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Chapter 4

Back to the Future? The Academic Professions in the 21st Century

by

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This chapter addresses the impact of changes in higher education on the academic profession in the past, present and possible future. We start by arguing that the growth of the academic profession implied increased differentiation. We then examine the ongoing transformation of working and employment conditions in the academic workplace, which challenges its traditional power structure. Finally we look at the restructuring of the international academic community. One of our conclusions is that demographic changes are likely to play a minor role in the reshaping of the academic profession.

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4.1. Introduction

Among the various sectors of production and service in modern societies and the institutions in charge of them, higher education has usually been perceived as peculiar in several respects: a relatively open set of multiple goals; a loose mechanism of coercion, controlled and steered from above; and a high degree of fragmentation and strong influence of the principal workers – the academic professionals – on the determination of goals, the management and administration of institutions and the daily routines of work. In addition, in terms of the interrelations between different sectors of production and services, the academic profession has been considered as one of the most influential in shaping other sectors. This is underscored, for example, by references to the academic profession as the "key profession" or to the "triumph of the academic man" (Perkin, 1969; Jenks and Riesman, 1968).

While this view has always been contested and has partly functioned as a myth, public debate and academic reflection on the academic profession now stress the disappearance of a (golden) age of contentment and serenity. We find complaints that the concept of a single academic profession may be an illusion, that the academic profession can hardly cope with the tensions it has to live with, and that it is endangered. For about three decades it has been widely assumed that the academic profession feels increasingly embattled, and the available literature suggests that the sense of crisis has grown (see for example Kogan, Moses and El-Khawas, 1994; Kingsley, 1997; Farnham, 1999; Enders, 2001; Altbach, 2000). Concern about the academic profession is obviously entangled with the massification of higher education and the long-standing secular trend towards a "knowledge society". The transformation of higher education and the changing nature and role of knowledge in society are accompanied by changes in higher education and its interrelationships with society that are a mixed blessing for the academic profession (Enders and Teichler, 1997).

- Over the last few decades, there has been a decline in the socioeconomic status of higher education alongside its expansion and the "scientification" of society. While the expansion of higher education was influenced by the expected need for highly qualified manpower, the economy did not follow. Consequently, the process of expansion has often been regarded as too expensive. Today, the private benefits of higher education are stressed whereas the public benefits were underscored in the past. And some observers are starting to talk about over-education.
- As scientific knowledge and highly qualified expertise have grown in importance, higher education and the academic profession are losing their exclusive and central role as the main producer of scientific knowledge and technology. Higher education faces growing competition from other research sectors and institutions, and its performance is more and more compared to that of other suppliers of tertiary education.
- There is increasing tension between the traditional modes of teaching and bodies of knowledge and the established forms of communication between students and

academic teachers, on the one hand, and the competences, life and learning styles, professional expectations and careers of students, on the other. This raises questions about the future conceptualisation of study programmes as well as the role of academic teaching and teachers.

- The growing importance of science-based knowledge and technology to society is accompanied by a great deal of ambivalence about the impact on future developments. On the one hand, expectations regarding the usefulness and practical impact of science and technology have increased. On the other, modern societies are more and more aware that science-based knowledge and technology can be risky in social, technological and ecological terms. Insofar as higher education is considered one of the main sources of the further development of society, it is blamed for some of the negative consequences of science-based innovations.
- The cosmopolitan approach to higher education and its research function in the 20th century has been one of the sources of globalisation. It seems indeed reasonable to argue that the academic profession was among the first global players. However, the effect of economic, political, social and scientific globalisation on the function of higher education is far from straightforward. National systems compete more and more on international markets and highly innovative research is increasingly conducted across the traditional boundaries of systems, disciplines and institutions. New information and communication technologies influence the distribution and dissemination of knowledge as well as the meaning of the words "knowledge" and "science".

This list is by no means exhaustive. The examples may, however, suffice to show that higher education and research have to cope with conflicting pressures. These pressures are not recent but seem to be embedded in long-term secular trends in modern societies. Neither are they a national phenomenon. At present, the higher education systems in most highly developed countries are undergoing a difficult process of change that affects the position of the academic profession.

The following discussion addresses the impact of such drivers of change on selected features of the academic profession in the past, present and possible future. Four main transformations of the changing profile of the academic profession are examined. We start by arguing that the growth of the academic profession implied increased differentiation. We then examine the ongoing transformation of working and employment conditions in the academic workplace which challenges the traditional power structure. Finally we look at the restructuring of the international academic community. In discussing the "academic profession", we rely on a rather broad definition that includes academic staff working in universities and other higher education institutions in different ranks, with different contracts and at different stages of their career. Thus, we consider not only the "professoriate", as the traditional core of the academic profession, but other faculty groups as well.

4.2. The changing profile of the academic profession

Growth and internal differentiation of the academic profession

In the 20th century higher education has grown into a mass system and a mature enterprise. Some time after World War II, various phenomena in highly developed countries contributed to a political climate which made possible a substantial boost in expenditure for higher education and research and encouraged an increase in the numbers of students in higher education institutions (Schofer and Meyer, 2004): a belief that blue-sky

research best serves society's needs for scientific and technological innovation; a boom in the economics of education, *i.e.* the belief that substantial investment in education is required to ensure economic growth; a readiness to reduce inequality of opportunity in education; and probably the radical student protest of the late 1960s as well.

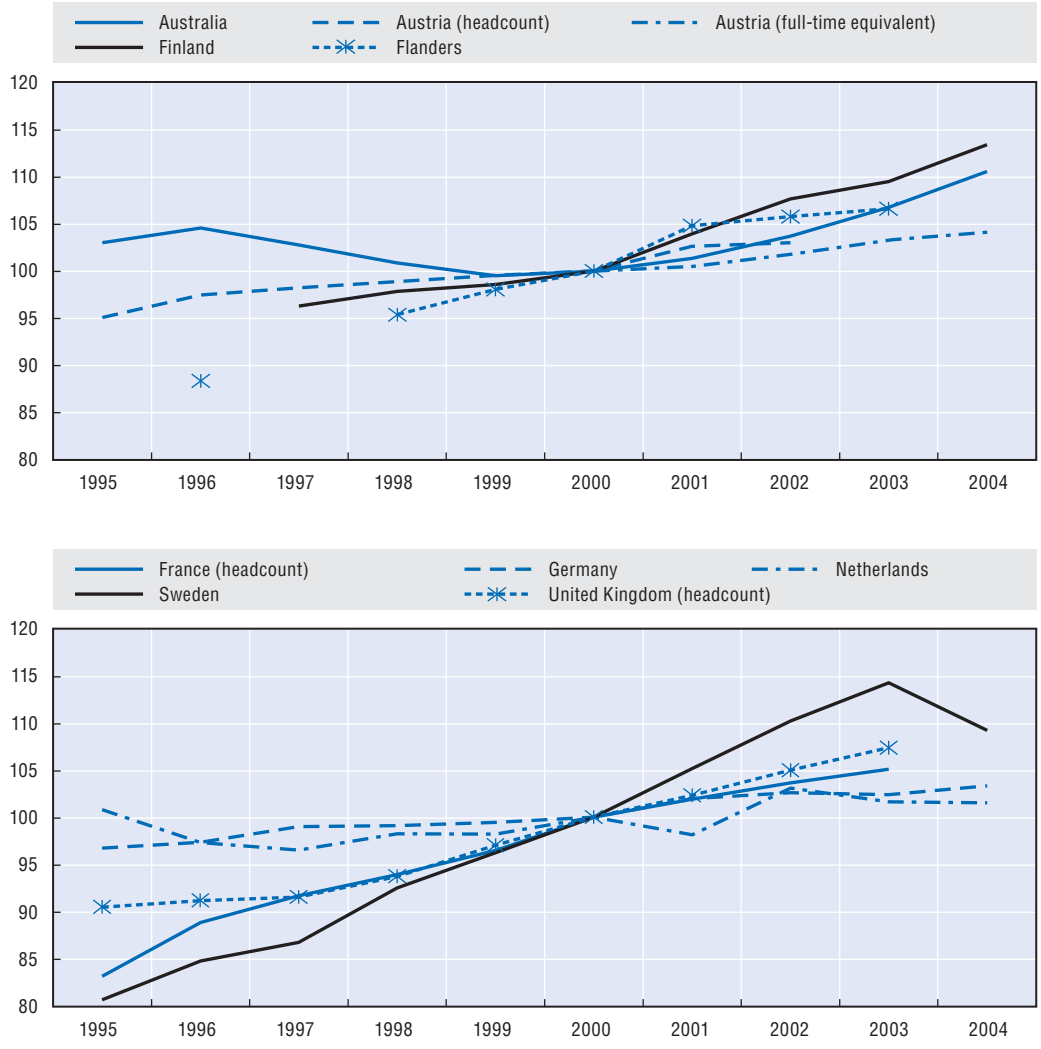
Expansion in world higher education has been dramatic, especially after about 1960. Nowadays higher education worldwide enrols more than 100 million students. In the OECD area, almost every second young person (17-25 years old) enters some kind of higher education programme. Between 1991 and 2001, participation in higher education for the age group 25-34 increased from 21% to 30% for the 19 OECD countries for which data were available for both years; in 2001, the participation rate in the OECD area amounted to 28% on average (Vincent-Lancrin, 2004). Enrolment and participation rates are considerably lower in many transition and developing countries, although many have experienced and/or are experiencing considerable growth in their higher education sectors. As a result, these countries typically have enrolment rates that approximate those of highly developed countries only a few decades earlier.

Further, the overall growth of the higher education sector has fuelled the "massification of academic research" (Vincent-Lancrin, 2006) and increased expenditure on R&D in the higher education sector. In the OECD area, trend data on R&D indicate significant growth in expenditure on R&D overall as well as in the higher education sector during the past two decades. While industry remains the most important performer, the share of R&D performed by the higher education sector has increased over this period.

These developments have left their imprint on both the quantitative and qualitative profile of the academic profession. Most obviously, the growth and diversification of higher education have meant growth and diversification of the academic profession as well. The massification of higher education has led to a rise in faculty numbers, sometimes in a relatively uncontrolled way which has affected quality in the profession. Of course, growth in academic staff was most impressive in times of dynamic expansion of higher education and increased funding. In many countries, these conditions are no longer present or are less so. Nevertheless, expansion of the academic profession has not yet come to a halt. For the last 20 years, OECD data indicate an increase of 127% (full-time equivalent) in growth of the number of higher education staff defined as "researchers". Available data on overall academic staff numbers for a selected number of countries covering the last ten years show a diversified picture (see Figure 4.1). For countries such as Austria, Germany and the Netherlands, there has been a rather small increase in academic staff numbers over the last decade, whereas the academic profession has grown considerably in countries such as Finland, France or Sweden.

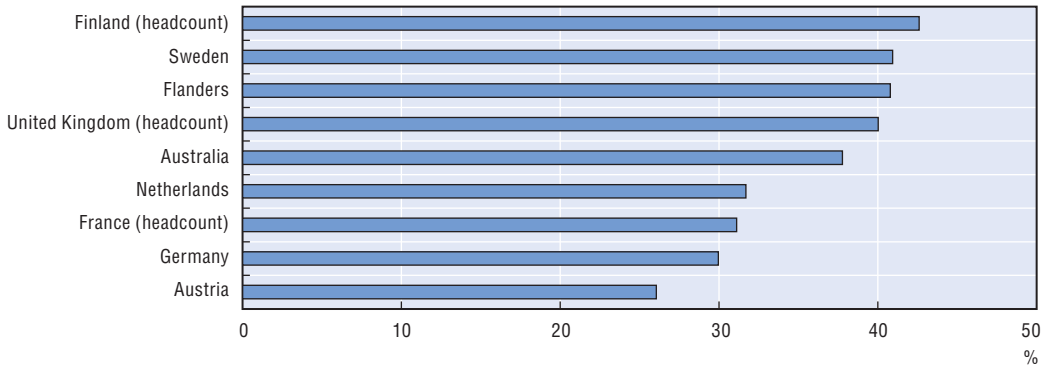
Overall expansion has also led to a rising share of female staff in the academic profession. In comparison with their representation among higher education students and graduates, however, women are still underrepresented. In 2003, female academic staff accounted for about 25% of the academic staff in Austria, about 30% in Germany, the Netherlands and France, and about 40% in Finland, Sweden, Flanders and the United Kingdom (see Figure 4.2). In all countries for which such data are available, women remain less likely to climb up the academic career ladder and hold a professorial position: the proportion of women in the professoriate ranges from less than 10% (the Netherlands), to about 15% (Sweden, the United Kingdom) to 20% (Finland). Important variations among disciplines may be hidden behind this average.

Figure 4.1. **Changes in the number of academic staff**
(FTE, 2000 = 100)



Source: *CHEPS International Higher Education Monitor.*

Figure 4.2. **Female academic staff as a percentage of total academic staff**
(FTE, 2003)

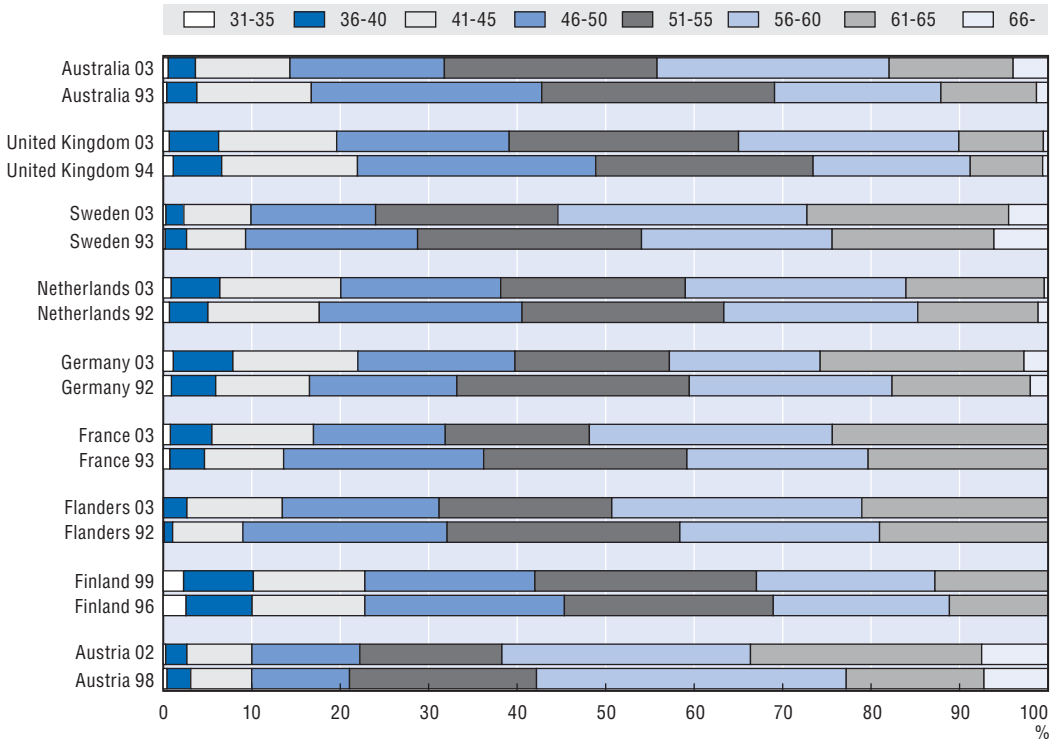


Source: *CHEPS International Higher Education Monitor.*

Faster and slower growth cycles in the academic profession have had an impact on the age structure of the academic profession. Data on the age structure of the professoriate in selected countries (see Figure 4.3) indicate a greying of the academic profession. In most of these countries, between 40% and 60% of the overall professoriate are older than 55 years of age; Finland is the exception. Altogether, between 4% and 6% of the professoriate is due to retire each year over the next decade. This creates career opportunities for younger academic staff as well as opportunities for policy measures to reorganise or cut back. It remains to be seen what role participation rates among traditional as well as non-traditional students will play with respect to policy measures regarding the replacement of professorial positions. What is clear, however, is that increasing rates of retirement provide ample room for human resource management in the years to come.

Figure 4.3. **Distribution of professors by age group**

Based on headcount



Source: *CHEPS International Higher Education Monitor*.

In any case, with resources either stabilising or increasing slowly, change is expected to take place through substitution and concentration rather than through overall growth. This development has already affected the size and profile of the academic profession as well as matters such as faculty workload and use of time, productivity and output. Academics are increasingly asked to take care of their own research funding, and the more successful they are in this respect, the less time and energy they have for their core activities of teaching and research. Often, adequate funding requires diverse sources, each of which has a stake in the expected outcomes and products of the academic enterprise. A further development concerns the disconnection of funding for research and teaching.

While resources for teaching have been reduced on a per student basis, research funding is more subject to market-like influences (see for example Chen, 2002).

Massification has resulted in greater differentiation of academic sectors, institutions and job roles. There is room for debate about the extent to which such diversity is an unavoidable response to the massification of higher education and the extent to which it is due to governmental regulation or institutional responses to market forces (Scott, 1995). Traditionally, diversity basically meant a division of work in terms of institutions' primary functions of either teaching or research, or a combination of both, through forms of governance and funding that worked as incentives and constraints. Recent forces, such as globalisation and regionalisation, however, encourage much finer and more flexible differentiation of institutions which may well lead to greater volatility and fuzziness within and across systems (Meek *et al.*, 1996; Nowotny, Scott and Gibbons, 2001; Bleiklie, 2003).

Enabling or limiting academics' time and resources for research and teaching is one of the most common means of specifying sectoral or institutional missions, and this can create new divisions within the academic profession or underline old ones. More and more faculty face the fact that the "gold standard" that once applied can no longer be taken for granted. The academic profession is becoming less homogenous in terms of the resources available, and the gap between the "haves" and the "have-nots" seems to widen, as reflected by the rise in untenured staff, teaching-only staff or research-project personnel (Gappa, 2002). Massification and diversification have also meant that the privileges once enjoyed by members of the academic profession in an elite higher education system have increasingly come under pressure (Trow, 1972). Traditionally, job roles in academia tended to encompass teaching and research, management and service, although with differing emphasis, while the division of work within the profession mainly took place via increasing specialisation of fields of knowledge. Today academics are more likely to concentrate on management or on teaching and research, while teaching and research themselves represent a further division of work.

At the same time, new opportunities for entrepreneurial academics have appeared in areas and activities beyond traditional job roles on the academic home turf. As historians have shown, technology transfer from universities to industry and other users of research results, such as the military or the health-care system, has always been part of the academic world. However, since the 1960s, it has become more prevalent. Priority setting to promote technologically promising scientific developments, attempts to forecast scientific breakthroughs with a strong application potential, and a general emphasis on "relevance" and "strategic research" are now familiar phenomena (Irvine and Martin, 1984; Rip, 2004). More and more academics face a situation in which they are asked to move from the circumscribed world of academia to a complex world of blurring boundaries and a growing emphasis on the quasi-entrepreneurial role of academics (Henkel, 2000; Kingsley, Owen-Smith and Powell, 2001). Finally, recent developments in new interdisciplinary fields of inquiry challenge traditional disciplinary boundaries and invite new forms of interaction in fields such as biotechnology, nanotechnology or the cognitive sciences. The technology-driven dynamics of such sciences allows for new forms of co-operation not only across the traditional academic disciplines but also between academia and other research providers and users.

For the coming decades, OECD figures indicate a decrease in the number of young domestic students in most OECD countries (Vincent-Lancrin, 2004). For our ageing societies

the projected decline in younger people may lead to a continuous decrease in the traditional university-age population. This is a serious threat for higher education in times where funding is increasingly related to numbers of students and graduates. Opportunities to compensate for such a demographic trend are available. They include increasing overall participation rates, increasing demand by non-traditional and elderly students, and catering on the international market. Especially in transition and developing countries, demand is increasing and supply is still limited. There is already a growing market for non-traditional higher education in highly developed countries as well as rises in enrolments of international students on campus, through foreign branch campuses, joint ventures and franchise arrangements, and online teaching and learning. In consequence, the need has arisen to reconsider study programmes and the role of academic teaching and teachers in order to adapt to new types of students and transformed teaching conditions. In a global perspective, the academic profession in the 21st century may be one in which the main mission of academics will be to train a diversified student body in an institutional context that is likely to further diversify as well.

In this evolving framework, it seems likely that "cutting-edge research" will be more concentrated in certain centres of excellence and relevance and that some academics will mainly dedicate their efforts to it, while other types of research[1] will be carried out by the mainly-teaching staff. Second, traditional disciplinary academic work is likely to persist but is likely to be increasingly accompanied by new forms of interdisciplinary co-operation that are driven by the internal dynamics of scientific discovery as well as by changing expectations as regards the contribution of research to application. Third, job roles and work tasks are likely to be more differentiated and aligned on those of the business sector owing to the blurring of boundaries between academia, on the one hand, and other sectors and stakeholders in society, on the other.

Transformation and diversification of conditions of work and employment

Higher education and research systems almost everywhere have undergone two major changes which affect, in one way or another, the management of academic staff as well as their work and employment conditions. The first concerns the constructing of universities as organisations (Brunsson and Sahlin-Andersonn, 2000) and their transformation from collegial communities of academics into an organisation with a hierarchy (de Boer and Goedegebuure, 2001). Accordingly, university leaders have been encouraged to become managers and to develop strategic management (Rhoades and Sporn, 2002). The second change deals with the modification of funding mechanisms, through the introduction of lump-sum or global budgets for higher education institutions, output-based criteria in the allocation process, further competition through project-based or programme-based funding for research, private funding, *e.g.* through tuition (fees) or public-private co-operation. Both of these changes have strongly impinged upon academics' working conditions but also traditional contractual arrangements.

These overall trends notwithstanding, conditions of work and employment still depend heavily on national patterns. Status, salary structures, forms and rules of collective bargaining, career paths and employment relationships are affected first and foremost by national settings, history and each country's economic situation. As a consequence, the same practices may have very different meanings in different contexts.[2] The degree to which conditions of work and employment are part of the social fabric must be taken into account, even though our argument is often couched in general terms.

To describe the ongoing transformations, four dimensions are discussed: academics-university relationships; contractual arrangements and "permanence" models; salary setting and salary structures; and the division of work.

More institutional affiliation and more mobility at the same time: the contradictory forces affecting academics-university relationships

In a Carnegie Foundation study of 14 countries at the beginning of the 1990s, academics always declared that their affiliation to their discipline was stronger than their affiliation to their institution. The strength of their affiliation to their institution varies however (only 34% of Germans considered their institution "very important" or "fairly important", compared to 95% of Chileans).[3] Interestingly, the two dimensions are not negatively correlated: both can be high. This international study did not tackle the reverse perspective, namely the kind of relationship developed by institutions with their academics. Do university managers conceive of their institutions as shelters for highly qualified individuals to whom they offer support for their activities? Or, at the other extreme of the continuum, do they behave like employers who provide income and working conditions to knowledge workers who in return have to meet production objectives in terms of number and quality of teaching, numbers and reputation of publications, etc.? While no study has documented the evolution of the level of affiliation to the discipline or to the institution since the Carnegie study, there is plenty of evidence that many countries have moved away from the shelter-like mode and towards the employer-like mode. This has had several sources. First is the move towards more institutional autonomy which has led in many countries to delegating the management of positions and staff from the state level to the university. Such transfers have taken place for instance in the Netherlands where faculty members are no longer appointed by the ministry but by the rector of the university (de Weert, 2004), in Italy with the reform of national competitions (Boffo, Moscati and Vaira, 2004), and recently in Japan with the reform of the national universities (Oba, 2005). Second, the expansion of assessment procedures at the national or institutional level has emphasised and publicised (sometimes widely) the quantity and quality of each academic's performance: the most spectacular case is probably the introduction of the Research Assessment Exercise in the United Kingdom, with its regular publication of rankings for each department according to the research production of its staff and distinguishing between those who are recognised as active in research and the others (see for example Henkel, 2000; Harley, 2002). Third, the introduction of staff management techniques in universities (evaluation, personal development, etc.) has been expanded and has led some authors to conclude that academics are becoming "managed professionals" (see for example Slaughter and Leslie, 1997; Rhoades and Slaughter, 1997). Even if these techniques are more often associated with Anglo-Saxon universities, the idea that universities have to develop their own staff management devices pervades France's recent law to reform the research system, adopted in April 2006, which foresees the creation by each university of a procedure for evaluating its staff and labs.

Such changes have modified universities' internal relationships and have created an employment relationship between each institution and its staff. In parallel, even in very egalitarian countries, many higher education institutions began differentiating themselves from one another,[4] exhibiting their singularity and developing stronger institutional identities (branding) and expecting their staff to adhere to their strategies. Both of these

trends have combined to strengthen but also transform the nature of academics' affiliation to their institution.

At the same time two other changes move in the opposite direction. First, institutional stability has become suspect. In many countries (Japan, Norway, Portugal, Spain), most academics' careers developed within a single institution, but this model is now widely criticised. Inbreeding is frowned upon and institutional mobility is promoted, thus encouraging faculty members to become more mobile. For the last decade there are, unfortunately, few comparative data, either over time or among countries that provide evidence of an effective increase in institutional mobility and a decrease in inbreeding. Some recent statistics on Japan (Yamanoi, 2006) give an idea of the strength of the process: in 1954, 98% of the faculty members at the University of Tokyo graduated from this institution; they were still almost 90% in 1984, but only 78% in 2003. Moreover, this shift in favour of institutional mobility is evident in many policy documents, and some institutions in countries where mobility is traditionally rare are trying to promote new practices. Spain has for example forbidden public universities to give a first permanent job to their former doctoral students.

Second, involvement in formal international or national networks or multiple affiliations has become frequent and is valorised. In Europe, the number of academics involved in European or international projects has increased steadily as the European Commission and individual countries have developed policy instruments encouraging international research projects. As a result many academics are more than ever engaged in strong relationships with partners from other organisations (including non-academic ones), thus weakening the institutional affiliation individual universities try to build with their staff.

If the traditional pattern of universities as shelters for self-regulated academics is weakening, the emerging pattern includes some contradictions, as it simultaneously aims at reinforcing academics' affiliation to their institution but also promotes mobility and flexibility. This tension is expected to increase in the coming years.

Permanence: a model for the happy few? Restructuring the contractual arrangements

The differentiation of the academic profession which derived from massification produced a diversification of career patterns. Until recently, academic careers were everywhere based on a two-stage process, with a first period characterised by apprenticeship, selection and time-limited positions, and the second beginning with access to a permanent position. From one country to another, within this overall pattern three very different career models developed and are still very frequent.

The first is the tenure model, which is typical of the US system. It is based on an early, severe selection of young PhDs, among whom some are offered tenure-track positions, *i.e.* time-limited posts[5] leading, at the end of a certain period of time, to a tenure procedure to decide whether they will be offered a tenured position.[6] This model is described by economists as an "up or out" system (O'Flaherty and Siow, 1992, 1995).

The second could be qualified as a "survivor" model and is typical of countries in which the Humboldtian and chair-system tradition is strong. Up to the 2001 reforms, it was characteristic of Germany. After their PhD, candidates for an academic career must go through various trials to provide evidence of their talents and wait many years to obtain a permanent position.[7] Only those overcoming the long period of selection and

"tournaments" (Lazear and Rosen, 1981), *i.e.* competitions involving many candidates among whom only one or a few are maintained, have a chance to survive.

The third model can be described as a "protective pyramid" and is (was) frequent in many public systems of higher education (Italy, Spain, France). In these countries, access to a permanent position occurs quite early after a highly selective tournament. There then exist different categories of permanent positions organised hierarchically with procedures allowing promotion of some from one category to another. There is no assurance that those entering the pyramid can rise to the top: this very much depends on the growth rate of the overall pyramid and the age/seniority of those on the top.

Up until now, these three models are still the most frequent, and few countries have tried to abandon their traditional model (see the case of Germany in Box 4.1).

Box 4.1. **An unusual case of shift from one permanence model to another: Germany**

In 2001, without abandoning the "survivor" model which still exists in parallel, Germany introduced a new category of positions, called the *Juniorprofessoren*. Two main arguments pushed this reform forward. First, the fact that many young scholars were suspected of leaving Germany to escape the long and uncertain selection process leading to professorship. Second, assistantship was criticised for its negative impact on the innovation capacity of young scholars: on the one hand, being dependant on the professors, they could not develop their own research autonomously and be creative; and on the other, the preparation of the *Habilitation* (an obligatory exercise for becoming a professor) was described as deadening and ill-adapted to the requirements of modern research. This led to the progressive suppression of the *Habilitation* (to be achieved by 2009) and the creation of *Juniorprofessoren*. The latter are in two respects comparable to US tenure track positions: they are time-limited (three years), can be renewed once, and provide the opportunity to apply for a permanent position after the sixth year without passing the *Habilitation*. Academics in these positions, albeit non-permanent, do not work as assistants for the permanent professors: they are autonomous. However, there is no tenure process as in the United States: at the end of the six years, *Juniorprofessoren* must apply for the open professor positions and go through the usual German recruitment process.

Even if rarely abandoned, each of these models has been subjected to strong criticism[8] during the last decades. A common claim concerns the lack of flexibility due to permanence: it entrenches highly specialised staff whose domains of competence may quickly become irrelevant owing to the rapid transformation of science; it deprives institutions of efficient means of managing their staff (more so when it occurs early); and it is given (and with it, better salaries) when the person's scientific productivity is about to decrease.

Different methods have been introduced to counteract these weaknesses. One consists in creating posts that delay access to tenure-tracks positions (model 1) or to permanent positions (model 2) and that provide highly qualified and productive scientific manpower. This leads to an increase in the number of post-doctoral positions in the countries concerned, in particular in the life sciences, but is becoming more common in most scientific disciplines. According to Stephan (2006), the number of individuals working in post-doctoral positions rose from 23 000 in 1991 to 30 000 in 2001. In other countries,

new positions were explicitly created as a means of transition towards a permanent job. For instance, in Germany the fixed-term C2 professor positions were introduced in the face of a lack of C3 (permanent) professor positions.

A second category of measures, typically for countries with a tenure system,[9] leads to the expansion of time-limited and part-time teaching positions, *i.e.* of non-tenure-track positions. According to Ehrenberg (2005), part-time and full-time non-tenured positions represented around 43% of the academic population in the United States in 1975, but reached 64% in 2003: as a result, the majority of faculty members no longer occupy tenured positions. In Australia, the number of casual positions more than doubled between 1990 and 2001 (Robinson, 2005). In the United Kingdom, the numbers of both fixed-term contracts and part-time staff have increased. The former represented 39% of the academic staff in 1994 and 44.8% in 2003, while the latter were about 12% in 1995 and rose to nearly 18% in 2002 (Court, 1998; Robinson, 2005). In a number of countries, the rise of private for-profit institutions contributes to this trend in academic appointments: they generally recruit their academic personnel from public universities but offer them few full-time or long-term contracts and operate on the contract system. Short-term contracts, part-time teachers paid by the hour and lack of social benefits characterise the employment conditions of many faculty in these institutions.

A third group of measures consists in developing new incentives on the internal labour market of each university (Musselin, 2005a). In countries with a tenure system, this has taken, for instance, the form of "tenure by objectives" or "post-tenure review" but many other devices have been implemented. In the two other models it appears more difficult to introduce such measures, but they are slowly appearing. In Germany for instance, a merit-based component has been introduced in the salary of newly recruited professors since 2001; in France bonuses are allocated to those who show a strong commitment to teaching, to research or to administrative responsibilities.

Other solutions consist in progressively reducing or abandoning the traditional permanent situations. New types of contracts are offered to those acceding to a "permanent" position. For example, in 1988 the British announced the suppression of tenure (Court, 1998). In Austria, for instance, new professors are no longer civil servants but have a time-unlimited contract (Pechar, 2004). Similar changes have been introduced in Japan's public universities (Yamanoi, 2003).

Traditional contractual arrangements and career paths have thus been criticised everywhere and new methods have been developed. Some are only improvements of existing arrangements (for instance when internal labour markets tend to strengthen and exert more control over academic staff), but others promote completely new contractual situations as well as new career paths which are more flexible, less structured and do not lead to permanence. Segmentation labour economists (Doeringer and Piore, 1971) would probably conclude that this leads to the creation of new secondary markets that reduce the chances of accessing the primary ones as the number of permanent or permanent-track positions decreases. Stephan (2006), for instance writes that "the probability that a young person trained in the biomedical sciences in the United States holds a tenure track position has declined considerably in recent years, going from 10.3% to 6.9%" from 1993 to 2001.

The pattern based on a two-stage dynamic is no longer the only one available for the academic profession, as traditional permanent positions tend to diminish in percentages and as career tracks that do not lead to permanence are developing. The contingent

positions tend to develop as alternative career tracks, less secure, distinct from the traditional two-stage tracks and with few paths for going from one to another. Ehrenberg observes that some American institutions have begun organising career development for casual staff (Ehrenberg, 2005).

Setting the salaries of academics: national diversity and increasing international differentiation

There are important symbolic elements in rewards for academics, in terms of reputation, distinctions, etc. Nevertheless, there are economic elements as well, which make it possible to speak of "prices" of academics. The composition of these elements, the way they are set, and their differences from one academic to another are strongly linked to national habits and context.

In some countries, compensation of academics consists solely of their salaries, while in others it also includes special working conditions, or even personal benefits (special loan to buy a house close to the university for instance). Practices vary significantly.[10] In some countries the salary component is negotiated at the national level and is part of a fixed scale that allows for little if any negotiation. In others, national collective bargaining fixes the overall evolution of salaries but each institution then decides, within this framework, what each academic will receive. In still others, salaries are determined through negotiations between each institution and its staff. The negotiation of the other components (special working conditions, personal benefits) is less regulated and therefore less visible and more closely linked to individual institutions and negotiations. This is probably why this aspect of the academic's compensation is becoming more prevalent, notably in countries where the negotiation of salaries is restrained by a bureaucratic scale. In France, for instance, some universities are beginning to play with these components in order to become more attractive (especially to foreign academics).

As a whole, this suggests that valorisation of academic work is handled very differently from one place to another on the basis of national practices and rules and that there are no harmonised international markets.

This heterogeneity (or tendency to individualised treatment), which seems to be increasing,[11] strongly limits possibilities for comparisons within a single country and *a fortiori* among countries. There are few available data on personal benefits and on special working conditions.[12] It is therefore necessary to focus on the salary aspect, even if it is only one part of academic compensation. Four main trends can be traced.

- The relationships between academic and non-academic salaries within a country are linked to the degree of massification of higher education – and thus to the size of the academic profession. In countries where the rate of access to higher education has increased, academic salaries tend to become less attractive, and there is a growing gap between these salaries and those of PhD holders working in the non-academic sector. In one survey of salaries of academic staff carried out for the Commonwealth Universities, J. Kubler and L. Roberts conclude that in these countries "all academic wages compare poorly with the private sector… Moreover evidence… indicates that academic salaries have not grown in step with salaries in other parts of the public sector" (Kubler and Roberts, 2004-05; Ehrenberg, McGraw and Mrdjenovic, 2005).
- Within a country salary variations among academics tend to increase with the introduction of more individualised assessment and performance measurement

(Slaughter and Leslie, 1997). But this depends heavily on the societal context: salary structures are regulated first of all by the rules of individual countries and are linked to the specific status of the academic profession. Therefore, in countries where academics are civil servants, their salaries depend first on salary rates for all civil servants; in countries (the Netherlands, the Nordic countries) where the gap between lowest and highest salaries is traditionally moderate even in the productive sector, the same holds true for academic salaries; while in countries built on less egalitarian social contracts, the increased differentiation experienced by all wage earners in the last decades is also valid for academics. In this last case, there are important gaps between the lowest and highest salaries, but also growing differences among disciplines according to the social value they are accorded by the non-academic sector.

- Third, the discrepancies among countries in terms of academic salaries have tended to increase. This is linked to variations in economic development but also to the variations mentioned above, *i.e.* when the non-academic salary structure becomes more differentiated, academic salaries also do. In this case, there is an increasing gap with countries where overall growth has been less strong and/or where differentiation remains moderate, and/or when public rules define the salary structure. Moreover, the share of non-salary components in academics' compensation is often greater in the first group of countries than in the others and such components tend to increase as well. As a result, some countries' comparative advantage has increased quite radically in the last years while other, even developed, countries cannot compete with the compensation offered by the former. Moreover, this can widen the gap among sectors within the same country: in the United States the academic wage offered by the public research universities cannot be as attractive as that offered by private ones; in France, the conditions (and incentives) proposed by the private not-for-profit business *grandes écoles* are far more interesting than the salaries offered by French universities and other public *grandes écoles*.
- Multi-affiliation develops when regular employment does not provide sufficient income. This has long been the case in Latin America where relatively few academics traditionally work as full-time university employees and many faculty members either have several academic positions at different institutions or teach part-time at a university in addition to their primary work obligations. Faculty members sometimes work on an hourly basis with meagre salaries or without pay, often while working towards their Master or PhD (Marquis, 2002; Balbachevsky and da Conceicao Quinteiro, 2002). This has become more and more frequent in the previous Eastern Bloc. In Poland and Russia, many full-time employees receive relatively low salaries and seek supplementary part-time contracts in order to have a reasonable income.

From academic activity to academic work and a new division of labour

This last section deals with academic activities and the organisation of work, which have undergone two main changes.

In the past, academics were involved in research and teaching[13] (along with administrative responsibilities and tasks) and were largely responsible for organising their time and managing the relative weight accorded to each task. With the diversification of career paths and the restructuring of contractual arrangements, only part of the profession still functions in this way. Many academics are now recruited to carry out only one of the two activities (research or teaching) and are expected to accomplish precise tasks. This is

particularly, but not only, the case for contingent staff. As stressed by Finkelstein, "full-time faculty are now hired as teaching-only or even lower-division/introductory courses teaching-only; or in natural sciences and the professions, research-only or clinical-only; or even primarily administrative roles in programme development and management" (Finkelstein, 2003). They thus come closer to being "academic workers".

This goes along with the increasing control over academic activities. The pressure for relevance and for short-term results facilitates the development of institutional or national devices to measure individual or collective performance as well as the introduction of incentives to encourage certain types of behaviour (and discourage others). In some cases, methods from the non-academic sector (such as the keeping of time sheets on one's activity) have even been introduced in order to better control the activities carried out and the time spent on them. The academic profession itself has professionalised and somewhat standardised its methods and outputs. All this directly affects the choices and work of academics. When the number of papers published each year in international journals and with a high impact factor becomes a main (and easy to calculate) indicator of performance, involvement in risky research projects with a long-term perspective for publication is no longer attractive. Or, when the main supervisor of each new PhD is offered a bonus, as in some institutions in the Netherlands, academics respond readily to such incentives. Indeed, some universities are finding it difficult to pay the bonuses, as they underestimated staff response. This reveals an ongoing transformation of the academic profession, which is now considered less as an occupation and more as a job.

The division of work is also affected. On the one hand, the divide between teaching and research, and between academics and academic workers, has increased. On the other, higher education institutions have become more interventionist in terms of allocation of work, and regular individual negotiations are used to set the tasks and duties of each academic, which reduces self-determination. There is a sensible shift in academic activity from a craft activity (where "either one worker makes the whole object or supervisors co-ordinate the work of specialists" [Granovetter and Tilly, 1988]) to a more "industrialised" activity.

We expect this evolution to continue and be generalised in the coming decades. The division of work is expected to increase and to become more formalised and institutionalised, leaving less initiative to the individual responsibility of each academic. On the one hand, the teaching and research divide will widen. Fewer academics will be involved equally in both, as specialisation in teaching or in research will be more frequent. The division of work within each group will be more structured than it is today. In teaching, for instance, development of curricula may become separate from the delivery of courses: this may already be the case for e-learning (Miladi, 2005) and may spread to more traditional teaching situations. In research, a new division is already observed between proposal writers, research managers, experimenters, etc., and it will intensify.

The reinforced division of work should increase the diversity of work and employment conditions. Specific conditions will be set for different categories of tasks. This is already the case for non-permanent staff who tend to be more and more specialised (either in teaching or in research) and recruited for quite specific tasks.

Today, the allocation of work of permanent staff is still self-regulated. However, the divide between teaching and research is already more externally structured: in some countries academics negotiate how they allocate their time with university managers,

while in others, higher education institutions are opening teaching positions on the one hand and research positions on the other. Self-regulation is expected to diminish in this respect.

This increasing division of work will probably provoke a growing differentiation in salaries, reflecting the hierarchy that will be established among the different categories of tasks and of staff and also among their respective "prices".

Will academic work become less attractive? There is no clear evidence of this. Many of the changes experienced by academics today are comparable with those observed on non-academic labour markets (see for example Osterman, 2002). Therefore, even if the academic profession may seem less attractive today than in the past, the issue at stake tomorrow is much more the relative attractiveness of academic and non-academic work.

Challenges to the power of the guild and growing demands for accountability

Many of the changes described above are congruent with the transformation of the nature of universities. In a nutshell, they reveal the shift from universities as interest organisations towards a model that is closer to (but not the same as[14]) "work organisations", with a stronger division of work, the introduction of more wage-earner-like employment relationships, and more professional and managerial university leaders. Academics are expected not only to contribute to science and to the development of their discipline, they are also expected to contribute to the overall performance of their university/organisation. This is emphasised by the development of institutional evaluation. In business schools, for instance, accreditation agencies such as EQUIS or the AACSB, which first developed in specific regions (Europe for the first and the United States for the second) but have tended to become international, provide their labels to the institutions they assess and not to single programmes. They therefore encourage each institution to expect results from all its members and to ask them to conform to the accreditation criteria. The same happens (and will intensify) with the recent diffusion of international rankings, such as the Shanghai ranking and the ranking issued by *Times Higher Education*. Both assess and rank institutions, thus emphasising overall performance.

The reinforcement of the institutional level modifies the status of academic production as shown by the increasing relevance of issues relating to the ownership of academic products. On the one hand, there is often a shift from views and practices in which these products (teaching and research) were considered as the property of individual academics to views and practices in which the higher education institutions have ownership. On the other hand, the transformation of academic goods into products whose circulation and diffusion is restricted by property rights provokes debate about the nature of academic goods, and initiatives launched against publishing houses such as open archives and open journals are gaining ground.

At the individual level, more diversified types of control have been introduced (see the case of France in Box 4.2). Traditionally, control over academic activities mainly consisted in assessment of research production and was often voluntary. Once they reached permanence or tenure, academics would be free not to apply for new positions, submit papers to journals or go to conferences.

Such a situation still exists in some countries but it has become rarer. Many countries have developed systematic assessments, for research as well as for teaching, sometimes directly linked to funding mechanisms, such as the Research Assessment Exercise in the

Box 4.2. **The progressive regression of voluntary evaluation in France**

Faculty members in French universities have long been able to escape any form of evaluation. Only those desiring a promotion, sending a paper to a journal, answering a call for proposal or asking for one of the bonuses created at the beginning of the 1990s faced some form of evaluation.

In 1997, the ministry introduced the evaluation of teaching. Implementation has been uneven but has become more frequent.

The four-year contracts signed between the ministry and each institution relating to its research strategy led to the evaluation of the research activities of faculty members involved in research labs receiving funding in this way. According to an administrative report, this concerns about 80% of permanent academics.

Under new measures of the recent act for research (April 2006), all faculty members working in universities should be regularly evaluated by their institution under the supervision of a national agency for the evaluation of higher education and research. If such regular assessment procedures are new to university teachers, they have been applied for many years to researchers in national research institutions such as the CNRS.

United Kingdom, while higher education institutions that are in charge of the management of their positions and staff are creating their own evaluation devices. In some cases, this involves norms concerning the number of papers published each year in international journals or the number of patents available for licensing.

It is nevertheless important to note that these assessment processes still generally rely on external peer reviews: this is the case for the British Research Assessment Exercise, for the Spanish research assessment, etc. As a result, external peer reviews regain vitality and legitimacy; they are taken seriously by university leaders who use them as a lever for change, redistribution or decision within their own institution. In a study on hiring and staffing decisions, Musselin (2005b), for instance observed that in three German mathematics departments, decisions made at the university level to cut positions were informed and justified by evaluations led by peers of the discipline.

In parallel, however, non-academic forms of evaluations have developed: greater control over the carrying out of teaching duties, stricter supervision of expenses, incentive mechanisms in the allocation of budget, etc. More attempts are being made to discipline behaviour and to restrict self-determination in the use of time and money. One can therefore speak of both a diversification and intensification of the scope of control and of the types of control on individual academics.

Rather than a loss of academic power (as is often stated), there is a general expansion of the forms and sources of control that are being superimposed on traditional professional assessment mechanisms. Instead of simply undergoing peer evaluation, academics are increasingly exposed to various types of external peer reviews, to institutional assessment devices, to national evaluation procedures and to competitive international ratings as well. These different devices are not only more numerous, they also cover an ever larger array of tasks: scientific publications of course, but also involvement in technology transfer, amount of research contracts, teaching, etc.

For the future, then, there are two main issues. The first is the generalisation of the trend towards specialisation and diversification described above. Today, the diversification

and intensification of control over academics still does not concern some countries, but this is expected to change as the academic profession diversifies and employment arrangements change. Moreover, in the same country, the span and intensity of control is likely to vary more among different segments of the profession. Academics with international reputations and careers will probably still benefit from considerable freedom and be more concerned by peer reviews than by other forms of assessment. However, a larger part of the academic population will certainly be more constrained in their day-to-day teaching or research activities and also more engaged in collective duties. In this segment, those with time-limited and single-task contracts should be even more dependent and controlled.

Second, the maintenance of professional power in its present form is under pressure. As noted, external peer review is still very strong. The research on hiring mechanisms mentioned above also concludes that in France, Germany and the United States the recruitment of colleagues and in particular the evaluation of applications and applicants for vacant positions are in the hands of academics (Musselin, 2005b). Some domains remain under academic control. External peer review is even gaining in importance and is used as a legitimate instrument for change by university managers. But this is not the only side of the issue. First, there is a tendency to mix different types of assessments and assert different kinds of control over issues which were previously free of control or only submitted to peer assessment. This is the case, for example, of the routine management of academic staff. Second, even when decisions are in the hands of academics, they often no longer rely on "pure" academic criteria but incorporate other kinds. This is sometimes done to increase the chances of achieving a goal: for instance, the defence of a new curriculum may gain in legitimacy if it can be demonstrated that there is a need for such training on the job market. However, it has also become part of the "normal" way of dealing with some issues: for instance, in many countries, the ability to develop contractual research is considered an important criterion when recruiting a professor. Finally, the involvement of non-academic stakeholders in decision-making bodies (university councils, research councils, etc.) may further diminish the guild power, if it strengthens the principle of shared governance on which their participation relies today.

Centres and peripheries: the international academic community

Higher education has many variants, and the situation of academic staff varies considerably across and within countries. A country's economic and political power, its size and geographic location, its dominant culture, the quality of its higher education system and the international role played by its language have to be taken into consideration when it comes to inclusion in or exclusion from the international academic community. In analysing the results of an international survey on the academic profession undertaken in the 1990s (Boyer, Altbach and Whitelaw, 1994), four types of approaches to internationalisation can be identified which reflect the different contexts set out above.

In some countries, generally less developed economically, academics may wish to be partners in international communication and co-operation but face problems because they tend not to be considered partners on equal terms. This is certainly a central problem for many senior academics in developing countries which are also experiencing a growing "digital gap". International flows mainly involve junior staff from these regions who contribute to a growing international orientation on their home turf owing either to

academics who return home or to emigrants who retain a certain commitment to, and support for, their home countries.

In other countries, generally developed but small, international communication, co-operation and recognition are considered indispensable. Except in a very small number of fields of study, academics are not respected in their home country unless they have international visibility. Academics from such countries gain access to international networks without major difficulties; the national system seems to be perceived as either too small or too limited to strive only for national visibility.

In larger countries such as Germany, France, Spain or Japan, academics in many fields can strive for either more national or more international visibility. International co-operation and communication are highly valued by most academics. But the country's own academic tradition, the networks in the scientific community on the home turf, academic communication and publication in the country's language still play an important role and support a certain insularity of their faculty as well.

Finally, for many years in the United States and to some extent the United Kingdom, internationalisation mainly meant hosting foreign students and academics and considering research from other countries only if published in English, and often only in "international" publications in these two countries. Being at the centre of the world academic system places faculty in a powerful and comfortable position in terms of international contacts and recognition. However, it also encourages a very insular approach that will probably last only as long as this dominance is not endangered.

Nowadays, global trends are expected to play an increasingly important role and a further push towards the internationalisation of higher education seems to be in the making (Sassen, 1996; Scott, 1998; OECD, 2004b). International mobility of students and academic staff seems to be rising, new technologies connect scholarly communities around the world in new ways, and English has become the new lingua franca of most international communities. New regulations concerning comparability of degrees and mutual recognition, such as those of the European Union, and the growth of virtual universities, off-campus providers and internationally active study programmes foster the internationalisation of teaching and learning (Teichler, 1999; van der Wende, 2001). There is an international market for academics, for members of the professoriate as well as for junior staff, even if it is still limited in scope. Academia contributes to internationalisation and is at the same time affected by increasing "globalisation" within and beyond higher education. "Internationalisation" would here imply greater exchange and mobility of faculty across national borders while "globalisation" refers to trend towards worldwide standardisation, with a consequent loss of national identities and traditions.

As regards growing international exchange and mobility of faculty, there is little doubt that there is a strong positive bias. The European Commission's policy stresses the need for inter-European co-operation and exchange and encourages mobility as an instrument to give a European dimension to academic careers. The OECD is another important advocate of academic mobility and exchange in the service of higher education, the economy and society simultaneously. The OECD was probably also among the first to investigate the rise of a truly global labour market for R&D in which national borders play a diminishing role (OECD, 2004a). Equally important, the growing awareness of the important role of international intake for the competitiveness of US higher education and research fosters a strong internationalisation discourse.

In addition, the information technology revolution is speeding up scientific research and communication worldwide and sharpens the need for up-to-date information as well as the search for the latest competitive advantage in a globalising scientific working environment. All this is still in the early stages and the impact on higher education and the academic profession will be felt everywhere. In the developing world, access to such resources and exchange channels is relatively recent and for many academics still sporadic. The issue of access is central if new technologies are to be used to help overcome the traditional isolation of academics in the developing world instead of increasing their peripherality (Altbach, 2002).

There is also some evidence that international academic mobility and exchange is growing. Certain indicators, such as joint publications and joint patent applications by researchers residing in different countries, research projects carried out by international teams and/or supported by international funds demonstrate the increase in cross-border research collaboration (Vincent-Lancrin, 2006; Guellec and Cervantes, 2002). In many highly developed countries the share of foreign doctoral candidates has risen but varies considerably: about 2% in New Zealand, 5% in Australia, 9% in the United Kingdom, 18% in Finland and the United States, 22% in Spain. As regards visiting faculty, the United States plays a leading role as receiving country with a considerable growth rate over the last ten years (and a slight decline after 9/11/2001). In Europe, the United Kingdom, followed by France, Germany and the Netherlands are main receiving countries for researchers. For China a massive increase in foreign experts working in higher education has been reported, and in Japan the inflow of faculty for long-term appointments has increased (Guellec and Cervantes, 2002; Institute for International Education, 2006; OECD, 2005; Luiten-Lub, van der Wende and Huisman, 2005).

Empirical evidence suggests that junior as well as senior faculty use such international experience in different ways (Sveva, 2001; Enders and Mugabushaka, 2004; Musselin, 2005c). There is certainly a pool of researchers and teachers, top academics in certain fields, who are truly global and of strategic importance for research universities and national governments. Second, many junior faculty use temporary international experience (especially at top universities) to increase their standing and career opportunities when returning home. Third, for another group of the internationally mobile, working in another country is a "second best" solution, owing to a lack of career opportunities at home. Finally, academics' international mobility also includes those who go from "poor to rich" and hope to stay, at least for a while, in the new country.

The academic world is still clearly hierarchical and research universities in the industrialised world set the standards for the international science system. International mobility, whether of academics or students, is predominantly a South-to-North phenomenon even though there are efforts towards an exchange on more equal terms. There is significant movement also between the industrialised countries – especially to the United States as host for a temporary stay of junior staff – and some South-to-South movement as well.

Recent developments on the global job market for scientists and engineers suggest that this picture is likely to change (Freeman, 2005). Data show that the overall share of science and engineering graduates from European and Asian universities, especially from China, is growing while US production is stagnating and increasingly relies on foreign-born faculty. Increasing numbers of scientists and engineers in low-income countries, such as

China and India, create opportunities to catch up with the North in certain fields of scientific discovery and innovative products and processes. Relocation of R&D facilities, offshoring of highly skilled work from the North to the South, and socioeconomic and technological improvements in certain low-income countries contribute to these countries' advances on the global market. While it is premature to forecast the effects of such developments in the long term we may conclude that there are signs of a move towards a more polycentric world of scientific excellence with the United States one of its heartlands.

4.3. Conclusions and outlook

Today, the academic profession finds itself living in interesting times. While each academic system is embedded in its own national traditions, there are some common realities: increasing financial constraints, processes of differentiation within massified higher education systems, demands for accountability and responsiveness to societal needs, market-like approaches to higher education, and rising international co-operation and competition. Higher education has become a mature service industry and the academic profession has become a large and complex profession with many faces. Obviously, there are many unanswered questions about the future of the academic profession. We live in times of uncertainty about the future development of higher education and its place in society and it is therefore not surprising to note that the future of the academic profession seems uncertain, too. Nevertheless, it seems worth having a final look at our findings and offering some conclusions.

In sum, we argue that the traditional consensus among faculty in modern universities about what it means to be a professional in the higher academic strata is under pressure. The consensus stressed the following points: research is supposed to be a prominent focus of academic work and knowledge is pursued for its own sake; the effort to advance the frontiers of knowledge is best organised in academic disciplinary units; reputation is established by national and international peer groups of scholars; and quality is assured by peer review and academic freedom. Recent experience shows that these defining notions of the academic career are not a given and are likely to be contested in various ways.

On the one hand, the national boundaries of academic careers are weakening. First, we observe a growing international market for faculty and growing competition for talent. Academic labour markets are likely to become more international than in the past. Nowadays, the baby boom generation of faculty moves towards retirement but important fields suffer from a shortage of PhD students on their home turf, with the result that they hire candidates from other countries, making the market for young talent increasingly international. The internationalisation of academia is also seen in the increasing importance of articles in international journals as performance criteria.

Second, we observe blurring boundaries between traditional academic roles and quasi-entrepreneurial roles. The traditional academic criteria of excellence also tend to be accompanied by new criteria of success. Academics are, for example, increasingly expected to raise their own research funding, and success in leveraging funding becomes more and more important for both the institution and the individual faculty member. Expectations regarding the "relevance" of academic work for other sectors and stakeholders in society are rising, and spin-offs and market-like activities tend to become part of the academic reward system.

Third, recent developments have created new positions and career lines around the traditional academic career ladder. As in other organisations that seek more flexible forms of employment, these more or less peripheral positions around the core of the profession offer limited prospects for climbing the traditional career ladder. Career management of new groups of staff and new forms of contractual arrangements have become more important. In addition, new divisions of work within the main areas of work have appeared. Universities tend to break up the teaching-research nexus and to professionalise their management. Different units are created for teaching and research, money flows through different channels for teaching and research, and staff may be assigned more exclusively to research, teaching or management.

On the other hand, there are signs that academic careers are becoming more closely bound to the institution. First, measures are taken to reorganise universities by aligning academics' activities more closely with the interests of their institution. Local expectations regarding commitment and contribution to the institution are rising. The growing need to profile individual universities and to commit faculty to the mission of the institution calls for a new organisational identity among faculty. Teamwork within and across institutional units is increasing, and the "group", in addition to the individual scholar, becomes an important unit for measuring success.

Second, within universities, academics are losing part of the traditional guild power that protected their autonomy and "idiosyncrasy". Priorities in teaching and research are increasingly set by professional management. Also, recent measures taken to steer and control the professional agenda of academics (prescription of work portfolios, performance contracts, time sheets, etc.) tend to limit the freedom of individual academics more than in the past. Various phenomena such as growing expectations as regards regular attendance of faculty at their workplace, assignment of staff to specific tasks and projects with prescribed time budgets, and use of time sheets indicate that management technology is being introduced into the academic workplace.

Various drivers thus affect academic careers in multiple and sometimes ambiguous ways. This may mean in effect a narrowing gap between career models in academia and the corporate world (see for example Kleinman and Vallas, 2001; Menger, 2002). Corporate career models seem to adopt more and more elements that traditionally played a defining role in the academic world. In turn, universities have adopted certain elements of the traditional corporate models of professional work. This also implies that the university is no longer unlike other organisations, or at least it is less unlike. This further implies that looking at the future of the academic profession means simultaneously looking at the future of corporate work and corporate workers, as the latter are expected to control and produce more and more knowledge as part of their own professional activity.

Notes

1. See for instance the typology proposed by Laredo and Mustar (2000) which shows that research activities and strategies are more heterogeneous and diverse than it is often said and that various types of research activities, commitments to research, and research-based relationships to the local environment may be observed.
2. For instance, being a permanent academic teaching in different institutions or working simultaneously in a firm has different causes in developing and in developed countries. In the first case, multiple affiliations are the only way to survive for low-income academics; in the second it exemplifies the emerging model of boundary-less careers and polycentric affiliations.

3. The study concerned: Australia, Brazil, Chile, England, Germany, Hong Kong (China), Israel, Japan, Korea, Mexico, the Netherlands, Russia, Sweden and the United States (Boyer, Altbach and Whitelaw, 1994).
4. This can take rather different forms. In some countries (Spain and France for instance), universities are encouraged to stress their particularities and their specific orientations in their strategic plans, while in others (as in Germany or China for instance), some institutions are identified as "elite institutions" and allocated funding, thus establishing a hierarchy and promoting vertical differentiation.
5. In the United States, where this model prevails, young academics on tenure tracks generally experience two three-year contracts before they pass the tenure procedure.
6. In most cases, with the exception of a few highly reputed institutions whose policy is to exceptionally give tenure to those they recruit on tenure tracks, the chance of receiving tenure is very high (more than 70% in the United States according to Chait, 2002; this includes the highly reputed institutions mentioned above).
7. In Germany, where this model prevailed, the average age of access to a first permanent position was 42 in 2000.
8. For a review of the on-going situation and debates in the US system, see Chait (2002).
9. In the United States, the tenure model is overwhelming (85% of all universities have tenure agreements, and almost 100% of the research universities) but in the last years the percentage of academics recruited on tenure tracks has diminished and is today below that of those recruited on adjunct, post-docs or part-time positions. This trend remains relatively rare in research universities, however.
10. For a description of academic price setting in Germany and the United States, see Musselin (2005a).
11. In countries where salaries cannot be negotiated, one observes increasing negotiation on working conditions or housing. In France for instance, salaries are set according to a national income scale which is the same for all disciplines and institutions. However, some universities have found support from local authorities to provide better housing to their new faculties. Others have negotiated with the ministry to have part of the budget they get for their four-year contract dedicated to start-up funds.
12. A recent Australian study commissioned by the Australian Department of Education (DEST) has shown how the decline in salaries for academic staff has led to the rise of other non-monetary benefits in employment negotiations: see Horsley and Woodburne (2003).
13. Research and teaching should be understood broadly. Teaching includes all activities linked to training, from teaching class, to preparing courses, organising internships, using new technologies, conceiving e-learning curricula, tutoring groups, etc. Research not only concerns experimentation and writing papers, but also technology transfer, project writing, networking with other research colleagues, etc.
14. As argued by Musselin (2004), academic activities possess two characteristics whose simultaneous presence makes universities specific: they are loosely coupled activities on the one hand and unclear technologies on the other. These two characteristics remain central even if recent trends tend to lower loose coupling and to make the productive technologies clearer.

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