

# **FUNDING HIGHER EDUCATION IN EUROPE: PRINCIPLES, COMPARATIVE EXPERIENCES AND SOME REFLECTIONS:**

**José García Montalvo\***

This article presents an overview of the funding of higher education in Europe and the mechanisms employed by different countries for distribution of budgetary resources to higher education institutions.

The negative mid-term demographic prospects for student numbers and the weak empirical evidence for the link between resources allocated and educational quality have shifted debate away from the total quantity of funding to the issue of efficient distribution of available resources. For this and other reasons, in recent years many countries have adopted mechanisms based on objective criteria (generators of appropriate incentives) for distribution of higher education funding. The general trend is towards distribution formulas which allocate greater weighting to output indicators (number of graduates, credits completed, pass-rates, etc.) as opposed to input indicators (for example, student numbers).

## **Contents**

1. Introduction
2. Education budgets and educational quality
3. An overview of higher education funding in Europe
4. Funding distribution mechanisms
5. Examples of distribution mechanisms in Europe
  - 5.1 The Netherlands
  - 5.2 Flanders
  - 5.3 Denmark
  - 5.4 Sweden
  - 5.5 United Kingdom
  - 5.6 The multi-year public university funding programme in Valencia
  - 5.7 The Catalan model
6. Some final observations on university funding
7. Conclusions

## **1. Introduction**

Higher education<sup>1</sup> is the educational sector which has undergone the highest levels of growth over the last 20 years. As a result, it mobilises an ever-increasing volume of

---

\* José García Montalvo lectures at Universitat Pompeu Fabra, Barcelona (Department of Economics and Business) and is a research fellow at the Institute for Economic Research (Valencia).

<sup>1</sup> This article concerns higher education as opposed to exclusively university education, since in several countries, for example, the Netherlands and Germany, the term “higher education” also includes advanced vocational training.

resources, both financial and human. In this context of rapid growth, in which third-level education became mass education, the basic principle underlying budgetary planning was an incremental one; that is, the quantity of resources was more important than efficient distribution of funding or objective-based incentives.

However, empirical evidence acquired over recent years indicates that simply increasing the funding provided to education does not necessarily guarantee an improvement in quality (indeed, the opposite may occur). In addition, demographic trends would suggest that growth in the number of university students has concluded, particularly in Spain. In a context of stabilising or falling numbers attending university, and well-founded reservations concerning the link between funding resources and quality, the issue of distribution of funding becomes a key element in university policy.

Therefore, the emphasis in higher education funding has shifted from the need to provide university education for greater numbers to an improvement of quality and the generation of objective criteria for distribution of funding resources. Many countries have now adopted objective distribution procedures for funding purposes.

This article seeks to provide an overview of the principles and procedures employed for resource distribution in different European countries. The second section presents a general description of the empirical evidence on the link between educational funding and educational quality, as background information to the recent move towards application of objective formulas. The third section provides a general overview of higher education funding in a number of European countries. The fourth presents a summary of the basic principles underlying most such funding distribution. The specific procedures employed in each country are discussed in section 5. Section 6 is a brief consideration of university funding in Spain, and conclusions are presented in the seventh section.

## 2. Education budgets and educational quality

Investment in human capital, as a mechanism to increase economic productivity and develop better citizens, is normally seen as a matter of increasing public funding of education. This also applies to higher education. The underlying assumption is that educational quality is closely linked to the quantity of public funding allocated.

Unfortunately, the empirical evidence available suggests that merely increasing available resources is an inefficient way of improving educational quality. Hanushek shows that the number of students has fallen, teachers are more qualified and funding has increased over recent years; however, there is very little evidence that this increase in resources has led to better student results.<sup>2</sup> Indeed, on the basis of the results of the *Third International Mathematics and Science Study* (TIMSS), Hanushek and Kimko show that when students' family backgrounds and certain other country-linked factors are controlled, the additional resources provided may even have a negative effect on the students' results.<sup>3</sup>

Hanushek presents a meta-analysis of almost 500 studies on the link between resources and student performance, both in the US and other developed countries.<sup>4</sup> Hanushek's

---

<sup>2</sup> HANUSHEK, 2003. See also KRUEGER, 1999, 2003 and HOXBY, 2000.

<sup>3</sup> HANUSHEK and KIMKO, 2000.

<sup>4</sup> HANUSHEK, 2003.

findings show that the resource indicators (spending per student, teacher : student ratio, administration spending, etc.) have a non-significant coefficient in approximately 75% of studies and, even give a negative result in 7% of cases.<sup>5</sup> The authors points out that these results, along with those of the STAR experiment, generate very little confidence in the idea that simply increasing resources will lead to better student performance. This message is clear and increasingly seems to have transcended the frontiers of the academic world and penetrated those institutions with an interest in promotion of education. For example, the latest OECD report points out that “lower per-unit spending cannot automatically be equated with lower quality educational services.”<sup>6</sup>

This, however, does not mean, that inputs are not important. In certain situations, an increase in funding may have a positive effect on student performance, although it is difficult to specify exactly what these situations are. Resources allocated can also play an important role if used as incentives and based on accomplishment of set objectives in, for example, the area of student performance. In Hanushek’s view,<sup>7</sup> it is not surprising that the majority of studies find that funding has little impact on student performance: student performance tends to have little input as feedback into decisions related to institutional funding.

### 3. An overview of higher education funding in Europe

This section provides an introductory overview of higher education funding in Europe. This is a difficult task, since higher education systems vary considerably from one European country to another. Table 1 sets out the basic indicators for 2000-2001.<sup>8</sup> The first column presents per-capita GDP in dollars corrected for purchasing power parity (PPP). This enables us to obtain constant price indicators accounting for price variations across the countries. This explains, for example, why Ireland is in third place and France far behind.

**Table 1**  
**Basic data on higher education funding in Europe**

	GDP pc (2001)	Pub. funds /GDP (2000)	Total funds /GDP (2000)	Relative effort (2000)	Net rate A (2001)	Net rate B (2001)
Germany	26,587	1	1,1	42	32	14*
Austria	28,626	1.2	1.2	39	34	
Belgium	26,782	1.2	1.3	41	32	36
Denmark	30,082	1.5 <sup>#</sup>	1.6	42	44	9
Slovakia	12,089	0.7 <sup>#</sup>	0.8 <sup>&amp;</sup>	44	40	3*
Spain	20,928	0.9	1.2	33	48	19
Finland	26,434	1.7	1.7	33	72	
France	25,538	1.0	1.1	33	37	22
Greece	16,887	0.9 <sup>#</sup>	0.9	21 <sup>o</sup>		
Ireland	30,052	1.2	1.5 <sup>&amp;</sup>	39	38	18
Italy	26,587	0.7	0.9	32	44*	1*
Norway	37,008	1.2	1.3	37 <sup>o</sup>	62	6

<sup>5</sup> Results for developing countries were slightly less pessimistic although not overly positive either.

<sup>6</sup> OECD, 2002, p.145.

<sup>7</sup> HANUSHEK, 2003.

<sup>8</sup> The last year for which homogenous information is available (in OECD, 2003).

The Netherlands	28,685	1.0	1.2	44	54	2
Poland		0.8	0.8	34 <sup>°</sup>	67*	1*
Portugal	18,589	1.0 <sup>#</sup>	1.1	28		
United Kingdom	25,294	0.7	1.0	39	45	29
Czech Republic	14,433	0.8	0.9	39	30	7
Sweden	25,551	1.5	1.7 <sup>&amp;</sup>	58	69	6
Switzerland	30,266	1.2	1.2	62	33	13
<b>European average</b>	25,023	1.0	1.2	41	46	12

Source: OECD, 2003.

<sup>#</sup> Family subsidies are not included in public spending; they are included in private spending.

<sup>&</sup> Higher education spending from international sources exceeds 1.5%.

<sup>°</sup> Only includes public institutions

\* Gross rates.

The second column presents public spending on higher education as a proportion of GDP. These data show that the effort made by Spain in funding higher education is very close to the European average and similar to that of countries such as Germany and France.<sup>9</sup> For the European countries considered here, the correlation between GDP and public spending on higher education is 0.52, while the correlation with spending on all public education is 0.57.

In contrast, the relative effort, that is, spending per student as a proportion of per-capita GDP (the fourth column of Table 1), is clearly lower in the case of Spain (33) than the average of the other countries considered (41), although the figure is quite similar to those of Finland and France. Obviously, the fact that spending on higher education as a percentage of GDP is similar to the European average, yet the relative effort considerably lower, can only be explained by the fact that the proportion of university students in the general population is considerably higher than the European average. For example, the United Kingdom and Spain spent the same proportion of GDP on higher education. However, out of a population of almost 60 million, the United Kingdom only had 1.7 million students in higher education in 2000, whereas Spain had a total of 1.5 million out of a population of 40 million. This means that the proportion of university students in Spain was 36% higher than in the UK, which explains how with the same level of higher education spending as a proportion of GDP, the UK nevertheless attains a level of relative effort close to the European average and far ahead of Spain.<sup>10</sup>

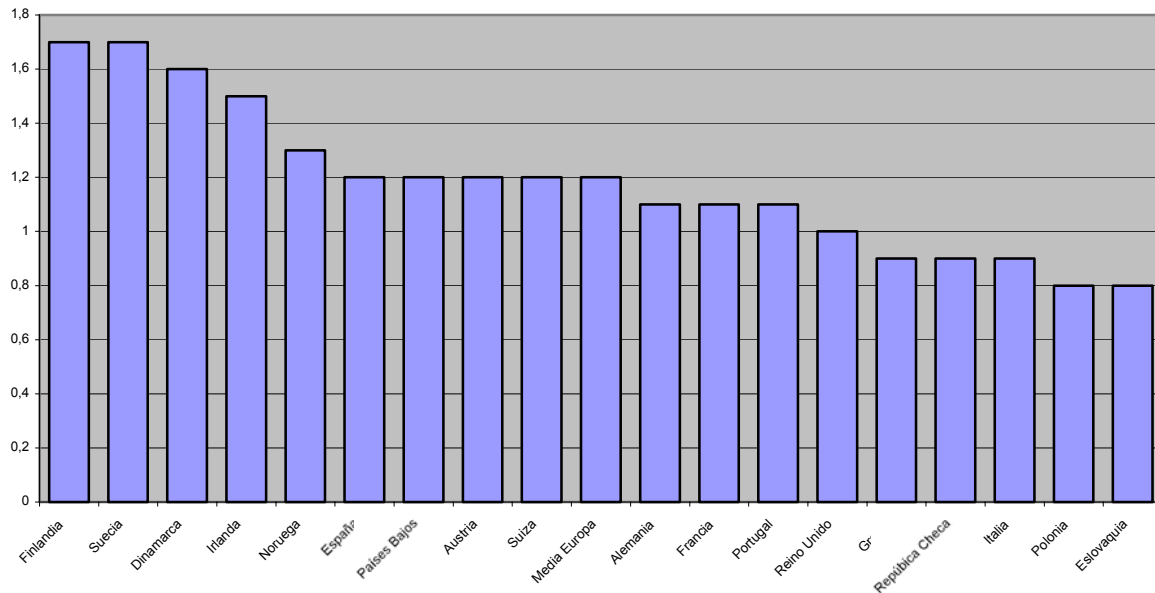
Other indications of the same phenomenon are the numbers entering higher education. The fifth column of Table 1 shows that the net entry rate to type A courses<sup>11</sup> in Spain is higher than the European average. The net entry rate for each age is calculated as the proportion of persons of a given age entering the higher education system. The net entry rate is the sum of the net entry rates for each age group. In certain cases, such as Italy, or Germany in the sphere of type B courses, the figure provided is the gross rate or the number of entrants of any age group as a proportion of the age group characteristically corresponding to university entry.

<sup>9</sup> Figure 1 presents this information in the form of a ranking.

<sup>10</sup> However, it must be borne in mind that the OECD counts fulltime students (FTE), which means that the number given for Spain is an underestimation.

<sup>11</sup> The OECD classification distinguishes between type A programmes (essentially theoretical programmes designed to enable participants to engage in research or enter professions requiring high levels of training; they have a minimum duration of three years fulltime, though normally take four or more years) and type B programmes (based on technical and practical skills enabling participants to directly enter the job market; these have a minimum duration of two years fulltime).

Figure 1.  
Higher education spending as a percentage of GDP (2000) in various European countries.



Source: OECD, 2003

Table 2 sets out the distribution of public subsidies, including direct subsidies paid to institutions, and family subsidies. It can be observed that the Nordic countries (Denmark, Sweden and Norway) are the most generous in terms of direct subsidies paid to families, both in the form of grants and loans. Spain occupies the last position in this ranking, with subsidies payable to families accounting for only 0.08% of GDP, in comparison with the European average of 0.23%.

**Table 2**  
**Public subsidies as a percentage of total public spending and GDP (2000)**

	Subsidies to institutions	Educational subsidies paid to private bodies			Payments to families and private bodies (% of GDP)
		Economic aids for students		Other private payments	
		Grants	Loans		
Germany	86.0	10.9	3.1	-	0.15
Austria	81.3	12.2	-	6.4	0.27
Belgium	83.7	16.3	-	-	0.21
Denmark	61.1	33.9	4.9	-	0.98
Slovakia	96.2	2.1	1.6	-	0.03
Spain	91.5	8.5	-	3.9	0.08
Finland	82.3	16.9	-	0.8	0.36
France	91.9	8.1	-	2.4	0.08

Greece	94.2	5.8	-	-	-	0.05
Ireland	87.6	12.4	-	4.7	-	0.16
Italy	81.5	18.3	-	6.3	0.2	0.15
Norway	71.4	11.5	17.1	-	-	0.48
The Netherlands	73.4	20.3	6.7	2.0	-	0.35
Poland	99.5	0.5	-	-	-	0.00
Portugal	93.3	6.7	-	-	-	0.07
United Kingdom	70.0	10.4	19.6	10.7	-	0.30
Czech Republic	91.4	8.6	-	-	-	0.07
Sweden	70.5	9.6	19.9	-	-	0.59
Switzerland	98.7	0.8	-	-	0.5	0.02
<b>European average</b>	<b>84.5</b>	<b>11.2</b>	<b>8.6</b>	<b>5.0</b>	<b>-</b>	<b>0.23</b>

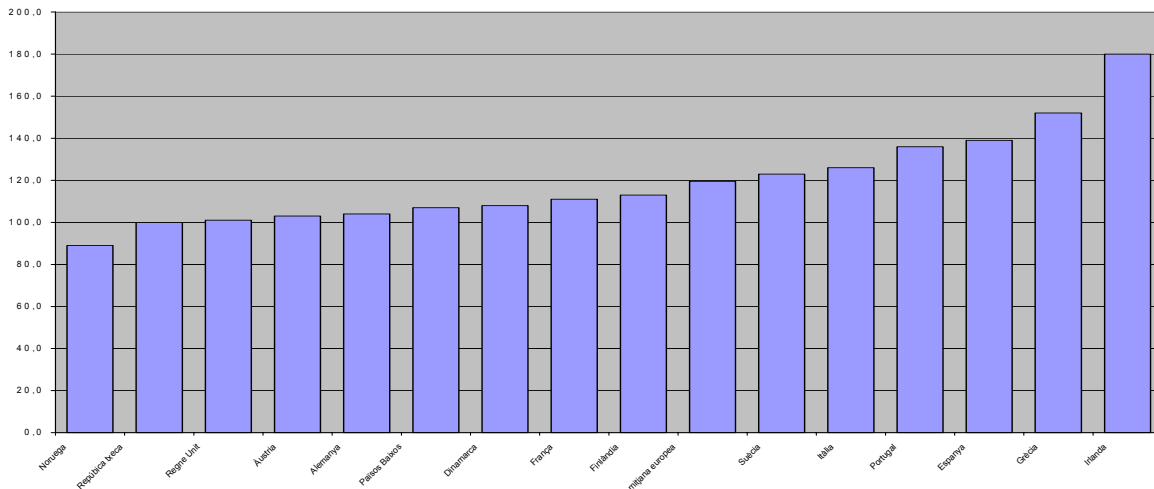
Source: OECD, 2003.

Figure 2 shows the trend in university funding between 1995 and 2000.<sup>12</sup> We see that the rise in resources allocated to universities was slower in Norway, the United Kingdom, Austria, Germany and the Netherlands. In contrast, in Spain and Greece, two countries with a low initial level of spending, investment rose more sharply, along with Ireland.

### Graph 2

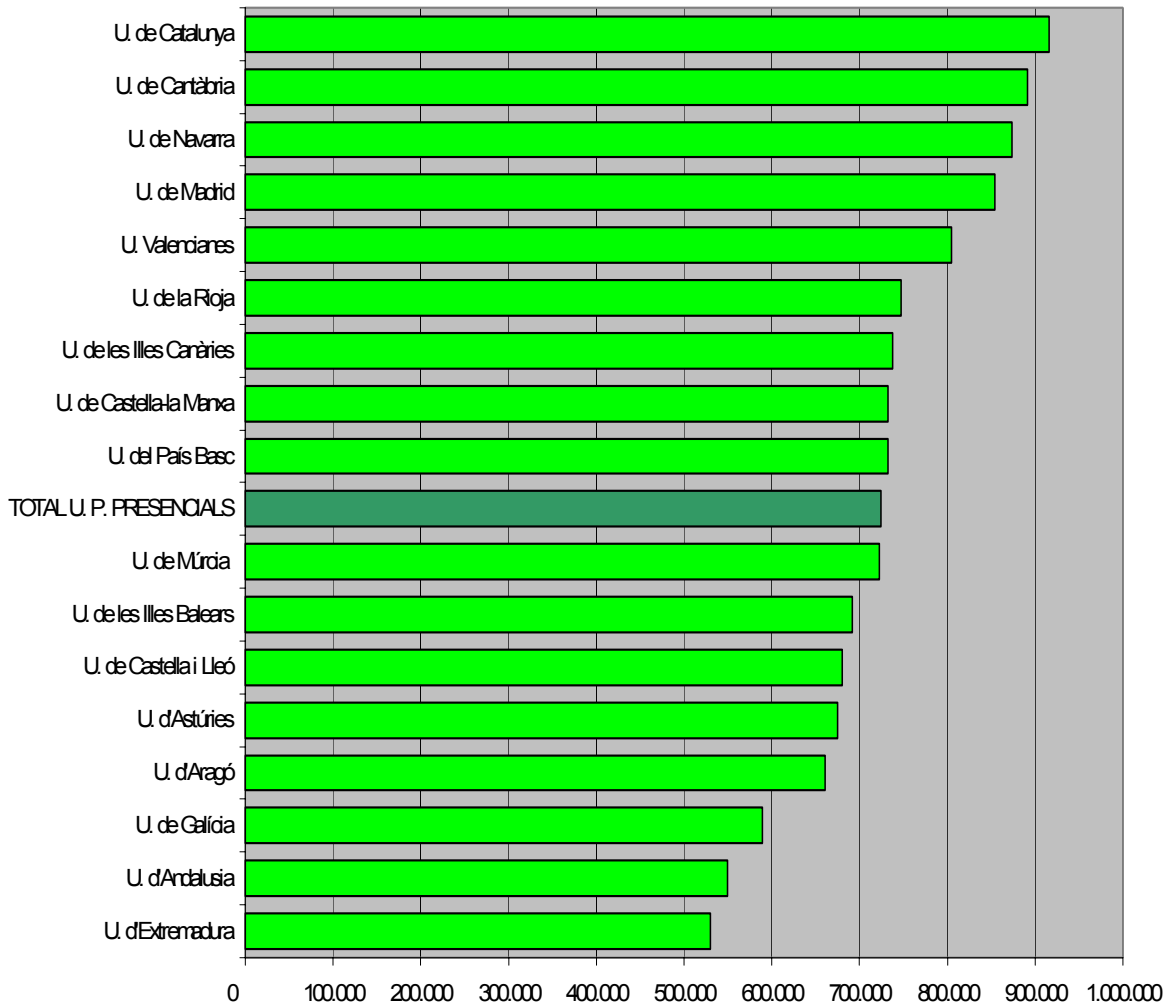
#### Evolution of per-student higher education spending 1995-2000 (1995=100). Constant prices

Source: OECD, 2003



<sup>12</sup> OECD (2002).

**Graph 3.**  
**Net funding per student in 2000 in traditional public universities of regions of Spain (pesetas)**



Source: Hernández, 2002

In his report for the *Conferència de rectors de les universitats espanyoles (CRUE)*,<sup>13</sup> Hernández provides numerous data on the funding of higher education in Spain. Catalonia offers an extreme example of what is occurring state-wide. Higher education spending as a percentage of GDP is approximately 1% and relative effort stands at 26, with a gross entry rate to universities of 61% in 2000.<sup>14</sup> Catalan spending on higher education as a percentage of GDP does not coincide with Hernández's figure of 0.71%, for a number of

<sup>13</sup> HERNÁNDEZ, 2002,

<sup>14</sup> This year was chosen for the purpose of comparison with the data from the other countries. In 2003 the gross rate of entry to university education reached 62.7%.

reasons. Firstly, his numerator only includes what is termed as net funding,<sup>15</sup> which is not compatible with the definition of higher education spending employed for international comparisons.<sup>16</sup> Secondly and more importantly, the GDP estimate used by Hernández (2002) is based on the calculations carried out by the FUNCAS savings banks foundation for social and economic research purposes and not on the official GDP figures published by the National Statistics Institute (INE). The FUNCAS figures overestimate Catalonia's GDP by more than 7%.<sup>17</sup> Also, Graph 3 shows that net per-student funding of Catalan universities is the highest in Spain, at more than 900,000 PTA in 2000.<sup>18</sup>

Despite the adverse demographic trends, the Catalan university has succeeded, at least until now, in withstanding the falling numbers of the university-going age group. In fact, entry applications to Catalan universities for the 2003-04 year were up (40,480 pre-registrations compared to 39,231 the previous year) despite the fact that the number of Catalan 18-year olds had fallen 4.5% in the same year. The key to this rise in admissions lies in increased numbers of students from other parts of Spain (5,670 compared to 4,548 the previous year – a rise of 25%). Bearing in mind that the demographic fall in the 18-year old age group is uniform throughout Spain, it would seem reasonable to think that the increase in the number of students from outside Catalonia is an indicator of the relative quality of Catalan universities, despite negative messages about their being under-funded.

We can say then, that it is its success in bringing university education to a wide segment of the population, both within Catalonia and Spain as a whole, that leads to Catalonia's relative effort indicators being lower than the European average.

#### 4. Funding distribution mechanisms

The previous section focused on the overall volume of funding allocated to higher education, and relative effort or per-student spending indicators. This section and the following will address the distribution of public funding among higher education institutions once the political process has decided what the total funding available to higher education is.

The use of objective formulas for distribution of funding among educational institutions is now common practice in the European Union and worldwide (for example, Australia, New Zealand, the Republic of South Africa, and public universities in the state of Tennessee).<sup>19</sup> Valencia is the pioneer among the autonomous regions of Spain, having had a distribution system for funding of third level institutions based on indicators and objective formulas since 1993. The Catalan university has had such a system since 2002.<sup>20</sup>

---

<sup>15</sup> It only includes direct funding, excluding income from external services provided by the universities, such as training, research services, etc.

<sup>16</sup> OECD, 2003.

<sup>17</sup> Hernández estimates higher education spending as a percentage of GDP in Spain as a whole at 0.84%, as opposed to the OECD's figure of 1.2% (2003). However, the value of GDP used as denominator is 108.69 billion pesetas (source: FUNCAS) whereas the official INE estimate is 101.29 billion pesetas (both figures in current prices).

<sup>18</sup> This indicator is quite imperfect, since it fails to account for the different levels of expense of the courses being done by the total of students forming the denominator.

<sup>19</sup> BANTA *et al.*, 1996.

<sup>20</sup> See PALLAROLS *et al.*, 2003.



In the majority of cases, the funding decision-making process includes two stages. The first comprises a political decision as to the total sum to be allocated to higher education, while the second is a process of distribution determining the sum for each institution via a concrete objective indicator-based formula. One exception is the case of Denmark,<sup>21</sup> where the distribution system also determines the total sum in accordance with evolution of the indicators involved. However, this system, known as the taximeter system, causes many problems since universities cannot accurately predict the total volume of funding, which leads to considerable uncertainty. For this reason, the Danish Ministry of Economics and Ministry of Education have reached an accord limiting the overall volume of funding. This, in effect, has the effect of eliminating the exception since it returns the decision on total funding to the political arena. In Valencia, total funding is determined by the target that it should reach 1% of GDP. This objective requires a political accord.

In Spain, the objectives pursued by the indicator-based distribution mechanisms are set out in the corresponding legislation of the autonomous region in question.<sup>22</sup> In general, they share the following aims:

1. To establish a stable multi-year funding framework for each institution that will facilitate financial autonomy and accomplishment of institutional objectives.
2. To put in place a system which will be simple, just, transparent and automatic, thus avoiding the need for continuous renegotiation, pressure and the *fet acompli* policy. The discretionary dimension of funding allocation is reduced to the minimum through use of objective parameters.
3. To improve the quality of higher education.
4. To promote qualitative competition among higher education institutions on the basis of a shared system of positive incentives.
5. To promote efficiency in resource allocation.

Normally, the main objective of such distribution systems is to determine the funding to be allocated to higher education teaching activities. Nevertheless, they often include mechanisms for distribution of funding for infrastructure and a portion of research funding. For example, in Germany, France and Flanders the system includes teaching and research.<sup>23</sup> The recent falling trend in numbers in the 18-25 age group has led to readjustment of the system parameters in many countries, allowing increased funding for improvements in research indicators, although in some cases per-student funding has also been raised.

One basic aspect of introduction or modification of the funding distribution system is the possibility that certain institutions will receive less funding while others receive more. This collateral effect could even threaten the survival of an institution. For this reason, the general practice in countries adopting new distribution systems is to stipulate a transition period to avoid such undesirable effects. Many different compensatory strategies can be applied during the transition period, such as that employed by Sweden after introduction of the new system in 1993; by Denmark, in 1994 when the taximeter system was introduced, and by the Netherlands in a recent modification of their system. The Catalan model also ensured that funding did not drop below the level of the previous year for any university.

---

<sup>21</sup> Another example, outside Europe, is New Zealand.

<sup>22</sup> For the case of Catalonia, see PALLAROLS *et al.*, 2003 and RIBAS i VILALTA, 2003.

<sup>23</sup> This is also the case in Australia and New Zealand.

The main features of these funding distribution mechanisms are the following:

#### **a) Fixed and variable funding: input and output criteria**

In practically all countries there is a fixed, common sum of funding allocated to all universities and also a variable portion which depends on performance as measured by a number of objective indicators and criteria. The main difference between the various systems in this second area is the relative weight of the various criteria. Basically, we can draw a distinction between input-based criteria (number of fulltime students, new entrants, numbers of credits taken, total surface area, etc.) and results or output-based criteria (number of graduates, time taken to complete courses relative to official course duration, credits passed, theses read, etc.). Normally, indicator readings are calculated as the average over a number of years.

#### **b) Input and output-based indicators**

Many countries and regions employ mainly input-based criteria for distribution of funding (for example, Germany, France, Flanders, and the United Kingdom). Others use a combination of input-based and output-based criteria, including the Netherlands, Sweden and Valencia. The Danish system only uses output-based indicators.

In input-based indicators, the general tendency is away from the total number of students and in favour of the number of new students entering. For example, in Germany and Denmark the total number of students registered is not considered as a criterion for funding, and in the Netherlands the total number of students has been replaced by the total number of new students. In Flanders and Sweden, the total number of students only accounts for half of the funding distributed.

#### **c) Recent trends**

In many countries the present trend is towards an increase in the relative weight of output-based criteria. In the Netherlands, the relative weight of the numbers graduating and credits passed is to be increased. In Flanders, it is also planned to introduce a new system with much greater emphasis on result-based criteria. In Sweden and Denmark, which already have essentially output-based systems, the criterion of credits passed is likely to be replaced by that of numbers graduating.

#### **d) Weighting**

In all countries, irrespective of the system employed (inputs, outputs or a combination of both), funding distribution criteria are weighted by type of institution (in binary systems,<sup>24</sup> such as in Germany and the Netherlands), the branch of learning (social sciences, engineering, medicine, etc.) and/or the educational stage (first-second year, third-fourth year, Master's degree, doctorate, etc.). The number of categories employed in weighting varies enormously, for example, from the three types used in Flanders for first-second year courses to the thirty-one factors included in the French system. In principle, these categories seek to approximate the differential costs according to the above-mentioned criteria (type of institution, branch of learning and type of course). In general:

---

<sup>24</sup> That is, systems including both universities and higher level vocational training institutions.

- The weighting is higher for university than for non-university institutions.
- The weightings are highest in Medicine and Veterinary Science, followed by Engineering, Social Sciences and Humanities. This order is determined by the extent to which courses require more expensive laboratory facilities, etc..
- Weighting is higher for doctoral courses than for undergraduate degrees which, in turn have higher weighting than shorter diploma courses.
- Weighting may be established on the basis of a calculation of the cost of providing education in the various types of degree courses or groups of degree courses, or may simply serve to determine the distribution of the available funding. In practically all systems, the second option has been chosen since the objective is not to establish the sum of total higher education funding but rather to distribute the quantity established by the political process.
- The use of contracts (programme-contracts) is becoming widespread as a supplementary funding mechanism. For example, contracts are in use in Germany, France, Sweden and Catalonia.<sup>25</sup>

## 5. Examples of distribution mechanisms in Europe

This section will describe the higher education funding distribution systems employed in a number of European countries. As pointed out above, one of the objectives of these systems is to improve the efficiency of the distribution process through use of objective criteria. The selection and weighting of these criteria can be carried out by means of formal optimisation procedures or by less formal operations. Numerous recent studies address the issue of efficient distribution of funding in higher education on the basis of formal, multi-criteria optimisation procedures. For example, Fandel and Gal employ optimisation techniques and various distance concepts to analyse distribution of funding in North Rhine-Westphalia (Germany).<sup>26</sup> Beasley, and Arcelus and Coleman, employ data envelopment analysis techniques (DEA) to study efficiency of teaching and research in various university departments in the United Kingdom and Canada respectively.<sup>27</sup> More recently, Caballero and other authors, employ a combination of multi-criteria optimisation and DEA techniques to determine the most efficient distribution of funding within the departments of the University of Malaga on the basis of the human resources efficiency in each department.<sup>28</sup>

Despite the academic interest of work based on formal optimisation procedures, in practice the models actually employed within higher education systems and described below follow less formal criteria. One argument which justifies not using complex, multi-criteria optimisation procedures is the case of England. The Higher Education Funding Council for England (HEFCE), the body with responsibility for distribution of funding among English higher education institutions, provides the formulas and necessary information for calculation of all totals allocated, so the institutions can themselves check that the model is being adhered to. Such confirmation would be extremely difficult, if not entirely impossible, if complex optimisation procedures were employed. In the latter case, each institution would require an in-house specialist to analyse results and implement changes.

---

<sup>25</sup> RIBAS and VILALTA, 2003.

<sup>26</sup> FANDEL and GAL, 2001.

<sup>27</sup> BEASLEY, 1995; ARCELUS and COLEMAN, 1997.

<sup>28</sup> CABALLERO *et al.*, 2003.

Many different systems and criteria are employed for distribution of higher education funding in Europe. Below, follows a description of the systems in a number of European countries and regions (the Netherlands, Flanders, Denmark, Sweden and the United Kingdom), Valencia in Spain and the new model for Catalonia. The samples have been chosen for their interest, originality or accuracy in establishing objectives.

### 5.1. The Netherlands

A basic characteristic of the Dutch higher education system is its binary nature, that is, both universities and advanced vocational and professional training institutions (*hogeschole*) are included. Funding formulas differ for each.

The income of higher education institutions in the Netherlands derives from three sources:<sup>29</sup>

- a. Basic funding allocated as *en bloc* subvention for teaching, research and related activities. For the *hogeschole* this funding is exclusively for teaching. In the case of the universities, 36% is allocated for teaching costs and 64% for research.
- b. Research funding from the Netherlands Research Council (NWO). A total of 60% of this funding is allocated to cover salaries and other research costs in universities.
- c. Research and teaching contracts.

Funding for teaching in Dutch universities is based on three main pillars (*Prestatie Bekostigings Model*, PBM):

- a. A fixed quantity per university, irrespective of student and graduate numbers, the objective of which is to provide stability in the university funding system.
- b. The number of first year students in universities. There are two weightings: one for art, humanities, law, social sciences and language, and another for sciences, engineering, agriculture and medicine.
- c. The number of graduates per year in each university. There are three categories of weighting: humanities and social sciences (art, humanities, law, social sciences and language), engineering (sciences, engineering and agriculture) and medicine.

Funding of the *hogeschole* is based exclusively on a formula based on the number of fulltime students, the number of graduates and the number of drop-outs. There are two weighting categories (one for social sciences and another for programmes with a high practical content). Last year, the Dutch Ministry of Education, Science and Culture began to study a proposed change in funding for *hogeschole* which would provide a higher weighting for results. If the proposed change is accepted, it will enter into force in 2005.

### 5.2. Flanders

In Flanders the system is also binary, similarly including both universities and *hogeschole*.

The basic objective in adopting a simple, automatic funding distribution system in 1991 was to increase the autonomy of higher education institutions.

---

<sup>29</sup> CANTON and JONGBLOED, 2001.

Universities receive funding to cover three categories of costs:<sup>30</sup>

- a) Teaching in general and research-linked teaching. There is a fixed and variable subvention. The variable sum is divided in two:
  - i) Academic and doctoral courses funded on the basis of the number of fulltime students divided into three weighting categories: humanities and social sciences, sciences (including first and second year of medicine and engineering) and medicine and engineering (later stages). Students registering for the third time in a subject (whether in the same or another university) do not count for funding purposes.
  - ii) Continuing education and general practical courses. The sums allocated in this category are based on the average number of graduates over the previous two years.
- b) Infrastructure costs are also funded by a fixed and a variable sum. The variable component is determined by the surface area in question.
- c) Social facilities (student restaurants, etc.) are also funded by a dual fixed/variable system in which the variable part depends on student numbers.

Funding for the *hogeschool* also comprises a fixed and variable component. The variable part is determined by student numbers (five year average) weighted for each course type. There are four course weightings: 1 (business administration and commerce courses), 1.2 (applied linguistics and first-second year industrial sciences courses), 1.4 (architecture, social work, biotechnology and later stages in industrial science courses) and 1.6 (education, health and product development).

### 5.3. Denmark

The Danish funding distribution system (the taximeter model) is based exclusively on results. Funding is directly linked to the number of students passing subjects. The universities do not receive funding for students not passing or failing to take exams. The quantity paid for each exam passed depends on the course in question and is designed to cover three types of cost: the cost of education and equipment, administration and related costs and the costs of practical education (in certain courses).

In the first year of application of the system (1994), two specific criteria were applied:

- a. That implementation of the new funding system should have a neutral funding effect in the first year, that is, there should neither be an increase or decrease in overall funding provided.
- b. That there should be no adjustment in the relative distribution of funds among universities in the first year.

This meant that funding was determined by historical factors more than an efficient assignation of funding based on objective principles.

Evaluations of the taximeter model conclude that it has led to positive effects in terms of educational quality. It is also pointed out that the professional ethics of teaching staff have prevented emergence of a tendency to pass more students, which could be a negative consequence of such an exclusively result-driven system.

---

<sup>30</sup> BEVERWIJK and LANGE, 1999.

#### 5.4. Sweden

Since the educational reform carried out in 1993, higher education funding in Sweden has been based on triennial budgetary plans. The funding distribution mechanisms reflect an increased emphasis on decentralisation and evaluation. Higher education institutions can decide how they wish to distribute their resources but they must meet certain regulatory objectives.

Funding is different for teaching and research. For teaching, total funding provided to the institution depends on the number of fulltime students and their annual results (in terms of credits passed). The total funding for teaching activities cannot exceed a fixed annual sum, which is set by the Parliament. This reduces the possibility of there being an excess of graduates. The three-year funding agreements can stipulate that the number of fulltime students in a given degree or specialisation must rise or decrease in relation to the previous three-year period. In addition, there is a ceiling for maximum aggregate funding per fulltime student and annual results in the financial year. Funding per fulltime student (FTE) and results (CRED) depends on the branch of learning and the weightings are established in accordance with the educational costs, service costs, capital costs and general costs. Weighting per branch of learning is set out in Table 3.

**Table 3**  
**Funding per fulltime university student and credit (2002 financial year)**

Branch of learning	FTE (€)	CRED (€)
Humanities, theology, law and social sciences	1,588.0	1,662.6
Science, technology and pharmacy	4,148.1	3,793.2
Dentistry	3,766.7	4,710.3
Medicine	5,067.6	6,646.3
Nursing	4,026.9	3,682.4
Others	2,967.6	3,759.2
Education	3,484.7	3,000.6
Design	12,357.3	7,941.2
Art	17,621.6	7,943.6
Music	10,640.8	7,109.4
Opera	25,403.1	16,028.6
Theatre	24,619.5	12,905.4
Media	24,900.6	21,182.3
Dance	17,267.6	10,068.5
Physical Education	9,043.3	4,394.6

Source: Högskoleverket, 2002

The formula employed to calculate funding for teaching in each institution is as follows:

$$RE_{it} = \sum_{j=1}^{15} [ETC_{ijt} * TE_j + CRED_{ijt} / 40 * TC_j]$$

where  $RE_{it}$  represents funding for teaching over period  $t$ ,  $j$  represents each of the 15 fields appearing in Table 3,  $ETC$  the number of fulltime students,  $TE_j$  is the rate paid per fulltime student in branch  $j$ ,  $CRED$  is the accumulated total of credits and  $TC_j$  is the rate assigned to each type of credit  $j$ .

Research and postgraduate training are financed from special funds within the general budget of higher education institutions. Funding is distributed in four main research areas (humanities/social sciences, medicine, natural sciences and technology). Each fund includes conditions, for example, a certain minimum must be allocated to postgraduate education.

The funding from the national budget allocated for teaching, research and postgraduate education represents approximately 60% of the income of higher education institutions. The remainder is made up of external resources and income from research contracts with municipal councils, companies and other bodies.

There is no tradition in Sweden of charging students for university education. In addition, there is a generous system of financial aids with minimum yearly grants of 2,408 € and a maximum yearly student loan of 4,579 €.

## **5.5. United Kingdom**

Distribution of higher education funding in the United Kingdom also follows an objective criteria-based procedure. In 1992, Higher Education Funding Councils were established for England, Wales, Scotland and Northern Ireland. This section will focus on the Higher Education Funding Council for England (HEFCE). The information presented is that in existence after revision of the formula in 1997<sup>31</sup> and includes funding of Higher Education Institutions (HEI) and Further Education Colleges (FEC). The system in use prior to 1997, provided institutional stability; however, in some cases it led to uneven funding patterns since it was based on historical more than educational considerations.

The objectives of HEFCE in distributing funding for higher education teaching, research and related matters are:

- a. Improve the opportunities for all students, irrespective of social origin, to benefit from higher education.
- b. Maintain and enhance the quality of teaching.
- c. To foster cooperation between universities and companies and the community.
- d. To support diversity.
- e. To foster efficiency in the use of public resources.
- f. To provide stability from year to year.

Funding is provided in a block sum to the institutions, which can then decide to distribute it as they see fit. The second main source of income for the colleges is from tuition fees. The average cost of fees in the 2002-03 academic year was approximately 1,100 pounds sterling (approximately 1,600 euro). Low-income families were either exempt or else only liable to pay a portion of this.

Every two years, the Secretary of State for Education and Skills informs the HEFCE of the total funding available for the following three years. Every year, between December and February, the HEFCE calculates the distribution of these funds on the basis of data provided by the universities.

---

<sup>31</sup> See HEFCE, 2002.

The distribution formula is obtained as follows: firstly, funding for teaching is calculated by adding the subvention (SUB) and the income from fees (MAT).

$$RE = SUB + MAT$$

The subvention is calculated in four phases. Firstly, the standard resource is determined; this depends on the number of students registered, the branches of learning and other factors, some of which are related to the students and some to the institution. The second phase is calculation of the actual resource, based on the previous year's subvention corrected for inflation plus the forecast income from fees. Thirdly, the standard resource is compared with the actual resource and the percentage difference is calculated. If this difference exceeds a 5% tolerance band, then either the subvention or the number of students (or both) is adjusted. Once completed, the subvention is set for the following year.

The most complex part of the operation is the calculation of the standard resource, based on the number of students weighted by subjects, type of students and type of institution. Students are counted as fulltime equivalents (FTE). Student weighting is carried out firstly according to the nature of the course in question, as set out in Table 4.

**Table 4**  
**Subject price groups in HEFCE funding distribution**

Group	Description	Weight
A	Clinical phases of medicine, dentistry and veterinary science	4.5
B	Laboratory-based subjects (sciences, engineering, technology and pre-clinical phases of medicine and dentistry)	2
C	Subjects with studio, laboratory or fieldwork content	1.5
D	All other subjects	1

Source: HEFCE (2002)

To this weighting, a premium must now be added as set out in Table 5.

**Table 5**  
**Student and institutional premiums**

Student premiums	
Part-time students	5% of unweighted FTE
Mature students	5% of unweighted FTE
Long courses	25% of the FTE weighted by price group
Institutional premiums	
London premium	8% of the FTE weighted by price group
Small institutions (fewer than 1,000 FTE)	Variable % of unweighted FTE
Old and historic buildings (prior to 1914)	Variable % of unweighted FTE
Specialist institutions	Usually 10% of the FTE weighted by price group
Pensions	2% of FTE weighted by price group

Basic funding per FTE is calculated by dividing all the money available to fund teaching by the total number of weighted FTE. This basic rate of funding is called the basic price.

In addition to the method described above, an additional cost is recognised every year for admission of students from areas with low representation in higher education or with disabilities. Students from areas which are under-represented in higher education receive a higher weighting.



Finally, funding for research is based on research quality, measured by periodic evaluations (Research Assessment Exercise - RAE). The procedure employed is one of the most original, efficient and accurate methods for funding of research. However, the formulation itself is overly complex for inclusion in this brief article.<sup>32</sup>

## **5.6 The multi-year public university funding programme in Valencia<sup>33</sup>**

What is known as the “Valencian model” for allocation of university funding was a pioneer within Spain. The first multi-year programme was for the 1994-1998 period. The second was approved in 1999 and was in vigour until 2003.

The Valencian universities’ White Paper, prepared in 1999, established actions to cope with the then emerging trends. These trends included:

- 1) A drop in the number of young people of university-going age. Developments in the job market and desirability or otherwise of university studies could have the effect of offsetting or worsening this drop.
- 2) Changing preferences among students, leading to a drop in demand for certain degrees and a highly significant rise in demand for others.
- 3) A growing demand for postgraduate and continuing education courses with content not necessarily equivalent to already existing degrees and diplomas.
- 4) Incorporation of new technologies, which would lead to a new way of understanding education, a widening of the scope of university activity and greater competition among higher education institutions.

The new funding model shared many features with its predecessor. It also presented some significant differences, including the following:

- 1) Investment in infrastructure was included in the new funding distribution mechanism. In this way, each university decides on the funding allocated to operational expenditure and infrastructure. Under the earlier system, investment in infrastructure was determined separately.
- 2) The fundamental criterion for total university funding was that it should be equivalent to 1% of GDP, including funding for research from the Valencia Science and Technology Plan and financial costs of investments. The earlier system did not include these.

The objectives of this system and its predecessor are essentially those set out earlier, in common with the other systems described:

- a) To improve the quality of university education by improving the system’s internal efficiency.
- b) To establish a stable multi-year funding framework for each university, fostering institutional autonomy.
- c) To eliminate or reduce to the minimum discretionary elements in allocation of funds.
- d) To establish the proportion of funding from different sources in overall funding.
- e) To achieve cooperative and consensus-based management and operation of the Valencian university system as a whole.

---

<sup>32</sup> See: <http://www.niss.ac.uk>

<sup>33</sup> This section is a close paraphrase of the official programme description.

The Valencian government provides the bulk of operational expenditure and infrastructure funding for universities. The remainder comes from tuition fees, research, consultancy and other external services provided by the universities.

Funding for each university is determined by the sum of the following four components:

- a) A fixed sum assigned to each university to cover minimum operational costs (i.e., running costs). This sum is the same for all universities.
- b) Basic funding established according to teaching costs.
- c) Funding to cover costs deriving from state laws in which the universities have no decision-making role (teaching and research staff productivity bonuses, fee exemptions for members of large families and scholarship holders, entrance exam costs, etc.)
- d) Objectives-linked funding. Additional funding dependant on achievement of pre-established objectives.

The proportional weight of each of these components is as follows:

a) Fixed funding:	1.25%
b) Basic funding	
b.1. Ordinary subvention	68.75%
b.2. Fees	15.00%
b.3. Own resources	3.00%
c) Costs deriving from state and regional regulations	2.00%
d) Objectives-linked funding	10.00%

Basic funding is calculated in terms of the number of fulltime students (i.e., students registered for at least 65 credits per year). There are 15 weightings (net subvention) for fulltime students depending on branch of learning (five groups) and the type of course (first-second year, third-fourth year or longer combinations). The branch of learning coefficient varies between 1.1 (humanities) and 2.1 (medicine and dentistry). The number of fulltime students per theoretical subject group is 115, 50 and 80 for first-second year, third-fourth year, and longer degrees, respectively.

The calculation process is as follows: firstly, the standard average total cost ( $CMTE$ ) is calculated for each weighting rate  $j$ , as the sum of the average cost of teaching and research staff ( $CMPDI$ ), plus the average cost of administration and service staff ( $CMPAS$ ), plus the average cost of operational spending on goods and services ( $CMGGEN$ ), plus the average cost of maintenance, upkeep and provision of infrastructure ( $CMINV$ ):

$$CMTE_j = CMPDI_j + CMPAS_j + CMGGEN_j + CMINV_j$$

Average cost of teaching and research staff is based on the assumption that certain courses demand more teaching input per fulltime student than others, depending on the way in which the theory groups are divided up for practical classes.

Operational spending on goods and services includes general spending on (1) goods and (2) services related to classroom teaching and (3) laboratory fungibles. The first depends

on the number of students, the second on the number of teachers and the third on the type of course.

Basic funding (FB) is calculated according to the net subvention per student, or standard average total cost (CMTE), plus the number of fulltime students (NETC) or number of credits registered divided by 65.

$$FB = \sum CMTE_j NETC_j$$

$$NETC_j = \frac{CREDmat_j}{65}$$

Objectives-linked funding is distributed in accordance with accomplishment of objectives. The objectives (see Table 6) are common to all the Valencian universities.

**Table 6**  
**Objectives and indicators in the Valencian multi-year plan**

AREA	OBJECTIVE	INDICATOR
TEACHING	Increasing quality of teaching	Credits passed / Total credits Students graduating / Total students
	Reduction of number of groups with few students	Credits registered in subjects with theoretical groups of fewer than 15 students / Total credits
	Adapting supply to demand	Rate of first and second option admissions / Total admissions
	Improving quality of teaching	Investment in teaching equipment / FTT
	Increasing student mobility	Months spent by students in foreign universities / FTE
	Improving knowledge of foreign languages	Number of students with accredited language skills / Total students
R&D	Improving results	Publication indicators Number of patents registered / FTT
	Increasing resources	Contracts with external companies and institutions / FTT Competitive funding / FTT
	Fostering training	Number of doctoral students / FTT Theses read / FTT
POSTGRAD	Widening of postgraduate education	Number of students on specialised courses, continuing training or master's courses / FTT Class hours of postgraduate education / FTT
EMPLOYMENT	Raise graduate employment rates	Existence of employment office Number of students on in-company work experience programmes / FTE Final theses carried out in-company / FTE Ratio of employed graduates within first year / Total graduates
INNOVATION	Fostering creation of innovative companies	Number of company start-up projects evaluated / Graduates Number of prototypes in development / Graduates Number of companies established / Graduates
MANAGEMENT	Fostering the use of advanced management and administration techniques	Quality management certificates Participation in quality evaluation programmes Implementation of strategic management models
CULTURAL	Fostering bilingualism	Number of credits in Valencian language / FTT
	Disseminating university culture	Special promotional measures

FTT: Fulltime teacher equivalent (22 credits / year)

FTE: Fulltime students (65 credits / year)

Source: Programa plurianual de finançament de les universitats valencianes.

Objectives-linked funding (*FLM*) accounts for 10% of total funding and 14.55% of the basic subvention

Investments in new infrastructure and renovation of existing facilities during the period covered by the multi-year funding plan are set out in the second Valencian Investment Plan. The funding model provides for costs deriving from maintenance and amortisation of infrastructure as a component of the standard average total cost. Funding in the second Valencian Investment Plan is as established in the accords between the Valencian regional government and individual universities.

### 5.7 The Catalan Model<sup>34</sup>

In 2002, the Catalan Ministry of Universities, Research and the Information Society (DURSI) adopted a funding distribution model based on objective indicators, in line with recent European trends. The Catalan Generalitat's funding system for new degrees (established in 1992) and the programme-contracts (after 1997) were the system's antecedents.<sup>35</sup>

As in the majority of cases described above, the new Catalan funding model is a distribution mechanism: it determines proportional funding to be allocated to each university without entering into the issue of total overall funding. This is determined by Government policy and set out in the budget presented to Parliament.

Unlike the Valencian system, the Catalan model is not based on precise calculation of university costs. It is therefore purely a funding distribution model. The indicators employed for this distribution are only linked to operational expenditure; they do not include expenditure on infrastructure included in the University Infrastructure Spending Plan 2001-2006 or funding for R&D included in the Research Plans. In this regard, the Catalan system is very similar to those of other European countries in which infrastructure spending and the bulk of research funding are not included.

The funding allocated to each university comprises five components:

- a) A fixed subvention (SF) which is independent of university size, to cover administration, management, and Board of Trustees costs, etc.
- b) A basic subvention (SB), to cover expenses arising out of ordinary academic activity. This is the main category in total funding. Calculation of the basic subvention includes the total number of registered credits (weighted by the academic structure coefficient and the repetition coefficient), the number of new students (weighted by the number of theoretical credits and the academic structure coefficient), the number of graduates (weighted by the number of theoretical credits and the academic structure coefficient) and the constructed surface area expressed in square metres. The weighting of these four indicators is as follows: credits

<sup>34</sup> For a more detailed description see PALLAROLS *et al.*, 2003.

<sup>35</sup> These two mechanisms are still in vigour.

registered: 45%; credits registered by new students: 15%; credits registered by those graduating: 30%; and surface area: 10%. This distribution places the Catalan model in an intermediate position between input-based and output-based systems: the input indicators (credits registered, credits registered by new students and surface area) represent 70% of the total, while the output indicator (graduate credits) accounts for the remaining 30%.

- c) The derived subvention (SD) aims to facilitate employment and promotion of teaching staff via criteria of academic excellence (merits). It covers employer's Social Security payments for teaching staff, research tranches, bonus payments for teaching and research merits and the teacher promotion programme.
- d) The strategic subvention (SE) provides funding to cover work in the area of quality assurance and strategic planning. It comprises two parts: funding of new degrees and programme-contracts.
- e) Finally, the competitive subvention (SC) includes all public competitive funding schemes open to all universities in which funding is distributed according to quality criteria as set out in the general conditions. The funding provided includes resources for promotion of the Catalan language, participation in the International Graduate School of Catalonia, educational quality programmes, etc.

Therefore, the total subvention for the university  $i$  ( $STT_i$ ) is calculated as follows:

$$STT_i = SF_i + SB_i + SD_i + SE_i + SC_i$$

One important problem in implementing a new funding distribution system is its impact on the overall funding received by each university. In principle, changing the funding system could lead to a reduction of funding for some universities. Therefore, the majority of systems include provision for a transition phase. The Catalan system is no exception. The basic condition is that no university should lose funding relative to the year before introduction of the new system. The transition phase ensures gradual increase of funding for those universities entitled to a rise under the new model, and yet prevents other universities from suffering a drop in funding. The transition phase will last four or five years.

## **6. Some final observations on university funding**

In this article we have seen how many countries have adopted funding distribution systems based on objective criteria. This serves to avoid an ongoing process of negotiation-renegotiation and leads to a certain reciprocal activity whereby the universities receive funding in accordance with their compliance with objectives which are deemed beneficial for the wider society. The mechanism would appear to be effective in creating incentives for efficient use of increased funding.

Much more problematic is the issue of just how much funding should be provided to higher education and the proportion of this funding which should come from private or public

funds.<sup>36</sup> In the second section, we have seen that as a percentage of GDP, Spanish spending on higher education is similar to the European average. Certain analysts point out that Europe is not a valid framework for comparison, since it is still far behind the countries that spend most on higher education, such as, for example, the United States (2.3% of GDP) and South Korea (2.4%). However, comparison with these two countries is not valid either, since the mix of public and private funding is very different. Indeed, at 1.1 of GDP, public funding of higher education in the United States is similar to the European average, whereas in South Korea public funding only accounts for 0.5% of GDP.

There has also been criticism of the fact that Spanish universities are not free, unlike in the Nordic countries, where public funding of higher education is much higher than the European average. However, such comparisons fail to take into account the fact that the Nordic countries apply highly progressive tax systems, in which those earning more pay much more. In such a system, it could hardly be expected that the rich should also pay university fees, having already paid them more than adequately through their taxes. In fact, the rich pay more for university services even though there are no fees. The Spanish tax system bands are not so varied; indeed, a great proportion of tax revenue derives from indirect (proportional) taxes and the bulk of income tax is from salaried employees (75% in 1999), while capital gains tax has been falling in recent years. In this context, it is logical that students from families earning more should pay a higher proportion of their university education, given that their contribution to income tax is relatively low. The Spanish tax system provides a wide margin to self-employed professionals and business people in fiscal self-assessment which, unfortunately, rules out any developments along the lines of the Nordic systems. Tax inspection services are now beginning to use income indicators such as cars owned, jewellery purchased or house valuations.<sup>37</sup>

The third section above has highlighted the clear inadequacy of the Spanish higher education grants system, no matter what the terms of comparison are. At present, student grants do not cover living costs, and are entirely insufficient as a means of ensuring equal opportunities of access to higher education, i.e., improving the opportunity cost of third level education for low-income families. This situation is incompatible with the concept of a competitive university system, in which universities compete to attract students in an overall context of stabilised or decreasing student numbers.

In summary, the relation between public and private higher education depends on the structure and functioning of the country's tax system. In the case of Spain, it would seem logical to introduce significant fee increases for students from wealthy backgrounds and to use these funds to provide grants to other students to cover accommodation expenses and compensate for opportunity cost. In itself, this mechanism would generate competition for students among the universities and would lead to higher educational quality and greater attention to social and labour market demands. In such a context, university autonomy would also develop its full potential, since when funding is distributed in accordance with objective criteria, the university can decide itself how it wishes to spend these resources, and has full control over its teacher contracting policies.

---

<sup>36</sup> An important issue, although one which is too complex to be dealt with in this article, is the question of the benefits to society of university education. Activities subsidised by the public sector should lead to benefits for society in general. While it is clear that university studies are beneficial on a private level (in the form of higher future salaries for the individual), the question of the general benefits to society is much less clear.

<sup>37</sup> These criteria are increasingly employed by tax inspection bodies to detect discrepancies between real income and declared income for tax purposes.

## 7. Conclusions

This article presents a general overview of higher education funding in Europe and the specific procedures employed in various countries for distribution of funding among the educational institutions.

The negative mid-term demographic prospects for student numbers and the weak empirical evidence for the link between resources allocated and educational quality has shifted debate away from the total quantity of funding to the issue of efficient distribution of funding. For this and other reasons, in recent years many countries have adopted mechanisms based on objective criteria (generators of appropriate incentives) for distribution of higher education funding. The general trend is towards distribution formulas which allocate greater weighting to output indicators (graduates, credits completed, pass-rates, etc.) as opposed to input indicators (for example, student numbers).

## REFERENCES

ARCELUS, F. and F. COLEMAN. «An efficiency review of university departments». *International Journal of System Science*, 1997, vol. 28, p. 721-729.

BANTA, T., L. RUDOLPH, L. VAN DYKE and H. FISHER. «Performance funding comes with age in Tennessee». *Journal of Higher Education*, 1996, vol. 67, p. 23-45.

BEASLEY, J. «Determining teaching and research efficiencies». *Journal of the Operational Research Society*, 1995, vol. 46, p. 441-452.

BEVERWIJK, J. and S. DE LANGE. *Higher education in Flanders. CHEPS Higher education monitor (Country reports)*. Twente (The Netherlands): CHEPS, Universiteit Twente, 1999.

CABALLERO, R., T. GALACHE, T. GÓMEZ, J. MOLINA and A. TORRICO. «Budgetary allocation and efficiency in the human resources policy of a university, following multiple criteria». *Economics of Education Review*, 2004, in press.

CANTON, E. and B. JONGBLOED. «The Dutch higher education system». In CPB & CHEPS, *Higher Education Reform: Getting the Incentives right*. The Hague: SDU Uitgevers, 2001, p. 15-33.

CANTON, E. and P. VAN DER MEER. «Funding higher education: the Danish taximeter model». In CPB & CHEPS, *Higher Education Reform: Getting the incentives right*. The Hague: SDU Uitgevers, 2001, p. 85-99.

CANTOR, N. and P. COURANT. «Scrounge we must: reflections on the whys and wherefores of higher education finance». Prepared for CHERI Conference on Higher Education Finance, Cornell University, May 22, 2001.[on line] Ann Arbor, Michigan: University of Michigan, Office of the Provost, 2001. Available at: <<http://www.umich.edu/~provost/speeches/cornell.html>>

CHAPMAN, B. «Conceptual issues and the Australian experience with income contingent charges for higher education». *The Economic Journal*, 1997, vol. 107, p. 738-751.

FANDEL, G. and T. GAL. «Redistribution of funds for teaching and research among universities: the case of North Rhine-Westphalia». *European Journal of Operational Research*, 2001, vol. 130, p. 111-120.

HANUSHEK, E. «The failure of input-based schooling policies. *The Economic Journal*, 2003, vol. 113, p. 64-98.

HANUSHEK, E. and D. KIMKO. «Schooling, labour force quality and the growth of the nations». *American Economic Review*, 2000, vol. 90, p. 1184-1208.

HEFCE. *Funding Higher Education in England. How the HEFCE allocates its funds*. Bristol: Higher Education Funding Council, 2002.

HERNÁNDEZ, J. *La universidad española en cifras. Información académica, productiva y financiera de las universidades públicas en España (año 2000). Indicadores universitarios (curso académico 2000-2001)*. Madrid: CRUE, 2002.

HOXBY, C. «The effect of class size on students' achievement: new evidence from population variation». *Quarterly Journal of Economics*, 2000, vol. 115, p. 1239-1285.

JONGBLOED, B. and H. TEEKENS (eds.). *The financing of higher education in Sub-Saharan Africa*. Utrecht: Lemma, 2000.

KAISER, F., H. VOSSENSTEYN and J. KOELMAN. *Public Funding of Higher Education. A comparative study of funding mechanism in ten countries*, mimeograph. Enschede (The Netherlands): CHEPS, 2001. Available at: <<http://www.utwente.nl/cheps/documenten/engart01fundingmech.pdf>>

KLEMPERER, A. *Higher education in Sweden*. CHEPS Higher education monitor (*Country reports*). Twente (The Netherlands): CHEPS, Universiteit Twente, 1999.

KOELMAN, J. «The funding of universities in the Netherlands: developments and trends». *Higher Education*, 1998, vol. 35, p. 127-141.

KRUEGER, A. «Experimental estimates of education production functions». *Quarterly Journal of Economics*, 1999, vol. 114, p. 497-532.

KRUEGER, A. «Economic considerations and class size». *Economic Journal*, 2003, vol. 113, p. F34-63.

LONDON SCHOOL OF ECONOMICS. *Review of funding options for higher education in the UK. A report for universities in UK*. London: London School of Economics, 2000.

MAAT, L. VAN DE. *Higher education in Germany*. CHEPS Higher education monitor (*Country reports*). Twente (The Netherlands): CHEPS, Universiteit Twente, 1999.

MARTIN, J. C. and A. VERDAGUER (1999), *The financing of the French higher education system*. Paper presented at the BRACARA project seminar on the financing of the higher education systems. Mexico City, February 8-10, mimeograph.

MORA, J., J. PALAFOX and F. PÉREZ. *La financiación del sistema universitario valenciano*. València: Edicions Alfons el Magnànim, 1993.

NATIONAL COMMISSION ON HIGHER EDUCATION (NCHE), «Current mechanism for the distribution of government funds to higher education». Pretoria NCHE, 1996. Available at: <<http://star.hsrb.ac.za/nche>>



NATIONAL COMMITTEE OF INQUIRY INTO HIGHER EDUCATION. *Higher education in the learning society (Dearing Report)*. London: NCIHE, 1997. Available at: <<http://www.leeds.ac.uk/educol/ncihe/>>

OECD. «Financing lifelong learning in tertiary education». *Background paper* for the Ottawa International Conference, December 7-8, 2000. Paris: OECD, 2000. Available at: <<http://www1.oecd.org/els/pdfs/EDSFLDOCA028.pdf>>

OECD. *Education policy analysis. 2001*. Paris: OECD, 2001.

OECD. *Education policy analysis. 2002*. Paris: OECD, 2002.

OECD. *Education at a glance. 2003*. Paris: OECD, 2003.

PALLAROLS, E., S. LACRUZ and J. RIBAS. «El model de distribució del finançament de les universitats públiques catalanes». *Coneixement i Societat*, 2003, núm. 1, p. 104-113.

RIBAS, J and J. M. VILALTA. «La gestió dels contractes programa entre les universitats públiques catalanes i la Generalitat de Catalunya». *Coneixement i Societat*, 2003, núm. 2, p. 86-99

TAYLOR, B. and W. MASSY. *Strategic indicators for higher education: Vital benchmarks and information to help you evaluate and improve your institution's performance*. Princeton, New Jersey: Peterson's, 1996.

TENGNER, O. (ed.). *Swedish universities and university colleges: annual report 2002*. Stockholm: Högskoleverket, 2002.

VOSENSTEYN, J., B. JONGBLOED and J. KOELMAN. *University funding mechanisms and related issues: a comparative analysis of the funding in eight Western European countries*. Enschede (The Netherlands): CHEPS, 1998.

WRAN COMMITTEE. *Report of the Committee on Higher education funding*. Canberra: Australian Government Publishing Service, 1998.