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Processes and Stages of Differentiation in European Higher Education

Introduction

In this paper we discuss the processes of internal differentiation that have characterized European Higher Education systems (HEs) in the last fifty years or so. We argue that these processes have gone through two main stages and in two different directions, each of which is showing its limits in the long run. Moreover, we suggest that a third stage may now be under way, we try to find some evidence for that in the UK and we briefly speculate about the likely configuration of European HEs in the near future.

In the first stage beginning in the 1960-70s the main objective of differentiating HEs was to create a vocational track, in which tertiary education institutions close to the productive system were especially in tune with labour demand, without having to profoundly modify the missions and features of traditional academic institutions, namely universities. We can term this process a “horizontal” differentiation between types of institutions operating within the wider national HEs.

Over time, this type of differentiation became increasingly blurred. Starting in the mid-1990s, however, a “vertical” type of differentiation within national HEs took shape. Its main objective was to differentiate between the more and the less competitive universities as regards the amount of financial and symbolic resources provided to them. The instruments used were several, ranging from research and teaching assessments to national calls for excellence, not to speak of the indirect but powerful effects of international rankings.

Both this objective and these instruments have rapidly gained worldwide popularity, so that all European HEs have set in motion, to a greater or lesser extent, processes that should lead to some form of vertical differentiation. From this point of view, the current situation could be characterized as one of convergence towards vertical differentiation within national HEs. However, increasing criticism is addressed to two major shortcomings of this situation which have become apparent. First, large comprehensive universities are containers of smaller units whose research and teaching performance may vary widely. Second, the outcomes of vertical differentiation are overwhelmingly dependent on research performance, whereas research is just one of the several functions that modern universities are called upon to perform. We may therefore expect that, in response to this growing criticism, the third stage of differentiation will be both “internal” to individual HE institutions and “functional”. By this we mean, on the one hand, a differentiation between departments or other organizational units of the same university and, on the other, a differentiation based on the functions (teaching, research, contribution to local development, etc.) that each of these units performs best and on which it may therefore try to specialize.

The paper is organized as follows: section 1 briefly discusses the concepts of diversity and differentiation as addressed in the literature; sections 2 and 3 address objectives and instruments of horizontal and vertical differentiation respectively, as well as their limits; section 4 provides some theoretical background to the hypothesis of an emerging third stage characterized by both internal and functional differentiation; section 5 provides empirical evidence from UK universities to support this hypothesis; while the last section presents a short conclusion.

The choice of focusing on UK universities is due to three reasons. On the one hand, the British HE system is a benchmark in this field: it is the leading system in terms of research performance and the first one to introduce systematic research assessment. Second, British universities work in a more competitive environment than their Continental counterparts, hence internal and functional differentiation may be a viable and productive strategy for their survival: departments or entire universities underperforming in research may find a stronger

incentive to specialize in other functions. Third, key data on the British HEs and its performances at institutional level are more easily available through governmental agencies than for other national HE systems.

Diversity, differentiation and diversification

There is wide agreement in the HE literature that some degrees of diversity are beneficial to the performance of HEs: several authors isolated quite a few arguments in favour of diversity (Birnbaum 1983; van der Wende 2011; van Vught 2009). Diversity helps universities to cope with the new functions they are assigned and to better meet the new demands coming from an enlarged audience of stakeholders (students, labour market actors, companies, institutions). For instance, a more diverse system can better meet the needs of students with different backgrounds in terms of education and expectations. Associated to this, it has been highlighted that diversity fosters social mobility: by providing different forms of entrance and tracking, 'a diversified system stimulates upward mobility as well as honorable downward mobility' (van Vught 2009). At the same time, a more diverse HEs can better serve the needs of a labour market characterized by different levels of specializations and complexity.

To sum up, a diversified system is seen as the only instrument to combine elite and mass HE. In order to allow elite institutions to survive in a mass HEs, a cluster of non-elite institutions is needed to help absorb the heterogeneous demand coming from students.

However, there is hardly any consensus in the literature on the determinants and dynamics of diversity (Rossi 2010): some authors maintain that HEs have an innate drive toward diversity, while others support the idea that the inherent nature of HEs is de-differentiation (Vaira 2009; van Vught 2009).

The former maintain that differentiation in HEs comes along with the emergence of new functions: the occurrence of such new functions, which have to be differentiated from the former ones, increases the level of organizational diversity, though this does not necessarily imply the emergence of new types of organizations (Parsons and Platt 1973). Also, due to the heterogeneity of student population, to increasing labour market chances for graduates and to the emergence of new disciplines, HEs face an ever-increasing complexity (Clark 1983). This will inevitably lead to a fragmentation of the system, in which old organizational forms will persist next to new ones, contributing to the layering of diverse forms.

On the other side, several scholars maintain that HEs show an immanent drive toward homogenization, spurred by several factors at macro and micro level. The theory of "academic drift" (Neave 1979; Riesman 1956) predicts that lower status institutions will try to imitate top-level institutions, generating a tendency toward uniformity rather than diversity. The very effort by governments to stimulate universities to compete has spurred a trend to isomorphism, which has led to a decrease in diversity as an unintended consequence (Huisman et al. 2007; Meek and Wood 1998).

In general, the "reputation race" among institutions, as well as among professors and among prospective students, has often proved stronger than a supposedly rational and orderly division of tasks within the tertiary education field.

The first stage: "horizontal" differentiation within European HEs

As is well known, a wave of "horizontal" differentiation within HEs took place in the 1960s and 1970s in most European countries. The process was not homogeneous across national HE systems, and local peculiarities in the design or in the implementation of the reforms gave origin to substantial national idiosyncrasies. However, all national patterns had in common

the same objective and the use of a principal instrument. The objective **was** to foster appropriate labour market outcomes for a wide and diverse population of students. In **many countries** this objective **was** reached through building some sort of “binary system” of tertiary education. Some authors highlighted the existence of broader and more articulated typologies (Kyvik 2004; Ulrich Teichler 2004; Ulrick Teichler 1988) beyond the basic distinction in two-type structures. However, for the purpose of this paper, we refer to the fact that as a general rule a binary system is composed by an academic track of comprehensive universities, carrying on the Humboldtian tradition that stressed unity of teaching and research, and by a track more vocationally oriented and closer to the needs of the productive system.

Factors leading to horizontal differentiation

The main factor was the process that is commonly known as the transition to a “mass university”. Over forty years ago, Martin Trow (1974) described – and foresaw – a generalized expansion of HEs. Though the timing differed in the various areas of the world, all HEs would go through three main stages. He called “élite systems” those in countries where university students were less than 15% of their age cohort, “mass systems” those in which the percentage was between 15% and 35%, and “generalized access systems” where more than 35% of a cohort attended HE institutions. Arbitrary as these figures may be, most developed countries are currently well beyond even this last stage of development. According to OECD report, “it is estimated that 67% of young adults in OECD countries will enter tertiary education at least once during their lifetime” (OECD 2015).

Why such “generalized access” took place is a much-debated question. Basically, two theories – which can only be cited here – try to account for this boom. On the one hand, we have the “skill-biased technological change” theory, which sees the increasing supply of tertiary-level students as a response to increasing demand for high skills by the economic system. It is a theory that can be traced back to the concept of “human capital” (Becker 1964) and that has, on the other hand, been fiercely opposed by those who see generalized access to tertiary education as the result of a competition for social status, leading to an “inflation of credentials” (Collins 1979).

The informal role of vertical differences and the limits of horizontal differentiation

As far as the academic track is concerned, of course in all European countries some universities have always enjoyed higher reputation and status than others. Whether these differences depended on tradition, ability to attract students from the upper classes, professors’ reputation, or actual performance in terms of teaching and research quality, in the first stage this hierarchy of status remained largely informal, well-known by the insiders but largely ignored by the wider public, with virtual no consequences on funding.

It comes as no surprise, therefore, that HE scholars’ attention was focused almost exclusively on horizontal differentiation. However, as we have seen in the previous section, some studies highlighted the immanent drive toward homogenization. In some other cases the process of homogenization has been the result of deliberate policies pursued by governments. For instance, in the UK the Polytechnics, established as basically vocational tertiary institutions in the 1960s, were granted the status of universities in 1992 (Halsey 2000). More recently, there has been a gradual convergence to a unitary system in Germany and The Netherlands (de Boer and Huisman 1999). Although the vocational track proved to work well and policies explicitly oriented to abolish it did not emerge, tendencies toward the “academic drift” appeared **especially** in the German system, making *Fachhochschulen* more and more similar

to universities and therefore threatening the roots of the differentiation between the two types of institutions. In 1998 the distinction between degrees provided by universities and by *Fachhochschulen* has been abolished and the latter were also allowed to carry out research, although with a focus on applied research. More recently, *Fachhochschulen* have come to provide some master degrees that allow to enroll in doctoral programs and to confer professional doctoral degrees as well. Finally, with the increasing interest of governments for the contribution of HE institutions to national competitiveness, also the non-university sector of vocational schools has been awarded governmental funds for research, which is carried out in the framework of partial complementarity with the university sector and partial overlap with academic research (Kyvik and Lepori 2010),

Finally, the Bologna Process, officially started in 1999, has played an ambivalent role in these processes of differentiation and de-differentiation. On the one hand, the diversification of the degrees granted by Continental European universities into a first and a second (later also a third) level, roughly corresponding to the Bachelor, Master and PhD degrees in the UK, seems to reinforce the general process of differentiation of European HEs. On the other hand, the distinction existing in binary systems between academic and vocational tracks becomes blurred, also due to the search for standards in European higher education and the introduction of the use of standards for evaluating the provision of services by universities (Amaral et al. 2009; Maassen and Stensaker 2011). . Thus, the original idea that different types of tertiary institutions should cater to the different requirements by the graduates' labour market and to the different aspirations of students has received a powerful blow.

The second stage: “vertical” differentiation within European HEs

In the late 1990s and the 2000s several European countries witnessed a second wave of differentiation. This wave was mainly a response to the perception of the key role that universities should play in the “knowledge economy”, and even more to the fiscal crisis of states increasingly unable to fund a mass system of HE. Following the New Public Management recipes, the main objective of vertical differentiation processes was to provide funds selectively to the most competitive institutions only, giving them a large degree of autonomy in making strategic choices but assessing the outcomes and holding them accountable to the taxpayer. Research assessment on the one hand, and competitive funding of top-level universities on the other, have been the main policy tools.

The clearest example is the *Research Assessment Exercise* (RAE), which was first introduced in the UK in 1996 with the aim of rationalizing the allocation of public funds to universities, in view of greater accountability of public spending. At the same time, however, it served as a tool for formalizing the differences already existing between “research intensive” and “teaching” universities. It is worth noticing that the introduction of RAE in the UK was decided at more or less the same time in which British Polytechnics were made formally equal to universities (“Further and Higher Education Act” in 1992), thus abolishing the binary system.

National evaluations of research performance have since then been conducted in other European countries as well (e.g. Italy). A tool originally conceived as a response to the shortage of public funds, as well as to claims for the accountability of public expenditure, ended up being the basis for pursuing (and in some cases formalizing) vertical differentiation within university systems.

On the other hand, the main example of competitive funding of top-level universities is Germany. Here, national policies explicitly aimed at vertical differentiation within the university system appeared only in the 2000s: the *Excellenzinitiative*, largely based on

research performance, was in fact first introduced in 2005. As for the RAE in the UK, the *Excellenzinitiative* had a profound influence on the universities' research strategies by creating an internal reputational ranking. It boosted the trend to vertical differentiation significantly, not only because of its financial dimension (the amount of funding allocated to the top universities is relevant), but especially for its symbolic value. The German *ExcellenzInitiative* was soon followed by the French government, that used it not just to formalize the informally accepted differences within the French HEs, but also to build a new type of vertical differentiation. The French way to foster such differentiation went first of all through determined efforts to force universities, *Grandes Écoles* and CNRS laboratories to merge into wider and internationally competitive "poles" (PRES), and then to follow the German approach to select the top institutions (*Plan Campus*).

Factors leading to vertical differentiation

The perception (and the rhetoric) of the advent of a "knowledge economy" was widespread in Europe even before it received formal recognition by the 2000 "Lisbon agenda". The increasingly crucial role of knowledge-intensive production of goods and services reinforced in turn the "skill-biased technological change" theory cited above, hence the widely positive view that economic élites and EU policy-makers held about the process of "generalized access" to tertiary education. Such élites and policy-makers developed a growing interest in the possibility of transferring the outcomes of scientific research into product and process innovation capable of increasing economic competitiveness, but also of concrete social and political goals(Braun and Merrien 1999; Maassen and Stensaker 2011) . For university administrations and academic communities, a new trade-off thus emerged between the chance to increase the employability of their graduates and to partly compensate for the reduced funding by the state on the one hand, and the risk of losing control over processes of knowledge creation, use and transmission on the other.

A largely unintended consequence of these processes was that the previous distinction between vocational and academic tertiary institutions, namely the horizontal differentiation within HEs, became far less clear-cut. As technology transfer of the research results became a much rewarded activity, vocational institutions tried to expand their mission to research and to research training, namely to graduate studies, previously the reserve of universities. On the other hand, traditional academic institutions increasingly adopted instruments to enhance the employability of their graduates and intensified their relationships with economic actors. Curricula were sometimes designed jointly with companies and teaching roles were often extended to non-academic professionals (Regini 2011).

More generally, the traditional values of academic communities, university administrations and states were often superseded by managerial-entrepreneurial considerations that stressed performance and competition. Braun and Merrien (1999) point to a shift in the belief system concerning the role of universities: an utilitarian and service-oriented view of public institutions spread across OECD countries, with the belief that a supervisor role of the state and market-like relationship would make more efficient the public services

The diffusion of policies inspired by neo-liberal theories, as well as the emergence of a fiscal crisis in many European countries, contributed to create a competitive environment for HE institutions. The New Public Management view of public sectors as quasi-markets, emphasizing the need for accountability, transparency and efficiency, boosted the introduction of rational, merit- and performance-based criteria of funds allocation also in the HE sector. As a consequence, it stressed the need for performance measurement and evaluation.

The limits of vertical differentiation and university rankings

In this framework, international rankings, league tables and similar instruments qualified as both causes and consequences of the processes of vertical differentiation. International university rankings became increasingly popular in less than a decade (the first widely known international ranking was the ARWU, published in June 2003), dominating the policy and research debate on higher education. Their power stays in providing a simple, easy-to-use reference, which has a great influence on molding policy makers decisions (Hazelkorn 2014). Nonetheless, there is a large body of literature highlighting the methodological problems of rankings (Paruolo et al. 2013; Soh 2014) and the implications in terms of institutional design and unintended consequences for national HEs (Kehm 2014; Marginson and van der Wende 2007). The proliferation of national and international rankings was on the one hand a powerful factor of vertical differentiation, but at the same time such proliferation should be seen as a consequence of the increasing relevance of this type of differentiation within and between HEs.

Given the growing importance of these tools in terms of funding, and especially of their symbolic value, the race for better positions in rankings (especially for inclusion in the top list) fosters imitative processes among universities. An instrument originally conceived for observing and fostering vertical differentiation within HEs, ends up working at the same time as a powerful drive towards greater homogeneity. In fact, the league table norms are implicitly those of large comprehensive universities, and it becomes impossible to advance an institution's comparative performance unless it adopts a similar approach. In other words, international rankings have a manifest function of vertical differentiation of universities, but an unintended effect of pressure for homogeneity.

However, this process is not exempt from problems and criticism that concern both the objectives and the instruments of vertical differentiation. Leaving aside the general criticism addressed to the increasing importance of the managerial idea of competition, there are two main critical points. The first problem has to do with the fact that large comprehensive universities are, in practice, containers of a wide variety of smaller organizational units, whose performance in both teaching and research may vary significantly. Second, vertical differentiation overwhelmingly relies on research; however, for all its importance scientific research is just one of the several functions that modern universities are requested to perform. We may therefore expect that, in response to this growing criticism, the next stage will focus on differences between a university's organizational units; and that each of these units will be encouraged to specialize on the mix of functions on which it can perform best. In other words, we may hypothesize that the third stage of differentiation will be both "internal" to individual HE institutions and "functional" in the meanings above (Regini and Colombo 2013). While these two dimensions, and especially internal differentiation, have always be present to some extent and are therefore not fully new phenomena, our hypothesis is that they may become the dominant criteria at least in the most competitive HE systems.

In the following sections we will first briefly speculate on this hypothesis and then provide some empirical support to it by focusing on the British case.

A new stage? Internal and functional differentiation

Differentiation within universities

The objective of the first stage of differentiation within HEs – the horizontal one – was to create different types of tertiary institutions, serving different purposes. Each of these tertiary institutions, once it had been assigned to one type or the other, was quite naturally seen as an internally consistent organization, with its own mission, structure, rules and values. The second stage of differentiation – the vertical one – initially aimed at distinguishing whole institutions, too. Research assessment was meant to reinforce the distinction, among other things, between research intensive universities and teaching universities. International rankings, whether based predominantly on reputational surveys or on research performance indicators, gained the obsessive attention of the media by proclaiming the top 100 (or 500) world-class universities according to their criteria, while there was little initial interest in the list of, say, the top 100 chemistry departments. And even national competitions for funding, such as the *Excellenzinitiative* launched by the German Federal government, were primarily meant to select “top universities”, although funding programs were targeted also to smaller units, such as doctoral schools or research networks.

But it is rather obvious that no individual university can excel in all possible areas of knowledge. The very logic of vertical differentiation, that for policy makers may be brutally expressed by the idea of “value for money”, and for academics by the idea that merit and excellence should be the only criteria to guide the allocation of resources, inevitably leads to attempts at differentiating not just within HEs but within individual universities, namely between departments or other internal organizational units.

Two relatively recent phenomena reinforce these trends. The first is the decline in public resources allocated to HE in almost all advanced economies. The second is the increasing competition among universities for funding, students, professors, reputation which also creates pressure on client-orientation of universities and priority setting by funding bodies (Braun and Merrien 1999). What these two phenomena have in common is, among other things, the pressure they put on the universities’ top leaders to make decisions that maximize efficiency for their organization, hence to be very selective in the choices they make.

As pointed out by de Boer and Huisman (1999) universities operate in a highly competitive environment and in a context of scarce resources. This makes the decision making strategic, since top leadership has to decide quickly about substantive and divisive issues. This process leads to a strengthening of executive leadership and to a increasing dependence of university’s organizational units on their performance. New funding schemes have contributed to a differentiation of universities either functionally or hierarchically, featuring their portfolios on specific competences (Fumasoli and Huisman 2013). These also contribute to increase internal competition within universities, as long as internal units promote their own market responsiveness for gaining more funding (de Boer and Huisman 1999, p.116), or as long as departments closer to revenue streams will tend to gain more power within the organization and in particular, in the decision-making process (Morphew and Eckel 2009).

Both national assessment exercises and international rankings theoretically allow for such an internal differentiation, as they provide measures of performance of the different departments or fields within a university and make comparisons with similar internal structures in other universities possible. However, such comparisons are likely to yield clear-cut results only in very competitive HEs such as the Anglo-American ones. In several Continental European countries, on the other hand, where universities have traditionally enjoyed little autonomy in selecting students and professors, in setting student fees and professor salaries, in providing selective incentives, the likely result is a high degree of dispersion of the best scientists in any fields among the various universities. Rather than having, say, an excellent Department of Physics and a mediocre Department of Economics, or viceversa, several “good” Continental European universities are likely to display an average medium-high quality in both of them.

Differentiation by functions

But why should national policy-makers or institutional governance bodies see an average medium-high quality (of their HE system or institution respectively) as unsatisfactory? An answer to this question can clarify the drivers that push for functional differentiation to emerge, thus providing some theoretical basis upon which this third stage of differentiation builds.

To some extent, the increasing “search for excellence”, which takes good quality for granted and wants to go beyond that, is the outcome of a myth, of a competition for status and prestige which does not correspond to actual needs and that, as we have seen above, takes research performance as the almost exclusive field on which to play that competition. However, this myth does not fully explain the obsession with excellence in HE.

Many actors who act on the global scene have come to see a good average quality as no longer sufficient; as a consequence, the lack of a recognizable “segment of excellence” risks hindering a whole HE system or institution. A typical example are the most innovative companies, that take excellence of local universities or departments into consideration as a major criterion to decide where to locate. But, in an ever more global scenario where the mobility of professors, researchers and students is becoming as high as that of innovative companies, also these actors increasingly orient their choices to those institutions (or their internal units) that are perceived as excellent. Think of many winners of ERC grants, that usually work in high-quality universities or departments yet decide to move to others that offer a reputation of excellence with regard to their scientific environment and equipment. Or of the many international students that, especially at doctoral level, apply exclusively to the universities considered as excellent in their fields, with the result that only the latter will be in a position to be very selective. Not to speak of venture capital, that tends to finance spin-offs and other research products that come predominantly from universities with a reputation of excellence.

Quite obviously, a national “policy for excellence” (Rostan and Vaira 2011) may try to create or reinforce “points of attraction” within a HEs for all such actors, hoping that this may have a positive repercussion on the reputation of the whole system. And a similar strategy may be adopted by rectors and boards of governors with regard to departments or other organizational units internal to their university. However, the high selectivity of any such strategies is likely to create major problems of legitimacy and consensus. It is here that a strategy of functional differentiation, which builds on the plurality of functions performed by HE institutions well beyond the mono-dimensional focus on research, may prove appealing to policy-makers and institutional leaders.

Such a functional differentiation becomes the more possible the more universities come to perform a plurality of functions, well beyond their traditional missions. An incomplete list includes basic, vocationally oriented training; human capital formation for highly-specialized occupations; research training; contribution to life-long learning; knowledge production through blue-sky research; and knowledge exchange; **applied research**; contribution to local economic and cultural development; contribution to the international exchange of knowledge and human capital. Quite interestingly, also recent attempts to build multi-dimensional classifications and rankings, such as U-Map and U-Multirank respectively (see www.u-map.eu/ and www.umultirank.org/), have started from the idea that HE institutions play different functions, that cater to different users and should be assessed separately.

Similarly to what we noticed above with regard to internal differentiation, the obvious observation that stems from such a list is that no individual university can possibly perform

all these functions at the same level of quality, especially if we consider all areas of knowledge. Hence, governments may come to see as a rational strategy to help each university to identify its mission in a specific combination of the functions above, for each of its disciplinary areas. In line with this theoretical background, in the next section we ask whether there is any empirical evidence that this is the direction currently taken in at least some European countries. Are we actually witnessing the advent of a third stage of differentiation that takes place within universities and is based on the plurality of functions they must perform?

Some evidence from UK universities

The aim of this empirical section is not to provide an exhaustive analysis of the British system and its recent evolution, but rather to use the British HEs as a case study for testing our hypotheses of internal and functional differentiation discussed above. Previous empirical research on institutional diversity has highlighted that the United Kingdom has the most diverse higher education system among OECD countries (Huisman et al. 2007), meaning that here many different types of institutions can be found, compared to other ones (e.g. Denmark the least diverse). The authors maintain that although the formal binary divide disappeared in the 1990s, the differences between the ‘old’ and ‘new’ universities have continued to exist, and that this was maintained through government-driven market mechanisms (Huisman et al. 2007, p.574). A recent empirical work on UK universities confirms this setting (Boliver 2015), pointing to the fact that UK universities can be clustered in four groups on the basis of their level of differentiation along five dimensions: research activity, quality of teaching, economic resources, academic selectivity and socio-economic mix of students. The paper confirms that the main divide runs between old and new universities (post-1992) and that among the old ones -not surprisingly- Oxford and Cambridge stand out as the elite cluster. On the contrary, other universities belonging to the Russell Group do not appear as homogeneous as self-described but, rather, tend to cluster together with other old universities in middle-tier institutions. This work represents an interesting starting point with respect to our analysis, with which it shares the idea of differentiation by functions among institutions. However, our study aims to contribute further to the debate by investigating internal differentiation jointly with the differentiation by functions.

Research questions and hypotheses

Our hypothesis regarding the presence of functional differentiation (Hypothesis 1) will be tested through the following sub-hypotheses:

- HP1.a we expect to find a negative correlation between specialization in research and specialization in teaching, namely that universities showing high levels of investment in research (input) do not necessarily invest at the same level in teaching and vice versa.
- HP1.b we expect to find that this specialization is not purely on research or teaching, but involves other functions as well. In particular, we expect to find a positive correlation between research (input) and technology transfer activities.

As far as internal differentiation (Hypothesis 2) is concerned:

- HP2 we expect to find that, within universities specialized in one function (e.g. research) there are a few sub-units (departments) which are instead specialized in the opposite function. **More specifically:**
- HP2.a - within a university specialized in research, we expect to find a number of departments scoring lower than country average in research but performing above the average in teaching;
- HP2.b - within a university specialized in teaching, we expect to find a number of departments scoring lower than average in teaching but above average in research.

Data and method

In order to investigate such complex phenomena as internal **and functional** differentiation we had to combine different types of data coming from various sources, all of them collected at the level of individual HE institutions.

The units of analysis are all 161 Higher Education institutions located in the UK; data is analyzed using correlation matrices and cross-tabulations.

Data about students, staff and finance of UK higher education institutions have been collected from the Higher Education Statistical Office (HESA) for the academic years 2012/13 (students and staff data) and 2011/12 (finance data). For this data we selected *a priori* a set of variables (relying on the HE literature) that are considered as good indicators of the several functions that universities have come to perform, thus good proxies for detecting trends of **functional** differentiation. The first column of table 1 summarizes the dimensions considered. For each dimension we selected a set of potential indicators of the university performance in that domain.

TABLE 1

The variables have been operationalized as proportions over the total corresponding value for the university in order to make them comparable across HE institutions of different size.

As a second step, in order to investigate internal differentiation, we looked for data on research and teaching performance at department level (whenever available) or at the level of subject-area.

Data for research performance come from the Research Excellence Framework carried out in 2014 (REF 2014). It is based on a process of expert review, which assesses the quality of research for 36 Units of Assessment (UOA) in 154 UK higher education institutions. The outcome of the process of evaluation is an 'overall quality profile' defined per each UOA within each institution, which reports the proportion of the submission judged to meet four starred levels. **Scientific products that are evaluated 4 stars are defined as of 'Quality that is world-leading in terms of originality, significance and rigour'; 3 stars are of 'Quality that is internationally excellent in terms of originality, significance and rigour but which falls short of the highest standards of excellence'; 2 stars are of 'Quality that is recognised internationally in terms of originality, significance and rigour'; 1 star are 'Quality that is recognised nationally in terms of originality, significance and rigour' (see <http://www.ref.ac.uk/results/intro/>).**

The overall quality profile is built on the evaluation of three dimensions of research: output (65% of weight on the final indicator), impact (20%), and environment (15%). For the

purpose of this paper we will focus our analysis only on the dimension of research output, made up of “journal articles, monographs and chapters in books, as well as outputs disseminated in other ways such as designs, performances and exhibitions.” (HEFCE 2014).

As regards teaching performance, we decided to use data coming from the National Students Survey (NSS) for the year 2014. NSS is a survey coordinated by HEFCE (Higher Education Funding Council of England), gathering students’ opinions on the quality of their courses from all HE institutions in the UK. Per each HE institution and, within them per each sub-unit, NSS provides the percentage of students responding on a 5-points scale from ‘Strongly Disagree’ to ‘Definitely Agree’ to several questions related to the quality of the courses taken. For the purpose of this paper we consider the proportion of students responding “mostly agree” and “definitely agree” to the question “Overall, I am satisfied with the quality of the course” (no. 22) as a proxy for the quality of teaching in the subject-area. Data from the NSS suffers several limitations due to their survey nature, which makes responses sensitive to the subjective perception of students. In addition, the assumption that the level of satisfaction of students corresponds to the quality of teaching may be questionable since the two dimensions might be not so directly related. An interesting opportunity of standardized sources of data about teaching quality available for research will be the Teaching Excellence Framework (TEF) that the British government is designing and will implement since the academic year 2017/18 on. Thus, to date, the NSS –although far from ideal- remains the best available source about teaching performance of UK higher education institutions and their internal units, as also confirmed by current research on the quality of teaching of UK universities, which employs NSS data (Boliver 2015).

Findings

Functional differentiation

The correlation matrix shows that the relationship among the proxies selected for each of the main functions of HE institutions confirms our hypotheses.

TABLE 2

Indeed, there is a positive and statistically significant correlation (in italics) between proxies for the dimension of research engagement and proxies for the dimension of technological transfer as well as international exchange. Similarly, a negative and statistically significant correlation (in bold) is observed between proxies for research engagement and proxies for the dimension of teaching. In addition, proxies for teaching are also negatively correlated with the dimension of international exchange and technological transfer. Thus, findings from the correlation matrix support both specifications of the first hypothesis (HP1), namely:

- a negative correlation between the dimensions of research and teaching (HP1.a);
- a positive correlation between the dimensions of research, technological transfer and international exchange (HP1.b) and
- a negative correlation between the dimension of teaching and the dimensions of technological transfer and international exchange (HP1.b).

Internal differentiation

By internal differentiation we refer to the possibility that within a HE institution specialized in one function (e.g. in teaching) we find departments which are low performing in that dimension, but good/top performing in the other dimension (i.e. research).

The empirical exercise we propose in this section represents a first attempt to compare the performances of the sub-units of UK higher education institutions in both teaching and research. To do so we combine data from the REF2014 -as an indicator of performance in the dimension of research- and data from the NSS 2014 -as a measure of engagement in the dimension of teaching-, per each unit of assessment of all UK higher education institutions. Unfortunately, there are various data limitations when comparing sub-units of a HE institution since disaggregate data by department on both teaching and research are not systematically available in one single survey. However, our attempt to combine data already included in publicly available surveys will provide some interesting, although preliminary, insights.

Internal differentiation in research-oriented HE institutions (HP2.a)

As a first step we divided British HE institutions in two groups based on their own specialization: a) HE institutions specialized in research and b) HE institutions specialized in teaching. In order to define members of the first group REF2014 data would have been the best option but, unfortunately, results are only available at the level of Unit of Assessment and not aggregated at institution level. Thus, we had to rely on data collected for the previous analysis about differentiation by function (Table 1). We defined as specialized in research the HE institutions that are in the top two deciles of the distribution of the two proxies for the research function (see columns 2-3 in Table 3).

Then, within each of these HE institutions, we looked for sub-units which are under-performing in the dominant specialization (research) but are over-performing in the other one (teaching). To do so we used data from REF2014 and looked at the proportion of research output evaluated as 4* (world-leading) and 3* (internationally excellent) per each Unit of Assessment (UOA). If the value of the UOA is lower than the UK average for that UOA (HEFCE 2014), the UOA can be considered as 'non-aligned', i.e. under-performing in the dominant specialization of the university to which it belongs. Table 3 provides the number of 'non-aligned' UOA per each institution: column 4 reports the number of UOAs scoring lower than UK average in both categories 4* and 3* (the most 'non-aligned' ones), while column 5 reports UOAs scoring lower than UK average in the category 4* only.

TABLE 3

Then, per each of these 'non-aligned' UOAs we checked the results in terms of quality of teaching, in order to detect whether their performance in the other function (teaching) is above average. Since NSS data are available at institution level but not at national level by field (exactly the opposite of REF), we compared the overall level of satisfaction of students for the sub-unit taken into consideration with the average level of satisfaction for the whole HE institution (% of 'mostly agree' and 'definitively agree' with question no. 22 in both cases). If a sub-unit scores higher than the institution's average we may argue that its performance in terms of teaching is pretty good, at least better than the university's average. In this case we may conclude that a form of internal differentiation is observable, a situation in which the sub-unit underperforming in research (by REF data) compensates with a performance above average in the domain of teaching (by NSS data).

In spite of the methodological limitations, the hypothesis according to which some forms of internal differentiation are already observable within the current landscape of the British HE system seems to find empirical support. Indeed, all HE institutions considered as specialized in terms of research have some sub-units which in turn perform well in teaching. This holds true even for such top research universities as Cambridge and Oxford, where at least there is one under-performing UOA, which in turn performs quite well in teaching (see Table 4).

TABLE 4

Internal differentiation in teaching-oriented HE institutions (HP2.b)

As before, assuming that the level of satisfaction of students is a proxy for teaching performance, we ranked the institutions included in the NSS on the basis of the percentage of overall satisfaction of students (‘mostly’ and ‘definitely’ agree to Q22 for the year 2014). We fixed arbitrarily the threshold at 90% and defined the institutions above that value as top performers in teaching. Then we investigated whether there are organizational units within each of these institutions that perform lower than average on teaching (the dominant specialization) but perform better than average in the other dimension (research). If an internal unit has a lower score than the institution’s average it qualifies as a ‘non-aligned’ unit, scoring poorly in the dominant specialization of its own institution (i.e. teaching). For each of these poorly scoring internal units we further investigated whether their performance in research (as reported in REF2014) is, in turn, above the average.

In order to avoid potential noise due to the characteristics of the discipline, the best term of comparison would have been the overall satisfaction of students for a given internal unit or subject area (e.g. the level of satisfaction for sociology at the university X compared with the level of satisfaction for sociology in the UK). However, this comparison is not possible since data on overall satisfaction by field of study or subject area are not provided by NSS.

As shown in Table 6, also among teaching-oriented universities some forms of internal differentiation are observable: with the only exception of three universities, all the HE institutions considered have at least one internal unit, which under-performs in the main specialization (teaching) but in turn scores above average in terms of research. In addition, the percentage of internal differentiation goes to about 15% (between 3 and 5 sub-units each) in 5 out of the 14 institutions considered.

TABLE 5

Concluding remarks

Can a strategy of internal differentiation based on a plurality of functions, that we have seen as emerging in the UK, be a viable one also in Continental Europe?

In such countries as Germany, France or Italy the myth of an homogeneous HEs is deeply rooted in the values of knowledge as a public good held by academics and of education as part of a universalistic welfare system shared by a large spectrum of political forces. It is, therefore, a myth that has preserved itself in spite of the existing differences of reputation and status enjoyed by universities in each country. Besides values and ideology, other reasons work against an institutionalization of vertical differentiation within some HEs. For instance, in countries with territorially-based strong socio-economic differences (such as Italy or Germany), a vertical differentiation of their HEs simply based on institutional performance would obviously reflect and increase such differences, and is therefore a politically sensitive issue for any governments.

However, it has become increasingly clear to policy-makers and institutional leaders that even a formally homogeneous HEs cannot be immune from the powerful forces that lead all HEs to differentiate. Quite simply, in such a HEs internal differentiation is likely to proceed in a “creeping” way, namely as a byproduct of uncoordinated actions or of reforms aimed at

achieving other objectives, rather than being steered from the centre according to an explicit strategy.

It is here that the observation we made above – that no individual university can possibly perform all functions at the same level of quality in all areas of knowledge – becomes relevant even for Continental European policy-makers and institutional leaders and may lead them to ask this question: is it possible to encourage each university to identify its mission in a specific mix of functions, possibly different for each of its organizational units, by taking into account the resources available and the demands of its stakeholders? And is it possible to devise a system by which any internal organizational unit is then assessed and rewarded only if it has achieved top performance in the chosen combination of functions, while being penalized if it shows just average performance in a plurality of functions?

Theoretically, both questions should receive a positive answer also as regards Continental European HEs, but two conditions seem necessary: an institutional governance that allows strategic and selective choices based on the strengths and weaknesses of each internal organizational unit; and an effective “steering from a distance” by governments capable to overcome resistance to innovation. To the extent that the recent reforms of university governance carried on in several European countries will be fully implemented, the direction of differentiation that we have outlined as characterizing the third stage may become actual powerful trends, even beyond the British case.

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Tables

For Review Only

Table 1 Functions of universities, potential indicators and variables used

FUNCTION	INDICATOR	VARIABLE computed from HESA data
RESEARCH	research-oriented students	Proportion of Master (research oriented) and PhD students over total postgraduate students
	income from and expenditure for research grants and contracts	Proportion of Income from research grants and contracts over university's total income
TEACHING	students' profile	Proportion of undergraduate students over university's total number of students
		Proportion of students enrolled in non-STEM fields of study over university's total number of students
	income from tuition fees	Proportion of income from tuition fees and educational contracts over university's total income
TECHNOLOGY TRANSFER (TT)	income from external sources	Proportion of income from industry, commerce and property rights over university's total income
INTERNATIONAL EXCHANGE	income from international sources	Proportion of income from international bodies over university's total income
	international students	Proportion of international students over total number of students

Source: own elaboration from HESA 2011/12 and HESA 2012/13

Table 2 Correlation matrix among functions performed by universities

		Research		Teaching			TT	International	
		Research/ PhD	research income	under- students	no-stem students	fees (income)	Industry income	international income	international students
Research	Research/PhD students	1.0000							
	research income	<i>0.7381</i> (0.0000)	1.0000						
Teaching	under- students	-0.3067 (0.0001)	-0.4126 (0.0000)	1.0000					
	no-stem students	-0.3639 (0.0000)	-0.5311 (0.0000)	-0.0406 (0.6090)	1.0000				
	fees (income)	-0.4710 (0.0000)	-0.6329 (0.0000)	0.0972 (0.2215)	0.3192 (0.0000)	1.0000			
TT	Industry income	<i>0.5443</i> (0.0000)	<i>0.7783</i> (0.0000)	-0.3386 (0.0000)	-0.4767 (0.0000)	-0.4713 (0.0000)	1.0000		
International	international income	<i>0.5796</i> (0.0000)	<i>0.8396</i> (0.0000)	-0.3892 (0.0000)	-0.4461 (0.0000)	-0.4752 (0.0000)	<i>0.5634</i> (0.0000)	1.0000	
	international students	<i>0.3679</i> (0.0000)	<i>0.3135</i> (0.0001)	-0.6246 (0.0000)	0.0931 (0.2403)	0.1136 (0.1526)	0.2791 (0.0004)	<i>0.3453</i> (0.0000)	1.0000

Source: own elaborations from HESA data, a.y. 2012/13 and 2011/12. In parenthesis p-value for statistical significance.
Note: in italic positive correlations (>0.3); in bold negative correlations; in grey non-significant correlations.

Table 3 Top HE institutions for research involvement

Institution name	Research involvement (HESA)		Research performance (REF)		
	research- masters and PhD students (%) (A)	income from research grants (%) (B)	no. UOA<UK average (in both 4* and 3*)	no. UOA<UK average (4* only)	Total no. UOA
Imperial College of Science, Technology and Medicine	.523	.410	0	1	14
The Institute of Cancer Research	.483	.593	0	0	2
The Queen's University of Belfast	.343	.213	9	9	28
The University of Liverpool	.357	.266	5	9	26
The University of Nottingham	.280	.192	5	12	32
The University of Sheffield	.327	.241	2	12	35
The University of Southampton	.367	.216	2	5	26
London School of Hygiene and Tropical Medicine	.352	.634	1	1	2
The University of Oxford	.503	.397	1	1	31
Queen Mary University of London	.293	.262	1	5	21
The University of Aberdeen	.314	.266	8	10	25
University College London	.389	.345	2	6	36
The University of Bristol	.402	.276	5	9	31
The University of Cambridge	.723	.221	1	2	32
The University of Edinburgh	.340	.275	7	4	31
The University of Glasgow	.291	.282	3	17	32
The University of Leeds	.308	.224	3	14	33
The University of Manchester	.303	.232	6	10	35
The University of Newcastle-upon-Tyne	.316	.222	5	5	28
The University of St Andrews	.407	.219	1	7	20

Source: own elaboration from HESA 2012/13 and REF2014.

Note: in grey institutions highly specialized in few disciplines, with only two Units of Assessment, not included in our empirical exercise.

Table 4 Internal differentiation for research-oriented universities

Institution name	Internal differentiation (No. UOA underperforming in research but overperforming in teaching)	total no. 'non-aligned' UOA (underperforming in research)	Total no. UOA	% UOA differentiated over total no. UOA
Queen's University Belfast	11	18	28	39,3%
University of Aberdeen	9	18	25	36,0%
University of Glasgow	8	20	32	25,0%
University of Bristol	5	14	31	16,1%
University of St Andrews	3	8	20	15,0%
University of Manchester	5	16	35	14,3%
University of Leeds	4	17	33	12,1%
Newcastle University	3	10	28	10,7%
Queen Mary University of London	2	6	21	9,5%
University of Nottingham	3	17	32	9,4%
University of Sheffield	3	14	35	8,6%
University of Liverpool	2	14	26	7,7%
University of Edinburgh	2	11	31	6,5%
University College London	2	8	36	5,6%
University of Southampton	1	7	26	3,8%
University of Oxford	1	2	31	3,2%
University of Cambridge	1	3	32	3,1%

Source: own elaboration on REF2014 and NSS2014 data

Table 5 Internal differentiation for teaching-oriented universities

Institution name	% mostly & definitely satisfied with the quality of the course (NSS-Q22)	Internal differentiation (No. UOA underperforming in teaching but overperforming in research)	total no. 'non-aligned' UOA (underperforming in research)	Total no. UOAs	% UOA differentiated over total no. UOA
University of East Anglia	0.93	5	15	30	16,7%
University of Bath	0.93	3	8	18	16,7%
University of Kent	0.91	4	12	27	14,8%
University of Oxford	0.91	3	8	21	14,3%
University of Exeter	0.91	4	12	28	14,3%
Newcastle University	0.91	2	14	32	6,3%
University of Glasgow	0.91	2	13	33	6,1%
University of St Andrews	0.93	1	7	18	5,6%
University of Essex	0.91	1	8	22	4,5%
Keele University	0.94	1	15	24	4,2%
Stranmillis University College	0.91	1	1	3	33,3%
Coventry University	0.91	0	13	34	0%
Open University	0.91	0	7	24	0%
Bangor University	0.91	0	13	25	0%

Source: own elaboration on NSS2014 and REF2014 data.