionally, funding of higher education institutions was based on item budget. Most Governments have abandoned the practice and rely on block grants (lump-sum), so that education institutions have discretion to set the internal allocation of funds between activities, within compliance of government regulations. Most governments use *formulae* to determine the size of the block grant.

Table 4-4 summarises the main financing arrangements across EU Member States. The first column shows the funding rules indicator calculated by the OECD (2007). A number of Member States have implemented subsequent reforms of funding arrangements, which are not

³⁶ Board with external members are appointed by the Government, but are independent.

³⁷ In Hungary, State-funded and fee-paying study places follow the student, whether to public or private tertiary education institutions.

³⁸ In Finland, for example, more than half of research funding is based on competition.

reflected in the funding rules indicator. The next columns show funding rules currently in place. Column 2 "performance-based funding" provides qualitative information on the extent and modalities of performance-based funding. Indicators of the performance of tertiary education systems become increasingly important as performance-related governance measures take hold. Column 3 details whether Member States have a formula in place, and whether the formula is mostly based on inputs, on outputs or on a mix of the two. It also details which inputs and outputs are used in the formula – e.g. number of students, graduation, or proxies of quality such as rankings or indexes of scientific publications and/or citations).

Column 4 "Research funding" details the specific arrangements to fund research. Part is based on quality or performance indicators, and part is based on competition for research projects. Member States generally take into account the broad cost differences between different types of courses. The last column indicates the countries where evaluation has an impact on funding decisions.

Some countries introduced performance criteria gradually (Italy, where it concerns about 6% of total State financing), Romania had a fast evolution with 30% of the core funding determined by indicators and the peer review highlighted that the new funding arrangements have induced change in University management.

Table 4-4 – Funding rules

	Funding rules indicator	Performance-based funding	Input or output based formula	Research funding	Impact of evaluation on funding
BE fr			Mainly input- based (number of students)		
BE vl	5.8		Both, Very sophisticated rule with large number (and varying) of input and output factors	Allocation from the Community and Research Funds (lump sum and for specific projects)	
BG	:	The subsidy for maintenance cost of tuition is determined on the basis of the results of the assessment for accreditation	Input based	Allocation of funds directly from the state budget to HEI for research. Funds are also allocated to specific projects.	
CZ	4	5% of total public funding depends on qualitative indicators. Funding coming through the Development Programmes uses qualitative indicators as selection criteria.	Input is 85% of total financial amount. Output: 10%.	The allocation of institutional funds for research is based on HEI's results in R&D for the past 5 years. Part of the research connected with education and with students participation is funded as target-oriented by the Ministry of Education.	
DK	5.3	Performance-based allocation model taking into account a bibliometric research indicator, education activities, attraction of external research funds and number of PhD graduates.	Output based: exams passed and completion bonus (account for around 12% of funding) for each student finishing within the prescribed study period (+ 1 year in the case of Bachelors).	Refined bibliometric research indicator to be introduced in the period 2010-2012	
DE	5.2	Yes	Both (including the number of students completing courses within the standard duration, the total number of graduates, the volume of third-party funding obtained for research and the number of doctoral degrees awarded).	In addition to the basic financing from the responsible Land ministry, research staff may carry out research projects funded by third parties (currently around 8.4% of institutions' revenues). The German research foundation is the main body for the promotion of research, in particular basic research, at higher education institutions via grants to individual researchers or institutions. Education institutions also receive third-party funding from companies that contract them to carry out specific R&D work.	Yes. The court of audit of the Länder carries out an economic efficiency check and the Länder pay attention to the results of evaluation in the calculation of budgets.
IE	5.9	Performance funding will be incorporated into the core grant allocations. The Recurrent Grant Allocation Model to allocate recurrent funds to universities, where funding follows the student. Greater emphasis on competitive funding allocations which explicitly encourage collaboration (funding meets 50% of the cost of collaborative activities)	Input-based for teaching: formula based on student numbers and 'weighted' according to the level of education and the type of programme being taken. A further weighting in the formula is given for research students. About 25% of the core grant is allocated based on research metrics.	A high proportion of research funding available is allocated on the basis of competitive research proposals. In addition, 5% is top-sliced from the aggregate grant for all institutions and allocated as follows: 75% in proportion of Ph.D. and Masters research degrees awarded and 25% in proportion of research income per academic staff member, earned by each institution. Further consideration will be given to increasing the 5% top-slice over time.	
GR	4.6	State funding depends on 4-year academic-development programme prepared by Universities. It doesn't take into account particular parameters in isolation, it aims to make a global approach.	Input based formula including students, academic personnel, number of University Departments.		
ES	4.8	Performance indicators are included.	Funding is a regional responsibility. Generally it depends on student numbers and performance.	Two sources: autonomous regions allocate funds to HEI to cover research activities with a part depending on research results; funds allocated to specific projects through annual public competitions.	ANEP assessment influences research project funding.
FR	6.6	Yes, since 2009, 20% of funding allocation of higher education institutions is based on performance (graduate employment, quality of management, success rate at bachelor's level, evaluation by AERES)	Since 2009, 80% of funding allocation is based on the volume of activity (number of students present at examinations, number of researchers having published)	In 2007, the split for public research was: 77% budgetary allocations, 8% own resources and 15% contract resources.	
IT	5.2	Performance indicators are used, but most of the State financing is still allocated on an historical basis ("baseline" share: 95% of expenditure in the previous year).	Both. A "rewarding share" accounted for about 7% of the Fund for the Ordinary Financing with the best improvement based on indicators for teaching, such as students' achievement, and research (two thirds of the share). It approximately represented the 6% of total State funding. A "balancing share" depends on structural factors referring both to teaching (two thirds of the share) and research.	Scientific research is financed by State resources assigned to research projects of Relevant National Interest (in Italian acronym PRIN projects). The funding is on a competitive base at national level. The other main funding source comes from the European Union with reference to the participation to the so-called Programmi Quadro di Ricerca e Sviluppo Tecnologico, as well as Structural Funds.	The results from quality assessment on teaching and research exert an impact for the indicators used in both the balancing share and the rewarding one.
CY	:	No	Input based. 85% of the funding comes from the state.	Mainly on a competitive basis through the research promotion foundation and through a basic research budget to support the academic staff.	No

	Funding rules indicator	Performance-based funding	Input or output based formula	Research funding	Impact of evaluation on funding
LV	:	No	Both. There are also indexes of costs by subject fields.	Base financing that depends on the results of the previous year and open call project financing.	
LT	:	The number of financed third cycle students depends on the quality assessment of research		Public funding: 70% is institutional funding (of which 70% is core funding and the rest performance-based competitive funding) and 30% is programme-based funding.	
LU	:	Lump-sum funding; 4-year agreement with performance indicators	Output based: research output and citations (2 publications per year in full-time equivalents + 6 citations)		
HU	4.3	3-year agreement with performance requirements; normative grants to institutions and other grants through application		Research grants	
MT			Input based (remuneration of staff, the collective agreements in force and the number of staff)	Competitive basis	
NL	5.1	Lump-sum funding for research universities and universities of applied sciences	Mainly output-based	Three sources: public funding, competitive funding and other sources (EU, industry). Universities are free to allocate the government funds between research and education.	External quality assessment performed by NVAO is required to obtain funding
AT	5.5	80% of the available budget is distributed according to a performance agreement.	Both	The part of the core funding (75%) of universities can be freely allocated to research. Part of formula funding depends on the quality of research.	
PL	:	No	Input	Statutory funding is based on a performance-based model. Performance is assessed every 5 years	
PT	7.8	No	Input. Differentiation by scientific area.	Funding of R&D units depending on the results of the evaluation and number of PhD researchers; contractual funding of Associated Laboratories; competitive funding for R&D projects and researchers.	
RO	3.1		Mix, mostly input based: 70% of the core funding depends on student numbers (in full-time equivalent and adjusted by cost coefficient per teaching subject) and 30% on performance criteria and institutional factors (quality of teaching staff)		Currently, external quality assessments performed by ARACIS do not have impact on funding. A draft Law under discussion provides for an impact.
SI	:	No	Both; the formula includes a historical part	Competitive based: a public agency makes the selection of research programmes and projects to be financed by state budget. Educational and related research benefits from a lump sum financing.	
SK	2.9	Yes	Both; recent decrease of the weight of the number of students' in favour of the number of graduates; account is taken of the number of graduates of an institution registered as unemployed and students numbers are adjusted, in particular to take account of a qualification structure coefficient reflecting the qualification of academic staff. The largest share of State budget subsidies is still allocated on the basis of the number of students.	Research funding is divided into purpose-specific (through calls made by the Research and Development Agency; HEIs may also apply for financial grants from other agencies or obtain funds from research activities performed for the private sector and institutional (a portion of funds is provided under the Ministry's internal grant schemes, while the remaining portion is financed on the basis of the performance of HEIs assessed by a weighted list of indicators (scientific and research capacity, number of PhD students, number of PhD graduates, research funds from domestic grants, research funds from foreign grants, publication activity, artistic activity).	
FI	6.2	Performance management process for funding allocation: the targets and the resources needed are negotiated between the government and each university. Performance and quality indicators are included in the new formula based funding.	Both	Core funding formula for the allocation of State funding that takes into account quality and quantity of research. HEIs can also apply for competitive-based funding.	
SE	4.6	Yes	Both (number of students and number of students completing their courses)		Planned (draft Bill)
UK	5.5	No	Input-based. The rules evolve over time, but in essence funding levels are proportional to levels of student recruitment, with allowances for additional cost factors such as the higher costs of recruiting and retaining students from low socio-economic backgrounds, differential costs depending on study intensity and differential costs associated with subjects. Institutions are free to decide on how to deploy resources of the block-grant.	Allocation of research funds direct to the HEI by the State. In addition allocation to specific projects by Research Councils.	

Source: Commission elaboration on the basis of country fiches prepared by Member States

A number of Member States (Bulgaria, Latvia, Lithuania, Hungary, Romania and Slovakia) do not provide public support to all the tertiary education students. In Hungary and Latvia, roughly 50% of study places are financed by the State while the remainder students are

subject to tuition fees. In Romania and Slovakia, the State typically subsidises study places for the normal duration period and if the student repeats one year, he or she will be required to pay tuition. Tertiary education institutions in a number of Member States require payment charges which are different from tuition fees, such as registration taxes.

More countries determine funding mainly or only on the basis of inputs such as the number of enrolled students, e.g. Belgium (Francophone Community), France or Slovenia. In some countries using both input and output criteria, such as Belgium (Flemish Community) and the Netherlands, output funding is typically more dominant than input funding while in Sweden the input and output criteria are essentially equivalent. German Länder use both output and input indicators in funding e.g. the number of graduates. In the United Kingdom and Ireland, output funding is not used. The United Kingdom allocates funds on a historical basis, independent of the number of students or output criteria. However, funding is negotiated with institutions and based on budget forecasts which reflect increases in enrolment, so there is an element of input funding. In recent years, the emphasis on output and performance in teaching and research has increased in the United Kingdom.

The accuracy in the formulation of key objectives is capital for the effectiveness of funding instruments based on objectives. Funding in Denmark has the largest emphasis on output. Danish education institutions receive funding depending only on the exams passed by students (the so-called 'taximeter model') and a completion bonus for each student finishing within the prescribed study period (+ 1 year in the case of Bachelors). The 'taximeter model' is *constantly* reformed. Furthermore, the example of Denmark illustrates that performance-based funding requires very close monitoring and frequent changes to maintain adequate incentives under changing conditions. Several models can be successful and a balance between input and output rules would seem important.

The peer review highlighted that several Member States have emphasised research performance, sometimes at the expense of teaching performance. For example, the United Kingdom has maintained a high quality of teaching while expanding the system, while the current emphasis in Spain is to enhance the quality of education, after a period of expansion of the tertiary education system. In France, many reforms have focused on improving research quality and a policy focus now on improving the success rate at University.

OECD (2010) presents information on the share of expenditure on tertiary educational institutions from private sources, e.g. households or private companies.³⁹ A general stylized fact is that the proportion of private investment in higher education has tended to increase in many Member States. The share of private expenditure in total expenditure (2007)⁴⁰ is largest in the United Kingdom (60%), Italy, and Portugal (30%). Private sources of funds account for

³⁹ Private funding of the best Universities in the United States comes from foundations, private firms, alumni and other sources, rather than from tuition fees, see comments by E. Duflo in the panel discussion in Jacobs and van der Ploeg (2006).

⁴⁰ Private expenditure on educational institutions includes all money transferred to educational institutions from private sources, including public funding via subsidies to households, private fees for educational services or other private spending (e.g. on accommodation) which goes through the institution (OECD, 2010).

20 to 30% in Poland, the Netherlands, Slovakia, Estonia Slovenia, and Spain and between 10 and 20% in the Czech Republic, France, Germany, Austria, Ireland and Sweden. In Belgium, Finland and Denmark, private sources of funds contribute less than 10% to the overall tertiary education expenditure.

Even where private sources of funding are relatively important, such as the United Kingdom⁴¹, public sources remain predominant. Most Member States acknowledge a need for increased private sources and provide incentives to attract them. Reforms to improve governance are also a way to attract private funding.

As regards contributions from households, tuition fees are one of the most controversial issues across the EU. Tuition fees are perceived as curtailing access, especially for students from disadvantaged socio-economic level. The experience of the United Kingdom shows a continuous increase in applications since the introduction of the fees (it should be noted that substantial grants have been introduced for lower income groups in parallel to the introduction of fees); furthermore, there are fewer students dropping out and fewer students in arrears of reimbursement of their loans. The experience of the United Kingdom illustrates the role of *alumni* in private funding.

The peer review of Luxembourg identified insufficient access to tertiary education by socio-economic level. The root problem is not financial (as there are no tuition fees and a well-developed, means-tested system of loans and grants is in place), but rather a problem of drop-out at secondary level of education and an issue of cultural awareness within few communities. The experience of Ireland shows that those who benefit most from loans and grants are the "in between" groups, and not the less privileged. Similarly, the lower-middle class benefited most from the abolition of tuition fees in 1985.

Member States tend to charge tuition fees to part-time students only (in Slovenia, the students who did not obtain a sufficiently high score in their school leaving certification have a part-time student status subject to tuition fee), or to students who are working (Denmark). Many Recently Acceded Member States (RAMS) fund a number of study places while the rest are fee-paying. Tuition fees were discontinued in Ireland and, more recently, in Austria.

Five years ago, there was a shift of the burden from students to graduates in the United Kingdom. As a result, taxpayers are paying more. The current system is costly and a review on fees is currently underway in England, as promised when fees were introduced. The Scottish Government is committed to making education free for all Scots and has ruled out any reintroduction of tuition fees. France is considering the introduction of income-contingent loans. The Netherlands have a system of both income-contingent loans and grants and are considering the partial replacement of grants by income-contingent loans. Institutions gain greater latitude with financial matters (donations, income from capital and business activities). There are many initiatives to encourage research collaborations between institutions, as well

⁴¹ The United Kingdom has a very diverse sector in terms of funding by public.

as between Universities and private companies. France, Finland, Portugal⁴² and Italy have introduced the possibility to create Foundations, to provide greater flexibility for education institutions to attract private funds, but the impact cannot be estimated yet. In Germany, Universities are allowed to found enterprises or endowments, to exploit patents and to receive donations. Tax breaks and trust funds are also introduced to encourage investment or donations by the private sector (Malta, France).

There is a trend to allocate research funding on a competitive basis, and research is possibly the area where the introduction of market and competitive elements has gone furthest. For example competition-based science fund operates in the Netherlands.

⁴² In Portugal, the regime of public Foundations governed by private law can bring the following advantages: borrow and raise funds without the interference from the state; own buildings, equipment and other financial assets; full control of budgets to achieve objectives; set internal administrative and management procedures; set academic courses and evaluation procedures; employ and dismiss academic and other staff; and set salaries and other remuneration and reward systems.

Table 4-5 – Private provision of funding

Business contributions	Public funds available for all public and private TEI	Tuition fees	Tuition fees differentiation	Students' loans	Grants	Types of grants (merit / means tested)
Not significant	No	Discontinued	Only exist for students who take longer than the minimum studying period plus two semesters to finish the course.	N/A	Yes	Both
		Yes, small part of TEIs budgets	Reduced for low revenues	Yes No	Yes	Both
Lack of diversified funding sources. Business contributions not significant.	N/A	Yes	Determined by the Council of Ministers but can vary according to the speciality.	In some circumstances, students can take a credit for payment of tuition fees. Since 2008 there are state loans granted to students.	Yes	Both
Not significant in total funding but for the last 2 years 20 programmes of business incubators are running with the involvement of universities under the financial support of the central government	No	Yes. 13% of the income.	Only for postgraduates (tuition fees for undergraduates are paid by the government). There are no variation between faculties but may occur between study programmes.	There are loans to excellent high school graduates who pursue studies at the higher education level.	All students in accredited programmes in Cyprus and abroad receive an annual grant.	Both
Weak (0.4% of total income) because there is no control of the money donated.	Private HEI are only entitled to public funding for research.	No	No	No	Yes	Means tested
Very significant		Partly (in some Länder only)	No	Interest-free loans (half)	Grant (half)	Means tested
The proportion of public expenditure in HEI represents around 96%	Yes. Tuition at Danish public and most private HEI is free for all EU/EEA and exchange students.	Higher education is free of charge for all EU/EEA and exchange students	No tuition fees	Students are offered supplementary state loans that represent 1/3 of total support. Even if students are no longer eligible for the grant are still entitled to the public loan.	Grants are given to all students in higher education during the prescribed duration of the study programme + 12 months and a maximum of 70 grants in the case students change courses. Grants represent 2/3 of total support	For all students. Students living with their parents receive half of the amount for students living alone. Extra monthly grants are available in cases of sickness and childbirth.
Small	Not for private HEI.	Yes. 18% of total costs.	They are defined by regional authorities within a range determined by the central government.	For masters and doctorates there are zero interest rate loans that have to be paid in 15 years. A system of ICL for Master's degrees was just launched.	There is an income based system of grants but with low levels of coverage. Responsibility of central Government, 0.08% of GDP.	Both
Corresponds to 5% of the Universities expenditure. Non public funding represents 36% and is expected to rise in the future. Fixed-term rise in the maximum tax-free corporate donations to universities.	All universities are public. Nothing is mentioned in what concerns privately run polytechnics.	No and no plans to introduce tuition fees	There are fees in certain Master's programmes for citizens of non-EU countries.	Yes. Payment is guaranteed by the State but everything else is determined between the bank and the student. Payback is usually twice the duration of studies. It is also valid in studies abroad.	Study grant and housing supplement.	Means tested by student's own income.
6.7% of total expenditure for higher education	For private institutions: only those with State recognition	Yes, except a few <i>grandes écoles</i> where students have to work for the State during a period after graduation	Yes, ranging from about 200 EUR per year for a Bachelor's diploma to about 7,000 EUR per year in a private business <i>grande école</i>	Yes but only in a few private business <i>grandes écoles</i> (unsecured internal loans repayable after completion of studies). Recently, bank loans with attractive interest rates and partial State guarantee.	A 2008 reform aims to extend the benefit of grants based on social criteria to 50,000 additional students.	Both
Insignificant	All HEI are legal entities of public law, fall under the supervision of the state and are State funded.	No tuition fees except for some post-graduate programmes, Hellenic Open University and International Hellenic University.	No	There are interest free student loans granted under certain conditions	Yes	Merit grants through participation in appropriately designed exams. And housing benefit for students from low income families.
		Yes	There are state-funded students and fee-paying students. Fee-paying students have a duty to pay tuition fees and other type of fees for special services listed in the law.		Bursaries	Students' allowances available based on academic achievement and social status of students
Small		Abolished in 1985.			There are a broad range of bursary or scholarship schemes in operation. The maintenance grant is the main source of financial help available from the Irish State for students in full-time Post Leaving Certificate Courses (PLCs) and full-time higher education undergraduate/postgraduate courses. Support is available to eligible students in most colleges in Ireland as well as eligible Irish students in many colleges in Northern Ireland, the UK and other EU States. For eligible students, the maintenance grant is there to help with the various costs of participating in further or higher education. In the academic year 2008/9, 33% of full-time undergraduate students were in receipt of maintenance grants.	Schemes are available which are specifically targeted at students with limited means, students with disabilities and students from minority ethnic groups. Family and/or personal income is a key factor that will be assessed when a student applies for a maintenance grant but there are also some other conditions.

	Business contributions	Public funds available for all public and private TEI	Tuition fees	Tuition fees differentiation	Students' loans		Types of grants (merit / means tested)
IT	Small	Yes, but non-State Universities do not rely very much on State financing and tuition fees are the fundamental part of their revenues.	Yes (13% of revenues)	They can vary depending on the scientific field and increase with the student's family income	Not well developed. Easy term loans and special loans for best performing students recently introduced.		Scholarships are on a competitive basis with takes into account both merit (student's performance) and the economic and wealth situation of the family
LT	Earned income (excluding tuition fees is about 7%-8%).	Yes	Yes (17.8% of the total budget of HEIs). Dual system where some students pay fees while the study of others is fully covered by the State	Level is defined by Universities	Yes. State supported loan system, students can choose between 5 commercial banks and there is a cap for the interest rate.	Yes	Both. Its amount is defined by the HEI in the case of merit grants and by the state for social grants.
LU	Increase in private funding should come mainly through industrial sponsoring		No				
LV	Funding of study programmes, infrastructures and provision of practice places. Private funded study places and other private funds are increasing	Yes	Yes.	Only full-time studies in field of national importance and study programmes with high expenses are financed through state budget.	Yes. For part-time students loans can only be used to pay tuition fees. Given by credit institutions, there is a tender for the interest rate but the part above 5% is paid by the state. Students start paying 1 year after graduating.	There is financial support for students who chose a certain study programmes.	Only students who have grades not lower than 4 can receive grants in the study programmes financed by the state. Priority is given according to a means tested criteria.
MT	n.a.	n.a.	Yes for: private TEI, some public TEI part-time undergraduate programmes, some public TEI postgraduate programmes, non-EU students at public TEI	Yes for: private TEI, EU/EEA and non-EU students, full-time and part-time programmes and depending on study programme	Yes for: studies abroad, studies in Information and Communication Technology	Yes for: studies at undergraduate level at private TEI in Malta, studies at undergraduate level abroad, studies at postgraduate level in Malta or abroad.	Both. At Undergraduate level: means tested (allowance for Gozitan students in Malta). At Postgraduate level: merit based selection higher grants for priority areas in Science and Technology means tested (allowance for Gozitan students in Malta; travel allowance and allowance for accompanying spouse / child during studies abroad).
NL	24% for universities. 7% for UAS	Yes	Set by Government. Account for 6% (research HEI) and 18% (UAS) of total budget	Only for a few specific programmes	Yes, conditional student loans to students aged below 30.	Yes. Students below age of 30 are entitled to basic grant. Also grants to institutions for research programmes.	Universal complemented by means tested grants for families with lower incomes
PL	HEI can operate academic business incubators and technology transfer centres and they can function as a commercial partnership. However, earned income is only marginal.	Private HEI can apply for State-budget subsidies in limited degree.	Are about 15% of revenues (mostly coming from part-time and doctoral programmes).	N/A	Only offered by commercial banks.	Yes	Means tested. There are also special grant schemes for mathematical, natural and technical faculties.
PT	Not significant	Not for private HEI.	Yes. 10%-12% of total financing.	Institutions have autonomy to set fees within a limit set by the State	Yes (they are not income contingent)	Yes. Received by 21% of students.	Both (merit grants are not means-tested; they can be accumulated)
RO	University enjoy autonomy and flexibility in contracting research or other sources with industry and can spend this additional funding according to university autonomy.		Both public and private universities may levy tuition fees, however, public universities have a number of state-funded places for students	Tuition fees by state universities can be charged for students enrolled in addition to those who are supported by the state budget and other students who exceed the prescribed number of academic years assigned to particular study programs, by law or Government decisions (i.e.: repeat years et.) or did not succeed in passing the examinations.	The Agency for Student Loans has been created in 2009, no loans yet awarded.		
SE			No. However, the Government considers that citizens from other countries – 'third country students' – should pay a fee for their higher education as of the autumn term 2011.	Tuition fee for 'third country students' as of the autumn term 2011	The study aid system offers grants and loans to all students in tertiary education and also at other levels of education (for example upper-secondary and adult education). The system is administered by a government agency (CSN) and the cost of the system is covered through the state budget. Study aid consists of a grant and a loan. The amount is designed to cover living costs as well as study related costs. The study loan is an annuity loan with a maximum repayment period of 25 years, or up until the year in which the borrower is 60 years old. The annual amount repayable depends on the total amount borrowed, current interest rates and the length of the repayment period. The loan system is state funded with special safeguards for the students. In general, the annual repayment amounts to 5% of the borrower's annual income. At the age of 68 outstanding debts will be written off.		The study aid system offers grants and loans to all students in tertiary education. The financial situation of the parents, spouses or cohabitants of students does not affect their possibilities of receiving study assistance. However, there is a ceiling to the amount they may earn without reducing the amount of grant and loan, albeit high in an international comparison
SI	N/A	Yes, for private HEI with concession	Yes	Only for part-time students		Yes. For postgraduate students	Merit based
SK	HEIs have numerous possibilities in this area (e.g. revenues from the provision of further education, conducting practical research) but they are not using them very actively yet.	Private entities are only entitled to a state budget subsidy to ensure the statutory entitlement of their students to social security (provision of social scholarships). Private HEIs may also apply for subsidies for study programmes, institutional research or their development, but have no legal entitlement to them.	A small number of places is financed by tuition fees and these fees do not account for a significant part of revenue of public institutions.	Tuition fee only applies to students whose length of study exceeds standard duration and to students attending certain part-time study programmes (as decided by HEIs).	Loans from non-governmental special purpose fund.	HEIs receive funds for social scholarships which are granted on the basis of income; as part of a social assistance subsidy, HEIs are provided funds for incentive scholarships that may be granted to best-performing students	Both
UK	Around 30%	Not for private TEIs	Set by TEIs within a cap set by Government, differentiation possible but in practice fees tend to be set at the cap; a review on fees is currently	Differentiation is possible below a cap set by Government, but in practice most Universities charge the cap.	Yes. Loans available to finance the tuition fee/ for maintenance/ for less affluent students.	Scotland will replace loans by grants in 2010-2011.	Bursaries by Universities for students with lowest incomes.

Source: Commission elaboration on the basis of country fiches prepared by Member States

4.4. Accountability

Governments have increasingly required tertiary education institutions to account for their performance and expenditure, hand in hand with their increased autonomy to decide. Evaluation is intended to promote quality assessment and in so doing encourage the creation or maintenance of quality assurance processes in higher education. It is also intended to provide students and their families, society at large, university administrations and government bodies with information on the quality of university education and its future

plans.⁴³ Internal/external evaluation systems are in place in most Member States. Typically, the results of the evaluation have no impact on funding decisions, except in some German Länder and Italy.

The evaluation indicator computed by the OECD in the first column of [Table 4-6](#) covers the type of evaluation (whether it is carried out by an independent agency, whether stakeholders are involved in the evaluation) and the public availability of evaluation reports. The other columns present information in more detail, in particular whether the evaluation includes a self-evaluation and an external evaluation, whether the reports are made public, whether the evaluation results have an impact, for example on funding arrangements and finally whether there are specific arrangements to increase transparency of the performance of tertiary education institutions.

Most Member States have established an independent agency. The evaluation results have an impact on subsequent funding decisions in a few cases and very few Member States have specific arrangements in place to enhance the transparency of performance.

⁴³ OECD definition, see <http://www.oecd.org/dataoecd/18/46/41014632.pdf>.

Table 4-6 – Evaluation

	Indicator	Self-evaluation report	External evaluation	Reports are public	Impact of evaluation
BE fr	5.4	Yes	Yes; analysis of the self-assessment report by an independent agency		
BE vl		Yes, required for accreditation	Yes, compulsory every 8 years		Impact on funding
BG	.				
CZ	6.6				
DK	4.6				
DE	6.9	Yes	Compulsory since 1998, often with international participation and inclusion of student evaluation	Yes	Impact on funding
IE	6.7	Universities have established and implemented procedures for quality assurance, and arranged for a review of the effectiveness of these procedures. The Irish Universities Quality Board (IUQB) was established by the universities to increase the level of inter-university co-operation in developing quality assurance procedures and processes, in line with best international practice and to facilitate the conduct of reviews of the effectiveness of quality assurance procedures and their outcomes.			
GR	2.3				
ES	6.5	Yes, based on guidelines provided by the Council of Universities	Yes, since 2007 there is a central Quality Assurance Agency and 11 regional agencies	Yes	Program evaluation has an effect on the accreditation of the programmes offered by universities; research and teaching evaluation has an impact on hiring and bonuses
FR	5.6		Yes, it concerns both institutions and researchers and is led by an independent agency (AERES created in 2006)	Yes on the AERES website	The evaluation process is too recent
IT	6.8		Yes, since 2001 for research projects and 1999 for teaching activities. Evaluation is currently carried out by two consultant bodies of the Ministry of Education, University and Research. Newly established agency will start work after the current evaluation process is completed.	Yes, online publication of annual reports and research projects evaluation	The results from quality assessment on teaching and research exert an impact for the allocation of State financing to State universities. Draft Bill under discussion proposes to enhance the feedback from evaluation to funding.
CY	.				
LV	.		Every 6 years		
LT	.				
LU	.	Yes	Yes (combined for teaching and research); assessment by international committee with student involvement	Yes; discussed in Parliament	Yes, evaluation is done 1 year prior to the conclusion of the 4-year plan and the lump-sum is influenced by the evaluation results
HU	8.3	Medium-term plan for institutional development (4 years minimum)	Every 7 years	Yes	
MT	.		Agency to be established in 2010		
NL	7.5	Yes, required by the national agency for accreditation. The self-evaluation is an input for the external evaluation	Compulsory every 6 years. Is an input for accreditation by national agency for accreditation	Yes	Impact on funding
AT	5.1		Every 3-4 years		
PL	.		Every 5 years	Yes	
PT	4.6				
RO	5.3		Yes by an independent Agency every five years		
SI	.		Every 7 years		
SK	6.5	Yes but they are not linked to the external evaluation process	Yes by Accreditation Commission which is an advisory body to the Government	Yes	Requirements are not binding for Universities
FI	4.0	Universities have their own quality assurance systems; many universities regularly organise international evaluations	Yes (by Finnish Higher Education Evaluation Council)	Yes	
SE	6.5		Yes	Yes	
UK	7.7		Yes by external quality assurance agencies (for England and Scotland/ Wales); professional bodies participate in the external audit of institutions.	Yes	Impact of quality assessment on funding

Source: Commission elaboration on the basis of country fiches prepared by Member States

Table 4-7 – Strengths and weaknesses

	Strengths	Weaknesses	Challenges	Opportunities
BE fr	Organisational autonomy			
BE vl	Performance-based funding			
BG	Systems for assessment and maintenance of the quality of education and of the academic staff within the universities that take into account students' opinion	System fragmentation; lack of balance between autonomy of universities and the level of control exercised by the state; Lack of diversified funding sources; inefficient system for funding and allocation of the state subsidy; weak connection with the labour market	Ageing academic staff	
CZ	Interconnection between education and R&D activities	High rate of failure to complete studies; large inequalities in the chances of achieving higher education and in the barriers of entering tertiary education.	Loss of talent, rapid increase in the number of students entering TEIs	High private returns to investment in tertiary education
DK	Well established output-based funding and careful follow-up to avoid grade inflation	Length of studies	Improve incentives to enrol (interactions with labour market policy) and to complete tertiary education	
DE	Significant third-party financing (20 to 30% of academic staff carries out research financed by third-party, which accounts for 8.4% of institutions' revenues)	Small number of graduates per student	Ageing, future lack of highly skilled labour supply (Mathematics, Science, Technology)	
EE				
IE	Basic flexibility and autonomy of tertiary education institutions (tradition); Strong quality assurance culture		Creating places for more students (due to rising population and expanding access) with fewer resources	
GR	Increase of autonomy and accountability	Legacy of administrative centralisation	Respond to excess demand for study places; dispersion of various academic schools and departments across the country	
ES	Equitable provision (also across regions); high rate of young population with tertiary education attainment; homogeneous and objective entry tests at national level	Below average in excellence of research and linkages with the labour market; low mobility of students and academics; low graduation rate	Enhance quality of education; as regards incentives: limited incentives to motivate tenured Professors; dual market for teachers; expand grants and loans; internationalisation; improve transfer of knowledge and linkages with firms; as regards demography: ageing of professors; drop in the number of students, especially in science; promotion and better integration of vocational training institutions	Mergers and strategic partnerships among universities promoted in the University Strategy 2015; continuous quality assessment of programmes.
FR	Relatively high rate of graduates per students enrolled, on of the highest numbers of scientific diplomas per capita in the 25-34 age bracket	Dropout rate in Universities, lack of private funding.	Improve the information at secondary level courses; reduce reorientation, repetition and dropout rates. Improve the educational and research quality.	Recent reform to improve evaluation, autonomy (capacity to create Foundations, more autonomy to set financial incentives and recruitments (2007 Universities Freedom and Responsibility Act and following Decrees) and to encourage grouping of higher education institutions and research centers (2006 Programme Law for research)
IT	Theoretical preparation, very high level of accessibility, low tuition fees	Ageing of academic staff; State Universities lack the autonomy to affect the labour cost; absence of medium-term plan for researchers discourages to undertake an academic career; large dropout and average length of studies; high unemployment figures among population with tertiary education attainment.	Long-term financial sustainability of the system, also related to the ageing of the academic staff and the introduction of turn-over for new entrants	Rationalisation process of Universities to create research excellence
CY				
LV	Wide range of study programmes; high motivation to study	Balance of higher education institutions autonomy and accountability; state financing in higher education decreased (economic crisis effect)	Academic staff ageing	

	Strengths	Weaknesses	Challenges	Opportunities
LT	Wide range of study programmes	Extensive network of HE institutions poses administration challenges, insufficient teaching/learning facilities and human resources		
LU	Internationalisation; good funding	Young system/ not enough school leavers with secondary education level	Ageing: future needs for certain categories (doctors, engineers...)	Tertiary education remains a priority despite the crisis
HU		Length of studies		
MT	Speedy conclusion of graduation	Early school leaving limits the number of young students		
NL	High degree of autonomy of institutions and large peer network across the world; for universities: education and fundamental research, valorisation of research, and advantages of scale (universities); for universities of applied sciences: relatively small size		Massification (research universities); disadvantages of scale and professionalism of management (universities of applied science)	
AT	Autonomy, performance funding	Labour contracts are not homogeneous across/ within universities; lower ability to control within the 3 year period (= performance agreement period); limited contribution by private households/students	Massification	
PL	Autonomy of institutions	Weak connection with labour market		High private returns to investment in tertiary education
PT	Large expansion; diversification of funding; strong investment on research and improvements in research output and internationalization	High variability of returns to education; Limited offer of lifelong learning, despite the low level of qualifications of the labour force; lack of financial planning and degree of uncertainty		High private returns to investment in tertiary education
RO	Generally high qualification of most of the academic staff	Relatively low absorption of young teachers and a lack of flexibility in terms of recruitment, due to relatively lower wages and an underdeveloped system of incentives, the staff takes on a relatively big load of teaching, leaving little room for their mentoring or research activities.		
SI	Autonomy of institutions	Salaries set by public sector	Large numbers of students (interaction with labour market policy)	
SK	Autonomy of institutions	Perverse incentives in the system. For example: criteria for the award of the professor title are strict but the assessment is done by a Scientific Board whose existence may depend on whether it has a professor in a given field of study. Funding rules provide incentives for HEIs to have the largest possible number of students and graduates. Trade-off between ensuring sufficient performance of educational activities while maintaining the quality of education provided to the graduates. Incentives to the quantity of publications rather than their quality. Internal education quality assurance systems should be developed and linked to the existing external system.		
FI	Autonomy of institutions	Length of studies	Large numbers of students	
SE	Basic flexibility and autonomy of tertiary education institutions; strong connection of education to research; high participation rate and increased participation by underrepresented groups; lifelong learning is an important part of the HE system.	The governing and funding system has a focus on quantity and includes no clear economic incentive to raise quality; the participation in subjects/programmes according to gender remains segregated.	Need to increase cooperation among HEIs	
UK	World-class research; basic flexibility and autonomy of tertiary education institutions (tradition); mature students; progress in narrowing social gaps; high levels of satisfaction among students		How to maintain and exploit research excellence; public funding of education to be reduced after the crisis.	Tertiary education remains a policy priority

Source: Commission elaboration on the basis of country fiches prepared by Member States and peer reviews

Table 4-8 – Selected good practices identified during the peer review

	Good practice examples
DK	High transparency and openness in hiring: international advertisement compulsory and assessment committees must be appointed.
DE	Strong system of support for research
DE	Increased permeability between vocational and higher education.
FR	Publication of statistics on exams success is compulsory
LU	Open access without secondary school leave diploma if prior learning is deemed sufficient
HU	Some tertiary education institutions conduct detailed surveys concerning the career of their graduates, and publish summaries of such surveys.
MT	Secondary school leave diploma is not necessarily required for mature applicants
SE	The Swedish National Agency for Higher Education organises national surveys to collect the opinions of first, second and third-year students as well as teachers about higher education. The Student mirror is a national survey intended to find out which aspects of higher education are experienced by students as positive for their educational and personal development. The Postgraduate Student Mirror is a survey of various quality factors in doctoral programmes. The International PhD Student Mirror is a survey that adopts an international perspective on doctoral programmes. The teacher survey is a questionnaire survey of teachers at higher education institutions in Sweden.
UK	World class research activities enable institutions to develop and deliver high quality teaching and to attract international funding
UK	The Higher Education Academy to promote best practices in teaching
UK	Many institutions work with subject expert academics, employers, and a range of professional, statutory and regulatory bodies when developing and evaluating courses. Feedback of students contributes to ensure both quality of teaching and student satisfaction

Source: Commission elaboration on the basis of country fiches prepared by Member States and peer reviews

4.5. A typology of tertiary education systems

The OECD (2009) provides a typology as regards approaches to funding tertiary education, with a focus on tuition fees and student support systems and identifies the following groups of countries⁴⁴:

- Denmark, Finland, Sweden and the Czech Republic have no or low tuition fees and generous student support systems;
- The Netherlands and the UK have higher levels of tuition fees and well developed student support systems;
- Austria, Belgium, France, Ireland, Italy, Portugal and Spain have a low level of tuition fees and less developed student support systems.

This typology can be used as a basis to expand on additional elements, such as public expenditure per student, efficiency results, and autonomy as regards staff policy and budget, see [Table 4-9](#).

⁴⁴ We only take into account EU Member States.

Table 4-9 – Selected elements of tertiary education systems

Public expenditure per student	Public expenditure as a % of GDP	Tuition fees	Student support systems	Autonomy staff policy	Autonomy budget	Efficiency (St. Aubyn)	Specialisation (St. Aubyn)
Above EU average (7,000 EUR PPS) LU FI IE FR BE DE SE NL CY AT DK	Above 1.5% of GDP EE CY PL PT FI	No or low DE DK FI SE CZ AT BE FR IE IT PT ES	More generous DE DK FI SE CZ UK NL	High DK CZ NL AT SK SE UK	Higher BE DE IE IT NL AT PT FI FR DK UK	Higher UK IE NL FI SE BE AT DK FI	Research AT SE NL FI DK BE DE
Between 5,000 and 7,000 EUR PPS IT CZ PT ES UK	between 1 and 1.5% of GDP CZ DK IE LT SI SE	Higher UK NL	Less developed AT BE FR IE IT PT ES	Average IT IE FI PT BE DE RO	Lower CZ GR ES HU RO SK SE	Middle DE FR CZ IT MT	Teaching IE FR BG PT PL RO MT CZ HU
Below 5,000 EUR PPS BG PL LV LT RO SK EE HU SI GR	below 1% of GDP BG DE GR ES IT LV LU HU MT AT UK			Low GR ES FR HU		Lower SK PL ES PT HU BG EE LT LV GR	Both UK GR ES SI

Source: Commission elaboration

The following groups of countries can be tentatively identified:

- Denmark, Finland, Sweden: no or low tuition fees, generous student support systems, above average public expenditure per student, high staff autonomy and, according to the study by St. Aubyn, relatively high efficiency and specialised in research;
- The Czech Republic also has no or low tuition fees, generous student support systems, high staff autonomy, average public expenditure per student, middle efficiency according to the study by St. Aubyn;
- United Kingdom, Netherlands: higher tuition fees, well developed student loan systems, above average/high public expenditure per student, high autonomy and according to the study by St. Aubyn, relatively high efficiency;
- Germany: also well developed student support schemes and tuition fees in some Länder, and, according to the study by St. Aubyn, average efficiency and a system specialised in research;
- Austria, Belgium, France, Ireland, Italy, Portugal and Spain have above-average/average expenditure per student, no or low tuition fees, and less developed student support schemes; of which:
 - Ireland, Austria, Belgium: relatively high efficiency according to the study by St. Aubyn,
 - France, Italy, Portugal and Spain: relatively middle/lower efficiency according to the study by St. Aubyn;
- Bulgaria, Poland, Latvia, Lithuania, Romania, Slovakia, Hungary: relatively low public expenditure per student, study places are either State-funded or fee-paying, typically specialised in teaching and relatively low efficiency according to the study by St. Aubyn;
- Slovenia, Greece: low public expenditure per student (driven by numbers of students per capita well above EU average), relatively low efficiency according to the study by St. Aubyn.

4.6. Conclusions: mapping performance with institutions

The preliminary conclusions are as follows:

- *A great deal of variance across Member States:* there is a high variance in governance across Member States and different dimensions of autonomy and accountability are not necessarily correlated.
- *Tertiary education institutions in many Member States still operate under parameters which they may have insufficient autonomy to set, but they are expected to respond to changes in demand and engage in competition.* The majority of institutions cannot select students, so applicants who have passed the national exam may not be refused. Institutions in many Member States cannot dismiss staff easily, nor do they have sufficient ability to attract the academic staff of their choice. Subsidies per student and tuition fees are in most cases set by government.
- Important governance aspects shared by the best performers as identified by St. Aubyn (2009) concern *staff policy autonomy* and *financial autonomy*, as well as *more autonomy to select students and their academic communities*.
- Best performers indentified by St. Aubyn et al. (2009) in terms of efficiency of the system and quality of the outcomes grant basic autonomy and flexibility to tertiary education institutions (in particular United Kingdom, Ireland or Sweden).
- *Autonomous tertiary education institutions can contribute to educational attainment and research productivity in their countries*, within the right conditions, such as adequate levels of resources (public and private sources combined), financial incentives, sufficient ability to attract and retain qualified staff and sufficient capacity to meet demand.

5. Reform of tertiary education in the EU

Tertiary education is an area of intense reform activity. Changes in governance and funding in recent years took place in (virtually) all Member States. Most Member States have adopted new tertiary education acts and many are planning further changes. New laws are under discussion in Parliaments in a number of Member States (such as Italy or Romania), while reforms are underway in Malta.

A major area of recent reform is related to the implementation of the Bologna Declaration. Member States are gradually introducing a new structure of tertiary education: a three-cycle system with 1st cycle academic study programmes, 2nd cycle masters' study programmes and 3rd cycle doctoral study programmes. This has brought up deep changes and inspired reforms to introduce or amend quality assurance and accreditation systems across the EU. Most Member States have not yet reached the steady state and some changes are still expected. Beyond the Bologna agenda, however, there is a need to enhance the quality of education and research which is what ultimately matters for innovation and growth, and the public interest at large.

A Commission Communication in 2006 set a modernisation agenda, identifying among the main problems a tendency towards uniformity and egalitarianism, too much emphasis on traditional learning and learners, and not enough world-class excellence. The three main blocks of reform concern curriculum, governance and funding, and they are closely intertwined. The EU's research framework programmes have encouraged partnerships of tertiary education institutions across Member States (via networks and consortia), with a role for the EU for agenda setting.

The subsidiarity principle calls for a supporting role for the EU which takes the form of policy support and funding programmes, such as Erasmus. There are clear externalities arising from increasing mobility of students, especially in a set-up of public financing with limited private contribution from students.⁴⁵ The European Commission has launched a feasibility study on a pan-European loan scheme.

The rationale of Governments' intervention in tertiary education is closely connected to public nature of financing. There is a trend to shift from Government control to supervision of tertiary education institutions. A series of reforms have enhanced the autonomy of tertiary education institutions, and in parallel they have increased accountability requirements of institutions, which are obliged to produce plans and reports and undergo compulsory evaluation. There is a trend towards a division of labour: Governments are in charge of supervision while education institutions become gradually more autonomous in organisation, funding and personnel matters, albeit to a varying degree and speed across Member States. The underlying rationale is that tertiary education institutions are better able to steer their outcomes and performance than Governments.

It is however important to note that tertiary education reforms are driven by many factors, such as demographic change, competitiveness and a future lack of highly skilled labour. In a number of Member States, the inclusion of young from disadvantaged socio-economic background is also source of policy concern.

There is an increased emphasis on competition and new funding arrangements across the EU. Governance through agreement of objectives and evaluation of performance is also developing. Decision-making bodies are changing, for example with creation of University boards with external stakeholder membership. Most Member States would like to see more private contributions, from industry and/or from private households. Some Member States encourage research collaboration between TEIs, and between public universities and business, while others do not make it attractive in practice. The private contribution to tertiary education expenditure has expanded in most Member States. Its role was typically very modest a decade ago and it currently accounts for 5 to 30% of total investment in tertiary education. In some Member States, public and private expenditure have both increased (with a faster growth in private sources), while others have reduced the public contribution. For

⁴⁵ During the peer review, it emerged that small countries may have difficulties in specific programmes when many students move from other EU Member States, for example funding per student may turn out to be insufficient in the event of large inflows, there are difficulties in planning the delivery of education as well as the number of graduates who will stay or return to their home country after graduation.

comparison, the United States and Japan have increased both public and private expenditure (with a faster increase of private investment).

As regards funding arrangements, historically-based allocation systems are progressively modified into mechanisms with increased emphasis on outputs. There is a general tendency towards increasing autonomy of TEIs to make the internal allocation of resources between teaching, research and other expenses. There is also a development towards greater transparency and simplicity in funding mechanisms, for example using formulae to allocate basic funds. However, the elements included on the formulae and the formulae themselves vary substantially between countries, between fields of study within a country, and over time. Moreover, the impacts of this mechanism depend on whether it operates on an open-end or on a closed budget basis, and on whether input or output indicators dominate in the distribution formula.

Tertiary education reforms tend to emphasise the improvement of research performance. The economic literature identifies the risk that such improvements are made at the expense of the teaching activities of academic staff, which would constitute a market failure. The literature also stresses that teaching and research activities can be mutually reinforcing. The peer review highlighted that trade-offs between research and teaching activities can be identified in most Member States. Recently, a number of Member States have implemented policy measures to improve teaching performance. Indeed, the peer review also highlighted that recent reforms had a focus on accountability and staff policy, with less emphasis on students (dropout, length of studies, large ratios of students per academic staff).

6. Summary and policy conclusions

Tertiary education matters in many ways, beyond its impact on economic growth. This report however has a focus on what is most relevant for economic policy makers, and does not cover many of the policy areas of concern to education policy makers, in particular curriculum.⁴⁶ As shown in the brief appraisal of the lessons from the economics of education research in the first chapter of this report, economists have contributed both to education research and to education policy-making. It is however important that economists work together with the other major disciplines in the field of education, in order to maximise their contribution to the field.

Education accounts for a sizable share of public expenditure in most Member States. The research surveyed in this report overwhelmingly indicates that this expenditure is associated with higher economic growth (some studies estimating that an additional year of average school attainment raises productivity by 6.2% and by a further 3.1% in the long-run through the contribution of faster technical progress).

In 2007, the United States devoted 2.9% of their GDP to higher education, compared to 1.4% for the EU as a whole. Spending per student is roughly double in the United States relative to the EU (including public and private contributions) and 39% of people aged 25 to 34 years

⁴⁶ The curriculum is key in the motivation of students and the relevance of studies.

had completed a tertiary education degree, whilst the figure in the EU is 30%. A number of Member States recognise a strong need for highly qualified labour and a need for more people in higher education (in particular Luxembourg, Denmark, or Germany), and some have explicit policies to raise participation rates in higher education, such as Ireland with a target of 72% of entrants by 2020. Participation targets in Malta are also expected to require additional expenditure. Education is at the core of the Europe 2020 strategy, with a target of 40% for tertiary education attainment among the 30-34 years-old. Moreover, future costs of tertiary education are probably set to increase further (if only because technical progress lags behind other sectors in the economy - Baumol cost disease), ignoring future increases in enrolment which may come from very different age groups in the population.

The surveillance of public finances needs to encompass the quality of public finances, especially so since the economic and financial crisis and the need for budget consolidation across the EU. Increased scrutiny is required to monitor the efficiency and effectiveness of public expenditure and assist in assigning priorities. Many Member States are sheltering education from expenditure cuts. Germany has a target to raise expenditure on education and research to 10% of GDP by 2015, while other Member States have, or plan to, reduce public expenditure on education. Although the policy stance across the EU is diverse, the public finance situation increases the responsibility for increased efficiency, and effectiveness, of public expenditure on education across the board. Furthermore, it stresses the need to review private contributions and safeguard

With ageing populations, raising the productivity of the labour force will increasingly become the efficient way to maintain standards of living. Demographic changes would lead to a reduction in the working-age population in the EU as a whole after 2020, according to the projections in the 2009 Ageing Report.⁴⁷ This will act as a drag on growth with productivity becoming the dominant source of growth. Productivity growth becomes imperative with ageing populations, although it may not be sufficient and costs need to be cut and contained to safeguard sustainable public finances.

The peer review of tertiary education systems has highlighted many differences across the EU and showed that different models can be successful. The differences span across many dimensions and policy making also differs in so far as education policy is a regional matter in a number of Member States where there is not a single, national, tertiary education system, e.g. Germany, Belgium, or Spain.

There are also important similarities. Three main challenges are common to all Member States:

- *Mass opening versus quality*: how to support mass access to tertiary education, and an increasingly diversified body of students, while achieving excellence in teaching performance?

⁴⁷ See European Commission (2009), 2009 Ageing Report: Economic and budgetary projections for the EU-27 Member States (2008-2060), European Economy 2/2009.

- *Education versus research*: how to overcome the trade offs, and exploit synergies, between teaching and research. Ultimately, economic policy makers' concern is to ensure that students acquire relevant skills and that scientific production is vibrant, so that both can contribute to the economy and society as a whole. Policies to stimulate research excellence might lead to a neglect of students if the appropriate safeguards are not in place.
- *Autonomy versus accountability*: with public funding of tertiary education come a number of conditions. There is a change from Government's direct *control* to *supervision* of tertiary education institutions; how to strike the right balance between autonomy of tertiary education institutions and the accountability for their use of public resources?

A *measurement challenge* is that the indicators available are crude, but that some issues are too big to be ignored while waiting for more refined indicators. There is a compelling need to evaluate the impact of tertiary education, and to assess the efficiency, and effectiveness of expenditure. It is also necessary to assess what employers seek from graduates from tertiary education, as well as the validity of available measures of teaching quality. Measuring the quality of tertiary education is as challenging as it is important. Even within Member States, there is hardly any comparable information available on the educational quality of different tertiary education programmes and institutions. Current assessment methods are not fully adequate and a combination of information sources is warranted.

Comparative indicators are crucial to analyse the issues of performance, efficiency and effectiveness of public expenditure in tertiary education. However, they are not sufficient to conclude the discussions and they need to be complemented with detailed knowledge at the country level.

There are early and late reformers in the EU. Some of the best performers in terms of efficiency of tertiary education as identified by St. Aubyn et al. (2009), in particular the United Kingdom, Sweden, Denmark, and the Netherlands started reforms earlier than the others and are frequently adapting their steering instruments. Clearly, implementation of reforms takes time, for example awaiting vacancies to arise before an institution can appoint the academic staff desired. There may also be other rules and regulations in place which hamper the way tertiary education institutions can use the opportunities brought by regulatory changes to improve their performance. Results in terms of higher economic growth may take even longer time to materialise.

The findings of the peer review support that more autonomy and performance-based management matter for performance of TEIs in terms of teaching and research outputs. Though efficiency matters, it would be crude to conclude that *only* efficiency matters, dismissing the amount of spending as irrelevant. Similarly, adequate resources seem to be a necessary but not sufficient condition for efficiency of expenditure. Higher expenditure does not necessarily lead to better outcomes, as some institutional arrangements allow improvements in performance while others may hamper them. The literature suggests that

governance and funding seem to be complementary: the positive effects of funding on research performance (higher budgets per student, including public and private sources) are higher if institutions have a higher degree of budget autonomy. This suggests that reforms will be more effective if they are undertaken in a comprehensive way, rather than choosing certain components of reform only. Spending increases have to be carefully managed and should go hand in hand with institutional reforms. And there is more than one model of university system that appears to work.

Efficient spending matters for labour and total factor productivity. The analysis in St. Aubyn (2009) suggests that the link between the resources used in tertiary education and broader outcomes, like productivity, goes *through efficiency*. This is evidence in favour of the greater importance of efficiency in higher education spending, as it is not only a matter of public finance but also a way of promoting innovation and growth. Efficient spending also matters for employability. The employability of graduates increases where tertiary education is more efficient and this evidence is stronger when young graduates are considered. If we are concerned about economic growth, then the focus on quality of education and the acquisition of skills ought to be strong.

In the same way, inefficiency in spending in public tertiary education matters greatly in explaining economic performance, all other things equal. St. Aubyn (2009) finds an important number of Member States is operating under inefficiency conditions (South and Eastern European countries, France, Germany). Tertiary education systems in a core group of Member States are clearly more efficient, in so far as they present clearly better results (outputs) from the consumed resources (inputs).

Tertiary education efficiency is related to institutional factors of tertiary education systems, but also to the compulsory level of education. The quality of secondary education, as measured by results attained by students at PISA internationally comparable tests, is consistently correlated to country efficiency scores. Earlier education levels are crucial to explain performance and efficiency at the tertiary level. Early interventions, to enhance the skills acquired at young ages – well before the age of access to tertiary education – enhance the efficiency of future investments in tertiary education, and also later on in life through lifelong learning. It may also help to avoid intense redistributive policies at later ages.

A number of countries where secondary education outcomes are weaker, as measured by results of the OECD Programme for International Student Assessment (PISA), have highlighted quality problems in tertiary education, even when attainment rates are comparatively high. Furthermore, a strong and attractive vocational sector in some countries, such as Austria and Germany, helps explaining why fewer students are drawn to the tertiary education system (both type A and type B) whereas in other countries, such as Spain, the vocational tier of education appears less attractive and larger numbers of young wish to enrol in tertiary education.

This argues for an integrated view on education policy, taking the whole cycle into account. The peer review of the United Kingdom highlighted the promotion of STEM (Science,

Technology, Engineering and Mathematics) at tertiary level is done across the education cycle, with a lot of emphasis on schools and girls.

As regards the institutional factors pertaining to tertiary education systems, there are a number of points, where the lessons from the literature were supported by the findings of the peer review. The multiple missions of institutions need to be taken into account: teaching and research, lifelong learning, and contribution to society. The peer review highlighted that most tertiary education systems are facing trade-offs between teaching and research. Several indicators are necessary in view of the various policy objectives.

Governance and staff policy issues:

- increase competition, by rising the institutions' autonomy in what concerns staff policy, namely in its ability to hire and dismiss staff and to set wages;
- promote accountability of tertiary education institutions, with careful and fair evaluation ensured by independent bodies;
- rationalisation and collaboration (use of shared facilities) should be encouraged;

Funding rules:

- some stability in funding appears necessary: institutions need time to adjust, in particular when they have limited autonomy e.g. as regards staff policy and they cannot fire or adapt the wages of staff;
- in designing financial schemes, relate funding to the institutions' performance in output terms, rather than relying only in inputs used or in historical trends. Maintain a balance between input and output indicators to avoid trade offs and perverse incentives such as
 - (i) grade inflation in the case of output-oriented funding (where the need for quality control by an external authority may be strong)
 - (ii) incentives to keep students in the education system when funding is based on the number of students – of importance in systems where students persist beyond the usual time of studies;

Funding sources:

- the extent of public funding varies across the EU, but it remains key also where private funding is more important. The literature suggests that the case for an increase in private funding sources is related to the extent to which limited public funding may ration the number of students or result in levels of spending per student which may jeopardise the quality of teaching and the acquisition of skills by students.
- An increase in private funding sources is a realistic way forward to cope with an increased need for resources, as the number of students tends to expand and the quality of teaching needs to be maintained or improved. The peer review

showed that a number of Member States have explicit policies to increase the number of people pursuing higher education and the Europe 2020 sets a target of 40% for tertiary education attainment among the 30-34 years-old;

- the literature also suggests that individuals (and firms) can appropriate large returns on their education investment at tertiary level, with estimated private rates at above 12% on average, and social returns at 8% (with large differences across programmes and disciplines). This would argue for a private contribution from students to the cost of education students as they are generally the main beneficiaries of their degrees. Such contributions would need to go hand in hand with appropriate mechanisms to relieve credit constraints, so as to ensure an equitable outcome where access to higher education of qualified individuals does not depend on parental income;
- measures to attract private funding are more likely to be effective if reforms to improve governance are also implemented;
- student support systems appear piecemeal and complex in many Member States, ranging from public grants and loans to private loans with State subsidy and bursaries from institutions. The systems could usefully be simplified, which would also make them compatible with increased mobility. Loans and grants with possibilities to shift part of a loan to a grant if graduation takes place within the nominal time so as to strengthen incentives to conclude graduation and loan systems with income contingent repayments should be considered, including coverage of living costs in addition to subsidising tuition costs; public support of the full costs targeted to fewer students would appear more effective than a modest support generalised to most students;
- public funding ought to be related to the benefits brought to society by different tertiary education programmes. Programmes where the private returns are much below the social returns should receive more support than programmes with a lower external return, as a major argument in favour of the public funding of education is the positive externalities generated. Fees should also be differentiated by cost of education, and the link with quality assurance should be strengthened in order to ensure that relevant and high-quality programmes receive adequate support.
- As regards future areas of work, a better understanding of the social bias in access to tertiary education and further analysis of the effectiveness of policies such as scholarships to reduce social discrimination would be warranted.

Access to, and success in, tertiary education:

- The challenge to public policy of delivering equality of opportunity in tertiary education is sizable, and goes beyond the scope of the tertiary education system itself, reaching back to pre-schooling and into compulsory and upper-

secondary education. Parental and school influences are key determinants of participation at the post-compulsory levels of education. The literature as well as some country experiences highlighted during the peer review, suggest that barriers to access to advanced programmes may be implicit (such as lower levels of basic skills for individuals from disadvantaged backgrounds and liquidity constraints), rather than explicit (tuition fees). Policies specifically targeted at these problems may be warranted, rather than further decrease to (generally) already low tuition charges that imply a large subsidy for relatively privileged groups. The limited access to tertiary education of people from disadvantaged socio-economic background is unlikely to be fully remedied by a policy of free access (no tuition fees) because they tend to lack the pre-requisite skills to access tertiary education, hence the need to intervene within the compulsory strand of education. The peer review also highlighted that, in a number of Member States, tuition fees are perceived as curtailing access by people from disadvantaged background, even though these are separate policy issues as shown by the peer review. Possibilities to disconnect the issues of tuition fees and access to tertiary education ought to be explored.

- the peer review confirmed that information policies could improve access to, and success in, tertiary education. A better orientation could reduce failure rates, which are particularly large in the first year in a number of countries. More specifically, information policies could include orientation and future possibilities brought by different tertiary education programmes, transparency of graduation/success by different programmes and institutions or employability of graduates in different programmes and institutions.
- the peer review showed that some students remain too long in the system, for a number of reasons including a generous treatment of non-studying students. Consideration should be given to provide incentives to graduate within the nominal time, for example by reducing the public subsidies, as it is already the case in a number of Member States;

Strategic sectors in the economy:

- there are also policy concerns about strategic sectors in the economy (Science, Technology, Engineering, Mathematics) and how to give incentives to study these disciplines; the challenge is sizeable as a main incentive concerns wages developments that governments cannot directly control and the peer review highlighted that public policy needs to reach back to compulsory and upper-secondary education;

Labour market policies:

- labour market and education policies are closely intertwined: returns to education are lower when labour markets are less rewarding of high skills, even though these skills may be in high need. This reduces the incentives to

enrol in tertiary education, and possibly also to conclude graduation. Other labour market institutions, such as the diffusion of temporary contracts and the limited conversion of temporary contracts into permanent contracts, also reduce the returns to tertiary education, weakening incentives to enrol and/ or graduate. Attractive student work contract may also introduce distortions in the education system. It is important to get the policies right to assist work experience of students: their main purpose is to provide work experience, and they should not be used as a flexible tool for companies.

Mobility:

- student mobility across tertiary education institutions (at national and EU level) should be encouraged; there is a strong demand for Universities established in the area where the family lives in a number of countries, although maintaining a large number of institutions delivering high quality teaching may be a challenge and the best matching between students and institutions may not be ensured.

Life-long learning:

- strengthening tertiary education institutions' role in lifelong learning is an area where more should be done in most Member States; few countries have significant numbers of students enrolling during their working life, or with strong links between tertiary education institutions and the labour market. The peer review has not looked into lifelong learning policies specifically, nor into their efficiency and effectiveness. However a general principle is that lifelong learning policies which allow tertiary education institutions to cater for the needs of the working population are essential in view of ageing populations; indeed the bulk of education continues to take place before the mid-20s and at the same time people are expected to remain active for longer; furthermore, the United Kingdom example highlights that the access of mature students makes up for some of the imbalance in access by socio-economic background.

7. Statistical annex

Table 7 1 – Long-run projection of public expenditure on tertiary education, as a % of GDP – baseline scenario taking into account the pure impact of demographic change

	2015	2020	2025	2030	2035	2040	2045	2050
BE	1.24%	1.20%	1.21%	1.25%	1.26%	1.27%	1.27%	1.26%
BG	0.53%	0.46%	0.48%	0.52%	0.53%	0.52%	0.51%	0.51%
CZ	0.77%	0.66%	0.67%	0.73%	0.73%	0.73%	0.72%	0.70%
DK	2.33%	2.47%	2.47%	2.49%	2.43%	2.39%	2.40%	2.42%
DE	1.04%	0.98%	0.96%	0.95%	0.95%	0.98%	1.00%	1.00%
EE	0.56%	0.50%	0.50%	0.52%	0.54%	0.55%	0.54%	0.53%
IE	0.99%	0.93%	0.94%	0.96%	0.97%	0.96%	0.93%	0.92%
GR	1.12%	1.06%	1.11%	1.17%	1.18%	1.17%	1.15%	1.16%
ES	0.69%	0.65%	0.68%	0.72%	0.72%	0.71%	0.71%	0.71%
FR	0.99%	1.00%	1.02%	1.05%	1.05%	1.03%	1.02%	1.02%
IT	0.76%	0.73%	0.74%	0.76%	0.75%	0.74%	0.74%	0.74%
CY	1.25%	1.10%	1.02%	1.07%	1.11%	1.12%	1.10%	1.07%
LV	0.64%	0.56%	0.56%	0.58%	0.60%	0.62%	0.62%	0.64%
LT	0.90%	0.80%	0.73%	0.73%	0.77%	0.80%	0.80%	0.79%
LU	:	:	:	:	:	:	:	:
HU	0.92%	0.83%	0.81%	0.84%	0.85%	0.86%	0.87%	0.87%
MT	0.97%	0.88%	0.80%	0.78%	0.79%	0.81%	0.82%	0.83%
NL	1.28%	1.30%	1.31%	1.27%	1.26%	1.28%	1.30%	1.32%
AT	1.28%	1.21%	1.17%	1.18%	1.19%	1.20%	1.21%	1.22%
PL	0.89%	0.76%	0.68%	0.70%	0.73%	0.74%	0.72%	0.69%
PT	0.81%	0.78%	0.79%	0.79%	0.79%	0.78%	0.78%	0.79%
RO	0.61%	0.55%	0.54%	0.54%	0.55%	0.55%	0.54%	0.54%
SI	1.12%	1.04%	1.04%	1.12%	1.18%	1.20%	1.20%	1.19%
SK	0.68%	0.57%	0.54%	0.55%	0.57%	0.58%	0.58%	0.58%
FI	1.75%	1.67%	1.63%	1.66%	1.69%	1.71%	1.71%	1.71%
SE	1.68%	1.54%	1.49%	1.53%	1.55%	1.59%	1.61%	1.60%
UK	1.18%	1.14%	1.14%	1.16%	1.17%	1.17%	1.16%	1.15%

Source: 2009 Ageing Report

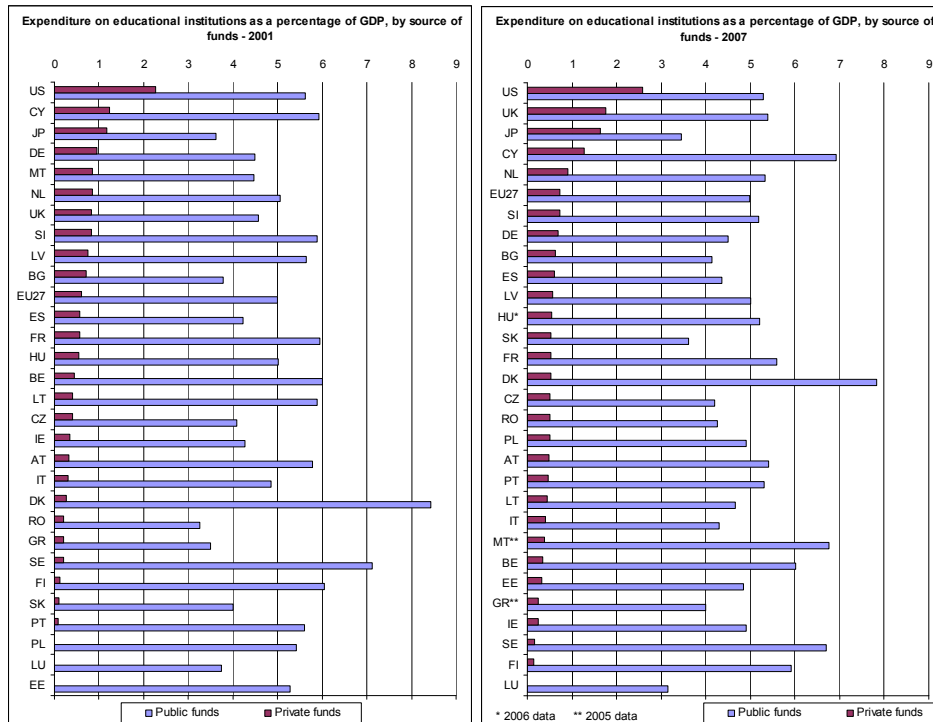
Table 7-1 – Projection of the impact of an increase in tertiary level attainment on public expenditure (the share of 30-34 years-old with tertiary education attainment is assumed to reach 45%), change relative to the baseline scenario, in p.p.

	2015	2020	2025	2030	2035	2040	2045	2050
BE	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.16
BG	0.37	0.33	0.34	0.37	0.38	0.37	0.37	0.37
CZ	0.56	0.50	0.51	0.56	0.55	0.55	0.54	0.53
DK	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DE	0.62	0.60	0.59	0.58	0.59	0.60	0.61	0.62
EE	0.26	0.25	0.25	0.26	0.27	0.27	0.27	0.27
IE	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
GR	0.04	0.03	0.04	0.04	0.04	0.04	0.04	0.04
ES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FR	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.11
IT	0.31	0.31	0.32	0.33	0.32	0.32	0.32	0.32
CY	:	:	:	:	:	:	:	:
LV	0.64	0.61	0.62	0.63	0.66	0.67	0.68	0.70
LT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LU	:	:	:	:	:	:	:	:
HU	0.49	0.46	0.45	0.46	0.47	0.48	0.48	0.48
MT	0.72	0.70	0.64	0.62	0.63	0.64	0.65	0.65
NL	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
AT	0.90	0.89	0.86	0.86	0.87	0.88	0.89	0.89
PL	0.41	0.36	0.32	0.33	0.34	0.35	0.34	0.33
PT	0.59	0.60	0.61	0.61	0.61	0.60	0.60	0.61
RO	0.50	0.47	0.47	0.47	0.47	0.47	0.47	0.46
SI	0.20	0.20	0.20	0.21	0.22	0.23	0.23	0.23
SK	0.53	0.47	0.44	0.45	0.46	0.47	0.47	0.48
FI	:	:	:	:	:	:	:	:
SE	0.17	0.17	0.16	0.16	0.17	0.17	0.17	0.17
UK	0.29	0.31	0.31	0.31	0.32	0.32	0.31	0.31

Source: 2009 Ageing Report

Note: The projection is not made for Cyprus and Finland where the share of 30-34 years-old exceeds the target.

Graph 7-1 – Private and public sources of funds in total expenditure on educational institutions



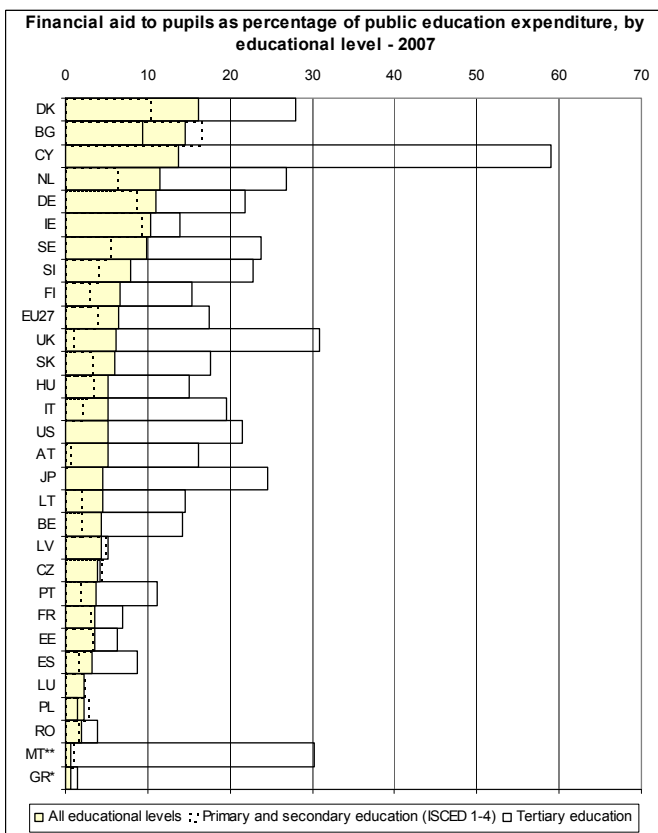
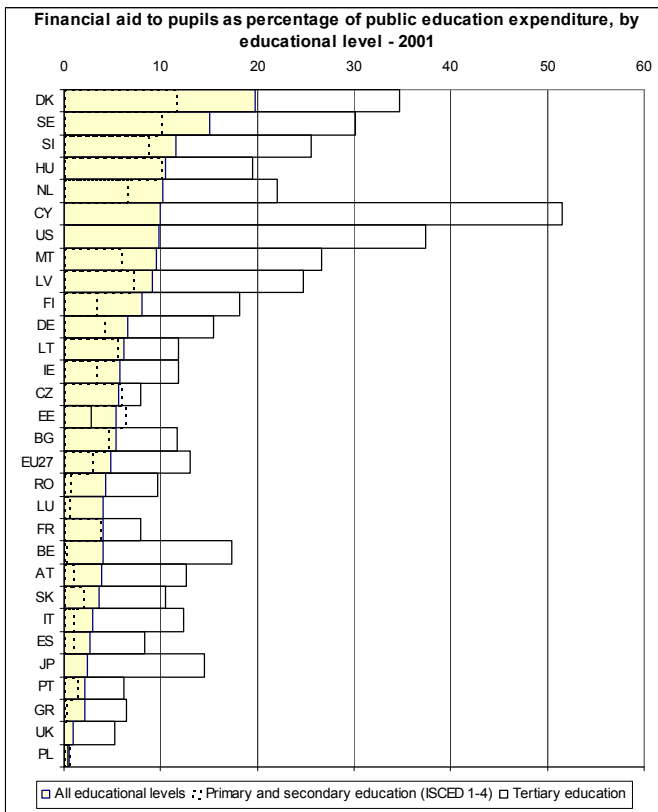
Source: Eurostat

Table 7-2 –Enrolment, in 000s (1999 to 2008) and growth rates

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	1999-2003	2003-2007
BE	352	356	359	367	375	386	390	394	394	402	6	5
BG	270	261	247	228	231	228	238	243	259	264	-15	12
CZ	231	254	260	284	287	319	336	338	363	395	24	27
DK	190	189	192	196	202	217	232	229	232	:	6	15
DE	:	:	:	:	:	:	:	:	:	:	:	:
EE	49	54	58	61	64	66	68	68	69	68	31	8
IE	151	161	167	176	182	188	187	186	190	179	20	5
GR	388	422	478	529	561	597	647	653	603	:	45	7
ES	1787	1829	1834	1833	1841	1840	1809	1789	1777	1781	3	-3
FR	2012	2015	2032	2029	2119	2160	2187	2201	2180	2165	5	3
IT	1797	1770	1812	1854	1913	1986	2015	2029	2034	:	6	6
CY	11	10	12	14	18	21	20	21	22	26	69	22
LV	82	91	103	111	119	128	131	131	129	128	45	9
LT	107	122	136	149	168	183	195	199	200	205	56	19
LU	3	2	3	3	3	3	:	3	:	:	13	:
HU	279	307	331	354	390	422	436	439	432	414	40	11
MT	6	6	7	7	9	8	9	:	10	:	55	10
NL	470	488	504	517	527	543	565	580	590	602	12	12
AT	253	315	265	224	230	239	244	253	261	285	-9	14
PL	1399	1580	1775	1906	1983	2044	2118	2146	2147	:	42	8
PT	357	374	388	394	401	395	381	367	367	:	12	-9
RO	408	453	533	582	644	686	739	835	928	1057	58	44
SI	79	84	91	99	101	104	112	115	116	115	28	14
SK	123	136	144	152	158	165	181	198	218	229	29	38
FI	263	270	280	284	292	300	306	309	309	310	11	6
SE	335	347	358	383	415	430	427	423	414	407	24	0
UK	2081	2024	2067	2241	2288	2247	2288	2336	2363	2329	10	3
EU27	13483	13920	14435	14978	15519	15906	16261	16485	16606	11359	15	7

Source: Eurostat

Graph 7-2 – Financial aid to pupils, by educational level



Source: Eurostat

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