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Funding models of Universities of Applied Sciences

International experiences and options for the Swiss case

Report on behalf of the
Rector's Conference of Swiss Universities of Applied Sciences

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Summary

This report has been prepared on request of the Rector's Conference of the Swiss Universities of Applied Sciences (KFH) as a contribution to the debate on the reform of funding models for Swiss higher education institutions foreseen with the new university act. In this context, its aim is to highlight the possible options and their underlying conceptual choices and to review the recent experience and policies in other countries, which introduced reforms of higher education funding during the last years, by addressing also specific issues for UAS like the funding of educational activities, the funding model for research and to which extent it is reasonable to adopt for UAS the same funding model as universities and which would be the implications of this choice.

The main results of the report can be summarized as follows.

1) Firstly, there is no so such thing as optimal funding model, but *the choice between allocation models is essentially a matter of political choice about the goals to be achieved and the wished configuration of the higher education system*, for example between an efficient use of public means, the development of research, quality of education and, finally, access to education. In this context, the main questions which need to be answered when designing a funding model are:

- the degree of autonomy of individual institutions in their functioning and budgeting vs. the direct control of the state (the supervision model based on objectives and results vs. the direct state control on cost items).
- the relative contribution of the state and of the students to the funding of higher education (education as a public good vs. education as a private service paid by its customers).
- the relative importance of the educational and research mission (the mixed model of teaching-research vs. the concentrated model with research-intensive institutions alongside teaching-only schools).
- the extent to which higher education institutions can (and/or) should be differentiated in their mission and functions and, in particular, the degree of diversity between UAS and universities (the binary model vs. the unitary model).

2) In this context, the today's funding model for UAS can be characterized as follows:

- a rather *high degree of state control* in the budgeting through the use of standard costs as the main planning tool and the clear separation between educational budget.
- Essentially *a free access to higher education* with tuition fees covering just a nominal share of educational costs.
- the *primacy of the educational mission* against the research mission, which is translated in a much lower share of the general budget invested in research than for universities. Conversely, a strong investment in education translated in pure educational costs which are generally higher than in universities (with the exception of the technological domains).
- a funding system which is *conceptually different than for universities* for many respects: a cost-based model instead of a lump sum allocation based on criteria, the separation between research and educational budget against a single budget, different institutional priorities (education vs. research).

Based on these results and on the international comparisons there are at least three major issues which need to be carefully discussed concerning the future funding model for UAS.

1) The first concerns the *budgeting system and the degree of autonomy of the institutions themselves*. Namely, there are some good reasons why the today's systems based on cost reimbursements and detailed accounting of activities should be replaced by a more output-oriented system where the state agrees with the HEI on specific objectives (research results, students enrolled, diplomas) and a price is set for these services.

Main reasons include the possibility of setting stronger incentives for efficiency, but most importantly leaving more autonomy to individual institutions on how to organize themselves and how to define their institutional priorities. This is essentially especially if research has to play a greater role in UAS.

In practice, the international experience shows that there are many possible choices concerning the design of the prices and that most countries adopted a mixed model including a cost-related component (for example using number of students or with an historical basic allocation) alongside a more result-related component (for example based on third-party funds or number of degrees).

It important to remark that switching to a price system does not imply deregulating higher education and abolishing state control, but *rather redefining the respective roles of the state and of the institutions and their relationships*, including also the set-up of a sound monitoring and evaluation mechanism of the delivered outputs, concerning the quality of education (for example through accreditation) and the quality of research (with systematic evaluation).

2) There is wide agreement in the international discussion that, given the private returns of higher education and differences in access, *substantial contribution of students to their study costs* is not only justified in financial terms, but also equitable and can foster to some extent more informed choice of the study. However, we recognize that this issue needs to be dealt for the whole Swiss higher education system. Moreover, since sizeable tuition fees have to be accompanied by suitable support to be available for low-income classes, this critically requires that the Cantons accept to harmonize their student support schemes for higher education and that these are reinforced.

3) Thirdly, UAS are faced to critical choices concerning their research activities. Firstly, it has to be decided *if research should have a higher institutional priority than in the today's situation*, which would largely mean reducing educational costs (respectively to limit the expansion of education) to free resources to support research (especially in the soft domains, where educational costs are significantly higher than in universities). This is a difficult strategic choice and UAS have to be aware of its implications, since it could mean weakening their profile as providers of high-quality professional education which is nowadays their main strength. It is important to notice that third-party funds are no substitute for institutional priorities, since in reality the acquisition of these funds depends critically on the funding base from the general budget.

Secondly, there are some critical choices concerning *the function of research and the internal repartition of funding*, between a demand-oriented model – where research is performed basically where there is external demand for it and for related services – and a model where research is seen as closely linked to education and thus largely spread across all domains. Given the today's available means there are clear trade-offs between these two models which have to be acknowledged. The chosen funding model will differ correspondingly.

4) Finally, behind the discussion on funding models, there is a much broader issue on the *future of the binary divide and of the distinction between universities and UAS*. As the experience in other countries displays, the permanence of this distinction can rest only on the definition of clear distinct profiles concerning education and research; otherwise, in a long term perspective, unification is likely to prevail (like in the UK and Norwegian case).

Now, both distinctions are also in the Swiss context under pressure: the adoption of the Bologna model means some blurring of the boundaries between UAS and university curricula and requires an attentive redefinition of these profiles. At the same time, broadening the research mandate to all domains and linking it to education (rather to technology transfer) brings the research profile of UAS nearer to universities. When taking choices UAS should be aware of these long-term and systemic implications for their governance and for funding.

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List of abreviations

BBT	Bundesamt für Berufsbildung und Technologie
BMBF	Federal Ministry for Education and Research (Germany)
CTI	Swiss Innovation Promotion Agency
Do-RE	Do Research program
FIT	Federal Institutes of Technology (ETH)
FTE	Full Time Equivalent
HEI	Higher Education Institutions
KFH	Rector's Conference of Swiss Universities of Applied Sciences
RAE	Research Assessment Exercise (UK)
R&D	Research and Development
SFSO	Swiss Federal Statistical Office
SME	Small and Medium Enterprises
SNF	Swiss National Science Foundation
UAS	Universities of Applied Sciences

1 Introduction

This report has been prepared on request of the Rector's Conference of the Swiss Universities of Applied Sciences (KFH) as a contribution to the debate on the reform of funding models for Swiss higher education institutions foreseen with the new university act which should entry into force around 2012. Namely, the report published in 2004 foresaw the harmonization of the financing of education through the widespread adoption of standard costs at the Swiss level and the funding of research through competitive funds (SNF, CTI) and through an overhead to cover general costs of research (Département fédéral de l'intérieur 2004).

This strategic orientation has been largely confirmed by the recent message on funding of research, higher education and innovation for the years 2008-2011 where a significant increase of the financial means for project funds and the introduction of an overhead on SNF funding has been proposed (Conseil fédéral 2007).

Now, the choice of a funding model in higher education is not just matter of technicalities, but it involves some political choices on how the whole system should be organized and managed. This includes for example the degree of autonomy of individual institutions vs. central steering from the state; the extent of differentiation between the institutions and among them among internal units; the definition and the weight of different institutional missions, especially between education and research. Further, it involves the weighting of different objectives which are to some extent conflicting, like promoting access to higher education, developing research and its transfer to economic innovation and achieving an efficient use of public money. All of this in the framework of the budgetary constraints of public powers, implying that choices have to be made requiring also some trade-offs between different policy goals.

In this context, the aim of this report is to highlight the different options and their underlying conceptual choices and to review the recent experience and policies in other countries, which introduced reforms of higher education funding during the last years. It will also address some specific issues relevant for Swiss Universities of Applied Sciences, especially in respect to the different scenarios for their positioning and the development of research (Lepori and Attar 2006).

More specifically, I will deal with three (largely interrelated) questions:

- How should educational activities be funded? Which should be the sources of funds (for example public vs. students and their families) and the allocation criteria?
- How should research be funded? Is today's funding system largely based on third-party funds sustainable in the long run?
- to which extent is it convenient to harmonize the funding model of UAS with that of universities and which would be its implications?

As it will be clear later, there are no unique answers to these questions, but they critically depend on the overall policy goals about UAS and their role in the Swiss higher education system. Hence, the need of considering together the goals and the funding system chosen to implement them.

The report is organized as follows. In the first chapter, I present an overview of the main funding channels for higher education. Further, I present a general view of today's discussion on higher education funding and of the main changes in Western European countries. The third chapter looks more specifically to the funding model of universities of applied sciences in other countries, while the fourth chapter analyses today's funding model of Swiss UAS and compares it with universities. Finally, the last section, based on these results, discusses the possible options for the future funding system.

Aknowledgment

The author would like to thank for their useful comments to this report Ben Jongbloed (CHEPS, University of Twente), Hans-Kaspar von Matt (KFH), Carole Probst (University of Lugano) and Fiorenzo Scaroni (CTI).

2 Funding channels for higher education: an overview

Figure 1 displays a simple representation of the main funding channels for higher education in most developed countries (Jongbloed 2004).

We notice that *we consider here jointly funding for educational and for research activities*, since the two are in most cases so interconnected that a neat separation would be impossible; in fact, it is more correct to consider higher education institutions as organizations which, from a set of resources (human and financial) produces jointly different outputs, including degrees, doctorates, scientific publications, technological results. This does not exclude that some categories of funding are attributed in priority for research or for education, but there can be a great deal of variation on how these funds are effectively used, depending on the internal organization of each institutions, on the accounting system, etc. Actually, the issue on *how to manage the relationship between education and research*, both at the level of funding allocation and of the use of funds, is central for the choice of the funding model of higher education. I will further discuss this issue in the last part of the document.

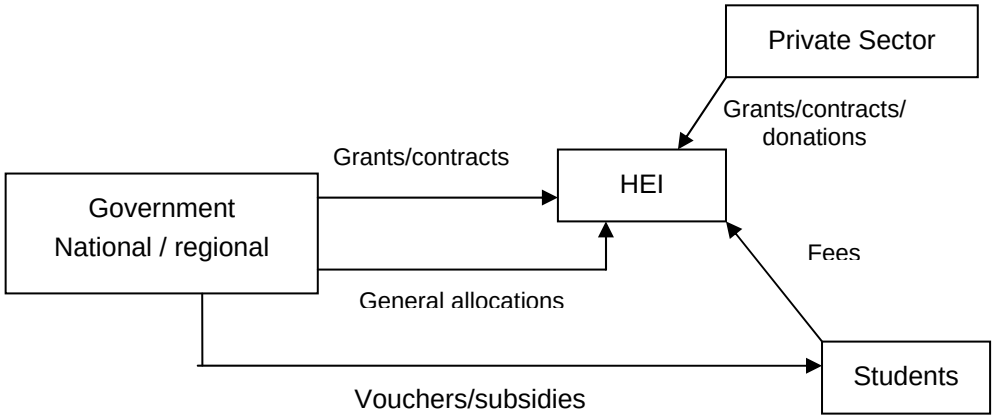


Figure 1. Funding channels for higher education

We can broadly distinguish between four main funding streams.

a) *Government allocations*. These are contributions from the state (national, as well as regional, especially in federal countries like Germany, Spain and Switzerland, but also to some extent in other countries) which are attributed to the institution for its normal functioning, like paying permanent staff and most functioning expenditures. In most cases these funds are attributed to the institution globally, leaving the decision on the internal repartition to the university itself, but there are still cases (like in France) where the state decides to a large extent on the allocation.

There are a number of possible allocation mechanisms for these funds; a simple categorization includes (Kaiser et al. 2001; Benninghoff et al. 2005):

- Negotiated allocation based on historical criteria, using the previous year level as a baseline.
- Negotiated allocation but based on input or performance indicators.
- Formula-based allocation. In these cases there is a mathematical formula calculating the allocation for each institutions based on a set of indicators.

It is worth noting that, while the allocation is attributed jointly for all institutions activities, its calculation is in many cases separated between education and research. As the following figures displays, these allocation mechanisms can be situated on a continuum between centralized steering towards more transparent and market-based models. As a matter of fact, almost all countries adopted a combination of these models to balance their respective advantages and disadvantages.

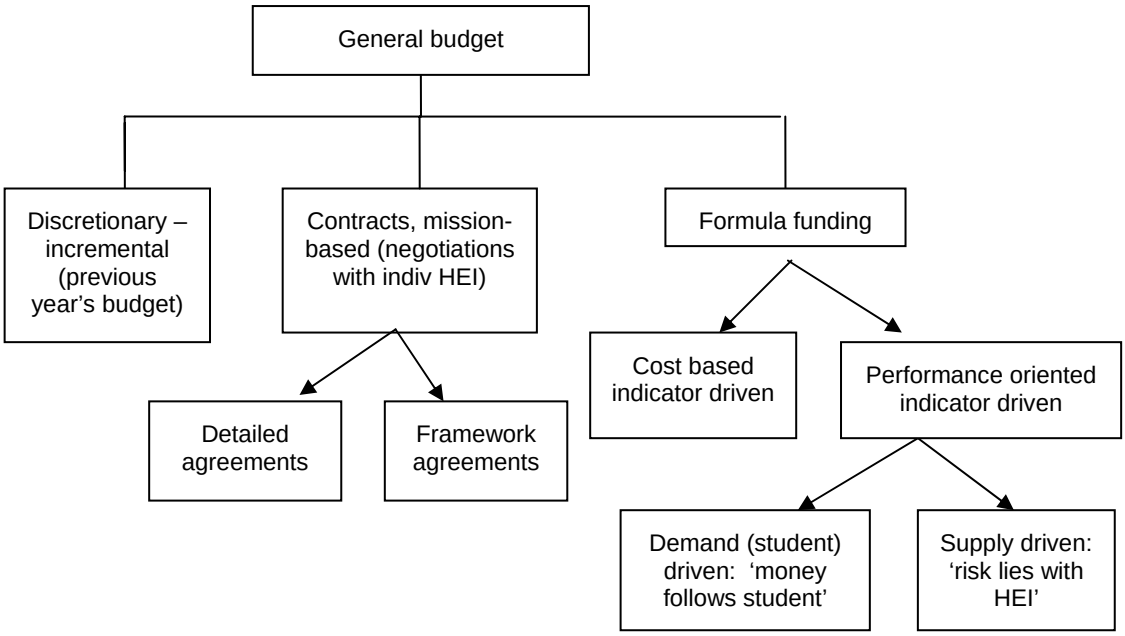


Figure 2. Mechanisms for allocation of general budget

Adapted from Leszczensky et al. 2004.

b) *Grants and contracts from the government*. This is money for research projects or other specific activities, mostly for a limited period of time and attributed directly to specific subunits (for example laboratories). Examples are competitive grants from research funding agencies, European framework programs, contracts from the government departments (see Lepori et al. 2007 for a more complete discussion of project funding). Generally speaking, most of these funds are attributed for research, but there might also be some service or educational component; We notice also that there are some borderline cases with general government allocations, like funds earmarked to specific activities in the general budget.

c) *Grants, contracts and donations from private companies*. A borderline case are private charities, which in some countries like UK play an important role in some sectors and in many cases adopt similar competitive procedures as research councils.

d) *Funding from the students* in the form of tuition fees for attendance to curricula or different types of courses. It is useful to distinguish between fees for undergraduate students, which are in most cases fixed by the state, and fees for postgraduate education where institutions have a larger freedom to set the level. In all countries these fees are to some extent subsidized by the state especially for lower income people.

Useful readings

The two following texts present an overview of the main issues concerning higher education funding, including its main conceptual aspects.

Lepori B. (2007), Options et tendances dans le financement de l'éducation supérieure en Europe, draft paper to be published in Critiques Internationales.

http://www.common.unisi.ch/pdf_pub2858

Jongbloed B., Funding higher education: options, trade-offs and dilemmas, Paper for Fullbright Brainstorms 2004 – New Trends in Higher Education.

http://www.utwente.nl/cheps/documenten/engpap04fundinghe.pdf

3 Higher education funding: critical choices and international experiences

In this section, I discuss the main changes concerning higher education funding in a number of European countries; the focus is on the overall trends and debated issues rather than on the specific situation of each country, on which good reviews are available (see Lepori et al. 2007a; Benninghoff et al. 2005; Leitner et al. 2007). I will specifically concentrate on the following issues:

- the share of *general government allocations* in the total budget of these institutions, respectively the share of other funding sources, including grants and contracts (mostly for research) and tuition fees (for education).
- the model for the *allocation of general funding*.
- the level and the composition of *contract funding* and its importance for the funding of research activities.
- finally, the extent to which funding for educational activities is channelled *through the students themselves*, either as a direct contribution or as mean to allocate public funds (for example through learning entitlements).

3.1 Data sources

Besides the existing literature and national sources, I use some results of a study financed by the Institute for Prospective Technological Studies of the European Commission (CHINC project) which allow for the first time to get a quantitative view of these changes.

This project was established to find evidence of changes in the funding of higher education institutions over the last 10 years in a selection of European countries and of their consequences for research and innovation activities. It covered 11 countries and utilised a combination of quantitative and qualitative methodologies to find systematic and comparable evidence. Quantitative data were collected from 117 institutions and interviews performed with leaders of 97 institutions. Table 1 displays some descriptive information on the sample.

	N. of Institutions	Institutions in the sample	Average number of students in the sample
Czech Republic	64	10	15397
Denmark	55	7	12147
France	105	12	15954
Germany	334	9	20157
Hungary	66	7	14095
Italy	77	14	35485
Netherlands	72	8	16379
Norway	44	10	8357
Spain	66	16	40823
Switzerland	19	12	7064
UK	90	12	13337
Total	*992*	*117*	*19828*

Table 1. Sample description (2002)

Source: CHINC project.

The sample contains also a number of non-university higher education institutions, but their number is too small to draw significant conclusions; for this reason, I shall concentrate here on universities, while discussing the specific situation of Universities of Applied Sciences in the next section.

The interest of these data is that they allow comparing the political discussion and the declared objectives with the real practices of funding, which give back in many cases a picture of much stronger stability and more moderated changes than the official declarations.

Useful readings

The CHINC final report is a useful reading of quantitative and qualitative results concerning higher education funding in Europe, including also interviews to university leaders.

CHINC project (2006), Changes in University Incomes and their Impact on University-based Research and Innovation, Final report.

http://www.common.unisi.ch/pdf_pub2859

3.2 Changing funding streams

Historically, general allocations made the largest part of the total budget of universities, but there has been in the last years a tendency to some decrease. The rationale has been to push individual institutions to adopt fund-seeking strategies and to compete on "markets", either for students (paying rather high fees) or for contracts to finance their research activities; at the contrary, high shares of general funding tends to imply a stronger direct state control on individual institutions (especially in negotiated settings). We notice that this shift towards less general allocations does not necessarily mean reduced state investments since a part of this external money might come from the state, either in the form of research contracts or as support to students (for example loans).

Our data show that, while some decrease has truly happened, for all considered countries except the UK general allocations still account for the largest part of the budget (see Figure 3): in fact, 10 of the 12 institutions below 50% are in the UK. Our data confirm also a general trend of the share of government allocations decreasing in the other countries, but this is particularly important for the institutions that started in 1995 with a share above 80%, while for those starting under 60% changes have been less dramatic.

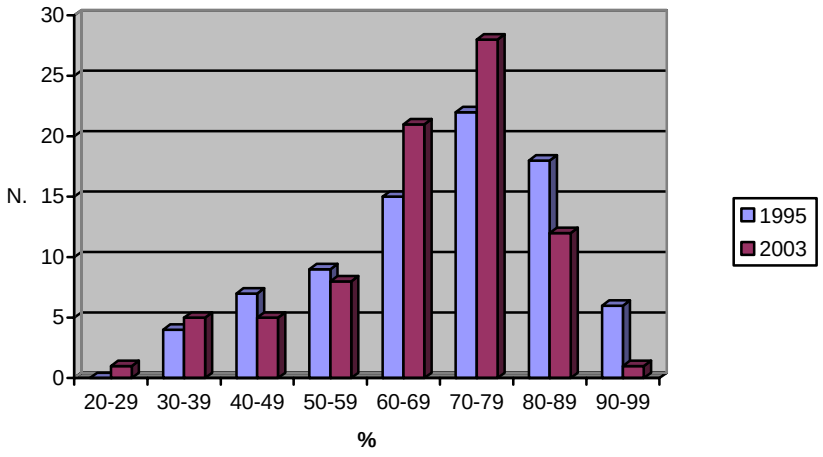


Figure 3. Government appropriations as % of total revenues: number of institutions in each class for the years 1995 and 2003

Source: CHINC project. Data for Italy are for 2002 instead of 2003.

Thus, while all considered countries have put some incentive to HEI to acquire external funds, this pressure has been rather moderate and has essentially concerned the acquisition of contract funding for research, while keeping at the same time a large funding base for education and some general funding of research. The exception is the UK, where external

funding accounts for about 2/3 of the total budget and thus it has become essential for the institutions to orient themselves towards activities where they can get external funding either through contracts or by recruiting students paying high tuition fees.

3.3 Changing allocation models

Relevant trends for the allocation of general funds include the introduction of a global budget, separation of research and educational allocation and the use of formulas for the calculation of the educational component.

A first trend has been the shift from line-item budgets – where funds are allocated to HEI for well-specified items and activities – to the allocation of a *global budget* whose internal repartition can be decided by the university itself. At least formally, this method is now adopted in almost all countries, with some exceptions like France and a number of German Länder where the university professors are still employed and paid directly by the ministry.

The underlying rationale is to leave to universities a higher degree of freedom in orienting their priorities (of course, inside the objectives agreed by the state) and in allocating the money internally. However, we remark that, beyond the formal budgetary arrangements, the real freedom in the internal allocation depends very much on the power share between state authorities, HEI directions and internal units and on their competences concerning HEI organization (for example, the right to close down curricula or institutes). I will come back on this issue in the concluding chapter.

A second major trend has been the shift from historically-based allocations to allocations either *negotiated on the basis of some parameters* or *directly calculated with a mathematical formula*. In most countries, general allocation is now divided in an educational and a research component, calculated separately and using different criteria. We notice that in almost all cases the institutions are free to use these funds either to research or to education.

In most cases, the *educational component* is now calculated on the basis of the number of students enrolled and of standard tariffs for groups of disciplines, meant to reflect the differences in cost levels. However, formulas based on graduation rates or other incentives to increase success rates are being introduced increasingly. Two relevant examples are the Danish taximeter model, where allocation is calculated only on the basis of the passed exams, and the Dutch model where half of the educational component is calculated on the basis of passed exams. Almost all models contain however some stabilizing device to protect institutions from short-term fluctuations, like the basic component of funding in Norway or procedures averaging the last years student's numbers.

Despite a widespread discussion on incentives, the *research component* is in most countries largely distributed through historical criteria, even in the countries where it was meant to introduce rather competitive elements. A typical example is The Netherlands, where 70% of the research allocation is composed by a strategic allocation, which is de facto an historical component. A similar case is Norway, where 60% of the overall general allocation is a basic component meant to ensure stability of revenues. A performance-based component is present in many countries based on third-party funds and scientific publications (Norway), doctorates and doctoral schools (Netherlands), but should be understood as a correction and soft incentive to efficiency.

The exception to this pattern is the UK, where the largest part of the research component of general funding has been attributed since 1992 through a formula based on a specific evaluation of the research quality, named the Research Assessment Exercise. The RAE is a peer-review based evaluation system where domain-specific committees evaluate the quality of research in each university based on a specific set of criteria, including the four most important publications of the last four years, third-party funds, number of researchers, etc. (Leitner et al. 2007; Geuna and Martin 2003; Barker 2007).

A very important feature of the RAE is its direct link between the RAE grade and the funding allocated and the very steep scale used, where grades 1, 2, 3 receive no funding at all, while grade 4 is weighted 1 and grades 5 and 5* 3 and 3,7 respectively in the formula. The result is a very strong concentration of basic research allocation, where just ten UK universities received in 2005-2006 55% of the total funding volume.

There has been a wide discussion on advantages and problems with the RAE, both concerning the quality of the evaluation, its positive and adverse impacts and the financial and administrative burden of this exercise. Recently it has been decided to replace the RAE

after 2008 with an allocation method based on indicators, like scientific publications and citations, third-party funds etc.

However, in terms of the funding pattern, the RAE has proved to be successful to pursue the explicit policy objective of concentrating the financial means on a small number of institutions and of promoting a stable stratification between top-level research institutions and education-intensive institutions, including Oxford, Cambridge and a small number of other reputed universities. This is coherent with a conception of the higher education system where all institutions have the same legal status, but there is a clear hierarchy concerning their reputation and functions.

Useful readings

There are a number of recent comparative analyses on higher education funding in European countries. Below a Swiss study as well as the most recent report published by the OECD programme on Institutional Management of Higher Education (IMHE).

Benninghoff M., Perellon J.,-F., Leresche J.-Ph. (2005), L'efficacité des mesures de financement dans le domaine de la formation, de la recherche et de la tecnologie, Université de Lausanne.

http://www.unil.ch/webdav/site/osps/shared/12_MesuresFinancement.pdf

Strehl F. (2007), Funding Systems and their Effects on Higher Education Systems, OECD, Paris.

http://www.oecd.org/dataoecd/36/23/38279332.pdf.

On evaluation mechanisms and more specifically on the RAE one can look to the two following papers:

Barker K. (2007), The UK Research Assessment Exercise: the Evolution of a National Research Evaluation System, Research Evaluation 16 (1), 3-12.

Geuna A., Martin B. (2003), University Research Evaluation and Funding: An International Comparison, *Minerva* 41: 277-304.

3.4 The increase of project funds

The increase of the share of project funds – i.e. funding allocated directly to individual units for specific activities, mostly research – has been a general tendency which emerges in almost all European countries. The underlying idea is that through this mechanism governments have the possibility of more directly targeting individual units by using specific criteria – for example the quality of research or its social or economic relevance – than through general allocations.

The quantitative data show that this trend is present in all European countries considered and for most institutions. A typical share of grants and contracts in the overall revenues of the universities lies today in the range between 15% and 25% (Figure 4).

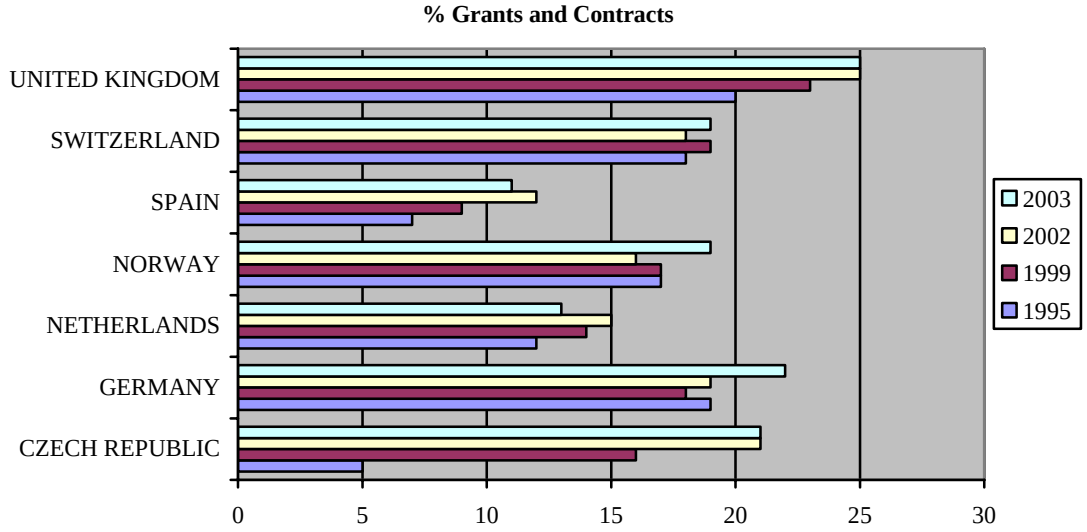


Figure 4. Share of grants and contracts in total revenues

Source: CHINC project. Unweighted average of the institutions in the sample.

An important feature of contract funding is *its skewed distribution among individual institutions*. Namely, for some institutions the share of external contracts is larger that ¼ of the total budget, while for others the share is lower than 10%. Our data display also an important mobility between institutions over the last ten years, with some institutions having, in 1995, very low levels of grants and contracts are strongly increasing the following ten years. Thus, while contracts are a selective instrument for allocating research funding, in the context of a strong general increase of the total volume of project funding also institutions with low starting level have some opportunities to catch up. In this respect, allocation through project funds (at least if coupled with a general funding allocation that is not very competitive) seems to leave much room for institutional mobility and for institutions for building-up their research capacity.

However, there are significant implications of this increase concerning the internal governance and structure of higher education. Namely, in today's settings, external contracts usually cover only the direct costs of research activities, but pass on indirect costs to the general budget of the institutions. These means that units successful in getting external contracts tend to absorb a share of the general resources for research and thus to increase internal differences in research activities.

Thus, it is likely that *project funding alone tends to increase differences between internal units* in the research capacity, depending on their quality, but also on the different availability of project funds across domains and types of research. In this respect, institutional policy in managing the link between general funding and project funding plays a critical role in the development of research, especially in systems largely based on external funding: the choice is between systems where general funding follows project funding (for example using overheads), reinforcing the differences between units, and policies which tend to distribute general funds for research more broadly (to the extent they are available).

Moreover, the increase of the share of project funding implicitly shifts the definition of priorities concerning research from the institutions to the funding agencies and thus a funding system for research based on this instrument requires the definition of political priorities at the national level, for example concerning the domains to be funded in priority or the mix between academic project funding and application oriented project funding.

Useful readings

For a comparative analysis of public project funding in European countries, the reader can refer to the following paper.

Lepori B. et al. (2007), Convergence versus national specificities in research policies. An empirical study on public project funding. Science and Public Policy, forthcoming.

http://www.common.unisi.ch/pdf_pub2860

3.5 Increasing student's contribution?

In almost all European countries, there has been a quite strong discussion concerning tuition fees and schemes for funding higher education through students.

Despite this debate, changes concerning student's contribution have been until now rather limited in most European countries; namely, according to the CHINC data, just in three countries – UK, Spain and Italy – student's fees account for more than 10% of the total budget of the considered universities and this share has not changed significantly during the last ten years (see Figure 5). Moreover, the share of tuition fees is quite similar for institutions in the same country, suggesting that there is limited flexibility in setting fees (or, if this flexibility exists, it is not really exploited by the individual institutions).

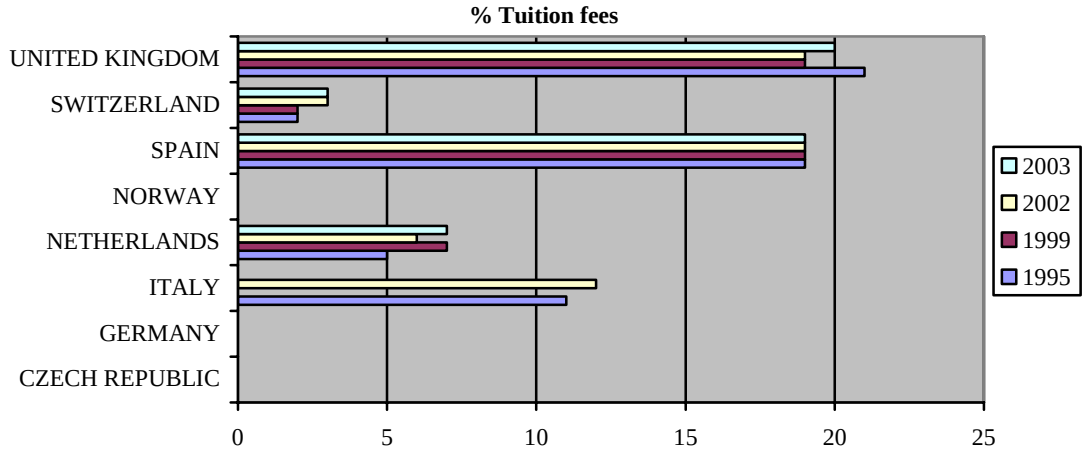


Figure 5. Share of tuition fees in total revenues

Source: CHINC project. Unweighted average of the institutions in the sample.

The main exception is the UK where the share of tuition fees for individual institutions in our (limited sample) varies between 13% and 33%. A closer look shows that this is the outcome of dramatic differences in the level of external resources between the considered institutions: namely, if normalized per student, highly reputed universities receive a far higher level of both contracts and tuitions fees (see Figure 6). This is not surprising since until recently deregulation of tuition fees in the UK regarded essentially overseas students, which are strongly attracted by the leading universities. To the other side, the increase of domestic tuition fees (which were limited to 1'125 £ until 2004) granted to the other institutions some additional income to compensate for the reduction of public funds.

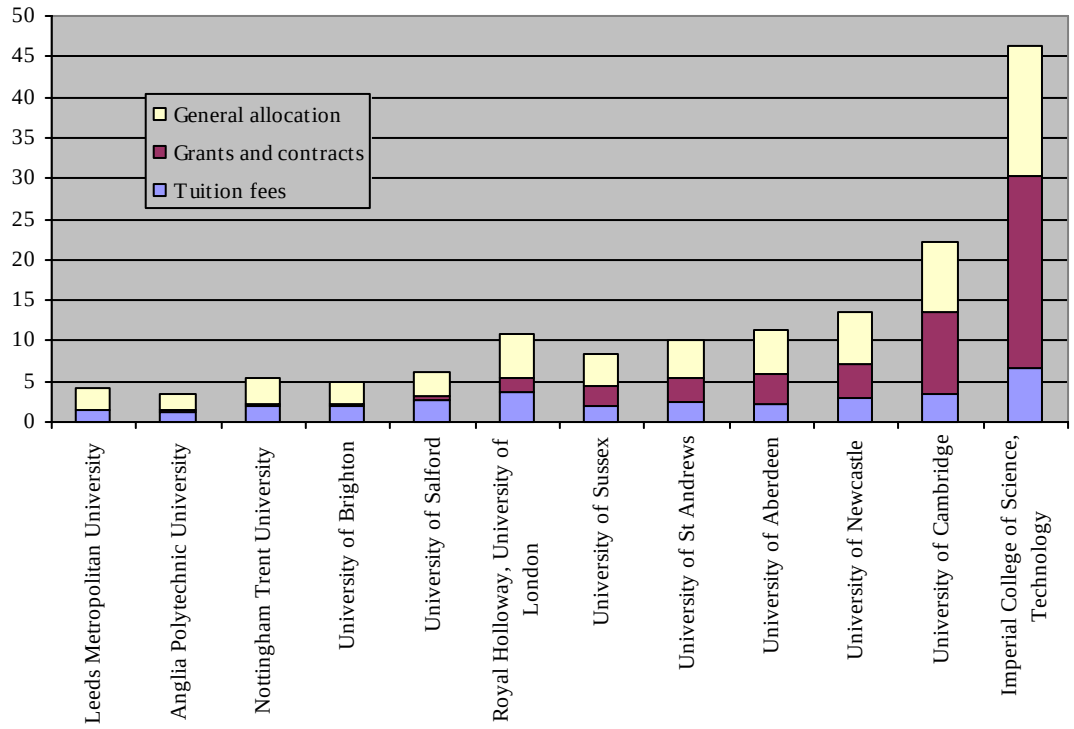


Figure 6 Resources per student, UK institutions only (2003)

in thousand euros per student. Source: the CHINC project.

In fact, in the discussion about student's contribution one should distinguish between two different objectives, namely (1) increasing available funds for higher education through the contribution of students (and their parents) and (2) introducing market instruments in the funding of education (money follows students). Some schemes like increasing tuition fees and loans aim to both objectives, while schemes like vouchers (learning entitlements) pursue just the second objective, since the money comes from the state.

Besides financial arguments, the first objective is largely motivated by the remark that (1) access to higher education is still largely uneven according to the revenues of the parents and (2) that the revenues of people having obtained a university diploma are systematically higher than those without. Under these conditions, it can be argued that funding higher education through public funds means at the end transferring public money to the social classes with higher revenues. The other argument is of course that public education should be free and, in particular, higher tuition fees would increase social differences in the access to higher education.

The second objective is to introduce competition in higher education leaving student's chose the educational provider who best answers to their requirements (in respect to the price to be paid). However, the whole literature on higher education points to the structural limits of markets in this domain and thus that care should be taken in introducing this kind of mechanisms.

The discussion about tuition fees is inevitably connected to that about student support schemes, since also in reality living expenditures account for most of the cost of the study (Barr 2004). Thus, student support schemes are seen as a necessary complement for tuition fees; a specific model which has been discussed and tested a number of countries are loans, which should be repaid after the end of the study and, in case of income-contingent loans, as a proportion of future revenues (Johnstone 2004).

A further model which has been discussed are the so-called *learning entitlements* (vouchers), where students get from the state a voucher for receiving education in an institutions of their

choice (under, of course, some conditions; normally in institutions that performed an accreditation procedures); the rationale for this proposal is to leave more freedom of choice to students and thus to introduce more market forces in higher education (since only institutions who enrol students would get funding). Despite a wide discussion, there have been until now relatively few experiences of wide application of this scheme, which do not lead for the moment to very clear conclusions and display an heavy administrative burden for the management of these schemes (from 2004 to 2006 in the German Land Northrhine Westphalia, from 2005 in Colorado and in Australia).

Besides the technical aspects and the advantages and disadvantages of the different systems, what is behind this whole discussion are two radically different conceptions of higher education; one model where higher education is essentially considered as a public service offered to the whole population (irrespectively of differences in access) and one where it is considered as market service which has to be in principle chosen and paid by the individuals themselves, with the state intervening to aid less favoured social classes.

Useful readings

For a quite complete discussion about student's participation to funding of higher education see the following book:

Teixeira, P.N.; Johnstone, D.B.; Rosa, M.J.; Vossensteyn, H. (Eds., 2007), Cost-sharing and Accessibility in Higher Education: A Fairer Deal?, Spinger, Dordrecht.

A recent review of learning entitlements with a good critical discussion of pros and cons is the following report:

Vossensteyn H., Jongbloed B. (2007), Learning Entitlements in Higher Education, CHEPS, University of Twente.

http://www.utwente.nl/cheps/documenten/2007learningentitlements.pdf

3.6 Summary and conclusions

To summarize, this analysis shows a patterns of moderated changes rather than a radical restructuring of the funding system in higher education; namely, with the exception of the UK, most European governments try to find a balance between the different funding models and their respective advantages and disadvantages.

Main emerging tendencies are the following:

- A decrease in the role of general allocations from the state with a parallel increase in other sources, especially public project funding, but also private funds and, to some extent, tuition fees.
- The shift for general public funding from line-items budgets negotiated on the basis of history towards more transparent methods, where the budget is calculated from different criteria and much freedom is given to the institutions themselves in the use of funds. The educational component is mostly calculated on the basis of the number of students, but degrees are increasingly used at least as a correction measure.
- Even if most European countries still have very low or no tuition fees (with the exception of the UK), there is an on-going debate on introducing them and most of the higher education literature agrees on the fact that this is feasible and does not necessarily hamper access to higher education.
- The research component of the budget is largely calculated on historical criteria, with the exception again of the highly competitive UK system. Most countries seem to rely on the combination of rather non-selective general funding and of competitive project funds.

4 Funding models of UAS

While most of the previous discussion applies also to Universities of Applied Sciences, there are for these institutions a number of specific aspects linked to their mission and to the historically lower research intensity. In this section, I will shortly review the information available on UAS funding in five countries – Netherlands, Germany, Finland, Norway and the United Kingdom -, as well as the main differences with universities.

4.1 The framework: mission and role of UAS in national systems

Each discussion on the funding model for UAS and on its differences with universities is critically linked to the political representation on the role and positioning of these institutions in higher education. Historically, most European countries have developed a higher education system organized in two sectors, one composed of the traditional universities and the other one which emerged from the reform of vocational education schools. As the following table shows, in many European countries the "second" higher education sector accounts for a large share of enrolments.

Country	University sector	Non-university sector
The Netherlands	25	75
Belgium (Flanders)	30	70
Finland	40	60
Ireland	45	55
Norway	45	55
Denmark	50	50
Portugal	60	40
Sweden	60	40
Germany	70	30
Switzerland	70*/55**	30*/45**
Austria	85	15
Italy	90	10
United Kingdom	90	10
Spain	100	-

Table 2. Percentage of first-year students in the university and non-university sectors 1999-2000

Source: Kyvik 2004

* original data 1999-2000 / data for 2005/2006

This binary divide has been originally based on two clear-cut distinctions:

- the distinction between general education in university and professional education in the non-university sector (with shorter curricula and more directly oriented towards specific professional competences in the latter).
- the centrality of the research mission in the university sector (with the close link between education and research, for example in the Humboldtian model), while a research mission was not present in the non-university sector (and seen as unnecessary for vocational education).

Both distinctions have been considerably weakened during the last two decades. Firstly, in almost all countries UAS have strived to develop some research activities and in a number of them this has been included in their official mandate. Secondly, the distinction between general and vocational curricula has proved to become increasingly difficult to maintain, both because of the tendency of UAS to develop more "academic" curricula and the

professionalisation of the university education (as a consequence also of the increase of the number of students). The introduction of the Bologna model requires this distinction to be fundamentally revised: from one side, the Bologna specification for the *university* bachelor degree sees it as a full diploma giving access to the labour market and this interpretation would be incompatible with the binary divide; to the other side, in many countries UAS are pushing to develop a two or three-tiered structure (with masters and PhDs) as in universities, promoting the convergence between the two sectors (De Weert 2006).

This debate has fundamental implications for the funding model, since of course the *justification of a different funding model for UAS should rest on some notion of difference of missions and activities between the two sectors*; for example, different rates of funding per student require that the education products are considered as different (concerning competences, skills and employability of the absolvents). Two remarks are here at place:

- firstly, *there has been no unique response across all countries to these issues*. Thus, some of them have gone further in the way towards an unitary system, while in other cases other forms of differentiation have emerged (like defining quite different research mandates along the distinction between basic and applied research). As we will see, funding systems for UAS differ accordingly.
- secondly, *the situation is highly dynamic and evolving with time*. Both the pressure of changes in society and higher education (like the increase of the number of students, the introduction of Bologna, changes in the research system) and the behaviour of the involved actors are profoundly changing the structure of higher education systems and the nature (or even the existence) of the binary divide. Thus, one cannot assume that today's configuration will be the same in some years and this requires also in the Swiss case considering different options and their implications for funding.

Useful readings

The issues on the role of the non-university higher education sector and on recent changes is a highly debated one; following a small list of titles:

De Weert E. (2006), Professional Competencies and Research in the non-University Sector: Systems Convergence after Bologna?, Paper presented at the CHER Annual Conference, Kassel, 7-9 September 2006.

Kyvik S., Skovdin O.-J. (2003), Research in the non-university higher education sector – tensions and dilemmas, Higher Education 45, 203-222.

Machado M., James J., Brites J, Santiago R. (forthcoming), The Development of Non-university Higher Education in Europe, Springer, Dordrecht.

Huisman, J. and Kaiser, F., Eds. (2001), *Fixed and Fuzzy Boundaries in Higher Education; A comparative study of (Binary) structures in nine countries*. Den Haag, Adviesraad voor het Wetenschaps- en Technologiebeleid.

4.2 Netherlands

Overall view	Dutch Hogescholen (HBO) are essentially funded by general state contributions (74% in 2002), tuition fees (18%) and to a lower extent contracts (8%). The share of third-party funds is substantially lower than in universities. Overall, the total resources per student (including all activities) at HBO is just 1/3 of that of universities, largely because universities receive basic funding also for research and a much higher level of project funding.
Educational funding	General funds are calculated on the basis of educational activities only using a formula based essentially on enrolments and an incentive factor to increase graduation rates and to decrease time to graduation (Boezerooy 2003). There are two funding tariffs for full-time students, one for programs with a strong practical character and a 20% lower one for programmes with a social science (so-called gamma) character. Previously there were six so-called *profiles*. Still, there are some special arrangements for students in performing arts, music, theatre and teacher training. The funding rates are not applied to the number of registered students, but to an estimate of the teaching load (`student demand'). This teaching load is a multiplication of enrolment numbers and a so-called dynamic demand factor, which is roughly the ratio of the normative funding period and the actual registration period for graduates and drop-outs. In case graduates or drop-outs take more time before leaving the *hogescholen*, the operation of this factor implies that the *hogescholen* receives less funding per student. The funding mechanism for education in HBO is rather different than in universities (which is based mainly on diplomas) and uses different funding rates.
Master studies.	Some HBO offer master studies, but are not entitled to get public funding for these curricula.
Tuition fees	Tuition fees levels are set at a moderate level and at the same level for universities and hogescholen (1500 euros per year in 2007/2008).
Research funding	Research activities in HBO have been developed essentially through the establishment of the lectorates from 2001. A lector occupies a chair at a HBO, called a “lectorate”. Lectors carry out applied research in a specific area of expertise and maintain contacts within the relevant branch of industry. In 2006, there were 270 lectors in HBO institutions. Lectors are funded by the state through an agreement with the HBO council, for a funding volume of 35 mio. euros in 2005. Additional means for research comes from contract funds, which account however for only 8% of the total budget according to some estimates (Boezerooy 2003). From 2007 onwards HBO will receive funds for development and application, or applied research, as a follow-up of payment for the lectorates.
General comment	Overall, the Dutch HBO funding model can be characterized as essentially centered on educational activities, which much lower funding per head of student than in universities and practically no general funding for research (except the appointment of the lectorates). HBO have a quite different funding system than universities, which seems to reflect the differences in their mission and activities.
Sources	See the CHEPS report on the Dutch Higher Education System. Boezerooy P. (2003), Higher Education in the Netherlands. Country report, CHEPS, University of Twente. http://www.utwente.nl/cheps/documenten/netherlands.pdf OECD (2007), Thematic Review of Tertiary Education. The Netherlands. http://www.minocw.nl/documenten/14717a.pdf

4.3 Germany

Overall view	It is quite complex to assess the funding model for German universities and Fachhochschulen (FH) since there are large differences between the Länder in the allocation models. However, a recent survey shows a widespread trend towards more flexible budgets than the traditional line-item budgets and the introduction in some regions of indicators to attribute general funding (Leszczensky and Orr 2003). Overall, general funds account for 90% of the total budget of the Fachhochschulen, while the remaining 5% are third-party funds and 4% administrative sources (tuition fees are practically negligible); this is a much lower level than for universities, where third-party funds account for about 15% of the total budget. On the average Fachhochschulen get per student about half of the resources of universities.
Educational funding	In most Länder, the largest part of the general budget is still attributed through direct negotiation between the State and the institution; the use of performance contracts has become a widespread practice in this context. A survey has showed that in 2003 three Länder allocated the main part of the general budget through a formula where the main component are the numbers of enrolled students (using different rates for domains and between universities and Fachhochschulen), namely Brandenburg, Hessen and Rheinland-Pfalz.
Master studies.	In the framework of the introduction of the Bologna model, Fachhochschulen got the right to offer also master studies.
Tuition fees	Tuition fees are non existent in Germany, except for some subsidiary costs.
Research funding	In most Länder FH received a research mission during the '80. There is no specific research funding as in most cases the budget is allocated for both activities jointly. Third-party funds amounted in 2001 to 130 mio. euros, of which 1/3 came from the federal government through different research funding programs and 1/3 from private economy (BMBF 2004). This is a much lower level than for universities. A special position in this context is occupied by the support program for applied research in the Fachhochschulen, which was launched in 1992 to promote applied research especially in cooperation with private companies. The program started with a funding volume of some millions euros, which have grown to about 16 mio. in 2006 (compared to a total budget of 2,6 billions euros).
General comment	Given the competence of the Länder it is difficult to get an overview, but it seems that the system is evolving towards some convergence between the two sectors, with FH getting a research mission and the right to offer master studies, however with a much lower share of research than universities.
Sources	See on Germany the following publications, the first one on funding systems and the second one on research in Fachhoschulen. Leszczensky M., Orr D. (2003), Staatliche Hochschulfinanzierung durch indikatorgestützte Mittelverteilung, Hochschulinformationsystem HIS, A2/2004. BMBF (2004), Forschungslandkarte Fachhochschulen. Potenzialstudie, Bonn.

4.4 Finland

Overall view	The funding system of Finnish Polytechnics is calculated on the basis of three components: education funding; project funding for specific activities including R&D support and some performance-based funding. These amounts are set in performance contracts between the state and the institutions which sets the targets (including the number of students) and the corresponding funding amounts (Ministry of Education 2004). Educational funding is jointly provided by the central and the regions, which contribute on the basis of the number of residents.
Educational funding	Educational funding is calculated on the basis of standard costs and of an agreed number of study places in the contract between the state and the Polytechnic. There is an overall national planning of study places and higher education institutions are then allowed to select the candidates according to the available places.
Master studies.	In principle, Polytechnics offer only first-cycle programs, which are considered equivalent to an university master. However, a pilot has been started to selectively develop master studies.
Tuition fees	There are no tuition fees in Finland, both for universities and Polytechnics.
Research funding	R&D activities have strongly grown in the last years, reaching a total of about 90 mio. euros of expenditures in 2004 (Marttlila and Kautonen 2006). Of this amount, almost ¾ are financed by external sources and just ¼ from the general budget. The most important external funding sources are European Programs (including structural funds) and the project funding from the ministry, while contracts with private companies were just 5 mio. euros per year. A very limited amount of specific funding for research is included also in the performance contract.
General comment	The Finnish model is the case of a planned model, where the state ensures a fixed contribution for each student, but at the same time defines in advance the number of study places which will be funded. Polytechnics have an explicit research mandate oriented towards regional development, where it is assumed that this research, being of direct economic interest, should be essentially funded by external sources (Marttlila and Kautonen 2006).
Sources	On Finland see the following publications, the first specifically on R&D in Polytechnics and the second presenting a detailed view of the Finnish funding system. Marttlila L., Kautonen M. (2006), Finnish Polytechnics as Providers of Knowledge-Intensive Services, XVI International RESER Conference, Lisbon, September 28-30, 2006. Ministry of Education (2004), OECD Thematic Review of Tertiary Education. Country Background Report for Finland. http://www.oecd.org/dataoecd/14/15/36039008.pdf

4.5 Norway

Overall view	Norwegian state colleges are subject to the same act as universities and share to a very large extent most of their regulatory framework. Accordingly, the general outline of the funding model is the same as for universities. The new funding model introduced in 2002 is based on three components, namely a "basic component", which is in the average 60 per cent of the total allocation and is meant to ensure stable resources to institutions, an "education component" of 25 per cent of the total allocation, based on the number of credits, number of graduates and number of international exchange students and a "research component" of 15 per cent of the total allocation. Overall, resources per students are about 30% lower than in universities, due essentially to a lower share of research, while educational costs are only slightly lower than in universities.
Educational funding	Educational funding is composed of a basic component (historical), as a well as a component based on the number of students credits with different tariffs per subject, which are the same for universities and colleges.
Master studies.	Colleges have the right of offering master degrees and receive state funding for them, even if the number of these degrees is still limited.
Tuition fees	Tuition fees are not existent in Norway both for universities and colleges.
Research funding	Research is relatively well-developed in the Norwegian colleges, covering on the average about 10% of the total expenditures (Kyvik and Skovdin 2003). The level of R&D expenditures has strongly increased in the recent years following the official recognition that colleges have a research mandate and the introduction of the same personnel career as universities. A relevant specificity of Norway is that about ¾ of the R&D expenditures of colleges are funded from the general budget, while only 22% of the funds come from other sources (against 37% in universities). The research component is calculated with a different formula than in universities considering the number of professors (40%), the study points (20%) and, finally, third-party funds (20%). It accounts for a much lower share of the general budget of colleges (6%) than of universities (22%).
General comment	In the Norwegian model, the mission and the regulatory framework for universities and colleges are to a large extent the same; the latter have the right to ask for accreditation as full universities. Consequently, research is also considered as a part of their mission and closely integrated with professional education and is essentially funded by general funds. However, the share of research and of research activities is much lower than in universities.
Sources	The OECD thematic report provides a detailed view on Norwegian higher education, while the paper of Kyvik and Skovdin enters more in detail in their research activities: Kyvik S., Skovdin O.-J. (2003), Research in the non-university higher education sector – tensions and dilemmas, Higher Education 45, 203-222. The Norwegian Ministry of Education and Research (2005), OECD Thematic Review of Higher Education. Country Background Report for Norway. http://www.oecd.org/dataoecd/22/55/35585126.pdf

4.6 United Kingdom

Overall view	The reform of UK higher education in 1992 removed legal differences between universities and Polytechnics and made them subject to the same set of rules and to the same funding mechanisms. As a consequence, 43 Polytechnics and Colleges were granted university status including the right of awarding PhD degrees.
Educational funding	Educational funding is essentially based on the number of students using different weights for the disciplines; the formula is the same for old and new universities.
Master studies.	New universities are allowed to offer master studies.
Tuition fees	Tuition fees have been successively increased and now account in the average for about 20% of the total revenues (but with higher shares in non-research intensive universities). In 2006 the flat rate of 1000 £ per students was replaced with a maximum cap of 3000 £; fees for overseas students are substantially higher.
Research funding	Polytechnics are subject to same rules for general research funding as universities. However, the very selective RAE mechanism, focused on international academic reputation, largely excluded them from funding. Thus empirical data show that in 1999/2000 the old Polytechnics received a teaching grant per student which amounted to ¾ of the average grant for old universities, but a research grant per student of 6% of universities. Overall, in that year, old universities received 87% of the basic research grant. Moreover, differences in this respect have not decreased in the period between 1992 and 2000 (Stiles 2000).
General comment	UK is the case for a unitary system with however a policy and funding systems actively promoting strong stratification of institutions concerning research. This means that Polytechnics (but also most of the historical universities) did not have a real chance of catching up the most reputed universities.
Sources	On RAE and Polytechnics see the following paper as well as the reports for the Higher Education Council: Stiles (2000), Higher Education Funding Patterns Since 1990: A New Perspective, Public Money and Management, October-December 2000, 51-57. Evidence Ltd. (2005), Impact of selective funding of research in England and the specific outcomes of HEFCE research funding. http://www.hefce.ac.uk/pubs/rdreports/2005/rd21_05/rd21_05.pdf

	General funding: allocation mechanisms	Funding of R&D activities	Specific funding instruments for the development of research	Third-party funds
Netherlands	Formula-based on education only: enrolments + dynamic demand sector. No specific research component.	Essentially third-party funds plus specific funding for lectorates	Funding of Lectorates positions (ca. 270 positions in 2006).	Essentially contract funding and European programs.
Germany	Basic funding is allocated by the Länder usually on the basis of contracts with the State; in some cases performance criteria have been introduced, but negotiated budget based on history is largely prevalent.	The budget is generally not linked to specific activities.	A specific program of the BMBF for funding projects in Fachhochschulen in cooperation with industry (16 mio. euros in 2006).	1/3 the central state, 1/3 private economy.
Norway	Colleges have the same funding model as universities, but the research component is much lower and calculated with different criteria.	80% from the general budget, the remaining from external funds	The Norwegian Research Council had a specific program to develop research-based knowledge related to professional education at State colleges	A mix of different sources.
Finland	Polytechnics' funding model is based on unit costs and number of study places defined in advance with the state. Additional funding is set in performance contracts.	¾ from external funds	Targeted project funding for individual Polytechnics based on specific objectives set in the performance contract + some performance-based funding.	The largest source is project funding from the Ministry of Education project funding and European funds.
UK*	The same model as universities, but Polytechnics do not practically receive research funding; educational component based on student numbers	Competitive allocation through RAE (the same mechanisms as universities) and third-party funds. De facto, Polytechnics practically do not receive general funds for research	None	
Switzerland	Educational funding based on standard costs. Research funding from the Confederation based on personnel (60%) and third-party funds (40%), from the Cantons as negotiated budget.	Half from the general budget, the rest from third party funds.	None.	Most important sources are CTI funds and private funds

Table 3. Funding models of UAS: summary

*Post-1992 universities (old Polytechnics)

4.7 Summary and discussion

1) Firstly, in all considered countries, *general funding for UAS is essentially attributed for educational purposes*. In quite a number of cases (Finland,. Norway, Netherlands) funding is calculated on the basis of enrolments, but an historical component is present for example in Norway and in most German Länder. Incentives based on educational output have been introduced in some case, like the Dutch formula which primes success rates and the reduction of the time to diploma (or to drop-out).

Concerning rates per student there are two models, namely countries where the rates are the same as for universities (as in Norway), but also countries where there are UAS-specific rates (normally lower than for universities). Overall, even if it is difficult to get precise numbers, *average resources per student are generally lower in UAS than in universities* by a proportion between 20% (Norway) and 40% (Germany; see OECD 2005). While to some extent these differences reflect different offers of education, they reflect also the fact that most non-university higher education institutions have been created as cheap alternatives to universities.

2) Secondly, there are two countries where UAS are officially entitled to get general research funding, namely Norway and UK (considering the post-1992 universities). This is unsurprising since in UK Polytechnics have the same legal status as universities, while in Norway University Colleges are quite similar to universities, being subject to the same law, funding system and career system (actually colleges can apply for official recognition as universities).

De facto, in both countries the level of general funds for research is much lower than for universities; this is extreme in the UK, where the system is very selective and practically excludes post-1992 universities from general research funding, but a similar pattern is reproduced in Norway. The Norwegian case displays an interesting phenomenon: having the right of performing research as a part of their core activities, closely linked to professional education, allowed Norwegian colleges to use part of the core budget (even if attributed on the basis of student numbers) for research activities.

3) Tuition fees are practically not existent in three of the considered countries (Finland, Germany and Norway), while in the other two they are set to the same level as universities. Thus, there is generally no distinction between the university and the non-university sector concerning tuition fees.

4) With the exception of Norway, in the other four countries funding of research is essentially based on external contracts and on specific support measures from the state. Even if it is difficult to normalize the data, the level of external contracts seems to be higher in Finland (where Polytechnics benefited largely from European structural funds) than in the other countries considered. Targeted measures to develop research in UAS have been introduced in almost all countries: these include the creation of lectorates in the Netherlands, the specific program for research in Fachhochschulen of the German BMBF and targeted funding for Finnish Polytechnics defined in their performance contracts. If compared to the size of these institutions, the corresponding amount is however quite low (53 mio. euros for the Dutch Lectorates, about mio. 15 for the BMBF program, etc.).

5) If we interpret these results in terms of the position of UAS in the higher education system, we can identify three main models:

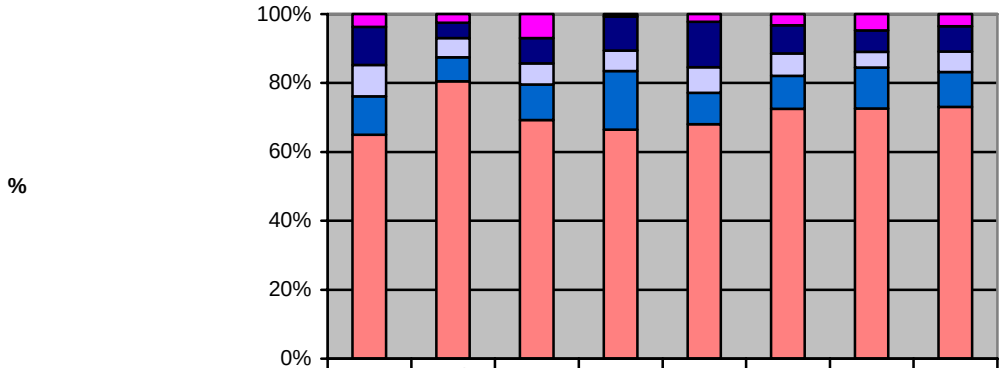
- a model where the mission of UAS is essentially educational and the divide with universities is very clear. In this case, UAS receive essentially only funding for education (at a lower level than universities), have quite limited research activities and basically do not offer master studies. This is characteristic of the Dutch model.
- a model where, besides education, UAS receive an explicit research mandate but clearly oriented towards applied research and cooperation with regional economy. In this case, UAS still receive their core funding for educational purposes only, but are pushed to develop and finance their research through external contracts and research programmes devoted specifically to regional development (like CTI projects in Switzerland and European Structural Funds in Finland). Thus, while the extent of development of research is significant, it is essentially funded through external sources. This model characterizes Finland and Switzerland.
- a model where the distinction between the two sectors is increasingly blurred (Norway, Germany) or even has been abolished (UK). In this case, UAS have basically the same funding model as universities and thus, in principle, are entitled to get also general funds for research, even if starting with a much lower level than universities. The essential difference is here between systems which redistribute some part of the funds to all institutions (like Norway) and highly stratified systems like UK where newcomers are de facto excluded from research funding. This model tends to promote research activities which are more closely linked to education than the previous one.

5 The Swiss model: today's situation and comparisons

In this chapter, I examine today's funding model of Swiss UAS, comparing it both with the countries presented in the preceding chapter and with the situation of Cantonal universities and Federal Institutes of Technology (FIT).

5.1 UAS funding: an overview

Composition of funding. For Swiss UAS general funding (both from the Confederation and from the Cantons) covers between 65% and 80% of the total revenues, a share which is lower than for UAS in other European countries and more similar to the situation prevailing for universities in Continental European countries. As Figure 7 display, this is largely due to the rather high share of grants and contracts, which account for nearly 20% of the total revenues (linked to the rather high level of development of research).



	SUPSI	HES-SO	BFH	FHZ	FHO	FHNW	ZFH	Total
Others	2.0	9.3	11.4	1.0	3.0	5.6	13.2	45.4
Private contracts	6.0	16.8	12.1	12.4	17.3	14.0	17.4	96.0
Public grants and contracts	4.9	20.9	10.0	7.5	9.8	11.2	12.9	77.3
Student fees	6.1	26.3	16.9	21.4	12.0	16.4	33.4	132.5
General funding	35.2	302.8	113.3	83.7	89.7	124.7	203.9	953.3

Figure 7. Funding structure of Swiss UAS, 2004 (mio. CHF)
Source: BBT.

General funding for education. General funding is allocated essentially on the basis of enrolments, through standard rates for each group of disciplines agreed between the Cantons and the Confederation in the UAS Masterplan; of these amounts, the Confederation funds about 30%, while the Cantons finance the rest. Recently, the system has been modified to allow for changes between institutions and curricula by accounting standard costs for ECTS credits to which the student enrols (with a maximum of 240 ECTS for a bachelor and 120 to 160 ECTS for a master curriculum).

	CHF per student		CHF per student
Architecture and construction	36'922	Health	28'296
Technology and Informatics	39'718	Social work	22'060
Chemistry and life sciences	47'722	Arts	39'547
Agriculture and forestry	47'722	Applied psychology	19'681
Economy and services	19'558	Applied linguistics	24'160
Design	37'910		

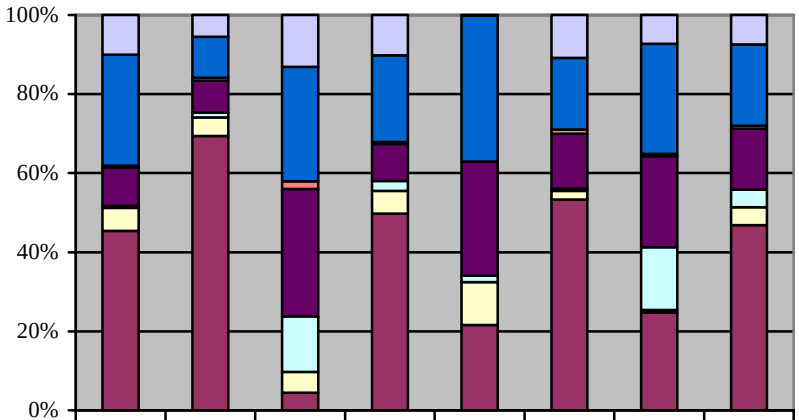
Figure 8. Standard costs for UAS

Source: Masterplan 2008-2011

Like the Dutch system, the model is a distributive one, where the rates are fixed taking into account the available financial means and forecasts of the number of students. For the new UAS masters, the mechanism contains some planning element, since the number of master students is limited by the masterplan and is foreseen that masters will be accredited only until this level (Conseil fédéral 2007). The level of standard costs is used as a planning tool to reduce the costs of UAS to comply with the overall financial envelope available: thus, for the years 2008-2011 average standard costs will be slightly reduced in nominal terms, meaning a reduction of about 5% in real terms (source: Masterplan 2008-2011).

Student fees. Students fees are set in most UAS between 500.- and 1000.- SFR per semester, which is a slightly higher level than in universities (600.- CHF per semester, except the USI which requires 2000.- SFR per semester).

Research funding. Research funding is based on two main sources, namely external contracts – largely from private companies and from CTI project – and general funds (see Figure 9). While the share of both sources in the average is about 50:50, there are in reality quite strong differences between individual UAS, with general funds accounting for 20% of the expenditures at FHO, but to over 70% at HES-SO. These differences reflect large differences in the policy of individual cantons in funding research activities at UAS.



	SUPSI	HES-SO	BFH	FHZ	FHO	FHNW	ZFH	Total
Other federal contracts	1.2	3.3	1.9	1.4	0.0	2.9	1.8	12.5
Private contracts	3.2	6.2	4.2	3.1	6.0	4.8	6.8	34.2
SNF	0.1	0.5	0.3	0.1	0.0	0.3	0.1	1.3
CTI	1.1	4.8	4.6	1.3	4.7	3.7	5.6	25.8
Other revenues	0.1	0.8	2.0	0.4	0.3	0.1	3.9	7.4
Confederation, general budget	0.7	2.8	0.8	0.8	1.8	0.6	0.2	7.5
Cantons, general budget	5.2	41.6	0.6	7.1	3.5	14.0	6.0	78.1

Figure 9. Funding of R&D in Swiss UAS (2004)

Source. Lepori 2006 (elaboration on BBT data).

General funding for research comes from two different sources:

- federal contributions: there is an yearly amount (15 mio. CHF in 2007), which is distributed to UAS according to two criteria, namely third-party funds (40%) and personnel engaged both in research and teaching (60%).
- cantonal contributions: these are attributed by the cantons under different forms (for example as strategic funding for HES-SO or as co-funding of externally funded research in Ticino). This amounts to about 80 mio. CHF, nearly half of which is attributed to the HES-SO.

In quantitative terms, general funding for research amounts to about 5% of general funding from the Confederation and to about 10% for the cantons.

Third-party funds come mostly from CTI projects and from private contracts, while the share of UAS in European funding and funding from the SNF is quite small; public contracts are of some importance especially in economy and social sciences.

Useful readings

BBT (2007), Masterplan Fachhochschulen 2008-2011.

Lepori B. (2006b), Subvention fédérale pour la recherche appliquée et le développement pour les Hautes Ecoles Spécialisées. Révision des critères de financement, rapport pour l'Office fédéral de la formation professionnelle et de la technologie, Berne.

Zbinden H. (2006), Studiengebühren an den Fachhochschulen, Aussprachepapier, KFH, Bern.

5.2 The funding system of universities: a comparison

The table below summarizes the main funding channels for Cantonal universities and FIT.

Instrument	Allocation mechanisms	Source	Share of the budget (2002)
General funding for home canton	Mostly as a global budget negotiated and based on history (with some exceptions).	Cantons	41% on the average for cantonal universities
General funding for FIT	A global budget negotiated and largely based on history. The performance contracts define a number of (non-binding) objectives.	Confederation	78% of the total budget of FIT
Federal funding for cantonal universities	The total amount available is defined in the budget. The repartition between the universities is based on two criteria: • 70% on the basis of the number of students enrolled using the same weight as in the intercantonal agreement. • 30% on the basis of research funding, mostly SNF (18,5%), EU (5%), private (5%) and CTI (1.5%).	Confederation	13% on the average for cantonal universities
Cantonal funding for students in other cantons	The amount is calculated on the number of students with three different tariffs: • 10'000 for social sciences and humanities. • 24'430.- for natural sciences and medicine. • 48'860.- for the clinical practice in medicine.	Cantons	10% on the average for cantonal universities
Third party funds	The two most important sources are SNF grants and private companies, then other public contracts including CTI and EU Framework Programs. Moreover, there are specific funds from the Confederation for cooperation projects between universities managed by the Swiss University Conference.	Mostly Confederation	24% for Cantonal universities, 20% for FIT
Student fees	Around 600 Sfr. per semester, except USI (2000 CHF for Swiss / 4000 CHF for foreigners).	Students	3% for Cantonal universities, 1% for FIT

What emerges from this brief description is that today's funding system for universities is fundamentally different from the funding system for UAS for at least two aspects:

- firstly, *there is no general separation between research and education funding*, but in most cases these are attributed jointly and, even where funding is calculated separately, it is considered that the repartition of funds between activities is left to the institutions themselves (or even their subunits). This reflects the normative understanding that in universities research and education are (or should) be so closely linked that a separation of funding streams would not be meaningful.
- secondly, the harmonization process of funding is far less advanced in the university sector than for UAS, where for education the masterplan and the standard costs model should provide some more uniformity between different institutions. This reflects the different legal situation of universities, where cantons have a much stronger competence. Thus, there is *no unique funding model of universities*, but funding is in reality allocated through the combination of streams calculated with different criteria (for example between general funds from Cantons, federal funding and funds from other Cantons). Moreover, there are quite large differences between FIT and cantonal universities and also among these in the allocation mechanism.

Useful readings

Filippini M. Lepori B. (2007),. Cost structure, economies of capacity utilization and scope in Swiss higher education institutions, in Bonaccorsi A., Daraio C., Universities as Strategic Units, Edward Elgar, forthcoming.

Conférence Universitaire Suisse (2006), Coûts de la formation universitaire. Résultats de la comptabilité analytique 2004, Berne.

Lepori B. (2007). Diversity in Swiss Higher Education System. in Bonaccorsi A., Daraio C., Universities as Strategic Units, Edward Elgar, forthcoming.

5.3 Some elements of comparisons

These differences make a comparison between the two systems quite problematic, yet in the framework of today's political discussion on future governance and funding models some elements of comparison have to be provided. Moreover, given the extreme differences between the subject domains especially in universities, each comparison has to be done at the level of individual domains rather than aggregated for the whole institutions, otherwise differences in subject mix can completely false the comparisons (as it is already when comparing universities with FIT).

I will to compare the situation in the two categories of institutions using the following criteria:

- the composition of funding between general funding, third-party funds and tuitions fees.
- the allocation mechanisms for general funding.
- the repartition of expenditures between activities and their funding sources.
- the resources available per students and per unit of staff.

The data presented here should be considered as a first rough approximation, which needs to be further corrected and refined in the future. All data come from the Swiss Federal Statistical Office and from the Swiss University Conference.

Composition of funding. In the aggregate, differences between UAS from one side, cantonal universities and FIT are rather limited (see Figure 10). UAS have a higher share of tuition fees (owing to an average level of resources lower than at the other institutions) and a generally lower share of third-party funds, but differences are not substantial.

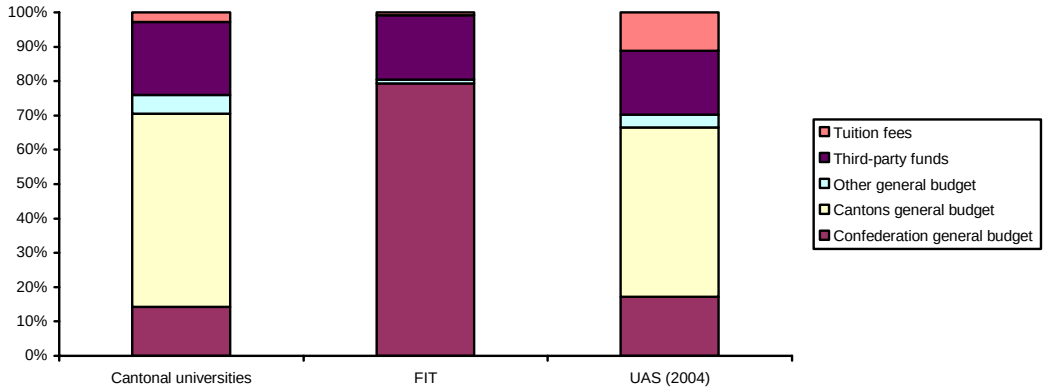


Figure 10. Funding sources for higher education institutions, 2004 (UAS) – 2005 (FIT and universities)

Source: SFSO and BBT.

Allocation mechanisms for the general budget. We face here two completely different systems. UAS general funding are allocated as a cost reimbursement per student enrolled (plus some general funding for research), while universities and FIT have mostly a global budget, which is negotiated with the Cantons, respectively the Confederation, largely on historical criteria. It is understood that this budget includes a substantial share of funding for research activities, but the repartition between domains and between research and education is essentially a matter of internal management of the university (even if, in most cases, strongly constrained by the history). The number of students and third-party funds enter in the calculation, but these are just conventional prices – negotiated at the political level - and do not necessarily reflect the real cost.

Expenditures and funding sources per activity.

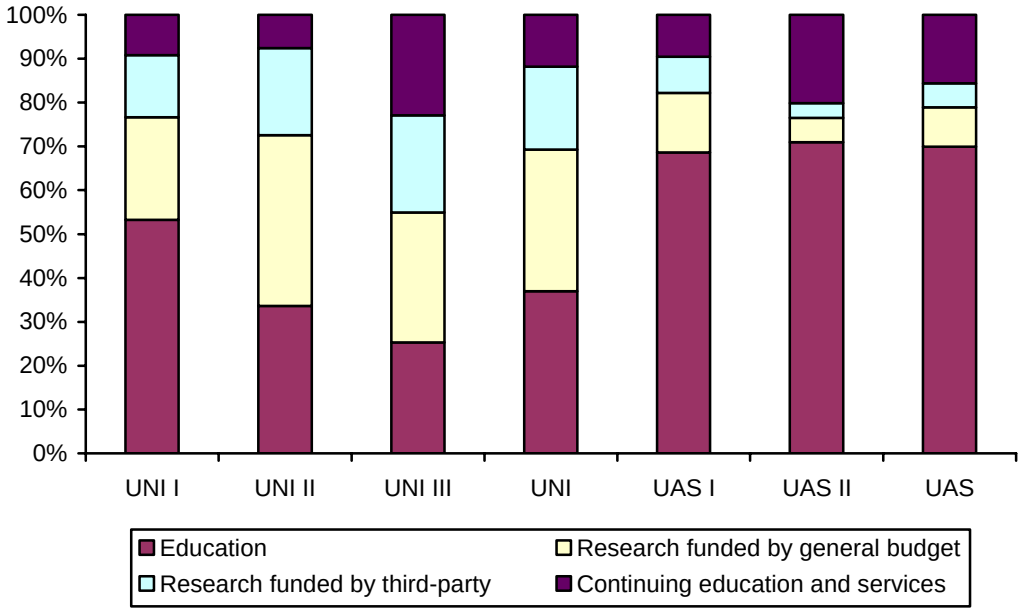


Figure 11. Expenditures per activity and funding source (2005)

Domains. Universities and FIT. I: social sciences, human sciences, economy. II: natural and technical sciences. III: medical sciences including pharmacy.

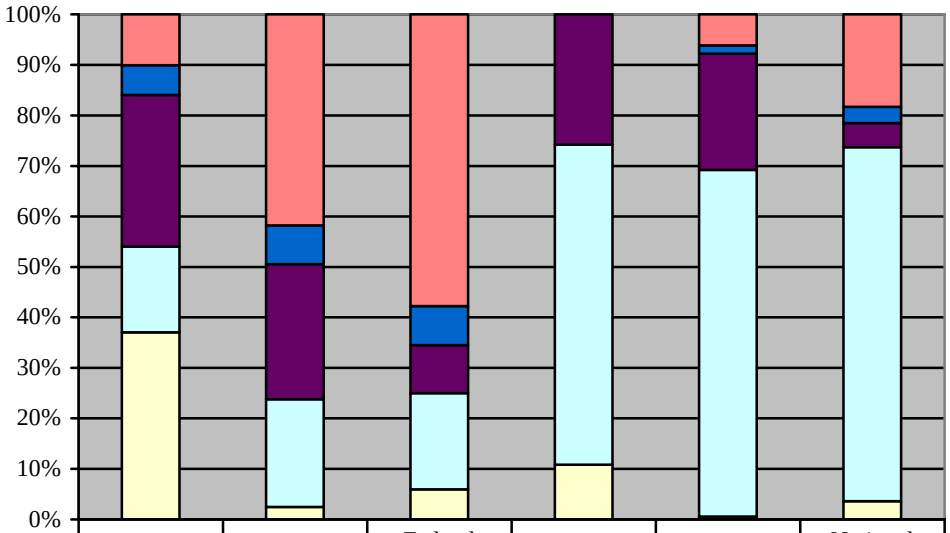
UAS. II: technology, construction, chemistry and life sciences. I: all the other domains.

For UAS the repartition of third-party funds for research by domain is done on the repartition of the total volume of third-party funds.

Sources. Swiss Federal Statistical Office and Swiss University Conference.

The breakdown by activities displays the large differences in research intensity both between UAS and universities and between the technical sectors and the social sciences in both categories of universities (the data concerning medicine have to be considered as quite problematic because of difficulty of separating research and educational costs from medical care).

Grants and contracts. In principle, at least in the Swiss system, all kind of grants and contracts are equally open to all types of institutions and thus, also, to universities and UAS. However, the data show that shares of different performers are dramatically different according to the chosen instrument: UAS have a share of about 40% at the CTI, but less than 5% in the EU framework program and less than 1% in the SNF free projects.



	CTI projects	Framework programs	Federal administration contracts	Private contracts	Free projects	National research programs
Other	7.1	44.4	46.4	0	15.8	4.6
FIT institutes	4.2	8.1	6.2	NA	4.2	0.8
FIT	21.2	28.4	7.6	80.7	58.8	1.2
Universities	12	22.7	15.3	198.5	175.6	17.6
UAS	26.2	2.6	4.8	34	1.5	0.9

Figure 12. Share of different performers in grants and contracts 2005

mio. CHF. Data from the Swiss project funding report.

These differences depend largely from different orientations of the funding agencies and selection criteria, which are more or less adapted to the type of research done by different performers. This means that the project funding system (which is common for all actors at the Swiss level) offers different opportunities according to the type of research performed and, also, the subject domain. This shows that the issue of funding research in higher education

institutions cannot be separated from the issue of the composition of project funding instruments.

Available resources. Each comparison of the cost between universities and UAS are subject to many difficulties, given the different internal organization and accounting systems. Hence, it is preferable to compare the level of resources available independently of their use. Again, we need to distinguish between sectors given the extreme large differences in universities.

Of course this broad division in domains still includes some relevant differences in the subject structure; for example the arts sector in UAS, whose costs are higher than in economy and social work, is not present universities (as well as for example theology in universities) and thus comparisons must be handled with care. Moreover, these comparisons deal only with the *measure of the available resources per student* and how these are invested and not with the cost and the value of the products (for example related to different profiles or length of the curricula). Thus they do not give any justification for investing more or less resources per student (for example having more intensive but shorter curricula).

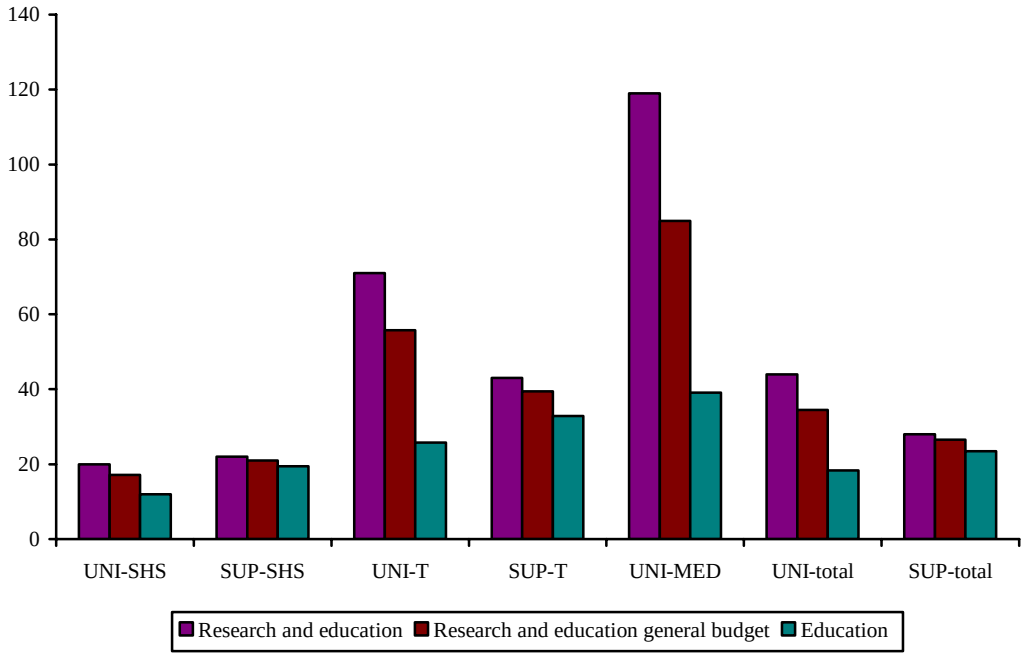


Figure 13. Resources per student (2004)

1000 CHF

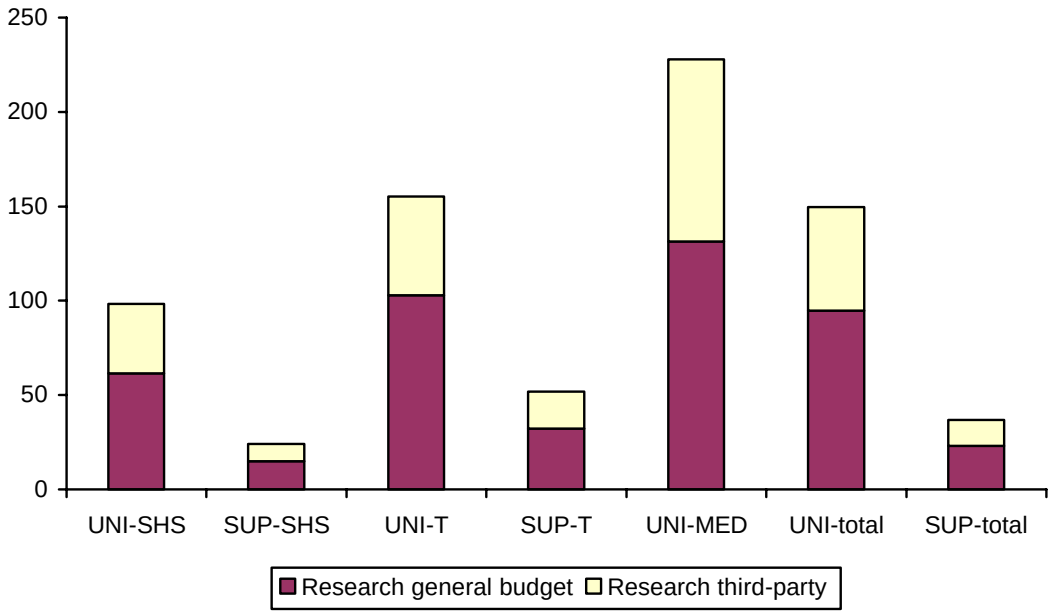


Figure 14. Research expenditures per staff (2004)

Sources and methodological notes: see previous figure.

Staff in full time equivalents excluding technical and administrative personnel. 1000 CHF

The two figures display a quite interesting pattern. Namely, in technical sciences the expenditures for education only per student are quite similar between universities and UAS, while universities have a much higher level of resources for research both from the general budget and from third-party funds. As a result, the total resources per student of universities in this domain are almost the double than in UAS.

The social sciences and humanities domains display a completely different situation. Resources per student are much higher in UAS than in universities, probably due to the lower number of students per teacher, while total costs are rather similar; thus, in this domain, it is the different use of resources between UAS and universities which accounts for the different research intensity and not the overall of resources per student.

The second figure shows not only that there are large differences in the expenditures for research per unit of staff, but also that there is a strong correlation between own funds and third-party funds. Thus, universities invest more resources from the general budget for research, but at the same time have a much higher level of third-party funds per staff.

Finally, it is interesting to look to the change in the available resources if we simulate what would happen if UAS would have the same level of resources per student than universities and the same repartition between research and education. The following figure shows the result, excluding medicine which is present only in universities.

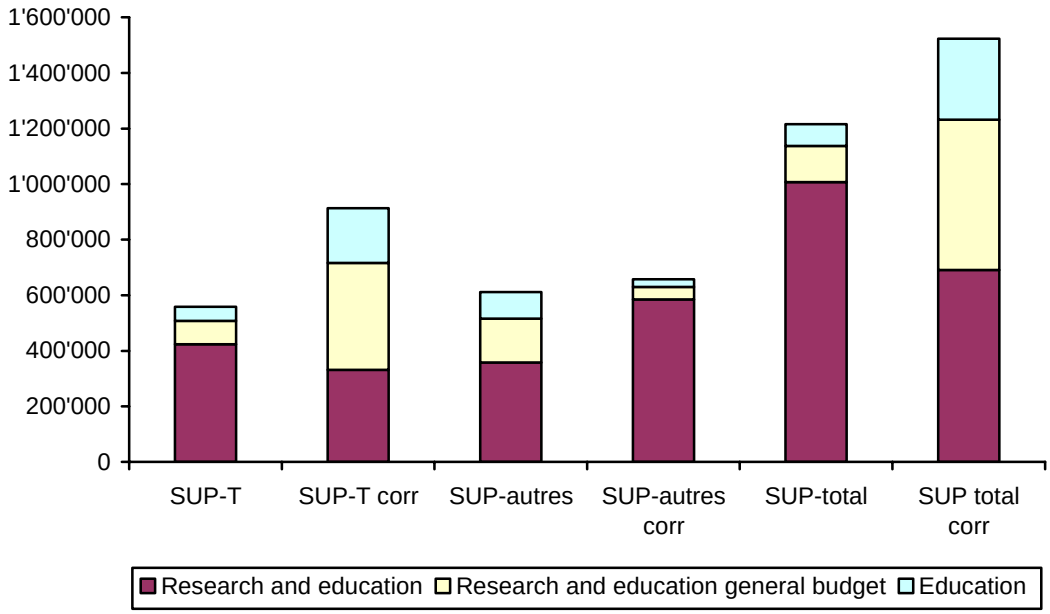


Figure 15. Resources per student for UAS

Original data and data recalculated with the resources level of universities and the number of students of UAS (excluding medicine). Data for 2004.

Of course these figures have to be interpreted carefully because of methodological problems and differences in data sources, but the overall trend is rather clear: namely, the *main difference between universities and UAS consists in different priorities attributed to education and to research respectively*, this especially in the social sciences, rather than in differences in the overall resources available in the general budget (which do exist, but are rather limited). Accordingly, investing a larger part of their budget for research purposes, universities have better conditions to acquire external funds which makes the largest part in the difference of the funding base.

Useful readings

Confédération Suisse (2005), Kosten und Finanzierung der Hochschulen und der Forschung in der Schweiz: ausgewählte Indikatore, Bern.

5.4 Conclusions

This short discussion leads to some interesting remarks. Firstly, in general terms the funding system of Swiss UAS is rather similar to the situation in other countries: thus, the general budget is allocated essentially for educational purposes and calculated on the basis of student numbers, while it is meant that research should be largely financed by third-party funds (like in the Finnish model): this is related to a research mission largely oriented towards applied research of interest for the private economy. However, figures show that nowadays funding of research from the general budget is substantial thanks especially to a strong increase of research funding from (some) Cantons; in this respect UAS have now a mixed funding mode for research which is not very different than universities in the proportion between general budget and third-party funding.

The substantial difference with other countries (with the exception of the centrally planned Finnish model) is the *cost-orientation of the allocation mechanism* and its strong central planning component; thus the whole system is meant to reimburse UAS for their educational costs (calculated on the basis of a Swiss average), while there are no incentives related to

results (for example number of degrees or drop-out rates). I will come back on this issue in the next chapter.

Finally, this discussion shows the whole difficulty of comparing the funding system of UAS and of universities, since they are based on *different conceptual categories*: cost reimbursement vs. allocation of a lump sum, respectively separated budgets for education and research vs. an overall allocation for both activities. The indicators I presented show that the different levels of research funding in the two categories of institutions are related to three different factors:

- an overall level higher of resources per student in universities than in UAS. This is relevant in technology, but not in the other domains.
- different institutional priorities with a larger share of the general budget spent for research in universities than in UAS. This is evident in all UAS subject domains if compared with universities.
- finally, a different ability to acquire third-party funds, which is clearly correlated to previous items.

These factors play a quite different role depending on the domain considered: thus, in natural and technical sciences universities have quite higher resources per student than UAS (both from the general budget and from third-party funds), while in social sciences the overall level of resources is similar, but priorities in spending are set differently.

Thus, it is perfectly correct that, when acquiring external funding UAS researchers are disadvantaged because of the lower funding base, but this disadvantage is due only partially to different resources basis between universities and UAS and to a large extent to different institutional priorities (with UAS investing more in education than universities).

6 Options and alternatives

As already introduced, the choice between allocation models is essentially a matter of political choice about the goals to be achieved and the wished configuration of the higher education system. Thus not only each funding model presents advantages and disadvantages, but also *there is no such thing as an optimal funding model*, since its choice involves normally a trade-off between different objectives to be achieved in higher education, for example between an efficient use of public means, the development of research, quality of education and, finally, access to education. Moreover, the design of the funding model is closely linked to the way a society wants to govern its higher education – for example to which extent its regulation should be left to competition, the degree of autonomy of the individual institutions and the degree of control of the state on their activities; different social and institutional actors – including politicians, higher education bodies, representatives of private companies – typically have also different preferences concerning funding of higher education.

This is the reason why in this section I will not directly discuss and compare models of higher education funding, but rather look to the answers to four main questions which are explicitly or implicitly behind the choice of the funding model, namely:

- the extent of autonomy to be granted to individual institutions and the role of the state in the steering of higher education.
- the relative contribution of the state and of the students to the funding of higher education.
- the objectives for the development of research, concerning its importance, the type of research and the subjects to be covered.
- the extent to which higher education institutions can and/or should be differentiated in their mission and functions and, in particular, the degree of diversity between UAS and universities.

6.1 The role of the state and the autonomy of the individual institutions

The degree of autonomy of individual institutions and the respective role of the state is one of the central choices in higher education steering, which has important implications also for the choice of the funding system.

The centralistic model where the state directly manages higher education alike for compulsory schools is not any more considered a sensible way of managing higher education institutions; in almost all countries, we witnessed an increase of the autonomy of these institutions, albeit with strong differences concerning different items and between countries (see Figure 16). There are good reasons for this tendency, including the increasing size and complexity of the higher education system, which makes central steering difficult, new approaches in public management emphasizing managerial autonomy of units and the specific nature of higher education, where many decisions can better be taken at lower levels.

Table 3.1 Extent of autonomy experienced by universities[1]

	Institutions are free to:							
	1 Own their buildings and equipment	2 Borrow funds	3 Spend budgets to achieve their objectives	4 Set academic structure/ course content	5 Employ and dismiss academic staff[2]	6 Set salaries[2]	7 Decide size of student enrolment[3]	8 Decide level of tuition fees
Mexico	●	◗	●	●	●	◗	●	●
Netherlands	●	●	●	◗	●	●	●	◗
Poland	●	●	●	●	●	◗	●	◗
Australia	●	◗	●	●	●	●	◗	◗
Ireland	●	◗	●	●	●	◗	●	◗
United Kingdom	●	◗	●	●	●	●	◗	◗
Denmark	◗	●	●	◗	●	◗	●	◗
Sweden	◗	◗	●	●	●	●	◗	
Norway	◗		●	●	●	◗	●	
Finland	◗		●	◗	●	●	◗	
Austria	◗		●	●	●	●		
Korea (national – public)			◗	◗		◗	●	
Turkey				◗	◗		◗	
Japan (national – public)				◗	◗			

Legend: Aspects in which institutions:
● have autonomy
◗ have autonomy in some respects (see the Appendix for details).

Figure 16. Dimensions of autonomy

Source: OECD, Education Policy Analysis 2003.

However, the relevant choice is not between a centrally planned system and a market-like system where institutions can behave like private enterprises, but rather concerns *the extent of autonomy to be granted to individual institutions and the remaining competences of the state*. This includes for example issues like to which extent the state should control the costs of higher education activities, decide on the repartition of funding between domains and activities (for example between education and research), set the level of tuition fees and rules for access or if these competences should be left to individual institutions.

In this respect, today's Swiss systems of UAS funding presents many of the features of a *centrally planned system*, where this planning is elaborated between the Confederation and the Cantons. Thus, the Masterplan provides a detailed forecast of the number of students for each domain and of the costs of their education (based on the mechanisms of the standard costs), as well as to the extent of research activities to be performed and of their costs; moreover, it defines through the combination of different sources the financing of these costs. Conversely, this model *limits the autonomy of the institutions in their internal management*. Even if there is no legal obligation, the normative assumption is that the funds are attributed as the reimbursement of the costs incurred for specific activities and this limits the possibility for redistributing them according to strategic priorities.

Of course, choosing among governance models is a political choice and thus one can assume that this is perfectly correct. However, we notice that in most European countries including Switzerland today's political discourse emphasizes increasing autonomy of individual institutions rather than reducing it. Moreover, there are some good reasons for this since autonomy is meant to promote innovation and diversification of institutional profiles, for example in the choice of subject domains to specialize in or in the mix of different missions (education vs. research vs. services). Of course, the question is not about having an overall planning of the development of the UAS (or of the whole higher education system) through a mechanism like the masterplan, but what has to be planned and to which level of detail.

Concerning funding, the basic change to grant more autonomy to individual institutions is to switch from a cost reimbursement model to a system of payments based on *politically agreed objectives* if possible based on a measure of the produced outputs (or some proxies) both for education and research.

Once the outputs and some quality criteria have been defined, *the institutions themselves should have more freedom to organize themselves* and to decide where to invest in priority. For example, an institution could reduce its costs by a better organization of education or by collaborations and invest these resources to develop research. Or, to some extent, an institution could decide to have less professors but with better competences by investing in research, with the argument that teaching quality would be improved in this way even with more students per teacher.

It is important to remark that switching to a price system does not imply deregulating higher education and abolishing state control, but *rather redefining the respective roles of the state and of the institutions and their relationships*. This includes two central presuppositions:

- the set-up of a sound monitoring and evaluation mechanism of the delivered outputs, concerning the quality of education (for example through accreditation) and the quality of research (with systematic evaluation);
- a much wider legal autonomy of higher education institutions concerning the management of the budget of their fixed assets and of the personnel.

6.2 Financing education: from costs to prices

This discussion is relevant for the funding mechanisms of education. Namely, while it is true that in most countries the allocation is largely based on the number of students, there is a substantial conceptual difference between *reimbursement of costs* (even if based, as in the Swiss case, on national averages) and the *payment of a price* for a service (thus educating students).

In this respect, today's Swiss model has the advantage of guaranteeing stable resources to the UAS, as well as a close control on how these funds are used (avoiding for example that funds for education are in reality used for other purposes). The major disadvantage is that this model does not create *incentives for an optimal allocation of resources between activities and sectors, as well as for more efficient production*. Thus, institutions are essentially reimbursed for their activity or *inputs* – the hours spent for teaching and research by their staff, costs for infrastructure – and not for their output, for example the number of degrees, the degree of success, the quality of education, etc. Moreover, the calculation basis for the standard costs are just the historical-born average Swiss costs. Under some conditions, the systems tends also to create wrong incentives: for example, an effort to reduce the costs in a specific domain is likely to imply a reduction of the calculation basis for state subsidies in the next planning period and thus there is an in-built incentive at least at the level of the domains to approach as far as possible the maximum cost level.

Thus, there are some reasons to replace standard costs with *prices for educational services*. Of course, in a non market system, there will always be need of some reconciliation between the price and the effective cost of production, but they do not need to be equal and there should be more room for negotiations in this respect. Moreover, it would be *at least in principle* possible to calculate prices using different criteria rather than just historical costs, for example costs abroad or in other types of institutions or calculated on the basis of theoretical models. A related possibility would be to introduce in the calculation of the price some output-related components like the number of diplomas, time to diplomas or drop-out rates (see for example the Dutch case).

This discussion is highly relevant for research since, as I will discuss later, the strict separation between a research budget and an educational budget can be quite problematic in some of the possible scenarios for the development of research.

6.3 Who should pay? The share of public vs. private funding for education

One of the most complex issues concerning higher education and research is that they provide both social benefits and private benefits. Thus, higher education in the aggregate brings substantial benefits to the society as a whole (independently of who gets the degree) and this is of course a reason for public funding of it. However, at the same time, there are

sizeable benefits for the individual in terms of higher income and employment prospects and this is an argument to support private funding through tuition fees. This matter is complicated by the existence of delay and incertitude effects concerning private returns (students paying fees for a potential rise in revenues in some years; incertitude and long-term nature of economic impacts of research). Thus, the whole issue is *how to set the strike between public and private contributions*.

As the comparative analysis shows, almost all European countries have a tradition of free access to higher education, but in all of them there has been a debate on changing this situation, even if only in the UK tuition fees have been substantially raised.

The research on the subject suggests that private returns from higher education are substantial and this *clearly points to a system where students (or their parents) substantially contribute to the costs of their education*; for instance, a contribution of about ¼ of the education costs would imply in the Swiss situation tuition fees in the range of 5'000 CHF per year, thus about five times higher than today; in Switzerland only the Università della Svizzera italiana approaches this level. Moreover, there would be probably some room for differentiation of fees according to the educational production, for example between bachelor and master level. A related argument is that since participation to higher education is much higher in the high-income classes free access means *in the average* subsidizing rich people with taxpayer money.

Clearly, an increase in tuition fees should occur for all higher education institutions – universities, FIT and UAS -, since there is no country where fees are differentiated according to the type of institutions; if the choice would be to grant some moderate flexibility to individual institutions, the solution of setting a maximum level instead of an unique fee would be an option to be considered.

Empirical evidence shows that overall participation to higher education does not diminish when increasing fees to this level, but participation of lower-income classes does, suggesting that support schemes are needed. In the Swiss context, the crucial issue is thus *the reform and harmonization of cantonal support schemes for tertiary education*. The experience of some countries with *income-contingent loans* should be carefully considered in this context, since they provide an interesting way of spreading the risk of education between beneficiaries and across time.

6.4 The research mandate and the shape of research activities

Research is one of the core missions of higher education, which marks also its difference with other education levels. However, what is at stake here is the role of research in higher education – in UAS in particular –, its relationships with other missions – with education in particular – and, finally, the organizational form of research and its distribution among institutions and departments. The answer to these questions is critical to define the best suited model for research funding. I shall below discuss these issues focusing particularly on UAS.

1) The *role of research in UAS and the objectives to be achieved.* International comparisons show that there are at least two models for research in UAS:

- a model where research is oriented towards collaboration with private economy and technology transfer. This is to a large extent the Finnish model and the original Swiss model as defined at the creation of UAS;
- a model where research is meant to improve the quality of professional education, thus closely integrated with professional curricula. This is largely the case in Norway.

These two models have quite different implications for research funding. The first model is essentially *customer-driven* and thus research should be developed where there is a demand from private economy (as well as from contracts of public or non-profit institutions). This implies that general funding from the general budget should be oriented to create the basic infrastructure to provide these services and thus its distribution should be linked to third-party funding (albeit with some averaging mechanisms over time and some possibility of developing strategically promising domains). The second model would call for a wide distribution of basic research funding, which should probably be linked to the number of students (albeit taking into account results to some extent).

Of course, it is possible to combine the two models, but *one should be aware of the trade-offs involved in this approach*: the data show that the acquisition of external funding is critically dependent on the availability of general funds and thus distributing to all domains general funds risks to reduce the ability to acquire external funds and to weaken the competitiveness of the more research-intensive units; to the other side, if a share of general funds is calculated on the basis to third-party funds, the remaining might not reach the critical threshold to develop research in the other domains. To strike a balance is clearly not easy.

2) The *degree of concentration of research among higher education institutions*: is it assumed that research is present in all institutions more or less to the same extent or is a specialization between research intensive and education-intensive institutions accepted or even actively promoted?

Of course, some degree of differentiation between individual institutions will always be present and beneficial, but the issue is *to which extent public policies and funding should actively promote it*. In a comparative perspective, the UK offers an extreme case of a funding system promoting differentiation, while most other countries adopt a mixed approach, where some basic level of funding is guaranteed to all institutions, but then a large share is allocated competitively (either through performance measures or competitive project funding).

The first option would thus imply switching towards a more competitive allocation of basic research funding for UAS, accepting that large differences could arise between the individual institutions, while the second one implies that general funding for research would be largely distributed, for example on the basis of the number of students. Again, there are advantages and disadvantages of each option, which clearly also linked to answer to preceding questions.

A related issue is *to which extent it is acceptable that Cantons finance UAS research to different levels according to their priorities and/or financial means*. While this is largely a political issue, economic reasoning suggests that rules and allocation criteria for basic funding of research should be the same for all Cantons – thus giving to all institutions the same opportunity to access to national competitive funds -, while it would be possible that the Cantons buy specific services from individual institutions (for example related to regional development objectives).

3) The degree of *sectoral concentration of research inside institutions*, thus allowing or not an internal specialization between domains with high research intensity and domains with a much lower intensity and focused on education.

A high degree of sectoral concentration is clearly acceptable in the customer-driven model, but it would be possible also in a model more oriented towards education, since one could decide that the link to research is more essential for education in some subjects (for example in technology) than in others or for some kind of curricula than for others. This would have relevant implications for the funding model: for example, it could be that basic funding for research is attributed only on the basis of the number of students at the master level, if it is decided that a research basis is much more important here than in the bachelor. Again, the issue is about priorities in respect to the available resources, but also to which extent these choices are in the realm of political decision or of the individual institutions.

6.5 The differentiation between universities and UAS

The final issue to be discussed is to which extent should the funding model of universities and UAS be different or the same criteria be applied to both types of universities.

The *general outline of the funding model for higher education* is largely the result of the answers to general questions concerning autonomy, private and public funding, role of research and institutional differentiation. In this respect, it is difficult to sustain that the basic principles of a funding system for higher education – for example the degree of private participation, the level of market and customer-orientation etc. – can be different between categories of higher education institutions (except if these are considered as completely different institutions, but this is not the case in the considered countries).

Thus, at least some basic decisions about the funding system should be the same for all institutions and between universities and UAS: this includes for example the degree of

autonomy in the management of the budget, the decision if to separate or not between a research and an educational budget, the degree of competitiveness of public funding, the orientation towards costs or prices, etc. The new higher education act offers an opportunity in this direction.

However, differences between UAS and universities in the specific criteria used to calculate the budget can be justified *if there is a sector-wide differentiation of the products and institutional missions*. Otherwise, the implication would be to apply the same criteria.

Thus, one could argue that professional curricula, since they do not require a research basis, should be cheaper than general curricula (this is the situation in most European countries) or, at the contrary, that because of their better employability, the price for three-year UAS curricula should higher than for university curricula of similar length.

As already discussed, the introduction of the master level and of two-tier structure (bachelor-master) requires the traditional distinction between general and professional curricula to be reconsidered: the decision on differentiating standard cost and prices for education will critically depend on the outcome of this process and on the extent to which universities and UAS curricula are considered to be different or not (linked also to issues like the conditions of transfer from one type of curricula to the other, etc.). Otherwise, the tendency will be to adopt the same rules for both as is already the case in a number of countries.

Concerning research, UAS have been historically characterized by a lower priority of research against education and, at least in some countries like Switzerland, by an orientation towards applied (and customer-oriented) research. This justifies the fact that the UAS general budget is essentially based on education, while it is assumed that research is largely financed by external sources.

Should this mandate be modified towards a wider presence of research and more closely connected to education, then the funding system would probably evolve towards that of universities, which have a single general budget for both activities. As shown before, such a convergence could mean a reduction of the investment in education in favor of research, especially in the social sciences domain, an evolution which is not necessarily politically acceptable.

What is important to remind in this context is that *external funds are no remedy for low institutional investment in research*, but rather differences in institutional priorities impact directly on the ability of acquiring external funds and thus reinforce in reality these differences.

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