Brain drain and job dissatisfaction.
Evidence from a developing country

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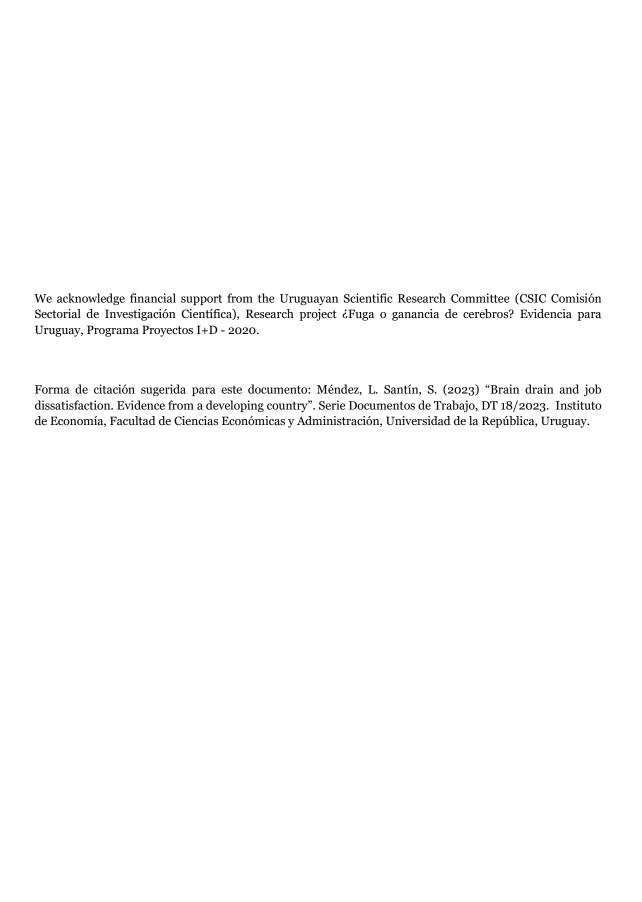
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Resumen

En este trabajo analizamos en qué medida la insatisfacción laboral reportada por los individuos podría impulsar la fuga de cerebros en un país en desarrollo, tomando a Uruguay como caso de estudio. Nos centramos en un grupo particular de trabajadores altamente calificados, aquellos que cuentan con un título de doctorado y se dedican a la investigación, debido a su relevancia para el desarrollo. Este grupo no ha sido suficientemente abordado por la literatura sobre fuga de cerebros.

Aportamos a la literatura previa a partir del análisis de estimaciones de ecuaciones aparentemente no relacionadas con variables instrumentales, que permite abordar la causalidad desde la insatisfacción laboral a la intención emigratoria. Nuestros resultados muestran una relación causal negativa entre la satisfacción laboral y el deseo del investigador de emigrar. También encontramos que los investigadores integrados en redes académicas internacionales son más propensos a reportar intención a emigrar.

Nuestras recomendaciones de políticas están en línea con aquellas que apuntan a aumentar los aspectos pecuniarios y no pecuniarios del trabajo, y a implementar políticas complejas de colaboración internacional con investigadores que viven en el extranjero para compensar al menos parcialmente la fuga de cerebros.

Palabras clave: fuga de cerebros, migración, capital humano, bienestar subjetivo, Uruguay

Código JEL: F22, J24, J28, O15.

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Abstract

We study the extent to which individuals' reported job dissatisfaction could drive brain drain in a developing country, taking Uruguay as a case study. We focus on a particular group of highly skilled workers, those holding a PhD and working in research, due to their relevance for development. This group has not been previously addressed in the literature on brain drain.

We build on previous literature and address causality by estimating seemingly unrelated equations with instrumental variables. Our results point to a negative causal relationship between job satisfaction and a researcher's desire to emigrate. We also find that researchers embedded in international academic networks are more prone to report an intention to emigrate.

Our policy recommendations are in line with those aiming to increase pecuniary and non-pecuniary aspects of the job, and to implement complex policies of international collaboration with researchers living abroad in order to at least partially offset brain drain.

1. Introduction

Although economic literature has long sought to understand the factors behind "brain drain" —understood as the international migration of highly skilled workers (Bhagwati and Hamada, 1974; Miyagiwa, 1991)—there has been considerably little attention paid to the international migration of individuals holding a doctorate degree and involved in research activities (Jewell and Kazakis, 2021).

Researchers have some traits that differentiate them from other highly skilled workers. First, they are recognized as a key factor in innovation, technological advancement, and the generation and dissemination of knowledge (Bender and Heywood, 2006; Kifle and Hailemarian, 2012). As a result, they are associated with holding a role in the economic development of their countries. Second, researchers have relatively high international mobility and their migrations are not necessarily permanent. Also, the international migration of researchers is often driven by non-economic factors, including access to technology or infrastructure and inclusion in transnational elite scientific networks (Cañibano et al., 2017), recognition by peers, intellectual challenge, among others (Jewell and Kazakis, 2021). These features make the factors driving researchers' intention to migrate a compelling issue worthy of further study.

Different branches of the literature address the factors that influence migration intentions. The standard economic framework stresses that individuals decide to migrate if the expected utility derived from living in a foreign country exceeds the expected utility of staying in the home country. Another branch of the literature, primarily developed by demographers, sociologists, and psychologists, considers actual migration to be a decision-making process that begins with considering migration as an option, followed by a planning stage, and finally a move to a different country (De Jong, 2000; Kley and Mulder, 2010; van Dalen and Henkens, 2013).

The propensity to emigrate reflects a willingness to leave one's country (Lovo 2014) due to a broad scope of reasons, including mismatch between goals and perceived opportunities (De Jong 2000). Given this, the subjective well-being (SWB) or happiness economics literature is relevant. This literature stresses that individuals' reported satisfaction with life or its different domains (i.e. job, family, health, etc.), is the result of aspirations and achievements (Clark and Oswald, 1998); which in turn influences individual behavior. Thus, individuals' declared happiness, their perceptions regarding, for instance, labor opportunities in the origin country, could affect individuals' intention to migrate (Graham and Markowitz, 2011; Czaika and Vothknecht, 2014; Ivlevs, 2014). In this sense, as researchers' international mobility is also driven by non-pecuniary factors (Cañibano et al., 2017; Jewell and Kazakis, 2021), migration can be seen as a mechanism through which

researchers seek to bridge the gap between job related aspirations and achievements by, for example, improving their access to research funds, autonomy, and status.

This study builds on existing literature to examine the factors influencing the intention to emigrate among researchers in Uruguay. We consider researchers to be those doctorate holders who report research as their primary job activity.[1] Migration intention refers to intentions to permanently or temporarily reside in a foreign country. Specifically, we address the following questions. First, to what extent do Uruguayan researchers' reported satisfaction with their current jobs affect their intentions to emigrate? Second, do personal academic networks influence researchers' intentions to emigrate?

We exploit a unique database of doctorate holders residing in Uruguay in which individuals reported on their intention to migrate and their job satisfaction (JS). We estimate seemingly unrelated regression equations (SURE) with instrumental variables to account for endogeneity likely to arise due to unobservables that affect individuals' selection in research activities, or that affect both their reported JS and intention to emigrate, and simultaneity between individuals' reported overall JS and intention to emigrate.

We contribute to the literature on brain drain by, first, providing empirical evidence on the factors that foster the intention to migrate among doctorate holders' living in developing countries—in this case, Uruguay. As previously observed, this population group makes for an interesting case study as researchers exhibit differences to other educated workers; they value pecuniary and non-pecuniary factors in migration intention, and also contribute to innovation. The literature on brain drain has left the group unaddressed.

Second, we take proper account of doctorate holders' selection in research activities and of causality between people's reported job satisfaction and their intentions to migrate. Except for a few studies, most studies report associations between life satisfaction (or different domains of well-being) and migration intention.[2] The causal relationship between unhappiness and researchers' migration intention has remained relatively unexplored. As far as we know, only Jewell and Kazakis (2021) address whether doctorate holders become happier following migration, but causality from dissatisfaction to migration intention has not been yet studied.

Uruguay is an interesting case-study for several reasons: it has a large proportion of its population living abroad (13.6% in Cabella and Pellegrino, 2005) mostly skilled workers (Pellegrino and Vigorito. 2005); a large share of young and educated individuals declaring

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[1] Henceforth, the term researcher/s, denote doctorate holder/s declaring research as their primary occupation.

[2] Exceptions are Ivlves (2015), Méndez (2020), and Mara and Landesmann (2013), described in Section 4.

their intention to migrate (Méndez, 2020); a relatively small share of its highly-skilled population living in the country (4.5 out of 100,000 inhabitants hold a PhD, in Méndez et al., 2019). These are all factors that the literature suggests would make 'brain drain' a major concern in a developing country (Brettmann et al., 2019).

In addition, Uruguay's relatively small economy indicates that labor opportunities are relatively fewer as compared to developed countries. This, combined with Uruguayan doctorate holders' significant exposure to international scientific networks (26% of Uruguayan PhDs live in a foreign country, 63% of Uruguayan PhDs graduated in a foreign university; in Méndez et al, 2019), and global competition for researchers, may foment Uruguayans' desire to emigrate. If brain drain does take place, the country's development could be compromised.

The findings of this study stress that reported job dissatisfaction increases researchers' desire to migrate. It also finds that researchers who participate in foreign academic networks are likely to report migration intentions. Therefore, if migration intentions do lead to migration, brain drain could become a major concern for the country unless complex policies of collaboration with Uruguayan researchers living abroad are designed and implemented to at least partially offset brain drain.

The next section reviews the related literature. Section 3 introduces the data used in the study and its main descriptive statistics. In Section 4 the methodological framework is described. Section 5 presents the results of the study, and Section 6 concludes.

2.   Related literature

The related literature on this subject includes standard economic perspectives on the intention to migrate as well as literature from other disciplines, including demography, sociology, and psychology. Also relevant is economic literature on happiness that considers individuals' reported happiness or subjective well-being (SWB) as a proxy for utility. Below, we describe in detail these branches of the literature.

2.1.   Brain drain and the intention to migrate

The standard economic approach for studying migration relies on revealed preferences that focus on actual moves, following a basic premise that people's preferences are revealed by their behavior. In this way, the intention to migrate and actual emigration are used interchangeably. In explaining migration, this framework stresses that individuals holding certain characteristics and skills compare their expected gains in a potential receiving country and associated costs of migration with gains that can be obtained if staying in their home country (Harris and Todaro, 1970; Hatton and Williamson, 1998; Massey et al., 1993).

Wage differentials (Borjas, 1994), living conditions (Avato, 2009) and individuals' social networks (Munshi, 2003; McKenzie and Rapoport, 2007), drive migration decisions.

Although the international migration of highly skilled workers has been studied, less attention has been paid to the migration patterns of PhDs. As previously noticed, individuals holding a PhD and involved in research activities differentiate from other highly skilled workers due to certain peculiarities that make them more likely to migrate (Jewell and Kazakis, 2021): i.e. "voyages are inherent to the exercise of the scientific enterprise" (Cañibano et al., 2017, 5).[3] Therefore, international mobility builds researchers' international networks, acting as a pull factor. Moreover, highly qualified researchers are the object of an intense global competition due to their importance for pursuing research-based innovation (Cañibano et al., 2017; Gibson and McKenzie, 2011). Countries investing more in knowledge and research activities offer higher wages, more stable and attractive jobs and, as a result, attract more academics (Docquier and Rapoport, 2009).

This framework can be complemented by literature that uses stated preferences to study migration (De Jong, 2000; Kley and Mulder, 2010; van Dalen and Henkens, 2013). This approach departs from the theory of planned behavior, in which expectations about achieving valued goals and intentions are among the primary determinants of behavior (Ajzen 1988). Thus, migration is defined as a process that begins with considering migration, continues with planning the move, and ends with realization (Kley and Mulder 2010; De Jong 2000). This framework can provide a better understanding of the differences between potential emigrants, those who do not want to leave, and the reasons why the former consider leaving.

2.2.   Happiness economics and people's intentions to emigrate

The literature on subjective well-being (SWB) or happiness economics stresses that individuals' reported satisfaction is the outcome of their aspirations and achievements (Clark and Oswald, 1998), and associates an individual's utility with her satisfaction with life, and different domains of well-being (i.e. job, health, leisure time, education, family, etc., in Layard, 2005).

In this sense, people's reported well-being is shaped by personal perceptions that mediate objective circumstances (Dolan et al., 2008) in which individual well-being is influenced by income in absolute terms, but also by the individuals' perception on whether this income satisfies their needs.

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[3] Physical proximity for scientific research motivates international migration; i,e young researchers' incorporation to transnational elite scientific networks, access or utilization of instruments or to infrastructures like big observatories, laboratories, or historical archives.

In this framework, reference groups are important: individual income perceptions depend on past flows as well as comparisons with the income of others (the reference group) (Ferrer i Carbonell, 2005; Frey and Stutzer, 2002; Clark and Oswald, 1998); income is thus expected to influence individual behavior through individuals' marginal utility (Clark and D'Angelo, 2013).[4]

Although controversies persist within this literature,[5] a certain consensus exists regarding the use of subjective measures of life satisfaction to measure individual well-being as an empirically proxy for individual utility (Ferrer i Carbonell, 2013; Dolan and White, 2007; Frey and Stutzer, 2002). Then, this literature uses individuals' reported satisfaction to analyze their choices, preferences, and behavior in different decisions, such as where to live, working status and job amenities, the risk of becoming unemployed, inflation and health status.[6]

In this vein, Czaika and Vothknecht (2014) stress that migration can be a valuable option to realize people's aspirations for increased well-being and job satisfaction, understood as the result of people's efforts and rewards on the job (Raab, 2019). In this sense, if the doctorate holders' effort, in terms of human capital investment, is not rewarded as expected, their intention to migrate can be a response to job dissatisfaction. When evaluating a job, individuals consider different aspects of the position in addition to monetary compensation (Clark, 2001). In particular, researchers value non-economic factors such as recognition by peers, independence, intellectual challenge, academic freedom, that could affect their mobility decisions (Jewell and Kazakis, 2021). Notably, Danzer (2019) stresses that job satisfaction can represent a comprehensive assessment of all relevant aspects of a job, including amenities and disamenities.

In summary, this literature associates reported unhappiness or alternative domains of well-being as a push factor in intentions to emigrate.[7] So far, empirical studies report a negative correlation between intention to migrate and individuals' subjective well-being. For instance, Otrachshenko and Popova (2014) stress that life satisfaction acts as a mediator between individuals' socioeconomic characteristics and macroeconomic conditions driving intention to migrate. Chindarkar (2014) shows that aspirations, a lack of opportunities available in the home country and a weak future economic outlook in the home country shape highly skilled Latin Americans' intention to migration. Graham and Markowitz (2011)

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[4] Dolan and Lordan (2013) review studies that consider alternative reference groups.
[5] A detailed review of the controversies in the literature can be seen in Ferrer i Carbonell (2013).
[6] For an exhaustive review of this literature, see Ferrer i Carbonell (2005 and 2013) and Dolan et al. (2008).
[7] Hendriks and Burger (2021) review the literature on the bi-directional relationship between happiness and migration.

describe Latin American potential migrants as "frustrated achievers": those with higher monetary income but lower satisfaction with their economic situation. In turn, Cai et al. (2014) show that, the negative relationship between individuals' life satisfaction and intention to migrate is more robust than that between income and migration.

Studies addressing causality between reported satisfaction and intentions to migrate are scarce in the literature and yield mixed results. On the one hand, Ivlevs (2015) finds that for 35 European and Central Asian countries, more satisfied individuals are more likely to report migration intentions.[8] On the other hand, Méndez (2020) finds a negative causal relationship between individuals' reported economic satisfaction and youths' intention to migrate in Uruguay.[9] Using a Polish panel database, Brzozowski and Coniglio (2021) show that unhappy individuals from unhappy households are more likely to declare intentions to migrate. In turn, Mara and Landesmann (2013) find that life satisfaction reduces Romanian women migrants residing in Italy, but not men's, intentions to out-migrate.[10]

Even less explored is the causal relationship between researchers' reported JS and reported migration intention. The exception is found in Jewell and Kazakal (2021), who show that international migration increases European academics' reported job satisfaction in its different domains (i.e. (i.e. salary, job security, mobility perspectives, among others).[11] However, the causality from individuals' reported JS to doctorate holders' intention to migrate, as far as we know, is not yet addressed.

3. Data and descriptive statistics

We employ a unique dataset obtained from the First Census of Doctorate-holder in Uruguay and Uruguayans living abroad (PCDUY: *Primer Censo de Personas con título de Doctorado en Uruguay*), carried out by the Migration Studies Group of the Uruguayan's public university, *Universidad de la República* (UDELAR). The PCDUY follows the Career Doctorate Holder's project (CDH) developed by the OECD and adapted to the Uruguayan reality, and it is the first study that quantifies Uruguayan doctorate holders living in Uruguay and residing abroad.[12]

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[8] Ivlevs (2015) tackles endogeneity by instrumenting individuals' happiness through parental education and if the individual had a family member killed or injured in the Second World War.
[9] Méndez (2020) uses as instrument the ratio of an individual income relative to the average income of a reference group: individuals with the same education level.
[10] Mara and Landesmann (2013) consider home ownership and individuals' civic participation as instruments.
[11] Their study addresses endogeneity due to individuals' selection by estimating a multinomial treatment model.
[12] Méndez et al. (2019) present a detailed analysis of migration, education, and labor trajectories of Uruguayan PhD holders, their perceptions and opinions regarding a broad set of issues.

The data was collected through an online survey sent to all individuals contacted through different sources: (i) the National Agency of Research and Innovation (ANII: *Agencia Nacional de Investigación e Innovación*) provided contacts of all individuals with a doctorate degree and with a public curriculum vitae; (ii) the University Planning Department provided the census among professors carried out in 2015 by the UDELAR; and (iii) a snowball methodology which asked respondents to provide contacts that could be considered as part of the Ph.D holders' universe. Overall, 2,415 individuals were invited to participate with a response rate of 86%, a high percentage among studies using online surveys.[13] After restricting the sample to Uruguayans living in Uruguay, employed or in a postdoctoral position at the time of the survey, we obtained a sample of 1,248 individuals.

Key variables and descriptive statistics

The dependent variable of this study, intention to migrate, is a dummy variable equal to 1 if the individual declares that they are considering living in a foreign country –temporarily or permanently- and 0 otherwise. On average, 12% of the employed doctorate holders in Uruguay report intention to emigrate.[14]

Table 1, column 1 introduces descriptive statistics for our sample. Almost half of respondents are women and were, on average, 49 years old at the time of the survey. Also, 37% of respondents obtained their PhD in Uruguay and 87% report research as their primary occupation, most frequently in full-time positions. At the time of the survey, 75.5% of respondents were public employees, and 71% were working at the public university.

One of the key variables of this study, overall job satisfaction, is measured using individuals' responses to the following question: "on a scale from 1 to 4, in which 1 means very dissatisfied, and 4 very satisfied, how satisfied do you feel about your actual job?" On average, respondents report being satisfied.

The second variable of interest is the individual's international academic network. It is proxied with two dummy variables: if the individual declares having collaborated in the past with foreign researchers or not and if she plans to collaborate in the near future with foreign researchers or not. For the whole sample, 75.6% report having collaborated in the past, while 54% plan future collaborations.

Notice that doctorate holders reporting migration intentions differ in observables from those who do not have the intention to migrate (Table 1, columns 2 and 3). In line with the literature, Uruguayan doctorate holders with migration desires can be defined as

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[13] For instance, in Di Paolo (2016) this figure is 58% and 67% for 2008 and 2011, respectively.
[14] 10.6% of doctorate holders report temporary migration intentions; and almost 1.4% report permanent migration intentions.

frustrated achievers: those with higher objective success in terms of income but lower satisfaction with their job. Also, note that those who reported connections to international academic networks are also likely to report migration intention.

Also, regarding other control variables, we observe that the former are more likely to be from the humanities or agricultural sciences, to have received their degree abroad, and to have held a post-doctorate position. They are also more likely to have had previous migration experience (understood as international migration for motives other than study), and have held their current position and worked at their current institution for a shorter period of time, on average, as compared to those who do not intend to migrate.

Next, Table 2 presents differences in observable characteristics between researchers and non-researchers. As compared to non-researchers, researchers are happier with their job and are more likely to be planning future collaborations with colleagues residing abroad. On average, researchers are also comparatively younger, a greater percentage are women, have obtained their PhD in Uruguay, and began and finished their PhD at a younger age and in a shorter period of time. There are relatively more researchers in the natural and agricultural sciences than non-researchers. Non-researchers have relatively more migration experience than researchers (43% of them lived abroad, versus 35% of the researchers) and they have lived abroad, on average, almost three more years as compared to researchers. Researchers are mostly employed in the public sector, mainly in academia (which includes public and private universities, and non-teaching research centers); while 62% of non-researchers are in other sectors (industry, commerce, government, non-government organizations, international organizations). In turn, non-researchers are, on average, part-time workers in their main job, with less time at their current institution, and have more opportunities for promotion (on average, achieving a higher position for researchers takes almost five more years than it does for non-researchers).

Finally, differences between researchers with and without intentions to migrate (columns 6 to 8 in Table 1) are similar in observables to those found for the whole sample of doctorate holders (columns 2 and 3 in Table 1). It is important to highlight that potential migrants who are researchers can also be characterized as frustrated achievers, reporting lower job satisfaction and higher wages; and expect to collaborate relatively more in the near future with researchers residing in a foreign country.

4. Methodological framework

4.1. Empirical strategy

This study explores the extent to which, conditional on doctorate holders' choosing a research career, individuals' reported job dissatisfaction fosters an intention to migrate. As previously noticed, endogeneity issues are likely to arise in this study.

First, job characteristics, sector specific characteristics and labor conditions may attract certain types of workers with previously-formed preferences and tastes, i,e, individuals valuing relative more scientific and teaching activities, autonomy in research projects, opportunities for publishing and interactions with the scientific community, may choose to work as a researcher (Di Paolo, 2016; Roach and Sauermann, 2010; Luechinger et al., 2006). Also, unobserved personality traits can affect individuals' reported satisfaction in particular jobs; i.e. extraversion could be associated with more favorable experience in jobs involving social interactions, or high sensation seeking may predict a poor experience in positions that are highly structured or lacking autonomy (Van den Berg and Feij, 1993).

In turn, job dissatisfaction can reflect a job mismatch, that is, workers not obtaining the job they want, due to demand restrictions like rationing in the public sector, budget restrictions for research activities, or private demand for PhD workers (Luechinger et al., 2006; Roach and Sauermann, 2010; Di Paolo, 2016).

At last, endogeneity issues can arise due to individuals' unobserved characteristics that jointly affect people's intention to migrate and reported satisfaction. For instance, personality traits such as extraversion, optimism, risk aversion, openness to experience, may influence one's feelings of satisfaction and intention to migrate (Ivlves 2014 and 2015). As individuals' reported overall JS and intention to migrate are both attitudes, reverse causality can take place; that is, the intention to migrate could also affect reported satisfaction.

Although scarce, previous studies using cross-sectional data use alternative empirical strategies to address the different sources of endogeneity. For instance, studies that examine individuals' self-selection into different sectors of activity and their reported JS estimate multiple simultaneous equations (Roach and Sauermann, 2010); endogenous multinomial treatment equation estimation (Di Paolo, 2016); and conditional mixed process and instrumental variable methods (Burone and Méndez, 2022).[15]

Regarding endogeneity due to individuals' unobservable characteristics and reverse causality between intention to migrate and people's reported satisfaction, Ivlves (2015) and

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[15] Burone and Méndez (2022) describe in detail the empirical strategies in these studies.

Méndez (2020) use alternative empirical strategies with cross-sectional data. The former uses instrumental variable analysis, while the second estimates a conditional mixed process and uses instrumental variable analysis.

This study builds on previous literature and uses instrumental variable (IV) analysis and a conditional mixed process (cmp) in which a system of seemingly unrelated equations is estimated. Specifically, a first equation considers the associated factors that foster researchers' intention to migrate. As multiple endogeneity issues are likely to arise in equation 1, equation 2 models the factors shaping doctorate holders' career choices, that is whether to become a researcher or not. Equation 3 shows the associated variables affecting researchers' overall job satisfaction. The equation system reads as follows:

$$
\begin{cases}
intention_i = dem_i'\beta_1 + edu_i'\beta_2 + migr_i'\beta_3 + labor_i'\beta_4 + network_i'\beta_5 + overallJS_i'\beta_6 + u_1 & (1) \\
research_i = dem_i'\gamma_1 + edu_i'\gamma_2 + migr_i'\gamma_3 + previous_i'\gamma_4 + Z_{inv}'\gamma_5 + u_2 & (2) \\
overallJS_i = dem_i'\pi_1 + edu_i'\pi_2 + migr_i'\pi_3 + labor_i'\pi_4 + network_i'\pi_5 + Z_{sat}'\tau + u_3 & (3)
\end{cases}
$$

where $\boldsymbol{\varepsilon} = (u_1, u_2, u_3)' \sim N(0, \Sigma)$

The vector of errors $u = (u_1, u_2, u_3)$, is supposed to be trivariate normally distributed as: $uN_3(0, \Omega)$, in which the main diagonal of the correlation matrix Ω is 1, and out of the main diagonal $\rho_{12}, \rho_{23}, \rho_{13}$.

The dependent variable in equation 1, the individual's intention to migrate ($intention$) is a dummy variable equal to 1 if the researcher i reports intention to migrate and 0 otherwise. Equation 1 controls for the key independent variables of this study, individuals' reported overall job satisfaction ($overallJS$) and individuals' academic networks ($network$)–dummies indicating past cooperation and future cooperation. We also consider a set of current labor conditions ($labor$).

Common to the three equations are individuals' socio-demographic characteristics (dem), educational choices (edu); and previous migration experience ($migr$). Sociodemographic variables included are gender, cohort age, whether the individual is in a couple or not, and if she has children or not. The set of individuals' educational choices considers a dummy variable indicating if the individual acquired the PhD in Uruguay or abroad; the year in which they started their doctorate program; and field of knowledge (agricultural sciences, medical and health sciences, natural sciences, social sciences, humanities, and engineering and technology). Previous migration experience ($migr$) is a dummy that indicates whether the individual has lived in a foreign country or not, excluding migration due to PhD study, and including having held a postdoctoral position abroad.

In turn, current labor conditions (*labor*) includes weekly worked hours; monthly hourly wage (in logarithm);[16] length of time at current institution and in current position; related tasks of the position (mentoring, advising theses); the relationship between PhD studies and current research (no relation, partial, high); the time devoted to research relative to the total tasks of the job–teaching, management and administrative tasks–, i.e. less than 25%, 25 to 49%, 50 to 75%, 75% and more; if after completing the PhD the individual returned to her previous job before starting the PhD (in a higher position, in the same as before, not, or never worked before); whether individuals are fully dedicated to their job or not (RDT); and if they are recipients of the National Researchers System (SNI).[17]

Equation 2 models the associated factors to doctorate holders' decision on whether to be a researcher or not. As the dependent variable r*esearch* is a dummy variable equal to 1 if the individual reports being a researcher in the main job, and 0 otherwise, equation (2) can be estimated using a probit model. Besides the common variables of the equation system, equation (2) adds previous research experience variables (*previous*), proxied by two dummy variables. An initial variable indicates whether the individual was dedicated to research activities before PhD enrollment; a second is equal to 1 if she was dedicated to research activities immediately after PhD graduation and 0 otherwise. We also consider an instrumental variable, Z_{inv}, further described in Section 4.2.

At last, equation 3 is informative about the factors influencing researchers' reported overall JS. In this case, the dependent variable, overall job satisfaction (*overallJS*) is categorical, ranging 1 to 4 – very dissatisfied to very satisfied–. Thus, equation 3 can be estimated as an ordered probit model and adds to the three equation common variables, the set of objective labor conditions (*labor*), and an instrumental variable (Z_{sat}) that is described in Section 4.2.

4.2. Exclusion restrictions

We use different instrumental variables (IV) to correctly identify the model. To address individuals' selection in research activities, we follow previous studies that highlight the importance of PhD funding on future career choices (Burone and Méndez, 2022; Horta et

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[16] In cases in which wage was not reported by the individual and if she reports working at the public university, wage was imputed according to the respondents' reported rank, hours, years in the institution, and if the individual is part of the Full Time Regime at the public university (which implies an extra monthly payment) or not. This is possible because wages at the public university are flat. The extra payment derived for the SNI is not imputed. However, results do not change if this extra-payment is considered.

[17] The SNI is a national research incentive program in which academics are categorized and receive a monthly extra monetary compensation. Besides the monetary compensation, being part of the SNI can also signal prestige or status, thus affecting reported overall JS.

al., 2018; Nisticò, 2018). These studies stress that PhD students with scholarships are more likely to pursue a research career, as funding may induce students to increase time dedicated to study and reduce time devoted to work. Also, that financed students may invest more in related research-oriented activities, such as attending workshops, visiting programs, etc. The less doctorate students are exposed to non-research work during the PhD, the more likely they are to pursue a research-career after PhD completion.

We include in Z_{inv} variables indicating the sources for PhD funding; i.e. granting public program, private funding, own or family savings.[18] Also, as in Di Paolo (2016), we consider the elapsed time between the completion of the undergraduate degree and PhD enrollment as an IV, on the understanding that each additional year between undergraduate degree and PhD enrollment represents more exposure to the labor market, increasing the chances of finding a job outside the academia. We expect that variables included in Z_{inv} directly affect doctorate holders decision-making but not directly affecting their intention to migrate nor their reported overall JS.

Based on the SWB literature, we instrument individuals' overall JS with individual subjective relative income measures in order to account for endogeneity due to unobservables and reverse causality between individuals' intention to emigrate and overall job satisfaction. As previously detailed, this literature highlights the relevance of an individual' income comparison with others, in which her perception of her circumstances can be a very important predictor of satisfaction (Clark and D'Angelo 2013; Dolan et al. 2008). Possible candidates for reference groups are individuals with similar characteristics like similar age, education, family, friends and colleagues (Ferrer i Carbonell 2005; McBride 2001; Blanchflower and Oswald 2004; Luttmer 2005; Pischke 2011).

Therefore, we consider the gap between the individual's wage relative to the average wage of doctorate holders in research activities (the reference group) (gap_researcher).[19] We also consider individuals' self-position in the income distribution ladder. Individuals are asked the following: on a scale from 1 to 10, in which 1 is very poor and 10 very rich, where on the income scale distribution do you think you are? Then, our instrument is a dummy variable (upper) that indicates whether the individual believes she is in the highest position of the income distribution (deciles 8 to 10) or not.

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[18] We also considered the elapsed time between the completion of the undergraduate degree and PhD enrollment as an IV as in Di Paolo (2016), arguing that each additional year between undergraduate degree and PhD enrollment represents more exposure to the labor market, increasing the chances of finding a job outside the academia. However, this IV proved to be not statistically significant in explaining the probability of being a researcher.

[19] We tested alternative reference groups for an individual's wage comparison: the whole sample of doctorate holders; doctorate holders in her field; by gender; field and gender. We also tested individuals' opinions regarding economic mobility in Uruguay.

Overall, we are confident that the intention to migrate is indirectly affected by individuals' source of doctorate study funding and to individual perception of own wages; these factors shape people's future career choices and their overall job satisfaction and thus account for self-selection and reverse causality.

5.   Results

We first present average marginal effects (AME) after simple probit estimations when not accounting for endogeneity (Table A.1). We find that researchers reporting being very dissatisfied with the job are 33.4 percentage points (pp) more likely to report migration intention. Note that the difference between this estimated coefficient and the one estimated when tackling endogeneity will give insights on the magnitude of the estimated bias if endogeneity is not accounted for.

5.1.   Unobserved Heterogeneity and Correlations

Cross-correlation coefficients of the estimated system of the seemingly unrelated equations with instrumental variables are shown in Table 3. Note that the positive and statistically significant estimated correlated coefficients between equations 1 and 2 ($\rho 12$) and equations 1 and 3 ($\rho 13$), show respectively that unobservables that increase individuals' probability of choosing a research career also foster their intention to migrate; and that unobserved factors that increase researchers' reported overall JS also increase their intention to migrate. However, the estimated correlated coefficient between equations 2 and 3 ($\rho 23$) is not statistically significant, showing that unobservables affecting people's research career choice do not directly affect their reported JS.

In turn, the rejection of the null hypothesis of correlation ignorability based on the Wald test highlights the importance of jointly estimating doctorate holders' self-selection in research and the simultaneity between individuals' reported job satisfaction and their intention to migrate. Therefore, not accounting for the potential endogeneity resulting from unobserved heterogeneity would lead to biased results.

Next, Panel B in Table 4 shows that the instrumental variables used in this study proved to be statistically significant in explaining doctorate holders' future career decisions. Specifically, doctorate holders that fund their PhD with public funds are 4.1pp more likely to be a researcher than those that did not. Also, those who used private resources for PhD funding are 3.5pp less likely to be a researcher.

In turn, the instrumental variables for individuals' reported overall JS proved to be statistically significant; i.e. measures of individual subjective income (wage gap between the individual's and her comparison group, individual's self-position in the income

distribution). First stage estimations (Panel B, Table 4) show that, the richer the individual feels, the more satisfied she is with her job (8.2pp, significant at 95%); while the larger the gap between the individual's wage and the average wage of her comparison group (researchers), the less satisfied with the job the individual is.[20]

5.2. What drives researchers' intention to migrate?

Panel A in Table 4 presents estimations of the seemingly unrelated equations with instrumental variables. Column 1 shows the AME of the associated factors affecting PhD researchers' migration intention. We first observe that the more satisfied an individual is with her job the less likely she is to report migration intention. Specifically, compared to very dissatisfied researchers, those reporting dissatisfaction with the job are 31.8pp less likely to report migration intention (statistically significant at 90%), those reporting satisfaction are 51.2pp less prone to intend to migrate (statistically significant at 95%), while very satisfied researchers reduce their likelihood of reporting intention to migrate by 60pp (statistically significant at 95%).

Notice that not accounting for endogeneity would underestimate the effect of overall JS on people's intention to migrate (coefficients in Table A.1 in the Appendix versus those reported in column 1 Table 4).

We next move to the other key variable of this study, observing that international academic networks affect people's intention to migrate via two channels; directly, increasing people's intention to migrate by 6.1pp, and indirectly, reducing by 5.6pp researchers' likelihood of being very satisfied with their job. In other words, academic networks foster doctorate holders' international circulation through research cooperation, these networks may also act as a comparison group, affecting Uruguayans' opportunity perceptions and job aspirations.

It is worth noting that objective labor conditions directly affect researchers' intention to migrate. Specifically, researchers with training activities at the job are more likely to report migration intentions; while being employed at a private university, being part of the National Research System (SNI), and holding a job that is not the same as the one held prior to PhD enrollment all reduce people's chances of declaring migration intention. Other important objective labor conditions such as wage, working hours, and being employed at a research center, indirectly influence intention to migrate by affecting overall JS (column 2 in Table 4). That is, higher wages, less worked hours, and being employed at a

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[20] Table A.2 in the Appendix presents AME of the estimated after cmp with alternative instrumental variables for the probability of being very satisfied with the job. We chose those instrumental variables that proved to be more statistically significant.

research center increase job satisfaction and thus reduce intentions to migrate. In line with the literature on SWB, the richer individuals are or feel, the greater job satisfaction reported.

Regarding other independent variables, women are more likely to report intention to migrate as compared to men. As expected, individuals' previous migration experience directly influences their intention to migrate, increasing it by 7pp, but does not impact their overall JS. Finally, although the field of knowledge is not directly associated to individuals' overall JS, it affects people's intention to migrate. For instance, individuals in social sciences and humanities are 10.6pp and 9.7pp, respectively, more likely to report migration intention than those in engineering and technology.

6. Concluding remarks

This study addressed the associated factors that shape Uruguayan researchers' intentions to migrate. In particular, it explored whether researchers' reported job dissatisfaction encourages an intention to migrate, and the extent to which researchers' international academic networks drive those migration intentions.

To this end, we accounted for endogeneity due to unobservables and simultaneity by estimating seemingly unrelated regression equations with instrumental variable analysis.

Two main conclusions can be derived from this study. First, we found that researchers that declare being very dissatisfied with their jobs are more likely to report intention to migrate. Specifically, our results show that Uruguayan researchers value pecuniary and non-pecuniary aspects of their jobs, which in turn affects their intention to migrate. This finding is in line with the literature on SWB that stresses that the richer the individuals are or feel, the more satisfied they are with their job, and the less likely they are to declare migration intentions. In particular, relevant for PhD holders, for whom education could be seen as an investment, if this effort does not meet their aspirations in terms of future rewards, i.e. pecuniary and non-pecuniary aspects of the job, job dissatisfaction arises. Then, migration can be seen as a possible mechanism through which highly-skilled individuals can reap the rewards of their long process of investment in human capital (Jewell and Kazakis, 2021).

Our second result stresses the importance of international cooperation networks on researchers' intention to migrate. In this sense, being part of an international academic network can help bridge the gap between researchers' expectations and realizations. Specifically, researchers embedded in an international academic network may access accurate information regarding labor opportunities abroad, where their expectations in

terms of wage, job related aspects such as autonomy, access or usage of infrastructure and technology, access to research funding, among others, might be better met. Therefore, information circulating through researchers' academic international networks can foster migration intentions by shaping aspirations, but this information may also indirectly affect researchers' reported job satisfaction by acting as a comparison group.

Finally, although outside the scope of this study, if researchers' migration intention ends in actual migration, brain drain could become a major concern in Uruguay, as the economic development could be compromised. Then, policies aiming to retain researchers in the country by improving pecuniary and non-pecuniary aspects of the job should be implemented. At the same time, the implementation of complex policies of collaboration with Uruguayan researchers living abroad, could at least, partially offset brain drain.

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Tables

Table 1. Descriptive statistics. Intention to migrate. Full sample and researchers

Independent variables	All PhD holders				Researchers			
	Total (1)	No intention (2)	Intention (3)	Diff (4)	Total (5)	No intention (6)	Intention (7)	Diff (8)
Age	49.680	49.772	48.712	1.060	49.325	49.418	48.354	1.064
Female	0.502	0.509	0.459	0.050	0.513	0.523	0.457	0.066
Income	77216.8	74260.8	100681.2	-26420.3*	78492.3	75214.7	104694.3	-29479.5*
Children	0.749	0.758	0.747	0.011	0.746	0.752	0.740	0.011
Age ends PhD	38.996	39.002	38.788	0.214	38.485	38.486	38.244	0.242
Age ends Bachelor	26.318	26.255	26.590	-0.334	26.195	26.150	26.381	-0.231
Gap PhD-Bachelor	7.803	7.840	7.537	0.303	7.398	7.418	7.169	0.249
PhD in Uruguay	0.370	0.383	0.267	0.116***	0.385	0.396	0.299	0.097**
Researcher	0.870	0.873	0.870	0.003				
Agricultural sciences	0.105	0.100	0.148	-0.048*	0.111	0.106	0.160	-0.054*
Medical & Health	0.123	0.127	0.099	0.029	0.116	0.118	0.104	0.014
Natural sciences	0.381	0.393	0.296	0.097**	0.412	0.423	0.328	0.095**
Social sciences	0.202	0.197	0.225	-0.029	0.187	0.181	0.224	-0.043
Humanities	0.083	0.075	0.134	-0.059**	0.074	0.069	0.104	-0.035
Engineering & tech.	0.107	0.108	0.099	0.009	0.100	0.102	0.080	0.022
Post Doctorate	0.257	0.247	0.331	-0.084**	0.265	0.256	0.333	-0.078*
No. of Postdoc	0.328	0.317	0.414	-0.097	0.340	0.329	0.418	-0.089
Private employee	0.117	0.120	0.089	0.031	0.099	0.104	0.063	0.041
Public employee	0.755	0.763	0.726	0.037	0.798	0.800	0.787	0.013
Self-employed	0.038	0.035	0.048	-0.013	0.015	0.014	0.031	-0.018
Part time	0.196	0.192	0.205	-0.013	0.160	0.159	0.173	-0.014
Yrs. institution	17.942	18.225	15.951	2.274**	18.541	18.779	16.736	2.043**
Yrs. job	6.990	7.065	6.007	1.058*	6.910	6.997	5.917	1.079*
Yrs. Promotion	10.906	11.112	9.783	1.329	11.515	11.671	10.636	1.035
Public University	0.708	0.713	0.699	0.014	0.775	0.776	0.775	0.001
Private University	0.058	0.059	0.044	0.015	0.052	0.054	0.033	0.021
Research centre	0.117	0.114	0.147	-0.033	0.126	0.124	0.150	-0.026
Others	0.117	0.114	0.110	0.004	0.046	0.046	0.042	0.004
Yrs. research pre PhD	3.355	3.374	3.212	0.162	3.372	3.394	3.200	0.194*
Overall JS	3.007	3.027	2.853	0.174***	3.020	3.039	2.895	0.144***
Live abroad	0.358	0.341	0.482	-0.141***	0.347	0.333	0.450	-0.117**
No. of countries	2.260	2.193	2.606	-0.413*	2.234	2.172	2.585	-0.413*
Yrs. lived abroad	2.967	2.914	3.548	-0.634	2.606	2.632	2.575	0.057
Previous networks	0.756	0.748	0.820	-0.071*	0.763	0.759	0.800	-0.041
Future networks	0.544	0.524	0.691	-0.167***	0.566	0.547	0.708	-0.160***
Observations	1248				1089			

Robust standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table 2. Descriptive statistics, researchers versus non-researchers

	Total	Non Researcher	Researcher	Diff
Age	49.648	52.075	49.294	2.782***
Female	0.503	0.424	0.515	-0.091**
Income	77279.6	67638.1	78576.5	-10938.3
Children	0.756	0.799	0.75	0.049
Age ends PhD	38.977	42.528	38.458	4.070***
Age ends Bachelor	26.294	27.141	26.177	0.964***
Gap PhD-Bachelor	7.805	10.817	7.39	3.427***
PhD in Uruguay	0.37	0.264	0.385	-0.121***
Agricultural sciences	0.106	0.064	0.112	-0.048*
Medical & Health	0.124	0.173	0.117	0.056**
Natural sciences	0.381	0.173	0.412	-0.239***
Social sciences	0.2	0.295	0.186	0.109***
Humanities	0.082	0.141	0.073	0.068***
Engineering & tech.	0.107	0.154	0.1	0.054**
Post Doctorate	0.257	0.203	0.265	-0.062
No. of Postdoc	0.328	0.25	0.34	-0.090
Private employee	0.116	0.233	0.099	0.134***
Public employee	0.759	0.484	0.799	-0.315***
Self-employed	0.037	0.182	0.016	0.167***
Part time	0.194	0.421	0.161	0.261***
Yrs. institution	17.96	13.78	18.542	-4.762***
Yrs. job	6.943	7.449	6.873	0.576
Yrs. Promotion	10.958	6.618	11.552	-4.934***
Public University	0.711	0.236	0.776	-0.540***
Private University	0.057	0.097	0.052	0.045**
Research center	0.118	0.049	0.127	-0.079***
Others	0.114	0.618	0.045	0.573***
Yrs. research pre PhD	3.356	3.239	3.371	-0.132
Overall JS	3.007	2.897	3.023	-0.126**
Live abroad	0.357	0.429	0.347	0.082**
No. of countries	2.257	2.397	2.233	0.164
Yrs. lived abroad	2.989	5.465	2.625	2.840***
Previous networks	0.756	0.709	0.763	-0.054
Future networks	0.544	0.389	0.566	-0.177***
Observations	1248	159	1089	

Robust standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table 3. Cross-correlation coefficients and test of ignorability

	Coefficient	Robust SE
$\rho 12$	0.373*	(0.218)
$\rho 13$	0.272**	(0.134)
$\rho 23$	0.079	(0.136)
Wald test of ignorability		
Ho: $\rho 12 = \rho 13 = \rho 23 = 0$		
$\chi 2$	p-value	
13.41	0.0038	
Obs.	1120	

* p<0.1, ** p<0.05, *** p<0.01
Ho: Sample selection is ignorable.

Table 4. AME after cmp estimations

Panel A	Intention to migrate		Very satisfied		Researcher	
Women	-0.050**	(0.024)	-0.016	(0.022)	0.057***	(0.018)
Cohort (omitted: < 40)						
40-49	0.003	(0.034)	-0.056	(0.036)	0.019	(0.025)
50-59	0.011	(0.044)	-0.092**	(0.043)	-0.056*	(0.032)
60+	-0.031	(0.052)	-0.060	(0.057)	-0.083**	(0.041)
Couple	0.077**	(0.033)	0.056*	(0.029)	0.008	(0.024)
No. of children	-0.004	(0.011)	-0.003	(0.010)	-0.017**	(0.007)
Field (omitted: Engineering and technology)						
Agricultural sciences	0.075	(0.049)	-0.044	(0.043)	0.086**	(0.038)
Medical and Health sciences	0.009	(0.041)	-0.028	(0.045)	0.006	(0.040)
Natural sciences	-0.001	(0.033)	-0.045	(0.037)	0.079**	(0.034)
Social sciences	0.106**	(0.047)	0.037	(0.045)	0.014	(0.038)
Humanities	0.097*	(0.058)	-0.040	(0.054)	-0.021	(0.051)
Postdoctorate	0.024	(0.029)	-0.008	(0.027)	-0.016	(0.021)
PhD Uruguay	-0.002	(0.030)	-0.030	(0.026)	-0.026	(0.026)
PhD enrollment (omitted: until 1989)						
1990-2000	-0.026	(0.063)	-0.099	(0.063)	-0.020	(0.026)
2001-2010	-0.026	(0.063)	-0.094	(0.068)	-0.095***	(0.031)
2011-2017	0.102	(0.088)	-0.075	(0.080)	-0.001	(0.039)
Previous lived abroad	0.073***	(0.025)	-0.020	(0.025)		
Weekly hours (20 or less)						
21-30	-0.030	(0.079)	-0.136	(0.102)		
31-39	-0.003	(0.095)	-0.200*	(0.108)		
40 and more	-0.008	(0.078)	-0.125	(0.104)		
Income (in log)	0.004	(0.028)	0.087***	(0.030)		
Job thesis relationship (omitted: No)						
High	-0.034	(0.057)	0.056	(0.050)		
Partial	0.009	(0.061)	-0.023	(0.047)		
Sector (omitted: Public university)						
Private university	-0.076*	(0.042)	0.130	(0.090)		
Research centers	0.019	(0.045)	0.093**	(0.047)		
Other	-0.033	(0.046)	0.038	(0.059)		
Job research related (omitted: < 25%)						
25-49%	-0.003	(0.046)	0.011	(0.047)		
50-74%	-0.042	(0.044)	0.002	(0.046)		
75-100%	-0.004	(0.050)	0.009	(0.050)		
Training activities	-0.095	(0.063)	-0.018	(0.053)		
Advise Thesis	-0.031	(0.042)	-0.043	(0.038)		
Trains assistants	0.068**	(0.031)	0.074**	(0.032)		
Yrs position	-0.001	(0.002)	-0.002	(0.002)		
Yrs institution	-0.001	(0.002)	0.001	(0.002)		
Reinstatement (omitted: Same position)						
Higher position	0.018	(0.029)	0.010	(0.028)		
No	-0.055*	(0.031)	-0.043	(0.028)		
Never worked before	0.011	(0.111)	0.094	(0.118)		
RDT	0.039	(0.030)	0.024	(0.031)		
SNI=1	-0.049**	(0.024)	0.005	(0.022)		

Table 4. Cont.

	Intention to migrate		Very satisfied		Researcher	
Previous cooperation	-0.004	(0.031)	0.039	(0.029)		
Future cooperation	0.061**	(0.027)	-0.056**	(0.023)		
Overall JS (omitted: Very dissatisfied)						
Dissatisfied	-0.318*	(0.167)				
Satisfied	-0.512**	(0.234)				
Very satisfied	-0.606**	(0.257)				
Instrumental variable						
upper (Deciles 8 -10)			0.082**	(0.033)		
Gap_researcher			-0.009***	(0.003)		
Research previous PhD					0.057	(0.035)
Research immediately after					0.529***	(0.070)
PhD public funding					0.041**	(0.019)
PhD private funding					-0.035*	(0.021)
Other source					0.007	(0.027)
Observations	768		768		768	

Robust standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Appendix

Table A.1. AME Simple probit Overall JS and intention to migrate

	Coef.	SE
Women	-0.056**	(0.024)
Cohort (omitted: < 40)		
40-49	0.019	(0.033)
50-59	0.032	(0.043)
60+	-0.014	(0.053)
Couple	0.081**	(0.034)
No. of children	-0.005	(0.011)
Field (omitted: Engineering and technology)		
Agricultural sciences	0.127**	(0.053)
Medical and Health sciences	0.049	(0.040)
Natural sciences	0.031	(0.029)
Social sciences	0.131***	(0.047)
Humanities	0.121**	(0.061)
Postdoctorate	0.017	(0.030)
PhD Uruguay	0.013	(0.031)
PhD enrollment (omitted: until 1989)		
1990-2000	-0.017	(0.062)
2001-2010	-0.014	(0.061)
2011-2017	0.133	(0.094)
Previous lived abroad	0.081***	(0.026)
Weekly hours (20 or less)		
21-30	-0.067	(0.094)
31-39	-0.064	(0.106)
40 and more	-0.053	(0.094)
Income (in log)	-0.020	(0.032)
Job thesis relationship (omitted: No)		
High	-0.076	(0.084)
Partial	0.011	(0.088)

Table A.1. (cont).

	Coef.	SE
Sector (omitted: Public university)		
Private university	-0.080**	(0.035)
Research centers	-0.021	(0.039)
Other	-0.070*	(0.038)
Job research related (omitted: < 25%)		
25-49%	-0.006	(0.047)
50-74%	-0.045	(0.047)
75-100%	-0.001	(0.052)
Training activities	-0.075	(0.076)
Advise Thesis	-0.005	(0.042)
Trains assistants	0.059*	(0.030)
Yrs position	-0.002	(0.002)
Yrs institution	0.000	(0.002)
Reinstatement (omitted: Same position)		
Higher position	0.027	(0.029)
No	-0.008	(0.035)
Never worked before	0.047	(0.138)
RDT	0.034	(0.032)
SIN	-0.047*	(0.025)
Previous cooperation	-0.035	(0.031)
Future cooperation	0.071***	(0.026)
Overall JS (omitted: Very dissatisfied)		
Dissatisfied	-0.245	(0.176)
Satisfied	-0.289*	(0.173)
Very satisfied	-0.334*	(0.172)
Observations	722	

Robust standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table A.2. Probability of being very satisfied with the job. AME. Alternative instruments

	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
Woman	-0.023	(0.021)	-0.020	(0.021)	-0.019	(0.022)	-0.023	(0.021)	-0.016	(0.022)	-0.020	(0.022)	-0.029	(0.023)
Cohort (omitted: < 40)														
40-49	-0.057	(0.035)	-0.057	(0.035)	-0.057	(0.035)	-0.058	(0.035)	-0.054	(0.036)	-0.053	(0.036)	-0.048	(0.037)
50-59	-0.092**	(0.043)	-0.092**	(0.043)	-0.092**	(0.043)	-0.092**	(0.043)	-0.090**	(0.043)	-0.090**	(0.043)	-0.081*	(0.045)
60+	-0.070	(0.056)	-0.070	(0.055)	-0.070	(0.056)	-0.070	(0.055)	-0.058	(0.057)	-0.054	(0.057)	-0.057	(0.058)
Couple	0.059**	(0.029)	0.059**	(0.029)	0.059**	(0.029)	0.059**	(0.029)	0.055*	(0.029)	0.050*	(0.028)	0.042	(0.030)
No. of children	-0.001	(0.010)	-0.001	(0.010)	-0.001	(0.010)	-0.001	(0.010)	-0.002	(0.010)	-0.001	(0.010)	0.001	(0.011)
Field (omitted: Engineering and technology)														
Agricultural sciences	-0.054	(0.042)	-0.050	(0.043)	-0.054	(0.042)	-0.050	(0.043)	-0.048	(0.043)	-0.045	(0.043)	-0.065	(0.045)
Medical & Health	-0.034	(0.044)	-0.036	(0.044)	-0.035	(0.044)	-0.036	(0.044)	-0.028	(0.045)	-0.026	(0.045)	-0.041	(0.047)
Natural sciences	-0.052	(0.037)	-0.054	(0.037)	-0.053	(0.037)	-0.054	(0.037)	-0.047	(0.038)	-0.044	(0.037)	-0.059	(0.040)
Social sciences	0.046	(0.045)	0.044	(0.045)	0.046	(0.045)	0.044	(0.045)	0.035	(0.045)	0.045	(0.045)	0.054	(0.048)
Humanities	-0.038	(0.055)	-0.042	(0.054)	-0.039	(0.055)	-0.042	(0.054)	-0.044	(0.054)	-0.036	(0.055)	-0.057	(0.056)
Postdoctorate	-0.012	(0.027)	-0.013	(0.026)	-0.012	(0.027)	-0.013	(0.026)	-0.009	(0.027)	-0.010	(0.027)	-0.006	(0.028)
PhD Uruguay	-0.033	(0.026)	-0.033	(0.026)	-0.033	(0.026)	-0.032	(0.026)	-0.030	(0.026)	-0.031	(0.027)	-0.034	(0.028)
PhD enrollment (omitted: until 1989)														
1990-2000	-0.105*	(0.062)	-0.105*	(0.062)	-0.105*	(0.062)	-0.105*	(0.062)	-0.098	(0.063)	-0.102	(0.065)	-0.102	(0.065)
2001-2010	-0.115*	(0.066)	-0.115*	(0.066)	-0.115*	(0.067)	-0.114*	(0.066)	-0.095	(0.068)	-0.106	(0.070)	-0.112	(0.070)
2011-2017	-0.093	(0.079)	-0.093	(0.079)	-0.094	(0.080)	-0.093	(0.079)	-0.076	(0.080)	-0.087	(0.082)	-0.094	(0.083)
Previous lived abroad	-0.021	(0.025)	-0.021	(0.025)	-0.021	(0.025)	-0.021	(0.025)	-0.019	(0.025)	-0.024	(0.025)	-0.019	(0.026)
Weekly hours (20 or less)														
21-30	-0.163	(0.110)	-0.160	(0.109)	-0.161	(0.110)	-0.161	(0.109)	-0.112	(0.097)	-0.113	(0.097)	-0.101	(0.100)
31-39	-0.226**	(0.115)	-0.223**	(0.114)	-0.224*	(0.116)	-0.224**	(0.114)	-0.172*	(0.102)	-0.178*	(0.102)	-0.172	(0.105)
40 and more	-0.145	(0.111)	-0.142	(0.110)	-0.142	(0.111)	-0.143	(0.109)	-0.096	(0.098)	-0.094	(0.098)	-0.090	(0.101)
Income (in log)	0.102***	(0.032)	0.099***	(0.030)	0.102***	(0.034)	0.099***	(0.030)	0.063**	(0.024)	0.063**	(0.025)	0.067**	(0.026)
Job thesis relationship (omitted: No)														
High	0.056	(0.051)	0.056	(0.051)	0.057	(0.051)	0.055	(0.051)	0.068	(0.046)	0.064	(0.048)	0.085*	(0.045)
Partial	-0.025	(0.048)	-0.025	(0.048)	-0.024	(0.048)	-0.025	(0.048)	-0.013	(0.044)	-0.019	(0.046)	-0.004	(0.043)

	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
Sector (omitted: Public university)														
Private university	0.141	(0.088)	0.141	(0.088)	0.141	(0.089)	0.141	(0.088)	0.133	(0.090)	0.133	(0.089)	0.112	(0.087)
Research centers	0.083*	(0.045)	0.084*	(0.045)	0.083*	(0.045)	0.084*	(0.045)	0.092**	(0.046)	0.079*	(0.046)	0.115**	(0.049)
Other	0.043	(0.059)	0.043	(0.059)	0.045	(0.059)	0.043	(0.059)	0.045	(0.060)	0.052	(0.061)	0.056	(0.063)
Job research related (omitted: < 25%)														
25-49%	0.020	(0.044)	0.020	(0.044)	0.019	(0.044)	0.020	(0.044)	0.011	(0.047)	0.012	(0.046)	0.006	(0.048)
50-74%	0.010	(0.042)	0.010	(0.042)	0.010	(0.043)	0.010	(0.042)	0.001	(0.046)	0.007	(0.045)	0.002	(0.047)
75-100%	0.024	(0.047)	0.024	(0.047)	0.025	(0.047)	0.024	(0.047)	0.006	(0.050)	0.018	(0.050)	0.001	(0.051)
Training activities	-0.019	(0.052)	-0.019	(0.052)	-0.018	(0.052)	-0.019	(0.052)	-0.016	(0.052)	-0.015	(0.052)	-0.004	(0.053)
Advise Thesis	-0.046	(0.038)	-0.045	(0.038)	-0.045	(0.038)	-0.046	(0.038)	-0.042	(0.038)	-0.047	(0.039)	-0.046	(0.041)
Trains assistants	0.075**	(0.031)	0.075**	(0.031)	0.075**	(0.031)	0.075**	(0.031)	0.071**	(0.032)	0.069**	(0.032)	0.059*	(0.034)
Yrs position	-0.002	(0.002)	-0.002	(0.002)	-0.002	(0.002)	-0.002	(0.002)	-0.002	(0.002)	-0.002	(0.002)	-0.003	(0.002)
Yrs institution	0.000	(0.002)	0.000	(0.002)	0.000	(0.002)	0.000	(0.002)	0.001	(0.002)	0.000	(0.002)	0.000	(0.002)
Reinstatement (omitted: Same position)														
Higher position	0.012	(0.028)	0.012	(0.028)	0.013	(0.028)	0.012	(0.028)	0.011	(0.028)	0.014	(0.028)	0.012	(0.029)
No	-0.041	(0.028)	-0.041	(0.028)	-0.041	(0.028)	-0.041	(0.028)	-0.043	(0.028)	-0.043	(0.028)	-0.046	(0.029)
Never worked before	0.049	(0.106)	0.050	(0.106)	0.047	(0.105)	0.050	(0.106)	0.092	(0.118)	0.083	(0.116)	0.057	(0.103)
RDT	0.023	(0.031)	0.024	(0.031)	0.024	(0.031)	0.023	(0.031)	0.033	(0.030)	0.033	(0.030)	0.035	(0.032)
SNI = 1	0.010	(0.022)	0.010	(0.022)	0.010	(0.022)	0.010	(0.022)	0.007	(0.022)	0.009	(0.022)	0.020	(0.023)
Previous cooperation	0.041	(0.029)	0.041	(0.029)	0.040	(0.029)	0.041	(0.029)	0.037	(0.029)	0.035	(0.029)	0.037	(0.030)
Future cooperation	-0.057**	(0.023)	-0.057**	(0.023)	-0.057**	(0.023)	-0.057**	(0.023)	-0.055**	(0.023)	-0.056**	(0.023)	-0.059**	(0.024)
Alternative IV														
Gap_field	-0.014**	(0.006)												
Gap_gender			-0.010***	(0.004)										
Gap_field_gender					-0.016*	(0.010)								
Gap_researcher							-0.010***	(0.003)						
Third tercile									0.083**	(0.033)				
abajo_media = 1											0.047**	(0.022)		
Mobility beliefs													0.071**	(0.033)
Observations	780		780		780		780		768		768		728	

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1