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**The European Higher Education Space:
Funding Issues**

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I. INTRODUCTION: THE SETTING

Thank you very much for the invitation to deliver this year's MEMS lecture at Humboldt-Universität. If I possess the appropriate combination of theoretical, applied and policy attributes that the task requires, I will let you be the judge. But if so, this is likely to be restricted to the theme of higher education. Hence, this is the subject I have chosen for the lecture. To address issues concerning universities to an audience of academics at an institution carrying the name of Humboldt is, I am well aware, a sobering and risky endeavor, yet a very exciting one.

More specifically, I propose to you that we concern ourselves with European higher education. Europe is, after all, our own environment. It is also fitting to do so in a date where, in few hours from now, Berlin will cease to be geographically located at the edge of (formalized) Europe. There is, however, a deeper reason: there is malaise in our university world. We look across the Atlantic with awe and with apprehension. While we recognize that the higher education sector – so intimately intertwined with the research sector – is increasingly central to our economic welfare and – let me indulge in a bit of rhetoric – to our image of ourselves, we are worried that we are not measuring up.

There are, indeed, reasons to be worried. The university, an institution invented in Europe and re-launched in the modern era from Europe – arguably, from here, from the university I am now speaking – has today its most excellent specimens not in Europe but in America. What a change since 1876 when Johns Hopkins University was created in imitation of the best European models! At that time the USA had only five endowed chairs of medicine (and almost 200 of theology – see J. Barry, 2004, Part I). Worse for us is the fact that considerable evidence reveals that, as opposed to lower and secondary education, the gap in higher education is widening.

At its 2000 Lisbon meeting, the Council of the European Union established “becoming the most competitive, knowledge-based economy in the world” as an objective for the year 2010. It is difficult to see how this may ever be achieved if Europe does not possess the best universities in the world. It is, therefore, a matter of extreme urgency to launch policies and initiatives that, at some future point, may close the gap. And let us not fool ourselves. A good policy, even if its effects are immediately noticeable, will not dramatically reverse the situation in a decade. In this matter dramatic reversals do not take less than 50 years.

Since I want to be forward-looking, I shall not dwell any longer on diagnostics of malaise but on challenges and lines of reform. I emphasize the term “reform”. Suggestions of revolution may be comforting to the soul but they must be saved for desperate situations. My position is more optimistic. I believe, indeed, that deep reform of European higher education is not only necessary but also possible. European universities have many assets, beginning with its human capital. Pushing ahead is a matter of knowing what to do and, most importantly, of forging the enabling coalitions that may unleash the productivity of these assets.

The blueprint of reform calls for fostering and developing a European-wide field of university competition: for students, for professors, for resources, for reputation. Out of this competition, and not out of bureaucratic decisions, there will emerge a few universities of global significance, a larger number of, let us say, European scope and many that will cater, with varying quality, to State and local environments. I do not ask you to accept the need of a competitive field as self-evident. I simply ask you to see it as plausible hypothesis and to entertain it as such for the duration of this talk, as it will be its, unjustified but very justifiable, premise.

A note of warning: the development of the competitive field I am claiming for, and which is already emerging here and there (the European landscape is far from uniform!), is not the same thing as the Bologna process. Of course, the European-wide standardization process that goes under this name is important, as standardization is a facilitating factor for the development of the competitive field, and the Bologna process may be one way to accelerate its establishment. Yet, in contrast to the impression one may get from following the European higher education debates, Bologna is not the single existing issue and, perhaps, not even the most important one. The debaters know this well, but hope that facing the Bologna agenda may constitute enough of a shock to induce putting everything else on the table. This may be so, but I should rather concentrate today on some of the less familiar, non-Bologna issues, so that we do not forget about them.

Allow me to classify the non-Bologna challenges for the development of a competitive field into two headings:

1. Issues related to governance and incentives.
2. Funding issues.

Today I shall review the matter of funding. Although there is some American evidence that seems to suggest that funding overrides organizational variables as university quality explanations (see Lombardi, 2002), I want to emphasize that, in my opinion, in the European context incentives and governance issues are very important. If I do not touch on them today it is only because I dealt with them recently elsewhere (the Angelo Costa Lecture in Rome, 15 of January 2004); see also Hansmann, 1999.

In what follows the higher education sector will be understood in the most general sense: as including any provider of post-secondary education. This must be kept in mind because I shall often lapse into referring only to universities. At any rate, and qualitatively speaking, it appears that universities are expansive institutions and that, by far, they are going to be the main protagonists of our story.

II. HOW MUCH DO WE SPEND? WHAT ARE THE PERSPECTIVES AHEAD?

Let us take a very brief look at figures. The OECD publishes statistics on, among other aspects, expenditure (from all sources) in higher education as a proportion on GNP and on the expenditure per full-time equivalent student. The first strikes me a better measure of higher education effort since the strategies of different countries concerning the mix of number of students and expenditure per student could be different.

The latest available overall OECD figures (which are, unfortunately, for 1999) put the investment (I prefer this term to "expenditure") in higher education at 1.6% of GNP. Per country it ranges from 2.5% for Canada, 2.4% for Korea and 2.3% for the USA to .8% for Italy and Slovakia. In Germany it stands at 1.1% (the same as for France, the UK, Spain or Portugal). Finland, Sweden, Austria, Ireland and the Netherlands are above this figure.

The differences are far from insignificant, so it must be kept in mind that there may be measurement issues that somewhat distort the picture. For example, the lodging and maintenance of university students that live with their parents may not be registered as higher education expenditure, while it certainly will be for the lodging fees of students who move to colleges' residences (a very common situation in the USA).

It is not a simple matter to estimate the future evolution of the GNP share devoted to higher education services. However, leaving aside possible price effects and even assuming that quality patterns remain constant, I find it difficult, however, to resist the conclusion that this share will, in the average of OECD countries, trend upwards. I offer several justifications for this claim:

- (i) Europe is trying to respond to the US challenge and, as we have seen, the US higher education share is above the European.
- (ii) It has recently been noted by Aghion and Cohen (2004) that as OECD economies gain in sophistication and squarely place themselves at the frontier of knowledge, they will need a powerful higher education (and research) sector in order to foster innovation over imitation. Indeed, advanced training is

increasingly becoming central to the innovation process (see, for example, P. Roemer, 2001).

- (iii) It appears that, partly as a consequence of the impulses just referred to, we are already witnessing a trend towards the generalization of higher education. Maybe some day we will even get to its universalization.
- (iv) It is a commonplace observation, but nonetheless a perfectly correct one, that the practice of (formalized) learning is changing from an activity taking place exclusively in youth to a lifelong undertaking. This is propelled, primarily, by the needs of retraining, but a luxury good effect on consumption also plays a role.
- (v) The maturing information technologies will undoubtedly affect the manner in which students learn. In this dimension a substantial increase in quality is taking place and more is to be expected. Yet, I do not think that these technologies will have much effect on the productivity of professors in the delivery of the core services they provide. Physical presence and immediacy are distinctive characteristics of the latter. Higher education will remain, I think, a relatively labor-intensive activity. The cost pressure that this will generate is reminiscent of the Baumol-Bowen effect (see Baumol- Bowen, 1968) for the performing arts. Perhaps not a complete coincidence since teaching is also to some extent performing.

To all I have referred to up to now, one would need to add a generalized, and welcome, trend towards higher quality (including, in a number of countries, higher salaries) as competitive pressure on our higher education institutions, from inside and from outside Europe, increases.

III. THE PROGRAM AHEAD

Once we accept that the funding needs for higher education, assuming the maintenance, if not the improvement, of the quality standards, are in an increasing trajectory, the first question that poses itself is to what extent one

can count on those needs being met by a corresponding increase in public funding.

Public support of the universities does not stem from a single budgetary concept. Typically, we may have a reference budget allocation in the federal or state budgets responsible for the universities, with the corresponding funds going as generic, direct subsidies to the institutions of higher education or, in the form of fellowships, to the students. There may also be substantial amounts of additional public money that reach the universities, as research support from public agencies or as contract money, from, say, local governments. The bulk of the resources lie in the first, generic category, but since those of the second may not be distributed with any sense of proportionality, they may end up being crucially important for particular institutions.

The last decade and a half have witnessed an extension all over Europe of the good practice of distributing by means of some reasonably objective mechanism the total amount that the public funding authorities devote as direct subsidies to higher education institutions. By and large, we might say that the core subsidy to any particular institution has three components:

- (i) A generic component related to the size of the university, size being measured by an index of educational responsibilities. This component may also include basic ground support for research.
- (ii) A specific component related to strategic or particular needs, often tied to the outcome of a bargaining process between the university and the responsible public authority. Typically, this process crystallizes in some sort of contract.
- (iii) A competitive component. Ideally, most research money goes, or should go, into this third category.

It is, incidentally, because of components (ii) and (iii), and others of similar nature from other sources, that competition among universities may develop and that, as indicated, the distribution of public funds may end up being proportional not to size but, hopefully, to some measure of overall excellence.

Let us return to our question: to what extent can one count on financing needs being met in coming years by an increase in public funding? My answer is the following:

- (i) The aggregate funds devoted by public authorities to student aid and to the generic financing of higher education will increase, but not much. The main reason are the fiscal mood and realities of Europe, and also a perception, possibly erroneous but nonetheless present, that the priority claim for public funding does not lie with the non-obligatory segment of education.
- (ii) The public funds devoted to R&D will increase significantly. More so in some countries than in others. But the Lisbon commitment and the Barcelona objective (3% of GNP invested in R&D) will, on average, yield an upward trend. We must hope, since this is not a foregone conclusion, that it is the competitively allocated segment of research support that will grow the most.

With this landscape as backdrop it is clear enough that either we give up – an unacceptable option for me and I am sure for all of you – or we must develop a strategy for softening the budget constraint on the universities. A strategy that goes beyond the narrow confines of intensifying the lobbying efforts aimed at the increase of generic public subsidies. In today's lecture I should like to present the elements of such a strategy.

In fact, the “elements of such a strategy” are five, to which, apart from conclusions, I shall devote the last five sections of my lecture. The five are organized into two background preliminary reforms and three lines of development.

The background reforms are the establishment of an explicit and non-penalizing public funding framework, and the revamping of the student-aid system. The aim of the background reforms is to foster the constitution of an enabling coalition that would encompass the public authorities and the university community and that would have the capability of easing in the three lines of development: liberalization of fees, university entrepreneurship, and competitive research assignment. These three lines do not have to be seen, somewhat crudely, as merely funding devices. They make sense in their own right. However, they have strong implications for

the budget constraint of the universities and the display of their full potentialities depends, it seems to me, on the prior establishment of the background reforms.

IV. BACKGROUND REFORM: AN EXPLICIT AND NON-PENALIZING FUNDING SYSTEM

It commonly occurs that when faced with sensible proposals for reform, the leadership structures of the universities give them only tepid support or, even, come down on the side of conservative no-change positions. I think these displays of excess prudence have an explanation. In a context of not firmly formalized rules and of public funding subject to political uncertainties and to the vagaries of lobbying efforts, university leaders are concerned, and rightly so, that their support for reform will have a definite political cost and, however, limited benefits as, and this is my crucial remark, the public funding authority may not provide, when the chips are down, the necessary backing. Or worse still, in the case of reforms that generate revenue, it may fail to deliver some of the public funds that in the absence of reform would have been provided. The effort exerted and the political gamble taken by the university leadership may thus come to nothing. This perverse phenomenon does not describe all the situations in Europe, yet it describes some and is highly relevant for any moment of transition.

This simple, but important remark justifies the need to go beyond a funding process based on constant haggling and lobbying. Let us do the lobbying once and for all (and let me wish ourselves good luck) but let us then set up funding systems (for the core public financing of the universities) that are explicit, stable and non-penalizing of good behavior. Specifically:

- (i) Explicit: the core subsidy to the university should be the consequence of written rules and depend, therefore, on computable indices. Of course, the result of this process needs not be certain or independent of university performance. Incentive policies are, therefore, included. As I mentioned earlier there has been progress in this explicitness dimension but more is needed.

- (ii) Stable: it is very important that the funding mechanism be perceived as cast in stone and fixed for the relevant future. If not, we shall be back to lobbying as the primordial funding effort, and to excess prudence – or outright hostility – as the leadership attitude to reform.
- (iii) Non-penalizing: this is again key, and slightly more subtle. It signifies that the written rules should not be perverse by, so to speak, recognizing and formalizing the negative feedback phenomena I alluded to above. More plainly: the funding system should not, directly or indirectly, tax the gross or net returns of initiatives, such as the ones to be discussed in a moment, which are good from the standpoint of the general interests of the university (be these academic, financial or of other types). In fact, it would be nice to see the system rewarding excellent outcomes, but at the abstract level of this lecture let me settle for emphasizing the need for, at least, neutrality.

The importance of this first background reform – setting up explicit, stable, non-penalizing funding systems – cannot be overemphasized. Currently in Europe we are weak in this dimension (especially in stability) and I am convinced that this is one of the factors that grips and locks the energies for powerful university reform.

V. BACKGROUND REFORM: STUDENT AID

The areas traditionally covered under the heading of “student support” constitute a primary source of concern for observers of the European higher education scene. Student aid is not uniformly treated across Europe. While in some countries the feeling exists that support is sufficient, or even excessive, in others the feeling is that it is far from being sufficient. Be this as it may, however, student-aid policy is part of a social-equity compact to which European societies are strongly committed, and rightly so. The goal is to guarantee that a willing individual is not denied university education due to a disadvantaged background. Any reform movement will have to respect and foster this fundamental objective.

Because of the expansive trend in the system, including the greater emphasis on lifelong learning, it may be anticipated that the need for student aid will only increase. This raises a significant conundrum to the extent that, on the average of countries, it is unlikely that the funds required to meet needs with subsidies will be available in the coming years.

There is a consideration that may help us out of the conundrum. The need for aid is justified by the disadvantaged background rationale. But perhaps a better measure (and certainly a non-paternalistic one) of the social status of the candidate for aid is the expected return, accruing throughout the potential student adult life, from the education being undertaken. The individual is not the sole beneficiary of his education. There are externalities. Yet, it is hard to question that, at the margin, individuals are the main beneficiaries of the higher education they receive. Thus, is it really justified that the subsidy be dependent on background and not on future income? One can doubt it.

All this suggests that the Australian method, recently also in process of implementation in England (under the name of Graduate Contribution Scheme), is the model to emulate. The method goes as follows: university students have the right to a sufficient loan, repayment of which will not be required until their future income exceeds some threshold (say, GNP per head). Ideally, the annual repayment should be modulated in magnitude by the differential between income and the threshold. The most practical way to proceed is that the repayment be implemented through a complement to the income tax and that it be administered by the tax authority. If income never goes over the threshold then the loan is condoned, thus becoming a complete subsidy. It seems to me that this method, properly and carefully implemented, passes with flying colors the test of not hurting income-constrained students.

The Australian aid scheme can also be seen as an expression of a solidarity pact among generations (this is how it is seen in some countries, e.g. Chile). Indeed, at a steady state of the system we will have a fund distributed to current students to help them with their studies. The fund is constantly replenished by the flow of repayments from past students. Thus, in this way past students are helping out current students.

The implementation of the scheme may demand some public intervention, although the specific mechanism may not be the same in every country. At the very least, the government should provide insurance towards private

providers of loans. Here, the role of the tax authorities may help to minimize the default risk.

One criticism to the scheme we are discussing has some merit. It says that to the extent that the income tax is progressive the Australian method is already in place. Hence the suggestion to put it in place is tantamount to suggesting an increase in the degree of progressiveness. The convenience of doing the latter is, therefore, the proper setting for the discussion of the matter. Although this is a valid point, I think that the criticism misses the significance of the small differences: first, this is an increase of progressiveness that is contingent to a decision made in youth (the decision to opt for higher education and for a particular kind of loan) and, second, there is a cap on the total amount to be collected.

Allow me to make a final remark on the topic of student aid. In reality there are two kinds of aid: need aid and merit aid. All my observations so far have applied to the first. I have never suggested, for example, that the loans be contingent on performance (although some of this will be necessary for moral hazard reasons). As for merit aid let me just remark that the trend will be upward since merit scholarship is a competitive tool and the expectation is of increasing competition.

As a conclusion: the implementation of the student-aid background reform is crucial since, otherwise, it is very unlikely that one can hope for student support, or at least neutrality, for the line of development reforms that shall now be considered. I'm not hoping for student support for the background reform itself. Yet the moral strength of a position based exclusively on self-interest (we all prefer subsidies to loans) is much lower than one based, in addition, on equity (the right not to be excluded from higher education).

VI. LINE OF DEVELOPMENT: FEES

Although higher education is nowhere part of obligatory education, the right to higher education is very basic in the European scene. In theory, this right is compatible with the existence of a price for higher education services, but in practice the wish not to impede access of students with disadvantaged backgrounds has pushed matters towards a guarantee that the budget constraint will not, indirectly, impede this access. Traditionally this has led to a policy of low fees, even of no fees at all.

Allow me to make a sort of theoretical digression on the role of prices. In conventional economics, prices play a financing and an incentive role. The financing role is expressed directly through the no-losses constraints: it simply says that the prices have to generate a revenue sufficient to cover the cost of production. The incentive role emerges as soon as we postulate an optimization problem and write down first-order conditions. One of the remarkable properties of standard price theory is that under convexity hypothesis this double role can be simultaneously satisfied.

In principle, and moving back to higher education, the departure of real fees from any notion of equilibrium fees implies that neither of the two functions is satisfied. The failure of the incentive function is, I would presume, mild. Certainly, low fees have to lead to some over-consumption. There may be too many students and, more plausibly, there may be over-consumption by individual students. Yet, contemplating the US experience and, also, taking into account the positive external effects of education, it is unlikely that the distortion is very pronounced. The failure of the financing function is, however, obvious and dramatic. Higher fees could represent a real inflow of much needed revenue. "Much needed" because, as we have emphasized, there is a limit to what will be provided publicly.

In view of all this, the question is then: in the current European context and contemplating future trends towards increases of quantity and quality in higher education services, is the low-fee policy tenable? I have already implicitly answered the question in the negative (where is the money to come from for the increase in quantity and of quality?) but I also want to emphasize that a negative answer is compatible with the guarantee of universal accessibility. Indeed, for this purpose it should suffice to carry out, before a liberalization of fees, the student aid-reform suggested as second background reform.

The sentiment at European universities against higher fees is strong. Let me repeat that it is therefore indispensable that prior to any liberalization of fees the background reforms be implemented. As discussed earlier, they are designed to facilitate the accord and/or support of the different university sectors. I want to stress the term "prior". The sequence of reform moves has to be the correct one. If we put the cart before the horse things will not work. In this respect let me point out the position of British universities towards the Higher Education Bill, which includes a partial liberalization of

fees: it is favorable but it also demands absolute guarantees that the funds generated from fees will be truly additional (see N. Brown, 2003).

Once we have set off on the liberalization of fees road we must recognize that we have also opened another door: the possibility of price competition. Should this be welcome? I believe it should. Competition will have the usual salutary effects on efficiency and, in particular, on cost minimization. And it may have good welfare effects by generating a menu of choices: some universities may specialize in high-quality, but costly products while other may provide lower-cost – but beneficial – products. In the context of the Bologna process I would anticipate that the most logical initial locus of liberalization and fee competition will be the postgraduate offerings and curricula.

VII. LINE OF DEVELOPMENT: THE ENTREPRENEURIAL UNIVERSITY

One of the distinctive features of the second half of the XX century is that universities have become economic engines. It is to be expected that as knowledge and science become increasingly more the basis for the establishment of new firms, or for the renewal of old firms, this trend will persist.

Here, the question is then to what extent the university general funding should benefit from this and in what way.

Traditionally the European university has not been very good at protecting and/or capitalizing its intellectual assets. The university is an institution that deals with knowledge but has, however, been much more adept at thinking of productive capital in terms of, say, real estate. The university has, often, either let intellectual assets be defined and taken by other parties (insiders and outsiders), or it has failed to exploit them properly. No doubt part of the reason for this state of affairs is the university secular commitment to the free circulation of ideas and knowledge. But the universities have not always recognized that to give something for free, which may be the socially optimal thing to do, one first has to establish ownership over it.

One salient example of external appropriation of assets is the commercial, or for that matter, non-university, publishing of journals. We have here the

following paradox: journals publish papers the vast majority of which originate at the universities (although, admittedly, they may be partly financed by other parties). Yet university libraries are paying huge amounts for the right to use these papers.

Cases of internal appropriation occur, for example, in those increasingly rare situations where the researcher-employee of the university acts as unilateral entrepreneur and collects all the benefits. It is evident that, ideally, some kind of splitting is called for. I could not pretend to give a rule for this sharing. The split will depend on a precise assessment of contributions and, also, on bargaining power. Since this is a lecture on funding let me make clear that, previous to an attribution of benefits, there should be an adequate imputation of indirect cost to the university. The practice, I hope residual, where, via university funding, subsidies are transmitted to commercial operations that compete, unfairly, with the private sector, should be condemned as a source of gross economic inefficiency.

I should like to conclude this section with a double message. The university, either by itself or (as in the case of the libraries) in a coordinated manner, should carefully and comprehensively define its intellectual assets, including a very special one: its name and reputation. Universities should be prudent in the exploitation of assets which are not intrinsically related to knowledge (for example, real estate assets). But, and this is the second message, the university should not be prudent at all in the exploitation of its intellectual assets. In fact, in the name of efficiency the universities are duty bound to exercise optimal effort for the capitalization of these assets. Note that socially efficient capitalization may mean, as in many instances of basic knowledge, giving it for free. In other instances it may mean obtaining and attempting to exploit commercially a patent. The form of the exploitation (direct, selling, leasing ...) is a secondary, technical matter. What is important is that universities be effective managers of their portfolios and, in particular, that they be well attuned to the risk aspects of portfolio management.

It should be, thus, fairly clear by now that I am endorsing the notion of the entrepreneurial university, a term popularized by Burton Clark (see 1998). And I should also like to emphasize that I am doing so in the belief that entrepreneurship for universities is a virtue in itself, not merely a desperate measure to raise funds in desperate situations. You may get the latter impression because this is a speech on funding and because, let's face it,

most entrepreneurial efforts at European universities have developed under the strong persuasive force of budgets shrinking in a fairly explicit and stable way. But, ideally, neither the entrepreneurial efforts at the universities have to wait for decreasing budgets nor the way to promote the entrepreneurial spirit has to be decreasing budgets.

VIII. LINE OF DEVELOPMENT: UNIVERSITIES AND RESEARCH FUNDING

Universities are at the heart of the European research system. Not all research is carried out at the universities and I think that, overall, it would not be optimal that it be so. Much as I would not recommend anybody to be only a researcher I believe that it is convenient that institutions exist for which the research responsibility can be taken for granted. But be that as it may, there is no doubt that the quality – not to say the quantity – of European research would suffer substantially if, so to speak, it were to lose the dedication and fervor of the universities.

Research has its own funding lines, through which resources are directed towards individual researchers, research groups, or research centers, connected or not with universities. It is to be expected that research funds, even the public segment of these, will increase in coming years at rates higher than the ones corresponding to universities. The attraction of research funds becomes therefore a very desirable source of funding for universities. This is fine provided it works as a strong incentive for the promotion of university research. To put this another way: research should be the aim, not the excuse, for the attraction-of-funds effort.

For the effectiveness of university research funding several desirable characteristics should be borne in mind:

- (i) The pull of universities towards research will be facilitated by generous overhead policies. Remember that when overhead policies were introduced in the USA under the leadership of Vannevar Bush in the postwar period (see V. Bush, 1945) their real justification was not the worthwhile accounting exercise of making sure that all the direct and indirect cost of a research project were covered, but a visionary design aimed at providing strong incentives for the universities to pursue research. The

subsequent launching of the NSF, and its espousing of powerful overhead policies, were crucial to the flourishing of the American model of research university.

- (ii) I think we all agree that research, and research projects, should be evaluated. The additional point I should like to make here is that to give correct incentives to the universities, and also to avoid distortions related to their multi-objective nature, research calls and the evaluation of research proposals should treat university and non-university researchers, groups and centers in a symmetrical way.
- (iii) Because research is part of the defining mission of the university (but perhaps not in the same way for all of them) some of the generic funding of the university should be allocated to research support. But it would be a mistake to pretend that, in a large proportion, the public research funding of a university devoted to, and successful in, research be part of its public generic funding and that it arrives to the university lump-sum, as some sort of summary outcome of an overall research assessment. It is preferable that it be the aggregate outcome of the funds (included the overheads) generated by competitively evaluated grants, each with specific recipients – personal or institutional – within the university.

IX. CONCLUSIONS

It may be worthwhile to summarize the points I have made so far:

1. Evaluating the possible gap between needs and available public funding for universities is a complex matter. Especially when it is taken into account that “needs” is a very relative concept: it depends on the quality one wants to offer. Even so, it may be conjectured that the gap exists and that if left to itself it will increase in coming years.
2. Public funding of universities should be stable and predictable in the aggregate, although it can be conditional on some exogenous, and even endogenous, variables. In the latter case the system must be

non-penalizing. Also, a portion of the public funding should be directed by incentive policies.

3. Student-aid systems must be drastically revamped and reoriented towards loan systems with income contingent repayment. I must emphasize that this system can be made fully compatible with the principle of universal accessibility to higher education.
4. Once the two previous reforms are in place the structure of student fees should be liberalized – perhaps in a gradual way. The increased competition that this may generate should be welcomed.
5. Universities should formalize their property rights and extract returns from their intellectual assets with a commercial character. Quite aside from the funding role that this might play, it is highly appropriate to its general aims that universities display an entrepreneurial spirit.
6. It is socially desirable that universities receive incentives for the pursuance of research. Even more: it is important that most of the research funding that reaches universities be the result of incentive and competitive policies. If this induces differentiation among universities, as it will surely do, so be it.

Many thanks for your attention.

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Formerly he was Professor of Economics at Harvard University (1981-96) and Professor of Economics and Mathematics at the University of California, Berkeley (1972-80). He has been a Sloan Fellow, a Guggenheim Fellow and a Visiting Professor at the University of Bonn, the Universitat Autònoma de Barcelona, the Mathematical Sciences Research Institute (Berkeley). He served as Editor of the *Journal of Mathematical Economics* (1985-88), and of *Econometrica* (1988-92). Professor Mas-Colell is a Fellow of the Econometric Society and was its President in 1993. In 1997 he was elected Foreign Associate by the US National Academy of Sciences and Foreign Honorary Member of the American Economic Association.

He is currently member of the Executive Committee of the International Economic Association. From 2000 to 2004 he was Minister for Universities and Research of the Government of Catalonia.

Andreu Mas-Colell has written some 100 research papers on subjects ranging from abstract general equilibrium theory and the structure of financial markets to pricing policy for public firms.

He is the author of *The Theory of General Economic Equilibrium: A Differentiable Approach* (Cambridge University Press, 1985) and co-author, with M. Whinston and J. Green, of the graduate textbook *Microeconomic Theory* (Oxford University Press, 1994).

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