



A cross-country configurational approach to international academic mobility: exploring mobility effects on academics' career progression in EU countries

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Abstract

This study takes a novel perspective on mobility as career script compliance to explore the factors that might influence how mobile academics in a country perceive the impact of international mobility on their overall academic career progression and job options. We conduct a country-level qualitative comparative analysis on a sample of 24 European Union (EU) countries, based on data from European Commission's MORE3 indicator tool. We find that these perceptions about the impact are shaped by the dominant patterns of mobility in that country, and the general perception of academics in that particular country that international mobility is rewarded in the institutional promotion schemes. This study introduces new explanatory factors for the career script for international mobility. In so doing, we provide a richer understanding of how countries might influence academics' mobility, which sheds light on previous inconclusive empirical evidence linking international mobility and academics' careers. Our findings have implications for the policy design of international mobility and open up new lines of inquiry for cross-country comparisons.

Keywords International mobility · Career scripts · Mobility patterns · Career progression · Qualitative comparative analysis · MORE3 indicator tool

Introduction

The last decades have registered an increased research interest in the determinants and outcomes of researchers' international mobility. This interest has been spurred by the reported systemic and individual benefits derived from brain circulation (de Weert, 2013; European

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Commission, 2018; Franzoni et al., 2014). Consequently, European mobility policies have progressively supported the globalisation of academia, promoting geographical mobility on quantitative bases and linking higher mobility to a more integrated European research system (Cañibano et al., 2008). This has led to a generalised expectation according to which researchers should be internationally mobile (Ackers, 2008; Laudel & Bielick, 2019) and specific European mobility funding schemes have been put in place to promote it.

However, the extent and patterns of researchers' international mobility vary from one European country to another (Cañibano et al., 2017). Previous research has made significant advances in explaining what drives differences in international mobility patterns at individual level, showing that the nature of the research work, field-specific research practices and researchers' career stage shape the patterns of international mobility in terms of duration, frequency and proportion of scientists who are mobile (Cañibano et al., 2008; Jöns, 2007; Laudel & Bielick, 2019). Nevertheless, variations in international mobility among countries cannot be explained by variations in field-specific epistemic practices and personal factors only. Countries have specific uniform terms of contracts across knowledge fields and institutions, and cultural practices (i.e. formal and informal institutions) that act as strong standardising forces at the country level (Janger et al., 2019; Lepori et al., 2015; Sautier, 2021).

One standardising force that has received scant attention in the literature on international mobility is the academic career system operating in the country. Previous research indicates that the academic career system shapes individual career decisions such as that of becoming internationally mobile through career scripts (Barley & Tolbert, 1997; Laudel et al., 2019). Career scripts consist of shared interpretative schemes about what an individual should do to have a successful career (Laudel et al., 2019). Considering that international mobility is perceived as an important criterion in career progression, it becomes part of the academic career script, encoding contextually appropriate behaviours in terms of being mobile and shaping thus actual mobility behaviour.

Building on Laudel et al. (2019), we conceptualise mobility as part of the career script in which academics will position themselves when making the decision about whether to become mobile or not. We explore how general perceptions of institutional recognition of mobility in a country and academics' actual mobility patterns are related to how mobile researchers perceive the effects of international mobility on overall career progression and job options. These aggregated perceptions about the effects of mobility epitomise the career script for mobility and influence thus academics' decisions about whether or not to be mobile (Barley & Tolbert, 1997; Gläser, 2019; Laudel et al., 2019). With this study, we seek to gain a deeper understanding of the factors underlying this career script. Academics' perceptions are embedded within national career systems that may objectively value international mobility differently in their reward schemes. While formal academic career systems are of paramount importance for the impact that international mobility has on career progression (de Weert, 2013), academics' mobility behaviour is largely determined by their perception of whether being internationally mobile favours their career progression. Therefore, academics' behaviour in this matter depends on their subjective perceptions of the objective benefits international mobility can provide. Moreover, academics' adoption of a new type of behaviour is highly dependent on their peers' adoption of such behaviour (Bercovitz and Feldman, 2008; Tartari et al., 2014). Thus, current patterns of mobility will steer researchers towards the same patterns of mobility, which in turn has career consequences as different types of mobility lead to different career outcomes (Aksnes et al., 2013; Børing et al., 2015; Netz et al., 2020). Therefore, the dominant forms of mobility in a national science system and the shared perceptions on whether mobility is rewarded in the career

promotion schemes are likely to influence how researchers value the career outcomes of the mobility experience and thereby the career script for international mobility.

Following previous research, we analyse three types of international mobility: short-term (less than three months), long-term (three months or more) and migration (changing employer during long-term mobility). We distinguish between migration and temporary long-term mobility (Aksnes et al., 2013; Børing et al., 2015; Cañibano et al., 2011, 2016) on the basis of whether or not the experience involves a change of employer (see Appendix, Table 4, for conceptual clarifications). We use the European Commission's MORE3 indicator tool to conduct a country-level qualitative comparative analysis on a sample of 24 European Union (EU) countries as a complementary and novel approach in this field to explore how the combination of these factors are related to how academics perceive the impact of international mobility on overall academic career progression. Qualitative comparative analysis (QCA) is particularly useful when a phenomenon is characterised by causal complexity as it is the case of international mobility, because it identifies different configurations of conditions that lead to a particular outcome. Besides equifinality, this method is also characterised by asymmetry: conditions that appear as sufficient to produce the outcome in one configuration can appear unrelated or inversely related to the outcome in another configuration (Misangyi et al., 2017). Therefore, this method helps shed new light on previous inconsistent findings regarding the career outcomes of different forms of mobility as we further explain.

This study contributes to the literature on international mobility in terms of both advancing knowledge and implementing novel methods. Regarding the former, we take a novel perspective on mobility as career script compliance, which allows us to identify new explanatory factors for the career script for international mobility. Specifically, we show that whether international mobility is perceived as a positive factor for career progression by mobile academics depends on (1) different combinations of dominant national patterns of mobility and (2) academics' general perception that international mobility is rewarded in the institutional promotion schemes. These new explanatory variables provide a richer understanding of how countries might influence academics' mobility and can shed light on previous inconclusive empirical evidence linking international mobility and academics' careers. Our findings are in line with recent research which supports the adoption of contextual perspectives that provide a more comprehensive framework to understand international mobility phenomena (Cañibano & Woolley, 2015; Cañibano et al., 2017).

Regarding the methodological contribution, we introduce several innovative elements in the research on international mobility, which respond to recent calls made in a special issue of Higher Education for methodological innovations in this field (Tzanakou & Henderson, 2021). First, the use of fuzzy-set qualitative comparative analysis allows us to identify different configurations of conditions (i.e. mobility types and perceptions regarding the institutional recognition of mobility) that lead to generalised positive or negative perceptions of the effect of international mobility on career progression. The asymmetrical combinations of identified conditions can shed new light on previous inconsistent findings about how mobility type influences academics' career progression, as we further explain in the discussion section.

Second, the design of this study addresses several limitations previous research has emphasised in relation to the samples and measures used to analyse the outcomes of international mobility. The outcome variable—perceived overall mobility effects on career progression and job options—is a more comprehensive measure of the consequences of international mobility. Specifically, it is closer to the type of global assessment academics carried out when evaluating the impact of mobility, thus contrasting with the previous

partial impact measures addressed in most studies (see Netz et al., 2020 for a review). The national samples of researchers analysed are representative by knowledge fields and career stages at the country level. This solves the biases of previous studies towards highly productive scientists or elite researchers (Azoulay et al., 2017; Cañibano et al., 2018) and specific fields of research where mobility can be more easily identified through publication patterns that can be captured through bibliometrics (Franzoni et al., 2015). Moreover, to our knowledge, this is the first study that explores the potential of the MORE3 indicator tool (developed by the European Commission) to explain international mobility at the country level.

Last, studies on the determinants and outcomes of international mobility have mainly focused on one or a few countries and on one specific type of mobility. Our analysis includes all the European countries for which data were available and all types of international mobility (short- and long-term mobility and migration).

International mobility and career effects

International mobility as a career script

In the last decades, international mobility has become an institutionalised expectation for the academic career (Ackers, 2008; Laudel & Bielick, 2019) and thus an important criterion in career progression. This institutionalised expectation and how it is enacted in the academic community constitute a career script, prescribing thus whether academics should become internationally mobile to progress in their career. Career scripts have been defined as “collective scripts that encode sequences of stages within a career and decisions that are likely to produce these sequences when made in specified situations in a specific institutional setting” (Laudel et al., 2019; p.938). Career scripts are conceptualised as a mediating factor that explain how institutions shape individual career decisions and actions (Barley & Tolbert, 1997; Laudel et al., 2019).

To differentiate this particular career script from other career scripts, we refer to it as international mobility script. According to Laudel et al. (2019), scripts are co-determined by institutions (in our case, the extent to which institutions formally recognise and reward international mobility) and by how individuals collectively enact institutional expectations (in our case, the actual international mobility practices of academics). Specifically, Laudel et al. (2019) proposed in their model of enactment of career scripts that observation of aggregated career decisions and their consequences by the scientific community is an important antecedent of career scripts. Approaching international mobility from this perspective, we propose that the extent to which mobile academics perceive that mobility has had a positive effect on their career progression epitomises the career script for mobility. In contexts where aggregated perceptions indicate that mobility is positive for career progression, mobility is part of the career script and academics are likely to be more internationally mobile as a form of script compliance. Drawing on the Laudel et al. (2019) model, in our specific case, we explore how aggregated international mobility patterns and perceptions of institutional recognition of international mobility configure perceptions of mobility impact on career progression which, in turn, reflects the career script for international mobility. From this perspective, with this study, we seek to gain a deeper understanding of the factors underlying international mobility as career script compliance.

In the following sections, we review previous literature on the relationship between international mobility and career progression. Conceptually, most of this literature focused on the anticipated objective benefits of international mobility for career progression, and our review presents them so. However, the data supporting these studies is based on both objective and perceived benefits of the mobility experience, assuming that perceived benefits are strongly correlated with and reflect objective benefits. Indeed, previous studies using objective and subjective measures of career outcomes indicate a positive significant correlation between them (Spurk et al., 2019).

Direct and indirect effects of international mobility on career progression

Most of previous studies approach the individual level of analysis and indicate that international mobility influences academics' career progression both directly and indirectly. Career progression has been measured employing different proxies such as time to tenure (Cruz-Castro & Sanz-Menéndez, 2010), getting tenure at a highly ranked institution (Bäker et al., 2016), time to promotion (Lawson & Shibayama, 2015) or publication productivity (Bäker et al., 2021). Regarding the direct effects on career progression, international mobility in itself can involve career progression when academics migrate for a better professional development opportunity (Stephan, 2015). For example, in a large sample of European researchers, Cañibano et al. (2020) found that 63% of the mobility instances that led to career progression were migrations (i.e. involved a change of employer). This suggests that migration is an important means for career advancement for a significant proportion of mobile European researchers.

Furthermore, international mobility can sometimes be regarded as a positive criterion for career promotion at their home institution (Netz et al., 2020), since it can be interpreted as a positive signal of researchers' desirable (unobservable) traits—such as open-mindedness or flexibility—(Bäker et al., 2016), or even a necessary condition of a script compliance scheme for getting a particular academic position (Laudel & Bielick, 2019).

Nevertheless, in general, studies directly linking international mobility with career progression provide mixed evidence. While some indicate that international mobility reduces time to promotion (Lawson & Shibayama, 2015) and increases financial rewards (Caparros-Ruiz, 2019), others find a negative relationship with time or the chances to obtaining a tenured position (Cruz-Castro & Sanz-Menéndez, 2010; Cruz-Castro et al., 2016).

Regarding the indirect link between international mobility and career progression, previous studies have identified various kinds of academic outcomes derived from international mobility that can contribute to academic career progression, pointing to both quantitative and qualitative positive impacts of international mobility on academic performance (Cañibano et al., 2017). However, the literature on the relationship between international mobility and academic outputs is nascent and fragmented, with results showing positive, negative and non-significant effects (Netz et al., 2020).

Overall, current explanations of how international mobility can indirectly support career progression point to the different types of resources academics can acquire through international mobility. International experience is expected to increase academics' human and social capital (Bäker et al., 2016). Human capital refers to the creation of new idiosyncratic knowledge and skills that could be obtained through access to new ideas, methods, experiences, training and courses (Azoulay et al., 2017; Bäker et al., 2016; Franzoni et al., 2015). Academics might also increase and strengthen their social capital through their international experience, developing new relationships and accessing new networks (Bäker et al.,

2016; Scellato et al, 2015; Melin, 2004). New human and social capital would increase the quantity and quality of academic output, which in turn would lead to career progression.

All these potential benefits of international mobility represent at the same time motives for which academics become internationally mobile and have been summarised as such by previous research. With few exceptions (e.g. Di Cintio & Grassi, 2017), most studies agree that academic career-related reasons are the main driver for international mobility and economic reasons—such as a higher salary—are secondary or non-significant (Jewell & Kazakis, 2018; Baruffaldi & Landoni, 2016; Børing et al., 2015; Conchi and Michels, 2014; Ackers, 2008; Jons, 2007). These career reasons are related to (1) advancing specific research projects and learning (Laudel & Bielick, 2019; Jons, 2007); (2) complying with international mobility script for a position and thereby sending the adequate signals for career progression (Ackers, 2008; Netz & Jaksztat, 2017); (3) the opportunities the destination country offers in terms of access to the scientific environment, research facilities, prestige and career progression (Reale et al., 2019; Conchi and Michels, 2014; Baruffaldi & Landoni, 2012; De Filippo, 2009); and (4) developing social capital (Bäker et al., 2021). Altogether, these findings suggest that one of the main reasons for which academics become mobile is the expectation of enhancing their career prospects.

This expectation can be realised directly by taking advantage of the promotion opportunity the international mobility itself might offer or indirectly through subsequent use of new human and social capital that is accessed through the international mobility. The extent to which academics perceive that these expectations are met is likely to influence their perceptions of the impact that international mobility has had on their career progression.

However, evidence on the positive effects of international mobility is not always consistent. Some studies highlight concerns about the potential negative impact of international mobility on job security and stability, re-entering the local job market, social networks, access to international funding and career development (Cañibano et al., 2017; Melin, 2005).

Some of the inconsistencies on previous findings could be explained, at least partially, by the type of international mobility and the characteristics of the institutional context for mobility. In the following sections, we present previous research on these aspects.

Type of mobility and career progression

Previous research suggests that short-term mobility, long-term mobility and migration can entail different career outcomes due to the varied types of links they involve with the home country and the different benefits and costs they entail (Aksnes et al., 2013; Børing et al., 2015; Cañibano et al., 2016; Edler et al., 2011; Netz et al., 2020; Sautier, 2021; Tzanakou, 2021).

Long-term international mobility experiences provide opportunities to establish stronger relationships with collaborators and integrate into local networks in the host country, compared to short-term mobility. They also offer more opportunities for developing idiosyncratic knowledge, knowledge brokerage and knowledge specialisation (Franzoni et al., 2015). These factors increase scientists' human and social capital and potentially lead to higher research, teaching and knowledge transfer performance. Previous evidence seems to support the argument that a longer mobility experience is associated with a higher probability of career advancement (Cañibano et al., 2020; Edler et al., 2011). Therefore, a priori, having had long-term international mobility

experiences should be perceived as a positive factor for career progression, while having had short-term mobility experiences should not be particularly relevant for academic career progression.

While in short- and long-term mobility experiences academics maintain their affiliation with the home institution—and thus remain embedded in the home country networks and scientific system—migration involves changing affiliation and detachment from the home country science system. The differences between migrant and non-migrant mobile researchers in this aspect are significant. Several studies indicate that the research productivity and impact of migrant researchers is higher than that of temporary mobile researchers. Migrant scientists outperform domestic scientists in terms of publication impact (Franzoni et al., 2014; Tartari et al., 2020). Compared to temporary mobile academics, migrant researchers develop stronger links in both the professional and personal arena. The reason is that, over time, they become embedded in the host country's scientific and social systems, acquiring both more social and cultural capital (Morley et al., 2018). Scellato et al. (2015) find that scientists who emigrate have larger collaboration networks than those who lack such experience. These networks are likely to provide new career opportunities by facilitating access to international projects and, thus, merits for career advancement.

The above findings suggest that migrant researchers should enjoy better career progression prospects than temporary mobile researchers in the long run, because they acquire more human, social and cultural capital, and produce a higher quality output. However, the evidence for this is not conclusive either. Morley et al.'s (2018) study provides a balanced view over the issue, underscoring several cons for migrant academics such as isolation and integration problems. Cañibano et al. (2020) find no statistically significant association between migration and career stage advancement. Moreover, if we take into consideration the usually short time frame adopted to analyse the impact of mobility (Bäker, 2015) and the obstacles faced by migrant researchers when returning to their country of origin (Ackers, 2008; Cañibano et al., 2017; Lu & Zhang, 2015), migration appears to undermine career advancement.

When migrant researchers return to their home country or relocate to another country, they have more transaction costs in terms of adaptation, relocation and family disruption than temporary mobile academics (Ackers, 2008; Cañibano et al., 2016). They may also have less local social and cultural capital and a narrower understanding of “how things are managed” at home (Lu & Zhang, 2015, p. 292). Returned-migrant researchers require a period of readjustment before they start putting into practice the knowledge and skills they gained abroad (Lu & Zhang, 2015). In a large sample of European researchers, Cañibano et al. (2017) find that returnees are more dissatisfied than non-returnees with salary, benefits, career advancement and social status, but more satisfied with job security. Returnees also report a decrease in access to international funding, job options, career development and progress in salary (Cañibano et al., 2017). Moreover, migrant researchers that do not return to their home country and relocate to another seem to face even more obstacles for career progression than returnees. In a sample from ten European countries, Marinelli et al. (2013) find differences in terms of career promotion between returned-migrants and still migrant researchers, with the latter facing more difficulties than the former in achieving a tenured position.

Altogether, these previous findings suggest that academics who migrate would be able to reap the benefits of enhanced human and social capital for career progression as long as the academic system facilitates integration for the newcomers and reintegration for returned migrants. An important facilitator is the institutional recognition of international

mobility as a criterion for career progression. Therefore, it is reasonable to expect that migration will be perceived positive for career progression when the academic career system rewards it.

In summary, each form of international mobility, migration and (short and long) temporary mobility, presents positive and negative aspects for career progression. These findings appear to be contradictory and might be better understood by examining the characteristics of the science system where academics develop their scientific careers (Cañibano et al., 2016; Cruz-Castro & Sanz-Menéndez, 2010; Sanz-Menéndez et al., 2013; Scellato et al., 2015). The characteristics of the science system may be a contingent factor to explain the effect of academic international mobility on career progression (Sautier, 2021). These characteristics have both a formal and an informal dimension (Gläser, 2019). The first refers to the existence of national schemes for promoting international mobility and the inclusion of international mobility as a formal criterion for career progression (de Weert, 2013). The second refers to how researchers actually perceive these incentives, based on the interpretation of their own and peers' experience (e.g. Melin, 2005; Musselin, 2004; Sautier, 2021). These aspects are addressed in the following section.

Country contingencies for the relationship between international mobility and career progression

Country contingencies play an important role in connecting international mobility and career progression (Cruz-Castro & Sanz-Menéndez, 2010). Previous research identifies two main country contingencies affecting the link between international mobility and career progression: (1) performance of the science system and (2) promotion schemes. First, high performing science systems facilitate the optimisation of international mobility outcomes. For example, Scellato et al. (2015) find that the home science system moderates the effect international mobility has on the development of collaboration networks; they show that scientists from countries with stronger research systems develop larger networks than those from countries with relatively weaker systems. Second, country promotion schemes have been identified as a contingent factor for the relationship between international mobility and career progression. While some science systems clearly reward mobility and consider it a criterion for promotion both formally and informally (i.e. it is part of the career script), in others, it seems to be dissociated from the formal criteria.

A number of studies provide evidence that international mobility is positively valued in the career promotion schemes. Lawson and Shibayama (2015) find that temporary stays abroad shorten the time to promotion upon return for Japanese academics in the biosciences. In a similar line, Musselin (2004) notes that French researchers also perceive international mobility as a key factor for future career promotion. On the other hand, the research also acknowledges that a highly rigid labour market and informal institutions that reward loyalty might put non-mobile academics at an advantage in terms of reaching a tenured position in a shorter period of time. This pattern can be found in Spain (Cruz-Castro & Sanz-Menéndez, 2010; Sanz-Menéndez et al., 2013), a context that typically discourages migration while supporting temporary mobility without changing affiliation (Cañibano et al., 2016).

These studies suggest that there are major differences between countries, which shape the patterns and outcomes of scientists' international mobility. Countries seem to promote different types of international mobility, which are implicitly reflected in the international mobility scripts prevailing in each country. However, regardless of the type of international

mobility supported in a determined country, institutional recognition of international mobility for career progression seems to be a key element for how academics perceive the impacts of mobility on their career (and hence whether they should become internationally mobile or not): first, because it is a signal about the advisability of engaging in mobility practices, so academics will try to comply with this criterion (i.e. script compliance) to ensure their career progression and second, because it represents a direct incentive and provides a differential advantage in relation to non-mobile academics. Therefore, it is reasonable to expect that in those countries where institutions recognise mobility for career progression, individuals will perceive that mobility is more beneficial for their career and will be more willing to become mobile, compared to countries where such recognition is not perceived.

However, cross-country comparisons are rare in this field of study (Cañibano et al., 2017; Netz et al., 2020; Sautier, 2021; Tzanakou & Henderson, 2021). Previous research examining more than one country is generally limited to identifying the different patterns of mobility and mobility outcomes, while ignoring the contextual factors that might explain these differences (e.g. Conchi & Michels, 2014; Gibson & McKenzie, 2014; Marinelli et al., 2013). The few studies that include contextual factors in the analysis to explain differences in the patterns and outcomes of mobility focus on formal aspects such as working conditions (de Weert, 2013; Franzoni et al., 2012; Janger et al., 2019), country performance indicators—such as economic status (Rostan & Höhle, 2014) and strength of the science system (Franzoni et al., 2014, 2018; Scellato et al., 2015)—and institutional resource endowments for research (Janger et al., 2019; Lepori et al., 2015; Veugelers & Van Bouwel, 2015). The academic career system operating in the country setting has not been explored in previous studies, although it can potentially shape scientists' international mobility behaviour through the career scripts for mobility (Gläser, 2019; Laudel et al., 2019). This is noticeable, since international mobility scripts orient individual action and can lead to the creation of patterns of mobility at national level (Barley & Tolbert, 1997; Laudel et al., 2019).

In sum, the design of national academic career systems and the mobility career scripts operating in each country represent an important source of country contingencies that could shape, positively or negatively, the connection between international mobility and career progression. Given the outstanding benefits of international mobility for science systems (Baruffaldi & Landoni, 2012; Edler et al., 2011; Jonkers & Cruz-Castro, 2013), additional science policy action is required in the EU to promote a consistent positive relationship. The analyses we carry out in the following sections aim to shed new light on this issue.

Methods

Data

We used the indicator tool of the Mobility Survey of the Higher Education Sector (MORE), 2016 wave (<https://www.more-4.eu/indicator-tool>), for the cross-country comparison of the effects of international mobility on researchers' total career outcomes. MORE is considered to be the most comprehensive empirical study on researcher mobility in Europe. The tool contains around 150 indicators which represent country aggregated data from the European Union Higher Education (EU HE) survey about

researchers, their careers and mobility. The EU HE survey was administered in 2016 to representative samples of researchers in each of the 28 EU member states plus three associated countries (Skålholt & Iversen, 2019). It targeted more than 10,000 researchers working in EU HE institutions, regardless of their citizenship status, who self-reported information on their mobility experience and the institutional context (see Appendix, Table 6, for the distribution of the sample by country). The MORE 3 final report indicates that 17.1% of the respondents are less than 35, 29.4% are between 35 and 44, 27.4% are between 45 and 54, 19.5% are between 55 and 64 and 6.4% are more than 65 years old. Forty-one percent of the respondents in the sample are females. The sample is distributed as follows among the different fields of science for the EU28 countries: Natural Sciences (Science, Engineering and Technology), 48%; Health Sciences (Medical and Agricultural Sciences), 17%; and Social Sciences and Humanities, 35%. Regarding the career stage of the respondents, the MORE project defines 4 career stages: R1, First Stage Researcher (up to the point of PhD); R2, Recognized Researcher (PhD holders or equivalent who are not yet fully independent); R3, Established Researcher (researchers who have developed a level of independence); and R4, Leading Researcher (researchers leading their research area or field). The distribution of the total sample among the four career stages is the following: R1, 15%; R2, 18%; R3, 40%; R4, 27%.

Mobile researchers are considered the researchers in a country who had worked in other EU or non-EU countries before the moment of the survey. In all cases, the sample on which the indicators are built consists of researchers at different career stages who work in European universities and are PhD holders or equivalent (i.e. R2-R4 researchers). Mobility indicators refer to the international mobility experience of the researchers after gaining the highest educational qualification (i.e. PhD). More information about the sampling and data collection can be found in European Commission (2018) and de Weert (2013).

Our analysis focuses only on the 27 current EU member states, as we explore mobility patterns and career effects with the aim of further informing public policy in the EU. Lack of available data for Malta, Latvia and Romania on the outcome variable (overall career effects of mobility) led us to eliminate these countries from the analysis. Our final sample therefore comprised 24 cases.

As we explained above, the impact of international mobility on researchers' career outcomes is shaped by factors related to both the characteristics of the mobility and the characteristics of the science system where the researchers work, which may or may not recognise and reward mobility. To approximate these factors, we extracted data from the MORE3 indicator tool referring to (1) the type of mobility: long- and short-term mobility and whether the researcher changed employer during long-term mobility (i.e. migration); (2) the characteristics of the country's academic career system: whether mobility is regarded as a positive criterion for career progression at the institution where the researcher works; and (3) total career and job option effects of mobility for mobile researchers. The long-term mobility indicator is built based on the affirmative responses to the item "I have worked abroad for more than 3 months at least once in the last 10 years" after gaining the highest educational qualification (PhD or other). The short-term mobility indicator is based on the affirmative responses to the item "I have worked abroad for under 3 months at a time during the last 10 years". Migration indicator is based on the affirmative responses to the question "Did you change employer" during the last 3 long-term mobilities in the last 10 years. The indicator referred to the recognition of mobility for career progression is based on the question "In your experience, would you say an international mobility experience is regarded as positive or negative factors for career progression in your

home institution”. Finally, the indicator referred to the effect of mobility is based on the responses to the question “Please indicate below the effects, if any, of your entire mobility experience on your overall career progression to date”. The measurement of all these indicators is detailed in Appendix (see Table 5).

Analysis

Method

We used fuzzy-set qualitative comparative analysis (fsQCA) and the fsQCA software (version 3.1b) to explore the outcomes of different configurations of mobility and science system characteristics in terms of career progression across EU countries. FsQCA is considered a mixed method, which combines quantitative and qualitative techniques. It takes advantages from both approaches (i.e. it analyses data by cases using qualitative inductive reasoning and complements it with quantitative empirical testing) to identify the different configurations that constitute sufficient and/or necessary conditions leading to the outcome of interest (Pappas & Woodside, 2021).

The method allows to support the three principles characterising causal complexity approaches, namely, conjunction (i.e. a given outcome is usually the result of the interdependence of multiple conditions rather than of a single condition), equifinality (i.e. a given outcome may be reached through different pathways or combination of conditions) and asymmetry (i.e. the presence/absence of a condition may produce the same given output, depending on its combination with other conditions) (Fiss, 2011; Misangyi et al., 2017; Ragin, 2008).

By means of Boolean algebra and fuzzy-set theory, it enables to identify sufficient and/or necessary conditions that explain the outcome of interest, but also those conditions that are insufficient on their own but are necessary parts of solutions leading to the outcome of interest (Fernández-Esquinas et al., 2021; Pappas & Woodside, 2021).

The most relevant reasons for applying this method are that it allows capturing complex phenomena, identifying the existence of different combinations of conditions producing an outcome, and its applicability for small samples (Fernández-Esquinas et al., 2021). Hence, the characteristics of fsQCA are particularly suitable for our exploratory cross-country analysis because it considers that cases are constituted by configurations of theoretically relevant attributes or conditions (i.e. mobility patterns and science system characteristics) that may be differently combined to produce one result (i.e. positive impact of mobility on career progression). Therefore, we can identify what combinations of mobility types and country science system characteristics are sufficient for creating a general perception among mobile researchers in a country that mobility has a positive impact on their overall career progression.

The criteria used to assess the FsQCA results are based on quantitative measures of consistency and coverage.¹ Consistency refers to the degree to which the cases sharing a given combination of conditions agree in displaying the outcome in question. Put differently, it indicates how closely a perfect subset relation is approximated. Coverage refers to the

¹ “Consistency is an asymmetric metric analogous to the symmetric correlation metric; coverage is an asymmetric metric analogous to the symmetric coefficient of determination” (Woodside, 2014, p. 2499).

Table 1 Descriptive statistics and calibration of outcome and conditions

Outcome/condition	Min	Max	Mean (SD)	Fully in	Crossover point	Fully out
Effect of international mobility on academic career and job options	0.41	0.73	0.58 (0.09)	0.71	0.58	0.45
Short-term mobility	0.30	0.49	0.38 (0.05)	0.45	0.38	0.31
Long-term mobility	0.17	0.61	0.28 (0.10)	0.38	0.28	0.18
Migration	0.13	0.67	0.33 (0.13)	0.50	0.34	0.16
Mobility recognition for career progression	0.72	0.92	0.86 (0.05)	0.90	0.87	0.78

n (EU HE) Survey

proportion of the outcome that is covered by a configuration of conditions or by the overall solution, thus indicating its empirical relevance (Misangyi et al., 2017; Ragin, 2008).

Consistency is used to identify whether a specific condition is necessary for the presence/absence of the outcome (the necessity analysis), which occurs when the consistency value meets the minimum threshold of 0.9. The consistency measure is also used to conduct the sufficiency analysis, where the minimum threshold recommended is 0.75. For example, the raw consistency measure is used in the truth table (see details below in the “FsQCA procedures” section) to identify which combinations of conditions lead to the output of interest. It is also used when assessing the final solution obtained, by means of the consistency of each configuration (combination of conditions) and the overall solution consistency (encompassing all the configurations leading to the outcome) (Pappas & Woodside, 2021). The coverage is used for assessing the final solution, which offers measures of the raw coverage (i.e. the amount of the outcome explained by a specific solution), the unique coverage (i.e. the amount of outcome exclusively explained by a specific solution) and the overall solution coverage (i.e. the amount of outcome explained by all the solutions) (Rihoux and Ragin, 2008).

FsQCA procedures

The first step in fsQCA is the calibration of the variables. Our outcome variable is the impact of mobility on mobile researchers’ career progression and we consider four causal conditions, namely long- and short-term temporary mobility, migration (employer change during long-term mobility) and the extent to which mobility is positively evaluated for career promotion (i.e. the country context for mobility). Calibration involves transforming the raw data into fuzzy values based on extant theory and substantive empirical knowledge (Ragin, 2008). These qualitative criteria define the threshold at which a case can or cannot be considered a member of a set or in the fuzzy area. Given that we do not draw on extant theory nor do we have substantive empirical evidence to establish these thresholds for our variables, we used the direct method proposed by Ragin (2008) and relied on three thresholds (based on percentiles) widely used in many previous studies to establish three cut-off points: 90% (fully in), 50% (crossover point) and 10% (fully out) (Amara et al., 2020; Stroe et al., 2018). The descriptive statistics and calibration values for the outcome and conditions are presented in Table 1.

The second step consisted of an analysis of necessity to identify whether any of the causal conditions is a necessary condition leading to the outcome of interest. According to the QCA standards of good practices, this analysis of necessity must be performed separately before truth table analysis to prevent wrongly claiming necessity of conditions (Fernández-Esquinas et al., 2021).

Then, we used fsQCA's truth table function to identify the different combinations of conditions resulting from the three types of international mobility considered and the recognition of mobility for career progression that are sufficient for positive career effects to occur (Ragin, 2008). The truth table algorithm maps all the logically possible combinations 2^K (being K the number of conditions) and empirical occurring combinations. This implies that combinations that are not empirically represented by the cases under study (i.e. the remainders) are also mapped (Misangyi et al., 2017).

Following the principle of causal asymmetry by which the causes leading to the presence of the outcome may differ from those leading to its absence (Fiss, 2011; Ragin, 2008), we rely on the truth table twice, to test for the sufficient conditions for (1) the *positive* career effects and (2) the *absence* of positive career effects. Thus, we applied the same strategy to test for the sufficient conditions for the positive career effects not to occur. In both cases (presence and absence of the output), the initial truth table had 16 rows that responded to all the possible combinations of conditions. We retained only those which met the conventional consistency threshold of 0.8 (Rihoux & Ragin, 2009) and had at least one case.² All the 24 country cases included in the analysis appeared in our results, either in the analysis of positive effects (12 cases are left in the truth table) or in the analysis of the absence of positive effects (the remaining 12 cases are left in the truth table). In other words, the cases excluded from the first analysis (presence of positive effects) were included in the second analysis (absence of positive effect).

FsQCA provides three possible solutions: complex, parsimonious and intermediate solutions. To calculate the complex solution, the software uses only those configurations for which there is empirical evidence (Ragin, 2008). This is the most descriptive and conservative solution. The parsimonious solution allows the combination of any counterfactual cases that yield a logically simpler solution (Ragin, 2008). In the case of the intermediate solution, the researcher decides only the plausible counterfactuals, based on theory, and this is the one that is generally presented (Pappas & Woodside, 2021; Ragin, 2008). Given that our study is exploratory in nature, we did not impose any restrictions about the presence or absence of these conditions for a (non-)positive effect of mobility on career progression. We conservatively made the assumption only for the condition of mobility recognition for career progress. Specifically, in countries where individuals state that mobility is positively regarded by their institution for career promotion mobility, we expected a positive impact on career progression and job options. Therefore, we imposed this condition for the outcome to occur, and we also imposed the absence of this condition for the outcome not to occur. We present the intermediate solution below, which is the one that is generally recommended to present the results of FsQCA (Pappas & Woodside, 2021; Ragin, 2008).

² In the context of small-N studies (from 12 to 50 cases), it is common to specify a minimum frequency of one or two cases, given the small number of cases and the exploratory nature of such research, as well as the researcher's intimate knowledge with the cases (Greckhamer et al., 2012, p. 66).

Table 2 Conditions for positive effects of international mobility on academic career and job options

	Solution 1	Solution 2	Solution 3
Short-term mobility	○	●	○
Long-term mobility	●		○
Migration	●	●	○
Mobility recognition for career progression		●	●
Raw coverage	0.49	0.41	0.30
Unique coverage	0.20	0.12	0.09
Consistency	0.85	0.92	0.85
Overall solution coverage	0.70		
Overall solution consistency	0.86		
Cases that respond to each configuration	Cyprus Denmark France Ireland Luxembourg Netherlands Sweden	Austria Belgium Finland Germany	Poland

Results

We first performed a test to check whether any of the causal conditions (or their absence) is a necessary condition for the occurrence or non-occurrence of the outcome. A specific condition is considered necessary for the outcome of interest if it always holds when the outcome occurs. Again, we assess both the presence or absence of each condition for the occurrence or non-occurrence of the output because, according to the principle of causal asymmetry, a condition that leads to the occurrence of an outcome can be different from a condition that leads to the non-occurrence of the same outcome (Misangyi et al., 2017; Ragin, 2008). The results indicate that none of the causal conditions or their absence meets the minimum consistency value (i.e. 0.9) to be considered a necessary condition for achieving our output of interest (either the presence or absence of a positive impact of mobility on career progression).

We second performed the analysis to identify sufficient conditions. The results of the analysis of conditions that lead to positive effects of international mobility on academic career are presented in Table 2. The symbol ● indicates that a particular condition has to be present for the outcome to occur. The symbol ○ indicates that a particular condition must be absent for the outcome to occur. A blank space or no symbol indicates a “don’t care” condition, which means that the outcome takes place independently of the presence or absence of that particular condition. The level of consistency of the overall solution is above the threshold of 0.8 and the overall solution coverage is of 0.7, indicating that each of the combinations of conditions presented in the global solution is sufficient for the outcome to occur and together they explain 70% of the outcome (Ragin, 2008).

We find three main configurations (solutions 1, 2 and 3) of mobility type and institutional recognition of mobility for career progression leading to mobile academics’ general perception that mobility positively impacts their career advancement. Most of the countries where academics perceive that international mobility has a positive impact on their career seem to correspond to two main configurations (solutions 1 and 2). The first configuration

(solution 1) includes countries where a high majority of academics do long-term stays and migrate, and where short-term stays are uncommon (Cyprus, Denmark, France, Ireland, Luxembourg, Netherlands, Sweden). In these countries, specifically rewarding international mobility in career progression does not play a relevant role. The benefits of international mobility for career progression seem to derive from doing long-term stays in other countries (be they temporary stays or migrations) and acquiring the human and social capital that further endow the academics with resources for career progression. The script for mobility in the case of these countries seems to be sustained mainly by a shared understanding that long-term international mobility is beneficial for the academic career, independently of institutional recognition. This shared understanding appears to be reflected in the massive practice of long-term mobility (maintaining and changing employer) and the scarce practice of short-term stays abroad.

The second configuration (solution 2) covers countries where most academics go both for short-term stays and migration, and international mobility is widely used as a criterion for career progression (Austria, Belgium, Finland, Germany). These patterns of short-term mobility and migration might suggest that institutions promote short-term mobility,³ and are open to receive returned-migrants and migrants in the system, recognising their international experience for career promotion. In this case, the institutional recognition of mobility might be the key component of the career script for international mobility, reinforced by aligned mobility practices of academics. The comparison between solutions 1 and 2 indicates that migration provide academics with benefits that are valuable for career promotion, independently of whether the international mobility itself is formally used as a criterion for promotion or the realisation of other short- or long-term mobilities.

Together with these two majoritarian configurations, there is a third one which represents the case of a single country: Poland (solution 3). In this configuration, few academics do any of the three forms of international mobility, but the institutional system does recognise international mobility for career progression. This seems to be sufficient for a large proportion of mobile academics to perceive that international mobility has an overall positive effect on their career. Therefore, although international mobility of any kind is not an extended practice among academics in Poland, it could pay off for those who do it because the system rewards it. In this case, the script seems grounded in the institutional recognition of international mobility. Moreover, given the scarce mobility practices, mobility could allow researchers to differentiate through signalling higher flexibility and potential human and social capital compared to non-mobile researchers.

In general, we can observe that the conditions of mobility recognition for career progression and migration are present in two out of the three combinations of conditions that lead to positive career effects of international mobility. These findings are in line with the rational we proposed in the literature review section, which suggests that mobile academics who perceive international mobility as having a positive impact on their career belong to contexts where institutions acknowledge and reward mobility in processes of career promotion. However, the duration of temporary international mobility does not seem to play a determinant role, as both short- and long-term stays lead to a positive impact of international mobility, together with other combinations of conditions.

We also performed an analysis to determine when international mobility is not perceived as having positive effects on mobile academics' career progression (absence of the output).

³ Previous research such as Ackers (2008) indicates that mobility at highly prestigious foreign universities is particularly valued.

Table 3 Conditions for the absence of a positive effect of international mobility on academic career and job options

	Solution 1			Solution 2
	Solution 1a	Solution 1b	Solution 1c	
Short-term mobility	●	●		○
Long-term mobility		○	○	○
Migration	○	○	○	●
Mobility recognition for career progression	○		○	
Raw coverage	0.46	0.56	0.50	0.34
Unique coverage	0.07	0.14	0.08	0.05
Consistency	0.88	0.85	0.87	0.92
Overall solution coverage	0.80			
Overall solution consistency	0.84			
Cases that respond to each configuration	Bulgaria Greece Hungary Slovenia Spain	Bulgaria Czech Republic Greece Italy Slovakia Slovenia	Bulgaria Croatia Greece Portugal Slovenia	Estonia Lithuania

In this case, we find two main configurations of conditions that explain the absence of positive effects of international mobility on academic career progression (Table 3).

The first solution covers most of the cases in this situation and presents three sub-solutions (1a, 1b and 1c). Sub-solutions are characterised by being configurations (i.e. combination of conditions) that share some condition(s), but also present slightly different condition(s) that are not incompatible between them. In our case, the three sub-solutions share the condition that migration is not a common practice among academics in the country, independently of the presence or absence of other forms of mobility and regardless of whether the promotion system recognises mobility. The compatibility across the sub-solutions implies that a country could be represented though different sub-solutions, as their conditions are not contradictory among them (e.g. Bulgaria, Greece, Slovenia). The presence of “don’t care” conditions allows for compatible variations across sub-solutions. This is so because the presence or absence of a condition is logically compatible with the “don’t care” condition.

The second solution is characterised by the absence of all forms of temporary mobility and the presence of migration, which indicates that in these countries changing affiliation and detaching from the country academic career system can lead to negative consequences for mobile researchers’ career progression or, in the best-case scenario, have no effect.

In general, we can observe that long-term temporary mobility is not a common practice in countries where international mobility does not have a positive effect on career progression and that the practice of migration does not provide career advancement benefits for researchers. Only short-term mobility appears to be a dominant practice and the appraisal of international mobility for career promotion is either absent or indifferent. Together, the different patterns that lead to a null or negative effect of international mobility on mobile academics’ careers suggest that the university system does not reward mobility, contractual fidelity is appreciated and the most common type of mobility academics do is short term. These structural conditions perpetuate the perception among academics that international

mobility does not benefit their academic promotion which, in turn, might discourage them from being mobile. It is noticeable that most of these countries have “young” science systems that have been fully opened only in the last decades, after the end of military dictatorships (Greece, Portugal and Spain in the 70 s) or the fall of communism in Eastern Europe at the end of the 80 s, and their science performance indicators are lower than the EU average (OCDE, 2021, indicator referring to Top 500 universities).

A comparison of the configurations of conditions that produce positive effects of international mobility on career progression (solutions in Table 2) with those that do not produce such effects (solutions in Table 3) leads us to conclude that the main differences lie in the time horizon of mobility and whether the promotion system rewards mobility. In countries where the common practice is long-term mobility (either in the form of long-term research stays or migration) and the promotion system includes international mobility as a criterion for promotion, mobility leads to a positive effect on mobile academics’ career progression. In contrast, where the common practice is short-term mobility, long-term mobility is scarce and the system does not value international stays for promotion, mobility is perceived as having null or negative effects on mobile academics’ career progression.

Finally, following the standards of good practice in fsQCA (Greckhamer et al., 2018; Schneider & Wagemann, 2010), we took two additional steps to ensure that the results obtained were robust. First, as our criterion for calibration was quantitative, our decision regarding calibration might have conditioned the results. For this reason, we also used a different method of calibration for all the indicators, splitting the values by quartiles and grouping the cases according to their degree of membership in the target set (Ragin, 2008). The configurations of conditions obtained using this calibration method revealed no substantial differences. Second, we compared the three possible solutions (complex, parsimonious and intermediate) that FsQCA provides. We found that the intermediate solution was identical to the complex solution, which is the most conservative one. Regarding the parsimonious solution (i.e. the simplest configurations in terms of presence/absence of conditions), we found they were compatible with those provided by the intermediate solution. Altogether, these additional analyses performed confirm the robustness of our results.⁴

Discussion and Conclusions

Researchers’ perception that international mobility is positive for career progression is key to whether they will be willing to have that professional experience or not. Previous evidence on the role of international mobility is mixed: reaping its fruits depends on several individual and contextual factors that are interrelated through complex patterns. This study contributes to the discussion on the outcomes of international mobility by taking a novel approach: international mobility as career script compliance. From this perspective, we show that the national context for mobility in terms of both mobility patterns and the institutional recognition of mobility for career progression shape the extent to which mobile researchers perceive that international mobility has positive consequences for their career progression and, thus, the career script for international mobility. Specifically, our results show that the duration of international mobility and institutional recognition of mobility for career progression are factors that, combined among them, determine whether mobility

⁴ These analyses are available upon request from the authors.

is perceived positively or not. The presence of migration appears more frequently in configurations leading to perceived positive effects, while its absence is more frequent in those leading to perceived non-positive effects of international mobility on academic career. Conversely, short-term mobility seems to be more absent in configurations exhibiting positive effects, while it is present in half of the solutions leading to non-positive effects of mobility on career paths. International mobility as a criterion in the promotion system is mostly observed in configurations of countries where mobility is perceived to have positive effects on academic career progression. Therefore, promoting long-term mobility and formally recognising it in academic promotion systems appear to be key conditions for mobile researchers of a country to perceive the beneficial effect of their international mobility.

A broad perception that international mobility has positive career effects will lead more academics to be mobile, creating a virtuous circle where incentives and practices are aligned. The alignment of formal incentives and academic practices depends to a large extent on science evaluation systems and promotion schemes. Previous research has shown that evaluation influences academics' decisions and performance (Hammarfelt & De Rijcke, 2015), since researchers' practices are shaped by the potential rewards they may obtain as a result of the evaluation process. Institutional reward procedures are considered an inducement mode of influence that make researchers' practices more or less attractive by providing positive or negative rewards (Gläser, 2019). Researchers anticipate what they expect would be positively evaluated and rewarded and react to it by adjusting their academic decisions to the career script and to what it is deemed to be "good" practices (Benneworth & Olmos-Peñuela, 2022).

In the context of mobility evaluation and recognition, the mobility career script exerts a steering effect in researchers' decisions to move abroad. This steering effect works as a result of a multi-level governance system of connecting different actors. At a macro and meso level, governments and institutions send signals about the advisability of engaging in mobility practices by considering mobility as an important criterion for promotion. At the micro level, individual researchers retain substantial autonomy and freedom over their academic decisions (Zalewska-Kurek, 2016) and, in particular, over whether they become mobile or not. Academics seek to comply with the career script, so they are tempted to respond to those external signals. However, researchers are subject to resource limitations that may hinder their mobility decisions. International mobility is resource intensive, so for researchers to be mobile, institutions must provide the necessary endowments. Therefore, in addition to signalling advisable practices and positively assessing them, institutional support in the form of financing programmes is also required for academics to be able to play by the rules. Lack of adequate support for international mobility might explain the case of Poland where, although international mobility is recognised as a criterion for promotion and mobile academics perceive a positive impact of mobility on their career progression, neither short- nor long-term international stays are common. The Polish case suggests that the steering effect derived from signalling "good mobility practices" is meaningless and ineffective if it is not accompanied by enabling conditions, such as a supportive environment that compensates the burden associated with academic mobility through funding or high salaries (Janger et al., 2019). From a theoretical perspective, this suggests that the script seems to be undermined by the lack of resources and institutional support for researchers to follow the formal institutional prescription.

Taken together, our findings can contribute in several ways to a better understanding of the impact that mobility has on academics' career development and, particularly, of how the combination of current mobility practices and their institutional recognition shape academics' decisions about international mobility.

First, we respond to recent calls for research into how international mobility affects academics' careers (Netz et al., 2020) by proposing a model to identify multiple pathways (combining types of mobility and academic career system characteristics) leading to perceived academic career progression. The qualitative comparative analysis conducted has allowed us to establish groups of countries which have in common the extent to which they promote a context that rewards international mobility. Interestingly, in several of these countries (Cyprus, Denmark, Ireland, Luxembourg and Netherlands), the number of inflows of foreign researchers is substantially higher than that of outflows of national researchers (Cañibano et al., 2017). They are countries with strong science systems and a clear receiving profile, which might explain the openness to mobility and the fact that mobile academics perceive that the experience is positive for their career progression.

In terms of commonalities among the countries where mobility is not perceived beneficial to career progression (e.g. Bulgaria, Greece, Italy, Slovakia and Spain), previous research indicates that several of them have weaker science systems and a clear profile of sending out more researchers than receiving (Cañibano et al., 2017). Moreover, these country characteristics contrast with those described for the group of countries where mobile researchers perceive positive impact from their mobility experience. Differences are observed in terms of their resource endowments for research (OCDE, 2022) and consequently for mobility. Scarce resources might explain the dominant pattern of short-term mobility that, combined with lack of institutional recognition, leads to the lack of positive impact of mobility on career progression.

These exploratory results, together with future research in this line, can provide new insights for designing EU mobility policies as well as individual member states' policies. This study adds new elements to refine these policies and make them more effective, by highlighting the importance of the type of mobility countries promote and the need to recognise it in the promotion schemes.

The second contribution is that our results can also shed light on previous inconsistent findings on the effect of mobility on scientists' career progression, which pointed to both positive and negative effects (Netz et al., 2020). Our findings suggest that the country context and the specific design of promotion criteria are important conditions for academics to perceive that long-term mobility is beneficial for their career progression. More specifically, previous studies found both positive (e.g. Franzoni et al., 2014; Scellato et al., 2015) and negative (e.g. Cañibano et al., 2017; Marinelli et al., 2013) effects of migration on academic career progression. Our results indicate that the role of migration varies depending on whether long-term mobility is also a common pattern of mobility in a country. This suggests that peers' patterns of mobility—and particularly the extent to which long-term mobility is a common pattern among researchers in a country—helps to create a context that reduces the transaction costs associated with return or relocation. In this case, the script is reinforced informally through the adoption of mobility practices that could be driven by the perceived human and social capital benefits derived from international mobility experience.

Third, this paper responds to recent calls for comparative studies across countries (Netz et al., 2020). Most previous research on the effect of international mobility on academics' output limited the context of study to a single country (e.g. Aksnes et al., 2013; Cruz-Castro et al., 2016) or a few countries (e.g. Baruffaldi & Landoni, 2012). Studies that analyse a large number of countries are less frequent and are usually approached at an individual level. Most of them use a bibliometric perspective to analyse the impact of international mobility on scientific performance in terms of publication productivity and impact (e.g. Dubois et al., 2014).

The design of this study solves several limitations highlighted in previous research in relation to the samples, measures and tests performed to evaluate the impact of mobility on different career outcomes. First, by using perceived mobility effects on career progression as an outcome variable, we employ a more comprehensive measure of the consequences of international mobility rather than considering a single type of outcome (see Netz et al., 2020 for a review of the different dimensions used to assess the outcome of international mobility). Career progression is a key indicator for evaluating whether academics have actual incentives to move abroad—as European institutions are trying to promote—and is similar to the type of overall assessment academics carry out when assessing the impact of mobility. Indeed, increases in human and social capital due to mobility are likely to positively impact all the facets of academic activity—not only research but also teaching, knowledge transfer activities and knowledge about how to organise and manage research groups and networks. These effects are not fully captured through specific research outcomes such as article publications, patents or collaborations with international colleagues. Analysing the relationship between international mobility and these bibliometric research outcomes may be problematic since both occur several times throughout the academic career, which entails an attribution problem derived from the difficulty of directly linking specific moves with specific outcomes (Cañibano et al., 2008, p. 23). Most previous studies focused on just one type of mobility (i.e. temporary international mobility), using different time intervals to distinguish between short- and long-term mobility (Netz et al., 2020) and assessing the effect of different time intervals (Bäker et al., 2016, 2021). In our analysis, we include both temporary mobility and migration, providing thus a more accurate and complete view of how different types of international mobility impact career progression.

Last, rather than analysing early career researchers (Laudel & Bielick, 2019) or highly productive scientists or elite researchers (Azoulay et al., 2017; Cañibano et al., 2018), who are far from being representative of the average researcher, we provide a more comprehensive understanding of the academic community by focusing on what Gibson and McKinze (2014) called the “ordinary scientist”. We do this by considering a large representative sample of scientists working in higher education institutions at the country level and their aggregated perceptions. Although previous bibliometric studies may have a broad international coverage, their scope is restricted to scientific performance, which introduces a bias towards consolidated researchers (vs. early career researchers who have yet to publish) and under-represents fields with different publication patterns that are not always properly captured through bibliometrics, such as social sciences and humanities (Franzoni et al., 2015).

Limitations and future research

Although this study brings new insights to the literature on international mobility and solves several methodological concerns related to earlier studies, it has its own limitations. One major limitation is derived from our analytical approach, which limits the number of factors that can be introduced in the configurational analysis. The future lines of inquiry we propose in the following paragraphs can help build a more complete understanding of the role that mobility and institutional factors play in academics’ career progression by including several examples of additional factors that could be explored.

Another limitation is derived from the time lapse of 10 years used to assess the mobility effects on career progression. As some of the benefits of international mobility require broad time intervals to manifest, the 10 years' time frame might not fully capture the benefits of the most recent mobilities. Given that mobility is not confined to a specific period in a researcher's career, this is a limitation of any study that employs any time interval to assess characteristics and outcomes of mobility. The results we obtain should thus be interpreted taking into account that the bound of the benefits might be higher than currently reported. However, this should not be particularly problematic, given that it could compensate for the potential overrating of mobility benefits that mobile researchers might introduce to avoid cognitive dissonance.

Working with country-level indicators based on the responses of representative samples of researchers helps to approximate the state of the question at the aggregate level. However, our country-level indicators are based on researchers' perceptions, which might be conditioned by other individual factors (e.g. the career stage in which the researcher moved abroad, the period of time since the last research stay) that we cannot control in this type of analysis. Therefore, future studies could explore these relationships to evaluate whether the patterns identified are confirmed.

Using aggregated perceptions about international mobility recognition and effects helps us capture collective interpretations about the role of international mobility. This is highly relevant in terms of approximating the incentives and global cost–benefit analyses researchers might make when assessing the possibility of engaging in international mobility to comply with the career script (Gläser, 2019; Laudel et al., 2019). Nevertheless, we do not know the extent to which formal requirements are aligned with these perceptions. Future studies could control for the role of formal institutions (i.e. formal requirements) and ascertain how their (non-) alignment with academics' perception affect the propensity of the latter to become internationally mobile and their career progression. Our results based on perceptions might also be affected by recollection bias and the overrating of mobility effects that mobile researchers might introduce to avoid cognitive dissonance. Future research could use combinations of objective benefits and subjective perceptions to control for the effect of these potential biases.

Finally, an additional avenue for future research concerns cross-country comparisons that could explore how other aspects of national science systems affect the extent and outcomes of researchers' international mobility, at country level. In the light of our results, it could be of particular interest to analyse how the general resources of national science systems (e.g. R&D national expenditures) and those specifically designated to support mobility affect mobility practices and outcomes. Building on previous work such as that of Auranen and Nieminen (2010) on the funding environments of university research, new questions arise about how resources and incentive systems shape mobility patterns and scientific outputs derived from mobility. This could provide more comprehensive explanations of cases such as Poland, where we find that, in spite of a general positive perception of mobility career effects, none of the types of mobility is frequent among researchers. Home and destination national science systems' research performance, academic labour markets and higher education systems could also explain the outcomes of mobility. In this line, previous studies have identified specific patterns of geographical mobility (e.g. Cañibano et al., 2017) that could offer new perspectives on why scientists working in high performing science systems such as Denmark, Finland, Germany and Sweden differ in their capacity to reap the benefits of international mobility.

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Declarations

Conflict of interest The authors declare no competing interests.

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