Money to move:
The effect on researchers of
an international mobility grant

Stefano H. Baruffaldi
University of Bath and
Max Planck Institute for
Innovation and Competition
S.H.Baruffaldi@bath.ac.uk

Marianna Marino
SKEMA Business School,
Université Côte d'Azur
(GREDEG)
marianna.marino@skema.edu

Fabiana Visentin
UNU-MERIT
Maastricht University
f.visentin@maastrichtuniversity.nl

Abstract. We examine the impact of a grant program promoting international mobility on researchers' scientific outcomes and careers. To provide causal evidence, we exploit unique data from the Swiss National Foundation and implement a Regression Discontinuity Design analysis. We find that the grant effectively supports periods of research abroad that often extend beyond the duration of the grant, without increasing the probability of permanent migration. Awarded researchers increase their output quality, although the effect on output quantity and careers is not significant. Additional evidence suggests that financing international mobility likely affects output quality by reducing the cost of exploring new collaboration opportunities and research topics: awarded applicants are more likely to collaborate with new coauthors of higher, on average, scientific quality and rely less on their previous own research results. Moreover, the grants mainly benefit researchers receiving a mobility grant for the first time.

Money to move:
The effect on researchers of
an international mobility grant

Abstract.

We examine the impact of a grant program promoting international mobility on researchers' scientific outcomes and careers. To provide causal evidence, we exploit unique data from the Swiss National Foundation and implement a Regression Discontinuity Design analysis. We find that the grant effectively supports periods of research abroad that often extend beyond the duration of the grant, without increasing the probability of permanent migration. Awarded researchers increase their output quality, although the effect on output quantity and careers is not significant. Additional evidence suggests that financing international mobility likely affects output quality by reducing the cost of exploring new collaboration opportunities and research topics: awarded applicants are more likely to collaborate with new coauthors of higher, on average, scientific quality and rely less on their previous own research results. Moreover, the grants mainly benefit researchers receiving a mobility grant for the first time.

1 Introduction

Highly skilled worker mobility has increased considerably in the last decades (Auriol, 2010; Saxenian, 2005, 2007). In particular, the academic sector has turned into a 'global market' of multicultural teams where foreign researchers often transit temporarily (Franzoni et al., 2012; Van Noorden, 2012). While the general phenomenon of permanent scientific migrations has often raised political concern (Adams and Douglas, 1968; Pierson and Cotgreave, 2000), several institutions and organizations have increasingly placed different forms of support to international temporal mobility at the center of their strategies to foster innovation (Meyer, 2003). The Fulbright Program in the United States or the Marie Curie fellowship in the European Union are notable examples, and have inspired several initiatives in other contexts. Despite the increasing presence of mobility programs within the portfolio of public funding agencies, there is still a limited understanding of their effects on scientists' productivity, careers, and modes of knowledge production. In a time of limited public resources and where the value of institutional efforts to promote international mobility is sometimes questioned, we deem important to understand the economic payoff of public financing in this domain.

Initiatives to support mobility often take the form of competitive grants offered to young researchers in the early and most crucial phases of their careers (Oyer, 2006; Stephan, 2012) to choose and spend a period in a different institution and country. In this paper, we provide causal evidence on the effect on researchers of one of these programs, the international mobility grant program sponsored by the Swiss National Science Foundation (SNFS). First, we assess the impact on short and medium-long term mobility. In the short term, we investigate if mobility grants crowd-out alternative funding for the same opportunities (Jaffe, 2002). Specifically, we want to measure the percentage of researchers who would not have moved abroad without the grant. In the medium-long term, we evaluate whether awarded applicants are more likely than non-awarded applicants to

stay abroad beyond the duration of the grant. The temporal duration of the experience abroad has important implications. On one side, the prolongation of the period abroad can be seen favorably as the sign of a successful professional experience and higher propensity to remain mobile geographically (Parey and Waldinger, 2011). On the other side, an excessive incidence of permanent migration induced by the grant would raise the specter of "brain drain" (Gaulé, 2014; Oosterbeek and Webbink, 2011).

Second, we investigate the effect of the grant on scientific productivity and careers. We distinguish the effects on productivity in terms of quantity and quality. We assess the impact on careers by looking at the academic position of researchers over time. Third, and last, we explore the potential mechanisms altering the modes of knowledge production by focusing on changes in research network and research trajectory. Mobility often constitutes a process of networking and extending one's social and knowledge space (Ackers, 2005; Baruffaldi and Landoni, 2012; Saxenian, 2005). We argue that supporting mobility lowers the cost of exploring new collaboration opportunities and of entering in new high-quality research projects. In other words, supporting international mobility may serve as a mean of promoting the formation of professional ties with new collaborators in excellent research environments. Accordingly, we study whether awarded applicants have a higher chance of working with new coauthors of high scientific quality than non-awarded applicants, and we assess changes in research trajectories.

In our study, we use unique data on a mobility grant program awarded during the period 2003-2011 by the Swiss National Science Foundation (henceforth SNSF), the major institution financing research in Switzerland. The program finances research periods of up to a maximum of 36 months at a foreign research institution. During their stay abroad, researchers become fully affiliated with the host institute. While encouraged, return to Switzerland is not required. We collect detailed data and information on both awarded and non-awarded applicants. Confidential data provided by the

SNSF on the selection process of candidates allows us to reconstruct the evaluation committee's ranking of candidates' proposals. We exploit a significant discontinuity in the probability of a grant being awarded along the evaluation committee's ranking and use a Regression Discontinuity Design (henceforth RDD)[1].

Our results show that awarded applicants are 47 percentage points (pp.) more likely to be abroad in the first year than non-awarded applicants. The effect of the grant extends beyond the duration of the grant itself, but the effect is reduced to 24 pp. five years later. For early cohorts, for which we can assess the probability of being abroad beyond the period of five years, this effect decreases further and tends to zero in the seventh year. We find significant and positive effects of being awarded in the output quality (average impact factor) but not in the output quantity (number of publications). We also do not observe significant effects on the likelihood of obtaining a professorship.

In terms of mechanisms, we provide evidence that being awarded a grant gives researchers access to a broader and better quality co-authorship network. Grant recipients have, on average, a 20 pp. higher share of new coauthors. Moreover, new coauthors of awarded applicants have, on average, publications of higher scientific quality. Importantly, the effect on the quality remains also if we exclude publications at or in collaboration with scientists of the host institution. This latter result

[1] The econometric methodology we apply allows for the estimation of causal effects locally (LATE), around the cut-off point of discontinuity in the probability of obtaining the grant, and is, therefore, relative to scientists of average quality in our sample.

demonstrates that the effect on quality extends beyond the specific period and network of collaborations at the host institution. Finally, awarded applicants rely less on previous own research results, as measured by the share of self-references in publications. However, we observe that they do not change the field of research. We conclude that mobility grants affect the scientific productivity of scientists by offering the opportunity to reach out to new colleagues and select collaborators that excel in their research field. By enlarging their network, awarded applicants are stimulated to invest in research project less related to their previous research, while remaining within their area of specialization.

Our study makes three main contributions. First, we contribute to studies relating to early mobility experience with later career choices. Parey and Waldinger (2011), analyzing the ERASMUS initiative, and Oosterbeek and Webbink (2011), with a study on a Dutch scholarship, find that experiencing a sponsored period abroad in the early stage of individuals' education increases the probability of working in a foreign country later after the studies. Differently from these studies, we consider the impact of mobility incentives to individuals at the early stages of their academic career, looking at a broad spectrum of outcomes. Doing so, we derive implications for individual professional performance in the sphere of knowledge production. Moreover, postdoctoral researchers represent a fundamental labor force for academic systems, constituting the base for future generations of scholars (Stephan, 2012).

Second, we add to the literature assessing the impact of public funding on researchers' productivity. The majority of existing studies have focused on general funding schemes (Arora and Gambardella, 2005; Azoulay et al., 2011; Gerritsen et al., 2013; Jacob and Lefgren, 2011; Lanser and van Dalen, 2013). As an exception, Kahn and MacGarvie (2012) analyze the Foreign Fulbright Program on the Science and Engineering field, exploring differences in productivity and return rates among students of different geographic origin. However, their study suffered the limitation of observing

only awarded applicants. Thanks to our data, comprising information on all applicants, their full career history, and the committees' selection criteria, we can assess a causal effect. Moreover, we add to the literature discussing how the design of research grants impacts research trajectories. Recent studies note that the length and autonomy provided by different funding schemes determine the choice between exploration and exploitation and risk-taking behavior (Azoulay et al., 2011; Myers, 2018). Our results suggest that funding targeted to specific policy objectives, such as international mobility, may have analogous implications as they lower exploration costs for scientists.

Third, we contribute to the literature on academic mobility. Seminal contributions in this area have shown that mobile researchers have higher productivity (Franzoni et al., 2014; Gaulé and Piacentini, 2013; Hunter et al., 2009; Stephan and Levin, 2001), and broader international collaboration networks (Scellato et al., 2015) than non- mobile researchers. However, it remains unexplored what are the effects of financial support to mobility. Our quasi-experimental research design allows us to overcome the endogeneity issue associate with this policy question (Hoisl, 2007). In our case, a challenging task remains to analytically disentangle the effect of receiving economic support (money effect) from the mobility itself (mobility effect) since these two events co-occur. While we cannot fully address this issue, we find evidence supporting the prevalence of the role of mobility, and we discuss the mechanisms behind changes in the knowledge productivity function. In particular, we find that our results are mainly driven by the subset of researchers receiving a mobility grant for the first time.

2 Institutional context

According to the European Innovation Scoreboard (EIS),[2] Switzerland is an innovation leader, outperforming all other European countries in terms of innovation capacities. One of the strengths of the country is the large number of PhDs: doctoral holders represent 1,8% of the total population and 2,8% of the total labor force, respectively (OECD, 2018). Switzerland is also one of the countries of the OECD area with the highest number of international students enrolled in Ph.D. programs. In 2017, the number of international students enrolled overcome the number of national students. Only Luxemburg is attracting a higher number of international students than Switzerland: 85% of the total versus 55%, respectively. The Swiss research system appears among the most attractive countries for foreign researchers (Franzoni et al., 2012). Three Swiss institutions figure among the top 100 worldwide (QS World University Rankings), and 6 in the top 200. The ETH Zurich - Swiss Federal Institute of Technology is ranked 7^{th,} placing Switzerland together with the US and UK in the set of countries with institutions listed among the top 10. The high performance of the country in terms of doctoral training is complemented by a great variety of programs supporting postdoctoral studies. The Swiss National Science Foundation (SNSF) is the leading Swiss institution supporting national scientific research, playing the same role as the National Science Foundation in the US. The foundation allocates more than 150 CHF million per year, corresponding to 20% of its total budget, to promote young researchers' activities and careers. The

[2] See http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards/

"Advanced Postdoc Mobility" fellowships represent one of the flagship SNSF instruments supporting young researchers' experiences abroad.

Awarded researchers receive a scholarship to stay abroad at an institution of their choice and have the unique opportunity to access top-ranked universities worldwide.[3] The grant covers a period of maximum 36 months and has to be spent in the foreign host institution indicated in the proposal. The SNSF encourages applicants to plan a return to Switzerland, but it is not a participation requirement, and awarded applicants are free to remain abroad beyond the grant duration;[4] there are also no financial incentives targeted explicitly to the return of awarded applicants. Grant applications can be submitted two times during the year, the 1st of February or the 1st of August, respectively. Applicants should hold a doctoral degree, should demonstrate at least one year of research experience at the postdoctoral level, and should have Swiss nationality or proof of at least three years of activity at a Swiss research institution. On average, the SNSF receives 150 applications per year from applicants overall disciplines and selects over half of them.

Applicants' evaluation is centralized in Bern. The National Research Council (henceforth NRC) of the SNSF is responsible for the scientific evaluation of all applications. Applications in all disciplines are admitted and assigned for the evaluation to one of the three NRC divisions: (i)

[3] The first top-10 most preferred destinations in our sample are: Harvard University, University of Cambridge, University of California Berkeley, the Max Planck Institute, Stanford University, Massachusetts Institute of Technology, University of Oxford, the Scripps Research Institute, California Institute of Technology, and University College of London. These are the preferred destinations for roughly the 25% of applicants. The total number of distinct host institutions indicated by applicants is 394.

[4] From informal discussions at the SNSF we also learned that a temporary prolongation of the period abroad with external funding, perhaps from the host institution, is perceived as a positive outcome of the initial grant.

Humanities and Social Sciences, (ii) Mathematics, Natural and Engineering Sciences, and (iii) Biology. Fellowships in experimental and clinical medicine and basic medical science are evaluated externally by the Swiss Foundation for Grants in Biology and Medicine (SFGBM). Each commission is made by field experts appointed for periods of minimum five years. Each application is evaluated based on (i) the quality and originality of the research project, (ii) the applicant's scientific publication record, (iii) the applicant's career perspectives, (iv) the applicant's attitude versus her academic career and, (v) the quality of the hosting research institution proposed and its goodness of fit with the applicant's interests. Concerning this latter aspect, applicants are asked to carefully choose the host institution that represents the best fit for the accomplishment of their research proposal. Not only applicants need to motivate their host institution choice, but they also have to include in their application a confirmation letter from that host institution that the infrastructure needed for their research is available for the entire duration of the fellowship. This latter requirement ensures that applicants establish early direct contacts with the host institutions. In the evaluation procedure, the SNSF aims to follow the principles of excellence through competition, fairness, and equal opportunities. The NRC assigns to each application two external reviewers who are chosen for their expertise in the applicants' field. The external reviewers are asked to assign to the application evaluated a priority score on a scale of seven distinct values[5]. Then, to select the best applications, the NRC collects the non-blind peer reviews, and during a general meeting, assigns a final score after having discussed and compared all the applications.

[5] The values are expressed as letters that goes from A to D where A is the maximum value, and intermediate values are admitted. The complete range of values results as follows: A, AB, B, BC, C, CD, and D. In our analysis we convert the original alphabetical scale in numerical.

The analyzed Swiss grant has commonalities with programs offered in other European countries. For example, it shares the dimension, selection process, and features with the post-doctoral fellowships sponsored by the Swedish Research Council, and the German Federal Ministry of Education and Research (BMBF). Each year, about 300 young Swedish scholars have the opportunity to stay at foreign universities or research establishments for up to 24 months (Swedish Research Council's website). The BMBF is supporting postdoctoral students for 12 months.

3 Data

Data sources

We combined different sources of data to create a unique dataset on awarded and non-awarded applicants. We obtained from the SNSF basic demographic information and information related to the grant applications for all applicants of "Advanced Postdoc Mobility" fellowships in the period 2003−2011. The SNSF data includes detailed information on the commission evaluating the applicants, the assigned score, and the final decision outcome. We integrated the information provided to us in an electronic format with data manually coded from the SNSF paper archives. We complemented the SNSF data with information on applicants' location and job position over time collected from applicants' CVs, LinkedIn, and personal webpages. Finally, we collected bibliometric data from the Scopus database. For each applicant, we manually collected her publication record and list of papers citing her work. Our initial sample included 1,179 applicants. We dropped 47 cases due to missing information about the key variables, mainly the grade assigned to their applications. Our final sample consists of 1,132 applicants. We grouped these applicants in 67 distinct cohorts, based on the date of their application and the assigned evaluation committee.

Applicants can reapply if they are not successful. However, this is rare, and happens only ten times in our sample, for applicants who applied a second time. Unsuccessful applicants often obtain

alternative funding without the need to wait for a later application deadline. Moreover, the window of time after the Ph.D. in which researchers can access this funding scheme is narrow, so that it is likely that an unsuccessful applicant will not fall anymore in the professional age requirement at a later application opportunity. In our main analyses, we drop the first application for applicants that applied twice. The results remain stable, either we drop entirely the observations of applicants who applied twice, or we keep only the first application for those applicants.

Variables

Table 1 lists the variables included in our analysis with a short description of each of them. In our data, we observe the year in which all applicants intend to start their period abroad ("proposed year"), and we use this information to construct all time-variant variables by considering the "proposed year" as "the first year after the grant." First, we look at the location of the applicant at a specific point in time, and we construct the dummy variable that is equal to one if the applicant is abroad and zero if she is in Switzerland. In the main analysis, we consider the first (*Abroad 1st year*) and the fifth year (*Abroad 5th year*) after the grant. Then, to analyze changes in recipients' scientific knowledge production, we consider the applicant's publication record. In the main analysis, we count the cumulated number of publications from the first to the fifth year inclusive (*Publications 5 years*). *Average JIF 5 years* is the average impact factor of the journals where those

publications appeared.[6] To trace the job position, the dummy variable *Prof 5th year* is equal to one if the applicant obtains a professorship position in the fifth year after the grant.

As the main mechanism leading changes in the scientific outcomes, we look at the exploration of new collaboration opportunities. To this scope, we measure the extension of the applicant's co-authorship network (*New coauthors 5 years*) in terms of the share of unique new coauthors acquired by the applicant in the five years after the grant, i.e., those coauthors who appear in the applicants' publications only after the start of the grant. To compute the share, we divide the total number of new distinct coauthors acquired in the five years after the grant by the cumulative number of coauthors over the entire period of observation (before the grant and 5 years after the grant). [7] To dig further into the mechanisms, we compute additional variables. We investigate the quality of the new coauthors, computing the average impact factor of the journals where a coauthor published

[6] We run a separate set of regressions using citations as quality measure. Results are in line with the ones that consider the journal impact factor. Since the journal impact factor is not affected by truncations problems we decided to keep the later one as main variable in the text. Results on citations are reported in the external appendix.

[7] The variable is computed only for applicants who had at least one publication at the moment of application. The impossibility to observe the starting moment of collaboration may induce measurement error, which, however, would bias both treated and controls around the cutoff similarly. As a robustness, to take into account larger delays between the start of collaboration and the observed publication, we lagged of one additional year the counting of the new co-authorships. The results are equivalent.

before starting her collaboration with the focal researcher.[8] *Co-authors JIF 5 years* is the average quality of new coauthors acquired in the 5-year period after the grant.[9]

As an important robustness analysis, we explore the researcher's independent ability to publish in specific journals regardless of direct collaborations with colleagues in the host institution. After geocoding all affiliations in our sample, we compute the average impact factor of the journals where the applicant publishes excluding those publications where the same city of the host institution appears in the list of affiliations (*Avg. JIF 5 years – no host*). Finally, we proxy changes in research trajectories by an indicator capturing the extent to which new publications rely on previous research. We look at the publications' references in the 5 years after the grant and compute the share of self-references – defined as the set of references to the papers published by the focal applicant before the grant application (*Self-references 5 years*). The idea behind this measure is that a researcher refers to her previous publications when she directly exploits and follows-on previous work. Reducing the number of self-references is an indication that the researcher is exploring a different research trajectory.

[8] We look at coauthors' publications in the 3-year window between 4 and 1 year before the first collaborative publication with the focal researcher. This period of choice relies on three main considerations. First, we need to measure coauthors' quality over publications that are not affected by the collaboration with the focal researcher. Second, we want to weight more the most recent research activities of new co-authors. Third, due to the large number of coauthors, we rely on the Scopus authors' identifiers for the disambiguation of names. Since, these identifiers may be less precise over long time periods a 3 years window reduces measurement error.

[9] We find equivalent results using an alternative variable measuring the difference in average JIF between coauthors of the post-grant period and previous coauthors.

As the demographic applicant's characteristics, we consider: the nationality of the applicant, distinguishing foreign applicants from Swiss applicants (*Foreign*); gender, a dummy variable equal to one for female researchers (*Female*); and the age of the applicant (*Age*). As indicators of the scientific productivity of the applicant, we consider the publication count (*Publications*), the average number of citations received over a 3-year window by these publications[10] (*Citations*) and the average impact factor (*Average JIF*) of the journals where the applicant published, at the moment of application. Additionally, we count the number of the applicant's distinct coauthors (*Coauthors*) at the moment of application. We are able to observe in our data whether an applicant received one or more early mobility grants before applying for the focal Advance mobility grant. In our analyses, we add a dummy *(Early mobility grants*), which equals one if the applicant received a mobility grant in the past. We include the affiliation ranking of the university where the applicant obtained her Ph.D. (*Rank Ph.D. university*) and the ranking of the hosting university (*Rank host university*) or hosting research center (*Rank host res. institute*) as indicated in the grant proposal. To retrieve the ranking, we referred to the QS World University Rankings, and we considered the ranking of the affiliation in the field of specialization of the applicant. Finally, we consider the main application characteristics: the country destination designated in the application by the applicant; the proposed duration in months (*Proposed duration*); and the amount requested in Swiss francs (*Amount requested*). For the country destinations, we distinguish the main destination countries,

[10] As alternative we also used the total number of citations received by any publication up to the year of the application. Results were unchanged.

i.e., the US, the UK, Germany, and France, and we group the remaining destinations in one unique residual category, *Dest. Others*.

--- Insert Table 1 and Table 2 about here ---

Table 2 reports the summary statistics for our analysis sample. A quarter of the applicants in our sample are not Swiss. Thirty-four percent of them are female. Most individuals in our sample are young researchers with a successful record of publications at the moment of the application. Their average age is 34. They have 7.44 publications, they receive 32.33 citations, and the journals in which they are publishing have an average impact factor of 2.93. The applicants in our sample also have relatively large coauthor networks, with more than 27 coauthors, on average. Thirty-eight percent of them benefited from an early mobility grant when applying for an advanced mobility grant. Sixty-five percent of applications are in the hard sciences, including engineering, life science, mathematics, medicine and health science, and natural science. The remaining 35% is in humanities and social science. Looking at the destination country, 38% of the applicants opt for an American research institute and about 40% for a country within Europe. The preferred destinations in Europe are the UK (7%), Germany (7%) and France (7%). The proposed duration for staying abroad varies between 12 and 36 months, with the average duration being 25 months. The average amount requested for an application is approximately CHF 116,970. In our sample, the success rate for grant applications is 71%.

4 Empirical Strategy

Grants are not randomly assigned since financial resources are limited and, on average, grants are assigned to individuals with better performance profiles. Those individuals with outstanding performance might have succeeded in their professional life, even without the grant. In our case, the descriptive statistics reported in Table 2 show that awarded applicants have a higher number of

publications and, on average, publish in journals with a greater impact factor than non-awarded applicants. We follow previous studies evaluating government research subsidies (Howell, 2017; Zhao and Ziedonis, 2012) and, to correctly infer and isolate the impact of the grant on scientific outcomes, we exploit the richness of our data and implement an RDD approach. The RDD analysis requires the presence of a clear discontinuity in the probability of receiving the treatment (obtaining the grant) along with a so-called "assignment or forcing variable" (e.g., grade). Figure 1 plots the probability of receiving the treatment as a function of the assigned grade.

--- *Insert Figure 1 about here* ---

As shown in Figure 1, we observe a sharp discontinuity between the grade value -1 and 0 (*Grade* is normalized accordingly). The probability of obtaining the grant passes from about 11% to 78% for a proposal scoring -1 and 0, respectively. The probability is 0 for grade values lower than -1 and close to 100% for a grade higher than 0. Therefore, we adopt the value of 0 for the variable *Grade* as the cutoff point or threshold values of discontinuity. Due to a few exceptions, this discontinuity is not sharp. From discussions with the SNFS representatives, we verified that these exceptions are due to few cohorts where a limited (or excessive) number of applicants, relative to the available number of scholarships, permitted (prevented) to assign the grant to applicants below (above) the "usual" cutoff. Thus, we implement both a reduced-form RDD and a fuzzy RDD[11]. For each one of our dependent variables, the RDD specification is:

[11] As robustness we verified that all results presented are qualitatively the same using a RDD model on a sample where "fuzzy observations" are excluded: applicants with Grade lower than the threshold who obtained the grant and applicants with Grade higher than the threshold who did not obtain or used the grant. Results are available in the external appendix.

$$Y_i = \alpha_i + \beta I(Grade_i > Treshold) + \gamma Grade_i + \delta I(Grade_i > Treshold) * Grade_i + \omega X_i + Cohorts_i + \varepsilon_i$$

where Y_i is either (i) *Abroad 1st year,* (ii) *Abroad 5th year,* (iii) *Publications 5 years,* (iv) *Average JIF 5 years,* or v) *Prof 5th year*. The coefficient of interest is β capturing the effect of receiving a grade above the cutoff. To implement the RDD estimation, we include a two-sided linear trend control function of the assigned grade. In all specifications, we include commission dummies, as the grade can be interpreted as a relative ranking assigned by the examiners to the applicants within each commission. Also, the inclusion of commission dummies controls for differences associated with the broad scientific areas to which commissions are assigned. Subsequently, we introduce cohort fixed effects. A cohort identifies all the applicants submitting their applications to a certain commission at a given time and accounts for average differences across applicant cohorts over time and by commission. Finally, X_i represents the vector of covariates including additional controls. Importantly, in the RDD framework, the controls are not necessary for identification but can improve the precision of the estimation. In particular, the pre-treatment values of the main outcome variables on productivity (*Publications, Average JIF*) and the number of coauthors (*Coauthors*) are suitable proxies for the quality of the applicant at the moment of application. To account for potential correlations in the error terms within cohorts, we cluster standard errors at the cohort level. The fuzzy RDD regression model requires the estimation of the following two-stage equation model:

$$Grant\ awarded_i = \alpha'_i + \beta' I(Grade_i > Threshold) + \gamma' Grade_i + \delta' I(Grade_i > Threshold) * Grade_i + \omega' X_i + Cohorts_i + \eta_i$$

$$Y_i = \alpha_i + \beta Grant\ awarded_i + \gamma Grade_i + \delta I(Grade_i > Threshold) * Grade_i + \omega X_i + Cohorts_i + \varepsilon_i$$

In this specification, in the first-stage equation, $I(Grade_i > Treshold)$ functions as an instrument of the probability of receiving the grant. In the second-stage equation, the coefficient of interest β can now be interpreted as the effect of receiving the grant. All other aspects of the model remain

the same. In particular, the RDD identification assumption states, for both models, that by controlling for the appropriate function of the assignment variable (*Grade*), the dummy variable $I(Grade_i > Threshold)$ is exogenous. The basic idea behind the RDD is that individuals who are ranked just below and above the cutoff have a reasonable degree of similarity (Angrist and Lavy, 1999; Black, 1999)

In our setting, the assignment variable is discrete and takes seven values. Using a finer-grained and more continuous assignment variable would be optimal and would allow us to control for more flexible functional forms of the variable. However, other empirical studies have used RD designs based on discrete assignment variables (Lalive and Parrotta, 2017; Ponzo and Scoppa, 2010). In our context, the ranking is applied to relatively small cohorts of applicants, only a few applicants (on average 4) concentrate around the acceptance threshold within each cohort. Most importantly, it remains possible to test the fundamental underlying assumption that, by controlling for our design function, applicants above and below the cutoff are comparable. We do this by regressing each of our covariates on our main RDD model with commission dummies. We report such a test graphically in Figure 2 and analytically as a set of regressions in Appendix Table A - 1. Figure 2 shows the corresponding plots of the trends of control variables above and below the cutoff point. It can be noted that no selection occurs in almost all of the covariates, as the dummy variable $I(Grade_i > Threshold)$, within the RDD model has no residual significant correlation with any of these pre-determined variables. The only exceptions are for the variable that indicates whether the applicant has obtained in the past an early mobility grant. We verified through informal interviews that this could be explained by a tendency of the SNSF to finance more likely applicants

who never received grants before[12]. Based on the same interviews, we are confident that no other unobservable characteristics are likely to affect the decision, besides what is captured by the applicants' ranking. The SNF is committed to maintaining high standards of fairness and transparency, and all documentation relative to the screening and evaluation of the proposal is at the disposal of applicants for scrutiny. Overall, this evidence supports the assumption that within our RDD model, the key background characteristics are balanced between awarded and non-awarded applicants, and that the RDD identification assumption holds.

--- Insert Figure 2 about here ---

[12] In Table 8, we estimate the effect of receiving the grant for these two groups separately.

5 Econometric analyses

We report the regression results for our main dependent variables from Table 3 to Table 6. For each main outcome variable, we report five different models. In the first model, we present results for a simple OLS regression that estimates the descriptive difference between applicants above and below the acceptance threshold. In the second model, we present the basic RDD model, in which we control for a linear function of the grade with different slopes above and below the cutoff. In the third model, we add *Cohorts FE* and all of the controls. In the fourth model, we consider a regression model restricting the sample to observations with *Grade* values just above and below the acceptance threshold. Finally, in the fifth model, we report the results for the fuzzy RDD model with all controls. First-stage regression results for the fuzzy RDD model are reported in the appendix (Table A - 2) and show that *I(Grade>threshold)* is a strong instrument for the probability of obtaining the grant. Estimates from the fuzzy RDD are generally larger in magnitude, as they reflect the results from the two-stage IV model and can be interpreted as the effect of actually receiving the grant.

Our empirical analysis is complemented by a graphical representation: Figures 3 to 6 plot the mean, with 95% confidence intervals, of the main outcome variables by *Grade*, the assignment variable. For publications, average JIF, and professor position, we plot *Grade* fixed effects from regressions with commission dummies to control for the heterogeneity across commissions. The cutoff point is highlighted by a vertical red dashed line.

5.1 Effect on mobility: Probability of being abroad

Figure 3 shows a sharp discontinuity in the probability of being abroad in the first year along with the grade values. Interestingly, a considerable share of the applicants below the cutoff point is also abroad in the first year. In the fifth year, the difference across the cutoff point is substantially reduced by a lower probability of the applicants above the cutoff of being abroad but remains qualitatively significant.

--- Insert Figure 3 about here ---

The regression results reported in Table 3 confirm a strong significant positive effect in the probability of being abroad in the first year across all the specifications.[13] The fuzzy RDD model in column 5 suggests that awarded applicants are 47 pp. more likely to be abroad in the first year: a large share of awarded applicants would not have moved abroad without the grant. In other words, the mobility grant, to a large extent, does not crowd-out alternative funding for the same opportunities. The effect on the probability of being abroad is substantially lower, but still weakly significant and positive, after 5 years, as awarded applicants are 24 pp. more likely to be abroad. This result is in line, in terms of magnitude, with previous studies related to students' mobility, and suggests that temporary mobility grants may facilitate longer or future new periods abroad (Parey and Waldinger, 2011).

--- Insert Table 3 about here ---

[13] The 5% of winners stay in Switzerland. A manual check of their CVs reveals that, of the corresponding 32 individuals, three renounced to the grant whereas the remaining individual temporal suspended it by postponing the departure. As robustness check, we run a separate set of regressions where we exclude those individuals. Results are consistent with the one reported, and available in the external appendix.

From CV information, we observe qualitatively that applicants who remain abroad are able to do so thank to funding from abroad institutions. For the 2003-2010 cohorts of applicants, we can observe their outcomes variable beyond the 5th year, up to the 7th year. Results reported in Appendix A-3 show that the probability of being abroad decreases significantly over the years and become insignificant in the 7th year. Interestingly, looking at the non-returnees' profiles versus the others, we did not find significant differences in the scientific productivity of scientists staying abroad up to the 5th year.

Among the control variables, we find some predictable significant correlations: the likelihood of being abroad is lower for older applicants, and foreign applicants, as well as applicants who apply for more extended periods of stay, are more likely to be abroad in the 5th year.

5.2 Scientific productivity and career

Scientific productivity

Regarding the scientific productivity, in Figure 4, we observe that scientific commissions, not surprisingly, tend to assign better grades to more productive applicants who likely continue to be relatively more productive after the grant application. However, accounting for this positive correlation, there is no visible difference between awarded and non-awarded applicants in terms of the number of publications, as there appears to be no discontinuity around the cutoff point. Looking at the average JIF, the positive shift above the cutoff point seems to indicate that awarded applicants have a greater chance of publishing in journals with a higher impact factor.

--- Insert Figure 4 about here ---

In Table 4, we report the corresponding econometric results. When we measure productivity as the number of publications in the 5 years following the grant, we do not find any significant effect. Remarkably, we find a positive and significant effect of receiving a grant on quality. The

coefficients of interest on the average JIF of journals where applicants publish are positive and significant across all of the specifications. In terms of magnitude, the JIF increases by 1.37 points (Column 10, Table 4). We find predictable correlations concerning the control variable coefficients. In particular, the rank of the university of the Ph.D. and the host university is positively correlated[14] with the number of publications after the grant and with the average JIF.

--- Insert Table 4 about here ---

Professorship

Regarding the effect on the likelihood of being in a professorship position in the 5th year, in Figure 5, only applicants with the maximum grade value (2) have a substantially higher probability of being professors (42%). Comparing applicants around the cutoff point, there appears to be no difference.

--- Insert Figure 5 about here ---

In Table 5, in the OLS estimation (column 1), we find that applicants who obtain a grade higher than the cutoff are more likely to be in a professor position after 5 years from the grant. However, the models in columns 2 to 5 reveal that there is likely no causal effect of the grant; as in the RDD and fuzzy RDD models, the coefficients of interest are not significant and, if anything, are negative in sign. The control variables show a lower probability of female applicants obtaining a professorship position and a positive correlation with citations and the ranking of the host institute.

[14] Universities are ranked in ascending order, so that a negative coefficient implies that to higher ranked institutions correspond higher levels of the outcome variables.

--- Insert Table 5 about here ---

The non-significant result on the likely to obtain a professorship has to be taken with care. At the threshold of acceptance, the grant may not have relevance for professorship since few academic positions are available, and a relatively low share of applicants obtain a professorship position within our period of observation. Receiving the grant, and the observed increase in research quality for those recipients may still play a role for the best applicants, or in the long run. It is also interesting to consider that, a priori, being awarded might have both a positive and negative effect on obtaining a professorship. On the one hand, the mobility grant may have a signaling value that increases the probability of obtaining a position. On the other hand, granted applicants may be forced to delay the search for an academic position to complete their project, while not-granted applicants are stimulated to enter the job market soon. Moreover, some authors note how mobility may lead to the loss of local networks that may undermine or delay the search for academic positions in the country of residence, while new networks abroad may not immediately compensate (Ackers, 2005). In additional analyses, available upon request, we also investigated whether granted applicants were more likely to find positions at higher (or lower) ranked institutions. We do not find any significant results also on this dimension.

5.3 Collaborations and topic exploration

Having observed a positive effect of the grant on scientific productivity, we explore the potential mechanisms altering knowledge production. We assume that obtaining a mobility grant may affect knowledge production by lowering the costs of exploring new collaboration opportunities in high-quality research environments and of broadening the research portfolio.

In this section, we present evidence to support this assumption. First, we consider changes in the scientific network by looking at the share of new coauthors (see Figure 6 and Table 6 for the corresponding results). Then, we complement this analysis with evidence on the scientific quality

of new coauthors, the quality of applicants' publications independent from collaborations with the new coauthors, and indicators of the exploration of new research topics (see Table 7). For the sake of brevity, in Table 7, we present only the main coefficients of interest for the second stage results of the fuzzy RDD model, including all controls and fixed effects.

Network: share and quality of new coauthors

Figure 6 shows the descriptive evidence of the change in the share of new coauthors. The graph shows a positive shift. Table 6 reports the analysis of the number of new coauthors and shows a consistently positive coefficient of the variables of interest on the number of new coauthors. From column 5, we can quantify this effect as an increase of 20 pp. higher share of new coauthors for awarded applicants.

--- Insert Figure 6 about here ---

Furthermore, we explore whether awarded applicants work with new coauthors of higher scientific quality. Specifically, we use *New coauthors JIF 5 years* as the dependent variable. Empirical evidence, reported in Table 7, column 1, shows that grant awardees substantially improve the quality of their coauthors' network after the grant compared with non-awardees.

--- Insert Table 6 about here ---

Publications at the host institute affiliation

Having observed the results on the share and quality of new coauthors, a possible concern might be that collaborations with scientists of high scientific quality during the visiting period in the host institution drive the findings on the average JIF. As robustness-check, to dispel this doubt, we look at the average JIF of publications excluding publications where the city of the host institution appears in the affiliation list. In other words, we disregard publications both during the stay in the

host institution and in collaboration with scientists in the host institution. The results reported in Table 7, column 4, show that the effect on JIF remains positive. The impact is still weakly significant and positive when looking at the 5-year period after the grant (Column 2) but remains more significant and stronger in magnitude in the 5th year (Column 3). This result strengthens the idea that the benefits to awarded applicants go beyond the mere collaborations during the period in the host institution. The increase of the output quality seems to be explained by an effective learning effect and/or by a substantial effect on the quality of personal collaboration networks that extend beyond those directly associated with the period in the host institution.

--- Insert Table 7 about here ---

In a set of additional analyses, we explored the heterogeneity of the main results with respect to the ranking position of the university where applicants obtained their Ph.D. and the host institution ranking. We may expect stronger results for scientists hosted by highly ranked institutions (Fernández-Zubieta et al., 2016), especially if factors directly related to the institution, such as prestige and access to superior equipment, were the main mechanisms explaining the results. However, we do not find any significant variation across this dimension (results are available in the appendixes A-3 and A-4, Table A- 4 and Table A - 5). On average, it remains that applicants spend the grant to reach out to excellent institutions. However, the results are comparable when applicants move to more highly ranked institutions as well as when they move to institutions of similar quality than the one of origin. This finding strengthens the idea that the support of the host institution per se does not fully explain our results.

Exploration of new topics

Having explored the changes in the new collaborations and their quality, we consider the exploration of new topics. In other words, we are interested in understanding whether new collaborations with coauthors of high scientific quality also correspond to a change in research trajectories. To do so, we use *Self-references 5 years* as the dependent variable. Arguably, a lower share of self-references in the publications of the later period would suggest that researchers are building marginally upon previous work to explore new topics. Column 4 of Table 7 shows that awarded applicants reduce their self-references by 2pp., a magnitude quite substantial if we consider that the sample average for the indicator *Self-reference* is 3%.

To complement this analytical finding, we looked descriptively at other aspects related to the research fields' exploration. We consider exploration across scientific fields counting the number of new four digits ASJC codes in publications appearing after the grant start year for both the applicants and new coauthors.[15] We found no significant differences. Applicants who received a grant publish on average in 1.5 new fields in the 5 years after the grant, as opposed to applicants who did not receive a grant who publish in 1.6 new fields. Similarly, previous publications of grant recipients' new coauthors published in 0.7 new research fields as compared to publications of former coauthors, but this figure is even higher for non-recipient applicants (0.9). We conclude that while we observe exploration towards new topics and projects, as captured by the share of self-

[15] We consider only codes where researchers (or co-authors) publish at least 5% of their publications to reduce noise. The results remain qualitatively the same when removing this restriction or weighting differently research fields, e.g. by the frequency of publications.

references, this does not go as far as branching into new fields.[16] Our finding is in line with the idea that awarded applicants spend the mobility grant to reach out to new colleagues and institutions that excel in their research field. While awarded applicants have the opportunity to select new topics and projects with high potential that are less related to their previous research, these projects, as well as their new coauthors, seem to remain within their area of specialization.

5.4 Money versus mobility effects

By design, a mobility grant needs to be used for a specific purpose, i.e., a temporary stay in a different university or research institute. This grant design makes it not possible to perfectly disentangle the effect of receiving research funding from the effect of moving. However, in this section, we discuss additional evidence suggesting that mobility seems to play the main role in our context of analysis.

Empirical evidence shows that the grant has no effect when mobility is not differential, i.e., when the recipients have recently received a previous mobility grant. The Advanced Mobility Scholarship program is the last opportunity to obtain funding to move abroad offered by the SNSF along with the career of a researcher in Switzerland. However, other opportunities exist in the early stages of a researcher's career. Taking advantage of a variable in our data (*Early mobility grants*), we

[16] The ASJC classification at the 4-digit level comprises 335 codes. Notably, each researcher in our sample is associated to 6 codes on average. The classification distinguishes, for instance, "Mechanical Engineering" from "Industrial and Manufacturing Engineering", "Biochemistry" from "Biophysics", "Management of Technology and Innovation" from "Strategy and Management". Therefore, a substantial deviation from a research field to another should be captured using this level of aggregation. Nonetheless, exploration of different topics and projects may very well happen within each one of these fields, at a finer grained level, which is what is likely reflected in our results on the share of self-references.

distinguish applicants who obtained only the advanced mobility grant from those who have previously received funding for an early mobility experience. In the latter case, the advanced mobility grant likely constitutes the prolongation of a previous period abroad. Table 8 reports the results of the main coefficient estimates for the two distinct sub-populations.

--- Insert Table 8 about here ---

Interestingly, applicants in their first mobility experience seem to drive the results. For them, obtaining the grant increases the probability of being abroad in the first year, as well as the fifth year. The likelihood of applicants with early mobility grants being abroad after 5 years is not statistically significant. Moreover, obtaining the grant has a positive impact on the average JIF of the journals where they publish and a positive and stronger effect on the number of new-co-authorships established (+35 pp.). On the contrary, the effect on these variables for applicants with previous mobility grants is negligible. The fact that the results are mainly driven by applicants who did not receive previous mobility grants is in line with the idea that the mobility experience, more than the financial support per se, drives our main results.

Additional qualitative evidence seems to support that the mobility effect dominates the money one. First, it is important to consider that the funding provided by the mobility grant is mostly limited to the researcher's wage, necessary expenses for conference participation, and does not include a research budget (or a relatively small one). There is no retribution gain in being awarded recipient, i.e., the salary paid by the grant is generally lower than the salary for a comparable position in Switzerland and aligned to wages in the destination country. Additionally, we screened manually the curricula of the non-granted applicants that almost received the grant (grade equal 0) and remained in Switzerland. Doing this exercise, we observed that those who stayed in Switzerland were capable of securing alternative research funding, and had no evidence of inactivity periods.

Most importantly, we verified that receiving the grant does not affect the probability of leaving academia.[17]

6 Robustness

We performed a set of analyses to test the robustness of our main results. Following Cattaneo et al. (2015) and Cattaneo et al. (2016), Table 9 presents randomization-based inference estimates at the minimum window around the acceptance threshold. These analyses overcome possible limitations deriving from large-sample approximations in relatively small samples, around the discontinuity threshold. To account for cohorts of applicants fixed effects, we demean the dependent variables by cohort groups' means. The window with values of the grade above and below the acceptance threshold is the narrowest window that we can use with our data. At the same time, this window passes the randomization assumption tests (window selection) based on all covariates, except for "Early mobility grants." This result is equivalent to the analysis presented in Table A – 1 and previously discussed in section 4. We report difference in means estimates, finite sample p-values, and Rosenbaum's confidence intervals under arbitrary interference (Rosenbaum, 2006).

.

[17] The grants analyzed in our study, Advanced Postdoc Mobility, are targeting researchers with some years of experience after their PhD and a high propensity to remain in academia. In our sample, 94% stay in academia. For this reason we focus our main analysis only on the academic careers. However, we run a set of regressions where we study the likelihood of staying in academia versus going to industry. The results show that being awarded the grant has no effect.

--- Insert Table 9 about here ---

In other robustness analyses[18] we tested the robustness of the results to our main model specifications in different scenarios: (i) when removing applicants at extreme values of the grade, (ii) when removing "fuzzy observations" (applicants above the threshold who did not receive or used the grants and applicants below the threshold that received the grant), and (iii) when removing applicants that moved abroad despite not having received the grant. Removing applicants at extreme values of the grade yields somewhat weaker results, but still significant and overall equivalent to the scope of our discussion. The results of the other two robustness analyses are consistent with our main model specifications.

7 Conclusions

In this paper, we implement a quasi-experimental research design to evaluate the impact of an international mobility grant program on individual careers. We find that obtaining the grant supports international mobility, both in the short and medium run. The mobility grant does not, to a large extent, crowd-out alternative funding for the same mobility experience. Interestingly, we find that receiving the grant supports mobility beyond the duration of the grant. Nonetheless, after 5 years, the effect is substantially reduced and further decreases in the subsequent years. We then find a positive effect on the average impact factor of the journals where scientists publish, as well as in the number of new research collaborations. The effect on productivity, in terms of the number

[18] The additional robustness analyses are available upon request.

of publications, and on the likelihood of obtaining a professorship, is not significant. Further investigating the mechanisms, we find that awarded applicants collaborate more likely with new coauthors, of on average higher scientific quality in their fields, and rely less on their previous research. Importantly, we verify that the effect on quality is not limited to publications realized during the period abroad or in collaboration with authors in the host institution. Moreover, the grant has a higher impact on a researcher receiving a mobility grant for the first time.

Our results speak to the literature on research public funding and add to the debate on the mechanisms through which supporting mobility is likely to affect individual outcomes, with implications for policymakers and organizations interested in supporting mobility. In our study, financially supporting international mobility proves to successfully increase initial mobility, which facilitates securing additional funding abroad, and eventually allows the realization of new collaborations and high-quality research projects. Moreover, the risk of leading to excessive permanent migration appears limited. The evidence on research outcomes is compatible with the idea that mobility grants reduce the cost of exploring new collaborations and research projects of high scientific quality within one's field, eventually leading to scientific output of higher quality.

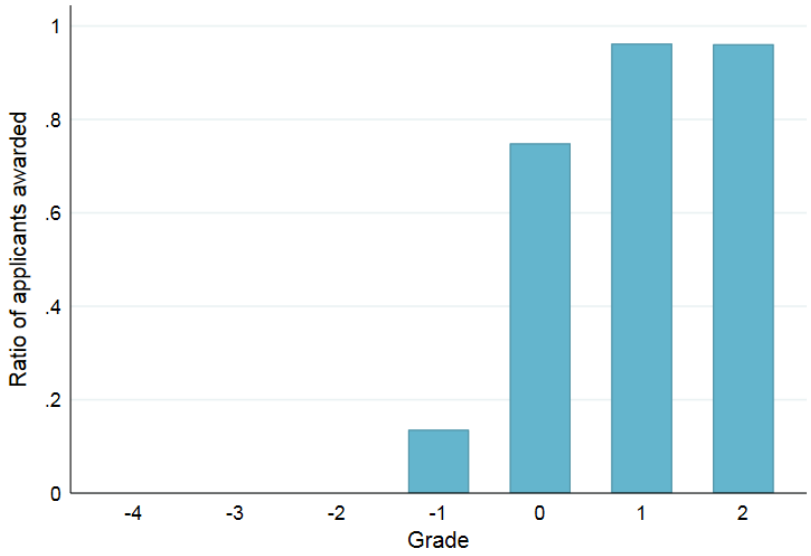
A few caveats are in order. Our results can be generalized to other OECD countries with similar research environments and policy tools. When looking at the outflow of students from Switzerland, the proportion of master's and doctoral graduates who are spending a temporal period abroad (48% for Switzerland) is comparable with the one of Sweden and Germany (OECD, 2019). The Swiss program studied has commonalities with programs offered by those European countries. While results can be generalized to such similar realities, they are limited to one country and may change in different contexts. For instance, financially promoting mobility in less competitive and less internationalized research environments may lead to a higher rate of permanent migration. The open nature of the Swiss research system may also imply conservative estimates since the exposure

to international science is already substantial within the country's borders. In other more closed, insular systems the effects might be greater. Also importantly, different policy tools - such as collaborative research grants (Ayoubi et al., 2017), welcoming institutional policies, immigration policies, quotas of external, and foreign candidates for research positions - may change the contextual factors in which mobility and collaboration take place - for instance, lowering or exacerbating initial mobility costs, favoring or limiting exploration activities - with consequences for the ultimate effects.

In general, researchers' mobility remains a multifaceted phenomenon, and further work might seek to extend our results to other policy programs and countries. The array of possible policies and contextual factors that may determine different forms and consequences of mobility is highly heterogeneous. Causal evidence on the effects of different policy and strategic interventions may be crucial for a deeper understanding of how mobility can be leveraged to enhance science and innovation performance, and for a better comprehension of the phenomenon itself.

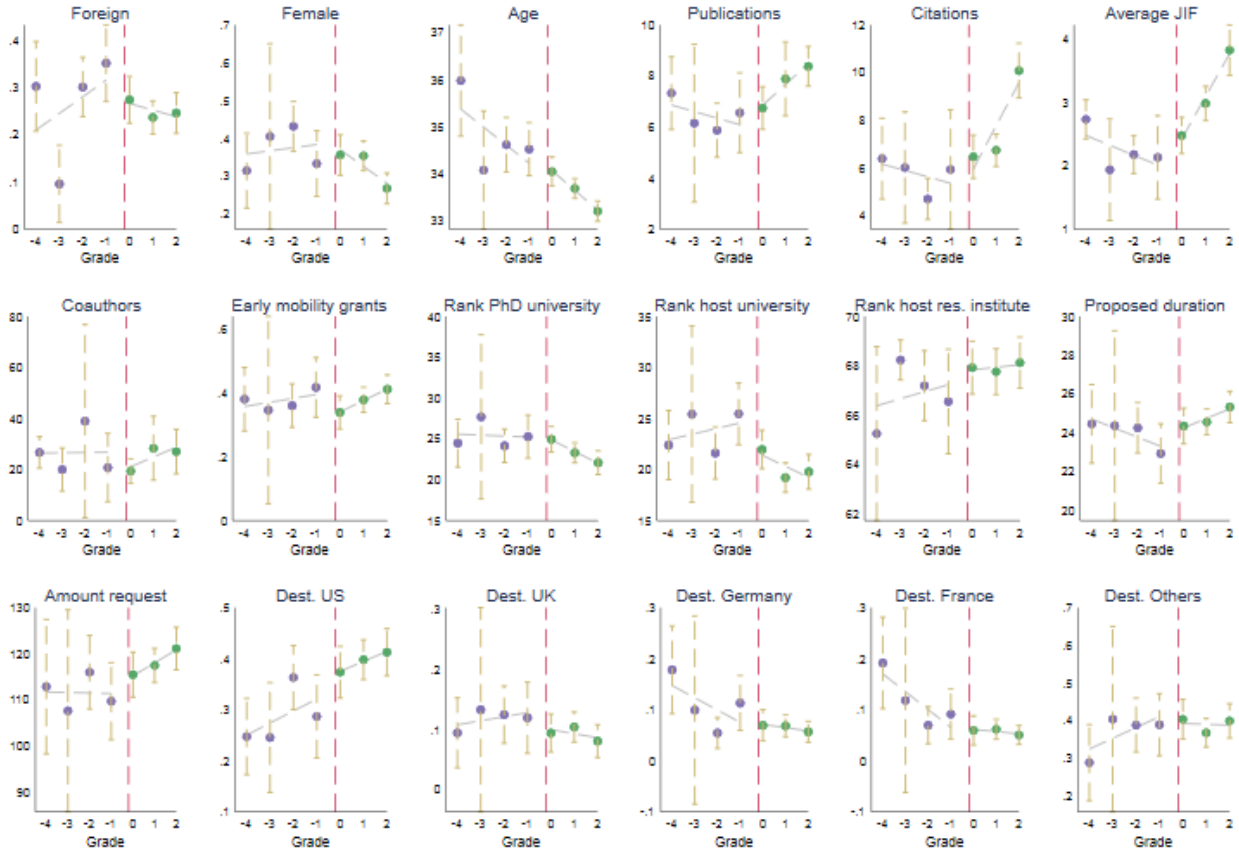
Figures and Tables

Figure 1: Probability of obtaining the grant by *Grade* value



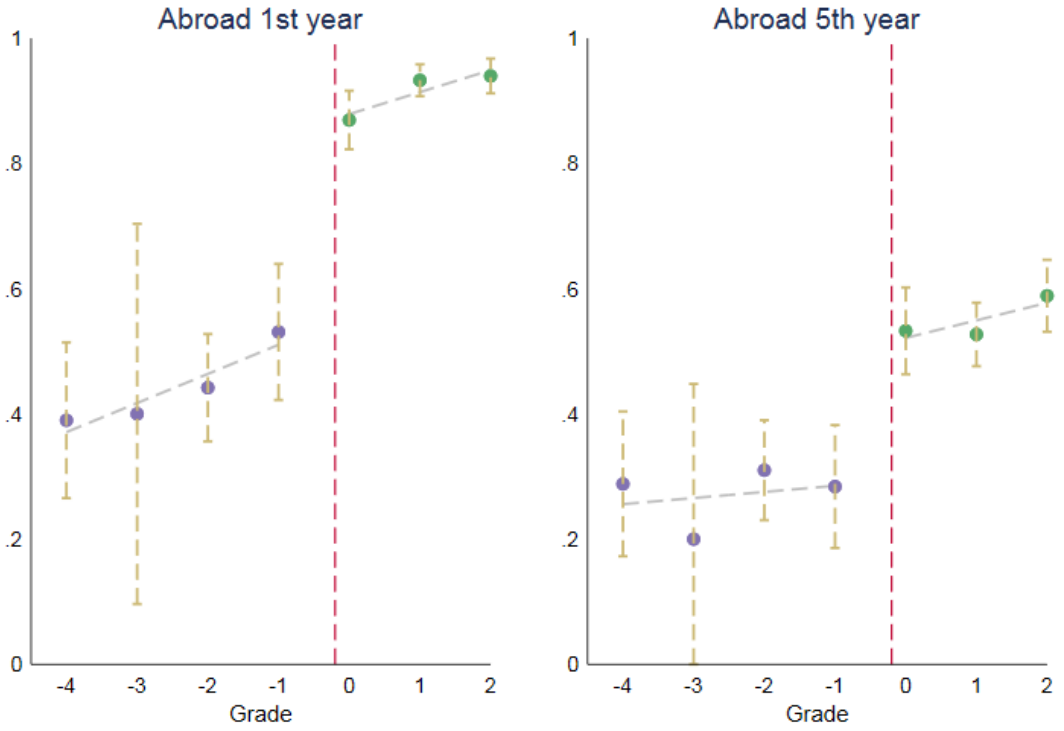
Notes: The graph reports the ratio of awarded applicants by *Grade* value assigned to proposals. The probability of obtaining the grant is 0 for values of a *Grade* lower than -1, it is about 10% for a value of -1, and it is equal to or higher than 78% for values equal to or higher than 0.

Figure 2: RDD graphs on career and covariates



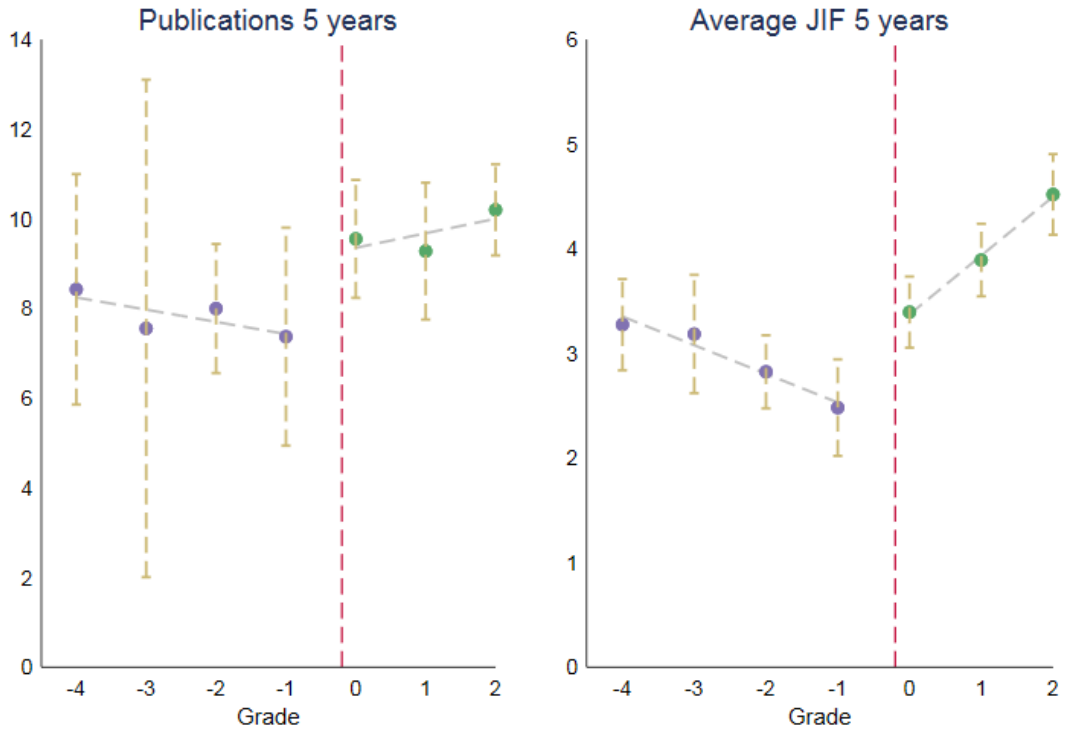
Notes: For each covariate as the dependent variable, the figure reports *Grade* fixed effect values from a regression with commission dummies as controls, to control for differences across commissions. We normalize the fixed effects to equal, on average, the sample average of the variable. Ninety-five percent confidence intervals are plotted. The vertical red dashed line highlights the point of discontinuity in the probability of obtaining the grant (*Grade* = 0).

Figure 3: RDD graphs on mobility



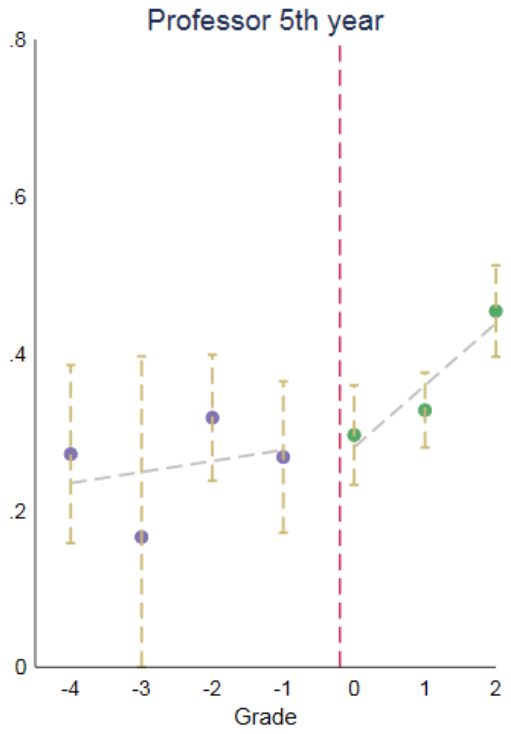
Notes: For each value of *Grade*, the figures report the average of *Abroad 1st year* and *Abroad 5th year*, respectively. Ninety-five percent confidence intervals are plotted. The vertical red dashed line highlights the point of discontinuity in the probability of obtaining the grant (*Grade* = 0).

Figure 4: RDD graphs on scientific productivity



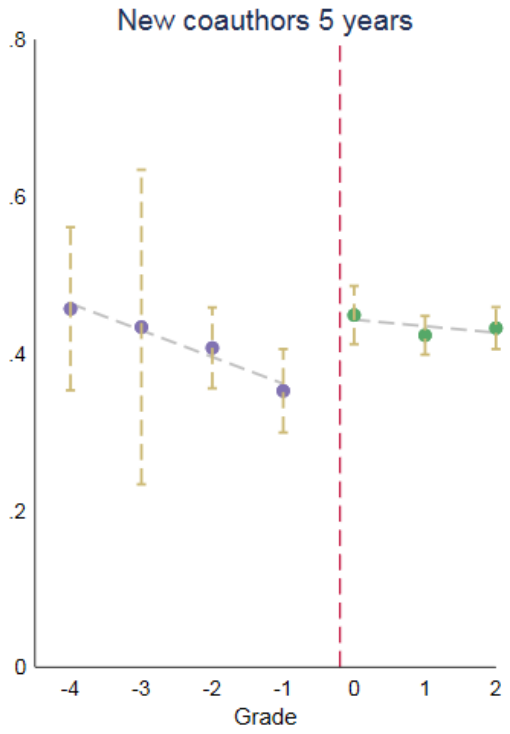
Notes: The figure reports *Grade* fixed effect values from regressions where *Publications 5 years*, left graph, and *Average JIF 5* years, right graph, are dependent variables, with commission dummies as controls, to control for differences across commissions. We normalize the fixed effects to equal, on average, the sample average of the variable. Ninety-five percent confidence intervals are plotted. The vertical red dashed line highlights the point of discontinuity in the probability of obtaining the grant (Grade = 0).

Figure 5: RDD graph on career



Notes: The figure reports *Grade* fixed effect values from a regression where *Professor 5 years* is the dependent variable and with commission dummies as controls, to control for differences across commissions. We normalize the fixed effects to equal, on average, the sample average of the variable. Ninety-five percent confidence intervals are plotted. The vertical red dashed line highlights the point of discontinuity in the probability of obtaining the grant (*Grade* = 0).

Figure 6: RDD graph on networks



Notes: The figure reports *Grade* fixed effect values from a regression where *New coauthors 5 years* is the dependent variable, with commission dummies as controls, to control for differences across commissions. We normalize the fixed effects to equal, on average, the sample average of the variable. Ninety-five percent confidence intervals are plotted. The vertical red dashed line highlights the point of discontinuity in the probability of obtaining the grant (*Grade* = 0).

Table 1: Variables description

Variable	Description
Grant awarded	Equal 1 if the applicant has obtained the mobility grant
Grade (normalized)	The grade that the applicant has received on a scale from -4 to 3 (acceptance threshold equal 0)
Abroad 1st year	Equal 1 if the applicant is abroad on the starting year
Abroad 5th year	Equal 1 if the applicant is abroad on the fifth year
Publications 5 years	Number of publications from the first year to the fifth year
Average JIF 5 years	Average journal impact factor (JIF) of papers published from the first year to the fifth year
Prof 5th year	Equal 1 if the applicant has a professor position on the fifth year
New coauthors 5 years	Share of new coauthors from the first to the fifth year
New coauthors JIF 5 years	Average quality of new coauthors acquired from the first to the fifth year
Self-references 5 years	Share of references to own publications overall unique references in papers from the first to the fifth year
Avg. JIF no host 5 years	Average JIF 5 years - excluding publications where the host city appears among the affiliation locations
Foreign	Equal 1 if the applicant is foreign
Female	Equal 1 if the applicant is female
Age	Age of the applicant at the moment of the application
Publications	Total number of publications at the moment of the application
Citations	Average number of citations to publications at the moment of application. Citations counted in a 3-year window.
Average JIF	Average journal impact factor (JIF) of papers published at the moment of application
Coauthors	Total number of coauthors at the moment of the application
Early mobility grants	Number of early mobility grants obtained before the application
Rank Ph.D. university	Ranking of the university where the applicant obtained her/his PhD
Rank host university	Ranking of the (proposed) host university
Rank host res. institute	Ranking of the (proposed) host research institute
Proposed duration	Duration proposed of the period abroad in months
Amount request	Amount request in Swiss francs
Dest. US	Equal 1 if the applicant indicated the US as a destination country
Dest. UK	Equal 1 if the applicant indicated the UK as a destination country
Dest. Germany	Equal 1 if the applicant indicated Germany as a destination country
Dest. France	Equal 1 if the applicant indicated France as a destination country
Dest. other	Equal 1 if the applicant indicated another country as a destination country

Table 2: Variables descriptive statistics

	All applicants			Awarded applicants			Non-awarded applicants		
Variable	Obs.	Mean	S.d.	Obs.	Mean	S.d.	Obs.	Mean	S.d.
Grant awarded	1,132	0.70	0.46						
Grade (normalized)	1,132	0.29	1.64	789	1.13	0.76	343	-1.63	1.50
Abroad 1st year	1,132	0.81	0.40	789	0.96	0.20	343	0.46	0.50
Abroad 5th year	1,132	0.49	0.50	789	0.58	0.49	343	0.27	0.45
Publications 5 years	1,132	9.21	15.18	789	9.13	15.51	343	9.40	14.39
Average JIF 5 years	1,132	3.70	4.52	789	4.12	4.85	343	2.73	3.47
Prof 5th year	1,132	0.34	0.48	789	0.38	0.48	343	0.27	0.44
New coauthors 5 years*	900	0.42	0.28	640	0.43	0.28	260	0.40	0.30
Coauthors JIF 5 years	1,132	2.17	2.55	789	2.42	2.72	343	1.61	1.98
Self-references 5 years	1,132	0.03	0.06	789	0.03	0.07	343	0.02	0.04
Avg. JIF 5 years - no host	1,132	2.09	3.23	789	2.35	3.52	343	1.47	2.35
Foreign	1,132	0.26	0.44	789	0.25	0.43	343	0.30	0.46
Female	1,132	0.34	0.47	789	0.32	0.47	343	0.37	0.48
Age	1,132	33.92	3.37	789	33.47	2.81	343	34.97	4.22
Publications	1,132	7.44	12.71	789	7.73	14.06	343	6.78	8.84
Citations	1,132	32.33	51.84	789	35.66	50.94	343	24.68	53.13
Average JIF	1,132	2.93	3.99	789	3.26	4.21	343	2.17	3.30
Coauthors	1,132	26.92	138.00	789	26.09	117.43	343	28.84	176.62
Early mobility grants	1,132	0.38	0.50	789	0.38	0.49	343	0.39	0.51
Rank PhD university	1,132	23.62	15.78	789	23.55	15.99	343	23.78	15.32
Rank host university	1,132	20.77	17.89	789	19.99	18.01	343	22.55	17.53
Rank host res. institute	1,132	67.61	11.14	789	67.77	10.85	343	67.23	11.78
Proposed duration	1,132	24.56	8.84	789	25.37	8.56	343	0.34	0.48
Amount request	1,132	116.97	49.92	789	120.57	46.58	343	0.10	0.30
Dest. US	1,132	0.07	0.26	789	0.39	0.49	343	0.09	0.29
Dest. UK	1,132	0.07	0.25	789	0.10	0.30	343	0.10	0.30
Dest. Germany	1,132	0.38	0.49	789	0.07	0.25	343	0.36	0.48
Dest. France	1,132	0.07	0.25	789	0.06	0.23	343	22.69	9.20
Dest. Other	1,132	0.38	0.49	789	0.39	0.49	343	108.70	56.08

* The number of observations for *New coauthors 5 years* is 900 because the variable is not defined for applicants without any publication at the moment of the application.

Table 3: Regression results on mobility

	Abroad 1st year					Abroad 5th year				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	OLS	RDD	RDD with controls	OLS at cutoff	Fuzzy RDD with controls	OLS	RDD	RDD with controls	OLS at cutoff	Fuzzy RDD with controls
Grant awarded					0.472***					0.244*
					(0.105)					(0.128)
I(Grade > threshold)	0.456***	0.310***	0.324***	0.303***		0.229***	0.162**	0.167*	0.221**	
	(0.031)	(0.077)	(0.073)	(0.090)		(0.036)	(0.080)	(0.087)	(0.089)	
Grade		0.052*	0.047*		0.025		0.022	0.017		0.005
		(0.029)	(0.028)		(0.031)		(0.026)	(0.029)		(0.034)
Grade*I(Grade > threshold)		-0.020	-0.037		-0.063***		-0.003	-0.008		-0.022
		(0.033)	(0.032)		(0.022)		(0.034)	(0.036)		(0.031)
Foreign			0.042*	-0.004	0.046**			0.167***	0.123	0.169***
			(0.023)	(0.053)	(0.022)			(0.035)	(0.083)	(0.035)
Female			-0.021	-0.009	-0.019			-0.008	-0.110*	-0.007
			(0.022)	(0.051)	(0.021)			(0.029)	(0.056)	(0.028)
Age			-0.012***	-0.010	-0.011***			-0.012**	-0.032***	-0.011**
			(0.004)	(0.006)	(0.004)			(0.005)	(0.010)	(0.005)
Publications			0.002**	0.005	0.001			0.001*	0.001	0.001*
			(0.001)	(0.005)	(0.001)			(0.001)	(0.005)	(0.001)
Citations			-0.000*	-0.004	-0.000**			-0.000	0.003	-0.000
			(0.000)	(0.003)	(0.000)			(0.000)	(0.003)	(0.000)
Average JIF			0.012***	0.023***	0.011***			-0.006	-0.005	-0.007
			(0.002)	(0.006)	(0.003)			(0.005)	(0.011)	(0.005)
Coauthors			0.000*	0.001	0.000*			-0.000	-0.000	-0.000
			(0.000)	(0.000)	(0.000)			(0.000)	(0.001)	(0.000)
Early mobility grants			0.030	0.037	0.031			0.065*	0.043	0.065**
			(0.022)	(0.056)	(0.021)			(0.032)	(0.087)	(0.033)
Rank PhD university			-0.002**	-0.004*	-0.002***			-0.002	-0.004**	-0.002*
			(0.001)	(0.002)	(0.001)			(0.001)	(0.002)	(0.001)
Rank host university			0.001	0.001	0.001			0.000	0.002	0.000
			(0.001)	(0.002)	(0.001)			(0.001)	(0.002)	(0.001)
Rank host res. institute			0.000	-0.000	-0.000			-0.003**	-0.002	-0.004***
			(0.001)	(0.001)	(0.001)			(0.001)	(0.003)	(0.001)
Proposed duration			0.004**	0.007	0.004*			0.012***	0.012*	0.011***
			(0.002)	(0.006)	(0.002)			(0.003)	(0.006)	(0.003)
Amount request			-0.000	0.000	0.000			-0.001**	-0.001	-0.001**
			(0.000)	(0.001)	(0.000)			(0.000)	(0.001)	(0.000)
Destination dummies	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Commission dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohorts FE	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Obs.	1132	1132	1132	280	1132	1132	1132	1132	280	1132
N.Cohorts	67	67	67	61	67	67	67	67	61	67
F-test	62.99	44.09	26.01	3.271	35.81	30.46	22.04	9.720	4.817	9.950

Notes: The table reports regression results for *Abroad 1st year*, from column 1 to column 5, and *Abroad 5th year*, from column 6 to column 10. All models include commission dummies. Columns 1 and 6 report results for the OLS regression. Columns 2 and 7 report results for the RDD model without controls. Columns 3 and 8 report results for the RDD model with the addition of all controls, including cohorts FE. Columns 4 and 9 report results for an OLS regression with sample restricted to observations with *Grade* values around the cutoff. Columns 5 and 10 report results for the second stage of the fuzzy RDD model with controls. Cluster-robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4: Regression results on scientific productivity

	Publications 5 years					Average JIF 5 years				
	(1) OLS	(2) RDD	(3) RDD with controls	(4) OLS at cutoff	(5) Fuzzy RDD with controls	(6) OLS	(7) RDD	(8) RDD with controls	(9) OLS at cutoff	(10) Fuzzy RDD with controls
Grant awarded					3.838					1.368**
					(2.731)					(0.573)
I(Grade > threshold)	1.694	0.791	2.629	1.144		1.311***	0.952**	0.937**	0.661*	
	(1.078)	(1.929)	(1.873)	(1.708)		(0.231)	(0.419)	(0.386)	(0.365)	
Grade		0.272	-0.507		-0.687		-0.163	-0.213*		-0.278**
		(0.711)	(0.633)		(0.737)		(0.124)	(0.122)		(0.140)
Grade*I(Grade > threshold)		0.031	0.295		0.084		0.839***	0.313		0.238
		(0.868)	(0.747)		(0.650)		(0.221)	(0.195)		(0.205)
Foreign			-0.507	-0.750	-0.687			0.069	-0.174	0.079
			(0.633)	(1.547)	(0.737)			(0.212)	(0.282)	(0.207)
Female			0.295	-2.805***	0.084			0.014	-0.252	0.020
			(0.747)	(0.967)	(0.650)			(0.213)	(0.340)	(0.214)
Age			-0.716	-0.259	-0.688			-0.060	-0.038	-0.055
			(0.675)	(0.181)	(0.662)			(0.036)	(0.039)	(0.037)
Publications			-2.260***	0.779***	-2.246***			-0.007	0.044**	-0.008
			(0.665)	(0.134)	(0.658)			(0.007)	(0.019)	(0.007)
Citations			-0.170*	-0.003	-0.155*			0.016***	0.051***	0.016***
			(0.095)	(0.064)	(0.094)			(0.004)	(0.011)	(0.004)
Average JIF			0.405***	0.079	0.402***			0.410***	0.338***	0.407***
			(0.133)	(0.216)	(0.132)			(0.055)	(0.077)	(0.054)
Coauthors			0.005	0.004	0.005			0.000	-0.002	0.000
			(0.012)	(0.018)	(0.012)			(0.000)	(0.002)	(0.000)
Early mobility grants			-0.085	1.588	-0.095			0.149	0.731**	0.151
			(0.124)	(1.369)	(0.124)			(0.228)	(0.333)	(0.229)
Rank PhD university			0.037	-0.101*	0.037			-0.016**	-0.016	-0.018***
			(0.029)	(0.052)	(0.029)			(0.006)	(0.011)	(0.006)
Rank host university			-0.772	0.002	-0.766			-0.008*	-0.017*	-0.009*
			(0.707)	(0.043)	(0.719)			(0.005)	(0.009)	(0.005)
Rank host res. institute			-0.070***	-0.019	-0.075***			-0.017	-0.022	-0.018
			(0.025)	(0.031)	(0.026)			(0.016)	(0.017)	(0.015)
Proposed duration			0.035	-0.140	0.034			0.001	0.094*	-0.001
			(0.026)	(0.109)	(0.026)			(0.015)	(0.050)	(0.015)
Amount request			0.048*	0.012	0.046*			0.004	-0.015	0.004
			(0.025)	(0.022)	(0.024)			(0.003)	(0.009)	(0.003)
Destination dummies	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Commission dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohorts FE	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Obs.	1132	1132	1132	280	1132	1132	1132	1132	280	1132
N.Cohorts	67	67	67	61	67	67	67	67	61	67
F-test	31.80	26.27	8.233	8.798	8.002	130	87.89	16.86	9.845	17.55

Notes: The table reports regression results for *Publication 5 years*, from column 1 to column 5, and *Average JIF 5 years*, from column 6 to column 10. All models include commission dummies. Columns 1 and 6 report results for the OLS regression. Columns 2 and 7 report results for the RDD model without controls. Columns 3 and 8 report results for the RDD model with the addition of all controls, including cohorts FE. Columns 4 and 9 report results for an OLS regression with sample restricted to observations with *Grade* values around the cutoff. Columns 5 and 10 report results for the second stage of the fuzzy RDD model with controls. Cluster-robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5: Regression results on professorship

	Prof 5th year				
	(1)	(2)	(3)	(4)	(5)
	OLS	RDD	RDD with controls	OLS at cutoff	Fuzzy RDD with controls
Grant awarded					-0.066
					(0.081)
I(Grade > threshold)	0.137***	0.050	0.016	0.016	
	(0.031)	(0.064)	(0.077)	(0.073)	
Grade		0.004	0.003		0.001
		(0.026)	(0.034)		(0.037)
Grade*I(Grade > threshold)		0.070**	0.063		0.062*
		(0.031)	(0.038)		(0.035)
Foreign			-0.008	0.054	-0.007
			(0.036)	(0.051)	(0.035)
Female			-0.082**	0.033	-0.082**
			(0.035)	(0.075)	(0.034)
Age			-0.005	0.013	-0.004
			(0.005)	(0.008)	(0.005)
Publications			0.001	0.003	0.001
			(0.002)	(0.005)	(0.002)
Citations			0.001**	0.006**	0.001**
			(0.000)	(0.003)	(0.000)
Average JIF			-0.002	0.011	-0.002
			(0.006)	(0.015)	(0.006)
Coauthors			0.000***	-0.000	0.000***
			(0.000)	(0.000)	(0.000)
Early mobility grants			-0.064**	0.025	-0.064**
			(0.031)	(0.061)	(0.030)
Rank PhD university			-0.001	-0.003	-0.001
			(0.001)	(0.002)	(0.001)
Rank host university			0.001	-0.000	0.001
			(0.001)	(0.002)	(0.001)
Rank host res. institute			0.003**	0.002	0.003**
			(0.001)	(0.002)	(0.001)
Proposed duration			-0.002	0.007	-0.002
			(0.004)	(0.007)	(0.003)
Amount request			0.000	0.000	0.000
			(0.001)	(0.001)	(0.001)
Destination dummies	No	No	Yes	Yes	Yes
Commission dummies	Yes	Yes	Yes	Yes	Yes
Cohorts FE	No	No	Yes	Yes	Yes
Obs.	1132	1132	1132	280	1132
N.Cohorts	67	67	67	61	67
F-test	15.31	13.42	7.695	2.775	7.642

Notes: The table reports regression results for *Prof 5th years*. All models include commission dummies. Columns 1 reports results for the OLS regression. Columns 2 reports results for the RDD model without controls. Columns 3 reports results for the RDD model with the addition of all controls, including cohorts FE. Columns 4 reports results for an OLS regression with sample restricted to observations with *Grade* values around the cutoff. Columns 5 reports results for the second stage of the fuzzy RDD model with controls. Cluster-robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 6: Regression results on network

	New coauthors 5 years				
	(1)	(2)	(3)	(4)	(5)
	OLS	RDD	RDD with controls	OLS at cutoff	Fuzzy RDD with controls
Grant awarded					0.207***
					(0.077)
I(Grade > threshold)	0.041	0.097*	0.135**	0.102**	
	(0.025)	(0.054)	(0.057)	(0.049)	
Grade		-0.033	-0.043*		-0.056**
		(0.022)	(0.023)		(0.024)
Grade*I(Grade > threshold)		0.043*	0.036		0.023
		(0.025)	(0.025)		(0.024)
Foreign				0.000	-0.032*
				(0.049)	(0.019)
Female				0.026	-0.044*
				(0.036)	(0.023)
Age				-0.016**	-0.008*
				(0.006)	(0.004)
Publications				-0.000	-0.002***
				(0.002)	(0.000)
Citations				0.001	-0.000
				(0.002)	(0.000)
Average JIF				-0.000	-0.001
				(0.006)	(0.002)
Coauthors				0.001**	-0.000
				(0.000)	(0.000)
Early mobility grants				0.026	-0.043**
				(0.037)	(0.020)
Rank PhD university				-0.001	-0.001
				(0.001)	(0.001)
Rank host university				-0.001	0.000
				(0.001)	(0.001)
Rank host res. institute				0.001	0.001
				(0.003)	(0.001)
Proposed duration				0.002	-0.001
				(0.005)	(0.002)
Amount request				0.000	-0.000
				(0.001)	(0.000)
Destination dummies	No	No	Yes	Yes	Yes
Commission dummies	Yes	Yes	Yes	Yes	Yes
Cohorts FE	No	No	Yes	Yes	Yes
Obs.	900	900	900	230	900
N.Cohorts	67	67	67	61	67
F-test	1.200	1.517	2.202	1.792	4.217

Notes: The table reports regression results for *New coauthors 5 years*. Columns 1 reports results for the OLS regression. Columns 2 reports results for the RDD model without controls. Columns 3 reports results for the RDD model with the addition of all controls, including cohorts FE. Columns 4 reports results for an OLS regression with sample restricted to observations with *Grade* values around the cutoff. Columns 5 reports results for the second stage of the fuzzy RDD model with controls. Cluster-robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 7: Digging into the mechanisms

	(1) New coauthors JIF 5 years	(2) Avg. JIF no host 5 years	(3) Avg. JIF no host 5th year	(4) Self references 5 years
Grant awarded	1.247***	0.728*	1.001**	-0.024**
	(0.334)	(0.376)	(0.480)	(0.011)
Obs.	1132	1132	1132	1132
N.Cohorts	67	67	67	67
F-test	13.24	5.807	4.381	5.415

Notes: The table reports the coefficients for the variable *Grant awarded* variable. The dependent variable is *New coauthors JIF 5 years* in column 1, *Avg. JIF no host 5 years* in column 2, *Avg. JIF no host 5th* year in column 3 and, *Self-references 5 years* in column 4. *Avg. JIF no host 5th* is a variant of the variable *Avg. JIF no host 5 years* where we consider the average JIF of publications published on the 5th year. All columns report results for the second stage of the fuzzy RDD model with controls. Cluster robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 8: Fuzzy RDD regression results for applicants with and without previous mobility grants

Sample	Stats.	(1) Abroad 1st year	(2) Abroad 5th year	(3) Publications 5 years	(4) Average JIF 5 years	(5) Prof 5th year	(6) New coauthors 5 years
Applicants not awarded early mobility grants	Grant awarded	0.605***	0.292**	3.042	1.255*	-0.157	0.351***
	Grant awarded (stnd.err.)	(0.128)	(0.126)	(3.532)	(0.645)	(0.160)	(0.094)
	Observations	708	708	708	708	708	542
	Cohorts FE	66	66	66	66	66	66
	F-test	32.18	9.246	6.615	16.32	4.412	5.686
Applicant awarded early mobility grant	Grant awarded	0.460**	0.116	3.934	1.235	0.290	0.016
	Grant awarded (stnd.err.)	(0.181)	(0.224)	(3.310)	(1.043)	(0.197)	(0.181)
	Observations	418	418	418	418	418	352
	Cohorts FE	59	59	59	59	59	58
	F-test	11.51	8.055	14.08	8.194	5.554	2.250

Notes: The table reports the coefficients for the variable *Grant awarded* variable, for each main dependent variable from column 1 to column 6. The analyses separately consider the sub-sample of applicants who did not receive other SNSF mobility grants in the past (first row) and the sub-sample of applicants who received other SNSF mobility grants in the past (second row). All columns report results for the second stage of the fuzzy RDD model with controls. Cluster robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 9: Randomization-based estimates at the acceptance threshold

	Abroad 1st year	Abroad 5th year	Publications 5 years	Average JIF 5 years	Prof 5th year	New coauthors 5 years
Diff. in means	0.338***	0.249***	-1.946	0.913**	0.097	0.082**
Finite sample p-value	0.001	0.000	0.277	0.017	0.182	0.014
Rosenbaum's C.I. 95%	(0.226, 0.452)	(0.122, 0.382)	(-5.470, 1.653)	(0.226, 1.637)	(-0.035, 0.208)	(0.019, 0.179)
N. observations	280	280	280	280	280	230

Notes: The table reports estimates from randomization based inference at the threshold of acceptance (Cattaneo et al 2015; Cattaneo et al., 2016). C.I. 95% under interference are Rosenbaum's confidence intervals under arbitrary interference between units (Cattaneo et al., 2016; Rosenbaum 2007). Dependent variable are demeaned to account for cohorts fixed effects. *** p<0.01, ** p<0.05, * p<0.1

Appendix

Appendix A -1.

Table A - 1: RDD regression results on covariates

	I(Grade > threshold)	
	Coeff.	S.e.
Foreign	-0.120	(0.0748)
Female	-0.0366	(0.0687)
Age	0.234	(0.606)
Publications	-0.121	(1.314)
Citations	-5.856	(6.288)
Average JIF	0.0841	(0.385)
Coauthors	-18.40	(15.67)
Early mobility grants	-0.173**	(0.0689)
Rank Ph.D. university	2.189	(2.300)
Rank host university	-3.757	(2.751)
Rank host res. institute	-0.0141	(2.000)
Proposed duration	2.037	(1.579)
Amount request	5.237	(6.898)
Dest. US	0.0296	(0.0635)
Dest. UK	-0.0606	(0.0562)
Dest. Germany	0.0478	(0.0446)
Dest. France	0.0524	(0.0428)
Dest. other	-0.0692	(0.0798)

Notes: The table reports coefficients means (Coeff.) and cluster-robust standard errors (S.e.) for the main variable of interest (dummy variable equal to 1 if *Grade* is higher than the cutoff) from a set of regressions where each control variable is regressed against the RDD model with cohort fixed effects and with clustered standard errors. The number of observations is 1132.

Appendix A -2.

Table A - 2: First-stage regression results in fuzzy RDD model

	First-stage regression	First-stage regression Applicants not awarded early mobility grants	First-stage regression Applicant awarded early mobility grant
I(Grade > threshold)	0.685***	0.718***	0.629***
	(0.057)	(0.069)	(0.084)
Grade	0.047***	0.044**	0.065*
	(0.017)	(0.019)	(0.034)
Grade*I(Grade > threshold)	0.055*	0.036	0.064
	(0.031)	(0.033)	(0.056)
Foreign	-0.007	-0.001	-0.010
	(0.016)	(0.019)	(0.028)
Female	-0.004	0.012	-0.030
	(0.020)	(0.025)	(0.024)
Age	-0.004	-0.005	-0.001
	(0.003)	(0.004)	(0.005)
Publications	0.001	0.002***	-0.002
	(0.000)	(0.000)	(0.002)
Citations	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)
Average JIF	0.003	0.000	0.002
	(0.002)	(0.003)	(0.003)
Coauthors	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)
Early mobility grants	-0.002		-0.007
	(0.021)		(0.101)
Rank PhD university	0.001***	0.002**	0.001
	(0.000)	(0.001)	(0.001)
Rank host university	0.000	-0.000	0.001
	(0.000)	(0.001)	(0.001)
Rank host res. institute	0.000	0.001	-0.000
	(0.001)	(0.001)	(0.001)
Proposed duration	0.002	-0.000	0.004
	(0.002)	(0.002)	(0.003)
Amount request	-0.000	0.000	-0.001
	(0.000)	(0.000)	(0.001)
Destination dummies	Yes	Yes	Yes
Cohorts FE	Yes	Yes	Yes
Obs.	950	616	328
N.Cohorts	1132	708	418
F-test	67	66	59
F-test instr.	366.1	672.1	227

Notes: The table reports results for the first-stage regression of the two-stage fuzzy RDD models. The dependent variable is *Grant awarded*. The table also reports the F-test on the excluded instrument, *I(Grade>threshold)*. Cluster-robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix A.3: Year by year regressions.

We extend our analyses by providing results for the main outcome variables for every single year separately. Results for the number of publications and the professorship remain not significant and are not reported. We perform the analyses up to the 5th year for the entire sample, and extend it to the 6th and 7th year for the subsample of the cohorts 2003-2010 and 2003-2009, respectively. Due to truncation, the outcome variables for the latest cohorts were not observable in the 6th year (2017 for mobility and professorship and 2018 for publications data) and 7th year (2018 for mobility and professorship and 2019 for publications data) at the moment of the data collection. The findings allow us to highlight some additional interesting considerations. Results are reported in Table A-3.

The probability of an applicant of being abroad gradually decreasing from the first to the fifth year. Interestingly, the effect remains substantially high and significant, equal to a 29 pp. higher probability of being abroad, up to the fourth year (beyond the maximum duration and considerably beyond the average duration of the grant). The effect continues to decrease and becomes gradually insignificant after the 5th year. Looking at the effect on the average JIF, our findings show a positive coefficient in each year following the first. The magnitude of the coefficient reaches the highest value and significance in the 5th year. This result suggests that the investment in a mobility experience may pay off in the medium-long term. However, publication delays of research results, in particular across different scientific disciplines, may also explain this result.

Finally, we find that the effect on collaboration with new coauthors is positive and significant in the 1st and 4th year. Notably, in Table A - 3, each variable is constructed to capture the number of new coauthors in the focal year, relative to all coauthors appearing in any publication up to the year before. For instance, the variable *Coauthors* for the 4th year counts the number of new coauthors in the 4th year, relative to all coauthors up to the third year. This finding means that the expansion of the network to new coauthors is sustained up to the 4th year. The fact that the coefficient in the 6th year is negative may suggest that after

a faster expansion of the network follows a period were the acquisition of new coauthors becomes less likely as compared to authors who expand their network more slowly in the previous years.

Table A - 3: Fuzzy RDD regression results year by year

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dep. Variable	Stats.	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year
Abroad	Grant awarded	0.472***	0.334***	0.254**	0.290**	0.244*	0.156	0.068
	Grant awarded stnd.err.	(0.105)	(0.104)	(0.110)	(0.124)	(0.128)	(0.127)	(0.144)
	Obs. (N. Cohorts)	1132 (67)	1132 (67)	1132 (67)	1132 (67)	1132 (67)	950 (59)	791 (51)
	F-test	35.81	25.49	15.74	9.984	9.950	9.649	15.70
Average JIF	Grant awarded	1.129	1.042*	0.750	1.034	1.412**	0.591	0.662
	Grant awarded stnd.err.	(0.700)	(0.577)	(0.512)	(0.702)	(0.653)	(0.579)	(0.662)
	Obs. (N. Cohorts)	1132 (67)	1132 (67)	1132 (67)	1132 (67)	1132 (67)	950 (59)	791 (51)
	F-test	6.719	10.70	9.625	4.516	4.743	3.779	2.313
Coauthors	Grant awarded	0.123**	-0.028	0.099	0.092*	0.037	-0.097**	0.002
	Grant awarded stnd.err.	(0.058)	(0.054)	(0.061)	(0.049)	(0.040)	(0.049)	(0.053)
	Obs. (N. Cohorts)	900 (67)	900 (67)	900 (67)	900 (67)	900 (67)	739 (59)	650 (51)
	F-test	2.330	3.248	3.802	1.790	2.643	1.770	1.509

Notes: The table reports results from a set of fuzzy RDD regression analyses with cohort fixed effects, where all controls variables are included. Each model reports the same dependent variables of our main analyses calculated on a yearly base from the 1st to the 7th year after the starting date of the grant. Depended variables for which we do not find significance results in the main specification are omitted; for these variables, results are also not significant when considered year by year, for all years. The coefficient of the main variable of interest, *Grant awarded*, and the F-test of each model are reported. The number of observations in column 6 and 7 is lower due to truncation in the latest cohorts of our sample. Cluster-robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix A.4: The heterogeneity of the institute quality.

We further explore the heterogeneity of the main results concerning the ranking position of the university where applicants obtained their Ph.D. and the host institution ranking. We use model specifications where we include interactions not only with Grant awarded and I(Grade>Threshold) but also with the assignment variable (Grade and Grade*I(Grade>Threshold), both in the first and second stage regressions (Hsu and Shen, 2017) (henceforth full interaction models). Interacted variables are centered at the median. We report results using the rank of the institution of the Ph.D. (Table A – 4) and the rank of the host institution (Table

A – 5) as interacting variables separately. We verified that results are the same using a combined variable measuring the difference in rank between the two institutions.

The only positive interaction relates to the probability of obtaining a professorship, implying that the likelihood of obtaining a professorship is higher for applicants having as destination a lower-ranked institution. The overall effect is significant only for the rather extreme values of the interaction variable. Based on evidence from CVs', the most likely explanation seems to be that non-recipients, which had lower-ranked institutions as a destination, have higher chances of finding a professorship position in the same institutions. While partly surprising, we posit that this result is in line with the mechanisms we have explored and found evidence for in the paper. Moreover, we note that all applicants, at the cutoff margin, are matched with institutions of similar and high quality in their field of research, yielding limited variance in the research quality of the institutions. The decision of the host institution results from the applicants' choices and that, in principle, all awarded applicants apply and are selected to spend a period in a host institution that is optimal for their research.

Appendix A-4.

Table A - 4: Heterogeneity of ranking position of the university where the applicant obtained her PhD

	(1)	(2)	(3)	(4)	(5)	(6)
	Abroad 1st year	Abroad 5th year	Publications 5 years	Average JIF 5 years	Prof 5th year	New coauthors 5 years
Grant awarded	0.497***	0.252*	3.992	1.419**	-0.035	0.215***
	(0.106)	(0.131)	(2.830)	(0.574)	(0.106)	(0.077)
Grant awarded	0.091	0.110	-0.877	-0.434	0.038	0.008
*Rank PhD university	(0.102)	(0.114)	(2.782)	(0.496)	(0.106)	(0.094)
All controls	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1132	1132	1132	1132	1132	900
N.Cohorts	67	67	67	67	67	67
F-test	52	15.45	6.896	19	8.919	4.503

Notes: The table reports the coefficients for the variable *Grant awarded* and for the interaction effect with *Rank Ph.D. university*, for each main dependent variable from column 1 to column 6. All columns report results for the second stage of the fuzzy RDD model with controls. The specification includes: the interaction with the main variable, *Grant awarded*, in the second stage, and as additional dependent variables of the first stage; the interaction of the interaction variable with *Grade* and *Grade*I(Grade > threshold)* both in the first and in the second stage regressions, and the interaction with the variable *I(Grade > threshold)* as additional excluded instrument in the first stage. Cluster-robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix A-5.

Table A - 5: Exploring the impact of the ranking position of the host institute

	(1)	(2)	(3)	(4)	(5)	(6)
	Abroad 1st year	Abroad 5th year	Publications 5 years	Average JIF 5 years	Prof 5th year	New coauthors 5 years
Grant awarded	0.404***	0.197	4.416	1.263*	-0.198	0.184*
	(0.133)	(0.173)	(3.713)	(0.703)	(0.154)	(0.111)
Grant awarded	0.056	0.045	-0.872	-0.444	0.343***	0.014
*Rank host	(0.098)	(0.116)	(2.364)	(0.526)	(0.116)	(0.081)
All Controls	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1132	1132	1132	1132	1132	900
N.Cohorts	67	67	67	67	67	67
F-test	29.93	8.318	7.144	15.11	8.112	3.374

Notes: The table reports the coefficients for the variable *Grant awarded* and for the interaction effect of *Rank host*, for each main dependent variable from column 1 to column 6. *Rank host* is obtained by combining the variables *Rank host university* and *Rank host res. Institute*. The specification includes: the interaction with the main variable, *Grant awarded*, in the second stage, and as additional dependent variables of the first stage; the interaction of the interaction variable with *Grade* and *Grade*I(Grade > threshold)* both in the first and in the second stage regressions, and the interaction with the variable *I(Grade > threshold)* as additional excluded instrument in the first stage. All columns report results for the second stage of the fuzzy RDD model with controls. Cluster-robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Bibliography

Ackers, L. 2005. Moving People and Knowledge: Scientific Mobility in the European Union. *International Migration*, 43(5): 99–131.

Adams, W., and Douglas, P. H. 1968. *The brain drain*. Macmillan New York.

Angrist, J. D., and Lavy, V. 1999. Using Maimodines' Rule to Estimate the Effect of Class Size on Scholastic Achievement. *The Quarterly Journal of Economics*, 114(2): 533–575.

Arora, A., and Gambardella, A. 2005. The impact of NSF support on basic research in economics. *Annales d'Economie et de Statistique*, 79/80(Contributions in memory of Zvi Griliches): 91–117.

Auriol, L. 2010. Careers of doctorate holders: employment and mobility patterns. *OECD Science, Technology and Industry Working Papers*.

Ayoubi, C., Pezzoni, M., and Visentin, F. 2017. At the origins of learning: Absorbing knowledge flows from within the team. *Journal of Economic Behavior and Organization*, 134: 374–387.

Azoulay, P., Graff Zivin, J. S., and Manso, G. 2011. Incentives and creativity: evidence from the academic life sciences. *RAND Journal of Economics*, 42(3): 527–554.

Baruffaldi, S. H., and Landoni, P. 2012. Return mobility and scientific productivity of researchers working abroad: The role of home country linkages. *Research Policy*, 41(9): 1655–1665.

Black, S. E. 1999. Do Better Schools Matter? Parental Valuation of Elementary Education. *Quarterly Journal of Economics*, 114(2): 577–599.

Cattaneo, M. D., Arbor, A., Titiunik, R., and Vazquez-Bare, G. 2016. Inference in regression discontinuity designs under local randomization. *The Stata Journal*. http://www-personal.umich.edu/, March 29, 2020.

Cattaneo, M. D., Frandsen, B. R., and Titiunik, R. 2015. Randomization Inference in the Regression Discontinuity Design: An Application to Party Advantages in the U.S. Senate. *Journal of Causal Inference*, 3(1): 1–24.

Fernández-Zubieta, A., Geuna, A., and Lawson, C. 2016. Productivity pay-offs from academic mobility: Should i stay or should i go? *Industrial and Corporate Change*, 25(1): 91–114.

Franzoni, C., Scellato, G., and Stephan, P. E. 2012. Foreign-born scientists: mobility patterns for 16 countries. *Nature Biotechnology*, 30(12): 1250–1253.

Franzoni, C., Scellato, G., and Stephan, P. E. 2014. The mover's advantage: The superior performance of migrant scientists. *Economics Letters*, 122(1): 89–93.

Gaulé, P. 2014. Who comes back and when? Return migration decisions of academic scientists.

Economics Letters, 124(3): 461–464.

Gaulé, P., and Piacentini, M. 2013. Immigration and innovation: Chinese graduate students in US universities. *Review of Economics and Statistics*, 95(2): 698–701.

Gerritsen, S., Plug, E., and Van der Wiel, K. 2013. *Up or out? How individual research grants affect academic careers in the Netherlands*. CPB Netherlands Bureau for Economic Policy Analysis.

Hoisl, K. 2007. Tracing mobile inventors-The causality between inventor mobility and inventor productivity. *Research Policy*, 36(5): 619–636.

Howell, S. T. 2017. Financing Innovation: Evidence from R&D Grants. *American Economic Review*, 107(4): 1136–1164.

Hunter, R. S., Oswald, A. J., and Charlton, B. G. 2009. The Elite Brain Drain*. *The Economic Journal*, 119(538): F231--F251.

Jacob, B. A., and Lefgren, L. 2011. The Impact of Research Grant Funding on Scientific Productivity. *Journal of public economics*, 95(9–10): 1168–1177.

Jaffe, A. B. 2002. Building Programme Evaluation into the Design of Public Research-Support Programmes. *Oxford Review of Economic Policy*, 18(1): 22–34.

Kahn, S., and MacGarvie, M. 2012. The Effects of the Foreign Fulbright Program on Knowledge Creation in Science and Engineering. *The Rate and Direction of Inventive Activity Revisited*: 161–197. University of Chicago Press.

Lalive, R., and Parrotta, P. 2017. How does pension eligibility affect labor supply in couples? *Labour Economics*, 46: 177–188.

Lanser, D., and van Dalen, R. 2013. *The effects of research grants on scientific productivity and utilisation*. CPB Netherlands Bureau for Economic Policy Analysis.

Meyer, J.-B. 2003. Policy implications of the brain drain's changing face. *Policy Brief, Science and Development Network*.

Myers, K. 2018. *The Elasticity of Science*. No. 3176991. *SSRN*.

OECD. 2018. *Education at a Glance 2018*.

OECD. 2019. *Education at a Glance 2019*.

Oosterbeek, H., and Webbink, D. 2011. Does Studying Abroad Induce a Brain Drain? *Economica*, 78(310): 347–366.

Oyer, P. 2006. Initial Labor Market Conditions and Long-Term Outcomes for Economists. *Journal of Economic Perspectives*, 20(3): 143–160.

Parey, M., and Waldinger, F. 2011. Studying Abroad and the Effect on International Labour Market Mobility: Evidence from the Introduction of ERASMUS. *Economic Journal*, 121(551): 194–222.

Pierson, A. S., and Cotgreave, P. 2000. Citation figures suggest that the UK brain drain is a genuine problem. *Nature*, 407(6800): 13.

Ponzo, M., and Scoppa, V. 2010. The use of informal networks in Italy: Efficiency or favoritism? *The Journal of Socio-Economics*, 39(1): 89–99.

Rosenbaum, P. R. 2007. Interference between units in randomized experiments. *Journal of the American Statistical Association*, 102(477), 191-200.

Saxenian, A. 2005. From Brain Drain to Brain Circulation: Transnational Communities and Regional Upgrading in India and China. *Studies in Comparative International Development (SCID)*, 40(2): 35–61.

Saxenian, A. 2007. *The New Argonauts: Regional Advantage in a Global Economy*. Harvard University Press.

Scellato, G., Franzoni, C., and Stephan, P. E. 2015. Migrant scientists and international networks. *Research Policy*, 44(1): 108–120.

Stephan, P. E. 2012. *How economics shapes science*. Harvard University Press.

Stephan, P. E., and Levin, S. G. 2001. Exceptional contributions to US science by the foreign-born and foreign-educated. *Population Research and Policy Review*, 20(1): 59–79.

Van Noorden, R. 2012. Global mobility: Science on the move. *Nature*, 490(7420): 326–329.

Zhao, B., and Ziedonis, R. H. 2012. *State Governments as Financiers of Technology Startups: Implications for Firm Performance*. *SSRN*. SSRN.

Money to move:
The effect on researchers of
an international mobility grant

External Appendix

Table 1: Main results dropping 'fuzzy observations'.

	(1)	(2)	(3)	(4)	(5)	(6)
	Abroad 1st year	Abroad 5th year	Publications 5 years	Average JIF 5 years	Prof 5th year	New coauthors 5 years
I(Grade > threshold)	0.485***	0.232**	2.012	0.822**	-0.009	0.158***
	(0.078)	(0.097)	(2.000)	(0.380)	(0.076)	(0.057)
Grade	0.013	0.010	-0.517	-0.216*	-0.003	-0.058**
	(0.028)	(0.031)	(0.680)	(0.119)	(0.034)	(0.023)
Grade*I(Grade > threshold)	-0.042	-0.027	0.830	0.429**	0.078*	0.053**
	(0.028)	(0.037)	(0.783)	(0.196)	(0.040)	(0.025)
Foreign	0.046*	0.162***	-1.188*	0.044	-0.000	-0.039**
	(0.025)	(0.037)	(0.629)	(0.233)	(0.035)	(0.019)
Female	-0.001	-0.013	-1.922**	0.126	-0.074**	-0.033
	(0.021)	(0.031)	(0.730)	(0.193)	(0.032)	(0.023)
Age	-0.015***	-0.012**	-0.125	-0.057	-0.005	-0.010**
	(0.004)	(0.005)	(0.101)	(0.037)	(0.005)	(0.004)
Publications	0.001	0.001	0.402***	-0.003	0.001	-0.002***
	(0.001)	(0.001)	(0.133)	(0.006)	(0.001)	(0.000)
Citations	-0.003**	-0.002	0.048	0.062***	0.004*	-0.001
	(0.001)	(0.002)	(0.067)	(0.018)	(0.002)	(0.001)
Average JIF	0.010***	-0.005	-0.059	0.448***	-0.003	0.001
	(0.003)	(0.005)	(0.130)	(0.056)	(0.007)	(0.002)
Coauthors	0.000*	-0.000	0.037	0.000	0.000***	-0.000*
	(0.000)	(0.000)	(0.029)	(0.000)	(0.000)	(0.000)
Early mobility grants	0.029	0.046	-0.567	0.248	-0.047	-0.039*
	(0.021)	(0.034)	(0.684)	(0.231)	(0.032)	(0.023)
Rank PhD university	-0.002***	-0.003**	-0.070**	-0.017**	-0.000	-0.000
	(0.001)	(0.001)	(0.028)	(0.006)	(0.001)	(0.001)
Rank host university	0.001	-0.000	0.044	-0.006	0.001	0.000
	(0.001)	(0.001)	(0.027)	(0.005)	(0.001)	(0.001)
Rank host res. institute	0.000	-0.003**	0.052**	-0.018	0.003**	0.001
	(0.001)	(0.001)	(0.024)	(0.016)	(0.001)	(0.001)
Proposed duration	0.004	0.011***	-0.211***	-0.017	-0.004	-0.001
	(0.002)	(0.003)	(0.079)	(0.018)	(0.003)	(0.002)
Amount request	-0.000	-0.001*	0.024	0.008**	0.000	-0.000
	(0.000)	(0.001)	(0.019)	(0.004)	(0.001)	(0.000)
Destination dummies	Yes	Yes	Yes	Yes	Yes	Yes
Cohorts FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1046	1046	1046	1046	1046	820
N.Cohorts	67	67	67	67	67	67
F-test	46.09	10.35	10.21	15.96	7.906	4.054

Notes: The table reports results for the main dependent variables from column 1 to column 6. All columns report results for the RDD model with all controls and FE. The sample excludes 'fuzzy observations': applicants with Grade lower than the threshold who obtained the grant and applicants with Grade higher than the threshold who did not obtain or use the grant. Cluster robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 2: Regression results on a sample that excludes 'movers without grants'

	(1) Publications 5 years	(2) Average JIF 5 years	(3) Prof 5th year	(4) New coauthors 5 years
Grant awarded	3.703	1.278*	0.033	0.226**
	(3.454)	(0.652)	(0.114)	(0.103)
Grade	-0.966	-0.291	0.008	-0.043
	(1.149)	(0.179)	(0.046)	(0.040)
Grade*I(Grade > threshold)	0.743	0.417*	0.067	0.028
	(1.007)	(0.219)	(0.045)	(0.036)
Foreign	-0.629	0.123	-0.001	-0.035
	(0.733)	(0.239)	(0.037)	(0.022)
Female	-2.288***	0.080	-0.084**	-0.040*
	(0.738)	(0.203)	(0.034)	(0.023)
Age	-0.147	-0.049	-0.002	-0.006
	(0.105)	(0.041)	(0.005)	(0.004)
Publications	0.343***	-0.007	0.001	-0.002***
	(0.113)	(0.007)	(0.002)	(0.000)
Citations	0.021	0.068***	0.004**	-0.001
	(0.056)	(0.018)	(0.002)	(0.001)
Average JIF	-0.135	0.425***	-0.005	-0.002
	(0.149)	(0.062)	(0.006)	(0.002)
Coauthors	0.074***	0.000	0.000**	-0.000
	(0.016)	(0.000)	(0.000)	(0.000)
Early mobility grants	-0.632	0.203	-0.042	-0.042**
	(0.837)	(0.253)	(0.034)	(0.019)
Rank PhD university	-0.053**	-0.015**	-0.001	-0.000
	(0.022)	(0.007)	(0.001)	(0.001)
Rank host university	0.023	-0.006	0.001	0.000
	(0.023)	(0.005)	(0.001)	(0.001)
Rank host res. institute	0.033	-0.018	0.003**	0.000
	(0.026)	(0.016)	(0.001)	(0.001)
Proposed duration	-0.220***	-0.014	-0.004	-0.003
	(0.062)	(0.016)	(0.003)	(0.003)
Amount request	0.018	0.007*	0.000	0.000
	(0.012)	(0.003)	(0.001)	(0.000)
Destination dummies	Yes	Yes	Yes	Yes
Cohorts FE	Yes	Yes	Yes	Yes
Obs.	1014	1014	1014	797
N.Cohorts	67	67	67	67
F-test	10.24	14.49	5.804	4.559

Notes: The table reports results for the main dependent variables from column 1 to column 4. All columns report results for the fuzzy RDD model with all controls and FE. The sample excludes 'movers without grants': applicants who did not obtain the grant but that moved anyway abroad in the years between the start year of the grant and the 5th year. Cluster robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 3: Regression results on citations as a measure of scientific quality.

	(1) 5 years average	(2) 1st year	(3) 2nd year	(4) 3rd year	(5) 4th year	(6) 5th year	(7) 6th year	(8) 7th year
Grant awarded	3.024**	4.832*	-4.160	4.788*	0.795	5.135**	2.314	3.352
	(1.541)	(2.686)	(2.952)	(2.825)	(1.939)	(2.550)	(1.730)	(3.076)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohorts FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	791	1132	1132	1132	950	791	674	551
N.Cohorts	51	67	67	67	59	51	43	34
F-test	21.09	9.557	6.654	5.616	2.691	4.474	10.74	8.646

Notes: The table reports results where the dependent variables are based on forward citations received in a 3-year window by papers published after the start year of the grant. Column 1 shows results for the variable *5 years average* which is equal to the average number of citations across papers published in a period of 5 years after the grant's start year. Columns 2 to 8 present results for the average number of citations to papers published from the 1st to the 7th year, respectively. The number of observations differs due to truncation: at the moment of the data collection, publications and citations to the applicants in the latest cohorts and for years distant to the start year of the grant were not yet observable. All columns report results with controls for the second stage of the fuzzy RDD model. Cluster robust standard errors at the level of cohort are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 4: Difference in average journal impact factor of coauthors after and before the grant

	(1)	(2)
	New coauthors JIF 5 years difference with previous coauthors	New coauthors JIF 5 years difference with previous coauthors excluding zeros
Grant awarded	1.145***	1.484***
	(0.291)	(0.432)
Grade	-0.276***	-0.333**
	(0.075)	(0.145)
Grade*I(Grade > threshold)	0.123	0.157
	(0.113)	(0.197)
Foreign	0.093	0.144
	(0.133)	(0.207)
Female	-0.090	-0.285
	(0.114)	(0.197)
Age	-0.014	-0.033
	(0.017)	(0.032)
Publications	-0.001	-0.004
	(0.006)	(0.005)
Citations	0.001	0.002
	(0.010)	(0.010)
Average JIF	-0.082***	-0.100***
	(0.026)	(0.029)
Coauthors	0.000	-0.000
	(0.000)	(0.000)
Early mobility grants	-0.030	-0.085
	(0.112)	(0.174)
Rank PhD university	-0.003	-0.000
	(0.003)	(0.004)
Rank host university	-0.005*	-0.007*
	(0.003)	(0.004)
Rank host res. institute	-0.003	-0.004
	(0.007)	(0.010)
Proposed duration	-0.007	-0.006
	(0.010)	(0.018)
Amount request	0.001	0.000
	(0.002)	(0.003)
Destination dummies	Yes	Yes
Cohorts FE	Yes	Yes
Obs.	1132	731
N.Cohorts	67	67
F-test	4.988	5.126

Notes: The table reports results for a dependent variable equal to the difference in the average journal impact factor of coauthors in the 5 years after the grant and coauthors before the grant. The average journal impact factor of coauthors may be equal zero if the applicant has no coauthors or if the coauthors have no publications previously to the first collaboration. Column 1 reports results for the full sample. Column 2 report results where zero values are dropped. All columns report results for the fuzzy RDD model with all controls and FE. Cluster robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5: Regression results on the probability of staying in academia versus going to industry.

	Industry 5th year				
	(1)	(2)	(3)	(4)	(5)
	OLS	RDD	RDD with controls	OLS at cutoff	Fuzzy RDD with controls
Grant awarded					0.052
					(0.056)
I(Grade > threshold)	-0.003	0.057	0.035	-0.004	
	(0.018)	(0.037)	(0.039)	(0.033)	
Grade		-0.024*	-0.017		-0.019
		(0.014)	(0.014)		(0.016)
Grade*I(Grade > threshold)		0.016	0.009		0.007
		(0.019)	(0.019)		(0.017)
Foreign			-0.002	0.011	-0.001
			(0.017)	(0.033)	(0.016)
Female			0.025	-0.023	0.025
			(0.019)	(0.026)	(0.019)
Age			-0.003	0.004	-0.003
			(0.002)	(0.004)	(0.002)
Publications			-0.001*	-0.000	-0.001*
			(0.001)	(0.002)	(0.001)
Citations			0.001	-0.001	0.001
			(0.001)	(0.001)	(0.001)
Average JIF			-0.003	0.000	-0.004
			(0.003)	(0.004)	(0.003)
Coauthors			0.000	-0.000	0.000
			(0.000)	(0.000)	(0.000)
Early mobility grants			-0.002	0.011	-0.002
			(0.021)	(0.036)	(0.020)
Rank PhD university			-0.002***	-0.001	-0.002***
			(0.000)	(0.001)	(0.000)
Rank host university			0.001*	0.001	0.001*
			(0.000)	(0.001)	(0.000)
Rank host res. institute			-0.000	-0.000	-0.000
			(0.001)	(0.002)	(0.001)
Proposed duration			-0.001	-0.000	-0.001
			(0.002)	(0.003)	(0.002)
Amount request			-0.000	-0.001	-0.000
			(0.000)	(0.000)	(0.000)
Destination dummies	No	No	Yes	Yes	Yes
Commission dummies	Yes	Yes	Yes	Yes	Yes
Cohorts FE	No	No	Yes	Yes	Yes
Obs.	1132	1132	1132	280	1132
N.Cohorts	67	67	67	61	67
F-test	2.701	2.416	2.547	0.747	2.504

Notes: The table reports regression results for Industry 5th years: equal one if the applicant had a position in industry and not in academia in the 5th year after the start of the grant. All models include commission dummies. Columns 1 reports results for the OLS regression. Columns 2 reports results for the RDD model without controls. Columns 3 reports results for the RDD model with the addition of all controls, including cohorts FE. Columns 4 reports results for an OLS regression with sample restricted to observations with Grade values around the cutoff. Columns 5 reports results for the second stage of the fuzzy RDD model with controls. Cluster robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 6: Regression results clustering by field-year

	(1)	(2)	(3)	(4)	(6)	(5)
	Abroad 1st year	Abroad 5th year	Publications 5 years	Average JIF 5 years	Prof 5th year	New coauthors 5 years
Grant awarded	0.541***	0.354***	2.191	1.839***	0.011	0.180**
	(0.106)	(0.133)	(2.282)	(0.678)	(0.121)	(0.078)
Grade	0.007	-0.025	-0.515	-0.446***	0.012	-0.049**
	(0.032)	(0.038)	(0.664)	(0.161)	(0.039)	(0.025)
Grade*I(Grade > threshold)	-0.055**	-0.009	0.217	0.440*	0.045	0.028
	(0.028)	(0.034)	(0.685)	(0.232)	(0.039)	(0.022)
Foreign	0.043	0.174***	-1.114	0.133	-0.005	-0.019
	(0.026)	(0.040)	(0.770)	(0.184)	(0.034)	(0.025)
Female	-0.031	-0.008	-2.434***	0.103	-0.082**	-0.059**
	(0.022)	(0.029)	(0.656)	(0.207)	(0.037)	(0.026)
Age	-0.008**	-0.010**	-0.105	-0.052	-0.001	-0.007
	(0.004)	(0.005)	(0.104)	(0.037)	(0.004)	(0.005)
Publications	0.001**	0.001	0.413***	-0.007	0.001	-0.002***
	(0.000)	(0.001)	(0.117)	(0.005)	(0.002)	(0.001)
Citations	-0.001	-0.001	-0.015	0.061***	0.004**	-0.001
	(0.001)	(0.001)	(0.063)	(0.013)	(0.002)	(0.001)
Average JIF	0.008***	-0.007	-0.109	0.400***	-0.003	-0.002
	(0.003)	(0.006)	(0.132)	(0.045)	(0.006)	(0.003)
Coauthors	0.000	-0.000	0.046	0.000	0.000**	-0.000**
	(0.000)	(0.000)	(0.030)	(0.000)	(0.000)	(0.000)
Early mobility grants	0.023	0.061*	-0.802	0.157	-0.072**	-0.051**
	(0.019)	(0.036)	(0.701)	(0.215)	(0.032)	(0.021)
Rank PhD university	-0.003***	-0.003**	-0.058**	-0.014*	-0.002**	-0.001
	(0.001)	(0.001)	(0.025)	(0.008)	(0.001)	(0.001)
Rank host university	0.001	0.000	0.035	-0.007	-0.000	-0.000
	(0.001)	(0.001)	(0.032)	(0.005)	(0.001)	(0.001)
Rank host res. institute	-0.000	-0.004***	0.060**	-0.018	0.002**	0.000
	(0.001)	(0.001)	(0.030)	(0.017)	(0.001)	(0.001)
Proposed duration	0.002	0.012***	-0.236***	0.011	-0.002	0.000
	(0.002)	(0.003)	(0.075)	(0.024)	(0.003)	(0.003)
Amount request	0.000	-0.001**	0.019	0.004	0.000	-0.000
	(0.000)	(0.000)	(0.015)	(0.004)	(0.001)	(0.000)
Destination dummies	Yes	Yes	Yes	Yes	Yes	Yes
Research field by year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1132	1132	1132	1132	1132	900
N.Cohorts	89	89	89	89	89	86
F-test	13.24	66.31	18.76	75.25	56.04	41.54

Notes: The table reports results for the main dependent variables from column 1 to column 6. Cluster standard errors and fixed-effects at the level of research fields by year combinations are used, instead of cohort fixed-effects and clusters. All columns report results for the second-stage of the fuzzy RDD model with all controls and FE. Cluster robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 7: Heterogeneity across research areas

Grant awarded by field	(1) Abroad 1st year	(2) Abroad 5th year	(3) Publications 5 years	(4) Average JIF 5 years	(5) Prof 5th year	(6) New coauthors 5 years
Medicine and health	0.440***	0.175	2.627	1.612**	-0.180	0.268***
	(0.110)	(0.134)	(4.404)	(0.689)	(0.119)	(0.075)
Social sciences	0.550***	0.224	2.733	0.475	0.117	-0.005
	(0.135)	(0.170)	(2.212)	(0.517)	(0.110)	(0.080)
Natural sc. and Eng.	0.508***	0.330**	8.539**	1.207**	0.012	0.187**
	(0.130)	(0.138)	(3.574)	(0.541)	(0.120)	(0.089)
Life science	0.449***	0.273*	1.534	1.574*	0.090	0.145**
	(0.120)	(0.161)	(2.406)	(0.912)	(0.111)	(0.073)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Destination dummies	Yes	Yes	Yes	Yes	Yes	Yes
Cohorts FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1132	1132	1132	1132	1132	900
N.Cohorts	67	67	67	67	67	67
F-test	35.63	9.567	8.298	21	8.616	4.760

Notes: The table reports the coefficients for the variable Grant awarded and for the interaction effect of each main research field, for each main dependent variable from column 1 to column 6. The specification includes: the interactions with the main variable, Grant awarded, in the second stage, and as dependent variables of the first stage; the interactions with the variable I(Grade > threshold) as additional excluded instrument in the first stage. All columns report results for the second stage of the fuzzy RDD model with controls. Cluster robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 8: Main regression results dropping lowest grades

	Abroad 1st year	Abroad 5th year	Publications 5 years	Average JIF 5 years	Prof 5th year	New coauthors 5 years
I(Grade > treshold)	0.236*	0.232	2.460	1.281**	0.073	0.175*
	(0.131)	(0.149)	(3.233)	(0.614)	(0.102)	(0.088)
Grade	0.107	-0.023	-0.568	-0.436	-0.068	-0.074
	(0.074)	(0.079)	(1.760)	(0.337)	(0.055)	(0.052)
Grade*I(Grade > treshold)	-0.093	0.035	0.239	0.538	0.156***	0.062
	(0.075)	(0.082)	(1.716)	(0.347)	(0.054)	(0.053)
Foreign	0.038*	0.185***	-1.103	0.177	0.005	-0.038*
	(0.023)	(0.037)	(0.743)	(0.229)	(0.033)	(0.020)
Female	-0.020	-0.020	-2.432***	-0.021	-0.078**	-0.045**
	(0.022)	(0.032)	(0.712)	(0.229)	(0.032)	(0.022)
Age	-0.008*	-0.010	-0.228*	-0.076*	0.000	-0.011***
	(0.004)	(0.006)	(0.126)	(0.043)	(0.005)	(0.004)
Publications	0.001*	0.001*	0.385***	-0.007	0.001	-0.002***
	(0.001)	(0.001)	(0.126)	(0.007)	(0.002)	(0.000)
Citations	-0.002**	-0.002*	0.039	0.071***	0.004*	0.000
	(0.001)	(0.001)	(0.063)	(0.017)	(0.002)	(0.001)
Average JIF	0.013***	-0.006	-0.110	0.417***	-0.002	-0.002
	(0.003)	(0.005)	(0.129)	(0.056)	(0.006)	(0.002)
Coauthors	0.000**	-0.000	0.038	0.000	0.000***	-0.000
	(0.000)	(0.000)	(0.030)	(0.000)	(0.000)	(0.000)
Early mobility grants	0.028	0.078**	-0.937	0.239	-0.037	-0.041**
	(0.023)	(0.033)	(0.715)	(0.238)	(0.031)	(0.017)
Rank PhD university	-0.001*	-0.001	-0.071***	-0.015**	0.000	-0.000
	(0.001)	(0.001)	(0.026)	(0.007)	(0.001)	(0.001)
Rank host university	0.000	-0.000	0.029	-0.010*	0.000	0.000
	(0.001)	(0.001)	(0.024)	(0.005)	(0.001)	(0.001)
Rank host res. institute	0.000	-0.003**	0.042*	-0.016	0.003***	0.001
	(0.001)	(0.001)	(0.024)	(0.017)	(0.001)	(0.001)
Proposed duration	0.005**	0.014***	-0.185**	0.003	-0.001	0.001
	(0.002)	(0.003)	(0.090)	(0.017)	(0.003)	(0.002)
Amount request	-0.000	-0.001***	0.020	0.003	-0.000	-0.000
	(0.000)	(0.001)	(0.020)	(0.003)	(0.001)	(0.000)
Destination dummies	Yes	Yes	Yes	Yes	Yes	Yes
Cohorts FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1063	1063	1063	1063	1063	863
N.Cohorts	67	67	67	67	67	67
F-test	21.92	6.904	9.309	14.41	8.314	4.248

Notes: The table reports results for the main dependent variables from column 1 to column 6 in specifications where we exclude applicants with the lowest grade. All columns report results for the RDD model with all controls and FE. Cluster robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1