

## D. LABOUR MARKET PERFORMANCE OF FRENCH PHDs: A STATISTICAL ANALYSIS

by

*Daniel Martinelli, Céreq, Marseille, France*

This document presents a statistical analysis of the supply and demand for PhD graduates especially those in science and engineering, in France. Drawing on surveys of recent graduates, it analyses the trend rise in higher education graduates in the 1990s and the underlying factors determining employment outcomes, in particular of PhD level graduates.

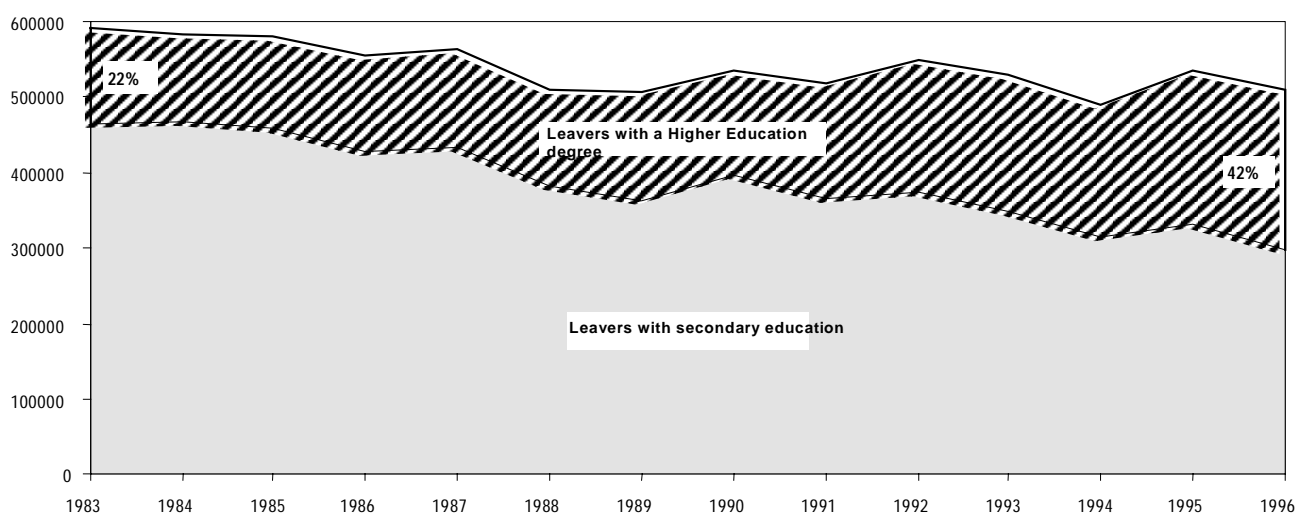
### The supply of doctoral programmes is outstripping employment

#### *Abrupt increase in Higher Education outflows*

Between 1983 and 1996 outflows from the education system fell from 592 000 to 510 000, the number of departures being calculated at the end of the first three years on the labour market. At the same time, the number of Higher Education (HE) graduates rose sharply from 129 000 to 213 000: this increased the proportion of HE graduates among new arrivals on the labour market from 22% to 42%. Of all graduates leaving HE since 1983, the number of those with a *BTS* (*Brevet de technicien supérieur* - Higher Technical Diploma) increased the most. There was a considerable increase in the number of third-cycle graduates completing 'long' HE courses in the late 1980s.

Between 1980 and 1994, there was a particularly sharp rise in the number of graduates in engineering schools run by the Ministry of National Education and in private engineering schools; in fact, the number of graduates produced by both types of institution doubled during the period.

**Figure 1. Number of labour market entrants by level of education (in employment after 3 years)**



Source: INSEE. Extrapolated by Céreq.

### ***Fourfold increase in the number of third-cycle graduates in natural sciences***

University teaching in natural sciences benefited particularly from the rise in the number of students entering Higher Education. The number of those passing the baccalaureate has risen steeply since the early 1980s, with most students in a given age-band in the most recent cohorts reaching this level. Most of this growth took place among the general and technology baccalaureates, many of whom generally move on to Higher Education. HE courses have had to accommodate an increasing number of students as a result: some Higher Education courses recruit students by competitive examination or on the basis of personal files (the so-called ‘closed’ lists); others have to accept all those with the baccalaureate who wish to enrol (the so-called ‘open’ lists). Universities account for the majority of the latter category, and have therefore accepted a large proportion of people who have recently passed the baccalaureate.

The increase in the number of first-cycle enrolments has been accompanied by a rise in the examination passing rate and in a lengthening of the period of university studies. University studies have also become more common among graduates of the so-called ‘closed’ courses, particularly those holding the DUT (*Diplôme universitaire de technologie* – University Degree in Technology).

This has triggered an explosion in the number of students and in the outward flows of graduates; the increase has been greatest among those studying natural sciences. Students taking these subjects usually have a baccalaureate in mathematics or science (bac C or D ); they also achieve better results, and undertake longer courses, than those with other baccalaureates. The number of graduates entering the labour market at the end of a second-cycle degree in natural sciences doubled between 1984 and 1994, while the number of those leaving after taking a third-cycle degree in natural sciences increased fourfold. Science students continued to remain in a minority among those leaving university at the end of the second cycle (9 100 out of a total of 39 900 in 1994), but they account for almost half of those departing on completion of a third-cycle degree (11 500 out of 26 400).

### ***Substantial increase in the number of theses during the 1990s***

The increase in the number of theses granted is illustrated by two data sources. The first is a survey by the Ministry of National Education’s *Direction de la Programmation et du Développement* (DPD – Planning and Development Directorate); the other is the work of the *Observatoire des flux et des débouchés* (Students Flows and Employment Opportunities Observatory); the latter body comes under the *Direction de la Recherche* (DR – Research Directorate). However, counting the number of doctorates granted has been made difficult by changes in the thesis system. Both sources contain figures on the increase in the number of theses after 1991<sup>11</sup>.

The number of theses remained relatively steady at around 5 000 during the 1980s, and even fell in the mid-1990s. Since 1992, however, the numbers have risen rather quickly and, according to the *Observatoire*, around 10 000 theses were submitted during 1994 and 1995. This doubling in the output of theses must be viewed in perspective, since the numbers of students and graduates of Higher Education also doubled during the same period.

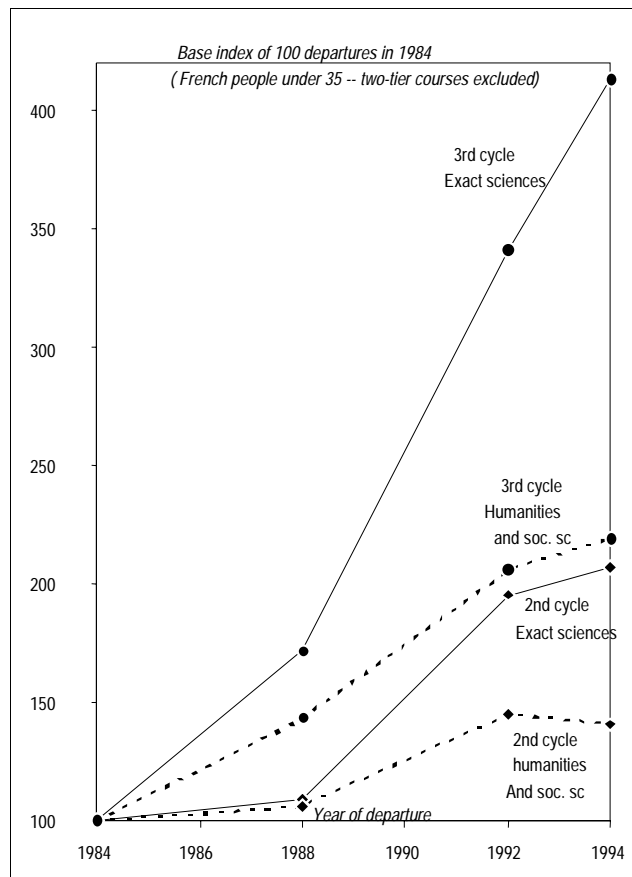
During the 1980s, the number of theses in natural sciences grew to the detriment of those in letters/humanities and law and economic sciences. However, since 1990 the distribution of theses by

---

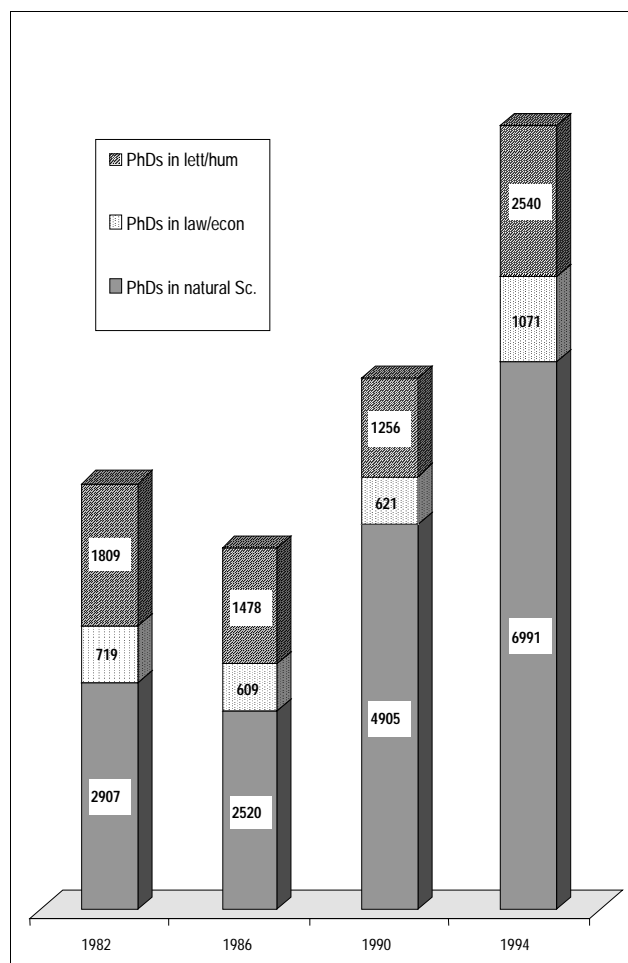
11 . We use DPD data up to 1989, and exclude ‘State’ PhDs. After that, we rely on data collected by senior DEA (*Diplôme d’études approfondies* – Degree in Advanced Studies) officials at the *Observatoire des flux et de débouchés*.

overall discipline has remained relatively stable, with two-thirds in natural sciences, a quarter in letters and humanities, and about 10% in law and economics.

**Figure 2. Graduates entering the labour market on completion of the 2<sup>nd</sup> and 3<sup>rd</sup> university cycles**



Source: Céreq.

**Figure 3. Number of theses granted by discipline**

Source: Ministry of National Education.

### **The scientific job market currently has less on offer**

#### ***The main employment destination after completing PhD theses***

As expected, teaching-research fellowships and engineering positions are the main job destination of graduates in exact sciences and humanities. Graduates in chemistry are an exception as this subject usually leads to employment in the private engineering sector. It should be noted that this discipline incorporates a large number of students undertaking doctorates in engineering.

PhDs in economics find positions both as teaching-research fellows and as managers in public administration and business. This includes managers of economic research units and in recruitment and personnel management, and manager-level posts in commerce, banking and insurance. Similarly, doctoral graduates in law usually find positions as teaching-research fellows, managers in administration, commercial companies and the public sector (including the post of Magistrate), and employment as lawyers. However, doctoral law graduates are few.

PhDs in letters and humanities often find employment in education; teaching-research fellowships are not the only outlet. Some PhDs in letters and humanities work in secondary education, even in primary education, and this indicates a relative decline in status in relation to the initial field of doctoral study. It should be noted that some PhD students in letters and humanities worked in primary and secondary education before completing their theses, and that a doctorate does not automatically open the door to higher education and research. It is likely that not all these teachers had a career plan when they were undertaking their theses. The average age on completion of theses in letters and humanities is often as high as 40.

### ***Young graduates benefit less from the increase in the number of jobs for PhDs***

Based on the above analysis, most PhDs become:

- Teachers and scientists in the public sector.
- Engineers and technical managers in enterprises.
- Managers in administration and in commercial enterprises.

In general, employment in these categories has grown at a similar pace. Although they are clearly expanding, it would appear that the increase has benefited younger graduates less since 1994. Employment among young graduates fell between 1994 and 1996, although it has picked up since. A survey of 1994 cohort of PhDs showed graduates did not benefit from the favourable economic upturn during their first two years of being on the labour market. Although the number of engineers employed by enterprises rose by almost 200 000 between 1984 and 1998, the recruitment of young university leavers fell dramatically in 1995/96 as a result of economic difficulties. This probably made it difficult for enterprises to recruit PhDs in natural sciences, but recruitment has subsequently revived.

There has been a rapid increase in the number of public sector jobs for scientists. Most of this growth is concentrated in teaching-research fellowship posts – a traditional destination for post-graduates – but there was particularly heavy recruitment in this category among young people between 1990 and 1994. Since then, employment among the under-30s group has stabilised at a level that is still quite high compared with the 1980s (14 000 teaching-research fellows under the age of 30 in 1996 and 1997, compared with 6 500 in 1984). Other scientific jobs in the public sector, which are of less appeal to PhDs, have increased in number at a similar pace, but the expansion has not automatically benefited younger people such as qualified and *agrégé* teachers, and engineers employed by the State and local authorities.

### **Labour market entry remains relatively positive**

#### ***Job opportunities for higher education graduates in general level off***

The number of graduates leaving higher education has risen sharply since 1990, 273 000 obtaining degrees in 1995 as compared with 184 000 in 1990, and there has been a particularly large increase among those who have pursued longer courses of study. Furthermore, since the early 1990s, the number of jobs in management and the intermediary professions, both traditional outlets for HE graduates, has risen more slowly. However, the fall in HE graduates finding employment that was observed in late 1994 appears to have been halted (Martinelli et al, 1997).

***More positive developments***

Three years after leaving higher education, members of the 1994 cohort found it slightly easier to find a job than their predecessors: their unemployment rate was 9.3% compared with 11.5% for the 1992 cohort. They were also more likely to find permanent employment and their salaries partly recovered from the steep fall that occurred in previous years. Moreover, their unemployment rate was twice as low as that of students with the baccalaureate, and almost four times lower than that of non-graduates. The share of higher education graduates in temporary employment (i.e. on fixed-term or temporary contracts, or working for agencies) fell sharply between 1994 and 1997. This number is still low as many graduates had managerial jobs on permanent contracts.

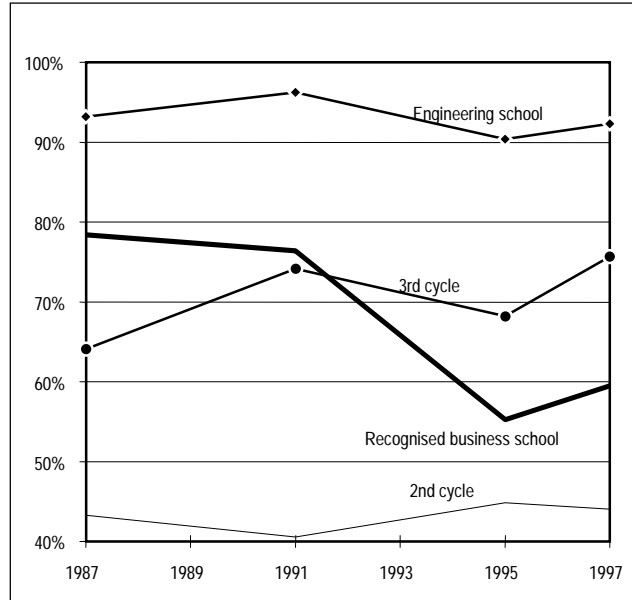
The salaries of HE graduates fell very substantially in 1992 and 1993, a time when the labour market was at a low ebb, but during periods of even quite modest economic upturn, pay levels recovered – as they did for the 1994 cohort. Salaries are now approaching the high levels achieved in 1991 at current rates. Higher Education graduates are also very likely to be recruited as managers (41% of them, including those holding a BTS (*Brevet de technicien supérieur* – Higher Technical Diploma) and or DUT (*Diplôme universitaire de technologie* – University Degree in Technology).

**PhDs still find it relatively easy to find employment*****PhDs quick to find jobs in the early 1990s***

In March 1991, Céreq conducted a postal survey of people who had completed HE degrees in 1988 (Martinelli, 1994). The exercise included a sample of young PhDs whose entry into employment could be compared with that of 1994 graduates. The 1988 cohort of PhDs found employment without much difficulty; this was due to the economic upturn and their relatively small numbers. French PhDs were as successful at entering the labour market as engineers (relatively low levels of unemployment, and satisfactory pay and employment levels); foreign PhDs were much less so. PhDs and engineers found employment most successfully on completing their Higher Education followed by graduates of recognised business schools, applicants holding the DEA (*Diplôme d'études approfondies* – Degree in Advanced Studies) or the DESS (*Diplôme d'études supérieures spécialisées* – Degree in Specialised Higher Studies), second-cycle university graduates, and those with a DUT or BTS.

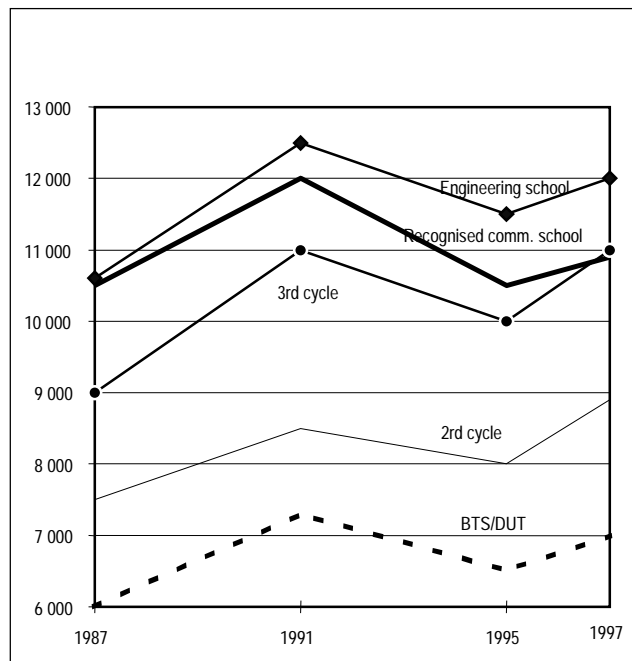
Engineering PhDs were the most successful in finding employment, their salaries and employment levels slightly surpassing even those of engineers. By contrast, PhDs who had received no more than a university education, and had not entered any public sector competitions prior to their doctorates, experienced some difficulties.

**Figure 4. Median salaries three years after completing studies**



Source: Céreq.

**Figure 5. Median salaries three years after completing studies**

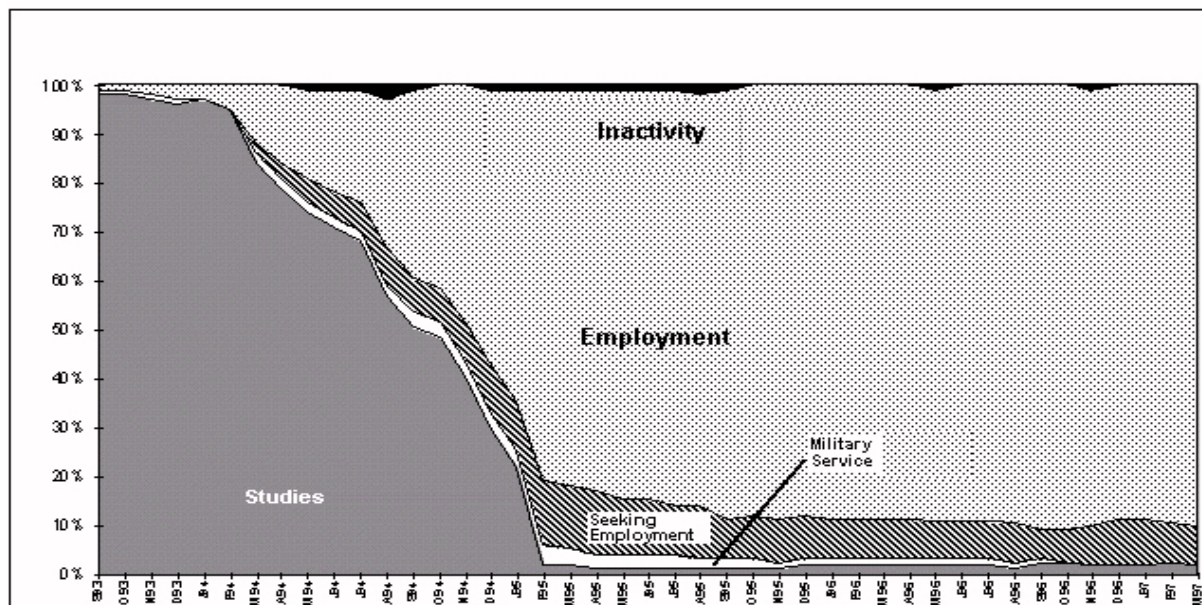


Source: Céreq.

### *PhDs still find employment more easily than other university graduates*

The increase in the number of PhD theses and the standstill in recruitment meant that employment openings for PhDs, like those for other graduates, fell in the early 1990s. However, their situation remains favourable by comparison with that of other HE graduates. Only 8.5% of the 1994 cohort of PhDs were unemployed after three years on the labour market, as compared with 10.1% of holders of the DEA or DESS, and 12.3% of second-cycle graduates. PhDs found jobs more quickly than other university graduates, and spent less time out of work during the period under review (only 10% unemployed for more than six months before finding their first job). Figure 6 below shows the relative rates at which they found employment. It should be noted that only a tiny fraction of PhDs did their compulsory military service after finishing their theses. Their first jobs were more insecure than those of other university graduates: 41% accepted temporary employment as ATERs (*Attachés temporaires d'enseignement et de recherche* – Temporary Teaching and Research Assistants) and post-doctoral fellows. This instability is unpopular among PhDs, despite the fact that three years after graduation, the share of those in temporary jobs falls to around 21%.

**Figure 6. Career paths of the 1994 cohort of PhDs (all disciplines)**



Source: Céreq.

PhDs experienced slightly more unemployment than graduates of the *Grandes Écoles*. Although they seek employment for comparable periods of time, a slightly higher proportion of them were out of work after three years on the labour market (8.5% compared with 5% for engineering school graduates and 7% for business school graduates). *Grande École* graduates also take less unstable jobs than university graduates, in particular those with doctorates. However, PhDs and engineers enjoy the highest employment and pay levels upon completion of Higher Education (no PhDs in medicine were interviewed): three years after the end of their studies, 94% of PhDs had managerial-level jobs, for example as managers in the private or public sector, engineers, teachers and researchers. A large number of engineering school graduates also achieved manager-level status, but only 71% of job-seekers with the DEA or DESS and under 50% of second-cycle and business school graduates found employment at this level.

These differences in seniority explain the salary differentials between graduates. The net median salary of young PhDs in March 1997 was the same as that of engineers (FRF 12 000). Other graduates had substantially lower salaries (holders of the DEA or DESS: FRF 10 500; graduates of business schools: FRF 10 000; and holders of second-cycle university degrees: FRF 8 950). Few PhDs earned low pay; in fact, three quarters of them earned over FRF 11 000. Low salaries are much more frequently found among engineers, and particularly among graduates of business schools. A quarter of PhDs earn more than FRF 14 000, a high salary for the beginning of a career (see Table 1) .

Table 1. Job integration of PhDs compared with that of other HE graduates

	1 <sup>st</sup> insecure job	Insecure employ 1997	6+ months unempl. out of 33	6+ months unempl. before 1 <sup>st</sup> job	Unempl. March 1995	Unem- pl. March 1997	Managers March 1997	Salary * in 1 <sup>st</sup> quartile	Median salary*	Salary* in 3 <sup>rd</sup> quartile	Number
	(in %)	(in %)	(in %)	(in %)	(in %)	(in %)	(in %)				
PhDs in science	44.2	23.7	21.0	11.0	16.0	9.4	94.6	10 500	12 000	14 000	5 381
PhDs in hum/soc science	31.0	14.7	9.8	3.9	7.2	5.8	92.7	11 000	12 400	14 500	1 262
CIFRE	20.7	12.5	16.0	10.7	16.3	3.4	97.3	11 700	13 500	15 000	400
All PhDs	40.5	21.3	18.7	9.7	14.5	8.5	94.4	11 000	12 000	14 000	7 043
Engin.sch.grads	22.0	10.3	16.3	11.8	16.0	5.0	91.2	10 300	12 000	13 600	14 305
Business sch. Grads.	28.5	10.7	19.2	9.2	17.0	7.0	48.1	8 000	10 000	12 000	13 645
DEA-DESS	33.7	19.4	23.5	15.4	23.2	10.1	70.5	8 900	10 500	12 000	21 244
2 <sup>nd</sup> cycle univ. degree	34.3	22.9	21.4	12.3	21.7	12.3	44.8	7 200	8 959	10 500	46 492
DUT	51.2	30.5	27.1	14.5	27.6	13.9	5.8	6 000	7 000	8 400	12 913
BTS	45.3	29.4	23.9	14.4	21.7	7.6	5.0	6 000	7 000	8 000	44 830
Total higher education	36.8	22.4	21.8	13.1	20.8	9.3	41.5	7 000	8 860	11 200	172 373

\* Net monthly salaries (all allowances included).

Source: Céreq.

### Box 1. Survey Methodology

The survey on the labour market entry of PhDs focused on French PhDs (other than PhDs in medicine) who finished their degrees in 1994, were under the age of 35 in 1994, and were entering the labour market. A relatively high share of PhDs, particularly those in humanities were older and had been employed long before completing their theses.

The focus of the survey was exclusively on French PhDs for several reasons. First, it is virtually impossible to contact foreign PhDs when they have returned to their countries of origin and, moreover, interviewing those who stayed on would not be representative. Second, there were virtually no foreigners pursuing higher education in other fields. Accordingly, it was decided to compare the labour market entry of only French graduates.

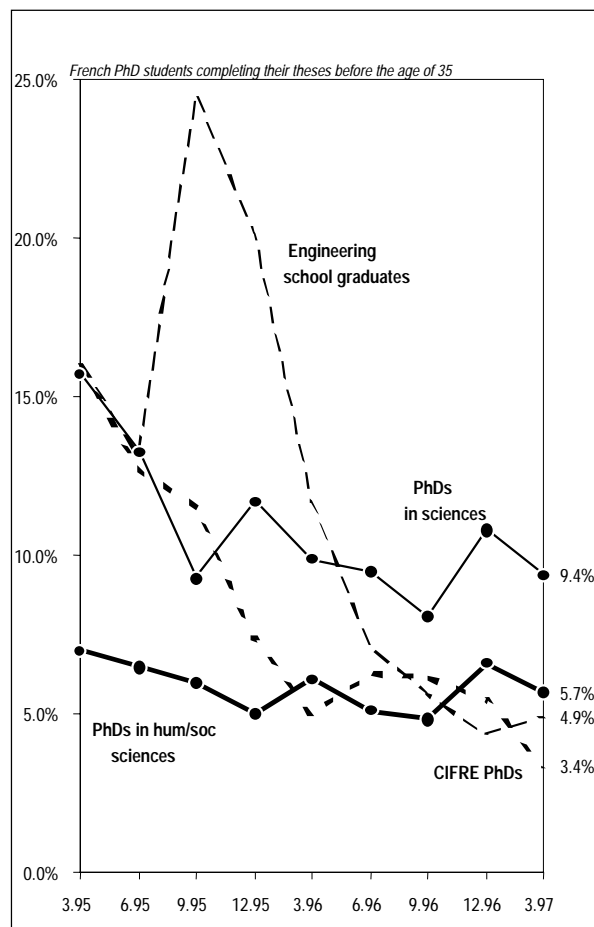
The survey was conducted by telephone between April and July 1997 using the computer-assisted telephonic interview (CATI) system. The interviews were carried out following an automatic and manual search of telephone numbers in the records of France-Telecom. Altogether 1 364 Doctors were contacted: 308 CIFRE (*Convention industrielle de formation par la recherche* – Industrial Agreement on Training through Research) PhDs, 515 non-CIFRE PhDs in sciences, and 541 non-CIFRE PhDs in humanities and social sciences. It is very difficult to contact these people, and the response rate reflected the accuracy of available address lists (ranging from 68% for CIFRE PhDs to 41% for PhDs in humanities and social sciences) Altogether, there were 926 questionnaires in which the age criteria were examined. The sample consisted of **274 CIFRE PhDs, 423 non-CIFRE PhDs in sciences, and 229 non-CIFRE PhDs in humanities and social sciences.**

### *CIFRE PhDs*

CIFRE PhDs (PhD having participated in the Industrial Agreement on Training through Research) are most successful in finding employment, although it should be noted they are pre-recruited by enterprises, and that their theses often count as professional experience. After three years on the labour market, their unemployment rates were below 4% and their jobs rarely temporary. Moreover, salaries were above average because of work experience in the company. They also enjoyed employment conditions that were at least as favourable as those of engineering school graduates and they were better paid: FRF 13 500 for CIFRE PhDs compared with FRF 12 000 for engineering school graduates.

The ease with which PhDs enter the labour market varies according to their field of study. PhDs in humanities and social sciences (i.e. law, economics, letters and humanities) find employment a little more easily than those in science (apart from CIFRE PhDs); they also spend less time out of work, find jobs more quickly, and have less unstable employment. Their salaries are slightly higher than those of science PhDs. It is noteworthy that despite the age limit of the survey (under 35), some PhDs in humanities and social sciences had already worked, mainly in secondary education, prior to completing their theses. The success with which PhDs in humanities and social sciences find employment may also derive from the fact that there are so few of them (they account for only a third of all post-graduates). PhD graduates in law and economics did well at finding employment, whereas graduates in letters and humanities performed at the average.

PhDs in the ‘hard’ sciences such as mathematics, physics and information technology find employment more effectively than PhDs in life sciences (e.g. chemistry, biology, and life and earth sciences), and they also experience less insecurity and unemployment. PhDs in life sciences have greater difficulties (14% were still looking for a job after three years on the labour market), but their salaries are close to those of PhDs in ‘hard’ sciences.

**Figure 7. Unemployment of graduates 1994-1997**

Source: Céreq.

### *The public sector is the main destination of PhDs*

Two thirds of PhDs find employment in the public sector. This is the highest proportion of public sector jobs observed to date on completion of Higher Education, but the traditional destination for students with theses is still teaching and research. No other university training leads so frequently to the public sector, although a significant proportion (45%) of second-cycle graduates enter the public sector via jobs in primary and secondary education. Taking all PhD graduates together, those in humanities most often opt for the public sector (85%). In addition a large number of graduates in letters and humanities at the second-cycle, DEA and DESS levels go into teaching. PhDs in sciences (excluding CIFRE PhDs) who do not work in the public sector are more likely to be in the tertiary market sector than in industry, especially engineering. Among PhDs, only the majority of CIFRE PhD graduates opt for the private sector. Following in the footsteps of engineering school graduates, they work in industry or in the services sector (i.e. business services).

Not all firms that recruit PhDs are large concerns. Since 1991, HE graduates have been increasingly hired by companies employing fewer than 500 staff and particularly by small enterprises with fewer than 50 employees. In this sense, the recruitment of PhDs differs from that of engineering school graduates in that a large proportion of the latter are still recruited by large firms. The jobs performed by PhDs are

closely linked to the sectors in which they seek employment; for example, almost 70% of CIFRE PhDs are engineers in firms, many of them becoming research engineers while other higher Education graduates rarely become production engineers.

It is less common for non-CIFRE PhDs to become engineers in firms; the majority find work as Senior Lecturers or Researchers. Most graduates with theses in 'hard' sciences become teachers, although PhDs in experimental sciences find work as researchers. PhDs in humanities and social sciences mostly move into the higher education sector, with a small share (11%) opting for research. A considerable proportion of PhDs in law and economics (15%) become administrative managers or commercial managers in firms, while post-graduates in letters and humanities who do not go into Higher Education or research become (or remain) first or second-level teachers, often with unstable employment (see Table 2).

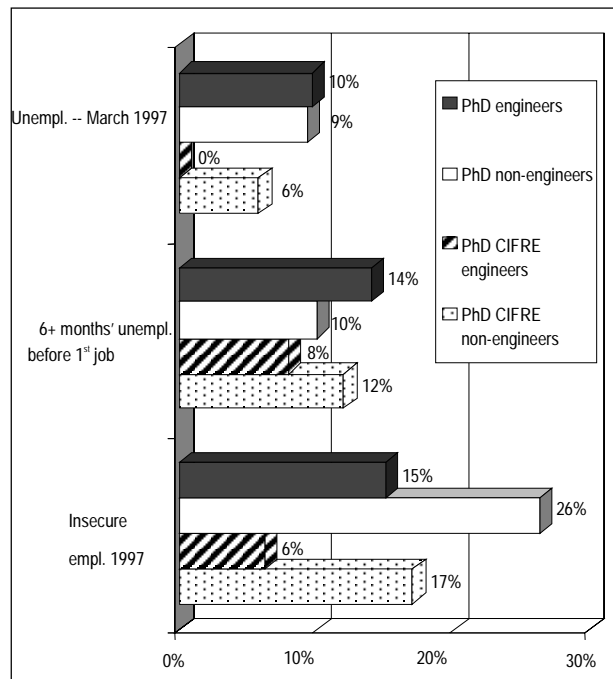
**Table 2. Employment in March 1997 by size of employing institution**

Degree	Size of institute	1-9 employees	10-49 employees	50-199 employees	200-499 employees	500 employees	Public sector	Total	Number
		%	%	%	%	%	%	%	NB
PhDs	Sciences	6.5	7.0	6.1	7.4	11.0	61.9	100.0	3 566
	Hum/Soc. Sc.	4.0	6.2	0.5	1.8	2.4	85.0	100.0	1 189
	CIFRE	5.1	11.3	12.6	14.2	25.5	31.4	100.0	373
	Total	5.8	7.2	5.3	6.6	10.1	65.1	100.0	5 128
Engin.sch.grad Business. Sch.graduate		5.1	13.2	17.0	17.1	38.7	9.0	100.0	12 765
		14.3	26.3	22.9	11.4	20.8	4.2	100.0	12 111
DEA-DESS	Sciences	7.4	11.7	16.3	10.4	23.8	30.4	100.0	5 609
	Law, econ.sc.	17.6	17.0	12.2	4.4	15.8	32.9	100.0	4 161
	Management	12.2	17.4	13.4	16.3	27.0	13.7	100.0	2 655
	Lett./hum.	8.9	8.9	9.5	2.5	7.4	62.9	100.0	4 829
	Total	11.0	13.1	13.0	7.6	17.8	37.5	100.0	17 254
Second cycle degree		10.8	17.7	10.7	4.4	11.2	45.3	100.0	31 060
DUT BTS		15.4	20.8	17.9	11.7	16.5	17.7	100.0	9 942
		26.4	24.6	15.2	9.6	12.5	11.7	100.0	37 862
Higher education total		15.4	19.0	14.3	9.1	16.5	25.7	100.0	136 195

Source: Céreq.

### ***PhDs engineers outperform other graduates on the labour market***

A substantial proportion of PhDs, particularly those with CIFRE theses come from engineering schools. This two-tier course is highly prized by enterprises, with PhD engineers performing better on the labour market than non-engineers. At the end of a typical natural sciences thesis, the rate of unemployment among engineering PhDs is similar to that of non-engineers, but there is much less insecurity. The salaries of engineering PhDs are higher, with half of them earning FRF 13 000 a month at the beginning of their careers. There are even greater differentials among post-graduates with CIFRE theses. Not one of the CIFRE engineering PhDs surveyed was unemployed three years on the labour market, temporary jobs were rare (6%), and salary levels were high. In March 1997, for example, the median salary of engineering PhDs was as high as FRF 14 000, compared with FRF 13 000 for non-engineers. Professional destinations varied slightly according to whether the PhDs were engineers or not; engineering PhDs being more frequently employed in the business sector, mainly in industry.

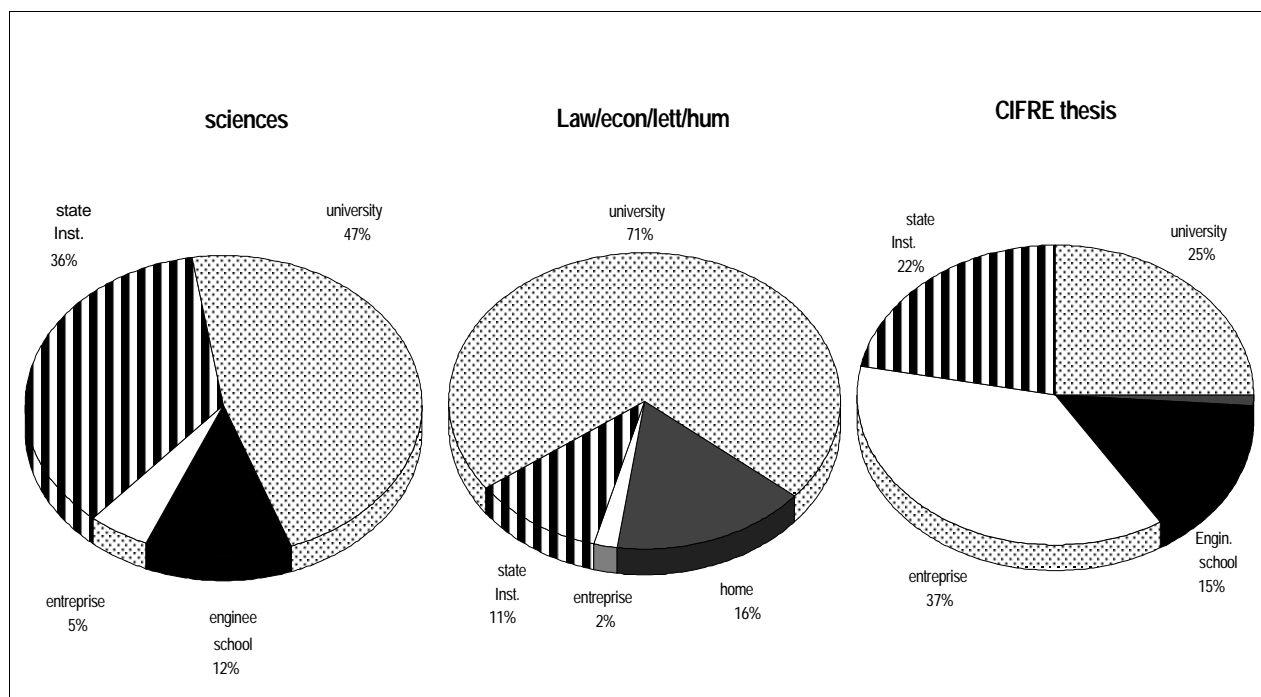
**Figure 8. Labour market performance of PhD engineers**

Source: Céreq.

***The conditions in which a PhD is completed has a strong bearing on employment destination***

The destination of PhD graduates is influenced by the funding source of the thesis, the institution of study, and the experiences gained while it is being written. Teaching while engaged on writing the thesis makes it easier for PhDs to move into the higher education sector. One option in this field open to them is the post of Graduate Assistant: a third of PhDs in sciences and 28% in humanities and social sciences surveyed held this job and, in so doing, obtained teacher training.

Carrying out part of PhD study in a firm can help PhDs establish a network of contacts that might be useful when seeking employment. Companies also look upon time spent with them as initial job experience. However, only a small proportion of PhDs surveyed worked in companies (14% in sciences, and 7% in humanities and social sciences). CIFRE PhDs were the exception: 82% of them carried out at least some of their theses in a firm. Universities are by far the most popular places in which to carry out a thesis. However, over a third of PhDs in sciences completed their theses in a state institution, and 16% in humanities and social sciences completed their theses at home; 37% of CIFRE PhDs completed their theses mostly in a firm.

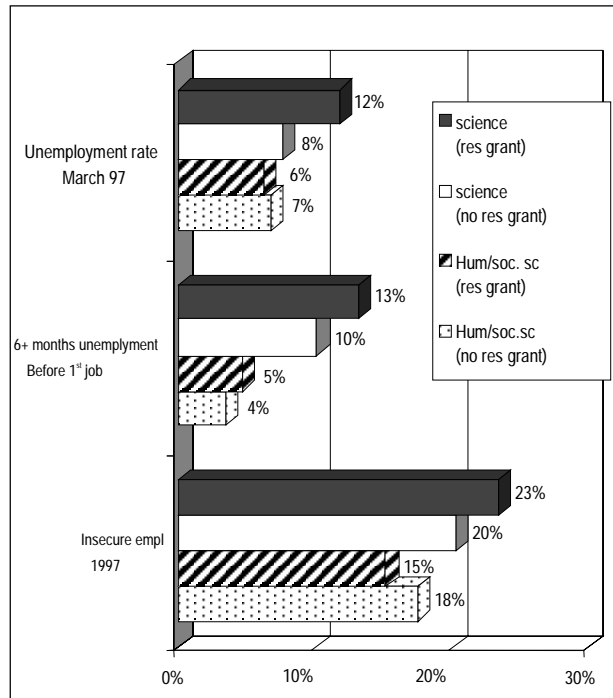
**Figure 9. Distribution of PhDs by field of study**

Source: Céreq.

One of the main differences between PhDs is the funding source of their theses. Having a research grant influences employment opportunities and encourages beneficiaries into research and higher education. Some 77% of one-time beneficiaries of a research grant worked in the public sector, compared with 58% of other PhDs, but the relative shortage of jobs in recent years appears to have blunted their employment opportunities. The unemployment rate and the amount of time spent looking for employment are both above average for recipients of thesis funding in sciences, and their salaries are lower than those of other PhDs irrespective of subject.

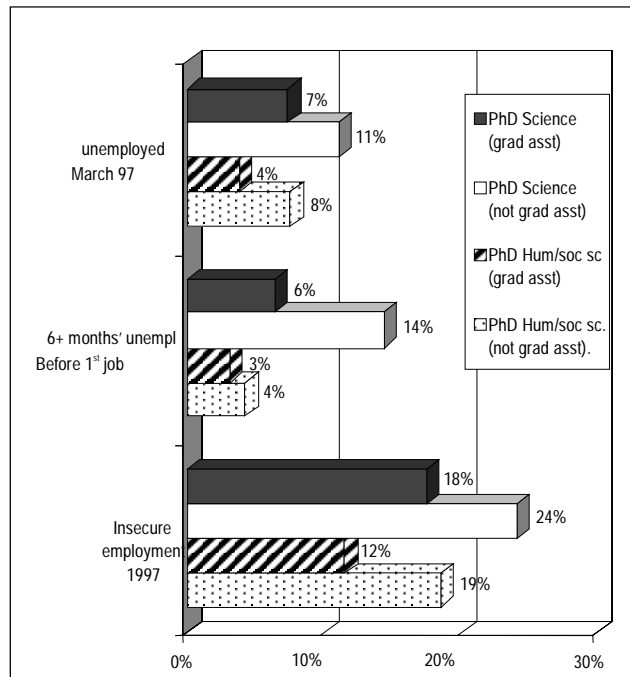
Former recipients of research grants become teachers in higher education more frequently than other PhDs. On completing the PhD theses in natural and exact sciences, half of the recipients of research grants go into teaching. The figure for those in humanities and social sciences is three-quarters. Having received a research grant does not help in finding employment as researchers. Of all recipients of research grants, graduate assistants enjoyed a more favourable situation in that much of them found employment in higher education and research. Few graduate assistants who completed their theses in natural sciences or in humanities and social sciences experienced unemployment or were in temporary jobs. They also spend very little time in the job search compared to those not having worked as graduate assistants, yet their salaries are slightly below average. This seems to suggest an ample supply of public sector jobs for graduate assistants. These jobs are a little less well paid in the early years. In summary, working as a Graduate Assistant leads to employment in higher education: 54% of Graduate Assistants teach after a thesis in natural sciences, and 81% do so after one in humanities and social sciences. It should be noted that Graduate Assistants are selected with this employment outcome in mind, and the teaching experience acquired during the thesis is likely to encourage their recruitment into higher education.

**Figure 10. Labour market performance of PhDs by funding source**



Source: Céreq.

**Figure 11. Labour market performance of graduate assistants**

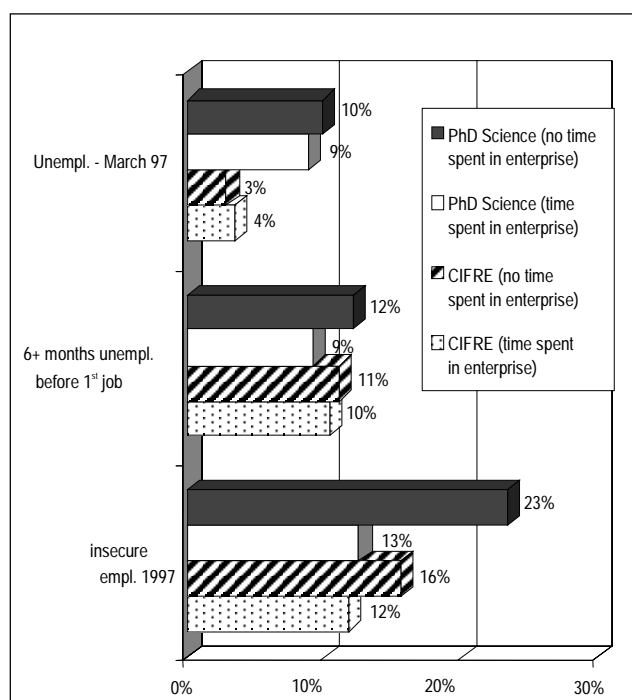


Source: Céreq

PhDs who completed at least part of their thesis in an enterprise were more likely (61%) to work in the private sector; they also had less unstable jobs than other PhDs and slightly higher salaries. PhD who did most of their theses in a firm found employment the easiest. Nearly all of them found a job within three years on the labour market: three quarters worked in the private sector, and earned relatively high salaries (about FRF 13 000). PhDs who did most of their theses in a state institution had more difficulty in finding a job, 61% of them went to work in the public sector, and their salaries were average (FRF 12 000). PhDs who did their thesis in a university were more effective at finding jobs in teaching and research than those from a state institution: they spent less time searching but their salaries (FRF 11 600) were slightly lower.

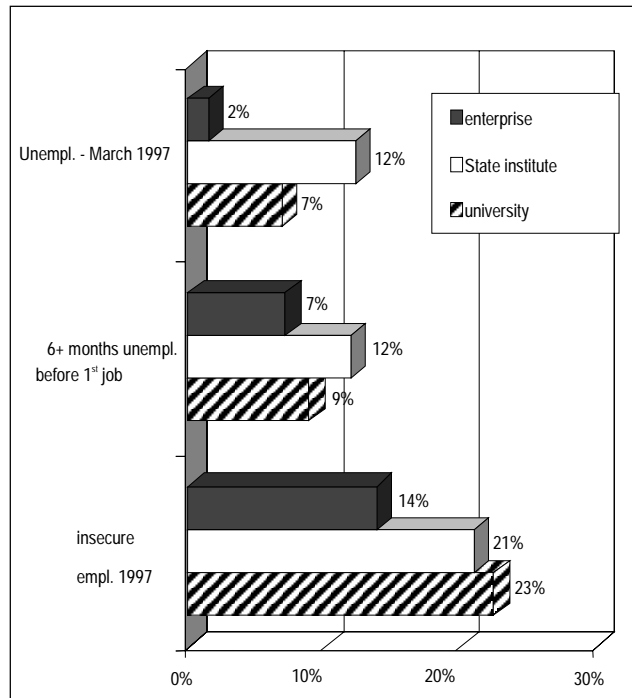
There is a correlation between the employment destination of PhDs and the institution in which they completed their thesis. Those who completed it in an enterprise became engineers in the private sector (63%), while those who carried it out in a university went on to teach in higher education (49%) or worked in the public research sector (17%). The employment destinations of PhDs from a state institution are less influenced by where they completed their thesis: one third worked in the public research sector while another third worked as engineers in firms, and 17% taught in higher education. The sample contained few PhDs who completed their theses in an engineering school. Their outcome appears to be similar to those of PhDs who came from state institutions, albeit with a higher share of teachers.

**Figure 12. Employment status and prior work experience in firms**



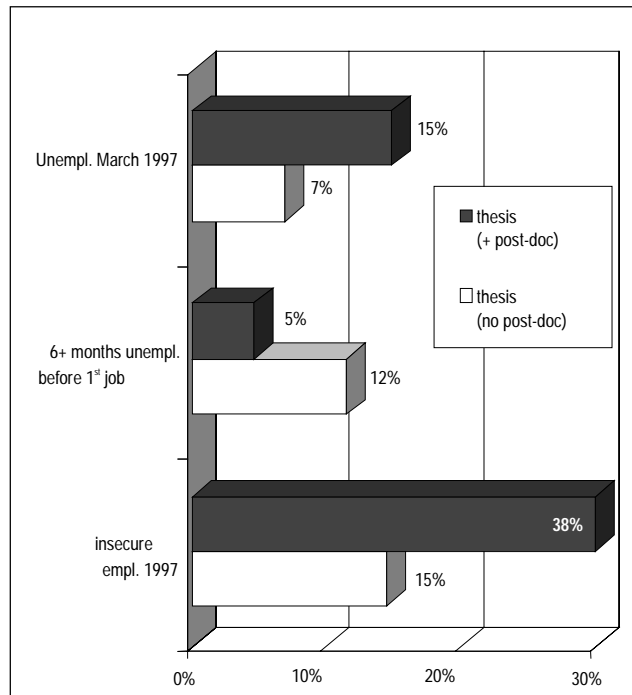
Source: Céreq.

**Figure 13. Labour market status by institution of theses completion**



Source: Céreq.

**Figure 14. Employment status of post-doctorates**



Source: Céreq.

***Post-doctoral fellows do not seem to be better prepared***

Post-doctoral fellowships are mostly taken up by non-CIFRE PhDs in natural sciences: in fact, almost one PhD in three in this discipline accepts these fellowships. Post-doctoral fellowships are less common among CIFRE PhDs (13%) and those with doctorates in humanities and social sciences (6%). Post-doctoral fellowships are usually taken up abroad (78%), in Europe (39%) or the United States (23%).

The career path observed in the survey (three years) made it impossible to assess the effects of post-doctoral fellowships on employment. Indeed, some PhDs were still working as post-doctoral fellows in March 1997, or had only just finished. Post-doctoral fellowships do not appear to improve job prospects; they avoid a long search for work, but PhDs who had taken this option faced more unemployment three years after their theses as well as unstable and less well paid jobs. These fellowships have given little boost to employment in public-sector research: 71% of PhDs who had completed such post-doctoral work left for employment in the public sector, compared with 65% of other PhDs.

This is not due to the fact that PhDs who find work the easiest are also more likely to undertake post-doctoral fellowships. In fact, post-doctoral fellows generally find it harder to find employment irrespective of their subject. Although post-doctoral fellowships do not help with finding a job in the short term, they do lead to research jobs. PhDs who have not taken such fellowships are more likely to become teachers in higher education.

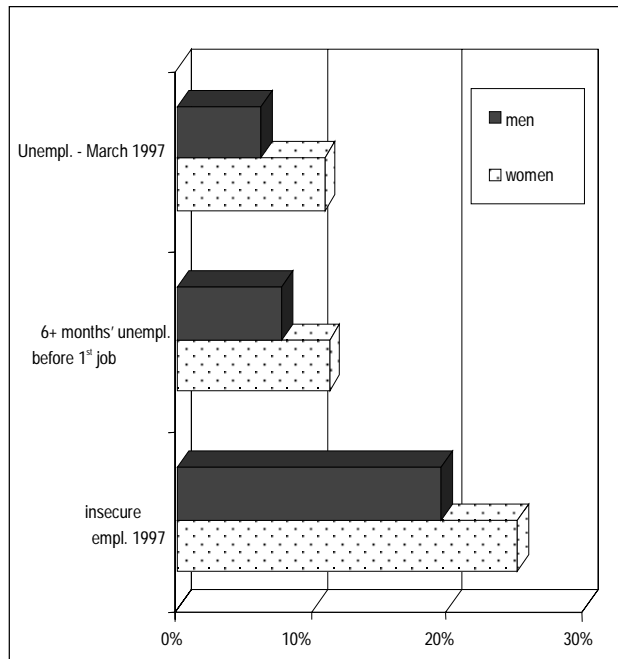
***Individual characteristics of PhDs also influence the jobs they take***

*Persistent disparities between men and women*

The share of women falls on completion of university studies and as the level of degrees rises. Women often perform better academically, but they pursue their studies for a shorter period. There are fewer women, for example, in natural sciences, traditionally the longest courses (sciences include a minority of second-cycle leavers, but as many as two thirds of all graduates with a thesis). Women represent 37% of all university PhDs but they account for a smaller percentage of PhDs in natural sciences or CIFRE PhDs than humanities and social sciences. Even at the very highest levels of higher education, there are employment and salary disparities between men and women. They are very small among those leaving state-recognised engineering and business schools, but greater at the end of courses at non-recognised universities and business schools. Among PhDs in natural sciences, CIFRE PhDs, and humanities and social sciences, women performed less favourably than men did. Women completing a thesis in natural sciences took longer to find employment than men did and, although their salaries were on a par, unemployment was higher among women (12%) after three years on the labour market.

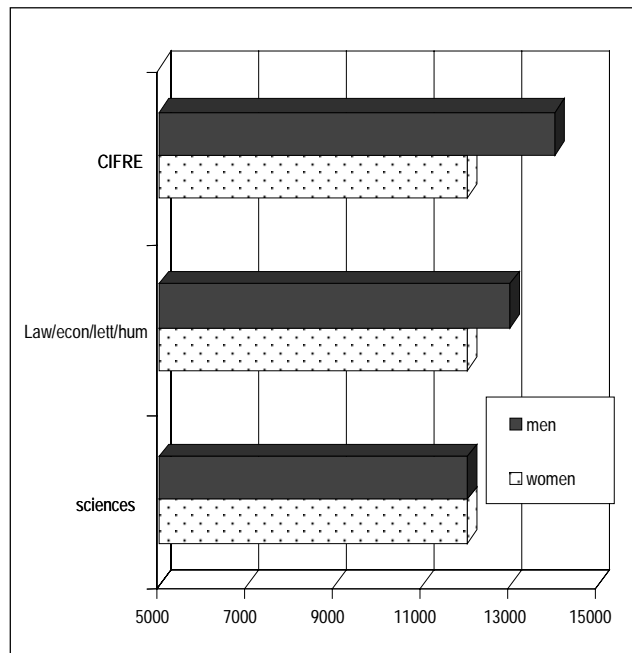
Women PhDs in humanities and social science also had higher unemployment rates than men and were less well paid (FRF 12 000 as compared with FRF 13 000 for men). While there are not many job seekers among CIFRE PhDs, women were slightly more unemployed and earned substantially lower salaries than men (FRF 12 000 as compared with FRF 14 000 for men). These disparities do not exist because women are more likely to seek employment in the public sector; indeed, the proportion of women PhDs working in the public sector (68%) is not much higher than that of men (64%).

**Figure 15. Labour market status of the 1994 cohort of PhDs by gender**



Source: Céreq.

**Figure 16. Median salary of the 1997 PhD cohort by gender**



Source: Céreq.

*PhDs come from favourable socio-economic backgrounds*

The level of higher education attainment is typically linked to socio-economic background: the higher the level of degree, the higher the parents' social category. Survey results show that the fathers of 57% of business school graduates were managers; followed by engineering school graduates and PhDs (53%). The social background of PhDs is not related to the subject of study. The father's academic level is also highest among business school graduates; followed by engineering school graduates and PhDs. The father's academic level is very similar among PhDs, irrespective of the field of study. PhDs whose fathers are managers, or had attained higher education, find employment most easily. Although social background has little impact on salaries, it does affect disparities with regard to unemployment and job insecurity.

*PhDs holding a baccalaureate in mathematics ("bac C") find employment more easily*

Among PhDs, the clear majority held either a mathematics baccalaureate C (57% of the total) or a baccalaureate in science (bac D) (26%). Only PhDs in humanities and social sciences held a baccalaureate A or B and 50% of these graduates held such baccalaureates. The following analysis thus focuses on the different experiences of the baccalaureate C and D holders in finding employment. This group accounts for the majority of PhDs, all fields of study combined. PhD graduates with a baccalaureate C found work most easily. They also spent less time looking for work, faced lower unemployment, and their jobs were more stable. By contrast, 39% of students with a baccalaureate D were still in unstable employment three years after completing their theses. PhDs with a 'bac C' had slightly higher salaries (FRF 12 500) than those with a 'bac D' (FRF 12 000). There was only a small sample of PhD graduates who held a baccalaureate A or B. Still, they seem to find jobs more easily than those with D baccalaureates. The labour market success of PhD graduates with B baccalaureates is boosted by the general success of PhDs in economics while PhD graduates holding baccalaureate D tend to fare less well due to the same difficulties facing PhDs in life sciences.

*Regional analysis: labour market performance of PhDs tends to be better in the Île-de-France region*

Outcomes are calculated based on the place where the thesis was completed. As a large number of graduates found employment in the regions where they were trained, these figures are influenced by the situation of the regional labour market. Outcomes are nearly always better in *Île-de-France* insofar as the region accounts for almost half of France's managerial positions and a large amount of the research; salaries are also higher there than elsewhere. Previous studies have shown that job seekers in *Île-de-France*, whether they hold the DUT or BTS or are university graduates, enjoy a clear advantage in finding employment (Martinelli, 1994). PhDs surveyed in 1997 were no exception to this rule. PhDs in sciences who were trained in *Île-de-France* experienced substantially less unemployment than their colleagues in the provinces (their unemployment rate was half as high after three years on the labour market), their jobs are a little less unstable, and their salaries are slightly higher. In contrast, PhDs in humanities and social sciences from *Île-de-France* had only a slight advantage in terms of unemployment and job insecurity compared to their peers in the provinces. Their salaries, however, were clearly higher (FRF 13 500 compared with FRF 12 000 for PhDs trained in the provinces). Regional differentials are smallest among CIFRE PhDs. Generally speaking, CIFRE PhDs face few problems, although there are small disparities in time spent on the job search and in salary, with those trained in *Île-de-France* enjoying a slight advantage.

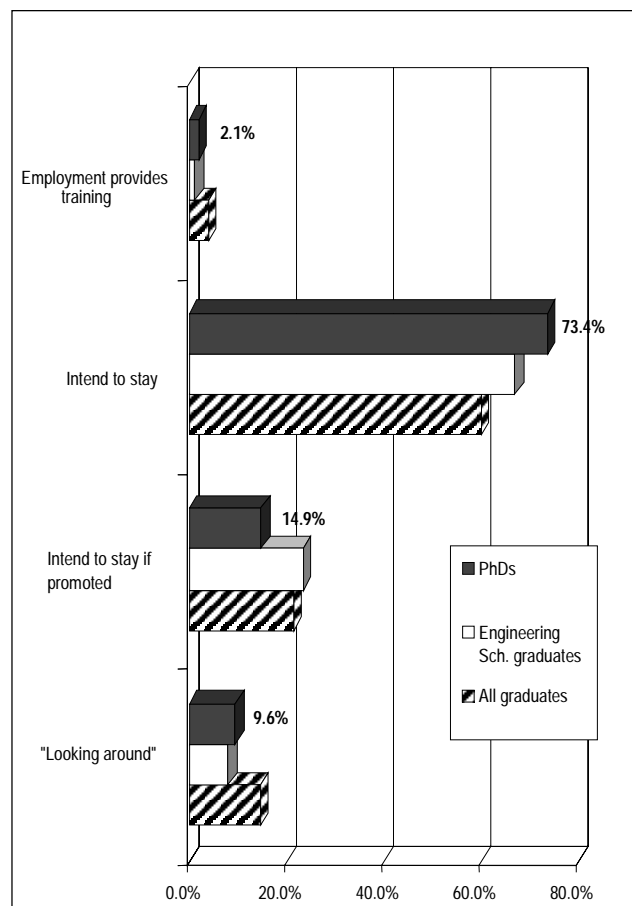
*Job satisfaction is higher among PhDs than other higher education graduates*

Of all higher education graduates, PhDs were the most satisfied with their jobs in 1997. Three quarters found their jobs interesting and intended to continue working for their present employer. In contrast, only

67% of engineering school graduates and 53% of business school graduates shared this view. Of other higher university education graduates, about 60% found their job interesting. While less than 10% of PhDs stated they were in their current job awaiting a better opportunity; up to 15% of those leaving higher education chose this response.

Among all categories of PhDs identified in this study, CIFRE PhDs were slightly more satisfied with their jobs than other PhDs and 74% of them intended to stay in their current job. However, job satisfaction of PhDs differs when their jobs are unstable (i.e. temporary). Half of them stated they were 'looking around', or that they would only stay if they got promoted. This confirms the very negative perception that PhDs have of the insecure employment conditions they sometimes face. Job satisfaction also varies according to sector of employment. The most satisfied PhDs worked in the public sector. Most of those employed in the tertiary market sector (e.g. engineering) intended to stay (64%), but a quarter stated they would only do so if they were promoted. PhDs working in industry were most likely to seek a higher position: only half stated they intended to stay and a third were seeking a promotion. It is noteworthy that salary had little influence on the job satisfaction of PhDs.

**Figure 17. Job satisfaction of PhDs in 1997**



Source: Céreq.

### BIBLIOGRAPHY

MARTINELLI, D. (1994)

*Diplômés de l'université. Insertion au début des années 1990*, Document N° 100, 'Observatoire' Series, Céreq, October 1994.

MARTINELLI, D. (1997)

*Diplômés de l'enseignement supérieur. L'insertion professionnelle se stabilise mais les écarts s'accroissent*, Bref N° 134, Céreq, September 1997.

## ANNEX

**Labour market integration of foreign PhDs in the sample living in France in 1997**

As the last survey carried out in 1991 showed, the situation of foreign PhDs in France is very unfavourable. We were unable to interview those who had returned to their countries of origin as it proved very difficult to contact them. The size of the sample prevented us reaching definitive conclusions, but the disparities are so substantial that these outcomes are sufficiently reliable. They do not prejudice the overall situation of foreign PhDs, as those who returned to their countries of origin may have been better off.

The overwhelming majority of the foreign PhDs that we did manage to interview are not from the European Union. There is a high incidence of unemployment and unstable employment among them, and unemployment has a tendency to rise at the very time that it is falling among other graduates. Salary and employment levels are also below average for the most part. Those in the most unfavourable situation are foreigners who do not come from the European Union and who remain in France.

**Table 1. Job integration of foreign PhDs in the sample living in France (63 questionnaires)**

Labour market integration indicators	All foreign PhDs
1 <sup>st</sup> insecure employ	60%
Insecure empl. 1997	38%
6+ months unempl.(out of 33)	38%
6+ months' unempl. before 1 <sup>st</sup> job	17%
Unempl. rate March 1995	24%
Unempl. rate March 1997	35%
Managers in March 1997	77%
Managers + interm. profs in March 1997	95%
Salary in 1 <sup>st</sup> quartile	8500
Median salary*	10000
Salary in 3 <sup>rd</sup> quartile	13500

Source: Céreq.