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Research-mobility and job-stability: is there a trade-off?

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Abstract

This article analyzes the effect of international job-mobility on career success measured by obtaining an open-ended contract or tenure-track position. We use an original database that covers experienced researchers in ten European countries ? Belgium, France, Germany, Italy, the Netherlands, Poland, Spain, Sweden, Switzerland and the UK. We develop a taxonomy of research-mobility and analyze its impact on the probability of holding a permanent position, controlling for individual and job characteristics as well as national effects. Our analysis confirms that international mobility impacts on career consolidation. In particular, those who move several times, unless they are more productive than their peers, are the least likely to consolidate their career. The country effects indicate that the career of researchers and academic labor markets differ substantially within Europe, with Polish, German and Spanish researchers being the least likely to consolidate their career in the long-term.

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Abstract

This article analyzes the effect of international job-mobility on career success measured by obtaining an open-ended contract or tenure-track position. We use an original database that covers experienced researchers in ten European countries – Belgium, France, Germany, Italy, the Netherlands, Poland, Spain, Sweden, Switzerland and the UK. We develop a taxonomy of research-mobility and analyze its impact on the probability of holding a permanent position, controlling for individual and job characteristics as well as national effects. Our analysis confirms that international mobility impacts on career consolidation. In particular, those who move several times, unless they are more productive than their peers, are the least likely to consolidate their career. The country effects indicate that the career of researchers and academic labor markets differ substantially within Europe, with Polish, German and Spanish researchers being the least likely to consolidate their career in the long-term.

1. Introduction

Research mobility, and particularly international mobility, has been encouraged at the policy level to gain enriching experiences, build networks and facilitate knowledge and technology transfer, thereby increasing productivity. The European Commission (EC) has proposed a significant number of measures to increase the mobility of researchers across the European Research Area (ERA) and to help European researchers to develop a research career (EC 2001; EC 2006; EC 2010a and EC 2010b). Improving the working conditions, facilitating mobility and guaranteeing an open recruitment of researchers have been identify as the main challenges that hinder the realization of an open and competitive European single labor market for researchers (EC 2012a). Recently, the Communication from the EC (2012b) recognizes the importance to ensure an open labor market for researchers as one of the five ERA priorities. An adequate supply of researchers, their mobility and careers appear important elements for the development of national and cross-national research system.

Despite such policy attention, little evidence exists, especially in Europe, on the effects of international mobility on collaborations, academic performance and career development and consolidation (Teichler, 1996; Musselin, 2004; Nerdrum and Sarpebakken, 2006 and Fernández-Zubieta and Guy, 2010).

In this context, we address the influence of international job-mobility on career-consolidation. We focus on established researchers working in universities across ten European countries – Belgium, France, Germany, Italy, the Netherlands, Poland, Spain, Sweden, Switzerland and the United Kingdom (UK). This topic has rarely been explored in the literature, not last for lack of suitable data.

In particular, we develop a taxonomy of mobility and examine how the latter affects the likelihood of having a permanent academic appointment, controlling for individual characteristics as well as for national fixed effects. To address our question we use data from the Study on International Mobility and Researchers' Career Development Project (SIM-ReC) launched in 2011 by the Institute of Prospective Technological Studies (IPTS)[1] in collaboration with NIFU (Norway) and Logotech (Greece) and the University of Athens.

The paper is organized as follows: Section 2 briefly introduces the theoretical and policy background; section 3 explains the data collection process as well as the sampling method; section 4 presents the taxonomy of international job-mobility of researchers; sections 5, 6 and 7 explain the econometric models applied, the descriptive statistics and the econometric results, respectively; section 8 draws some conclusions and suggests future research.

2. International mobility of researchers: Theoretical and policy background

Research mobility has increased remarkably in the past few years (OECD 2003, Moguerou and Di Pietrogiacomo 2008, BIS 2011). For example, Moguerou and Di

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[1] The Institute for Prospective Technological Studies (IPTS) is one of the seven scientific institutes of the European Commission's Joint Research Centre (JRC). For more information see: http://ipts.jrc.ec.europa.eu/

Pietrogiacomo (2008) show that, between 2000 and 2006, in 9 European Member States the proportion of non-EU27 researchers increased from 1.6% to 2.4%, and the proportion of researchers from another EU27 country rose from 2.2% to 2.9%.[2] The trend has been supported at the European policy level with the EC sponsoring mobility programmes (e.g. Marie Curie programme) as well as putting mobility at the core of the European Research Area (EC 2001; EC 2006; EC 2010a and EC 2010b).

The policy support of mobility is grounded in its benefits for research systems and, in turn, for industrial competitiveness. Mobility is a mechanism of knowledge diffusion (Bozeman et al. 2001; Crespi et al. 2007 and Gagliardi 2013), especially its tacit (Polanyi 1967) and embedded (Granovetter 1985 and Griliches 1973) features. When moving, researchers can spread and increase their human (Schultz 1990; Becker 1964) and social capital (Bourdieu 1986 and Coleman 1988). The European Union (EU) lags behind other main R&D performers, such as the US and Japan, in terms of its R&D intensity and its share of researchers (FTE) in the total labor force[3], and mobility is seen as a tool to help fill such gap.

Whilst the benefits of research mobility at the systemic level are clear, its consequences at the individual level are more ambiguous. On the one hand, researchers exploit mobility to get access to the best scientific equipment and teams (Martin-Rovert 2003; Pellens, 2013) and to improve their career prospects abroad or in their home countries (Ackers 2005). Job experiences abroad are sometimes required for the return of researchers to their home countries (Ackers and Oliver 2007). International mobility is also an important asset for academic progression in some research fields and at institutions that reward excellence. Indeed, after finishing the PhD, it is standard practice in many fields to pursue a post-doctoral stay abroad (Ackers 2005). Transparent and meritocratic recruitment with clear progression systems based on objective evaluation procedures that reward excellence appear to encourage researchers' job-mobility (Ackers, 2001; Van de Sande et al. 2005; Sockanathan, 2004 and Fernandez-Zubieta and van Bavel, 2011). However, mobility could also reflect the lack of job opportunities for researchers at home (Ehrengerg 2003; Gaughan and Robin 2004) and the increase of employment insecurity in the academic working life (Bryson 2004, Stepan 2005; Cruz-Castro and Sanz-Menendez 2005; Smith-Doerr 2006). The latter is effectively expanding the "educational career ladder" (Zumeta 1985; Tobias et al. 1995; NAS 2000; NRC 1998), not without consequences. The delay in taking up a permanent position, in fact, could hinder the very benefits that mobility was supposed to provide as it could reduce opportunities for specialization (Stephan 2005; Smith-Doerr 2006), for promotion and, in turn, reduce academic performance.

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[2] In the case of the UK, one of the European countries with higher levels of internationalization, 63% of active UK based researchers have worked at non-UK institutions at some point during their career (BIS 2011). At student level, there is an increase in the number of international students in countries with strong research systems. In the US, the number of international students has increased by 32% since 2000-2001 (Institute of International Education, 2012). A similar increasing trend can be observed in the UK (HESA 2007).

[3] In 2008, the R&D intensity of the European Union (EU-27) was 1.9%, compared to 2.8% in the United States and 3.4% in Japan. In 2008, the share of researchers in the labor force was 6 per thousand in Europe (EU27), 9 per thousand in the US and 11 per thousand in Japan (EC 2011). It is estimated that the EU will need to create at least 1 million new research jobs in order to reach an R&D intensity of 3 % (EC 2011).

The ambiguous effects of mobility are all the more problematic if we consider that the academic and research job-market displays marked national differences that directly affect mobility. Whilst in the US mobility tends to be linked with scientific merit and encouraged by universities[4], this is not the case in many European countries (Horta et al. 2010; Cruz-Castro and Sanz-Menendez 2010; Stephan 2012) where inbreeding[5] is still a prevalent practice that discourages the mobility of researchers (e.g Cruz-Castro and Sanz-Menendez 2010, and Heitor and Horta 2004). National experts report that this practice occurred to a large extent in Greece, Hungary, Italy, Latvia, Malta, Romania, Slovenia and Spain (Fernandez-Zubieta and Van Bavel 2011). Remarkably, researchers hired under this practice do not necessarily get tenured positions with less scientific merits than their peers from other institutions (Cruz-Castro and Sanz-Menendez 2010).

To sum up, whilst there are good arguments to support international research mobility, its effects on career consolidation (with its potential detrimental consequences) are still not well understood. This paper contributes to fill this gap. Specifically, based on an original dataset, we develop a taxonomy of five mobility categories and, controlling for other relevant variables, analyze how different migratory choices affect the probability of obtaining a permanent position.

3. Data collection

To study the links between international job-mobility and career consolidation we use an original dataset produced by the SIM-ReC Project.

SIM-ReC[6], which was run by JRC-IPTS, in collaboration with NIFU (Norway), Logotech (Greece) and the University of Athens, collected data through an online questionnaire targeting experienced researchers currently working in European universities. In particular the questionnaire was sent to those researchers with at least five years post-doctoral professional experience and/or a tenured position. By targeting established professional, we are able to evaluate the middle-to-long term impact of mobility.

SIM-ReC focussed on ten European countries - Belgium, France, Germany, Italy, the Netherlands, Poland, Spain, Sweden, Switzerland and the UK. The questionnaire was designed to gather information about the role and extent of cross-border job changes. In addition, the 28 questions of the survey were intended to elucidate important background information that may shape the propensity and experience of this type of migration. For instance, we gathered detailed information on the professional experience of the researcher (up to the last 5 positions), including dates and country of employment, financial and non-financial conditions of work, publications and cooperation, self-assessment of their career-choices and assessment of the role of mobility in scientific careers.

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[4] From the beginning of the 20th century, the US academic system discourages the tenure track recruitment of PhDs granted by the same university (McNeely 1932; Ben-David 1984; Clark 1995).
[5] "Inbreeding" refers to the practice of a university hiring its own graduates to be lecturers after completing their PhD degrees
[6] The SIM-ReC Project was developed under the ERAWATCH contract (http://erawatch.jrc.ec.europa.eu/) and it run from October 2011 to July 2012.

In the absence of a population frame for researchers, the data collection was based on a Two-Stage Stratified Cluster Sampling method.[7] The stratification variables were: (a) Country of current position (10 levels, one for each country included in the study) and (b) Field of science of the department of work (3 levels: physical sciences & engineering, life & health sciences and social sciences & humanities). The clusters are represented by departments, that is, a cluster will be "Department of University X in Country Y and Field of Science Z". The departments were selected in the first stage of sampling whilst, individual researchers within them were identified in the second stage. The sizes of the clusters were assumed unknown, since such information is unavailable in a large subgroup of the countries.

4. A taxonomy of international job-mobility of researchers

We propose a taxonomy[8] of international job-mobility of European researchers based on the SIM-ReC dataset. The taxonomy (and this paper) rests on the assumption that the research career begins once the PhD is awarded. Our starting point to define the different migratory choices is, therefore, the country where the PhD was obtained. Previous international mobility (occurring in case the country of the Bachelor, the Master and the PhD differ) is considered as "student-mobility" and is out of the scope of the paper.[9]

Five mobility categories are proposed: "stayers", "returners", "stable-migrants", "first-time migrants" and "repeat migrants":

- "**Stayers**". Researchers are considered "stayers" if they have always worked in the country where they received their PhD.

  For example, a German researcher who received the PhD in Munich and has always worked in Germany would fall in this category, as would a Spanish researcher who obtained his/her PhD in London and worked in the UK ever since.

- "**Returners**". Researchers are classified as "returners" if they have held at least a position abroad (in a country different to where the PhD was awarded) and their current position is in the country where they received their Doctorate.

  A German researcher who received the PhD in London, subsequently hold a position in Germany and currently works in the UK would be classified as returner. Similarly, a Spanish researcher who received the PhD in Spain, hold a position in The Netherlands, and now works in Spain would fall in this category.

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[7] In cluster sampling the population members are divided into clusters and the sampling process involves sampling the clusters (and not the population members), and then selecting all members within each sampled cluster (single stage clustering) or a sub-sample of members from each cluster (two stage clustering).

[8] The taxonomy draws on the work of Faggian (2005) on UK graduates.

[9] As part of our robustness checks, we included- in our empirical analysis- a dummy to account for student-mobility, which was not significant and did not affect the results reported in section 7.

- *"Stable migrants*" are those researchers that are currently working in a country different from the one in which they obtained their PhD and they have held at least two jobs in the same country.

  For instance, a Belgian researcher who obtained the PhD in The Netherlands and afterwards landed a position in London, followed by another position in the UK, which he/she is currently holding, would classify as a stable migrant.

- **"First-time migrants"** are those researchers that moved-out the country where they were awarded their PhD for the first time.

  An Italian researcher who graduated from her/his PhD in London and is currently holding her/his first position in Spain would fall in this category.[10]

- "**Repeat migrants**" are researchers that are currently working in a country different than the one of PhD-graduation and moved internationally, in between, at least once more.

  For example, a German researcher who obtained a PhD in Germany, currently works in the UK, and has held a job position in a Dutch university would be classified as a repeat migrant. Similarly an Italian researcher who obtained his doctorate in the UK and subsequently worked in Spain and France, would fall in this category.

5. Econometric analysis

We apply logistic regressions (Greene 2003) to study the impact of mobility on the probability to have a tenured position. Logistic regressions are suited to analyze binary outcomes, such as ours. Our dependent variable Permanent takes the value 1 if the researcher currently holds a permanent position and 0 if the researcher currently holds a non-permanent position. To ensure that individuals in our sample are the most similar, we only include in the analysis those who (a) have a PhD, received (b) after a Master degree and (c) before starting their career (i.e. they did not hold research positions whilst studying).[11]

We estimate the following three models:

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[10] In theory, this group could also include researchers who have held several positions in the country where they received their PhD and moved subsequently. Yet, due to the restrictions applied to our sample (see footnote 10 below), in the present paper, first-time migrants comprise only researchers at their first post-doctoral position.

[11] As the SIM-ReC study covers all researchers with more than 5 years experience, some of the eldest members of the sample never received the PhD title or received it well after having started their academic career.

Model 1:

$$\Pr(Y = Permanent) \ f(Mobil, Abil, Multidis, Part-t, Teach\_load, FactorPR, FactorRA, \overline{Publ\_prod}, Indiv, Country)$$

Model 2:

$$\Pr(Y = Permanent) \ f(Mobil, Abil, Multidis, Part-t, Teach\_load, FactorPR, FactorRA, Mobil \times Abil, Publ\_prod, \overline{Indiv}, Country)$$

Model 3:

$$\Pr(Y = Permanent) \ f(Mobil, Abil, Multidis, Part-t, Teach\_load, FactorPR, FactorRA, Mobil \times Abil, Publ\_prod, Mobil \times Publ\_prod, \overline{Indiv}, Country)$$

Model 2 differs from model 1 simply for the interaction term Mobil-x-Abil (explained below), and model 3 differs from model 2 for the interaction term Mobil-x-Publ_prod. Where:

Mobil is a categorical variable capturing the different types of migratory behavior described above.

Abil is a measure of the innate ability of the researcher. It reflects the time taken to complete the PhD and it is calculated as the difference between the year of award of the PhD and the year of award of the Master degree.

We use Abil as a fixed effect proxy that tries to address the problem of unobserved individual heterogeneity.[12] The underlying assumption is that researchers who spent more time to complete their doctorate may be less attractive for the labor market and have fewer opportunities to find a permanent position.

We cannot stress enough the limitations of this metric and its underlying assumption. Those who took a break between the PhD and the Master degree may figure as less able, as would those who took longer to complete their degree because of personal or professional reasons, or because they chose a challenging research-topic. Despite that, to tackle the aforementioned heterogeneity problem we needed a variable that is independent from future mobility choices and permanent positions. Abil was the only variable we could build with the SIM-ReC data: as it reflects behavior previous to any professional position it was suited for this purpose.

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[12] When studying the impact of mobility on career consolidation we are confronted with inherent bias problems, such as reverse causality, sample selection or omitted variable (Heckman, 1979). We address those by (1) controlling for factors which co-explain mobility and career consolidation (e.g. gender, age, productivity) (2) use Abil as fixed-effect proxy. Other alternatives such as "instrumental variable approach" (Wooldridge 2010) and "treatment effect" (Wooldridge 2006) are not applied due to lack of suitable variables.

Multidisc is a dummy variable capturing those individuals involved in multidisciplinary work. When a researcher is working in the same field as their PhD we assume that no multidisciplinarity is occurring. Conversely, when the field of work is different than the field of PhD, we assume multidisciplinarity.

Part-t is categorical variable that captures when the type of contract of each individual is part-time (versus full-time).

Teach_load captures the number of hours devoted to teaching activities of each individual.

Factors – PR captures how personal/family reasons have influenced job-change decisions. The variable is expressed in a 5-level Likert scale going from very negative to very positive.

Factors – RA captures how the possibility of developing a personal research agenda has influenced job-change decisions. The variable is expressed in a 5-level Likert scale going from very negative to very positive.

Publ_prod is a measure of academic productivity. It is calculated as the average number of ISI publications per year of career.[13] In the SIM-ReC database we have the self-reported number of ISI publications per job-position as well as the starting date of the last 5 positions of the individual. We can therefore calculate the total ISI production of the research as well as the career length. By dividing the former by the latter we obtain our indicator.

Indiv is a vector of individual control variables such as: Age and Gender,

Country captures the fixed effects of the ten nations under study, which is critical to take into account national contexts.

6. Descriptive statistics

Our sample comprises 2,858 cases, and in this section we provide some descriptive statistics to have a first understanding of the issues at stake.

Table 1 below shows that the majority of the respondents (53.5%) are stayers, followed by returners (20.8%), stable migrants (11.8%), repeat migrants (7.3%) and, finally first-time migrants (6.7%). Although Germany, the Netherlands, Poland and Spain follow this overall pattern, remarkable differences across countries emerge. Italy is the country with most stayers (73.8% vs a national average of 53.5%) and least returners (14.5% vs 20.8% in the sample as a whole). Belgium and Switzerland host the largest proportion of first-time migrants (15.4 and 14.8% respectively, as compared to 6.7% in the sample as a whole). Belgium is also the country with the lowest proportion of stayers (30.8%). Spain, with 34.6% is the country with most returners, whereas

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[13] To measure career length we look at the year in which the first reported job was started.

Switzerland has the largest proportions of stable migrants (24.7% vs 11.8% in the total sample) and repeat migrants (22.5% vs 7.3% in the total sample).

Table 1. Proportion of researchers by country and type of mobility

Country of current work	Type of mobility (%)					Total
	Stayers	Returners	Stable migrants	Repeat migrants	First-time migrants	
Belgium	30.8	26.9	16.7	10.3	15.4	100
France	66.3	19.6	5.1	5.4	3.8	100
Germany	49.0	29.9	9.8	5.7	5.7	100
Italy	73.8	14.5	6.0	2.6	3.2	100
Netherlands	42.7	19.4	16.1	12.8	9.0	100
Poland	63.3	28.6	6.1	2.0	0.0	100
Spain	41.8	34.6	14.1	5.5	4.1	100
Sweden	56.7	19.5	10.3	6.2	7.3	100
Switzerland	12.7	25.4	24.7	22.5	14.8	100
United kingdom	50.7	17.8	15.1	8.4	8.0	100
Total	53.5	20.8	11.8	7.3	6.7	100

Pearson chi2(12) = 339.4081   Pr = 0.0000

Table 2 reports the mean, standard errors and the percentages of age, ability and productivity. Whilst the age profile is similar across mobility categories (with the exception of first-time migrants who are, unsurprisingly, younger), interesting differences emerge for our measures of ability and publication productivity. Indeed, we see that stayers and first-time migrants are the only category with a PhD completion time higher than average and with a publication productivity lower than average.

Table 2. Descriptive statistics: individual and academic characteristics by mobility

	Age		Abil (ability)		Publ_prod (publication productivity)	
	Mean	Std. Err.	Mean	Std. Err.	Mean	Std. Err.
Stayers	46.1	0.300	5.6	0.117	1.5	0.052
Returners	46.0	0.466	4.7	0.108	2.2	0.090
Stable migrants	44.6	0.505	4.7	0.131	2.3	0.132
Repeat migrants	45.3	0.760	4.4	0.126	2.2	0.160
First-time migrants	43.5	0.857	5.3	0.231	1.6	0.157
F-ANOVA	4.53		12.73		30.50	
P-value	0.0012		0.0000		0.0000	

Table 3 provides an overview of some job-characteristics and personal evaluations. We see that part-time researchers are only 6.9% of the total, yet represent 7.8% of the stayers. Stayers are also the group with the largest proportions of researchers with high-teaching load (35.2% vs 30.6% in the total). Multidisciplinarity is most common among first-time migrants (64.7%) and least common among returners (49.8%). For first-time migrants, personal considerations have had the highest impact in choosing their job

(31.7%), similarly, the possibility of setting one's own research agenda has been the most relevant for them (34.8%) followed by repeat migrants (33.7%).

Table 3. Descriptive statistics: job-characteristics and attitudes by type of mobility

	Part-time (%)	High teaching load (%)	Multi-disciplinary (%)	Very-positively - Personal considerations (%)	Very-positively – Research agenda (%)
Stayers	7.8	35.2	62.0	22.6	25.6
Returners	5.0	33.0	49.8	25.2	27.1
Stable migrants	5.5	21.6	53.0	26.8	25.6
Repeat migrants	4.1	17.5	51.2	25.3	33.7
First-time migrants	12.1	17.2	64.7	31.7	34.8
Total	6.9	30.6	57.8	24.6	27.2
Chi-2	15.6782	98.3326	37.3070	33.4788	31.4779
P-value	0.003	0.000	0.000	0.006	0.012

7. Econometric results [14]

Table 4 below reports the results for our three models.

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[14] The reported results are robust to several alternative specifications which included other individual and job-characteristics.

Table 4. Results of the econometric models

	Permanent position		
	Model 1	Model 2	Model 3
Returners[a]	-0.154	0.141	0.395
	(-0.80)	(0.32)	(0.77)
Stable migrants	-0.611***	-0.634	-0.206
	(-2.77)	(-1.27)	(-0.35)
Repeat migrants	-0.657**	-1.334*	-2.078**
	(-2.46)	(-1.77)	(-2.47)
First time migrants	-1.101***	-0.395	-0.527
	(-4.45)	(-0.68)	(-0.84)
Abil	-0.0443	-0.0300	-0.0251
	(-1.58)	(-0.82)	(-0.67)
Multidisc	-0.534***	-0.523***	-0.508***
	(-3.61)	(-3.52)	(-3.39)
Factors – PR (Personal reasons)	0.124*	0.122*	0.121*
	(1.96)	(1.92)	(1.89)
Factors – RA (research agenda)	-0.263***	-0.255***	-0.265***
	(-2.93)	(-2.85)	(-2.91)
Part-t	-1.980***	-1.971***	-1.935***
	(-7.86)	(-7.81)	(-7.64)
Teach-load	0.417***	0.416***	0.418***
	(5.56)	(5.53)	(5.52)
Age	0.0728***	0.0742***	0.0734***
	(7.71)	(7.78)	(7.45)
Gender	0.133	0.138	0.135
	(0.85)	(0.89)	(0.85)
Interaction_returnXabil		-0.0583	-0.0695
		(-0.73)	(-0.86)
Interaction_stableXabil		0.00817	-0.0141
		(0.09)	(-0.15)
Interaction_repeatXabil		0.157	0.174
		(1.00)	(1.08)
Interaction_first_timeXabil		-0.137	-0.135
		(-1.35)	(-1.34)
Productivity (Publ_prod)			0.0477
			(0.73)
Interaction_returnXprod			-0.0974
			(-1.01)
Interaction_stableXprod			-0.143
			(-1.41)
Interaction_repeatXprod			0.354*
			(1.84)
Interaction_first_timeXprod			0.0715
			(0.50)

France[b]	-0.0952	-0.116	-0.0567
	(-0.26)	(-0.32)	(-0.16)
Germany	-2.073***	-2.099***	-2.076***
	(-6.93)	(-7.00)	(-6.88)
Italy	-0.697**	-0.700**	-0.689**
	(-2.43)	(-2.43)	(-2.38)
Netherlands	-1.063***	-1.093***	-1.112***
	(-3.65)	(-3.73)	(-3.77)
Belgium	-1.641***	-1.674***	-1.609***
	(-4.31)	(-4.38)	(-4.16)
Spain	-1.890***	-1.898***	-1.866***
	(-6.48)	(-6.47)	(-6.31)
Sweden	-0.581**	-0.570**	-0.510*
	(-2.11)	(-2.05)	(-1.82)
Switzerland	-1.520***	-1.553***	-1.572***
	(-4.63)	(-4.70)	(-4.69)
Poland	-2.490***	-2.504***	-2.497***
	(-5.82)	(-5.84)	(-5.80)
_cons	3.009***	2.868***	2.720***
	(5.38)	(5.01)	(4.45)
N	1610	1610	1607
Pseudo R2	0.21	0.21	0.22

t statistics in parentheses * p<.1, ** p<.05, *** p<.01
a The reference category for mobility is Stayers
b The reference category for countries is the UK

Model 1 confirms that mobility impacts on the probability of holding a permanent position. Indeed, the coefficients are significant and negative for stable migrants, for repeat migrants and for first-time migrants. For the latter the coefficient is of higher absolute value than for the former, suggesting that first-time migrants are the least likely to get a permanent position. First-time migrants are also the youngest in the sample (see Table 2), which partially explains the results. Models 2 and 3, which include two types of interaction effects, confirm these results only for repeat migrants.

Our measure of ability is never significant, nor are its interaction-effects. In model 3 we add the measure of publication productivity, as well as its interaction terms with the mobility categories. The measure of academic productivity is not significant, yet the interaction is positive and significant only for repeat migrants, indicating that such highly productive movers are more likely to consolidate their career.

Multidisciplinarity (Multidisc) is significant and negative in all models, indicating that exploring other fields of knowledge, has a cost in terms of stability. Policy-makers are increasingly aware of the importance of interdisciplinary research and this result suggests that there is scope and need for measures to encourage this academic approach.

Part-time.(Part-t) is also significant and negative in the three models. Unsurprisingly, part-time posts are less likely to be permanent in nature. On the other hand, those posts with high-teaching load are more likely to be tenured, as shown by the positive and

significant value of Teach-load This reflects the internal structure of European universities where most of the academic staff has teaching responsibilities.

Furthermore, results show that those who took into account the role of personal reasons in their career moves, are more likely to have consolidated their career (Factors_PR is positive and significant). On the other hand, those who valued highly the ability to set one's research agenda are less likely to have a permanent job (Factors_RA is negative and significant).

The three models indicate that gender is not relevant when it comes to career consolidation, whilst age matters. Unsurprisingly, older researchers are, ceteris paribus, more likely to have a permanent position.

Country effects are also relevant. Polish researchers are the least likely to achieve a permanent position, followed by the German and the Spanish.

8. Conclusions and ways forward

The article has analyzed the effect of international mobility on the career consolidation of researchers, using the SIM-ReC dataset developed at the JRC-IPTS in 2012.

Our analysis has highlighted that part-time and low-teaching posts are typically not associated with permanent positions, reflecting the current structure of European universities. Interestingly, we have shown that multidisciplinarity is negatively related to tenured jobs. This reflects the fact that, despite being highlighted as a desirable characteristic by policy documents, multidisciplinarity is not encouraged in real practice. Furthermore, we have highlighted that those researchers guided by the specific pursuit of a research agenda, are more likely to face employment instability, as opposed to those taking career-related decisions on the grounds of personal reasons.

The models have confirmed that international mobility indeed impacts on career consolidation. In particular, model 1 showed that stable, repeat migrants and first-time migrants are less likely than stayer, or returners to consolidate their career. When interaction effects with ability or productivity are taken into account (model 2 and 3), the trade-off between stable employment and repeated moves is confirmed. However, as shown in model 3, a high research-productivity can reverse this outcome.

To conclude, our results suggests that mobility may come at the expense of employment (and, thereby personal) stability. This result calls for a deeper understanding of the phenomenon, in order to better target policies, minimizing the individual costs of mobility whilst maximizing its social benefits.

Even though our results are robust to alternative specification, one should keep in mind that the study has several limitations. Among other things, we do not take into account cohort and vintage effects, as well as other important institutional factors, such us prestige. Future research with the SIM-ReC data will dig further in these aspects, exploring, among other things, the different career-path of mobile researchers, as well as the role and implications of mobility at the different stages of career.

9. References

Ackers, L. 2001. The participation of women researches in TMR Programme of the European Commission: An Evaluation. Brussels: European Commission.

Ackers, L. 2005. Moving people and knowledge, the mobility of scientists within the European Union. International Migration 43: 99-129.

Ackers, H.L, and Oliver E. 2007. 'From Flexicurity to Flexsecquality? The Impact of the Fixed-term Contract Provisions on Employment in Science Research'. International Studies of Management and Organization 37(1): 53-79.

Ben-David, J. 1984. The scientist's role in society: A comparative study. Chicago: University of Chicago.

Becker, G. S. 1964. Human capital. A theoretical and empirical analysis, special reference to education. New York: National Bureau of Economic Research.

BIS. Business, Innovation and Skills. 2011. International comparative performance of the UK research base

Bourdieu, P. 1986. The forms of social capital. In. J.G. Richardson, ed. Handbook of theory and research for the sociology of education. New York: Greenwood.

Bozeman, B., Dietz, J.S., and Gaughan, M. 2001. Scientific and technical human capital: an alternative approach to R&D evaluation. International Journal of Technology Management 22(8): 716–740.

Bryson, C. 2004. 'The Consequences for Women in the Academic Profession of the Widespread Use of Fixed Term Contracts'. Gender, Work and Organization 11(2): 187-206.

Clark, B. 1995. Places of inquiry: Research and advances education in Modern universities. Berkeley: University of California Press.

Coleman, J.C. (1988) Social capital in the creation human capital. American Journal of Sociology 94: 95–120.

Crespi, A.G., Geuna, A., and Nesta, J.J.L. 2007. The mobility of university inventors in Europe . Journal of Technology Transfer. 32: 195-215.

Cruz-Castro, L., and Sanz-Menedez, L. 2005. The employment of PhD. in firms: trajectories, mobility and innovation. Research Evaluation 14(1): 57-69.

Cruz-Castro, L., and Sanz-Menedez, L. 2010. Mobility versus job stability: Assessing tenure and productivity outcomes. Research Policy 39, 27-38.

Ehrenberg, R.G. (2003) Studying ourselves: The academic labour market. Journal of Labor Economics. Vol, 21, 2, pp. 267-287.

European Commission. 2001. High-level Expert Group on improving mobility of researchers. Luxembourg: Publications Office of the European Union.

European Commission. 2006. Mobility of researchers between academia and industry. Luxembourg: Publications Office of the European Union.

European Commission. 2010a. Europe 2020. A European strategy for smart, sustainable and inclusive growth. Luxembourg: Publications Office of the European Union.

European Commission. 2010b. Europe 2020 Flagship Initiative Innovation Union. SEC(2010) 1161. Luxembourg: Publications Office of the European Union.

European Commission. 2011. Innovation Union competitiveness report. Luxembourg: Publications Office of the European Union.

European Commission. 2012a. Excellence, equality and entrepreneurialism building sustainable research careers in the European Research Area. Luxembourg: Publications Office of the European Union.

European Commission. 2012b. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and The Committee of the Regions. A Reinforced European Research Area Partnership for Excellence and Growth. COM(2012) 392 final

Faggian, A. (2005) Human capital, migration and local labour markets: the role of the higher education system in Great Britain. Doctoral Thesis, University of Reading, Reading.

Fernández-Zubieta, A., and Guy K. 2010. Developing the European Research Area: Improving knowledge flows via researcher mobility. Luxembourg: Publications Office of the European Union.

Fernández-Zubieta, A., and van Bavel, R. 2011 Barriers and bottlenecks to making research careers more attractive and promoting mobility. Luxembourg: Publications Office of the European Union.

Gaughan, M., and Robin, S. 2004. National science training policy and early scientific careers in France and the United States. Research Policy 33(4): 109-122.

Granovetter, M.S. 1985. Economic action and social structure: the problem of embeddedness. American Journal of Sociology 91: 481-510.

Greene W. (2003) Econometric Analysis, 5th Edition. Upper Saddle River, NJ, Prentice Hall.

Griliches, Z. 1973. Research expenditures and growth accounting. In B. R. Williams, ed. Science and technology in economic growth, London: Macmillan, pp. 59–95.

Heckman, J. 1979. Sample selection bias as a specification error. Econometrica 47: 153–61.

Heitor, M., and Horta, H. 2004. Engaharia e desenvolvimento científico: O atraso estruturla portugues explicado no context histórico. In Heitor et al. Eds. Momentos de inovacao e engeharia em Portugal no seculo XX. Alfragide: D Quixote.

HESA. Higher Education Statistics Agency (2007) www.hesa.ac.uk.

Institute of International Education (2012) International students in the U.S. http://www.iie.org/opendoors.

Horta, H., Veloso, F., and Grediaga, R. 2010. Navel Gazing: Academic inbreeding and scientific productivity. Management Science 56(3): 414-429.

Martin-Rovet, D. 2003. Opportunites for outstanding young scientists in Europe to create an independent research team. Strasbourg: European Science Foundation

McNeely, J. 1932. Faculty Inbreeding in Land-Grant Colleges and Universities. Wahington: Office of Education.

Moguerou, P., and Di Pietrogiacomo, P. 2008. Stock, career and mobility of researchers in the EU. Luxembourg: Office for Official Publications of the European Communities.

Musselin, C. 2004 Towards a European academic labour market? Some lessons drawn from empirical studies on academic mobility. Higher Education 48: 55-78.

National Academy of Sciences NAS. 2000. Enhancing the Postdoctoral Experience for Scientists and Engineers. Washington, DC: National Academy Press.

National Research Council NRC. 1998. Trends in the Early Careers of Life Scientists. Washington, DC: National Academy Press.

Nerdrum, L., and Sarpebakken, B. 2006. Mobility of foreign searchers in Norway. Science and Public Policy 33: 217–229.

OECD. 2003. The international mobility of researchers: recent trends and policy initiatives. Paris: OECD.

Pellens, M. 2013. The motivations of scientists and drivers of international mobility. CESifo Seminar Series. Cambridge: the MIT Press.

Polanyi, M. 1967. The Tacit Dimension. New York: Anchor Books.

Schultz, T. 1990. Restoring economic equilibrium: human capital in the modernizing economy. Oxford: Backwell

Smith-Doerr. L. 2006. Stuck in the middle: doctoral education ranking and career outcomes for life scientists. Bulletin of Science, Technology & Society 26(3): 243-255.

Sockanathan, A. 2004. Conceptualising and rewarding excellence in the UK: the role of research assessment. CSLPE Research Report 2004-17, University of Leeds.

Stephan, P. 2005. Job market effects on scientific productivity. Paper presented at the Conference the future of science. Venice, September

Stephan, P. 2012. How economics shapes science. Cambridge: Harvard University Press.

Teichler, U. 1996. Research on academic mobility and international cooperation in higher education: an agenda for the future. In Peggy Blumenthal et al., eds, Academic Mobility in a Changing World, Higher Education Policy 29, 338–358. London: Jessica Kingsley Publishers.

Tobias, S., D.E. Chubin, Aylesworth, K. 1995. Rethinking Science as a Career: Perceptions and Realities in the Physical Sciences. Tucson AZ: Research Corporation.

Van de Sande, D. 2005. Impact assessment of the Marie Curie Fellowships under the 4th and 5th Framework Programmes of Research and Technological development of the EU (1994-2002). Brussels: European Commission.

Wooldridge 2006. Econometrics: A Modern Approach, third edition

Wooldridge 2010, Econometric Analysis of Cross Section and Panel Data, second edition.

Zumeta, W. 1985. Extending the Educational Career Ladder: The Changing Quality and Value of Postdoctoral Study. Lexington, MA: Lexington Books.