International research visits and careers - An analysis of bioscience academics in Japan

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Abstract

This paper investigates the effect of international research visits on promotion. Research visits may help to expand existing networks and promote knowledge transfer while at the same time ensuring career stability, identified as the main barrier to mobility in Europe and Japan. Using a dataset of 370 bioscience professors in Japan we find that international research visits have a positive effect on promotion and reduce the waiting time by one year. This provides evidence that these visits also benefit a researcher's career in the long-term. This positive research visit effect is weaker for academics who also change jobs, but stronger for inbred academics. Research visits may therefore be of specific importance for otherwise immobile academics. We further find that, while research visits of tenured staff enhance the career by providing an early chair, postdoctoral fellowships have no lasting effect on career progression.

Keywords: International research visits, Career paths, Promotion, Academic mobility

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1 Introduction

The mobility of academics is a subject viewed with increasing interest by policy makers around the world. It is encouraged as an instrument to improve the performance of the research system by promoting the diffusion of knowledge, as well as facilitating knowledge and technology transfer, network creation, and productivity. In the context of the university, enhanced transparency in hiring decisions and the movement of university staff between universities and to firms has been viewed as crucial for the advancement of knowledge (OECD, 2000, 2008). For these reasons, the mobility of academics has become an important issue for science and technology policy in Europe (EC, 2001, 2010) as well as in Japan (Arimoto, 2011; MEXT, 2003a, 2009; RIHE, 2006) with localism and inbreeding considered as inhibitors to scientific advancement and innovation (EC, 2010; MEXT, 2003b).

In the context of academic mobility it is further important to highlight changes in promotion and career patterns arising in recent years. The growing diversification of academic work roles, including an increasing number of part-time and short-term contracts (Enders, 2005; Stephan and Ma, 2006; Stephan 2012), makes mobility an important element of career progression and demands a better understanding of the consequences of mobility, especially international mobility, not only for the flow of knowledge but also for individual academic careers (Enders, 2005; Enders and de Weert, 2004; Zellner, 2003).

Mobility in general is considered beneficial for individual academics as it helps expand existing networks and exploit new knowledge sets (e.g. Saxenian, 2005), which may increase both the chances of receiving promotion at home and of being offered a position elsewhere. However, the "incentive structures of employing organizations" (Cruz and Sanz, 2010: 37) often fail to reward mobility. While academic career patterns have diversified, a system with primarily tenured academic positions with long-term employment relationships between academics and their institutions and a rigid structure of hierarchy is common in most of

Western Europe, and also in the US and Japan (Pezzoni et al., 2012).[4] For example, job transition could be seen as disruptive at early stages of the career in systems that support stability, and indeed there is some evidence in France, Spain and Italy that non-mobile faculty are promoted sooner (Gaughan and Robin, 2004; Cruz and Sanz, 2010; Pezzoni et al., 2012). For the US and Mexico, on the other hand, Hargens and Farr (1973) and Horta et al. (2010) find that non-mobile faculty were promoted less or later, highlighting important country differences.

In this paper, we focus on international mobility , due to its growing pervasiveness and political importance (Glanzel et al., 2008; Stephan, 2012). Internationally mobile academics are believed to provide collective benefits in terms of spillovers to their home countries (Ackers, 2005; Saxenian, 2005), evidence that sparked policy initiatives to encourage home-grown academics to go abroad and to encourage those who migrated abroad to return home (Hunter et al., 2009).[5] International mobility may, however, be especially likely to be unrewarded due to varying labour market conditions for academics in different countries that promote different research trajectories (Gaughan and Robin, 2004). We focus on international research visits, which describe short-term moves to a different country while holding a permanent academic post, and how they relate to promotion in the national career system, focussing on the case of Japan.

Empirically, we focus on a set of 370 bioscience professors in Japan, identify their average career path and evaluate the role of international research visits in career advancement in the home country. In order to do so, we examine useful theories of job-matching and social capital that could inform the institutional features of academia that affect promotion and

[4] The period between doctorate and attainment of first academic position (postdoctoral period) is increasing in length in most countries, leaving an increasing number of early career scholars in fixed -term appointments.
[5] For example, the EU offers prestigious Marie Curie fellowships to facilitate the mobility of postdoctoral researchers. At the same time individual countries initiated programmes to provide support for returnees, e.g. the "Ramón y Cajal" programme in Spain.

mobility. In Japan, inbreeding, employment at the same institution from which one graduated, has been observed to be institutionalised, representing practices "to assure organizational stability and institutional identity" (Horta et al., 2011: 1), features similar to those observed by Cruz and Sanz (2010) in Spain. Japan also traditionally exhibited high levels of job security already for junior academics. By enabling mobility within a secure job environment, research visits may then lead to potentially higher individual benefits than mobility that offers less job security. We therefore follow a 'life course perspective', which calls for an investigation that distinguishes the types of mobility and the career stage at which they occur (Fernandez-Zubieta et al., 2015), to examine the effect of international research visits in connection with and in comparison to other types of mobility.

The remainder of the paper is structured as follows: In section 2 we review the literature on mobility and careers and draw up our hypotheses. Section 3 gives background information on the Japanese academic labour market and educational system and section 4 introduces the data. Section 5 discusses the empirical strategy and presents the results and section 6 discusses and concludes.

2 Mobility and Careers

2.1 Effect of mobility on promotion

While the study of the determinants of scientific productivity has been a major focus in the Economics and Sociology of Science, the analysis of career and mobility has received less attention perhaps because both are assumed to be closely linked to productivity (Allison and Long, 1990; Long et al. 1993). However, the relationship between mobility and careers is more complex. Mobility may have varying effects on careers and on science and knowledge

production depending on the type of mobility and the career stage at which it occurs (Fernandez-Zubieta et al., 2015).

Several approaches have tried to explain the link between mobility and careers and here we focus on the job-matching and scientific and technical human capital approaches. The job-matching approach emphasises the importance of a good job match between academics and their institutions (Jovanovic, 1979; Topel and Ward, 1992). If an institution does not enable an academic to develop their full potential or does not give recognition for their work this can cause the academic to move in an attempt to further their career elsewhere. Job-matching is especially important at the early stages of the career when young academics transition from PhD graduate to academic colleague. Not all institutions may support this transition or offer the roles required for transition, causing academics to move (Glaser, 2001). This includes mobility to lower rank institutions if they provide career advantages (Fernandez-Zubieta et al., 2015). A better match following the move may then result in better career development also in terms of promotion. However, not all mobility necessarily results in a better match due to asymmetric information especially at early career stages and mobility may fail to provide the anticipated benefits in terms of research and reputation (Fernandez-Zubieta et al., 2015), for example, previously acquired knowledge may not be recognised at the new institution.

The notion of scientific and technical human capital (S&T HC; Bozeman et al., 2001) which describes "the sum of scientific, technical and social knowledge, skills and the resources embodied in a particular individual" (pp. 5-6) can further help explain the link between mobility and promotion. Social ties established throughout the career are important elements of S&T HC and may enable the individual to access networks that make promotion easier (Pezzoni et al., 2012). These ties can be expected to increase through mobility and research collaboration (Bozeman and Rogers, 2002; Pezzoni et al., 2012) and we could therefore

expect mobility to have a positive effect on promotion. However, depending on the academic career system, promotion is often conditioned by the previous commitment to the home organisation. For example, Long et al. (1993) show that changing affiliations can reset the tenure clock, delaying the promotion of job mobile academics. Heining et al. (2007) also suggest that mobility may weaken the social ties that may be required for career progression. Life-long contracts and the importance of scholarly networks for increasing one's chances to be hired and promoted may therefore endorse immobility in a system that provides stable employment, as is the case in most of Europe and in Japan (Cruz and Sanz, 2010; Stephan, 2012).

Fernandez-Zubieta et al. (2015) build on these two approaches and conclude that we may not always expect a positive effect of mobility on careers but that this effect depends on the type and timing of the move. In what they call a 'life-course perspective' they consider the relevance of different types of mobility events throughout an academic's career and at different career stages. They specifically stress the importance of different aspects of mobility (international, intersectorial and social mobility) that may overlap and of successive movements which may lead to different effects compared to single mobility events. Empirically, they suggest considering one specific mobility event while taking account of other mobility types when investigating the relationship between mobility and promotion. We focus on international research visits, i.e. temporary mobility to another institution abroad while keeping one's home affiliation, and its effect on promotion, taking into account: (1) postdoctoral mobility, i.e. mobility prior to obtaining an academic position, and (2) job-to-job mobility, i.e. mobility from one academic employer to another.

2.2 International return mobility and promotion

The employment market for academics is international, differentiated by academic discipline (Enders and de Weert, 2004). Especially at early stages of the career international mobility can provide training in leading research groups. In some instances this may aid the establishment of a career in the new institution and country (Becher and Trowler, 2001) while in others, academics enter a leading lab abroad to acquire specialist tacit knowledge that can be applied back at their sending institution or in their home country (Stephan, 2012).

However, while young academics are encouraged to engage in international mobility, the activity often becomes detached from its original objectives, including knowledge transfer and positive spill-over effects, and may be better described as an additional compulsory career stage (Ackers, 2008). Indeed, Musselin (2004) finds that academics participating in postdoctoral fellowships perceive their international mobility as a personal strategy aimed at improving their career prospects back home. Jons (2007) also showed that improving career opportunities is one of the most important factors for academics in biosciences to participate in international research stays in Germany, though the search for new ideas and contacts are still more or equally as important.

Literature has previously addressed international return mobility empirically (e.g. Mahroum 2001). Several papers find that those who have participated in international mobility perform better and have a larger international network (thus higher S&T HC) than their peers who have not been internationally mobile (Canibano et al., 2008; Franzoni et al., 2012; Jonkers, 2011; Scellato et al., 2012). However, many of these studies conflate different mobility types, for example combining pre- and postdoctoral mobility or forced and voluntary mobility

(Ackers, 2008)[6] and already there is evidence that not all internationally mobile academics benefit from their experience. Jonkers (2011)reports that early career academics in Argentina are promoted later than their non-mobile peers who are equally as productive, and Cruz and Sanz (2010) find that young returnees in Spain are less likely to gain a permanent position following their postdoc than those that have not been internationally mobile. Melin (2005) also shows that a discernible share of returnees in Sweden have difficulties in incorporating the knowledge acquired abroad. Thus, not all types of international return mobility have a positive effect for individual careers, something that has been linked to the loss of social ties necessary for promotion (loss of S&T HC) and the lack of openness towards the new knowledge from abroad (mismatch).

2.3 Hypotheses

While the literature on returnees primarily refers to internationally mobile academics in general, this paper follows Fernandez-Zubieta et al. (2015) and focuses on one type of mobility, specifically on academics participating in a research visit abroad while continuing to hold a permanent position in their home country. These research visits can be considered a form of faculty development, which has been a focus of universities and governments for many years, resulting in a variety of programs and activities being proposed, including faculty exchanges, sabbaticals, unpaid leaves, and research visits, often supported by foundations or government. They are designed to improve faculty performance, particularly in terms of scientific expertise and personal growth (Camblin and Steger, 2000; Centra, 1978).

[6] Ackers (2008) also points out that different mobility requirements and opportunities exist for different disciplines, which is supported by Canibano et al. (2011) and Zubieta (2009), adding the difficulty of generalizability. For example, some disciplines are less space specific and thus enable higher levels of mobility and international career paths due to the translatable character of the knowledge (Ackers, 2005).

Research visits abroad may thus help the development of S&T HC, including tacit knowledge and links to colleagues in the field, which in turn may result in better performance and promotion (Becker, 1962; Colquitt et al., 2000; Parent, 1999)

More importantly, it might address potential barriers to other types of mobility (e.g. international job-to-job mobility) experienced by permanent academic staff. For example the difficulty of re-entry due to the loss of social ties (loss of S&T HC), delayed promotion due to lack of prior commitment or the potential mismatch with the new department, do not apply to research visits. Research visits then, by focussing all efforts of the academics on research in a prestigious international environment, is expected to enable a quicker career progression as reflected in earlier promotion[7].

Hypothesis 1: Academics that undertake research visits abroad are promoted sooner than their peers that do not undertake such visits.

As argued by Fernandez-Zubieta et al. (2015), any mobility event has to be seen in the context of the academic's life course and its interaction with other types of mobility. Research visits not only offer an opportunity of career development but can also increase job satisfaction, indicate approval and give a sense of achievement (Allen et al., 2004) that could likely reduce later job mobility (Parent, 1999).a Further, while mobility is generally assumed to be beneficial, a change of employer may result in a loss of social ties and a reset tenure clock (Heining et al, 2007; Long et al., 1993). Research visits enable mobility without cutting institutional links (without loss of S&T HC) and remove the risk of a mismatch as there is no change of employer, and should therefore have a more positive effect for otherwise non-job-

[7] It also contributes to the performance and visibility of a mobile academic's institution as it benefits from new or maintained links to other organisations (Almeida and Kogut, 1999; Agrawal et al., 2006; Azoulay et al., 2012; Jons, 2009). Institutions therefore have an incentive to allow their staff to participate in these exchanges.

mobile academics. Similarly, we expect a greater effect of research visits for inbred academics who can take advantage of institutional links since PhD training.

Hypothesis 2a: The promotion enhancing effect of research visits abroad is greater for otherwise non-job-mobile academics than for job mobile academics.

Hypothesis 2b: The promotion enhancing effect of research visits abroad is greater for inbred academics than for non-inbred academics.

To emphasise the importance of considering different types of mobility separately (Fernandez-Zubieta et al., 2015), we also investigate the effect of post-doctoral international mobility. In a similar vein to international research visits, international postdoctoral mobility has been argued to have a positive effect on research careers (Su, 2011; Stephan and Ma, 2005). Some studies have focused specifically on international postdoctoral mobility and find that it has a positive effect on performance, career and networks (Horta, 2009; Zubieta, 2009). However, the increasing frequency of postdoctoral mobility and associated job insecurity (Stephan and Ma, 2005; Stephan, 2012) can compromise these benefits. For example, many postdocs may spend a significant amount of time on job-hunting rather than research, collaboration networks with previous affiliations may break down (loss of S&T HC) and new knowledge may not be rewarded (mismatch). Thus, while we hypothesised that international visits expedite the promotion of academics, we do not expect the same benefits from postdoctoral stays abroad:

Hypothesis 3: Academics that undertake international postdoctoral mobility are not promoted sooner than their peers.

3 Mobility of academics in Japan

This study focuses on the case of bioscience professors in Japan. Japan is one of the leading countries in bioscience research contributing a share of 7% of the world academic articles in the field, the same as, for instance, Germany and the UK (BIS, 2013). Bioscience represents the largest research sector in Japan with almost one third of all research articles in Japan published in bioscience-related fields (BIS, 2013). These fields also account for 45% of all grantees of the Grants in Aid programme, the primary public source of research funding in Japan, further emphasising the importance of the field for the Japanese academic market. This chapter gives an overview of mobility and employment patterns in Japan that also affect bioscience academics. Bioscience needs to be considered a special case within academia with potentially higher mobility rates than other scientific areas due to its international nature. However, the international importance of the bioscience field may make the results more relevant also for other countries.

3.1 The Japanese academic employment system

Japan has three types of institutions that offer 4-year courses and postgraduate education: national, public and private universities. National universities are financed by the central government and primarily research oriented institutions, while public universities are run by local governments with a regional development objective. Their employees were government employees until reforms in 2004 and thus fell under the public servants law. In 2012 the 86 national universities employed 101,522 academic staff and the 92 public universities 27,344 (full- and part-time staff; MEXT, 2012). The majority of students and academic staff, however, can be found at the 605 private universities that in 2012 employed 240,012 academic staff (MEXT, 2012). Private universities, though theoretically sovereign institutions that are financed primarily through student fees, are also subject to government control, in

terms of enrolment and organisation (Shimbori, 1981). Though only about 10% of their finances come from government (figure for FY2008; Statistics Bureau Japan, 2012: 724), they are heavily affected by its regulation of national universities with which they need to compete, an endeavour made difficult by the heavy government subsidy and low tuition fees of national universities (Akabayashi and Naoi, 2004).

Surveys of the Japanese university system describe it as highly elitist with an established hierarchy that limits any transition of academics between universities and thus stymies overall mobility (Shimbori, 1981; Horta et al., 2011; RIHE, 2006). Looking at employment statistics, we can see that the average length of employment is higher for academics than for university graduates in general (15 years vs. 12.5 in 2010), but the same as that of other high-skill professions (e.g. architects, engineers and teachers) with the exception of medical doctors (4.6 years) (Statistics Bureau Japan, 2012: 518-520). However, Japanese universities have an alma-mater based form of patronage for graduates of one's university called *gakubatsu* (literally: school tie), which has gradually been institutionalised (RIHE, 2006). Graduates are placed in a university with links to their degree institution, thus reinforcing the *gakubatsu*. The university hierarchy is dominated by The University of Tokyo, followed by other national universities and a handful of older private universities. This structure is reinforced by the fact that the majority of postgraduate and specifically doctoral education is done in the few national universities. While private institutions have consistently accounted for 77% of undergraduate students in the past 25 years, they only produced 23% of PhDs in 2010. The national universities on the other hand, provide just 20% of undergraduate education but produce 70% of doctoral students (Statistics Bureau Japan, 2012: 714-715). In 2001, 11% of the academic workforce in Japan had graduated from The University of Tokyo alone (Yamanoi, 2007).

Japanese universities largely have a three level promotion system with professor at the top, then associate professor and finally assistant professor (or lecturer/assistant). In 2012, 40% of all academic positions were professorships, 24% associate professors and 36% in lower ranks (MEXT, 2012). Promotion decisions in Japan are largely made at the departmental level (Teichler et al. 2013). It has further been claimed that promotion is primarily based on seniority with minor adjustments for education and performance (Shimbori, 1981; Takahashi and Takahashi, 2009). This is particularly true for national and public universities which, until recently, fell under the public servant laws. Moreover, before 1990 the academic labour market was characterised by a chair structure (RIHE, 2006), where promotion was only possible if a chair resigned. This system was challenged when other academic structures were introduced, e.g. allowing for fixed-term appointments (RIHE, 2006). In April 2004, a reform to incorporate these national and public universities removed the public servant status from academics and allowed greater freedom in recruitment, wages and promotion (RIHE, 2006).

3.2 Careers and Mobility

While Japanese academics are not entirely immobile, policymakers have long realised that the cross-organisational flow of academics lacks flexibility, heavily constrained by rigid social structure (e.g. *gakubatsu*). Among others, the practice of inbreeding has been regarded as a serious impediment (Yamanoi, 2007). The Japanese ministry for education (MEXT) reported that inbred academics, who assumed professorship in the same university where they earned their degree, accounted for about 62% of all faculty members in graduate schools in 1998 (MEXT, 2003b). Arguing that inbreeding deters scientific competitiveness, the government began to restructure the career system especially for young academics around 2000. For example, it has prohibited one type of nationally-funded postdocs from staying in the same laboratories where they completed their PhD theses. National universities are also

now required to employ faculty members through open competition, and permanent employment for entry positions was largely replaced by temporary contracts with the intention of forcing mobility. Further, a tenure-track system, modelling the American system, was introduced so that young academics can obtain entry positions without social ties with incumbents (Morichika & Shibayama, 2011). Nevertheless, the old structures prevail and still in 2005 only 3.4% of academics were hired on a fixed-term basis, however, this percentage was much higher amongst junior academics (6%), especially those at national universities (10%) (RIHE, 2006). Despite these efforts, the rigidity of the Japanese academic market largely remains, and further policy reform seems to be needed.

While the above-mentioned changes may have primarily addressed the lack of domestic job mobility, policies for international mobility have a long history in Japan. MEXT implemented several programs for temporary research visits abroad starting in the late 19th century. The primary objective of these programs was the quick absorption of knowledge from and catching up with other developed countries, but their emphasis has shifted towards the promotion of academic and educational exchange in general (Tsuji, 2010). The government task force for faculty development has recently published its future vision, in which the necessity for early-career research experience in foreign institutions is stressed as a means for increasing global competitiveness (MEXT, 2003a; MEXT, 2009).

Many of these government faculty development programs provide fellowships for temporary stays or travel funds for conference attendance and, according to government statistics, approximately 7,000 university faculty members were sent abroad every year in the 1990s (MEXT, 1990). Importantly, many of them were allowed to visit a foreign institution while on leave from their home institution. These stays differ from sabbaticals in that sabbaticals are given to senior scholars more as a reward rather than as part of faculty development for

younger scholars. Further, they differ from postdoctoral mobility in terms of job security. The programs aim "to dispatch university faculty members to foreign research institutions, encourage them to concentrate on their research, and improve their research capabilities" (MEXT, 1980).[8] The major government sponsored program for temporary visits was called "Overseas Research Scholars Program," which started in the late 19th century.

A recent analysis of academic articles in peer-reviewed journals and affiliation details of academics on Scopus found that 30% of academics that published under a Japanese affiliation at least once spent up to 2 years outside Japan, and 10% stayed abroad for more than 2 years (BIS, 2013). These shares are lower than those for other academic markets (e.g. UK or US), but are comparable to those of Italy. The results of the study showed that international research visits are wide-spread amongst Japanese academics and a more important means of international mobility than permanent migration. The most important partner for international exchanges and collaborations is the US as evidenced by the large number of articles co-authored by US authors (BIS, 2013) and the large share of academic staff with a doctoral degree from the US (Yamanoi, 2007).

4 Data and Descriptive Statistics

4.1 Data

The data used in this paper was collected as part of a survey conducted in 2010. The survey was addressed to full professors in the field of biology and bioscience that received a Grant-in-Aid (GiA) at least once between 2006 and 2009. GiA is the largest and primary funding source for academics in Japan, amounting to 200 billion JPY (2.4 billion USD) in 2010.[9] This

[8] Some universities offer similar programs for young scholars.
[9] GiA used to be the sole government research grant provider in the early 1980s (CNUFM, 2009: 89). Several other funding systems were later implemented, but GiA remains the primary funding source.

sampling criterion allows us to effectively eliminate non-research active faculty members from the sampling frame.[10] We identified 1378 academics in the database that fulfilled the criteria. From this population we selected 1,080 professors in the top 56 universities[11]. After reviewing research fields and affiliations on university websites, we arrived at a final sample of 900 academics.[12]

Postal questionnaires were sent to the 900 academics in May 2010. A reminder was sent one month later. Participants had to fill in the paper based questionnaires and send them back by post. We received 400 responses by August 2010, thus achieving a response rate of 44%. Although this represents a good response rate, there may be a concern of respondent bias. However, the original survey did not indicate that the data would be used for the analysis of mobility and career advancement, mitigating this risk.[13] In addition, to examine non-response bias, we randomly selected 50 non-respondents and found no significant difference between the response and non-response groups in terms of productivity, organisational rank, and gender ($p > 0.1$)[14].

CV information was collected from ReaD[15], a career database created by a governmental agency, where scientists deposit their CV information voluntarily. The data in ReaD is completely structured and thus particularly useful for career analysis. As data registration at ReaD is not mandatory and information may not be complete, we completed CVs with information from the scientists' personal websites. All CVs were verified with information

[10] The accompanying survey suggests that our respondents spend, on average, 53% of their time on research, 21% on teaching, and 26% on administration, respectively.
[11] This was done to reduce workload for preparing the sampling frame.
[12] The majority of the excluded 180 academics had either retired or moved to universities outside our sample population. We also dropped non-Japanese academics to prevent errors from the necessary translation. Though comparison between foreign and Japanese scientists may be of interest, we believe that meaningful comparison would have been difficult due to the very low rate of foreign faculty members in Japan (6%).
[13] The original survey aimed to investigate the style of laboratory management and only the secondary objective was to investigate careers.
[14] Analysis available from authors upon request.
[15] http://read.jst.go.jp/ (accessed 28 March 2013)

collected through the questionnaire survey, which included questions on year of PhD and years of promotion. Full CVs were available for 370 academics who in 2010 worked at 56 different universities in Japan.

CVs provide a rich source of longitudinal information that covers the major dimensions of an academic's career as well as their research contacts. While some of the dimensions of mobility can be inferred from bibliometric data, most of an academic's activities may not be observed using traditional data sources, particularly if they do not involve publications in scientific journals. CVs have been found to be particularly useful in the analysis of academic careers as they inform about the exact time of recruitment, promotion and job transitions and additionally allow us to gather reliable publication data. Using data collected from CVs in addition to pure bibliographic measures improves accuracy of the data as mismatches arising from name similarities and changes in academics' institutional affiliations can be avoided. In recent years, several academics have taken to CV analysis to study the impact of mobility on academic productivity and career progression (Canibano and Bozeman, 2009).

Data taken from CVs includes all career information starting from the year of the first degree (Bachelor). It comprises a comprehensive listing of all positions, including research visits. Additionally, publication data was collected from the Web of Science (WoS).

4.2 Descriptive Statistics

Basic demographic characteristics for the sample of 370 professors for which full CVs were available are displayed in Table 1. We find that 3% of the sampled professors are women (also 3% of the total sample population of 900 are women). The average professor finished his undergraduate studies in 1978 and his PhD in 1984. The average age of professors in 2010 is 54. As discussed earlier, doctoral courses are highly concentrated and promotion is

directly linked to training in one of the elite institutions in Japan. In our sample 91% of academics received their doctorate from a national university (336 professors), including 26% from The University of Tokyo alone. Just 3% of doctoral degrees came from public universities (10 professors), 5% from a private universities (17 professors) and 2% received their degree abroad (7 professors). Fifty-eight academics (16%) in the sample have a degree in medicine and may behave differently from the rest of the sample due to periods spent as medical staff in hospitals with lower levels of research activity.

Career Paths

We define positions in terms of the three career steps described above: assistant professor, associate professor and full professor. On average, academics finish their PhD six years after award of BA and take up their first position as assistant professor one year later. During this period they are still under the supervision of a full professor.

We have to consider that not all academics in our sample follow this strict career path. In fact, 45 academics never assume the position of an assistant professor, but take up other types of appointments and enter the standard academic career as associate professors (27 cases) or as full professor (18 cases). Moreover, 25 academics in our sample are promoted from the rank of an assistant to that of a full professor without the intermediate step of an associate.

Of the 325 academics that start their career as assistant professor, 79% take up their first academic position at one of the national universities, 4% at public universities, 12% at private universities, 3% at public research organisations that follow academic career steps and 2% at foreign institutions.

Table 2 reports the years from first degree to promotion for various groups of academics. On average, they are promoted to the position of associate professor 14 years after the BA and to

full professor 21 years after BA award. The time from first degree until promotion is significantly shorter for academics with a medical degree (12 and 17.5).

International research visits

The main focus of this paper is research visits abroad. We operationalize research visits as a move to another university or public research institution of up to three years that is followed by a return to the original institution. We do not include postdoctoral appointments but we include only research visits that occur after an academic has been appointed assistant professor. Research visits can appear very similar to postdoctoral appointments; however, research visits are marked by a return to the original institution and original tenured position, indicating that they were solely intended as temporary stays. This type of mobility is fairly common amongst Japanese academics. Of the sample that starts their career as assistant professors, 76 professors (23%) spent some time as researchers or visiting fellows at other institutions, usually outside Japan (95% of cases). The majority of these research visits happened early during their career with 80% being visiting fellows as assistant professors. Only one academic in our sample has been a visiting fellow after his promotion to full professor. This may be due to increased administrative and teaching commitments of full professors that do not allow them to leave their institutions for more than a few weeks. The remainder of the paper will focus on international research visits and not consider domestic research visits.

Table 2 shows that, on average, academics who visited other institutions abroad during their time as assistant professor are promoted to associate 8 months earlier than those that have not

participated in research visits. Further, academics that undertake research visits are also promoted to full professor more than one year earlier than their peers[16].

Postdoctoral mobility

In comparison, postdoctoral fellowships, which are operationalized as research stays of up to four years starting straight after completion of PhD and before an appointment to assistant professor, of those 325 academics that start as assistant professors, 99 completed a postdoctoral fellowship. In contrast to research visits, these postdoctoral appointments are distributed evenly across Japanese and foreign institutions, with 60% of appointments being abroad. In 23 cases professors are appointed postdoctoral academics in the same institutions that awarded their PhD. In 20 cases professors are offered a position as assistant professor in the same institution upon completion of their postdoctoral research. 16 academics that did a postdoc also take up international research fellowships later. Table 2 shows that academics that completed a postdoctoral appointment are on average not promoted earlier than their peers.

Job mobility and career life-course

Any mobility event has to be seen in the context of the academic's life course and its interaction with other types of mobility. We therefore control for other types of mobility in all estimations and interact our international research visit variable with other types of mobility. Job-to-job mobility is operationalized as a change of position that occurs after an academic's first appointment as assistant professor. The move has to be non-temporary with no return to the original institution within three years of the initial move. Some of these appointments may be research fellow appointments at foreign institutions; if they are held for at least three

[16] Only the second difference (age at promotion to professor) is statistically significant.

years and academics do not return to their original institutions, they are considered job mobility and not visits.

We can identify three main job mobility patterns for the 325 academics that started as assistant professor:

1. Those that never change universities (84 academics)
2. Those that move at assistant and/or associate level (232 academics)
3. Those that move at professor level (40 academics; including 31 from group 2)

Non-job-mobile academics (group 1) constitute just 26% of the sample, indicating a very high degree of job-to-job mobility amongst university academics in Japan. This contradicts Shimbori (1981) and Horta et al. (2011) who argue that the Japanese system limits job mobility. This high rate of job mobility could be due to our sample selection that only included full professors at research intensive universities. The 241 job mobile professors (groups 2 and 3) move 414 times, spending an average of 7.9 years in each institution. 251 of these moves were accompanied by a rank promotion. Of those that are job mobile at assistant professor level, 62% move to be promoted to associate or full professor; amongst those job mobile at associate professor level, 76% move to gain the position of full professor. Thus, job mobility in Japan is closely linked to promotion opportunities.

In addition, regressions that consider promotion from associate to full professor will include academics that have started their career in industry or in a public research organisation. The mobility back to academia is also considered job-to-job mobility and affects 40 academics. Table 2 shows that on average job mobile assistant professors are not promoted sooner than their non-job-mobile colleagues, while job mobile associate professors are promoted to full professor about two years earlier than their peers.

Inbreeding

In addition to (non-)job-mobile academics we can look at academic inbreeding, widely defined as the practice of universities to hire their own graduates, a practice assumed to be widespread in Japan (Horta et al., 2011). In our sample 146 academics are initially hired by their PhD institutions and another 53 academics move back to their PhD institution after a short period elsewhere. Just like previous studies in the US context (e.g. Burris, 2005) we find that inbreeding is more prevalent amongst elite institutions. The Japanese university ranking is headed by the seven pre-imperial national universities (Tokyo, Kyoto, Osaka, Tohoku, Hokkaido, Nagoya, and Kyushu). We can distinguish The University of Tokyo from the other six as it receives twice as much funding in the Biosciences compared to the second ranked institution (Kyoto). In our sample, more than 80% of new hires at The University of Tokyo received their PhD from the same institution. For the other six elite institutions this share is still 78%. Lower rank institutions mostly hire out of the pool of top graduates, partly out of necessity due to less developed post-graduate programmes. On average, 10 years after first hiring, still 60% of academics at the top seven institutions are inbred. Figure 1 shows the distribution of academics amongst different types of institutions for years since PhD. It clearly shows the dominance of top institutions and the high degree of inbreeding at the top. Table 2 further shows that on average inbred academics wait longer for promotion to associate professor. We expect these patterns to affect the relationship between international research visits and promotion.

Other controls

We collected the number of publications for each professor from the Web of Science (WoS). Publications may be associated to promotions though Takahashi and Takahashi (2009) do not find this to be the case for a sample of Japanese economists. However, their sample was

mainly drawn from education-oriented institutions where merit has less of an effect on promotion. Performance may play a greater role at research universities, which are the focus of this paper. Each professor published on average seven publications per year during the observation period (the years since PhD until 2012). Additionally, we collected the number of citations received by each publication as a quality measure. Publications receive on average 22 citations, a number significantly higher than the world- and Japan-average for citations in biological sciences (BIS, 2013)[17], indicating that academics in our sample are high performers. In our estimations we use the stock of publications and average number of citations to measure an academic's productivity.

We also have detailed information on GiA funding received by each academic in each year. The amount of funding was split across years and investigators and each professor received an average of 5 million yen per year (60,000 USD).

We further assume that promotion is more difficult to achieve at top institutions. We therefore rank all institutions based on GiA funding received by a university in the field of bioscience in the previous five years. Funding values are normalised linearly, dividing each value by the maximum amount received in the sample. Thus, we have a one-to-one relationship between the original and normalised values. The University of Tokyo represents the value 1 and all other universities are defined as a share of this.[18] Based on this index we assign each academic a PhD ranking and a university ranking. The mean PhD rank is 0.5 indicating that most academics receive their PhDs from one of the top universities. The mean rank amongst current institutions is 0.3, indicating a general downward mobility trend amongst academics following their PhD, as indicated in Figure 1.

[17] The world average number of citations per article in the field of biosciences is 12.9 (BIS, 2013).
[18] The University of Tokyo has always been the largest recipient of the national funds in the Biosciences.

5 Empirical Strategy and Results

We estimate a duration model of career promotion as a function of international research visits, taking into account past and current job mobility events. We assume that each academic is subject to the probability of being promoted conditional on her status of being an assistant or associate professor. We therefore estimate our promotion equation separately for assistant professors that are promoted to associate professors (300 academics) and associate professors that are promoted to full professors (365 academics). In the duration analysis an academic is at risk of being promoted to associate professor from the beginning of his career and at risk of being promoted to full professor as soon as he becomes associate professor[19]. We make use of Cox-proportional hazard model where the dependent variable is the time that elapses from first degree until promotion.

The same model is used to evaluate the differential effect of international research visits for inbred or non-job-mobile faculty based on the life-course perspective approach (Fernandez-Zubieta et al., 2015). We expect that non-job-mobile or inbred academics benefit more from research visits than their job mobile or non-inbred peers and therefore introduce an interaction term.

Age and its square term are included to control for a possible age effect on promotion. Gender, PhD, and university type indicators are used as controls. Performance measures are included to assess the importance of merit for promotion. All regressions also include year dummies.

Table 3 shows descriptive statistics for the main variables used in the regressions for the sample of 300 academics that experience promotion to associate professor and the sample of

[19] 27 professors are promoted from assistant straight to full professor. These are included in the model for promotion to full professor but omitted from the model for promotion to associated professor.

365 academics that experience promotion to full professor. Table A.1 displays the correlation matrix.

There is one caveat to these estimations. Standard models that control for confounding factors fail if the treatment, research visits in our case, is time-variant (Robins, 1999). Thus, controlling for past values of, for example, productivity, which affect later research visits and promotion, can lead to biased estimates. To address this problem of reverse causality between research visits and promotion, we use matching techniques to match each academic to a peer that has not participated in a research visit based on pre-visit observable characteristics. This strategy considers research visits as a treatment with a lasting effect on academics' careers. Research visits are usually undertaken by junior academics and can serve as a treatment affecting future career paths.

We thus divide the sample into a treated group and an untreated control group, i.e. academics that participate in research visits and similar academics that do not. We then use a difference-in-difference (DD) framework to estimate the effect of research visits on years until promotion. Thus, we analyse if, everything else being equal, academics that spend some time in a foreign institution as a visiting fellow are promoted faster. The propensity score matching is described in Appendix B.

Main results

Table 4 shows the results of the Cox model estimations for promotion to associate and to full professor. The Cox results for promotion to associate professor (Table 4 column 1) show that research visits have a strong positive effect, indicating that academics benefit from their international visit in terms of career advancement and are promoted faster. This is consistent with Hypothesis 1. In column 2 we split research visits into visits to the US, which are assumed to be the most valuable for Japanese academics due to the global status of their

institutions, and visits to other countries. Indeed we find that visits to the US increase the hazard to be promoted more than visits elsewhere.

Looking at column 6, we see that for promotion to full professor the picture is slightly different. Temporary research visits seem to play less of a role, the effect remaining positive but turning insignificant. Distinguishing visiting destination, column 7 shows that the effect is again stronger for visits to the US than for other countries though both are insignificant.

The results of the DD estimation confirm that international research visits reduce the time until promotion once we control for pre-mobility factors, year fixed effects and institution rank (Table 5 columns 1 and 6). The mean-comparison test (Table 6) shows that this difference is approximately one year for both promotion to associate and professor. Thus, the career effect from the duration analysis can be confirmed and is significant also at the professor level. The effect for promotion to full professor is driven primarily by research stays at US institutions (column 7). At the level of the associate professor, stays at institutions both in the US and in other countries have a significant career advancing effect (column 2). Overall, these results support Hypothesis 1.

Interaction with other types of mobility

To examine whether temporary research visits particularly benefit non-job-mobile academics, we interact the research visit variable with indicators for job-to-job mobility and inbreeding. Column 3 of Table 4 shows that the interaction between job-to-job mobility and research visit is negative. Thus, the additional positive effect of research visits is weaker for academics that also change jobs. This supports Hypothesis 2a. However, as job changes themselves are associated with a strong positive effect, job mobile academics that also participate in international research visits would be at highest risk of promotion. For promotion to full

professor (column 8) job-to-job mobility is highly significant and research visits turn positive and significant if we include an interaction term, thus indicating a general positive effect of research visits for academics once we control for job-to-job mobility[20]. The coefficient for the interaction term is negative, which is consistent with Hypothesis 2a, but is insignificant.

In columns 4 and 9 we present the interaction of the research visit variable with inbred academics (i.e. those that work at their PhD awarding institution). The main effect for inbreeding is negative both for promotion to associate professor (column 4) and for promotion to full professor (column 9). Thus, time to promotion is longer for inbred academics than for non-inbred academics, in line with results for the US but contrary to Europe. The interaction term is positive and significant for promotion to associate professor, signalling that research visits are particularly important for inbred academics. This is supportive of Hypothesis 2b.

In the DD estimation we also interact the treatment effect with other post-research visit characteristics (Table 5). First, columns 3 and 8 show that in the matched sample the main effect of job-to-job mobility is not significant, but that the interaction term is positive suggesting that the promotion enhancing effect of research visits is weaker if the academic was also job mobile. This result is statistically significant in column 3 but not in column 8. Thus, Hypothesis 2a is supported only for promotion to associate professor.

Second, columns 4 and 9 examine the interaction effect with inbreeding using the matched sample. Inbreeding, just as before, delays promotion to associate professor (column 4). The interaction is significant and negative, suggesting that temporary research visits are particularly beneficial for inbred academics. For promotion to full professor (column 9) the

[20] Job-Mobility remains positive also if we do not include an interaction with visiting fellowship. The coefficient is very similar with 0.89

main effect of inbreeding as well as the interaction effect are insignificant, indicating that the effect of a research visit does not differ between inbred and non-inbred academics. Thus, Hypothesis 2b is supported only for promotion to associate professor.

Postdoctoral mobility

In columns 1 and 6 of Table 4 we also include a dummy for international postdoc experience to compare its effect to international research visits. We find that international postdoctoral mobility does not have a significant effect on promotion risk at associate or full professor levels, though their signs are positive.[21] This is confirmed by a DD estimation based on a sample of academics participating in international postdocs and a matched control group (Appendix C). The effect of postdoctoral mobility on promotion is weaker than that of research visits and insignificant. Thus, the temporariness of postdoctoral appointments and the associated job insecurity may hamper the expected positive effects of prolonged research on later promotion. Therefore, the results support Hypothesis 3. Postdoctoral fellowships, however, also do not affect time until promotion negatively.

Other controls

Merit (publications, citations and funding) has no significant effect on promotion duration for promotion to associated professor. This confirms prior research on the relationship between merit and promotion in Japan (Shimbori, 1981; Takahashi and Takahashi, 2009). However, since we are only looking at full professors that have successfully applied for research funding we are already looking at the best performers and therefore might not find an additional performance effect.

[21] The research visit effect is significantly larger than the postdoc effect for promotion to associate professor ($\rho<0.01$), but not for promotion to full professor ($\rho>0.1$).

For promotion to professor, merit, as measured through average citation counts and funding, has a positive effect on reducing duration until promotion. Thus, merit is indeed important for advancing to the rank of a full professor, a promotion usually accompanied with responsibility for a large research group. Overall this indicates that research visits becomes less important and promotion is based on merit in later career years.

In all regressions we include institution rank at the time of promotion to control for any potential institutional differences. We find a negative effect for promotion to associate and full professor. Thus, academics at top-universities generally wait longer for promotion. We interact this university rank with our research visit measure to see if academics at top universities benefit more from such stays (Table 4 columns 5 and 10). The interaction term is positive in the estimation of promotion to associated professor, indicating that academics at top institutions who have participated in a temporary research visit are promoted sooner than their peers. The effect is insignificant for promotion to full professor.

In the matched sample, on the other hand, we do not find a significant institution effect (Table 5 columns 5 and 10), perhaps due to the nature of the sample which matches academics based on their PhD and pre-mobility institution. The interaction between rank and research visits is insignificant for promotion to associate professor but indicates that academics at top-institutions are promoted sooner, just as in Table 4 (column 5). For promotion to full professor we find a positive interaction term, indicating that the group of academics participating in research visits abroad is not promoted to full professor earlier at higher rank institutions (column 10). Thus, research visits primarily enhance promotion chances at top-tier universities at assistant professor level but not at later career stages when merit may be of more importance.

Why do international research visits benefit careers?

In this context the question arises, weather the positive career effects from temporary research visits are due to increased productivity during the research stay or the acquisition of skills and networks that result in a greater visibility and value of the academic. We therefore compare the productivity of the treated and untreated sample during the 5 years after matching. The results of a mean difference test are shown in Table D.1 in Appendix D. They show that even though the group of academics participating in research visits are more productive and receive more citations during the 5 years following the treatment than other academics, these differences are insignificant, perhaps due to the small sample size. As a second test we include the average number of publications published during the 5 years after matching and their citations into a DD Poisson model. In Table D.1 we have shown that there is a positive correlation between research visits and publication outcomes. If in the DD Poisson regression the effect of research visit disappears or decreases this would imply mediation, i.e. it would imply that research visits affect promotion by increasing the number of publications. The results are presented in Table D.2. Both performance measures are insignificant, suggesting that the performance does not have an additional effect on years until promotion. The effect of research visits does not decrease, suggesting that publication and citation increases resulting from temporary research visits do not decrease time until promotion. Thus, the positive effect of the research visit may be driven perhaps by greater visibility and value of the returning academic or other tacit elements that cannot be measured through publications.

6 Conclusions

This paper investigated the effect of international research visits on academic career progression in terms of time until promotion. We focussed on the case of bioscience in Japan and assembled data on the full academic careers of 370 professors. We considered research

visits which may help to expand existing networks and promote knowledge transfer while at the same time ensuring career stability, which has been identified as the main barrier to mobility in Europe and Japan (Cruz and Sanz, 2010; Stephan, 2012). The Japanese government has a long history of providing international mobility grants for such visits, which have been further strengthened in recent years.

The life-course perspective followed in the empirical analysis called for investigating the effect of mobility on career progress by distinguishing the types of mobility and the career stage at which they occur. Responding to this, the current study distinctively analyses postdoctoral mobility, job-to-job mobility, and research visits, with a particular focus on international research visits, which have been relatively understudied. In doing so, this study presents the first evidence of the link between research visits and other types of mobility. By examining the effect of visits in the context of a long-term career plan with and without job-to-job mobility and for inbred and non-inbred academics we show the importance of considering various mobility events in the analysis of mobility and promotion. Then, comparing postdoctoral mobility and research visits, we evaluated the effect of the interaction between international experience and employment status. Finally, this study indicated different effects of research visits depending on career stages by contrasting promotion to associate professors and to full professors. Overall, our results revealed the complex nature of the mobility-career relationship and gave support to the life-course perspective as a valid approach for the empirical analysis of mobility (Fernandez-Zubieta et al., 2015).

Our findings show that international research visits have a positive effect on promotion and reduce the waiting time by one year. This provides evidence that international research visits benefit academic careers in terms of promotion, though the effect is weaker for promotion to professor, which is instead driven by merit. We further found that the positive effect of

research visits is weaker for academics who also change jobs. Research visits may therefore present a way for non-job-mobile academics to speed up promotion without the need for job mobility. We also found that these visits are particularly important for inbred academics, again indicating that they increase promotion speed.

These results present some interesting insights into the role of research visits for career advancement. Research visits can be considered a form of on-the-job-training that increases skills as well as job satisfaction and may thus increase an academic's performance and sense of achievement. To shed light on the question of why research visits increase promotion speed we looked at their effects on publications performance and found only weak evidence for performance increases. Instead, benefits in terms of teaching and access to external networks may represent more important achievements. These benefits in turn translate into earlier promotion, and academics undertaking such research visits also appear to be less likely to change institution, indicating an increased sense of affiliation with the home institution following the visit abroad.

We still need to concede that it may not be the international mobility per se that is career enhancing but the associated time for research. Thus, alternative programmes that enable academics to free themselves from their teaching and administrative duties to pursue research for an extended period may benefit careers to a similar extent. This release from all non-research duties, however, is easier to achieve when visiting a different institution, whether this is nationally or abroad.

Of course we also cannot rule out the possibility that promotion and involvement in research visits are driven by other unobserved factors, for example ability. We implemented propensity score matching to match mobile researchers to immobile researchers based on pre-mobility characteristics to address this concern and still find a positive effect of research

visits. However, this does not rule out the possibility that these academics have better existing networks (or invisible colleges) which may help with mobility and with promotion (see Pezzoni et al. 2012). It would therefore be important for future analysis to take into account networks of academics when analysing the effect of mobility on promotion.

We further found that, while research visits of permanent academic staff enhance career prospects by providing an early chair, international postdocs have no lasting effect on career progression. This finding suggests that postdoctoral mobility may be an indicator for an academic's struggle to find a permanent position after the PhD, which is line with evidence for Spain and France. This 'extension of the educational career ladder' (Zumeta 1985) is a source of temporariness and uncertainty that could create future problems in recruiting and promotion, as a lack of autonomy and decreasing opportunities for specialisation are possible consequences of delaying tenured positions (Stephan 2012). Also, many young academics in Japan have little incentive to go abroad as science facilities inside the country are of international standing and because their job chances may decrease upon return due to a close-knit scholarly network.

Thus, while policy has enabled mobility at all career levels, mobility itself does not necessarily lead to career benefits for the researcher. As in the above case, this especially affects international mobility due to varying labour market conditions for academics in different countries. One remedy for this may be for policy to address the institution level as well as the individual level. Our findings suggest that international research visits avoid some of the barriers to job mobility: career insecurity, instability, and difficulty of re-entry, and are therefore more likely to lead to promotion, however, the same is not true for postdoctoral mobility. This makes a case for governments to provide better incentives for employing organisations to reward other types of mobility as well.

A better understanding of mobility and career opportunities of individual scientists may also help to evaluate recent reforms in Japan which touch upon many aspects of academic life, including recruitment and promotion. A series of reforms during the last decade, which encouraged and supported universities to adopt a tenure-track system and introduced more fixed-term positions wanted to address problems of inbreeding and inflexibility in the Japanese career system. However, they failed to offer a good career path for junior academics and do not address the problem of invisible colleges and networks required for promotion. Especially, the position of assistant professor is no longer permanent but limited to 5 years, albeit, unlike the US system, without subsequent tenure evaluation. Only a minority are able to move into an associate professorship upon end of contract and instead most have to start a new assistant professorship, leave academia or move abroad. Thus, the question of promotion prospects and how they can be increased becomes more pressing if Japan does not want to lose good junior academics to other markets or to non-research jobs. International research visits during the 5-year assistant professorship may then provide that extra advantage to gain promotion, i.e. to gain a tenure-track associate professorship or a permanent position.

Evaluating the effects of these reforms on academic careers in Japan will be the task of future research. CV analysis was useful for obtaining the exact time of recruitment and promotion but improved measures of networks may further aid future analysis. This research will be important in moving forward the discussion of the Japanese academic career system but beyond this can inform the policy debate on current changes also in Europe.

Our results should be understood with some limitations. The specificity of the Japanese cultural and policy contexts may restrict the applicability of our results to other academic markets. Our results also have to be seen in the context of biosciences and may not be applicable to other scientific fields which may see very different mobility and career patterns

(e.g. Becher and Trowler, 2001; Ackers 2008; Jons, 2007). In addition, we focus on research academics, not teachers; these two groups might follow different career paths, and our results may not apply to academics who work at teaching oriented institutions.[22] This study was able to analyse international research visits in the context of the academic's life-course. More research is necessary to include a broader set of countries, institutions and scientific fields to see if the results hold in other contexts.

Appendix A: See Table A.1

Appendix B: Propensity Score Matching

We use propensity score matching to find a match for each academic. Matching is based on observable characteristics before the international research visit and controls are chosen so that (1) treated academics have no differential publication, citation and funding records, (2) job experience distribution is similar for both groups, (3) year and PhD year distribution is similar, (4) postdoc and prior mobility is equally distributed, and (5) treatment and control group are similarly distributed across different institution types (quality ratings) and PhD rankings. Academics that have not yet participated in international research visits but do so after their promotion can serve as control group for academics that participated before their promotion. We further restrict the matching to academics at assistant professor level for measuring the impact on promotion to associate and to assistant and associate professor levels for promotion to full professor.

We match the 54 academics that have visited another institution abroad while they were assistant professors with a colleague that remained in the university. Figure A.1 shows

[22] The study considers only funded academics that have been promoted to professor, thus, only the most successful academics. The results therefore present a conservative estimate of the effects of international research visits on promotion.

propensity scores of treated and untreated groups before and after matching. The matching returned two groups that are not statistically different in any of the matching criteria. Table B.1 displays descriptive statistics for the group of academics that participate in research visits and those that do not. Similarly, a control group is selected for those 65 academics that were a visiting fellow before their promotion to full professor.

Appendix C: DD of Postdoc and Control Sample

To further check if research stays are desired over postdoctoral stays, we perform a DD analysis for postdoctoral mobility, matching the 29 academics participating in international postdoctoral stays with 29 academics that did not participate in such placements based on pre-mobility characteristics. We find that postdocs abroad do not reduce the time until promotion significantly, but neither do they delay promotion. The mean comparison test in Table C.1 shows that the difference in promotion is insignificant. We find the same results if instead we perform a Poisson regression that controls for university rank and year effects.

Appendix D: DD of Performance

See Tables D.1 and D.2.

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