

PhDs' early career trajectories strongly differentiated

For those who obtained their PhDs in 2010, research remains the main opening. If they embark on careers in public-sector research, their trajectories during the first five years of their working lives are synonymous with periods of temporary employment of varying lengths. These trajectories contrast sharply with those of PhDs who seek employment in the private sector at a very early stage in their careers.

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The question of the future careers of holders of PhDs lies at the heart of the recent reforms of doctoral programmes. The new ministerial order, published on 25 May 2016, puts the emphasis on the quality of those programmes with the aim of making better use of PhDs in all sectors of the economy – in the public or private sectors, in research or elsewhere – both nationally and internationally. It sets out a number of good practices relating to supervision, research quality and preparation for future careers that have been espoused for several years now by various national actors.

The available data on PhDs' career trajectories show that their education-to-work transition is often described as difficult and longer than for other higher education graduates. Most university student tracking systems seek to provide snapshots one, two and three years after graduation, in accordance with the higher education and research act of 22 July 2013. While these data are essential for managing programmes and providing information to students, they do not properly capture the diversity and plurality of PhDs' career trajectories over a sufficiently long period. Taking cognisance of this fact, Céreq and the Ministry of Education's sub-department of information systems and statistical studies (MENESR-SIES) decided to observe their career trajectories over the first five years of their working lives. This longitudinal approach shows that research jobs in the public sector research that last beyond the first three years tend to stabilise and that trajectories are diverse and influenced by the discipline of the PhD.

Gradual stabilisation in employment

Questioning holders of doctorates five years after they submitted their theses produced results that stand in sharp contrast to those generally produced by observations at three years. Thus their frequently highlighted disadvantage in the labour market compared with graduates of the grandes écoles had at this point in their careers largely dissipated. While their unemployment rate remained higher on average (7% for PhDs compared with 5% for graduates of the grandes écoles), they were more likely to be employed in managerial positions and their monthly salaries, at around 2,400 euros, were on a par. Moreover, five years into their working lives, the share of PhDs employed on permanent contracts was similar to that of graduates with five years' higher education (78 % compared with 80 %). However, these average characteristics, which work to the advantage of PhDs, conceal considerable disparities between disciplines. Those with doctorates in life and earth sciences had a high rate of unemployment (12%) and 38% of them were still on fixed-term contracts five years into their working lives. Conversely, graduates of the grandes écoles and PhDs in comparable disciplines were level pegging.

One major result of the survey of PhDs' career trajectories five years into their working lives is the gradual decline over the course of the period in the share of those on fixed-term contracts, and particularly among those in public-sector research jobs. According to the latest data from L'état de l'emploi scientifique en France/The state of scientific and academic employment in France, the ●●●

PhD
CAREER
TRAJECTORY
PUBLIC-SECTOR
RESEARCH
R&D
EMPLOYMENT

1 The survey

These data are drawn from two enquiries carried out as part of the Génération 2010 surveys in the spring of 2013 and 2015 into the early career trajectories of 8,000 PhDs who were among the 708,000 young people who left the French education system in 2010.

The field of these surveys comprises all individuals leaving the education system for the first time in 2010 who were under 35 years of age, of French or foreign nationality, were registered in an educational establishment during the academic year 2009-10 in metropolitan France or in the French overseas départements and were living in France at the time of the two enquiries. Young people who had interrupted their studies for a period of one year or more (except on health grounds) were excluded from the field, as were those who had returned to education the year after entering the labour market. Thus PhDs living abroad are not included in the Génération survey.

More than 1,900 PhDs within the field as defined by Céreq were questioned as part of the Génération 2010 surveys. More than 1,400 PhDs were questioned in the second enquiry conducted in the spring of 2015. This was the first time that a repeat enquiry had had a sampling extension available at this level. This extension was funded by the MENESR-SIES.

* *Temporary lecturers, PhD candidates who have obtained a non-renewable 3-year salaried position and other temporary personnel.*

Further reading

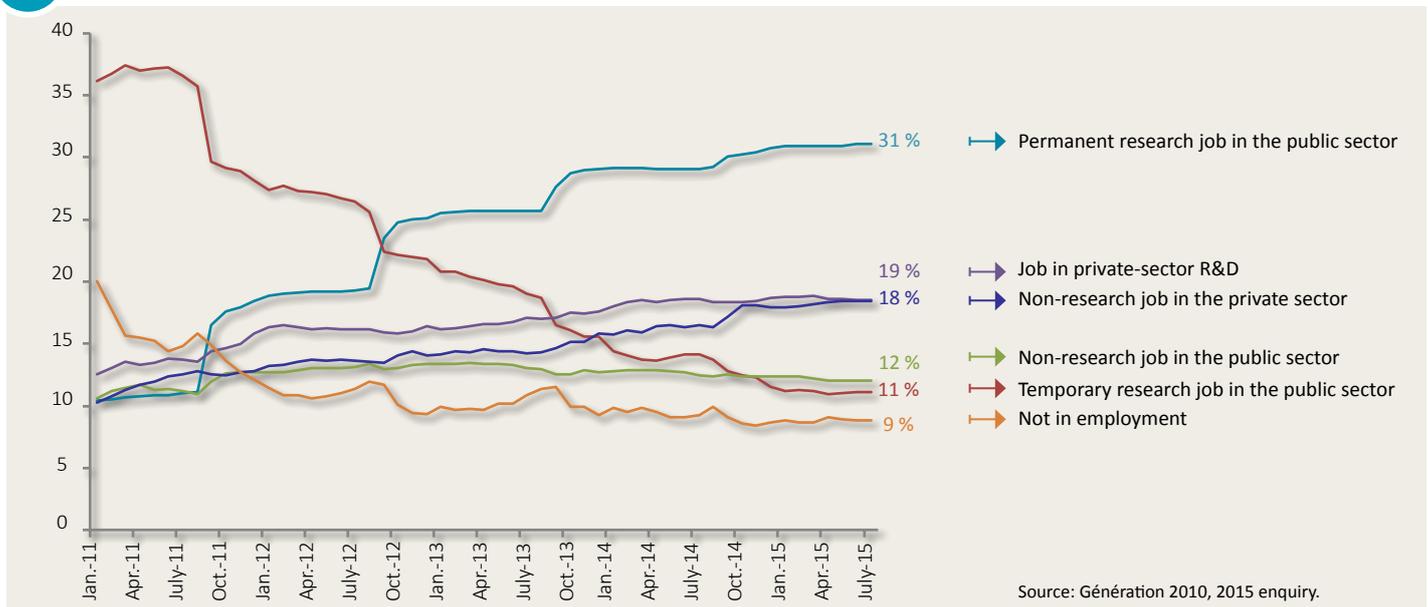
Les cinq premières années de vie active des docteurs diplômés en 2010, J. Calmand, Céreq Études n°9, avril 2017.

●●● number of people retiring from public scientific and technical research establishments (in French: établissements publics à caractère scientifique et technologique, or EPSTs) and the universities has continued to decline (1,920 directors of research, research fellows and research-active university teachers retired in 2014, compared with 2,100 in 2009). In certain types of job, there has been a reduction in the number of permanent positions that can be allocated through competitive examinations and hence an increase in competition between PhDs. Thus the Ministry of Education data show that the number of temporary university lecturers* increased in volume terms by 111% between 1992 and 2013 (compared with 39% for full professors and 74% for assistant professors). Since 2004, the number of permanent teaching/research positions to be filled through the normal recruitment process, whether at full or assistant professor level, has actually declined.

In publicly funded research, appointment to a permanent position is a process that takes place in stages. It varies in length depending on the discipline and is dependent on several factors, including the circumstances under which the PhD was completed (funding, time taken), the quality of the PhD itself (publications, examiners' report) and, for university positions, a successful application to the Conseil national des universités (CNU) to be placed on the list of those qualified for the position of assistant professor. While waiting for access to a permanent position, PhDs tend to take a series of temporary positions, which enables them to publish a number of articles based on their PhD and to acquire work experience. Over time and as job openings appear and are filled, the share of PhDs in public-sector research on fixed-term contracts tends to decline in favour of permanent positions. Thus between January 2011 and July 2015, the share in temporary jobs fell from 36% to 11% (cf. graphic in Box 2). The share of those in permanent jobs increased from 10% to 31% over the same period. September 2012, i.e. approximately two years after this cohort obtained their PhDs, marks the turning point at which the share of them in permanent positions in public-sector research was greater than the share in non-permanent positions. However, the transitions from temporary to permanent positions in this job category tend to be spread out over time and are frequently indirect: only 15% of those who obtained their PhDs in 2010 moved directly from one status to the other during the first five years of their working lives.

There are now more openings than ever in the private sector for PhDs, whether in research or elsewhere. In 2010, when they submitted their theses, 31% of them said they wanted to work in the private sector, compared with 24% of those who completed their

2 Evolution of the PhDs' labour market situations between 2011 and 2015



PhDs in 2007. Between 2010 and 2015, the share of PhDs working in research in the private sector rose from 13% to 19%. Although most of the PhDs working in the private sector sought employment there at a very early stage in their careers, the private sector might represent a fall-back position for those who have experienced difficulties in the labour market, having failed to find a job at all or only temporary posts in public-sector research. On the other hand, analysis of career trajectories shows that the PhDs in stable employment in the public sector did not move into the private sector during the first five years of their working lives.

Eight career trajectories

The longitudinal dimension of the Génération surveys enables us to study the PhDs' career trajectories over the first five years of their working lives. On the basis of the data analyses, eight typical trajectories can be identified.

Three of them are linked to public-sector research positions; they account for 42% of the PhDs who obtained their degrees in 2010. The first (20%) is made up of PhDs who quickly obtained stable employment in public-sector or academic research. In almost 75% of cases, entry to this sector took place before December 2011. Those who had had a doctoral contract and those who had published while completing their PhDs had more chance of finding themselves in this category. The second category (11%) is made up of trajectories characterised by deferred access to public-sector research. The PhDs in this category managed to obtain stable employment from the autumn of 2012 onwards, having spent on average 23 months in temporary jobs in public-sector research. The third category (11%) is made up of PhDs who had mainly experienced unstable employment in public-sector research. They had spent 46 of the 55 months in the observation period in temporary jobs and 30% of them had never had any other type of job. The women were less likely to find themselves on this trajectory. At a time when some of them might have been having children, their trajectories tended to include breaks in the sequence of fixed-term jobs in public-sector research.

Two categories are characterised by early-career non-research jobs in the public sector. The PhDs in category 4 (8%) obtained stable jobs of this type at an early stage in their careers. These individuals had spent 45 months on average in such jobs and 45% of them had been in the same job since obtaining their doctorates. Those who had not been in receipt of any funding were more likely than the others to find themselves in this category. Those in category 5 (6%) were on trajectories characterised by unstable employment in non-research jobs in the public sector.

3 Salaries and job satisfaction in 2015 by career trajectory

The PhDs' view of their situation and trajectory (% salary in euros)	Difficult career trajectory	Anxiety about future career	Employed below their level of competence	Median net monthly salary
1. Rapid access to stable research job in the public sector (20%)	30	11	10	2 500
2. Delayed access to stable research job in the public sector (11%)	57	18	7	2 380
3. Unstable research job in the public sector (11%)	61	50	18	2 150
4. Rapid access to stable non-research job in the public sector (8%)	33	21	42	2 490
5. Unstable non-research job in the public sector (6%)	50	30	46	2 130
6. Rapid access to stable jobs in the private-sector R&D (17%)	28	16	31	2 620
7. Rapid access to stable non-research jobs in the private sector (14%)	41	16	34	2 370
8. Out of work and unstable employment history (13%)	72	44	42	1 970

Source: Génération 2010, 2015 enquiry

The final category (13%) comprises career trajectories characterised by disengagement and instability in employment. These PhDs had, on average, been unemployed, inactive or in training/back in education for 23 months and in temporary employment for 28 months, regardless of the sector under consideration.

Those PhDs who had quickly obtained stable research jobs in the private sector were better paid five years into their working lives and were not worried about their futures (cf. table in Box 3). They were fairly happy with their situations and only 28% of them believed their career trajectories to date had been difficult. The salaries earned by those who had been quick to obtain stable, non-research jobs in the public sector put them among the most highly paid of their generation. Nevertheless, 42% of them thought they were employed below their level of competence. In public-sector research, the time taken to obtain stable employment determined the level of both pay and satisfaction. Those who had taken the longest time to obtain research jobs in the public sector were a little less satisfied. Those with the most unstable trajectories were the most anxious about their futures.

MENESR • Ministry of National Education, Higher Education and Research.

SIES • Ministry of Education's sub-department of information systems and statistical studies

The effect of PhD discipline on career trajectories

A PhD's chosen discipline had a strong impact on career trajectories and labour market situation in 2015. Those who had specialised in maths/ ●●●

	%	Maths, physics, chemistry	Engineering and computing sciences	Life and earth sciences	Law, economics, management, social sciences	Arts and humanities	Total
1. Rapid access to stable research job in the public sector	18	26	7	30	26	20	
2. Delayed access to stable research job in the public sector	12	9	9	14	14	11	
3. Unstable research job in the public sector	10	6	24	7	5	11	
4. Rapid access to stable non-research job in the public sector	6	2	7	11	18	8	
5. Unstable non-research job in the public sector	2	1	9	8	10	6	
6. Rapid access to stable jobs in the private sector R&D	27	30	15	3	2	17	
7. Rapid access to stable non-research jobs in the private sector	13	19	9	17	11	14	
8. Out of work and unstable employment history	12	7	19	9	15	13	
Unemployment rate in 2015	4	4	12	6	9		

Source: Génération 2010, 2015 enquiry

●●● physics/chemistry, engineering and computer sciences, law, economics, management and social sciences had lower rates of unemployment than the PhD population as a whole (cf. table in Box 4). The former group was divided equally between trajectories characterised by research jobs in the public (40%, trajectories 1 to 3) and private sectors. Holders of PhDs in engineering and computer sciences were the ones most likely to be employed in the private sector, particularly in R&D jobs. Those holding PhDs in law, economics, management and social sciences were the ones most likely to be on trajectories characterised by rapid access to stable research jobs in the public sector (30%). Holders of PhDs in the arts and humanities tended to find themselves in intermediate situations in the labour market. Their unemployment rate, at 9%, was slightly higher than that for PhDs as a whole but only 15% were in temporary employment. They were overrepresented in those trajectories in which non-research public-sector jobs predominate (18%).

The situation of PhDs in life and earth sciences proved to be problematic in several respects. They were more likely to be unemployed and accounted for the highest shares of those on trajectories characterised by unstable research jobs in the public sector or disengagement from the labour market.

The data provided by the SIES offer some explanations for this phenomenon. On the labour market side, the queue for permanent jobs is longer in life and earth sciences than in other disciplines. In 2013, the ratio of assistant professors recruited to qualified PhDs was much higher than average (1 to 25 in life and earth sciences, 1 to 6 across all disciplines). On the education system side, a higher share of those with a master's in life and earth sciences go on to study for a PhD. Finally, for the other science disci-

plines, the private sector offers real career opportunities and good employment conditions; however, only 25% of the holders of PhDs in life and earth sciences had gone down this route.

Longitudinal analysis of the first five years of the working lives of PhDs who were awarded their degrees in 2010 shows that a high share of them embarked on trajectories oriented towards jobs in public-sector research. Over the last 20 years, however, the queue for permanent jobs has tended to get longer, particularly in certain disciplines such as life and earth sciences. Even after five years in the labour market, not all had obtained stable employment and some had chosen to change direction. For this latter group, it was by no means certain that they would be able to turn the experience acquired in other segments of the labour market to their advantage, which is in itself problematic given that such changes of direction are often advocated by policymakers at European level. In contrast, 39% of the PhDs who finished their degrees in 2010 embarked on careers outside public-sector research immediately on entering the labour market. Launching without delay on to these trajectories is associated with better employment conditions and higher pay. Nevertheless, PhDs employed outside public-sector research are more likely to feel they are working below their real competence level, which raises questions about their position in the organisations employing them, and more specifically in the companies in which they work.

