French PhDs Employed in the Private Sector: The signal effect of chaotic pathways

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Abstract. This paper deals with the question of French PhDs' career trajectories and especially those that lead to private sector employment. Using quantitative longitudinal survey "Génération" from Céreq, which allows observing professional pathways over the first five years of working life, it shows that for PhDs graduated in 2010, public-sector research remains the main opening. There are few career paths leading to private sector, and PhDs employed in firm found their job at a very early stage in their working life. Data analysis and econometrics methods find that thesis conditions, professional expectations, and early pathways are a key determinant to employment in firms.

Keywords: higher education, PhDs, transition from school to labor market

Introduction

Dissemination of highly qualified workers in the whole society is one of the top priorities of the European and French policy (Commission Européenne, 2005). Justified by the revival of growth theories (Nelson & Phelps, 1966), young researchers are encouraged to experience professional mobility in the private sector. In France, development of this policy has resulted in higher professionalization in doctoral training: through higher supervision of doctoral students who are encouraged to consider their professional fate outside academic sector.

In France, only one third of a cohort of PhD holders works in the private sector (Calmand, 2013). These figures appear lower than other OECD countries (Harfi & Auriol, 2010). Several reasons explain these relatively low results. On the one hand, due to a high segmentation of the scientific labor market, criteria that are valued in firms are not the same in the academic sector. In fact, PhD holders who have developed, during their thesis, experiences oriented toward the academic sector face difficulties in receiving value for their pathway outside the academic sector. On the other hand, from a recruiter's perspectives, there is a preference for business and engineering school graduates (Mason, Beltramo & Paul, 2004).

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This article addresses the question of PhDs' long-term transition from thesis to labor market and more especially access to the private sector. Main results of this articles have been published in non-academic publication from Céreq (Calmand, 2017b; Calmand, Prieur & Wolber, 2017).

The purpose of the research is to describe PhDs' professional pathways. One of the main goals is to show that jobs in public research remains the main opening for PhDs. According to research on this subject, the results will demonstrate that for those individuals professional pathways are characterized by unstable positions. Considering that, is access to the private sector a fallback position for those who never achieve employment in a permanent position? What are the determinants of access in firms? What is the effect of an early labor market trajectory on this access? Econometric methods such as survival analysis will help answer these questions.

Then, typical professional trajectories will be constructed in order to better understand the transition from thesis to labor market. Using the optimal matching method, some questions are addressed. Are professional trajectories really differentiated? What are their main characteristics? Which PhDs belong to different trajectories?

Finally, in a descriptive way, it will be demonstrated that belonging to different professional trajectories has an effect, five years after graduation, on work characteristics.

PhDs' transition from thesis to labor market: some evidence from the French case

Administrative data from the French Ministry of Education (Boinet, Maetz & Wolber, 2017) show that more than 12,000 PhD diplomas are awarded in France each year. As a percentage of one age group, most OECD countries produce more PhDs than France (Harfi & Auriol, 2010). Administrative data show also that the number of PhDs awarded has increased from 9200 in 2004 to more than 12900 in 2014. However, it is mainly the share of foreign graduates that has increased the most, from 27% to 44% (2500 to 5500).

On the training side, since 2006, the doctorate, the highest and most prestigious diploma in French higher education, has undergone major transformations. The various decrees relating to doctoral training were aimed at improving the supervision of the thesis recourse to compulsory thesis funding; reduction of the thesis duration; implementation of training modules within the doctoral program; and awareness of doctors to the question of their professional development etc., in order to secure their professional pathways which are often difficult.

Indeed, in the early 2000's, three years after their graduation, the unemployment rate for PhDs, although low (6.5% for 1998 graduates), was higher than that of graduates from Grandes Ecoles and especially than that of graduates from Master 2 degrees. Progressively, this trend has been reversed, the three-years unemployment rate of PhDs has increased, but it stabilized at around 9% in 2013, while, under the effects of the economic crisis (Barret, Ryk & Volle, 2014) the rate of unemployment of University dropouts reached 11%. If we see a reversal, it does not concern all PhDs; there are

strong disciplinary disparities (Calmand, 2017a) and the advantage on the labor market of Grandes Ecoles graduates persists. Moreover, the career beginnings of PhDs are characterized by the high presence of fixed-term jobs in professional trajectories.

Research on PhDs' transition in the labor market shows that this process is different and much longer than that of other higher education graduates (Calmand, 2011). Doctorates are much older when they enter the labor market and most of them have already worked during their training (Giret, 2011). At the end, frontiers between initial training and labor market entrance are relatively blurred (Giret, 2011). Their transitions are also linked to job opportunities in the academic sector and more generally in the public-research sector. At the time of finishing their thesis, 70% of PhDs claim that they want to work in this sector (Calmand, 2014).

In this sector, 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 Ministry of Education data show that the number of temporary university lecturers increased in volume by 111% between 1992 and 2013 (compared with 39% for full professors and 74% for assistant professors) (MENESR-DEPP, 2012). 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. Since twenty years ago, access to permanent positions in the research public sector becomes longer.

This process is now well documented and in fact, 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 universities (CNU) to be placed on the list of those qualified for the position of assistant professor (Bonnal & Giret, 2009). 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.

Facing these difficulties, the private sector might represent a fallback position for PhDs who are not interested in an academic career or who have experienced difficulties in the labor market or having failed to find a job at all or having only found a temporary position in public-sector research. However, in France, private sector is not a traditional opening for PhDs. Ministry data show that in "*2013, 55% of researchers had graduated from an engineering school. Although there was a greater proportion of PhD holders in public research organizations, higher education or non-profit institutions, doctoral graduates only represented 12% of researchers in the private sector"* (Perrain & Boinet, 2017).

Few reasons can explain the low integration of PhDs in private firms. First of all, there is an educational dual system (University and Grandes Ecoles), and a high competition between PhD

graduates and graduates from Grandes Ecoles in access to jobs linked with Research and Development (R&D). Many researches show that, in firms, there is a preference for graduates from Grandes Ecole. Training in Grandes Ecoles appears more linked to private sector preoccupations and many graduates know firms' environment or had ever worked in firms during their studies. Recent publication from Cereq attests also that recruiters have a poor understanding of doctoral training (d'Agostino et al., 2009). On the PhD side, integration in academic sector is the main opening. It is usually explained by their high preference for research or science prestige (Menger, 1989; Merton, 1973; Stern, 2004). Since recently, doing a doctorate was synonymous of integration in academic sector (Gérard, 2014; Musselin, 2008) but reduction in job opportunities in research public sector has change the story.

Career pathways of PhDs who left the French education system in 2010

This section describes the transition from thesis to employment in a longitudinal way. This demonstration helps one to understand the overall process that takes place and how employment in the private sector evolves during the time. Then, the main factors of access to private sector and how early professional pathways play are demonstrated.

Data

These data were drawn from two enquiries conducted 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 France; 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 labor 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 French Ministry of Education

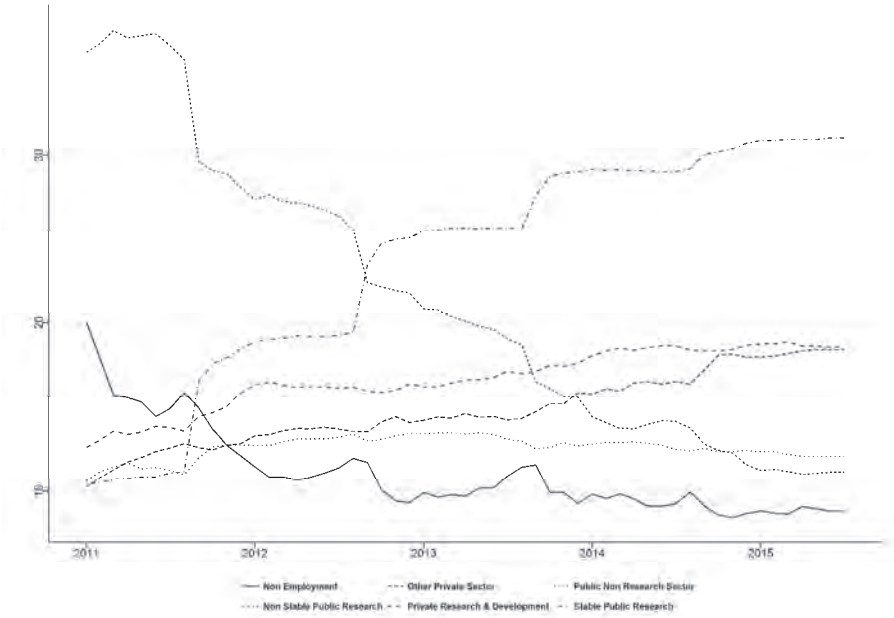
The longitudinal dimension of the Génération survey enables one to study, month by month, the PhDs career trajectories during the first five years of their working life. For each, information on labor market situations (employed vs unemployed) and work conditions (type of organization, work

contract, occupations) are available. As the figure 1 shows, one can describe graphically over the considered period how PhDs' professional pathways look like.

Descriptive analysis

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 favor of permanent positions. Thus between January 2011 and July 2015, the share in temporary jobs fell from 36% to 11%. 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.

Between 2010 and 2015, the share of PhDs working in the private sector rose from 20% to 37%. The share of PhDs who worked in the private sector rose regularly during the observed period, but there were small peaks at the end of year 2012 in the R&D sector and at the end of 2015 in private sector outside research. Here one can assume that, at this time, some PhDs experience professional mobility from inactivity/unemployment/unstable occupations in the academic sector to employment in the private sector.



Source : Génération 2010 survey, Céreq

Figure 1. Evolution of the PhDs' labor market situation between 2011 and 2015

Econometric analysis

The aim of this section is to determine which factors allow PhDs to access firms. In order to do that, econometric methods such as survival analysis (Cox proportional hazards regression) which estimate the expected duration of time access to private employment were used. To exclude job situations which were characterized by very low employment conditions or short-terms contracts, the analysis focused on access to stable positions in private sector. Three regressions are estimated: duration time access to permanent position in private sector; permanent position in R&D; to permanent position in private sector outside research.

To control estimations by sociodemographic characteristics variables such as gender and nationality were introduced. Scholarship pathways are controlled by grade obtained at A-level ("baccalaureat" in French) and prior grades obtained before entrance in doctorate (diplomas from engineering schools vs other). Thesis conditions were controlled through main thesis workplace (at home, at university, in a firm or in a public organization); fields of study and main funding (French national doctoral funding, private contract, CIFRE[1], public funding, other funding and non funding). Finally, professional pathways represented by job expectations at time of thesis graduation and number of post doctorate, inactivity, and unemployment experiences.

Considering job market segmentation and also French particularities of the public sector employment individuals who access over the time to permanent positions in the public sector are excluded. They are considered as not having interest to experience professional mobility in the private sector.

[1] CIFRE (Convention Industrielle de Formation par la REcherche), which correspond to a thesis done half time in university and half time in a firm, increase the probability of access to stable positions in private sector.

Table 1. Estimations of survival analysis of expected duration time access to stable positions in private sector

	Stable employment in firms	Stable employment in R&D	Stable employment in private sector outside research
Gender (Ref: Women)	1.084	1.079	0.923
	(0.83)	(0.57)	(-0.60)
A level : very good (Ref: Other)	1.094	0.964	1.099
	(0.90)	(-0.28)	(0.66)
Foreigner (Ref : Natives)	1.074	0.974	1.323
	(0.59)	(-0.17)	(1.56)
Parents empl. : professionals (Ref : Other)	1.072	1.373**	0.832
	(0.56)	(2.08)	(-0.95)
M2 : Eng. School (Ref : Other)	1.192	1.179	1.056
	(1.55)	(1.14)	(0.33)
Thesis Workplace (Ref : At Home)	ref.	ref.	ref.
Univ.	0.857	1.947	0.597*
	(-0.69)	(1.62)	(-1.94)
Public Org.	0.885	1.989	0.435***
	(-0.48)	(1.58)	(-2.64)
Firm	0.973	2.086*	0.399***
	(-0.11)	(1.70)	(-2.83)
Field of Study : (Ref : Law, Eco., SS.)	ref.	ref.	ref.
Math/Chemistry/Physics	1.142	2.341***	0.822
	(0.79)	(3.43)	(-0.88)
Engineering Sciences	1.142	2.377***	0.794
	(0.78)	(3.51)	(-1.01)
Biology	0.682**	1.328	0.678*
	(-2.18)	(1.09)	(-1.71)
Humanities and Art	0.929	0.775	0.928
	(-0.37)	(-0.72)	(-0.32)
Thesis Funding (Ref : None)	ref.	ref.	ref.
Doctoral Funding	1.208	1.339	0.967
	(1.13)	(1.13)	(-0.15)
Private Contract	1.051	0.982	1.074
	(0.26)	(-0.06)	(0.29)
Public Funding	0.834	1.249	0.638*
	(-0.95)	(0.79)	(-1.73)
CIFRE	1.494***	1.562	0.897
	(2.04)	(1.56)	(-0.40)
Other Funding	1.200	1.148	1.278
	(0.87)	(0.43)	(0.93)
Publications (Ref : None)	0.981	0.815	1.309*
	(-0.18)	(-1.46)	(1.82)
Prof. Asp. : Pub. Res. (Ref : Other)	0.472***	0.695***	0.531***
	(-7.64)	(-2.78)	(-4.57)
Number of postdoctoral experiences (Ref : 2 or more)	ref.	ref.	ref.
None	1.400	0.891	1.842
	(1.20)	(-0.32)	(1.47)
One	0.839	0.525*	0.941
	(-0.61)	(-1.75)	(-0.14)
Number of unemployment experiences (Ref: 2 or more)	ref.	ref.	ref.
None	5.327***	8.137***	3.252***
	(8.01)	(6.91)	(4.77)
One	1.752***	2.127**	1.205
	(2.59)	(2.41)	(0.70)
Number of inactivity experiences (Ref : none)	0.558***	0.486***	0.603**
	(-3.57)	(-3.48)	(-2.28)
Observations	891	877	875
Events	556	315	281

Hazard Risk Ratio; *t* statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01
Source : Génération 2010 survey, Céreq

Results

In our cohort, more than 550 PhDs who obtained their thesis in 2010 have found a stable position in the private sector between 2010 and 2015. There are 315 individuals who have been employed in a permanent contract in R&D and 281 in a permanent contract in private non-research sector.

Sociodemographic characteristics or prior education before doctorate has no effect on the estimate probability. Only, individuals whose both parents occupied a professional position have a greater chance to be employed in a stable position in R&D. Theory on gender segregation in scientific employment often concludes that women are less employed in R&D firms; here estimations do not confirm this.

Effects of early professional trajectories are central in estimations. The number of unemployment or inactivity experiences affect negatively the duration time to access to stable positions in the private sector. The less these situations appear, the more PhDs have a chance to be employed rapidly in a stable position in the private sector. In this case, early chaotic pathways have a strong negative effect on access to the private sector. The role of post doctorate experience doesn't play significantly. In fact, one can speculate that these experiences encountered in public research can be valued in firms. More precisely, PhDs who have done one post doctorate experience have significantly less chance to be employed rapidly in a stable position in R&D than those who have done 2 (or more) post doctorate experience.

Thesis conditions play a significant role in estimations. Graduates from engineering, math/chemistry/physics have better chances of access to stable positions in R&D than the other. On the contrary, biologists have less chances of access to stable positions in firms outside research. Funding such as CIFRE, which correspond to a thesis done half time in university and half time in a firm, increase the probability of access to stable positions in the private sector. Finally, PhDs who have done their thesis mainly at home have greater chance to be employed in the private sector outside research which confirms that individuals who have been less socialized to a specific type of job (mainly academic or R&D jobs) during their thesis look more to work in this sector because they can't be employed in research.

Finally, professional expectations at the time of graduation have a strong effect on estimations. Graduates who wanted to work in the academic sector have less chance to be recruited rapidly in the private sector. As far as individuals who access a permanent job in the public sector are excluded in the analysis, most PhDs who are keen to work in the academic sector at time of finishing their thesis prefer to stay in a non-stable positions in this type of job than to experience professional mobility in firms. For them, these unstable situations last over the five years.

Eight PhDs' typical professional trajectories

This section demonstrates that PhDs' professional pathways are strongly differentiated. One of the methods to achieve this goal is to use data method analysis in order to construct typical professional trajectories.

Method

In order to better understand young persons' transition from school to work, researchers often analyze labor market sequences. The sequences reflect different situations for them in the labor market during the first five years after graduation. In Generation survey, these situations are entered month by month. Thanks to that practice, it is no longer a question of trying to explain the trajectories, but more to describe precisely by a statistical analysis, the "typical trajectories", that is to say, grouping individuals who have similar career paths.

Optimal matching occupies a central place in the corpus of descriptive methods of analysis of sequences (Robette & Thibault, 2008). To do this, we used the software R which currently the most complete and powerful method for sequence analysis. For the research, a maximum of 9 states that can be represented simultaneously are retained. These are:

- stable position in public research;
- non-stable position in academic research;
- stable position in public non-research;
- non-stable position in public non-research;
- stable position in R&D;
- non-stable position in R&D;
- stable position in private non-research;
- non-stable position in non-research private sector; and
- non-employment situation (unemployment, inactivity, long-life training).

Table 2. Professional trajectories by fields of studies

Types of trajectories	Math, Chemistry, Physics	Engineering, computing sciences	Life, earth sciences	Law, economics, management, social sciences	Arts, Humanities	All
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%

Source: Génération 2010 survey, Céreq

Results

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 the public-sector or in 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 a greater chance of finding themselves in this category. The second category (11%) is made up of trajectories characterized 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 characterized 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 characterized by unstable employment in non-research jobs in the public sector. The final category (13%) comprises career trajectories characterized 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.

Two trajectories are linked to private employment, the first (17%) is related to jobs in the private sector R&D and the other is related to non-research jobs in the private sector (14%). Basic descriptive analysis shows that PhDs in these trajectories found employment at a very early stage in their careers. In fact, almost 40% of doctorates who are concerned by trajectory linked to employment in R&D have never changed jobs. Some of them have experienced post doctorate experiences, during the first year on the labor market but those who have been outside the labor market are not represented in these two categories.

At the end, integration in private sector is more linked with rapid job stabilization than in the public research sector. Major results of the analysis show that professional mobility between types of jobs is relatively rare in France and there this type of transition does not constitute a typical pathway. Furthermore, the demonstration seems to confirm theory which states the existence of a high segmentation in the French scientific labor market. Due to that, PhDs choose at a very early stage their professional pathways, choices undertaken during initial training (in terms of thesis condition) appears irreversible on professional fate (Duhautois & Maublanc, 2005).

Trajectories, fields of studies and work conditions in 2015

A PhD's chosen discipline had a strong impact on career trajectories and labour market situation in 2015. Those who had specialised in mathematics/physics/chemistry, engineering and computer sciences, law, economics, management, and social sciences had lower rates of unemployment than the PhD population as a whole. 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 characterized 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 characterized by unstable research jobs in the public sector or disengagement from the labor market.

Table 3. Career trajectories and work conditions in 2015

The PhDs' view of their situation and trajectory	Difficult career trajectory	Anxiety about future career	Employed below their level of competences	Median net monthly salary
1. Rapid access to stable research job in the public sector	30%	11%	10%	2500
2. Delayed access to stable research job in the public sector	57%	18%	7%	2380
3. Unstable research job in the public sector	61%	50%	18%	2150
4. Rapid access to stable non-research job in the public sector	33%	21%	42%	2490
5. Unstable non-research job in the public sector	50%	30%	46%	2130
6. Rapid access to stable jobs in the private-sector R&D	28%	16%	31%	2620
7. Rapid access to stable non-research jobs in the private sector	41%	16%	34%	2370
8. Out of work and unstable employment history	72%	44%	42%	1970

Source : Génération 2010 survey, Céreq

Affiliation to typical professional trajectories has an effect on the work conditions in 2015. 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. 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.

Conclusion

Despite political incentives in favor of PhDs' integration in firms and reduction of permanent job opportunities in the academic sector, professional trajectories linked to the public research sector are still the more numerous in France. For PhDs graduated in 2010, 37% work in the private sector five years after their graduation. Comparisons between typical trajectories in private and public research sectors show that they are differentiated, and the first are more related with rapid access to a stable job position. Nevertheless affiliation to "private trajectories" is mainly the case of PhDs who enter at a

very early stage of their working lives. Thesis conditions, fields of study of professional expectations are a key factor of this affiliation. At the time of this research, post-doctoral experiences are not an obstacle to integration in firms and in some way some individuals can value them in the private sector. That is not the case of PhDs who have encountered unemployment or inactivity sequences during 2010 and 2015. In this case, that plays as a negative effect.

Our findings show that early integration in corporate sector firms is synonymous with good work conditions after five years on the labor market. That's especially true for PhDs who are concerned by trajectories in R&D sector. Nevertheless, even if they are more rapidly stabilized in their job and have better salaries, some of them declare that they are employed below their level of competences. This figure is higher than PhDs who are represented in trajectories linked to public research sector even those who are concerned with low job conditions such as work insecurity. Such results interrogate PhDs role and recognition of doctorate in the private organization

The aim of this article is to present PhDs professional trajectories five years after graduation. Our results show despite political incentives in favor of PhDs' integration in firms, trajectories in public research sector remains the main pathways. Those pathways are strongly linked to job instability. Our analyses show that for some graduates, after a period of job instability or non-employment situations on the labor market, integration in the private sector can be an opportunity. In fact, after four years on the labor market, the rate of PhDs who are employed in the private sector rise significantly. Considering that, our approach is to underline which specific characteristics determine access to private employment Calculations with econometric analysis of the expected duration of time access to private employment give important results. Thesis conditions, field of studies and professional expectations have a great effect on estimations. Our findings show that professional trajectories have a great effect. Unemployment or inactivity situations on the labor market appear to be a wrong signal to integration in the private sector. The less these situations appear, the more PhDs have a chance to be employed rapidly in a stable position in the private sector. Our results suggest also that unstable experiences in the public research sector can play a role and can be valued in firms. More precisely, PhDs who have done one post doctorate experience have significantly less chance to be employed rapidly in a stable position in R&D than those who have done 2 (or more) post doctorate experiences.

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