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Permanent Contracts and Job Satisfaction in Academia: Evidence from European Countries¹

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Abstract

Temporary contracts are increasingly used in academia. This is a major concern for non-tenured researchers, since weak job security may hamper job satisfaction. In spite of the relevance of this topic, scholarly research on the theme is scant. This paper presents an empirical analysis of the role of academic tenure for job satisfaction of researchers in European countries. The work uses data from the MORE2 survey, a recent large-scale representative survey of researchers in European countries. The results show that, *ceteris paribus*, academics with a permanent contract are on average more satisfied with their job than those that are employed on a temporary basis. We also show that academic tenure is a relatively more important factor of job satisfaction for researchers at an intermediate stage of the career. Finally, we point out some important differences in the working of the model among European countries. Our hypotheses receive significant empirical support for the groups of Continental EU and Nordic economies, which combine high job satisfaction and good working conditions, on the one hand, with relatively weak job security for younger academics, on the other.

JEL: I31; J28.

1. Introduction³

In many European countries, recent labour market reforms towards deregulation and flexibility of employment have led to an increasing use of temporary forms of contract. The academic labour market has also been affected by this trend, and temporary contracts are now increasingly used in HEIs in several countries, among which the Netherlands, Germany, the UK and the Nordic economies (Waaijer et al., 2017).

For many academic researchers throughout Europe, this is an issue of great concern. Younger and non-tenured academics often find it increasingly difficult to get a permanent job in academia in their own country, and they must therefore consider to migrate to another country, or leave academia altogether and get a job in another sector. Weaker job security and worsening career prospects have potentially important negative consequences for researchers' job satisfaction and well-being.

In spite of the relevance of this topic, though, scholarly research on the effects of temporary employment on job satisfaction of researchers is scant. Empirical research in several other sectors of the economy suggests that weak job security is an important factor hampering work life satisfaction (Wilkin, 2013; Castellacci and Viñas-Bardolet, 2018). A few recent papers have started to explore this question for the academic sector, focusing for instance on the cases of the Netherlands and Spain (Escardíbul & Afcha, 2017; van der Weijden et al., 2016; Waaijer et al.,

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2017). However, research in this field does still lack comprehensive cross-country evidence on the effects of academic tenure on job satisfaction.

Do permanent contracts contribute to support researchers' well-being? This research question is not only important from the point of view of academic researchers, but it also have some relevant implications for the national public science system as a whole. In fact, if the increasing use of temporary forms of employment will end up weakening job security and worsening career prospects for non-tenured academics, many of these may well decide to leave academia and get a job somewhere else. If so, the public science system will progressively become a less attractive sector of employment for many young talents, and thus weaken its quality, performance and competitiveness in the longer run.

To investigate this question, we carry out an empirical analysis based on data from the MORE2 survey (*Mobility Survey of the Higher Education Sector*) a recent large-scale representative survey of researchers in all European countries (IDEA Consult 2013)⁴. The dataset provides rich information on about 10,000 European researchers, thus enabling a comprehensive cross-country analysis of the relationships between job security and satisfaction in academia.

Our empirical analysis has three interrelated parts. First, we develop and test the hypothesis that permanent contracts are positively related to job satisfaction. Second, we ask whether this relationship varies along the life cycle, i.e. for academics that are at different stages of their career (which is a reasonable expectation according to the descriptive evidence previously presented by Bentley et al., 2013; Höhle & Teichler, 2013; Locke & Bennion, 2013). This part of the analysis shows that academic tenure is relatively more important for middle-aged academics, which is the age group for which stability and career prospects are particularly important in terms of academic achievements and personal / family life. Third, we investigate whether the tenure-satisfaction relationship varies across countries in Europe, and point out the existence of important differences due to country specificities in academic traditions, career paths, and employment regulations among European economies (Bennion & Locke, 2010; Enders & Teichler, 1997).

The paper contributes to the important, but still limited, strand of research on job satisfaction in academia by focusing on one important unexplored dimension, academic tenure, which is a relevant topic of concern for researchers, but it has not yet received the scholarly attention it would deserve. Further, the paper contributes by presenting a cross-country empirical analysis based on a large representative sample of researchers, which is important due to the paucity of cross-country comparative studies on academic job satisfaction (Shin & Jung, 2014). In fact, as noted by Bentley et al. (2013), "most detailed former studies are single-country, often from the USA. (...) International studies have been limited to comparisons of descriptive results and mean levels of satisfaction, rather than exploring job satisfaction through a multivariate approach" (Bentley et al., 2013, p. 240). The empirical approach used in this paper is therefore meant to complement and extend previous research on job satisfaction in academia.

⁴ At the time when the research was conducted, the results of MORE3 survey were not available.

2. Literature and hypotheses

Research on job satisfaction has investigated a large variety of factors that affect workers' subjective well-being (Erdogan et al., 2012; Castellacci and Viñas-Bardolet, 2018). Empirical research has looked at several types of occupations and different sectors of the economy. A large part of this literature has focused on jobs in private organizations, and much less so in public institutions such as Universities and HEIs. As noted by Machado-Taylor et al. (2016, p. 542), "the important area of academic staff job satisfaction is an under-researched subject in need of further discussion and documentation".

Among recent research on job satisfaction in academia, several papers have carried out country-specific studies analysing the "Changing Academic Profession" (CAP) survey. Locke and Bennion (2013) focus on the UK, and point out differences in working conditions and job satisfaction for academic staff at different stages of the career (young, mature, older). Höble and Teichler (2013) analyse CAP data for Germany, providing a descriptive analysis of a broad variety of factors that affect well-being at work. Aarrevaara and Dobson (2013) use CAP data for Finnish HEIs, emphasizing differences in working conditions between academics working in Universities and in Polytechnics.

Other country-specific studies made use of different data sources. Bender and Heywood (2006) analyse the 1997 Survey of Doctorate Recipients, a large cross-sectional sample of PhD scientists (nearly 32,000 respondents) carried out in the US. The work focuses on gender differences, and it shows how these relate to tenure and wage differentials between male and female researchers. Machado-Taylor et al. (2016) consider a sample of more than 4,500 academics in Portugal, highlighting a broad variety of factors that affect job satisfaction in academia. Escardibul and Afcha (2017) present an analysis of data from the Spanish Survey on Human Resources in Science and Technology (2009), focusing on differences between male and female PhD holders.

Cross-country comparative research on this topic is scant. Enders and Teichler (1997) present an early study based on the results of the "International Survey of the Academic Profession", comparing working conditions in HEIs in Germany, Netherlands, Sweden, England, Japan and US. More recently, Bentley et al. (2013) make use of the CAP survey to compare job satisfaction patterns in 12 countries. The empirical study, based on a large sample of 13,400 academics, shows that researchers' perception of their own well-being at work is affected by different types of antecedents previously pointed out by Hagedorn (2000), and in particular motivators, demographic variables, environmental variables and trigger factors. Finally, Shin and Jung (2014) present a comparative study of job satisfaction and job stress across 19 countries, also based on the CAP survey, and it points out that managerial reforms in HEIs are on the whole worsening working conditions and increasing job stress in academia.

2.1. Permanent contracts and job satisfaction

An important factor that has until now received very limited attention relates to the role of permanent contracts in academia. Several studies have examined the relevance of job security in

private sector occupations, and Wilkin (2013) presents a comprehensive meta-analytic review of the effects of temporary work on job satisfaction. The survey points out that temporary workers report on average lower well-being than permanent employees, and it explains this pattern in the light of social comparison theory, i.e. arguing that temporary workers are less satisfied at work because they compare themselves to their colleagues with a permanent contract.

In academia, temporary contracts have increasingly been used in the last few years. However, only a limited number of studies have examined the consequences of this important trend for researchers' job satisfaction. Escardibul and Afcha (2017) analyse data for a large representative sample of PhD holders in Spain and find, among other results, a positive and significant correlation between academic tenure and job satisfaction. Waaijer et al. (2017) present a study on the effects of temporary employment on job satisfaction in a large sample of recent PhD graduates (over 1,000 respondents) in the Netherlands. Van der Weijden et al. (2016)'s work presents the results of a recent survey carried out in the Netherland showing that low career prospects for postdoctoral researchers are related to job dissatisfaction.

In line with these recent works, the main hypothesis developed in this paper is that permanent contracts are important for job satisfaction of academic researchers. This proposition is based on three arguments. First, academic tenure gives researchers more stability and job security, thus reducing uncertainty about the future. This makes it possible for scientists to plan career steps and future work, setting up priorities and focusing on activities that are considered more relevant and more interesting – and hence more rewarding in terms of job satisfaction. On the other hand, temporary positions make employees more dependent on "psychological contracts" with their employers (Waaijer et al., 2017). When such psychological contracts are violated, the employee feels her expectations have not been met, and this typically leads to dissatisfaction with the job (Lam & de Campos, 2015; Robinson & Rousseau, 1994). Second, in line with social comparison theory, researchers often compare their performance and achievements with those of their peers, and such social comparisons represent an important source of (dis)satisfaction. However, it is reasonable to argue that tenured employees will be less exposed to such comparison effects (because their job security is not affected by their peers' performance), whereas temporary workers are more vulnerable in this respect (as their colleagues' performance may have implications for their chances to get a permanent job in the future). Third, temporary employment will not only have negative effects on satisfaction with working conditions, but it will arguably also reflect on personal life. For instance, having a temporary contract will in many countries make it harder to get a mortgage to buy a house (Waaijer et al., 2017); and/or it will make it more difficult to plan family and social life in a given location (given the high mobility that academic researchers are typically subject to). Based on these three arguments, we formulate the following hypothesis.

H1: Permanent contracts are positively related to academic job satisfaction.

2.2. Job satisfaction at different stages of the academic career

It is also important to investigate whether the relationship between job security and well-being at work varies along different stages of the academic career. The literature points out a relationship between career stage, working conditions and job satisfaction (e.g. Enders &

Teichler, 1997). Hence, it is important to examine whether permanent contract is an equally important factor of job satisfaction for young early stage researchers, more experienced middle-aged scientists, and older academics.

In general terms, the literature on life satisfaction has previously pointed out a remarkable regularity that holds in many countries worldwide, the so-called U-shape of life (Blanchflower & Oswald, 2004, 2008). According to this, life satisfaction is typically high at young ages, it declines steadily until mid-life, and thereby increases again during older age. A similar pattern has also been found for job satisfaction. Clark et al. (1996), using data from the British Household Panel Study from 1991 (about 10,000 individuals), find a robust U-shaped relationship between age of workers and job satisfaction, after controlling for a large number of possible confounding factors. Clark et al. (1996) point out various possible explanations for this pattern, emphasizing one plausible argument that is particularly relevant for our study, namely changing expectations and aspirations over the career. At young ages, workers often experience high satisfaction due to the excitement of having a job, instead of being unemployed like other peers in the same age group. As the career proceeds, workers typically rise their aspirations and expectations about desired working conditions, which may lead to dissatisfaction when these aspirations turn out to be unmet. Finally, at older age, workers have increased experience and maturity, which lead them to form less ambitious aspirations and more realistic expectations, as well as to put less emphasis on comparisons with other peers and colleagues at work.

This U-shaped pattern has not been investigated yet for the case of academic researchers. However, some recent studies provide scattered evidence that is in line with this idea. For instance, Höble and Teichler (2013) find that job satisfaction in Germany is lower for middle-aged academics in their late 30s and early 40s. Machado-Taylor et al. (2016) find a similar pattern for Portuguese academics, with highest satisfaction at early and later stages of the career, and lower levels in the middle. Bentley et al. (2013) also report a positive relationship between age and job satisfaction at later stages of the career. Further, Escardibul and Afcha (2017) include a quadratic term in their regression analysis of the determinants of job satisfaction among Spanish PhD holders, finding support for a non-linear relationship between age and workers' well-being.

We contend that the theoretical argument explaining such U-shape of academic life is closely related to Clark et al. (1996)'s explanation for the working population as a whole. According to Hagedorn's (2000) framework, age is a "trigger", as in different phases of life academics tend to change their expectations about desired work conditions and job satisfaction. Hence, differences in job satisfaction among researchers at different stages of the career may be explained by "differences of expectation, focus and aspiration and in levels of understanding of the demands of an academic career" (Locke & Bennion, 2013, p. 233). In other words, it is reasonable to postulate that young early stage researchers will typically have high motivation and a focus on learning opportunities and intrinsic aspects of the scientific work. Middle-aged and more experienced academics will often have higher ambitions, stronger pressures to perform, and they will also be more subject to comparison effects. Finally, older and well-established researchers will have greater experience, which will arguably lead to form lower and more realistic ambitions, and to be less vulnerable to performance pressure and social comparison effects.

Based on this reasoning, we develop our second hypothesis. We argue that job security is not an equally important factor at all stages of the academic career. Although having a permanent contract is admittedly important for all researchers, we postulate that it is relatively more important for middle-aged academics. The reason is twofold. On the one hand, academic tenure makes researchers less vulnerable to performance pressure and social comparison effects, which are crucial at intermediate stages of the career. On the other hand, having a permanent contract is important because it makes it easier to plan personal and family life, e.g. reducing mobility and the need to get a job in other cities or countries, which is a negative factor for satisfaction related to family life. This is a particularly important aspect for middle-aged individuals, which is typically the age group when important family-related decisions (e.g. having children; getting married; buying a house) are taken.

H2: Permanent contracts are relatively more important for the job satisfaction of researchers at an intermediate stage of the career.

2.3. Differences across countries in Europe

Although the two hypotheses that we have pointed out above formulate general relationships that we expect to hold, on average, for all researchers in European countries, it is also important to consider that there are huge differences in academic and labour market conditions across countries in Europe, which may affect the extent to which researchers get academic tenure, and the latter affects job satisfaction.

Regarding differences in terms of academic tenure systems, Enders and Teichler (1997) emphasize country specificities for early stage researchers, and point out that «different systems offer tenured or unlimited contracts for middle-rank positions to younger staff members with a PhD to a different extent» (p. 350). For instance, Germany has worse employment security for younger staff compared to other European countries (Enders & Teichler, 1997). Other studies emphasize the existence of more general differences in academic traditions and institutions across European countries, which determine different career paths in academia (Bennion & Locke, 2010; Brechelmacher et al., 2015; Cavalli & Moscati, 2010; Frølich et al., 2018).

However, cross-country differences may also be related to the more general issue of labour market institutions, and in particular employment protection legislation (EPL), which may of course also have implications for academic tenure and career structure in different countries (Waaijer et al., 2017). European countries have largely different relationships between employment protection legislation (e.g. legal protection against dismissal) and job security, on the one hand, and labour market flexibility, on the other (Muffels & Luijkh, 2008). Böckerman (2004) and Clark and Postel-Vinay (2009) find a negative correlation between EPL and perceived job security. The reason for this is that stricter EPL makes it harder to dismiss workers. Strict EPL is thus good for “insiders” (i.e. workers that are already permanently employed) but it makes it harder for “outsiders” (unemployed, or part-time workers) to find a new job. Hence, EPL may also end up increasing job insecurity of temporary workers, which might anticipate the costs and insecurity of becoming unemployed in the future. Examples of countries with strict EPL in Europe

are Southern EU economies, as well as Sweden, Norway and Germany (Esser & Olsen, 2012, p. 446). Relatedly, it has also been noted that countries with stricter EPL typically make active use of temporary jobs (Clark & Postel-Vinay, 2009). Recent labour market reforms towards deregulation in Europe have not changed substantially regulations to protect insiders, but rather affected hiring conditions for outsiders, hence in practice increasing the use of temporary forms of contract. This general trend is also reflected in the academic labour market, in which temporary contracts are now increasingly frequent, among other countries, in the Netherlands and Germany, as well as UK and the Nordic economies.

The variety of capitalism approach points out different groups of countries that are characterized, among other institutional features, by distinct labour market institutions (Amable, 2003; Hall & Soskice, 2001). In our empirical analysis, in line with this literature, we will distinguish five groups of countries (Continental, Nordic, Anglo-Saxon, Mediterranean, Eastern EU), in order to investigate whether our two theoretical hypotheses hold for all groups, or the extent to which they differ among European countries.

3. Data and methods

The database used for this study is the second edition of the Mobility Survey of the Higher Education Sector (MORE2), which was carried out in 2012. This is a large-scale representative survey of European researchers, their working conditions and their career paths. The objective of the MORE2 study was to “provide internationally comparable data, indicators and analysis in order to support further evidence-based policy development on the research profession at European and national level” (IDEA Consult, 2013). MORE2 provides information on about 10,000 researchers (from different scientific fields and at different stages of the career stages), working in HEIs in the EU27 member states, associated countries (Iceland, Norway, Switzerland) and candidate countries (Croatia, Turkey, the former Yugoslav Republic of Macedonia).

The dependent variable in our study is job satisfaction. The MORE2 survey includes 13 questions measuring different aspects of researchers’ reported well-being at work: job security; salary; benefits; dynamism; intellectual challenge; level of responsibility; degree of independence; contribution to society; opportunities for advancement; mobility perspectives; social status; job location; reputation of employer. Our dependent variable job satisfaction is a composite indicator that sums together the thirteen variables noted above. The reason for combining these variables together into a single composite indicator is that they are highly correlated to each other (Cronbach's alpha = 0.76), so that the composite job satisfaction indicator provides a good summary measure of different aspects of well-being at work.

The MORE2 survey contains a large variety of questions that can be used as variables in our analysis. Table 1 reports all variables that we have included in the empirical study, along with their definition and some descriptive statistics. Among the personal characteristics of individual researchers (top part of the table), we consider their gender, age, nationality, family status and education level. Among the working characteristics and conditions (bottom part of table 1), we include the scientific field in which each researcher works, teaching load, reported career

prospects and collaboration patterns (within academia and outside). The main explanatory variable in the empirical analysis is the contract duration variable, which is a dummy that takes value 1 for researchers that have a permanent contract, and 0 for those with a temporary contract.

Table 1. Indicators: definitions and descriptive statistics

Variable	Description	Mean	Std. Dev.	Min	Max
Job satisfaction	Sum of 13 indicators of workers' satisfaction with current position.	10.01	2.64	0	13
Personal characteristics					
Gender	1 if worker is male, 2 female.	1.38	0.49	1	2
Age	Age of respondent (years).	43.39	10.94	19	71
Age ²	Age of respondent squared.	2002. 76	995.57	361	5041
Couple	1 if worker has a stable partner, 0 otherwise.	0.74	0.44	0	1
Children	1 if worker has children, 0 otherwise.	0.55	0.50	0	1
Education	Highest level of education successfully completed. Four categories: 1 'non higher education/post-secondary'; 2 'Undergraduate'; 3 'Graduate'; 4 'Postgraduate'.	3.12	0.94	1	4
Foreign researcher	1 if country of employment is different from country of citizenship, 0 otherwise.	0.16	0.37	0	1
Work characteristics					
Engineering & technology	Field of Science: Engineering & technology.	0.15	0.36	0	1
Medical Sciences	Field of Science: Medical Sciences.	0.21	0.41	0	1
Agricultural Sciences	Field of Science: Agricultural Sciences.	0.04	0.20	0	1
Social Sciences	Field of Science: Social Sciences.	0.26	0.44	0	1
Humanities	Field of Science: Humanities.	0.11	0.31	0	1
Natural Sciences	Field of Science: Natural sciences.	0.23	0.42	0	1
Full time	1 if job is full-time, 0 if it is part-time.	0.89	0.31	0	1
Contract duration	1 if permanent contract, 0 if temporary.	0.61	0.49	0	1
Teaching	Teaching load. Four categories: from None to 100% of overall working hours.	1.72	1.12	0	4
Career Prospects	How confident do you feel about the future prospects for your research career? 1: low; 4: high.	3.00	0.82	1	4
Coll_Academic	1 if worker collaborate with colleagues in other HEIs, 0 otherwise.	0.92	0.28	0	1
Coll_nonAcademic	1 if worker collaborate with non-academic sector, 0 otherwise.	0.48	0.50	0	1

Number of observations = 9,389.

The objective of the econometric study is to investigate whether researchers' job satisfaction is affected by the type of contract they have (permanent vs. temporary). An important issue that has to be taken into account in this analysis is that the main explanatory variable of interest,

permanent contract, is arguably not an exogenous and randomly assigned variable, but it is in turn dependent on a set of work-related and personal characteristics. For instance, the probability that a researcher has a permanent contract does arguably depend, among other things, on the worker's age, education, experience level, and scientific field. This means that when we estimate the relationship between job satisfaction and academic tenure we have to take into account the possible endogeneity of the permanent contract variable.

To take this issue into account, we adopt a two-equation IV econometric approach. The first step is a probit equation that investigates the factors explaining why some researchers have a permanent contract and others have not, while the second equation studies the relationship between job satisfaction, academic tenure (endogenous variable) and control factors. The econometric model is the following:

$$PC_{ic} = \alpha + \sum_k [\beta^k W_{ic}^k] + \Psi Z_{jc} + \sigma_{ic} \quad (1)$$

$$JS_{ic} = \mu + \eta PC_{ic} + \sum_k [\pi^k W_{ic}^k] + \varepsilon_{ic} \quad (2)$$

where PC denotes permanent contract, JS job satisfaction, W is a set of control variables, Z is a peer effect included as instrumental variables (see below), and σ and ε are the error terms of the two equations. The subscripts i, c and j indicate the individual researcher, country and University (HEI) respectively. The subscript k indicates the kth variable in the vectors of control variables.

To improve identification of the model, in addition to other explanatory variables, equation 1 also includes a vector of instrumental variables Z that are not included in equation 2 and that are supposedly uncorrelated with the error term of the second equation. Specifically, we use two instrumental variables, both of which are measured at the HEI-level: publications per capita and citations per capita of the University in which each researcher works. Both variables are from the ETER database. The main idea of using these HEI-level variables as instruments in the permanent contract equation is that more prestigious Universities (that in general have higher publications and citations per capita) typically represent more competitive environments that attract a large number of well-qualified and talented researchers, and where it is therefore more difficult, on average, to get a permanent position. These HEI-level instrumental variables exploit exogenous variation in HEIs' prestige. Differences in prestige across Universities in Europe are typically large and persistent over time (as indicated for instance by international ranking systems). Further, these differences are not affected by the set of individual-level control variables (W_{kic}) included in our model specification.

The key assumption of this identification strategy is that the HEI-level instrumental variables affect job satisfaction only through their impact on academic tenure, and that they are therefore not directly correlated with the job satisfaction variable (and any possible unobserved determinant of it). A possible criticism of this assumption would be to say that more prestigious and more competitive HEIs are also those in which researchers can feel more pressure to perform, which is in turn a factor that negatively affects job satisfaction. However, we argue that the sort of social comparison effects that are relevant for job satisfaction do not relate to the prestige of the University as such (which is typically a large multi-unit organization), but they rather work at

a more disaggregate level of analysis, i.e. the specific scientific discipline, Department or research group to which each individual researcher is affiliated. In other words, our point is that HEI-level prestige affects the extent to which an academic institution makes use of temporary contracts (since this is an institutional mechanism that is typically regulated by University leadership authorities, in line with national employment regulations), but it does not affect directly well-being reported by researchers working in that institution.

4. Results and discussion

Before presenting the results of the tests of the two hypotheses outlined in section 2, it is interesting to look at the results of the first-stage of the econometric model. Table 2 reports the results of probit estimations of equation 1. The first two variables in the table (age and age-squared) indicate that the probability to have academic tenure increases non-linearly with age, i.e. it increases throughout the career up to a certain threshold, and it increases more slowly thereafter. Being a foreign researcher decreases the probability to get a permanent contract. The permanent contract variable is also positively correlated, among others, with work characteristics such as teaching load and full-time work (as opposed to part-time employment). Further, the two HEI-level instrumental variables, measuring the institutional prestige of the HEI where a researcher is employed (proxied by publications and citations per capita), are negatively related to academic tenure, suggesting that, *ceteris paribus*, it is more difficult to get a permanent contract in a prestigious University.

Table 2. First-stage results (equation 1). Dependent variable: Permanent contract (dummy). Probit estimations

	H1	H2
Age	0.307*** (0.024)	0.306*** (0.024)
Age ²	-0.003*** (0.000)	-0.003*** (0.000)
Gender	-0.044 (0.059)	-0.045 (0.059)
Couple	0.056 (0.081)	0.057 (0.081)
Children	0.095 (0.077)	0.100 (0.076)
Education	0.047 (0.032)	0.045 (0.032)
Full time	0.835*** (0.106)	0.841*** (0.105)
Foreign researcher	-0.252** (0.082)	-0.252** (0.082)
Teaching	0.240*** (0.031)	0.240*** (0.031)
Career Prospects	0.249*** (0.036)	0.247*** (0.036)
Coll_Academy	0.109 (0.099)	0.123 (0.098)
Coll_nonAcademic	0.055 (0.058)	0.052 (0.058)
HEI's publications	-0.000*** (0.000)	-0.000*** (0.000)
HEI's citations	-0.211** (0.074)	-0.222** (0.073)
<i>Scientific field</i>		
Engineering Technology	0.014 (0.116)	0.020 (0.115)

Medical Sciences	-0.068 (0.106)	-0.064 (0.106)
Agricultural Sciences	-0.233 (0.176)	-0.231 (0.176)
Social Sciences	0.035 (0.105)	0.039 (0.104)
Natural Sciences	-0.146 (0.105)	-0.138 (0.105)
Intercept	-9.189*** (0.596)	-1.107*** (0.268)
 N	 8,405	 8,405

Regressions include country dummies. Standard errors in parentheses.

Table 3 presents the results of equation 2 (second-stage), which tests the two hypotheses on the role of permanent contracts on job satisfaction (see section 2). The control variables confirm some patterns that are in line with previous research on job satisfaction in academia. Researchers' education level is positively related to the satisfaction they report. Teaching load negatively affects job satisfaction, given academics' typical preference to focus on research rather than pedagogical activities. Further, having good career prospects for the future is strongly correlated with current job satisfaction.

Focusing now on the first column of table 3, the permanent contract variable reported on top of the table presents the results of tests of hypothesis 1. The results indicate that academic tenure positively and significantly affects job satisfaction. This provides support for hypothesis 1. After controlling for a number of possible confounding factors, and after taking into account the possible endogeneity of the tenure variable, we find that job security (having a permanent contract) is an important factor supporting well-being of academic researchers. As explained in section 2, our interpretation of this result is based on three related arguments. First, job security reduces uncertainty about the future, and it gives researchers the possibility to plan future career steps and working activities with a focus on more rewarding tasks. Second, tenured employees are in general less exposed and less vulnerable to social comparison effects, because their job security and future career prospects are not affected directly by their colleagues' performance. Finally, having a permanent contract has also positive implications in terms of personal life, e.g. by making it easier to plan family and social life in a given location on a long-term basis, without the prospect to move to another city or migrate to another country.

Table 3. Second-stage results (equation 2). Dependent variable: Job satisfaction.
Linear regression with endogenous covariates

	H1	H2
Permanent	0.734* (0.373)	0.251 (0.354)
Age	-0.181*** (0.042)	-0.167*** (0.043)
Age ²	0.002*** (0.000)	0.002*** (0.000)
Permanent * Age		0.219** (0.068)
Permanent * Age ²		-0.003*** (0.001)
Gender	0.007 (0.085)	0.002 (0.085)

Couple	-0.082 (0.122)	-0.087 (0.122)
Children	0.178 (0.114)	0.194 (0.113)
Education	0.215*** (0.047)	0.223*** (0.047)
Foreign researcher	-0.080 (0.132)	-0.101 (0.130)
Full time	0.048 (0.151)	0.180 (0.153)
Teaching	-0.128* (0.051)	-0.104* (0.050)
Career Prospects	1.227*** (0.064)	1.243*** (0.063)
Coll_Academy	-0.145 (0.163)	-0.137 (0.164)
Coll_nonAcademic	0.067 (0.081)	0.060 (0.080)
<i>Scientific field</i>		
Engineering Technology	0.164 (0.168)	0.160 (0.169)
Medical Sciences	0.172 (0.162)	0.166 (0.162)
Agricultural Sciences	0.361 (0.246)	0.314 (0.242)
Social Sciences	0.201 (0.154)	0.200 (0.154)
Natural Sciences	0.348* (0.154)	0.321* (0.155)
Intercept	9.972*** (1.024)	6.036*** (0.381)
 N	8,405	8,405

Regressions include country dummies. Standard errors in parentheses.

* p<0.05, ** p<0.01, *** p<0.001.

The second column of table 3 presents the results of tests of hypothesis 2. This hypothesis postulates that permanent contracts are relatively more important for the job satisfaction of researchers at an intermediate stage of the career. Before discussing these results, it is important to point out that table 3 finds a U-shaped relationship between age and job satisfaction, since the estimated coefficient for the age variable is negative, and the one for the age-squared variable is positive. This pattern, which is in line with extant research (notably Clark et al., 1996) indicates that job satisfaction of academic researchers in our sample tends to decrease in the early phase of the career, it reaches the lowest point at middle-age (43-year old on average, according to our estimation results), and thereby increases steadily in the later part of the career.

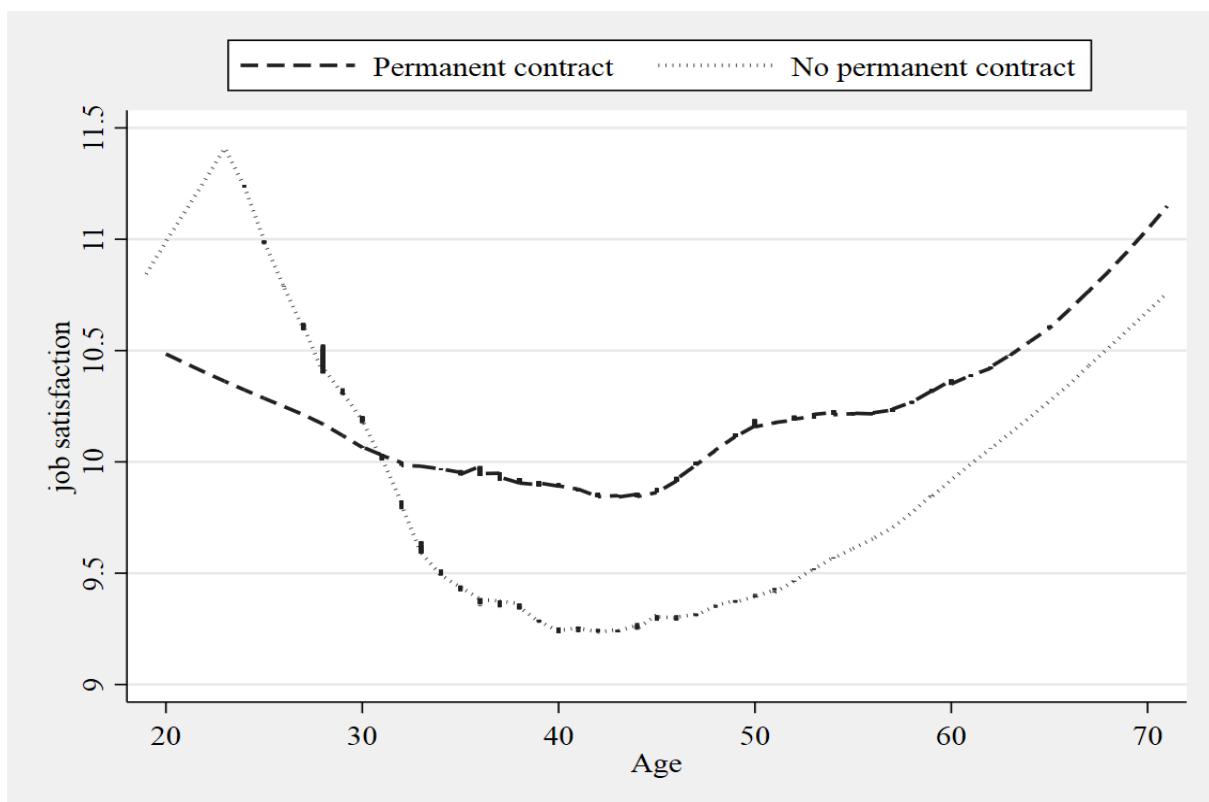
Based on this background, hypothesis 2 tests whether the type of contract that researchers have (permanent vs. temporary) affects such U-shaped relationship between age and job satisfaction. To put it differently, we test whether age moderates the positive effect of academic tenure on researchers' well-being. To test this second hypothesis, we introduce two interaction terms in the model specification of equation 2, which multiply academic tenure with age and age-squared, respectively. In this extended model specification, the coefficient that tests hypothesis 2 is the interaction effect of permanent contract and age-squared (Haans et al., 2016).

The results in the second column of table 3 show that this interaction variable is negative and significant. This means that the permanent contract variable affects the U-shaped relationship between age and job satisfaction by flattening it (i.e. decreasing its slope before the turning point). This econometric result is also evident in figure 1, which compares the U-shape of academic life for researchers with a permanent and those with a temporary contract. The figure shows that both tenured and non-tenured academics tend to experience a decrease in job satisfaction in the early phase of the career and up until middle-age, but such decrease is much steeper for

temporary workers, and substantially milder for permanent employees. The figure also shows that the relative effects of academic tenure are more visible up until middle-age, whereas the increase in job satisfaction at later stage of the career is remarkably similar for tenured and non-tenured academics.

This econometric and graphical evidence lends support to our second hypothesis, i.e. that job security is a relatively more important factor of job satisfaction for middle-aged academics. As discussed in section 2, the interpretation of this result is based on two arguments. First, a permanent contract makes researchers less vulnerable to performance pressure and comparison effects with peers and colleagues, which are particularly important at intermediate stages of the career (and less so at later stages of academic life). Second, job security may also have some important positive implications for researchers' personal and family life, for instance because it reduces uncertainty about the future, e.g. due to the need to get a job in other cities or countries. This aspect is particularly important for middle-aged individuals, since this is the age at which people typically take important family-related decisions.

Figure 1. U-shaped relationship between age and job satisfaction, permanent vs temporary contract



We have so far presented results for the whole sample of researchers that have responded to the MORE2 data survey, and which therefore provide a general test of our hypotheses when we

consider academics from all European countries in this dataset. However, an important aspect that must be discussed refers to possible cross-country differences in these results. As noted in section 2, extant research points out that European countries differ substantially in terms of working conditions for researchers, and particularly so at early stages of the career. The academic tenure system does also vary among countries in the EU. These differences are broadly related to country-specific academic traditions and HEIs policies, as well as labour market institutions and policies (e.g. employment protection legislation; see Waaijer et al., 2017). It is therefore reasonable to expect that the role of permanent contracts for job satisfaction may not be the same across European economies, and arguably be more important for some and less relevant for other countries.

In order to discuss this aspect, we have repeated the tests of the two hypotheses for five distinct groups of countries: Continental, Nordic, Anglo-Saxon, Mediterranean, and Eastern EU. These country groups are in line with studies in the variety of capitalism approach, which points out different groups of countries that are characterized by distinct institutional features, and in particular different labor market institutions (Amable, 2003; Hall & Soskice, 2001).

Tables 4 and 5 report the results of estimations of equation 2 for each of these country groups separately. Table 4 focuses on the test of hypothesis 1. While most of the control variables have similar results across country groups, an important difference is that the permanent contract variable is only significant for the sub-samples of Continental EU and Scandinavian countries, and not significant at conventional levels in the other three country groups. Table 5 shifts the focus to the test of hypothesis 2. The interaction variable Permanent * Age-squared (which is the one that we use to test the hypothesis on the moderating effects of age on the job security-satisfaction relationship) is negative and significant for the groups of Continental EU and Scandinavian countries, and again not significant for the other three sub-samples. Taken together, the results in tables 4 and 5 indicate that we are able to confirm the important role of job security for researchers' well-being only for Continental EU and the Nordic economies, whereas the evidence for other European countries is not statistically precise, and it does not enable to support our two hypotheses.

What can be the reasons of this? One possible explanation may simply be related to the way in which the econometric exercise was done. By dividing the MORE2 sample into five distinct subsamples, we carried out some of the estimations on samples that are smaller (see e.g. the relatively small size of the Anglo-Saxon group) and have more limited variability, which may arguably explain some of the weakly significant estimation coefficients.

However, it is also possible to put forward another explanation, that is related to country-specific institutional characteristics that are important for Continental and Scandinavian countries, and less so for other countries in Europe. These countries, according to MORE2 data, have on average a high level of academic job satisfaction (above the EU average), and at the same time a relatively low share of permanent contracts vis-à-vis other European countries. We think that this peculiar combination of high job satisfaction and flexible labour markets for academic researchers may contribute to explain our econometric results.

These countries typically combine better working conditions for academics than other countries in Europe (e.g. in terms of wage, available resources and infrastructures, flexible time and work

organization). Such good working conditions make the HEI sector highly attractive for many young workers, who may prefer to undertake an academic career and take a PhD instead of working in the private sector. However, in recent years, there has been a growing mismatch in these countries between the number of young and middle-aged researchers aspiring to an academic career, on the one hand, and the number of available permanent positions, on the other (Bennion & Locke, 2010; Brechelmacher et al., 2015; Cavalli & Moscati, 2010; Frølich et al., 2018). In the same period, HEIs in these countries have therefore increasingly made use of temporary forms of employment (which the trends towards deregulation and labour market reforms have facilitated). In short, according to this interpretation, it is this peculiar combination of high job satisfaction, good working conditions, but relatively low job security that may contribute to explain why researchers in Continental EU and Nordic economies point to temporary employment as an important factor hampering well-being at work.

Tables 4. Second-stage results for different country groups. Dependent variable: Job satisfaction. Linear regression with endogenous covariates. Baseline results, no interaction variables (test of hypothesis 1)

	Continental EU	Scandinavian	Anglo-Saxon	Southern EU	Eastern EU
Permanent	1.447**	1.069*	0.949	1.087	0.296
Age	-0.324***	-0.196***	-0.078	-0.176	-0.137*
Age ²	0.003***	0.002***	0.001	0.002	0.002*
Gender	0.024	0.256	0.073	-0.169	0.154
Couple	-0.008	0.320	-0.487	-0.029	-0.174
Children	0.104	0.028	0.395	0.093	0.265
Education	0.081	0.374***	0.343*	0.236**	0.420***
Foreign researcher	0.144	-0.020	-0.581*	0.443	0.259
Full time	0.103	-0.073	-0.875	-0.082	0.280
Teaching	-0.039	-0.384***	-0.334	-0.092	-0.237***
Career Prospects	0.988***	1.183***	1.295***	1.310***	1.385***
Coll_Academy	0.213	-0.230	0.434	-0.807**	-0.207
Coll_nonAcademic	-0.031	-0.030	-0.197	0.223	0.253
<i>Scientific field</i>					
Engineering Technology	0.627*	0.277	-0.301	0.174	0.351
Medical Sciences	0.935***	0.094	-1.238**	0.507	0.478
Agricultural Sciences	0.580	0.343	0.979	0.816	0.258
Social Sciences	0.562*	0.057	-0.395	0.413	0.147
Natural Sciences	0.595*	0.428	-0.134	0.626*	0.396
Intercept	13.430***	10.156***	8.624	8.640***	6.071***
N	2,486	1,239	659	1,842	2,179

Standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001.

Tables 5. Second-stage results for different country groups. Dependent variable: Job satisfaction. Linear regression with endogenous covariates. Models including interaction variables (test of hypothesis 2)

	Continental EU	Scandinavian	Anglo-Saxon	Southern EU	Eastern EU
Permanent	0.571	0.015	0.168	1.030	0.135
Age	-0.310***	-0.127	-0.045	-0.179	-0.109
Age ²	0.003***	0.001*	0.001	0.002	0.001*
Permanent * Age	0.349**	0.378**	0.376	-0.040	0.195
Permanent * Age ²	-0.004**	-0.004**	-0.004	0.000	-0.002
Gender	0.038	0.185	0.082	-0.170	0.155
Couple	-0.040	0.239	-0.448	-0.035	-0.164
Children	0.146	0.143	0.403	0.093	0.275
Education	0.073	0.397***	0.361**	0.235**	0.433***
Foreign researcher	0.106	-0.092	-0.575*	0.434	0.228
Full time	0.260	0.277	-0.596	-0.034	0.312
Teaching	-0.006	-0.293*	-0.256	-0.092	-0.234***
Career Prospects	0.995***	1.256***	1.325***	1.312***	1.394***
Coll_Academy	0.232	-0.190	0.443	-0.804**	-0.218
Coll_nonAcademic	-0.047	-0.001	-0.185	0.216	0.256
<i>Scientific field</i>					
Engineering Technology	0.628*	0.233	-0.329	0.183	0.355
Medical Sciences	0.963***	0.131	-1.261**	0.519	0.466
Agricultural Sciences	0.559	0.321	0.392	0.835	0.207
Social Sciences	0.582*	-0.017	-0.357	0.417	0.133
Natural Sciences	0.611*	0.425	-0.297	0.635*	0.366
Intercept	6.309***	5.273***	6.743***	4.647***	3.084***
N	2,486	1,239	659	1,842	2,179

Standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001.

5. Conclusions

The paper has presented an empirical analysis of the role of academic tenure for job satisfaction of researchers in European countries. We have developed new hypotheses on the relationships between job security and well-being at work in academia, and empirically tested those using data from the MORE2 survey, a large-scale representative survey of European researchers, their working conditions and career paths.

The empirical results point out that academic tenure is an important antecedent of job satisfaction for researchers working in HEIs in Europe. We find that academics with a permanent contract are on average more satisfied with their job than their colleagues that are employed on a temporary basis. We also show that academic tenure is a relatively more important factor of

job satisfaction for researchers at an early and intermediate stage of the career, and less so for older and well-established scientists.

Finally, we also point out some important differences in the working of the model among European countries. Our two hypotheses receive empirical support for the groups of Continental EU and Nordic economies, whereas the tests are not statistically significant for other country groups (Anglo-Saxon, Southern EU, Eastern EU economies). This calls for future empirical research to investigate further the relationships between country-specific characteristics of the academic labour market and employment regulations on temporary work, on the one hand, and working conditions and job satisfaction in different countries in Europe, on the other.

On the whole, the paper contributes to the strand of research on job satisfaction in academia by focusing on one important variable – job security and academic tenure – which, in spite of being a major topic of daily discussion, it has not yet received sufficient attention in scholarly research on well-being at work.

By showing empirically that permanent contracts matter for job satisfaction in a large sample of European researchers, the paper has also some important managerial and policy implications. Job satisfaction of researchers is a key policy target for two reasons. First, and more obviously, because public HEIs should to the extent possible provide their employees with good working conditions and career prospects, which are important preconditions to build up open and stable public spaces where creativity and new scientific ideas can flourish and be disseminated to the society. Second, job satisfaction is also important because it contributes to shape the attractiveness of a country's R&D sector and public science system. Countries that provide good working conditions for public scientists will in general be able to attract a larger pool of talented researchers from the domestic private sector, and/or from other countries. And a larger and more competitive HEI sector will be important to foster scientific and technological innovations in the economic system as a whole.

Policy-makers and University leadership authorities should reflect upon this dilemma, and be aware that the recent trends towards labour market deregulation and the increasing use of temporary contracts in academia may end up worsening job satisfaction of non-tenured researchers, making the public science system less attractive for young talented individuals, and thereby less competitive in the future.

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IRMO Occasional Papers 1/2018

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