Migration patterns and job satisfaction: evidence from European doctorate holders

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ORIGINAL PAPER

Migration patterns and job satisfaction: evidence from European doctorate holders

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Abstract
The aim of this study was to disentangle the role migration plays in several job satisfaction dimensions for academic researchers. We employ a novel database, MORE2, to track the migratory behaviour of European doctorate holders and use a multinomial treatment model to deal with selections bias. We find that more migratory individuals demonstrate higher levels of job satisfaction across several dimensions. These findings are in line with the hypothesis that economic agents who migrate more are better at processing information and find more suitable employment.

JEL Classification I26 · J28 · J61 · R23

1 Introduction

A large body of the economics literature has dealt with the phenomenon of migration, whereby the focus has been to analyse the mechanisms under which individuals decide whether to migrate, along with the pecuniary outcomes of such an action. In recent decades, with the increase in international migration of individuals with tertiary education, a subset of migration literature has put the spotlight onto skilled workers.[1] From an economics perspective, this is important, since the migration of highly skilled individuals is perceived as a mechanism to diffuse and develop new

[1] For recent reviews see Czaika and Parsons (2017) and Kerr et al. (2016). Specifically, for the case of OECD countries, for the years 2000/2001 and 2010/2011, immigration of individuals with tertiary education has increased about 70% (Arslan et al. 2014).

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ideas, share knowledge and increase innovation. Among the skilled workers, academics and researchers are a sub-group who are internationally very mobile (Hunter et al. 2009; Ioannidis 2004; Trippl 2013) but also driven by non-economic factors. Not only do these people increase knowledge sharing by moving to another country, but they also do so with short visits, such as visiting positions, conferences, co-authoring with people from other countries and co-patenting. In that sense, academic researchers are different from the general population of skilled workers in that their moves are not necessarily permanent (Newland 2009) and again not always economically motivated.[2]

Important for our study is the view that migration can be perceived as a form of investment in human capital (Sjaastad 1962).[3] Different aspects of a person's life change considerably when migration takes place. This is because an individual, through migration for example, may attend a better educational institution, or find a more appropriate job that matches her abilities. Highly skilled economic agents will have higher motives to try and reap the rewards of their long and on-going process of investment in human capital.

In this study, we turn our attention to migrants that hold a Ph.D. degree. That is, individuals who possess specialized knowledge and constitute an important subsample of the general population. In the economics literature, although a large body of research deals with the migration and consequences of highly skilled migration, it remains relatively silent about doctorate holders. Yet, this group of people presents some interesting traits worth investigating. Namely, the highly educated are typically more mobile than other education groups (Docquier and Marfouk 2006) and tend to gain most from migration (Sabot 1987; Yankow 2003). In addition, academic researchers tend to move more often than the rest of the workers, as they try to find the best potential match for their abilities and career perspectives. To this end, they do not only move within a country, but they might decide to immigrate to other countries which may vary markedly from their country of origin.

The mobility decisions of academic researchers are less likely to be driven by economic motives compared to other highly skilled workers (Baruffaldi and Landoni 2016; Mahoney 1979; Merton 1979; Sauermann and Cohen 2010) and more likely to be driven by non-economic factors (Mahroum 2000; Roach and Sauermann 2010; Salt 1997; Sauermann and Cohen 2010; Stern 2004). Such factors are recognition by peers, independence, intellectual curiosity and challenge, and academic freedom. One of these aspects in a person's life is job satisfaction, an important parameter

[2] For the recent literature regarding international migration of students and highly skilled workers, see, among others, Beine et al. (2014), Freeman (2010), OECD (2005), and Skeldon (2009). Regarding the diffusion of knowledge see Döring and Schnellenbach (2006), Edler et al. (2011), Goldin et al. (2011), Miguélez and Moreno (2014), Møen (2005), OECD (2008), Schiller and Revilla-Diez (2010), Thorn and Holm-Nielsen (2008), Trippl (2013), Williams (2007), Zucker and Darby (2006), Zucker et al. (1998, 2002).

[3] Human capital theory assumes economic agents weigh the cost and benefits of migrating and decide whether to migrate or not. These economic agents who migrate are selected individuals in the sense that they are more likely to migrate to get higher education and find a better job that matches their educational background (Faggian et al. 2007a; Jewell and Faggian 2014; Kazakis and Faggian 2017).

that affects an individual's performance either at work or other life activities. Particularly for academic researchers, moving to a specific location might have multiple implications in their academic career (e.g., academic network, grant possibilities). Therefore, a researcher's job satisfaction is expected to be affected by her migration decisions.

Past research has focused on the decision to migrate and the selectivity of migrants, as well as the impact of mobility of academic researchers on productivity, citation rates and career development (Aksnes et al. 2013; Azoulay et al. 2012; Baruffaldi and Landoni 2012; De Filippo et al. 2009; Franzoni et al. 2014; Hunter et al. 2009; Levin and Stephan 1999; Veugelers and Bouwel 2015). However, few studies have focused on the job satisfaction of academic researchers which is important in trying to understand workers' decisions (Clark 1996, 2001). This is somewhat surprising, given how important job satisfaction is in the working environment (Clark 2001) and in later employment decisions for academic researchers (Baruffaldi and Landoni 2016).

The study of happiness has a long history in several disciplines, such as economics, psychology, and sociology. Regarding economics, Easterlin (1974) was one of the first researchers to show that average happiness in the United States seemed to be stagnant, although the income was increasing rapidly ("Easterlin paradox"). Other researchers looked at how micro- and macro-economic characteristics could potentially affect self-reported well-being (see e.g., Clark and Oswald 1994; Frey and Stutzer 2000; Alesina et al. 2004; Stutzer and Lalive 2004; Di Tella and MacCulloch 2005). In studies that use questionnaires, the premise is that self-reported happiness could be perceived as a proxy for economic utility (see e.g., Alesina et al. 2004). Researchers have also examined the factors that affect the quality of life (QOL) at the regional level. For example, Biagi et al. (2018) apply the capability approach of Sen (1987, 1993) to investigate the determinants of QOL in an Italian city on the island of Sardinia. A common outcome of these studies is the mixed results they obtain, indicating that measuring happiness and asserting determinants that affect it is not an easy task.

In this work, we study a specific aspect of subjective well-being, that of job satisfaction. When individuals first start a job, they have only limited information about their occupation and the location they work. As they gain more experience, they get acquainted with their working environment and update their beliefs accordingly. It is in that period, when concerns about job and location may arise. Furthermore, job satisfaction is important, as previous research links it with productivity (Oswald et al. 2015; Patterson et al. 2004), the probability to quit a job (Clark 2001; Clark et al. 1998; Green 2010), and retirement (Clark et al. 2015).

Our aim is to study how migration patterns of European researchers affect their well-being in various job-related satisfaction dimensions. In doing so, we understand that groups of individuals who belong in different migration categories are not randomly selected. That is, different migratory groups possess latent characteristics that might affect their ultimate decision of where to migrate and how often. We employ advanced econometric techniques to deal with the bias issue stemming from selection.

We contribute to the literature in several ways. First, we are among the few studies to study how migration patterns affect researchers' job satisfaction. Second, we use a novel database, MORE2, that provides rich information about European researchers for whom heterogeneities are larger compared to individuals who move within a country.[4] The MORE2 allows us to track individuals' different migratory paths at an international level (between countries) based on the country of citizenship, the country where their highest degree was awarded—in our case Ph.D.—and the country of employment. Third, understanding that different migratory paths conceal people's latent characteristics, we apply a multinomial treatment model to deal with selectivity. We find that individuals who are the most migratory—and especially those who move to different countries—are more likely to express higher levels of job satisfaction. This corroborates the economic intuition that people leave their countries of origin and move to foreign countries to work in an environment that matches their abilities and offers opportunities for career progression.

2 Background

Global work experiences affect people in several aspects of their lives, including personal, work, and non-work dimensions (Bakker and Demerouti 2007). Because of this, the number of studies on how migration affects expatriates is increasing. According to Shaffer et al. (2012), there are two main types of expatriates. The first type is the corporate expatriates. These are individuals who are sent overseas temporarily by their firms. The second type is self-initiated expatriates. These people initiate their migration and finance it on their own. It is very likely that people who work in academia and migrate to find a suitable position belong to the second category. Their main purpose for such an action is personal and career development, whereby intrinsic motivators—such as job satisfaction and career perspectives—play a crucial role (Ng et al. 2005; Hippler 2009). For example, Brewster et al. (2005) find expatriates to be more satisfied with their career prospects, while Starr and Currie (2009) document that expatriates enjoy higher personal growth. For these effects to be stronger and increase the satisfaction of expatriates, embeddedness in the host country is a key point (e.g., Tharenou and Caulfield 2010).

Apart from intrinsic motivators, researchers have also studied extrinsic motivators. These are observable indicators of success in a specific occupation; salary and promotions are such examples. Other researchers have pointed to other competencies expatriates can obtain through migration, such as a global mind-set, increased self-confidence, and the ability to understand their strengths and weaknesses (see e.g., Dickmann and Harris 2005). Likewise, expatriates learn how to use their international network to further enhance their careers.

The life of ex-pats, nonetheless, is not always rosy. First, potential migrants need to choose the location they want to migrate. For this, they will consider cultural

[4] The full name of MORE2 is: Mobility Survey of the Higher Education Sector: Mobility and Career Paths of Researchers in Europe.

differences (Dickman et al. 2008), standards of living (Carr et al. 2005), the prestige of working in a specific corporation, institution, or even the city (Doherty et al. 2011), and personal issues, including the relationship with family and friends. All the above add many stressors to (potential) expatriates. Eventually, those willing to deal with all these stressors, are the ones who will more likely decide to migrate (Selmer and Leung 2003). Moreover, movers are more likely to develop strategies that help them solve problems more efficiently (Mäkelä and Suutari 2011).

Another issue is that frequent movers might find it tougher to integrate, either in a new or even in their original country. This problem is especially more severe for those who move quite frequently between foreign locations, or domestic locations and foreign locations (Welch et al. 2007). As these stressors might add up in time, the health of international employees might be at risk. Several studies have already pointed towards this direction, finding that many ex-pats are suffering from poor health and limited social relationships (see Mayerhofer et al. 2004).

Moving to the Economics literature, Schultz (1961) and Sjaastad (1962) argue that migration can be perceived as an investment in human capital—human capital is the skills, knowledge, and attributes individuals bring with them into the labour market. That is, the more individuals migrate, the higher will be their accumulation of human capital; since individuals gain knowledge with every additional move. Yet, people are quite heterogeneous in their migration trajectories. Those who are the most determined and ambitious at the same time will try to use their abilities to the fullest. They do this to exploit their acquired skills. As a result, they will be more likely to migrate. In our setting, such individuals are Ph.D. holders.

Ackers (2005) argues that people who want to succeed in science, need to be willing to move; since there will be pressure for them to reach their full potential. For a Ph.D. holder to exploit her skills, the necessary infrastructure must exist. Nonetheless, due to the presence of regional heterogeneities, not all locations have the necessary infrastructure required. To this end, some people will decide to migrate and relocate to a region where they can put their skills in use. Such places are countries with strong universities or research hubs. Precisely, these areas are more likely to attract scientific talent (Dickson 2003). Furthermore, Meyer et al. (2001) argue that, although migration is "polycentric" in nature, the flow of migration seems to always flow from less developed countries to more advanced countries.

From these two strands of literature, we deduce that migration affects several aspects of migrants' lives and that it manifests differently based on the type of migrant. In our case, academic migrants most likely belong to the category of self-initiated expatriates. For this type of migrants, the main driving forces are job satisfaction and career perspectives. Since migration is seen as an investment in human capital, more migration experiences increase peoples' skills. This materializes in the labour market with higher pecuniary outcomes. Further, the literature on expatriates documents that frequent migration can also have negative consequences, including the difficulty to integrate into a foreign society, the choice of location, and family issues, especially for those who move frequently. Our empirical findings point to the directions proposed by these strands of literature.

3 Method

To study the effect of selection due to migration on various job satisfaction variables, we support our empirical strategy with the model developed by Lévy-Garboua and Montmarquette (2004). We show the theoretical model here (with some alterations) to accommodate the reader. We start by introducing an experience good, Z, that among others is determined by the migratory path (MP) of a person. We define job satisfaction as:

$$S = \begin{cases} 1, & u\big(Z\big(\mathrm{MP}_k\big)\big) > u\big(Z\big(\mathrm{MP}_{\neg k}\big)\big) \\ 0, & u\big(Z\big(\mathrm{MP}_k\big)\big) \leq u\big(Z\big(\mathrm{MP}_{\neg k}\big)\big) \end{cases} \tag{1}$$

with MP dictating the categories of migration by taking into consideration the country of citizenship, the country a person received her Ph.D. degree, and the country of employment. Thus, following the typology of Faggian (2005) and Faggian et al. (2007a, b), we construct the following migration categories[5]:

$$k = \{repeat - migrant, return - migrant, late - mover, university - stayer, non - mover\}.$$

S denotes a vector of job-related satisfaction categories, such as salary satisfaction, career development, job security.

An individual at a specific point in time, $\tilde{t}$, is asked to express her job satisfaction. The person takes into consideration her experience up to that point to answer. In mathematical terms, we define a job satisfaction index in the following manner:

$$I_{k\tilde{t}} = \begin{cases} 1, & \psi_{k\tilde{t}} + \omega_{k\tilde{t}} > \psi_{\neg k\tilde{t}} + \omega_{\neg k\tilde{t}} \\ 0, & \psi_{k\tilde{t}} + \omega_{k\tilde{t}} \leq \psi_{\neg k\tilde{t}} + \omega_{\neg k\tilde{t}} \end{cases} \tag{2}$$

with ψ representing pecuniary outcomes and ω non-pecuniary outcomes. Following Lévy-Garboua and Montmarquette (2004), we set the "pecuniary value of job", taking into consideration future income flows, as follows:

$$\psi_{k\tilde{t}} = \sum_{t=1}^{\tilde{t}} \frac{\mu_{kt} - \mu_{\neg kt}}{(1+r)^{t-1}} + \frac{\mathbb{E}_{\tilde{t}} V_{kt} - \mathbb{E}_{\tilde{t}} V_{\neg kt}}{(1+r)^{\tilde{t}}} \tag{3}$$

with μ_{kt} denoting the wages a person has received from his choices at time t, while $\mu_{\neg kt}$ represents the wages a person could have taken should her choices have been different. In addition, we denote the discount rate by r, the expected pecuniary outcomes by $\mathbb{E}V_{kt}$ should the person continues with the same choice as before, and $\mathbb{E}V_{\neg kt}$ represents the expected future value for an alternative choice.

The general job satisfaction index is then defined as:

[5] We provide examples of each category in Appendix Table 10.

$$\Phi_{k\tilde{t}} = \sum_{t=1}^{\tilde{t}} \frac{\mu_{kt} - \mu_{\neg kt}}{(1+r)^{t-1}} + \frac{\mathbb{E}_{\tilde{t}} V_{kt} - \mathbb{E}_{\tilde{t}} V_{\neg kt}}{(1+r)^{\tilde{t}}} + \omega_{k\tilde{t}} - \omega_{\neg k\tilde{t}} \tag{4}$$

It follows from the previous analysis that:

$$I_{k\tilde{t}} = \begin{cases} 1, \ \Phi_{k\tilde{t}} > 0 \\ 0, \ \Phi_{k\tilde{t}} \leq 0 \end{cases} \tag{5}$$

To incorporate this theory in a regression scheme, we perform a slight modification. More specifically, we set:

$$S = \begin{cases} 1, \ h(\psi, \omega) = \beta_0 + \beta_1 \psi + \boldsymbol{\gamma}\boldsymbol{\omega} + \epsilon > 0 \\ 0, \ \text{else} \end{cases} \tag{6}$$

with $\psi = \psi(\boldsymbol{MP})$ and $\omega = \omega(\boldsymbol{MP})$, since the migration path could affect both pecuniary outcomes and other aspects of life that might alter an individual's level of job satisfaction.

3.1 Data

To conduct our research, we use the Mobility Survey of the Higher Education Sector: Mobility and Career Paths of Researchers in Europe, 2012 (MORE2). This survey collected data for 27 EU countries and six other countries: Associated and Candidate Countries.[6]

In our research, we concentrate on individuals between the ages of 25 to 65. Furthermore, we focus on individuals who are employed, have obtained their Ph.D. degree and work in western European countries (see also Table 7 for the list of countries). This leads to a sample of slightly more than 3000 observations for our preferred empirical approach.

The database provides useful information regarding the most favourite destinations of European researchers and their motivation to migrate. Figure 1 corroborates the intuition we developed above. Specifically, most people mention career progression as their main driver to migrate to another country, followed by availability of research funding, suitable positions, and research network, among others. From the same figure, we deduce that pecuniary outcomes (remuneration) score low as an incentive for migration, although we notice that career progression might have indirect pecuniary benefits in the longer term.

Table 1 presents summary statistics. Given the main job satisfaction indicators, we see that European researchers tend to document lower satisfaction scores concerning their salaries, career advancement, and benefits, whereas they are more satisfied regarding independence, social status, or social contribution. As for migration indicators, we find that about 26% of the interviewees have been awarded their Ph.D.

[6] A complete list of countries can be found in Table 7 of the appendix, while a detailed description of this database can be found in "Appendix B". Questions of the survey are in Table 12 of "Appendix C".

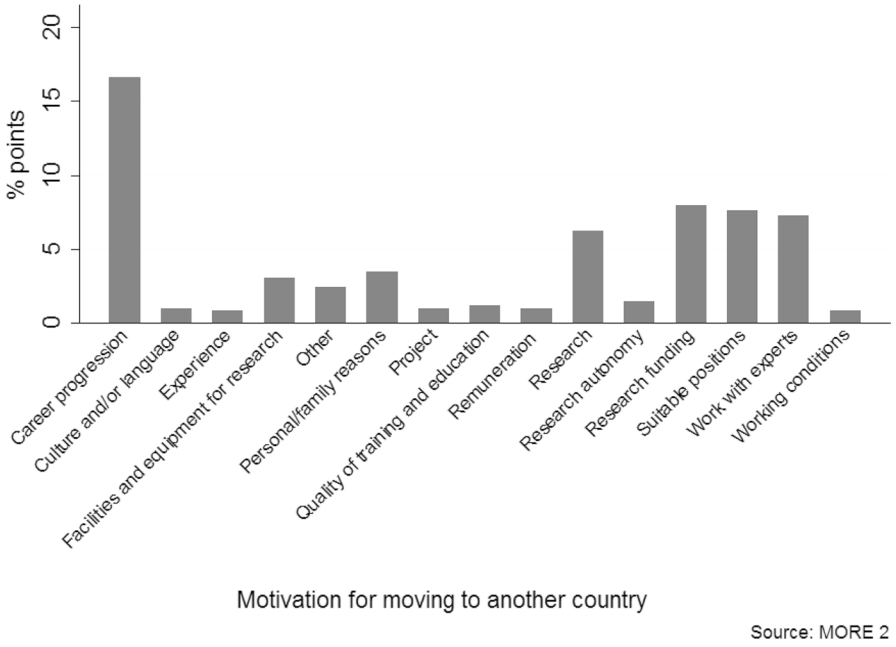

Fig. 1 Motivation for moving to another country based on the last international move

abroad, while 53% had an experience of working abroad. Furthermore, migrants—those who are employed in a country different from their country of citizenship—consist about 22% of the population in our sample. About 5% are repeat-migrants, 15% are return-migrants, 6% are university-stayers, 11% are late-movers, and a large percentage are non-movers.

Taking into consideration the limitations of our database, we try to incorporate standard control variables that have been previously used in the extant literature of migration studies. These include gender, marital status, age, and field of study. Specifically, females represent 34% of the sample. Most individuals live with a partner (married, or unmarried) and have children. Most Ph.D. holders are in the fields of social sciences, closely followed by natural and medical sciences. Based on the major they studied at the university and their current research field, we find about 12% to be mismatched—that is, working in a field that might require different skills from those obtained in the university. Most researchers in our database are established, followed by leading researchers, and recognized researchers.[7] About 71% of the researchers have a permanent contract, while a 9% of them hold a dual position.

The MORE2 database provides information about researchers' teaching activities. Most interviewees reported that their teaching activities require about 26–50% of their time. There is also a small number of people whose main duty is teaching; they represent about 6% of the sample. Finally, 10% of our sample consists of individuals

[7] See also Table 8 for a description of the variables and "Appendix B" for more details.

Table 1 Summary statistics

Variable	Mean	SD	Min	Max
Job satisfaction indicators				
Salary	0.59	0.49	0	1
Independence	0.87	0.33	0	1
Social contribution	0.86	0.35	0	1
Career advancement	0.57	0.50	0	1
Mobility perspectives	0.61	0.49	0	1
Social status	0.83	0.38	0	1
Benefits	0.56	0.50	0	1
Job security	0.74	0.44	0	1
Job location	0.89	0.31	0	1
Employer's esteem	0.86	0.34	0	1
Migration indicators				
PhD abroad	0.26	0.44	0	1
Migrant	0.22	0.41	0	1
Worked abroad	0.53	0.50	0	1
Worked abroad and PhD abroad	0.15	0.36	0	1
Worked abroad, no PhD abroad	0.37	0.48	0	1
Not worked abroad, PhD abroad	0.10	0.30	0	1
Neither worked abroad or PhD abroad	0.36	0.48	0	1
Repeat-migrant	0.05	0.22	0	1
Return-migrant	0.15	0.35	0	1
Non-movers	0.64	0.48	0	1
University-stayers	0.06	0.24	0	1
Late-movers	0.11	0.31	0	1
Individual specific characteristics				
Female	0.34	0.47	0	1
International collaboration	0.78	0.41	0	1
Couple with children	0.60	0.49	0	1
Couple w/o children	0.19	0.39	0	1
Single with children	0.01	0.10	0	1
Research: engineering	0.14	0.35	0	1
Research: humanities	0.11	0.31	0	1
Research: medical sciences	0.22	0.41	0	1
Research: natural sciences	0.23	0.42	0	1
Research: social sciences	0.27	0.45	0	1
Degree in engineering	0.14	0.35	0	1
Degree in humanities	0.12	0.32	0	1
Degree in medical sciences	0.18	0.39	0	1
Degree in natural sciences	0.27	0.45	0	1
Degree in social sciences	0.25	0.43	0	1
Research mismatch	0.12	0.33	0	1
Recognized researcher	0.25	0.43	0	1
Established researcher	0.41	0.49	0	1

Table 1 (continued)

Variable	Mean	SD	Min	Max
Permanent contract	0.71	0.45	0	1
Dual position	0.09	0.29	0	1
Teaching: 25% of less	0.30	0.46	0	1
Teaching: 26–50%	0.38	0.48	0	1
Teaching: 51–75%	0.16	0.37	0	1
Teaching: 76–100%	0.06	0.24	0	1
Confidence for the future	3.03	0.82	1	4
Age 25–29	0.03	0.16	0	1
Age 30–34	0.13	0.34	0	1
Age 35–39	0.17	0.37	0	1
Age 40–44	0.19	0.39	0	1
Age 45–49	0.17	0.37	0	1
Age 50–54	0.14	0.35	0	1
Age 55–59	0.10	0.30	0	1
Age	44.83	9.35	25	65
Knows Euraxess	0.13	0.34	0	1
Knows Marie Curie	0.73	0.44	0	1

without any teaching activities. These could be potentially people who are under a research contract only, work at research centres, or other relevant institutions.

Regarding their confidence for the future, on a scale of 1 to 4, interviewees document an average value of 3.03. The respondents' average age is about 45, with those belonging in the [40, 44] age group being the majority. We include two variables regarding funding opportunities within Europe: the knowledge of Euraxess and Marie Curie fellowship. Although most people appear to know Marie Curie fellowship, they seem to have limited knowledge about Euraxess.

In the multinomial treatment model, we have included socioeconomic variables from the country of origin that could have potentially affected individuals' migration decisions. As we do not know when an individual migrated, we utilize average values for the decade before MORE2 survey took place. We acknowledge that such a method is not exactly precise, nonetheless it provides important information for the identification of our first stage model. The country of origin variables we use are the following: growth rate of GDP per capita, empowerment rights index, human capital index, Gini coefficient, openness, Polity scores, employment protection, gross savings, out-of-pocket health expenditures, compensation for tertiary education, government expenditures for tertiary education, and unemployment (youth unemployment and unemployment for those with higher degrees).[8]

[8] A description of these variables along with their sources and use can be found in Tables 8 and 9 of "Appendix A".

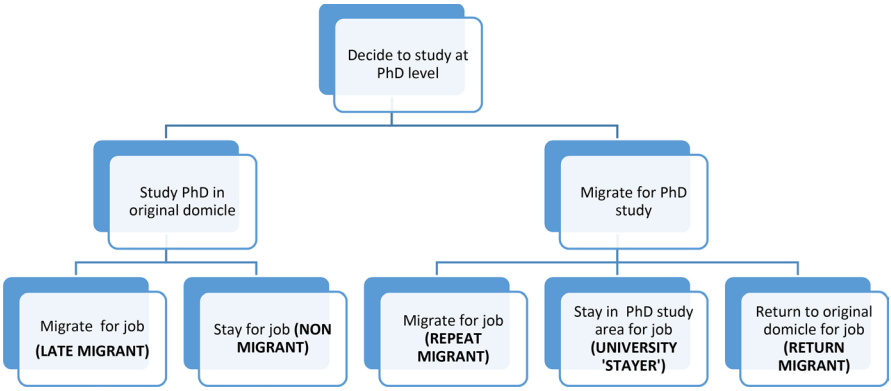

Fig. 2 Sequential migration typologies. *Source*: Jewell and Faggian (2014)

3.2 Empirical strategy

We categorize individuals according to two sequential migration decisions using the typology of Faggian (2005, 2007a, b)—whether to migrate to study and whether to migrate for employment. We focus on international migration i.e., migration between countries, and we have information on individuals' country of citizenship, country where their Ph.D. was awarded, and the country of employment. Since migration is perceived as an investment in human capital, we expect those who have migrated more to possess more human capital. These individuals are more likely to adapt to difficult situations and be able to address asymmetric information more efficiently. Next, we characterize as *non-movers* those citizens who have not moved outside their country of citizenship to pursue a Ph.D. degree or employment.[9] *Late-movers* are individuals who finished their Ph.D. degree in their country of citizenship, yet they are employed in another country. Likewise, individuals who are employed in the country where they undertook their Ph.D. studies (but different from their country of origin) are described as *university-stayers*. The most migratory group are *repeat-migrants*. That is individuals who were awarded their Ph.D. degree in a country different from their country of citizenship and are employed in another country (different from both the country of citizenship and country where their Ph.D. was awarded). Finally, those who returned to their country of citizenship, after they pursed a Ph.D. program in another country are *return-migrants*. Figure 2 summarizes the five migration strategies.

Past literature recognizes at least two important schemes in international migration (see e.g., Grogger and Hanson 2011). The first regards the fact that more educated individuals are more likely to migrate (i.e., positive selection). The second argues that highly educated individuals are expected to move to (destination)

[9] We understand this is not a perfect measure either, as we only know a person's current employment status.

countries that reward more those with higher skills (positive sorting). Since our sample comprises only of individuals who are at the highest level of educational attainment (doctorate holders), and because migration can be perceived as an investment in human capital, those who have migrated more during their lifetime, could be characterized as having acquired more human capital.[10] To this end, we expect those who migrate more to other countries to do so in order to achieve the highest possible reward given their accumulated abilities. That is, our sample might be affected by positive sorting that could potentially undermine our econometric analysis. To deal with the bias of positive sorting, we implement a technique introduced by Deb and Trivedi (2006). This method has been applied recently in Kazakis and Faggian (2017) and Abreu et al. (2015). Below, we provide a summary of this technique.

The Deb and Trivedi (2006) two-stage technique corrects self-selectivity when the nature of selection is polychotomous. The five different migration categories analysed above are all mutually exclusive and will be labelled as "treatments" ($k = 1, 2, 3, 4, 5$). Having non-movers as a base category, we set the indirect utility for treatment k and individual i be:

$$V_{ik} = z_i \alpha_k + \delta_k l_{ik} + \eta_{ik}, \tag{7}$$

where z_i describes our knowledge of observables, while l_{ik} is a vector of latent characteristics that could affect both the treatment and the outcome. Using the observed treatment—belonging to one of the five migration categories—the researcher can deduce important insights about the nature of the selection process. Thus, we model the migration choice as a mixed multinomial logit (first-stage model):

$$\Pr(\boldsymbol{d_i} | z_i, l_i) = \frac{\exp(z'_i \boldsymbol{\alpha}_k + l_{ik})}{1 + \sum_{n=1}^{K} \exp(z'_i \boldsymbol{\alpha}_n + l_{in})} \tag{8}$$

The second stage, which models satisfaction perceptions of European researchers, has the following form:

$$E(S_i) = \mu\left(\boldsymbol{x}'_i \boldsymbol{\beta} + \sum_{k=1}^{K} \gamma_k d_{ik} + \sum_{k=1}^{K} \lambda_k l_{ik} \right), \tag{9}$$

with $\boldsymbol{x}$ denoting observables for individuals, d denoting migration dummies, and $\lambda_k l_{ik}$ are the correction terms. The letter μ indicates the functional form that has been used; in our case is a linear one, which means the model in the second stage is a linear probability model.[11]

[10] It could also be that the migration history of an individual could potentially capture grit—the perseverance some people possess to achieve long-term goals. Credé et al. (2017) argue that grit might have a larger effect on individuals with above the average cognitive ability, while Duckworth et al. (2007) state that grit could potentially be instilled in individuals from a young age. In a recent article, Light and Nencka (2019) document that for high-skilled students grit and cognitive ability are complements and that their inter-relationship is stronger for more challenging tasks.

[11] For more information about the choice of the functional form, see Deb and Trivedi (2006).

To corroborate our findings, we use other proxies for consecutive migration which we construct based on whether individuals were awarded a Ph.D. abroad and whether they have worked abroad. This leads to four mutually exclusive groups. Namely, economic agents who, (1) have been awarded their Ph.D. abroad and have experience working abroad, (2) have experience working abroad, but their Ph.D. was not awarded abroad, (3) have their Ph.D. from abroad, but do not have experience working abroad, and finally, (4) have neither a Ph.D. awarded from a country abroad, or worked abroad.

4 Results

This section presents the findings of the study. Table 2 shows the results of the multinomial treatment model, and Table 3 demonstrates its first stage results. In Table 4, we provide evidence while using an overall measure of satisfaction, incorporating insights from the Item Response Theory (IRT). Table 5 exhibits the results with alternative forms of migration. Lastly, Table 6 shows the results of an endogenous treatment model.[12]

4.1 Results for all migration groups

In this section, we study how standard controls used in the literature of human capital migration are related to the different job satisfaction categories.

Regarding age, we find younger people to present lower levels of salary satisfaction, but higher levels of satisfaction regarding independence, career, social mobility and job location. The results are in tandem with the literature that finds a U-shaped effect between age and job-satisfaction (see e.g., Kacmar and Ferris 1989). As for gender, past research has shown that females tend to have higher levels of job satisfaction than men but this observed gender satisfaction differential has decreased over time (Clark 1997; Kaiser 2007; Sousa-Poza and Sousa-Poza 2003) and this is particularly true for women who are working part-time (Booth and Van Ours 2008, 2009). Nonetheless, the results concerning gender differentials in terms of job satisfaction and quality of life are mixed. For example. Alesina et al. (2004) document that women are happier than men, while Anand and Van Hees (2006) find no significant effect. On the contrary, Biagi et al. (2018) show that males are more satisfied with their quality of life. Our results show that female researchers are less satisfied about their salary, social status, and benefits, but more satisfied about their independence, social contribution, career, and mobility.

Single individuals without children are the most satisfied in terms of salary, career progression, and social status, but they rank last in terms of social contribution.

[12] Table 2 incorporates country-of-employment fixed effects in the second stage. To further test the robustness of these results we incorporate a model with country-of-origin fixed effects. We do this to capture time-invariant characteristics, such as culture or family ties. We show these results in Appendix Table 11.

Table 2 Multinomial treatment model results for various job satisfaction indicators

Variables	Salary	Independence	Social contribution	Career	Mobility	Social status	Benefits	Job security	Job location	Employer's esteem
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Reference: Non-mover										
Repeat-migrant	0.097***	0.047***	−0.095***	0.299***	0.239***	0.176***	0.072***	0.129***	−0.042***	−0.067***
	(0.002)	(0.003)	(0.004)	(0.001)	(0.002)	(0.002)	(0.001)	(0.049)	(0.011)	(0.004)
Return-migrant	−0.364***	−0.000	−0.306***	−0.025***	0.182***	0.090***	0.364***	0.058	−0.069***	−0.076***
	(0.002)	(0.004)	(0.006)	(0.002)	(0.001)	(0.001)	(0.001)	(0.046)	(0.007)	(0.003)
University-stayer	−0.043***	−0.237***	−0.040***	0.152***	0.334***	0.016***	0.120***	0.041	−0.283***	−0.015
	(0.001)	(0.006)	(0.005)	(0.001)	(0.001)	(0.001)	(0.002)	(0.056)	(0.022)	(0.011)
Late-mover	0.090***	0.117***	−0.026***	−0.245***	0.032***	−0.258***	0.084***	0.047	−0.066***	−0.280***
	(0.002)	(0.005)	(0.004)	(0.001)	(0.004)	(0.001)	(0.001)	(0.045)	(0.011)	(0.006)
Reference: Age 60–65										
Age 25–29	−0.060***	0.051***	−0.158***	0.081***	0.138***	0.058***	0.147***	−0.041	0.061***	−0.055***
	(0.002)	(0.008)	(0.005)	(0.004)	(0.003)	(0.003)	(0.006)	(0.062)	(0.023)	(0.012)
Age 30–34	−0.112***	0.032***	−0.070***	0.115***	0.102***	−0.018***	0.011***	−0.079**	0.041***	−0.028***
	(0.002)	(0.005)	(0.003)	(0.004)	(0.004)	(0.003)	(0.002)	(0.032)	(0.012)	(0.006)
Age 35–39	−0.148***	−0.054***	−0.063***	0.063***	−0.002	−0.017***	0.020***	−0.046*	−0.009	−0.032***
	(0.002)	(0.005)	(0.003)	(0.002)	(0.003)	(0.002)	(0.001)	(0.024)	(0.012)	(0.004)
Age 40–44	−0.188***	−0.102***	−0.083***	−0.004**	−0.026***	−0.024***	0.004***	−0.068***	−0.029***	−0.011***
	(0.002)	(0.004)	(0.003)	(0.002)	(0.003)	(0.002)	(0.001)	(0.023)	(0.011)	(0.002)
Age 45–49	−0.140***	−0.041***	−0.042***	0.033***	−0.014***	0.018***	0.010***	−0.031	0.006	−0.016***
	(0.002)	(0.004)	(0.003)	(0.001)	(0.002)	(0.003)	(0.001)	(0.021)	(0.010)	(0.003)
Age 50–54	−0.159***	−0.061***	−0.042***	0.060***	−0.025***	−0.033***	0.051***	0.014	0.007	−0.012**
	(0.002)	(0.004)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)	(0.021)	(0.011)	(0.005)

Table 2 (continued)

Variables	Salary	Independence	Social contribution	Career	Mobility	Social status	Benefits	Job security	Job location	Employer's esteem
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Age 55–59	−0.061***	−0.061***	−0.012***	−0.063***	0.004	−0.006**	−0.029***	0.020	−0.016	−0.052***
	(0.001)	(0.005)	(0.003)	(0.002)	(0.002)	(0.003)	(0.001)	(0.022)	(0.011)	(0.004)
Female	−0.020***	0.022***	0.021***	0.011***	0.010***	−0.011***	−0.025***	0.020	0.006	−0.012***
	(0.001)	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.013)	(0.005)	(0.002)
International collaboration	0.018***	−0.025***	−0.009***	−0.057***	0.043***	−0.017***	−0.028***	−0.047***	−0.019***	−0.044***
	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.015)	(0.006)	(0.004)
Reference: Single without children										
Couple w/ children	−0.068***	0.017***	0.017***	−0.023***	−0.021***	−0.008***	−0.064***	−0.021	0.028***	−0.022***
	(0.001)	(0.003)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)	(0.017)	(0.006)	(0.002)
Couple w/o children	−0.113***	−0.023***	0.015***	−0.051***	-0.002	−0.037***	−0.078***	−0.039*	0.039***	−0.058***
	(0.001)	(0.003)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.021)	(0.007)	(0.004)
Single w/ children	−0.027***	0.049***	0.044***	−0.203***	−0.093***	-0.136***	−0.174***	−0.101	0.070***	0.058***
	(0.003)	(0.003)	(0.009)	(0.002)	(0.007)	(0.002)	(0.001)	(0.071)	(0.009)	(0.010)
Reference: Research in agriculture										
Research: engineering	0.026***	0.012**	0.108***	0.015***	0.099***	-0.114***	−0.033***	−0.003	−0.023**	−0.002
	(0.002)	(0.006)	(0.005)	(0.002)	(0.003)	(0.002)	(0.002)	(0.038)	(0.011)	(0.004)
Research: humanities	0.051***	−0.020***	0.068***	0.025***	−0.023***	−0.076***	−0.081***	−0.016	−0.034***	−0.013***
	(0.002)	(0.004)	(0.003)	(0.001)	(0.003)	(0.002)	(0.002)	(0.039)	(0.010)	(0.003)

Table 2 (continued)

Variables	Salary	Independence	Social contribution	Career	Mobility	Social status	Benefits	Job security	Job location	Employer's esteem
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Research: medical	0.079***	−0.017***	0.098***	0.078***	−0.008***	−0.041***	−0.011***	0.018	0.000	0.056***
	(0.001)	(0.004)	(0.005)	(0.001)	(0.003)	(0.002)	(0.002)	(0.037)	(0.008)	(0.002)
Research: natural sciences	0.063***	0.030***	0.052***	0.018***	−0.004	−0.075***	−0.005***	0.003	−0.029***	0.036***
	(0.002)	(0.004)	(0.004)	(0.002)	(0.003)	(0.003)	(0.002)	(0.037)	(0.007)	(0.004)
Research: social sciences	0.057***	0.008*	0.063***	−0.001	0.034***	−0.066***	−0.034***	−0.001	−0.015**	0.049***
	(0.001)	(0.005)	(0.005)	(0.001)	(0.003)	(0.002)	(0.002)	(0.037)	(0.007)	(0.003)
Research mismatch	−0.035***	0.000	0.003**	−0.056***	−0.040***	−0.037***	−0.039***	−0.008	0.012**	0.005**
	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.019)	(0.005)	(0.002)
Reference: Leading researcher										
Recognized researcher	0.033***	−0.084***	−0.053***	−0.063***	−0.049***	0.004***	0.012***	−0.032	0.038***	0.017***
	(0.001)	(0.006)	(0.007)	(0.002)	(0.002)	(0.001)	(0.001)	(0.022)	(0.010)	(0.005)
Established researcher	0.015***	−0.020***	−0.030***	−0.051***	−0.057***	−0.010***	0.014***	0.011	0.037***	−0.021***
	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.013)	(0.006)	(0.004)
Permanent contract	−0.002**	−0.016***	0.012	0.031***	−0.027***	0.023***	−0.012***	0.477***	0.035***	−0.027***
	(0.001)	(0.003)	(0.007)	(0.001)	(0.002)	(0.001)	(0.001)	(0.023)	(0.009)	(0.002)
Dual position	−0.032***	−0.000	−0.003	0.076***	0.000	−0.009***	−0.022***	0.012	−0.061***	−0.037***
	(0.002)	(0.007)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.021)	(0.008)	(0.003)

Table 2 (continued)

Variables	Salary	Independence	Social contribution	Career	Mobility	Social status	Benefits	Job security	Job location	Employer's esteem
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Reference: No teaching										
Teaching 25% or less	−0.062***	−0.008***	0.006	0.039***	0.009***	0.035***	−0.001	−0.001	−0.008	−0.003
	(0.001)	(0.003)	(0.004)	(0.001)	(0.002)	(0.002)	(0.001)	(0.030)	(0.009)	(0.005)
Teaching 26 to 50%	−0.048***	0.006*	−0.026***	0.042***	−0.036***	0.049***	0.028***	0.054*	−0.020**	−0.006
	(0.001)	(0.003)	(0.003)	(0.002)	(0.001)	(0.002)	(0.001)	(0.029)	(0.010)	(0.005)
Teaching 51 to 75%	−0.080***	−0.019***	−0.042***	0.001	−0.067***	0.047***	−0.042***	0.041	−0.065***	−0.043***
	(0.002)	(0.005)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)	(0.032)	(0.010)	(0.008)
Teaching 76 to 100%	−0.124***	−0.072***	−0.034***	−0.038***	−0.100***	−0.031***	0.025***	0.028	−0.068***	−0.123***
	(0.002)	(0.005)	(0.010)	(0.002)	(0.002)	(0.002)	(0.001)	(0.037)	(0.010)	(0.004)
Confidence for the future	0.065***	0.083***	0.073***	0.216***	0.139***	0.104***	0.094***	0.097***	0.058***	0.066***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.009)	(0.003)	(0.002)
Destination country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.384***	0.781***	−0.198***	−0.263***	0.306***	0.362***	0.547***	0.203*	0.785***	0.420***
	(0.006)	(0.011)	(0.014)	(0.005)	(0.009)	(0.004)	(0.004)	(0.113)	(0.024)	(0.008)
Selection outcomes										
Ln(σ)	−5.795***	−4.979***	−5.303***	−5.899***	−5.840***	−5.588***	−6.052***	−1.178***	−3.955***	−5.073***
	(0.150)	(0.119)	(0.132)	(0.169)	(0.108)	(0.129)	(0.089)	(0.077)	(0.111)	(0.140)
λ repeat-migrant	−0.090***	−0.017***	0.031***	−0.217***	−0.280***	−0.081***	0.006***	−0.074*	−0.052***	−0.007***

Table 2 (continued)

Variables	Salary	Independence	Social contribution	Career	Mobility	Social status	Benefits	Job security	Job location	Employer's esteem
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.038)	(0.005)	(0.001)
λ return-migrant	0.414***	−0.007***	0.340***	0.007***	−0.179***	−0.085***	−0.456***	−0.061	0.026***	0.014***
	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.044)	(0.002)	(0.001)
λ university-stayer	0.087***	0.321***	−0.028***	−0.122***	−0.313***	−0.017***	−0.105***	−0.061	0.292***	−0.038***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.042)	(0.002)	(0.001)
λ late-mover	−0.085***	−0.080***	−0.026***	0.377***	−0.021***	0.354***	−0.045***	−0.037	−0.014***	0.345***
	(0.000)	(0.001)	(0.002)	(0.000)	(0.001)	(0.000)	(0.000)	(0.045)	(0.003)	(0.001)
Observations	3,161	3,185	3,051	3,023	2,978	3,059	2,978	3,162	3,189	3,081
Wald χ^2	1,904,537.32	68,484.93	225,487.03	4,331,113.6	6,296,785.41	1,109,147.6	3,351,261	3376.36	6510.12	174,160.96
Log pseudolikelihood	−4231.675	−3449.525	−3329.518	−4138.726	−4124.991	−3558.262	−4126.83	−3521.417	−3182.68	−3396.4367
Likelihood Ratio (LR)	268.695	185.109	214.364	253.106	266.646	261.787	310.841	2.191	81.553	199.042
LR *p*-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.701	0.000	0.000

This table documents results obtained through a multinomial treatment model with 2000 simulation draws. Robust standard errors in parentheses. Stars indicate significance levels, ***at 1%. **at 5%, and *at 10% respectively

Table 3 First stage results for the multinomial treatment model

	Repeat-migrant	Return-migrant	Non-mover	University-stayer	Late-mover
Age	−0.0015***	0.0028***	0.0041***	−0.0018***	−0.0035***
	(0.0004)	(0.0005)	(0.0008)	(0.0005)	(0.0006)
Female	−0.0206**	−0.0025	0.0430***	−0.0002	−0.0197*
	(0.0085)	(0.0104)	(0.0158)	(0.0078)	(0.0110)
Knows Euraxess	0.0397***	0.0086	−0.0937***	0.0044	0.0410***
	(0.0078)	(0.0138)	(0.0201)	(0.0100)	(0.0128)
Knows Marie Curie	0.0148	0.0253**	−0.0661***	−0.0028	0.0287**
	(0.0096)	(0.0121)	(0.0172)	(0.0080)	(0.0120)
Couple w/ children	−0.0098	−0.0103	0.0481***	0.0040	−0.0320***
	(0.0084)	(0.0130)	(0.0185)	(0.0096)	(0.0118)
Couple w/o children	0.0073	0.0141	−0.0268	0.0203**	−0.0148
	(0.0094)	(0.0157)	(0.0220)	(0.0102)	(0.0144)
Single w/ children	0.0386	0.0528	−0.1306*	0.0456	−0.0063
	(0.0290)	(0.0367)	(0.0766)	(0.0332)	(0.0654)
Degree: engineering	−0.0094	0.0128	−0.0204	0.0042	0.0127
	(0.0178)	(0.0247)	(0.0459)	(0.0269)	(0.0355)
Degree: humanities	0.0048	0.0529**	−0.1095**	0.0168	0.0350
	(0.0187)	(0.0253)	(0.0474)	(0.0271)	(0.0359)
Degree: medical sciences	−0.0342*	0.0183	−0.0240	0.0167	0.0232
	(0.0194)	(0.0241)	(0.0454)	(0.0266)	(0.0351)
Degree: natural sciences	−0.0005	0.0141	−0.0657	0.0140	0.0381
	(0.0165)	(0.0238)	(0.0444)	(0.0262)	(0.0343)
Degree: social sciences	0.0106	0.0280	−0.0522	0.0140	−0.0005

Table 3 (continued)

	Repeat-migrant	Return-migrant	Non-mover	University-stayer	Late-mover
	(0.0165)	(0.0234)	(0.0443)	(0.0261)	(0.0349)
Growth rate of GDP per capita	−0.2478***	0.5240***	0.2371	−0.0113	−0.5021***
	(0.0880)	(0.2029)	(0.2103)	(0.0980)	(0.2757)
Empowerment Rights Index	−0.0321***	0.0323***	0.1195***	−0.0356***	−0.0841***
	(0.0063)	(0.0121)	(0.0185)	(0.0067)	(0.0119)
Human Capital Index	0.0648*	−0.0947**	−0.1214**	0.0483	0.1030**
	(0.0354)	(0.0458)	(0.0659)	(0.0370)	(0.0464)
Gini	0.0024	−0.0073	0.0154**	0.0007	−0.0112***
	(0.0019)	(0.0061)	(0.0073)	(0.0028)	(0.0038)
Openness	−0.0004	0.0017***	0.0009	−0.0007*	−0.0016***
	(0.0003)	(0.0006)	(0.0007)	(0.0004)	(0.0005)
Polity IV	−0.0002	−0.0005	0.0016	−0.0032*	0.0023
	(0.0020)	(0.0045)	(0.0055)	(0.0018)	(0.0033)
Employment protection	−0.0088	0.0108	−0.0039	−0.0008	0.0027
	(0.0110)	(0.0301)	(0.0278)	(0.0166)	(0.0257)
Gross savings (% GDP)	−0.0013	−0.0088**	0.0038	0.0052***	0.0011
	(0.0017)	(0.0041)	(0.0034)	(0.0016)	(0.0027)
Health expenditure, private (% of GDP)	−0.0064	0.0823***	−0.0174	−0.0253***	−0.0332**
	(0.0098)	(0.0163)	(0.0210)	(0.0084)	(0.0132)
Compensation (tertiary education)	−0.0004	−0.0032	0.0043*	−0.0003	−0.0005
	(0.0010)	(0.0021)	(0.0024)	(0.0008)	(0.0016)
Government expenditures (tertiary education)	−0.0069***	0.0033	0.0239***	−0.0062**	−0.0141***

Table 3 (continued)

	Repeat-migrant	Return-migrant	Non-mover	University-stayer	Late-mover
	(0.0024)	(0.0050)	(0.0072)	(0.0025)	(0.0045)
Unemployment (with tertiary degree)	0.0030	0.0016	−0.0145***	−0.0002	0.0101***
	(0.0019)	(0.0032)	(0.0053)	(0.0023)	(0.0034)
Youth unemployment	−0.0034**	0.0018	0.0092***	−0.0006	−0.0070***
	(0.0014)	(0.0020)	(0.0029)	(0.0013)	(0.0018)
Observations	3331				
Wald χ^2	767.77				
Prob > χ^2	0.000				
Pseudo R^2	0.1808				
Log pseudolikelihood	−2707.051				

The coefficients shown are marginal effects for the five migratory groups based on individual specific and country-of-origin characteristics. Robust standard errors are in parentheses

Stars indicate significance levels

***At 1%

**At 5%

*At 10% respectively

Table 4 Migratory decisions and cumulative job satisfaction measures

	Satisfaction (sum) (1)	Satisfaction (IRT) (2)
Repeat-migrants	0.746**	0.203**
	(0.304)	(0.088)
Return-migrants	0.879***	0.421***
	(0.174)	(0.056)
University-stayers	0.417	−0.124
	(0.317)	(0.094)
Late-movers	0.120	0.212***
	(0.196)	(0.061)
Individual controls	Yes	Yes
Destination country FE	Yes	Yes
ln(σ)	0.219	−1.088***
	(0.138)	(0.164)
λ: repeat-migrants	−0.693***	−0.140**
	(0.249)	(0.061)
λ: return-migrants	−1.037***	−0.494***
	(0.149)	(0.039)
λ: university-stayers	−0.483*	0.159**
	(0.266)	(0.063)
λ: late-movers	−0.245	−0.230***
	(0.212)	(0.052)
Observations	3,238	3,239
LR-test	11.25	9.76
LR-test *p* value	0.024	0.044

This table documents results obtained through a multinomial treatment model with 2000 simulation draws. Robust standard errors in parentheses. Stars indicate significance levels, *** at 1%. ** at 5%, and * at 10% respectively

The outcome might be expected, as single individuals could potentially have more time to devote to their careers, all other things considered. Nonetheless, this does not mean that single people are happier. According to the literatures in economics, medicine, and sociology, married people tend to live longer and be healthier (Myers 1999), but the effect of marriage on happiness is not monotonic, albeit it tends to be higher in the first decade after marriage (see e.g., Stutzer and Frey 2006).

The literature informs us that the migration of scientists is not the same across all disciplines. Mahroum (1998) and Ackers (2004), find that highly specialized disciplines place a stronger emphasis on mobility. This is because researchers in these disciplines need the best possible infrastructure to work; such disciplines are for example medicine and engineering. When considering the type of research, we find those with degrees different from that of agriculture, present higher levels of job satisfaction in most categories. The highest levels of satisfaction are reported in

Table 5 Multinomial Treatment Model results for various job satisfaction indicators (alternative migration proxies)

Variables	Salary	Independence	Social contribution	Career	Mobility	Social status	Benefits	Job security	Job location	Employer's esteem
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Reference: Neither worked or obtained Ph.D. abroad – Work_PhD4										
Work_PhD1	0.197*	0.008**	0.136***	0.012	0.173	0.150***	0.441***	0.146**	0.040***	−0.046***
	(0.109)	(0.004)	(0.002)	(0.076)	(0.119)	(0.002)	(0.001)	(0.074)	(0.007)	(0.002)
Work_PhD2	0.064	−0.301***	0.156***	−0.127	0.135***	0.204***	0.097***	0.200***	0.045***	−0.316***
	(0.070)	(0.003)	(0.001)	(0.166)	(0.031)	(0.002)	(0.001)	(0.033)	(0.005)	(0.004)
Work_PhD3	−0.305***	0.086***	0.095***	0.182	−0.237***	0.073***	−0.007***	0.089	−0.300***	−0.046***
	(0.109)	(0.004)	(0.002)	(0.126)	(0.084)	(0.004)	(0.001)	(0.084)	(0.011)	(0.004)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Selection outcomes										
Ln(σ)	−2.246***	−4.850***	−5.338***	−0.929***	−1.549***	−5.273***	−5.806***	−1.845***	−4.177***	−5.057***
	(0.739)	(0.115)	(0.078)	(0.085)	(0.254)	(0.108)	(0.115)	(0.202)	(0.110)	(0.132)
λ work_PhD1	−0.222*	−0.028***	−0.211***	−0.067	−0.162	−0.193***	−0.455***	−0.144	−0.053***	−0.024***
	(0.131)	(0.001)	(0.001)	(0.077)	(0.129)	(0.001)	(0.000)	(0.089)	(0.003)	(0.001)
λ work_PhD2	−0.108	0.345***	−0.235***	0.130	−0.116***	−0.296***	−0.112***	−−0.245***	−0.109***	0.356***
	(0.074)	(0.001)	(0.001)	(0.198)	(0.030)	(0.001)	(0.000)	(0.038)	(0.003)	(0.001)
λ work_PhD3	0.349***	−0.051***	−0.159***	−0.148	0.360***	−0.127***	0.086***	−0.106	0.284***	0.012***
	(0.106)	(0.001)	(0.001)	(0.133)	(0.078)	(0.000)	(0.000)	(0.083)	(0.002)	(0.001)
Observations	3,161	3,185	3,051	3,023	2,978	3,059	2,978	3,162	3,189	3,081
Wald χ^2	3413.23	78,975.65	845,986.54	1699.31	1303.66	216,830	1,959,469	3342.93	17,941.23	158,122.93
Prob > χ^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 5 (continued)

Variables	Salary	Independence	Social contribution	Career	Mobility	Social status	Benefits	Job security	Job location	Employer's esteem
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log-likelihood	−5202.799	−4301.127	−4146.958	−5078.981	−5062.668	−4442.477	−4968.876	−4381.544	−4014.606	−4220.368
LR test	22.582	192.661	222.040	3.474	9.690	171.294	244.170	8.669	133.582	200.445
LR *p* value	0.000	0.000	0.000	0.324	0.021	0.000	0.000	0.034	0.000	0.000

This is a truncated table following the same specification as Table 2. *Work_PhD1* indicates those individuals who were awarded their PhD abroad and have an experience of working abroad, *Work_PhD2* is for those who have obtained their PhD degree in the country of their citizenship and have a working experience abroad, while *Work_PhD3* is for those who did their PhD abroad, but did not work abroad. *Work_PhD4* refers to those who have neither moved either for obtaining their PhD or to work abroad. This table documents results obtained through a multinomial treatment model with 2000 simulation draws. Constant term is not reported. Robust standard errors in parentheses

***Indicates significance at 1%, ** at 5%, and * at 10%

Table 6 Endogenous treatment model

	Salary	Independence	Social contribution	Career	Mobility	Social status	Benefits	Job security	Job location	Employer's esteem
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Migrant	0.065	0.057*	−0.006	0.027	0.122**	−0.023	0.112*	0.039	−0.062**	−0.448***
	(0.062)	(0.030)	(0.031)	(0.056)	(0.059)	(0.066)	(0.067)	(0.035)	(0.031)	(0.027)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Selection outcomes										
Ln(σ)	−0.849***	−1.115***	−1.097***	−0.818***	−0.789***	−1.013***	−0.790***	−1.108***	−1.218***	−0.980***
	(0.010)	(0.018)	(0.018)	(0.009)	(0.009)	(0.015)	(0.008)	(0.016)	(0.022)	(0.023)
Observations	3161	3185	3051	3023	2978	3059	2978	3162	3189	3081
Wald χ^2	1658.08	238.34	4986.24	1175.11	626.99	337.68	789.38	2540.72	248.45	523.29
Prob > χ^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Log likelihood	−3018.121	−2194.953	−2152.469	−2974.427	−2997.882	−2405.164	−3012.335	−2193.628	−1873.495	−2167.946

Migrant is an indicator variable taking value one for migrant Ph.D. holders. Apart from the individual controls and country of employment indicators, the models presented here have also a constant term that is not reported. Robust standard errors are in parentheses. *** indicates significance at 1%, ** at 5%, and * at 10%

medicine and natural sciences. This is an expected outcome, as wages in these fields are higher. We also find that those whose research is not relevant to what they have studied, present lower levels of job satisfaction. We argue that this is because such individuals will need to devote more time to learn new skills. Also, they might need to start from a lower position, thus starting with a relatively lower wage.

Researchers who collaborate internationally are more satisfied salary-wise. They are also more satisfied with potential future mobility. This demonstrates the importance of encouraging the mobility of researchers and international collaboration. It also indicates that collaborations—and, thus, networking—might play a crucial role in future moves.

Finally, scientists with a permanent contract are more satisfied with their career, social status, job security, and job location. We view this as evidence that permanent contracts immunize people from future negative shocks (i.e., job security). On the contrary, those holding a dual position are less satisfied in all categories except career advancement. We find extremely negative coefficients on job satisfaction for those who have only teaching contracts. We view the above as evidence of low payment, potential job mismatch, or an inability for career progression.

4.2 Results for specific migration types

In this section, we report our findings for each migration category. By and large, our findings show that at least for the categories tied with pecuniary outcomes, more migratory groups document higher levels of satisfaction.

4.2.1 Repeat-migrants

With *non-movers* as our reference group, we find that the most migratory group, *repeat-migrants*, present higher job satisfaction levels in all categories except those of social contribution, job location, and employer's esteem. Our interpretation to this outcome is that frequent movers tend to form weaker ties with the region/country they live temporarily. Because of this it is relatively harder for them to contribute to the local society, even with their high-level of expertise. Furthermore, we find *repeat-migrants* to be highly satisfied with their career advancement (e.g., the coefficient is 0.299 and statistically significant). We interpret this as the tendency of the most-migratory group to reap all possible benefits of migration, with the utmost goal to further climb the ladder of their respective disciplines. This result is also in tandem with the argument of Van de Sande et al. (2005) that international experience is a key parameter for success, especially for younger researchers.

4.2.2 Return-migrants

Martin-Rovet (2003) and Ackers (2005) argue that scientists who have decided to migrate to countries with a better research environment, might return to their country of origin, but this usually happens when they have better credentials compared to those in the country of origin. For *return-migrants,* the coefficient is negative and statistically significant for the following job satisfaction categories: salary, social contribution, career, job location, and employer's esteem. It is positive for mobility, social status and benefits. There are many reasons why people would like to return to their country of origin. Some of these reasons belong to the family of social networks and include, among others, finding a partner, taking care of parents and family, being close to friends, and business networks (Crescenzi and Holman 2017). Other reasons include the creation of international networks and the fact that researchers might be able to work with their co-authors when they return. Yet, we could also argue that people were unable to succeed in foreign countries (*e.g.,* they were unable to find a suitable position) and had to return to their origin. This in the literature is viewed as a corrective move. Especially, if the country where they return is relatively poor (compared to where they were awarded their degree), then these individuals are more likely to express less job satisfaction for the categories mentioned above.

4.2.3 University-stayers

The coefficient for university-stayers is positive for the following job satisfaction categories: career advancement, mobility perspectives, social status, and benefits. As it was argued before, researchers usually move from less developed countries to more developed countries to get their degrees, and, eventually, work. This is because the degrees they get there are perceived to be of higher quality in the labour market. In addition, working in centres with a well-known tradition of research, they are more likely to work with "star" scientists and develop strong networks with both academia and industry. As a result, they build a strong basis to advance their career. In addition, such researchers are more likely to be known to their respective fields and be top scientists themselves. Subsequently, this puts them in a narrow list of esteemed researchers, whose mobility ease is quite substantial.

Here, we acknowledge that in some countries there is a culture that prevents the hiring of homegrown Ph.D. graduates. Although we are not able to test for this in our database directly, we are able to capture such "cultural" time-invariant characteristics indirectly by incorporating country fixed effects.

4.2.4 Late-movers

Late-movers, on the other hand, seem to be more satisfied with their salary, independence, and benefits, but not with career perspectives, compared to *non-movers*. This migration group tends to have a good understanding of their local economy, as they have lived there for a longer time. Hence, when the time comes for them to migrate for work purposes, they may have already achieved a level of recognition—since this group may be of a higher ability compared to non-movers—that allows them to get jobs in more senior positions that pay better.

4.3 First stage results

Next, we present the results of the first stage in Table 3. We find that belonging in an older cohort is negatively related with being a *repeat-migrant*, *university-stayer*, or *late-mover.* A reason for this could be family responsibilities, such as children, elderly parents that need care, or homesickness. Those having children are less likely to migrate. Female researchers tend to be less migratory (see e.g., Comunian et al. 2017), and generally more likely to be non-movers than men. As for the European programs aiming to further assist researchers migrate around Europe (e.g., Euraxess), or programs that aim at providing researchers with funding to perform their research (e.g., the Marie Curie program), we find that researchers who are more familiar with them tend to be more migratory. Those with a degree in humanities are more likely to be *return-migrants* and at the same time less likely to be *non-movers*.[13] Previous research has found that graduates in humanities' subjects tend to have poorer outcomes in the labour market (Comunian et al. 2014), thus they may need to migrate in order to find a job relevant to their human capital. Finally, those with a degree in medicine are less likely to be *repeat-migrants*.[14] Furthermore, the results for the macroeconomic variables of the country of origin are most of the times in line with past literature (e.g., countries with higher growth rate and better property rights are able to keep highly skilled economic agents).

4.4 Alternative models

Unfortunately, our database does not have an overall measure of job satisfaction. Yet, we investigate whether our main results hold when we create cumulated satisfaction measures by (1) adding satisfaction proxies, and (2) by computing

[13] This is consistent with the findings of Comunian and Jewell (2017), Faggian (2005), and Faggian et al. (2014).

[14] Apart from the usual reasons regarding family issues, language, and cultural barriers, doctors who are willing to move to another country might need to learn anew the healthcare system. In some countries, they may need to re-take medical examinations, a requirement for work and visa purposes. Furthermore, they may be unfamiliar with the technical terms used in the profession in the destination country.

latent job satisfaction based on the Item Response Theory (IRT) technique.[15] The results found in Table 4 are qualitatively in accordance with our main findings.

As a final alternative model, we perform the multinomial treatment approach, based on the migratory behaviour of individuals regarding the location they have chosen for their Ph.D. and whether they have experience working abroad. This differs from the previous approach in that we could potentially capture longer career perspectives. Results can be found in Table 5.

Having the least migratory group as a reference point (individuals with a Ph.D. in their country of citizenship and no work experience abroad) and in accordance with our previous findings, we find that more migratory individuals—captured by the indicator *Work_PhD1* (have both obtained their Ph.D. abroad and have an employment history abroad)—document higher levels of job satisfaction in several categories (i.e., salary, independence, social contribution, social status, benefits, job security, and job location). On the contrary, those who have obtained their Ph.D. in another country, but do not have work experience abroad (*Work_PhD3*), express lower levels of job satisfaction regarding their salary, benefits, and job location. Furthermore, we find that those without experience from abroad, report higher values of satisfaction regarding their employer's esteem. Generally, our results corroborate our main findings and show that migration does indeed play an important role in the job satisfaction of European doctorate holders.

Lastly, we perform an analysis based on an endogenous treatment-regression model that deals with self-selection bias (see Heckman 1976, 1978). This differs from our previous approach in that individuals are solely characterized as migrants when they work abroad. Thus, this indicator captures migration at a higher scale and does not allow for the additional migration nuances we have seen before. The results of these alternative models are found in Table 6. Specifically, we observe that European doctorate holders are more satisfied regarding their independence, mobility, and benefits. The coefficient for the salary satisfaction category is positive, albeit not significant. In addition, individuals are less satisfied regarding their job location and their employer's esteem.

5 Conclusion

This work asks whether the migratory paths individuals follow in their lives affect different dimensions of their job satisfaction. To answer this question, we use a novel and representative database that concentrates on European doctorate holders, MORE2.

[15] The IRT technique allows for the calculation of latent variables, in our case overall satisfaction, based on people's responses to specific questions. Here, we perform this analysis for IRT models for dichotomous data using the *gsem* command in Stata.

To deal with the potential bias issues that afflict migration choices, we utilize a multinomial treatment model approach, where individuals are categorized in five distinct groups given their country of citizenship, the country their Ph.D. was awarded, and the country where they were employed at the time of the survey. Our findings indicate that more migratory individuals tend to express higher levels of job satisfaction compared to those who never moved. This further strengthens our argument that individuals who migrate the most, do so to reap the fruits of their investment in human capital. Through migration, economic agents find better employment opportunities that match their abilities, they further develop their network, and see their careers advance.

Our work stresses the role migration plays for researchers, who oftentimes need to spend a considerable amount of time—a period of stress and uncertainty—until they find appropriate employment given their expertise. We view this work as an important addition in the economic literature on job satisfaction and suggest the following avenues for future research. First, future researchers might be interested in studying how perceptions of job satisfaction differ for different cultures and what are the patterns for the general population and doctorate holders. Second, our research reveals that women doctorate holders document lower job satisfaction than men in many categories. Given that past research has shown that women are, on average, more satisfied than men, it would be very interesting to study why there are obvious differences for female doctorate holders. We trust that future research will provide important answers to the aforesaid.

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Appendix A

See Tables 7, 8, 9, 10 and 11.

Table 7 Country list based on the country of employment

Core countries of the survey	
Austria	Lithuania
Belgium	Luxembourg
Bulgaria	Macedonia (FYROM)
Croatia	Malta
Cyprus	Netherlands
Czech Republic	Norway
Denmark	Poland
Estonia	Portugal
Finland	Romania
France	Slovakia
Germany	Slovenia
Greece	Spain
Hungary	Sweden
Iceland	Switzerland
Ireland	Turkey
Italy	United Kingdom
Latvia	
Western countries (not related to the former Eastern Bloc)	
Austria	Italy
Belgium	Luxembourg
Cyprus	Malta
Denmark	Netherlands
Finland	Norway
France	Portugal
Germany	Spain
Greece	Sweden
Iceland	Switzerland
Ireland	United Kingdom

Table 8 Description of variables

Variable	Description	Source
Salary	= 1 if person satisfied with salary	MORE2
Independence	= 1 if person satisfied with independence in his employment	MORE2
Social contribution	= 1 if person satisfied with his/her social contribution	MORE2
Career advancement	= 1 if person satisfied with his/her career advancement	MORE2
Mobility perspectives	= 1 if person satisfied with the mobility perspectives of his/her job	MORE2
Social status	= 1 if person satisfied with his/her social status	MORE2
Benefits	= 1 if person satisfied with the benefits he/she enjoys	MORE2
Job security	= 1 if person satisfied with job security	MORE2
Job location	= 1 if person satisfied with job location	MORE2
Employer's esteem	= 1 if person satisfied with employer's esteem	MORE2
PhD abroad	= 1 if person was awarded a Ph.D. outside his country of citizenship	MORE2
Work_PhD1	= 1 if person was awarded a Ph.D. abroad and has experience working abroad	Own calculation based on MORE2
Work_PhD2	= 1 if person worked abroad, but did not receive a Ph.D. abroad	Own calculation based on MORE2
Work_PhD3	= 1 if person did not work abroad, but Ph.D. was awarded abroad	Own calculation based on MORE2
Work_PhD4	= 1 if the person has neither worked abroad or was awarded a Ph.D. from abroad	Own calculation based on MORE2
Migrant	= 1 if a person's country of citizenship differs from the country of his/her employment	Own calculation based on MORE2
Repeat-migrant	= 1 if a person's country of employment differs from the country he/she obtained the Ph.D. degree and the country of citizenship	Own calculation based on MORE2
Return-migrant	= 1 if a person was awarded a Ph.D. degree in another country from his citizenship, but eventually returned home	Own calculation based on MORE2
Non-mover	= 1 for those individuals who did not make any change in their residence up to the time of this survey	Own calculation based on MORE2
University-stayer	= 1 for those who migrated to a different country from their origin to get their Ph.D. and stayed there for employment	Own calculation based on MORE2

Table 8 (continued)

Variable	Description	Source
Late-mover	= 1 for those who obtained their Ph.D. in the same country as their origin, but move later for employment	Own calculation based on MORE2
Female	= 1 if the person is female	MORE2
International collaboration	= 1 if the person has cooperation with colleagues internationally	MORE2
Couple with children	= 1 if a couple has children	MORE2
Couple w/o children	= 1 if a couple does not have any children	MORE2
Single with children	= 1 if person is single and has children	MORE2
Single w/o children	= 1 if person is single without children	MORE2
Research: engineering	= 1 if person does research in this field	MORE2
Research: humanities	[same as above]	MORE2
Research: medical sciences	[same as above]	MORE2
Research: natural sciences	[same as above]	MORE2
Research: social sciences	[same as above]	MORE2
Degree in engineering	= 1 if person was awarded the Ph.D. in this field	MORE2
Degree in humanities	[same as above]	MORE2
Degree in medical sciences	[same as above]	MORE2
Degree in natural sciences	[same as above]	MORE2
Degree in social sciences	[same as above]	MORE2
Research mismatch	= 1 if research field is different from degree field	Own calculation based on MORE 2
Recognized researcher	= 1 for Ph.D. holder or equivalent who is not yet fully independent; post-doctoral stage)	MORE2
Established researcher	= 1 for researcher who has developed a level of independence; research specialist or manager, senior lecturer, senior scientist, etc.	MORE2
Leading researcher	= 1 for researcher leading his/her research area or field; professor stage)	MORE2

Table 8 (continued)

Variable	Description	Source
Permanent contract	= 1 if a person is under permanent contract	MORE2
Dual position	= 1 if person holds a dual position	MORE2
Teaching indicators	These are dummies indicating the amount of time a person gives for teaching activities	MORE2
Confidence for the future	Takes values 1 to 4, with 4 indicating extreme confidence	MORE2
Age	= 2012 – year of birth	Own calculation based on MORE2
Age a-b	These are dummies for people belonging to this age group	Own calculation based on MORE2
Knows Euraxess	= 1 if person knows Euraxess program	MORE2
Knows Marie Curie	= 1 if person knows Marie Curie program	MORE2
Growth rate of GDP per capita	This is the growth rate of GDP per capita for the country of origin	Penn World Tables 7.1
Empowerment Rights Index	This is an additive index constructed from the Foreign Movement, Domestic Movement, Freedom of Speech, Freedom of Assembly & Association, Workers' Rights, Electoral Self-Determination, and Freedom of Religion indicators. It ranges from 0 (no government respect for these seven rights) to 14 (full government respect for these seven rights)	CIRI
Human Capital Index	Human Capital Index. Index of human capital per person, based on years of schooling and returns to education	Penn World Tables 7.1
Gini	GINI index (World Bank estimate)	World Development Indicators
Openness	Calculated as (Imports + Exports)/2	World Development Indicators
Polity	Polity scale (− 10 strongly autarchic, 10 strongly democratic)	Polity IV
Employment protection	Version 1 of this indicator measures the strictness of regulation of individual dismissal of employees on regular/indefinite contracts. It incorporates 8 data items	EPL – OECD
Gross savings (% GDP)	Gross savings (% of GDP)	World Development Indicators
Health expenditure, private (% of GDP)	Health expenditure, private (% of GDP)	World Development Indicators
Compensation (tertiary education)	All education staff compensation, tertiary (% of total expenditure in tertiary public institutions)	World Development Indicators

Table 8 (continued)

Variable	Description	Source
Government expenditures (tertiary education)	Expenditure on tertiary as % of government expenditure on education (%)	World Development Indicators
Unemployment (with tertiary degree)	Unemployment with tertiary education (% of total unemployment)	World Development Indicators
Youth unemployment	Unemployment, youth total (% of total labour force ages 15–24) (national estimate)	World Development Indicators

Table 9 List of variables used in each stage

Variable name	Main stage	First stage
Individual level variables		
Age	✓	✓
Female	✓	✓
Knows Euraxess		✓
Knows Marie Curie		✓
Marital and children status indicators	✓	✓
Ph.D. degree field indicators		✓
Research field (after Ph.D.)	✓	
Status of researcher	✓	
Contract type	✓	
Dual position	✓	
Teaching indicators	✓	
Confidence for the future	✓	
Migration indicators	✓	
Country of origin variables		
Growth rate of GDP per capita		✓
Empowerment Rights Index		✓
Human Capital Index		✓
Gini		✓
Openness		✓
Polity IV		✓
Employment protection		✓
Gross savings (% GDP)		✓
Health expenditure, private (% of GDP)		✓
Compensation (tertiary education)		✓
Government expenditure (tertiary education)		✓
Unemployment (w/tertiary degree)		✓
Youth unemployment		✓

Table 10 Sequential migration typologies

Type of highly skilled migrant	Meaning
Repeat-migrant	A repeat migrant is a person who was born in country A, got his Ph.D. in country B, and currently works in country C
Return-migrant	A return-migrant is a person who was born in country A, got his Ph.D. in country B, and currently works in country A
Non-mover	A non-mover is person who was born in country A, got his Ph.D. degree in country A, and currently works in country A
University-stayer	We categorise as university-stayer a person who was born in country A, got his Ph.D. in country B, and currently works in country B
Late-mover	A late-mover is a person who was born in country A, got his Ph.D. in country A, and currently works in country B

Table 11 Multinomial treatment model results for various job satisfaction indicators

Variables	Salary	Independence	Social contribution	Career	Mobility	Social status	Benefits	Job security	Job location	Employer's esteem
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Reference: Non-mover										
Repeat-migrant	0.285***	−0.029	−0.107***	−0.066***	0.055***	0.090*	0.345***	0.040	−0.044**	−0.010**
	(0.005)	(0.024)	(0.004)	(0.006)	(0.001)	(0.048)	(0.002)	(0.048)	(0.019)	(0.005)
Return-migrant	−0.398***	0.043***	0.027***	−0.006***	0.096***	0.061*	−0.374***	0.101**	0.037**	−0.019***
	(0.002)	(0.006)	(0.004)	(0.002)	(0.001)	(0.034)	(0.002)	(0.050)	(0.015)	(0.005)
University-stayer	0.107***	−0.281***	−0.370***	0.033***	−0.425***	0.029	0.054***	−0.023	−0.285***	−0.275***
	(0.003)	(0.015)	(0.006)	(0.004)	(0.003)	(0.042)	(0.002)	(0.037)	(0.012)	(0.015)
Late-mover	0.210***	−0.000	−0.001	−0.420***	0.061***	0.073**	0.220***	0.016	−0.009	−0.015
	(0.002)	(0.004)	(0.002)	(0.005)	(0.002)	(0.030)	(0.002)	(0.038)	(0.006)	(0.020)
Reference: Age 60–65										
Age 25–29	−0.021***	0.135***	−0.016***	0.099***	0.249***	0.005	0.033***	0.046	0.094***	0.056***
	(0.002)	(0.015)	(0.005)	(0.003)	(0.002)	(0.047)	(0.004)	(0.053)	(0.012)	(0.005)
Age 30–34	0.023***	0.099***	0.002	0.150***	0.109***	0.006	0.021***	−0.003	0.046***	0.005
	(0.002)	(0.015)	(0.004)	(0.004)	(0.002)	(0.026)	(0.002)	(0.026)	(0.010)	(0.005)
Age 35–39	0.064***	0.072***	0.017***	0.079***	0.059***	−0.002	0.011***	0.008	0.003	−0.019***
	(0.002)	(0.010)	(0.005)	(0.002)	(0.003)	(0.021)	(0.003)	(0.020)	(0.011)	(0.004)
Age 40–44	−0.001	0.078***	0.027***	0.028***	−0.032***	0.008	−0.014***	0.041**	0.018***	−0.011**
	(0.001)	(0.009)	(0.004)	(0.003)	(0.003)	(0.020)	(0.001)	(0.018)	(0.007)	(0.005)
Age 45–49	0.054***	0.029***	0.031***	0.062***	−0.017***	0.002	0.009***	0.066***	−0.002	0.020***
	(0.002)	(0.010)	(0.005)	(0.001)	(0.001)	(0.021)	(0.003)	(0.019)	(0.009)	(0.003)
Age 50–54	0.052***	0.028**	0.038***	0.048***	−0.028***	0.040*	0.031***	0.092***	0.022**	−0.002

Table 11 (continued)

Variables	Salary	Independence	Social contribution	Career	Mobility	Social status	Benefits	Job security	Job location	Employer's esteem
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	(0.002)	(0.012)	(0.004)	(0.001)	(0.002)	(0.022)	(0.001)	(0.019)	(0.009)	(0.004)
Age 55–59	0.102***	0.056***	−0.027***	−0.049***	0.015***	0.032	0.060***	0.068***	0.024***	−0.002
	(0.002)	(0.008)	(0.003)	(0.005)	(0.002)	(0.024)	(0.002)	(0.021)	(0.009)	(0.010)
Female	−0.001	0.034***	−0.008***	0.009***	0.004***	0.040***	0.019***	0.020	0.002	0.012***
	(0.001)	(0.004)	(0.002)	(0.001)	(0.001)	(0.013)	(0.001)	(0.012)	(0.008)	(0.004)
International collaboration	0.012***	−0.019***	−0.007**	0.014***	0.013***	−0.020	−0.022***	−0.033**	−0.021***	−0.037***
	(0.002)	(0.003)	(0.003)	(0.002)	(0.001)	(0.015)	(0.001)	(0.014)	(0.008)	(0.003)
Reference: Single without children										
Couple w/ children	−0.055***	0.031***	0.027***	−0.038***	−0.019***	0.002	−0.039***	−0.022	−0.011*	0.016
	(0.002)	(0.004)	(0.004)	(0.002)	(0.002)	(0.016)	(0.002)	(0.016)	(0.006)	(0.011)
Couple w/o children	−0.107***	−0.022***	0.030***	−0.028***	−0.009***	−0.024	−0.116***	−0.043**	−0.048***	−0.021***
	(0.002)	(0.003)	(0.004)	(0.004)	(0.003)	(0.020)	(0.002)	(0.019)	(0.006)	(0.003)
Single w/ children	−0.120***	−0.015	−0.031***	−0.161***	0.058***	−0.140*	−0.021**	−0.118*	−0.033***	0.090***
	(0.007)	(0.018)	(0.007)	(0.018)	(0.004)	(0.073)	(0.009)	(0.062)	(0.010)	(0.012)
Reference: Research in agriculture										
Research: engineering	−0.035***	0.000	0.069***	0.010	0.046***	−0.028	0.011***	0.013	0.028***	−0.067***
	(0.003)	(0.013)	(0.004)	(0.008)	(0.001)	(0.040)	(0.002)	(0.037)	(0.011)	(0.005)
Research: humanities	0.065***	−0.039***	0.080***	−0.012***	−0.070***	−0.023	0.017***	0.003	0.018	−0.051***

Table 11 (continued)

Variables	Salary	Independence	Social contribution	Career	Mobility	Social status	Benefits	Job security	Job location	Employer's esteem
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	(0.003)	(0.007)	(0.004)	(0.003)	(0.002)	(0.041)	(0.002)	(0.038)	(0.011)	(0.009)
Research: medical	−0.036***	−0.028***	0.089***	0.056***	−0.009***	0.020	−0.032***	0.035	0.044***	−0.016***
	(0.003)	(0.007)	(0.006)	(0.004)	(0.002)	(0.038)	(0.001)	(0.036)	(0.015)	(0.004)
Research: natural sciences	−0.001	0.043***	0.071***	0.035***	−0.005***	0.001	0.031***	0.029	0.038***	−0.004
	(0.002)	(0.010)	(0.005)	(0.004)	(0.002)	(0.039)	(0.003)	(0.036)	(0.009)	(0.008)
Research: social sciences	0.006***	−0.022***	0.065***	0.020***	0.017***	−0.003	−0.003**	0.019	0.027	−0.023***
	(0.002)	(0.008)	(0.004)	(0.003)	(0.001)	(0.038)	(0.001)	(0.035)	(0.022)	(0.006)
Research mismatch	−0.045***	0.009*	0.001	−0.025**	−0.076***	−0.038**	−0.010***	−0.007	−0.046***	0.009**
	(0.003)	(0.005)	(0.004)	(0.010)	(0.001)	(0.019)	(0.001)	(0.017)	(0.006)	(0.004)
Reference: Leading researcher										
Recognized researcher	0.054***	−0.076***	−0.054***	−0.031***	−0.026***	0.025	0.078***	−0.035*	0.031***	0.036**
	(0.002)	(0.005)	(0.004)	(0.005)	(0.001)	(0.021)	(0.001)	(0.020)	(0.008)	(0.017)
Established researcher	0.009***	−0.035***	−0.023***	−0.063***	−0.064***	−0.001	0.008***	−0.005	0.024**	0.010**
	(0.001)	(0.004)	(0.002)	(0.002)	(0.001)	(0.014)	(0.001)	(0.013)	(0.011)	(0.004)
Permanent contract	0.016***	−0.017	0.006	0.084***	0.003**	0.027	0.016***	0.470***	0.023***	−0.013*
	(0.001)	(0.011)	(0.004)	(0.003)	(0.002)	(0.018)	(0.002)	(0.020)	(0.007)	(0.007)
Dual position	−0.029***	0.070***	0.026***	−0.003***	−0.037***	−0.029	0.049***	0.015	−0.013	−0.010***
	(0.001)	(0.005)	(0.003)	(0.001)	(0.002)	(0.021)	(0.003)	(0.020)	(0.012)	(0.003)

Table 11 (continued)

Variables	Salary	Independence	Social contribution	Career	Mobility	Social status	Benefits	Job security	Job location	Employer's esteem
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Reference: No teaching										
Teaching 25% or less	−0.073***	−0.001	−0.005	−0.042***	−0.039***	0.041*	0.051***	0.001	0.035***	−0.027***
	(0.002)	(0.005)	(0.004)	(0.003)	(0.001)	(0.025)	(0.001)	(0.026)	(0.011)	(0.009)
Teaching 26–50%	−0.075***	0.035***	−0.072***	−0.021***	−0.052***	0.040	0.030***	0.042	0.006	−0.038***
	(0.002)	(0.006)	(0.005)	(0.005)	(0.002)	(0.026)	(0.002)	(0.026)	(0.010)	(0.007)
Teaching 51–75%	−0.174***	0.007	−0.087***	−0.071***	−0.143***	0.042	0.010***	0.027	0.014	−0.032**
	(0.003)	(0.005)	(0.005)	(0.004)	(0.002)	(0.029)	(0.002)	(0.029)	(0.012)	(0.013)
Teaching 76–100%	−0.159***	−0.029**	−0.067***	−0.096***	−0.152***	−0.013	−0.005**	−0.009	0.041***	−0.094***
	(0.003)	(0.013)	(0.004)	(0.003)	(0.002)	(0.037)	(0.002)	(0.034)	(0.011)	(0.006)
Confidence for the future	0.096***	0.069***	0.079***	0.206***	0.145***	0.116***	0.084***	0.107***	0.058***	0.079***
	(0.001)	(0.004)	(0.001)	(0.001)	(0.001)	(0.009)	(0.001)	(0.008)	(0.004)	(0.001)
Country of origin FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.390***	0.681***	0.662***	−0.026***	0.336***	0.393***	0.278***	0.141**	0.645***	0.677***
	(0.004)	(0.046)	(0.006)	(0.010)	(0.004)	(0.067)	(0.003)	(0.065)	(0.026)	(0.044)
Selection outcomes										
Ln(σ)	−5.500***	−4.639***	−5.006***	−5.934***	−5.729***	−1.097***	−5.722***	−1.165***	−4.032***	−4.991***
	(0.247)	(0.118)	(0.136)	(0.115)	(0.113)	(0.051)	(0.125)	(0.077)	(0.232)	(0.197)
λ repeat-migrant	−0.052***	0.029***	−0.019***	0.060***	−0.048***	−0.051	−0.144***	−0.017	−0.001	−0.072***
	(0.002)	(0.001)	(0.002)	(0.002)	(0.000)	(0.037)	(0.001)	(0.039)	(0.009)	(0.001)

Table 11 (continued)

Variables	Salary	Independence	Social contribution	Career	Mobility	Social status	Benefits	Job security	Job location	Employer's esteem
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
λ return-migrant	0.439***	−0.058***	−0.089***	−0.059***	−0.079***	−0.080***	0.448***	−0.123**	−0.073***	−0.059***
	(0.001)	(0.002)	(0.002)	(0.000)	(0.001)	(0.027)	(0.001)	(0.052)	(0.004)	(0.001)
λ university-stayer	−0.059***	0.316***	0.323***	−0.038***	0.455***	−0.040	0.078***	−0.028	0.298***	0.335***
	(0.002)	(0.004)	(0.001)	(0.001)	(0.001)	(0.026)	(0.000)	(0.020)	(0.001)	(0.002)
λ late-mover	−0.054***	−0.011***	−0.027***	0.457***	−0.052***	−0.078***	−0.101***	−0.030	−0.017	−0.036***
	(0.000)	(0.002)	(0.001)	(0.001)	(0.000)	(0.022)	(0.001)	(0.032)	(0.010)	(0.002)
Observations	3,904	3,933	3,774	3,743	3,681	3,758	3,693	3,897	3,935	3,821
Log pseudolikelihood	−6370.770	−5233.817	−5086.737	−6101.035	−6068.682	−5498.221	−6172.856	−5438.433	−4975.601	−5181.154
Likelihood Ratio (LR)	261.837	174.473	237.981	293.713	289.955	1.907	268.406	1.275	126.636	219.308
LR *p*-value	0.000	0.000	0.000	0.000	0.000	0.753	0.000	0.866	0.000	0.000

This table documents results obtained through a multinomial treatment model with 2000 simulation draws. Robust standard errors in parentheses.

Stars indicate significance levels

***At 1%

**At 5%

*At 10% respectively

Appendix B

The MORE2 database was compiled by the European Commission and its aim was to "provide internationally comparable data" in order to study the migration patterns of European researchers. The main objectives of this database were:

- To refine the concepts of "mobility" and "mobile researcher". By doing so, it delivers better accuracy for this measurement.
- To provide a broader geographical scope.
- To provide a representative database which will help researchers draw conclusions for a larger geographical unit, such as the country.
- To show early stage researchers' working conditions and collect information about their opinions regarding the aforesaid.
- To reveal which factors affect researchers' decision when they choose different positions.
- To estimate the number of European researchers working outside of the country where they obtained their degree.

The final database is based on inputs of five different working packages.

- WP0—kick off and road-map
- WP1—EU HEI survey
- WP2—Extra-EU survey
- WP3—Case study on working conditions and career paths
- WP4—Case study on renumeration
- WP5—update of the researcher indicators

All the above working packages are summarized in WP6—Synthesis and final report.

The MORE2 database meets a minimum level of accuracy by using different methodologies to obtain accurate results. The data were collected through two main methods: (a) computer-assisted telephone interviews (CATI) and (b) computer-assisted web interviews (CAWI). The project managers took all the necessary measures for the two projects to interact, to avoid unnecessary outcomes, such as contacting the same people. A follow-up survey completed the data. In addition, measures of refinement that account for seasonal effects were adopted. The final sample had 10,547 individual researchers who at the time of the survey where working in the EU.

Importantly, this database tracks researchers' movements throughout their career. To better capture mobility, it distinguishes between short-term movements

(less than three months), and long-term movements (more than three months). The database can track changes in employer, intersectoral moves, along with the types of origin (citizenship, highest education) and destination. An important advantage of the MORE2 is its global perspective, as it is the only known study to be able to track researchers' movements at a global scale. Specifically, through the EU HEI survey, this database contains accurate data for all EU member states, along with the Associated and Candidate countries. Furthermore, this survey collects data on satisfaction, working conditions, and mobility.

The database concerns the following fields of science (classified according to the FOS classification of the Frascati Manual):

- Natural Sciences
- Engineering and technology
- Medical Sciences
- Agricultural Sciences
- Social Sciences
- Humanities

Additionally, in the database one can distinguish between four different career stages:

- R1: First Stage Researcher (up to the point of Ph.D.)
- R2: Recognized Researcher (Ph.D. holders who are not fully independent)
- R3: Established Researcher (researchers who have developed a level of independence)
- R4: Leading Researcher (those are individuals who are leaders in their area of research).

In this study we have used only individuals who have obtained a doctorate and therefore we do not include those under the R1 flag.

Appendix C

Here we provide the core questions asked in the questionnaire along with the possible answers (see Table 12).

Table 12 Questionnaire

Question	Potential answer
I consider myself a researcher	Tick box type question
What is your gender?	Male or female
What is your year of birth?	Interviewees choose their year of birth based on choices given to them
What is your country of residence?	Interviewees choose a country from a list provided to them
What is your country of citizenship?	Interviewees choose a country from a list provided to them
What is the country of your employer?	Interviewees choose a country from a list provided to them
What is your status?	Potential answers are: (i) couple with children, (ii) couple without children, (iii) single with children, (iv) single without children, (v) prefer not to disclose
Did you obtain a higher education (=post-secondary) degree?	Yes or no
Please, indicate below all higher education (=post-secondary) diplomas/degrees you obtained	Potential answers are undergraduate, graduate, postgraduate
What was the field of study for these degrees?	Natural sciences, engineering and technology, medical sciences, agricultural sciences, social sciences, humanities
What is your main field of research in your current position?	Natural sciences, engineering and technology, medical sciences, agricultural sciences, social sciences, humanities
In which career stage would you currently situate yourself?	R1 first stage researcher R2 recognized researcher R3 established researcher R4 leading researcher
Are you currently working on a Ph.D. or enrolled in a doctoral program?	Yes or no
In what year of your Ph.D. are you currently studying?	1st, 2nd, 3d, 4th, 5th or more
Are you currently in a so-called "dual position", whereby you are employed both in the university (or higher education institution) and another sector?	Yes or no
Please, indicate which other sector:	Public or government, private, not-for-profit sector, private industry
Is your university employment your primary employment?	Yes or no
Employed since?	Interviewees choose from a list of different years
Type of contract	No contract, fixed term (less than a year), fixed term (between one and two years), fixed-term (between two to four years), fixed-term (more than four years), permanent contract, self-employed
Type of position	Full-time, part-time (more than 50%), part-time (50%), part-time (less than 50%)

Table 12 (continued)

Question	Potential answer
Status	Civil servant, employee, student, self-employed, other
Teaching activities (as % of your overall working time)	None, 25% or less, 26–50%, 51–75%, 76–100%
Please, indicate your satisfaction with each factor as it relates to your current position:	Interviewees can choose either "satisfied" or "dissatisfied" in the following: dynamism, intellectual challenge, level of responsibility, degree of independence, contribution to society, opportunities for advancement, mobility perspectives, social status, salary, benefits, job security, job location, reputation of employer, and other
Overall, how confident do you feel about the future prospects for your research career?	Very confident, somewhat confident, I lack confidence, I very much lack confidence
Did/will you obtain your Ph.D. in a country other than the one where you obtained your previous degree (the degree that gave you access to the Ph.D.)?	Yes, No, do not know
During your Ph.D., did you move for 3 months or more to another country than the country where did/will obtain your Ph.D.?	Yes or no
To which country(ies) was this?	The interviewee chooses from a list of countries
Which of the following factors were important/not important for your decision to move to another country?	People choose either "important" or "not important" from the following list: availability of research funding, availability of suitable Ph.D. position, career progression, facilities and equipment for your research, working with leading experts, research autonomy, quality training and education, culture and/or language, personal/family reasons, remuneration, social security and pension system, job security, working conditions, other
After your highest educational qualification (Ph.D. or other), how would you typify your international mobility experience?	Potential answers are as follows: I have worked abroad for more than 3 months at least once in the last 10 years, I have worked abroad for more than 3 months, but this was more than 10 years ago, I have never worked abroad for more than three months
Dual position?	Yes or no
Please, indicate with who you collaborate in your research (e.g., joint projects, joint papers, etc.) and also indicate, where relevant, whether this collaboration was the results of a previous mobility experience (of 3 months or more, in or outside the EU)	Interviewees can provide an affirmative answer to the following components: researchers at universities/public research institutes in your country, researchers from the non-academic sector in your country, researchers from universities/research institutes in other EU countries than your own, researchers from universities/research institutes in non-EU countries, researchers from private industry in other EU countries than your own, researchers from private industry in non-EU countries
Are you aware of the services offered by EURAXESS (services network, jobs portal)?	Yes or no

Table 12 (continued)

Question	Potential answer
Are you aware of the Marie-Curie Actions of the EU's Seventh Framework Programme for Research (FP7)?	Yes or no

References

Abreu M, Faggian A, McCann P (2015) Migration and inter-industry mobility of UK graduates. J Econ Geogr 15(2):353–385

Ackers L (2004) Managing relationships in peripatetic careers: scientific mobility in the European Union. In: Women's studies international forum, vol 27, no 3, pp 189–201. Pergamon

Ackers L (2005) Moving people and knowledge: scientific mobility in the European Union. Int Migr 43(5):99–131

Aksnes DW, Rørstad K, Piro FN, Sivertsen G (2013) Are Mobile researchers more productive and cited than non-mobile researchers? A large-scale study of Norwegian scientists. Res Eval 22(4):215–223

Alesina A, Di Tella R, MacCulloch R (2004) Inequality and happiness: are Europeans and Americans different? J Public Econ 88(9–10):2009–2042

Anand P, Van Hees M (2006) Capabilities and achievements: an empirical study. J Socio-Econ 35(2):268–284

Arslan C, Dumont J-C, Kone Z, Moullan Y, Parsons C, Özden Ç, Xenogiani X (2014) A new profile of migrants in the aftermath of the recent economic crisis (OECD Social, Employment and Migration Working Paper No. 160). Paris, France: OECD

Azoulay P, Zivin J, Sampat B (2012) The diffusion of scientific knowledge across time and space. In: Lerner J, Stern S (eds) (Vol. Rate and d). University of Chicago Press

Bakker AB, Demerouti E (2007) The job demands-resources model: state of the art. J Manag Psychol 22(3):309–328

Baruffaldi SH, Landoni P (2012) Return mobility and scientific productivity of researchers working abroad: the role of home country linkages. Res Policy 41(9):1655–1665

Baruffaldi SH, Landoni P (2016) Mobility intentions of foreign researchers: the role of non-economic motivations. Ind Innov 23(1):87–111

Beine M, Noël R, Ragot L (2014) Determinants of the international mobility of students. Econ Educ Rev 41:40–54

Biagi B, Ladu MG, Meleddu M (2018) Urban quality of life and capabilities: an experimental study. Ecol Econ 150:137–152

Booth AL, Van Ours JC (2008) Job satisfaction and family happiness: the part-time work puzzle. Econ J 118:77–F99

Booth AL, Van Ours JC (2009) Hours of work and gender identity: does part-time work make the family happier? Economica 76:176–196

Brewster C, Suutari V, Bonache J (2005) Job satisfaction among expatriates, repatriates and domestic employees. Personnel Review

Carr SC, Inkson K, Thorn K (2005) From global careers to talent flow: reinterpreting 'brain drain'. J World Bus 40(4):386–398

Clark AE (1996) Job satisfaction in Britain. Br J Ind Relat 34(2):189–217

Clark AE (1997) Job satisfaction and gender: why are women so happy at work?". Labour Econ 4:341–372

Clark AE (2001) What really matters in a job? Hedonic measurement using quit data. Labour Econ 8(2):223–242

Clark AE, Oswald AJ (1994) Unhappiness and unemployment. Econ J 104(424):648–659

Clark A, Georgellis Y, Sanfey P (1998) Job satisfaction, wage changes, and quits: evidence from Germany. Res Labor Econ 17:95–121

Clark AE, Mavromaras K, Wei Z (2015) Happy to stay: job satisfaction and retirement. Flinders University, Mimeo

Comunian R, Faggian A, Jewell S (2014) Embedding arts and humanities in the creative economy: the role of graduates in the UK. Environ Plan C Gov Policy 32:426–450
Comunian R, Faggian A, Jewell S (2017) Graduates migration in the UK: an exploration of gender dynamic and employment patterns. (Corcoran J, Faggian A (Eds) Edward Elgar, New Horizons in Regional Science
Comunian R, Jewell S (2017)Young, talented and highly mobile': exploring creative human capital and graduates mobility in the UK, unpublished manuscript
Credé M, Tynan MC, Harms PD (2017) Much ado about grit: a meta-analytic synthesis of the grit literature. J Pers Soc Psychol 113(3):492
Crescenzi R, Holman N (2017) Why do they return? Beyond the economic drivers of graduate return migration. Ann Reg Sci 59(3):603–627
Czaika M, Parsons CR (2017) The gravity of high-skilled migration policies. Demography 54(2):603–630
De Filippo D, Casado ES, Gómez I (2009) Quantitative and qualitative approaches to the study of mobility and scientific performance: a case study of a Spanish University. Res Eval 18(3):191–200
Deb P, Trivedi PK (2006) Specification and simulated likelihood estimation of a non-normal treatment-outcome model with selection: application to health care utilization. Econ J 9:307–331
Dickmann M, Harris H (2005) Developing career capital for global careers: the role of international assignments. J World Bus 40(4):399–408
Dickmann M, Doherty N, Mills T, Brewster C (2008) Why do they go? Individual and corporate perspectives on the factors influencing the decision to accept an international assignment. Int J Hum Resour Manag 19(4):731–751
Dickson D (2003) Mitigating the brain drain is a moral necessity. Sci Dev Netw 29
Di Tella R, MacCulloch R (2005) Partisan social happiness. Rev Econ Stud 72(2):367–393
Docquier F, Marfouk A (2006) International migration by educational attainment (1990–2000). Özden Ç, Schiff M (Eds). Palgrave Macmillan, New York
Doherty N, Dickmann M, Mills T (2011) Exploring the motives of company-backed and self-initiated expatriates. Int J Hum Resour Manag 22(03):595–611
Döring T, Schnellenbach J (2006) What do we know about geographical knowledge spillovers and regional growth: a survey of the literature. Reg Stud 40(3):375–395
Duckworth AL, Peterson C, Matthews MD, Kelly DR (2007) Grit: perseverance and passion for long-term goals. J Pers Soc Psychol 92(6):1087
Easterlin RA (1974) Does economic growth improve the human lot? Some empirical evidence. In: Nations and households in economic growth, pp 89–125. Academic Press
Edler J, Fier H, Grimpe C (2011) International Scientist mobility and the locus of technology transfer. Res Policy 40:791–805
Faggian A (2005) Human capital, migration and local labour markets: the role of the higher education system in Great Britain. University of Reading
Faggian A, Comunian R, Li QC (2014) Interregional migration of human creative capital: the case of "Bohemian graduates". Geoforum 55:33–42
Faggian A, McCann P, Sheppard S (2007a) Human capital, higher education and graduate migration: an analysis of Scottish and Welsh students. Urban Stud 44(13):2511–2528
Faggian A, McCann P, Sheppard S (2007b) Some evidence that women are more mobile than men: gender differences in UK graduate migration behavior. J Reg Sci 47(3):517–539
Franzoni C, Scellato G, Stephan P (2014) The mover's advantage: the superior performance of migrant scientists. Econ Lett 122(1):89–93
Freeman RB (2010) Globalization of scientific and engineering talent: international mobility of students, workers, and ideas and the world economy. Econ Innov New Technol 19(5):393–406
Frey BS, Stutzer A (2000) Happiness, economy and institutions. Econ J 110(466):918–938
Goldin I, Cameron G, Balarajan M (2011) How migration shaped our world and will define our future. Princeton University Press, Princeton
Green F (2010) Wellbeing, job satisfaction and labour mobility. Labour Econ 17(6):897–903
Grogger J, Hanson GH (2011) Income maximization and the selection and sorting of international migrants. J Dev Econ 95(1):42–57
Heckman JJ (1976) The common structure of statistical models of truncation, sample selection and limited dependent variables and a simple estimator for such models. In: Annals of Economic and Social Measurement, Vol 5, number 4, pp 475–492. NBER
Heckman JJ (1978) Dummy endogenous variables in a simultaneous equation system. Econometrica 46(4):931–959

Hippler T (2009) Why do they go? Empirical evidence of employees' motives for seeking or accepting relocation. Int J Hum Resour Manag 20(6):1381–1401
Hunter RS, Oswald AJ, Charlton BG (2009) The Elite Brain Drain. Econ J 119(538):F231–F251
Ioannidis JPA (2004) Global estimates of high-level brain drain and deficit. J Fed Am Soc Exp Biol 18:936–939
Jewell S, Faggian A (2014) Interregional migration "Wage Premia": the case of creative and science and technology graduates in the UK. Kourtit K, Nijkamp P, Stimson R (Eds). Springer, Berlin
Kacmar KM, Ferris GR (1989) Theoretical and methodological considerations in the age-job satisfaction relationship. J Appl Psychol 74(2):201
Kerr SP, Kerr W, Özden Ç, Parsons C (2016) Global talent flows. J Econ Perspect 30(4):83–106
Kaiser LC (2007) Gender-job satisfaction differences across Europe. An indicator for labour market modernization. Int J Manpower 28:75–94
Kazakis P, Faggian A (2017) Mobility, education and labor market outcomes for U.S. graduates: is selectivity important? Ann Reg Sci 59(3):731–758
Levin SG, Stephan PE (1999) Are the foreign born a source of strength for US science? Science 285(5431):1213–1214
Lévy-Garboua L, Montmarquette C (2004) Reported job satisfaction: what does it mean? J Socio-Econ 33(2):135–151
Light A, Nencka P (2019) Predicting educational attainment: does grit compensate for low levels of cognitive ability? Learn Individ Differ 70:142–154
Mahoney MJ (1979) Review paper: psychology of the scientist: an evaluative review. Soc Stud Sci 9(3):349–375
Mahroum S (1998) Europe and the challenge of the brain drain. IPTS report 29:21–27
Mahroum S (2000) Highly skilled globetrotters: mapping the international migration of human capital. R&D Manag 30(1):23–32
Mäkelä L, Suutari V (2011) Coping with work-family conflicts in the global career context. Thunderbird Int Bus Rev 53(3):365–375
Martin-Rovet D (2003) Opportunities for outstanding young scientists in Europe to create an independent research team. European Science Foundation, Strasbourg
Mayerhofer H, Hartmann LC, Herbert A (2004) Career management issues for flexpatriate international staff. Thunderbird Int Bus Rev 46(6):647–666
Merton RK (1979) The sociology of science: theoretical and empirical investigations. University of Chicago Press, Chicago
Meyer JB, Kaplan D, Charum J (2001) Scientific nomadism and the new geopolitics of knowledge. Int Soc Sci J 53(168):309–321
Miguélez E, Moreno R (2014) What attracts knowledge workers? The role of space and social networks. J Reg Sci 54(1):33–60
Møen J (2005) Is mobility of technical personnel a source of R&D spillovers? J Labor Econ 23(1):81–114
Myers DG (1999) Close relationship and quality of life. In: Kahneman D, Diener E, Schwartz N (eds) Well-being: the foundations of hedonic psychology. Russell Sage Foundation, New York, pp 374–391
Newland K (2009) Circular migration and human development. Hum Dev Res Pap 42:1–22
Ng TW, Eby LT, Sorensen KL, Feldman DC (2005) Predictors of objective and subjective career success: a meta-analysis. Pers Psychol 58(2):367–408
Organisation for Economic Co-Operation And Development (OECD) (2005) Trends in international migration
Organisation for Economic Co-Operation And Development (OECD) (2008) The global competition for talent. Mobility of the Highly Skilled
Oswald A, Proto E, Sgroi D (2015) Happiness and productivity. J Labor Econ 33(4):789–822
Patterson M, Warr P, West M (2004) Organizational climate and company productivity: the role of employee affect and employee level. J Occup Org Psychol 77(2):193–216
Roach M, Sauermann H (2010) A taste for science? PhD scientists' academic orientation and self-selection into research careers in industry. Res Policy 39(3):422–434
Sabot RH (1987) Internal migration and education. Psacharopoulos G (ed) Economics of education research and studies. Pergamon Press, Oxford
Salt J (1997) International movements of the highly skilled. OECD Social, employment and migration working papers, No. 3, Paris: OECD Publishing

Sauermann H, Cohen WM (2010) What makes them tick? Employee motives and firm innovation. Manag Sci 56(12):2134–2153
Schiller D, Revilla-Diez J (2010) Local embeddedness of knowledge spillover agents: empirical evidence from German star scientists. Pap Reg Sci 89:275–294
Schultz TW (1961) Investment in human capital. Am Econ Rev 51(1):1–17
Selmer J, Leung AS (2003) International adjustment of female vs male business expatriates. Int J Hum Resour Manag
Sen AK (1987) Commodities and capabilities. Oxford University Press, Oxford
Sen AK (1993) Capability and well-being. In: Nussbaum MC, Sen AK (eds) The quality of life. Clarendon Press, Oxford, pp 30–53
Shaffer MA, Kraimer ML, Chen YP, Bolino MC (2012) Choices, challenges, and career consequences of global work experiences: a review and future agenda. J Manag 38(4):1282–1327
Sjaastad LA (1962) The costs and the returns of human migration. J Political Econ 70(5):80–93
Skeldon R (2009) Of skilled migration, brain drains and policy responses. Int Migr 47(4):3–29
Sousa-Poza A, Sousa-Poza AA (2003) Gender differences in job satisfaction in Great Britain, 1991–2000: permanent or transitory?". Appl Econ Lett 10(11):691–694
Starr TL, Currie G (2009) 'Out of sight but still in the picture': Short-term international assignments and the influential role of family. Int J Hum Resour Manag 20(6):1421–1438
Stern S (2004) Do scientists pay to be scientists? Manag Sci 50(6):835–853
Stutzer A, Lalive R (2004) The role of social work norms in job searching and subjective well-being. J Eur Econ Assoc 2(4):696–719
Stutzer A, Frey BS (2006) Does marriage make people happy, or do happy people get married? J Socio-Econ 35(2):326–347
Tharenou P, Caulfield N (2010) Will I stay or will I go? Explaining repatriation by self-initiated expatriates. Acad Manag J 53(5):1009–1028
Thorn K, Holm-Nielsen L (2008) International mobility of researchers and scientists: policy options for turning a drain into a gain. Solimano A (Ed) (Vol. The Intern). Oxford University Press, Oxford
Trippl M (2013) Scientific mobility and knowledge transfer at the interregional and intraregional level. Reg Stud 47(10):1653–1667
Van de Sande D, Ackers HL, Gill B (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). Contract nr. IHP-D2-2003-01, 6
Veugelers R, Bouwel LV (2015) The effects of international mobility on European Researchers: comparing Intra-EU and U.S. Mobility. Res Higher Educ 56(4):360–377
Welch DE, Welch LS, Worm V (2007) The international business traveller: a neglected but strategic human resource. Int J Hum Resour Manag 18(2):173–183
Williams A (2007) International labour migration and tacit knowledge transactions: a multi-level perspective. Glob Netw 7:29–50
Yankow JJ (2003) Migration, job change, and wage growth: a new perspective on the pecuniary return to geographic mobility. J Reg Sci 43(3):483–516
Zucker L, Darby M (2006) Movements of star scientists and engineers and high-tech firm entry. National Bureau of Economic Research (NBER), (Working Paper Number 12172)
Zucker L, Darby M, Brewer M (1998) Intellectual human capital and the birth of U.S. biotechnology enterprises. Am Econ Rev 88:290–306
Zucker L, Darby M, Armstrong J (2002) Commercializing knowledge: university science, knowledge capture and firm performance in biotechnology. Manag Sci 48:138–153