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Student mobility in tertiary education: institutional factors and regional attractiveness

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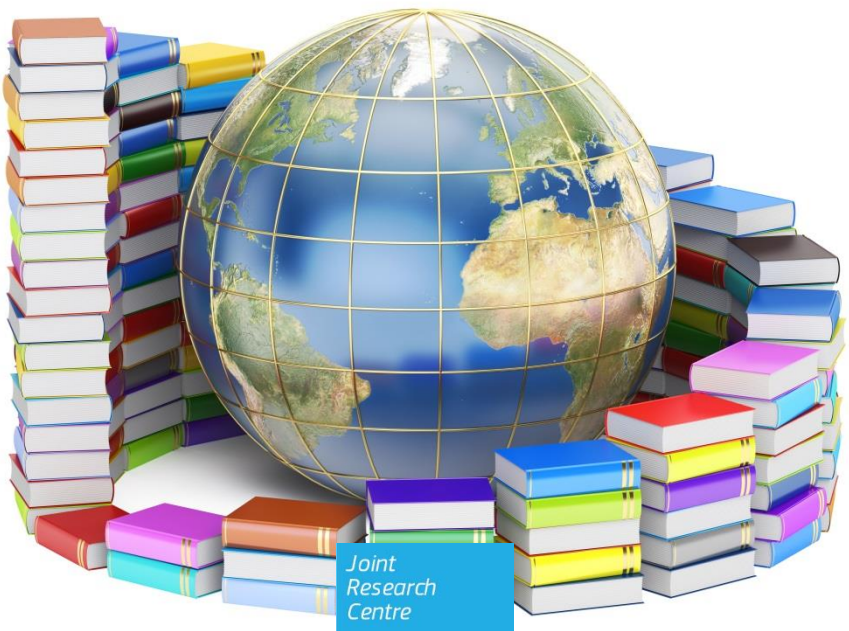
Mabel Sánchez Barrioluengo
Sara Flisi



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Contact information
Name: Mabel Sánchez Barrioluengo
Address: Unit of Human Capital and Employment, Via E. Fermi 2749, I-21027 Ispra (VA), Italy
Email: mabel.sanchez-barrioluengo@ec.europa.eu

Name: Sara Flisi
Address: Unit of Human Capital and Employment, Via E. Fermi 2749, I-21027 Ispra (VA), Italy
Email: sara.flisi@ec.europa.eu

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Executive summary

Member States have committed themselves to promoting the learning mobility of young people following the 2011 Communication on an agenda for the modernisation of Europe's higher education system (COM(2011) 567). The Council conclusions on a benchmark for learning mobility (2011/C 372/08) specified that by 2020 'an EU average of at least 20% of higher education graduates should have had a period of higher education-related study or training abroad'.

In this report, two types of mobility are distinguished, namely degree mobility and credit mobility, both of which are included in the benchmark. Little research has been carried out on international student mobility determinants in general and on Erasmus students in particular, especially taking into account the regional dimension of learning mobility. This report focuses on student mobility in the EU between 2011 and 2014, through the description of the main destinations of mobile students, as well as on inward mobility across and within countries (measured as the share of mobile students on total student population), with a particular focus on institutions and regions. It also analyses the main factors associated with degree and credit mobility, taking into account different tertiary education levels (i.e. undergraduate, master and PhD level), through the comparison between institutional factors (teaching and research activities of universities as well as their reputation) and regional attractiveness (level of urbanisation, employment opportunities and regional education systems).

There are five main conclusions from this report. First, in relation to the most attractive destinations, degree mobility appears to be very concentrated in a few countries, while credit mobility tends to be more equally distributed across Member States. Second, degree mobility is higher than credit mobility across and within countries. Third, institutional characteristics tend to be associated with student mobility more than regional ones. Fourth, among institutional characteristics, better quality universities and those with a higher reputation are associated with a higher share of mobile students, while research orientation and excellence are more relevant for degree mobile PhD students. Fifth, among regional characteristics, the level of urbanisation of the region is an important factor in shaping students' mobility: high-density regions have higher degree mobility rates, but a lower share of credit mobile students.

1 Introduction

The globalisation of higher education, through the mobility of students, has grown considerably over the past 40 years. Among the various categories of migrants, international students have experienced the most rapid increase in relative terms (Beine et al., 2014), with the number of international students in Europe having increased by roughly 114% from 2000 to 2010 (ICEF, 2013) ([1]). Internationalisation in higher education has become one of the priorities of the European Commission in recent years and, in 2011, a specific benchmark for learning mobility was established, requiring that by 2020 a European Union (EU) average of at least 20% of higher education graduates undertake a period of higher education-related study or training abroad, representing a minimum of 15 European Credit Transfer System (ECTS) credits or lasting a minimum of three months ([2]).

To quantify and measure this benchmark, in 2015, a methodological manual on learning mobility in tertiary education (European Commission, 2015) was developed, which provides the official statistical definition of mobility adopted for the benchmark on learning mobility in higher education. This official definition identifies learning mobility in tertiary education as the physical crossing of national borders between a country of origin and a country of destination, and subsequent participation in activities relevant to tertiary education (in the country of destination). The country of origin is defined as the country of prior education, i.e. the country where the upper secondary diploma was obtained.

Two types of mobility are identified in the manual, namely degree mobility and credit mobility, both of which are included in the benchmark. ***Degree mobility*** is defined as the physical crossing of a national border to enrol in a degree programme at tertiary level in the country of destination. The degree programme would require the students' presence for the majority of courses taught. ***Credit mobility*** is defined as temporary tertiary education and/or study-related traineeship abroad within the framework of enrolment in a tertiary education programme at a 'home institution' (usually) for the purpose of gaining academic credit (i.e. credit that will be recognised by that home institution).

Improving student mobility is a core goal of the European Higher Education Area and a major policy priority of the EU agenda for modernising higher education. As stated in the 2011 Council conclusions on the benchmark for mobility, 'learning mobility is widely considered to contribute to enhancing the employability of young people through the acquisition of key skills and competences, including especially language competences and intercultural understanding, but also social and civic skills, entrepreneurship, problem-solving skills and creativity in general'.

The increasing mobility of students within the EU may be crucial to developing Europe's skilled labour force in order to strengthen its position as a knowledge-based economy. In addition to cross-country comparisons, the importance of looking at the institutional and regional levels for student mobility is twofold. First, at the institutional level, attracting students from other countries is expected to improve the quality of HEIs (Lepori, 2016). Second, at the regional level, the attraction and retention of students can increase the pool of highly skilled human capital that is available for the workforce, and can play an influential role in regional development and growth. In addition, putting the emphasis on regions instead of on countries has the additional advantage of shedding some light on

([1]) The latest Organisation for Economic Co-operation and Development (OECD) estimates of the number of individuals worldwide who moved abroad with the purpose of study (i.e. international students) are not comparable with past series, because too few countries were providing this information in the past. However, time series of the total number of students enrolled abroad (foreign students) constructed until 2012 show that between 2005 and 2012 the number of foreign tertiary students enrolled worldwide increased by 50% (OECD, 2015).

([2]) Council conclusions on a benchmark for learning mobility, 2011/C 372/08.

the differences within countries and across similar regions located in different countries. However, little research has been carried out on international student mobility determinants in general (Findlay et al., 2006), on Erasmus student mobility in particular (Rodríguez-González et al., 2011) or on the regional dimension of learning mobility.

Most studies have emphasised the role played by economic factors (Rodríguez-González et al., 2011) as well as higher education characteristics (Lepori et al., 2015) in determining students' mobility. Economic determinants are related to region and country attractiveness, i.e. the influence of the political, social, cultural and economic conditions of a territory (Beine et al., 2014; Caruso and de Wit, 2015), while the institutional configuration, i.e. the activities of a university in relation to teaching and research, shapes university attractiveness based on the nature and quality of an institution (Mixon and Hsing, 1994; Baryla and Dotterweich, 2001).

This report aims to shed light on degree and credit mobility at the tertiary level across and within countries (with differences across regions), as well as across education levels (from International Standard Classification of Education (ISCED) 6 to 8). It analyses the main factors associated with mobility at EU level comparing between institutional factors (teaching and research activities of universities) and regional attractiveness (level of urbanisation, employment opportunities and education systems). In order to do so, the report mainly relies on information from the European Tertiary Education Register (ETER) and on Erasmus mobility statistics for the period 2011–2013. This is complemented by secondary data at regional level based on Eurostat information.

The rest of the report is structured as follows. Chapter 2 provides an overview of student mobility in higher education from a policy perspective and from an academic perspective. Chapter 3 presents the methodology, describing the indicators used in this report for degree and credit mobility. Chapter 4 presents the main descriptive results, comparing degree and credit mobility at the national, regional and institutional levels. Chapter 5 summarises the scientific literature in relation to the determinants of mobility and investigates which characteristics influence the attractiveness of particular destinations for mobile students for both types of mobility. Various factors are taken into account, including the institutional characteristics of the host HEIs and regional attractiveness. In addition, this chapter uses gravity models to explore the factors associated with Erasmus flows. Finally, the conclusions are presented in Chapter 6.

2 Student mobility in higher education: policy context and literature review

2.1 Mobility: a priority in the policy agenda

Improving student mobility is a core goal of the European Higher Education Area and a major policy priority of the EU's agenda for modernising higher education. In the words of the European Council, it is 'one of the fundamental ways in which young people can strengthen their future employability, as well as their intercultural awareness, personal development, creativity and active citizenship' ([3]). In the 2000s, a Council resolution ([4]) developed a mobility action plan that sets out three major objectives: (a) to define and democratise mobility in Europe, (b) to promote appropriate forms of funding and (c) to increase mobility and improve the conditions for mobility. Since then, the mobility of students has been present in the EU policy agenda and constitutes an important EU priority. A summary of different policies related to mobility is included in Table 1.

At the tertiary level, internationalisation in higher education is an important target of the European Commission given the specific benchmark set in 2011 for learning mobility. It requires that by 2020 an EU average of at least 20% of higher education graduates have undertaken a period of higher education-related study or training abroad.

2.2 Student mobility: the scientific literature

Increasing the mobility of students within the EU may be crucial to developing Europe's highly skilled labour force and strengthening its position as a knowledge-based economy. Abella (2006) and Kuptsch and Pang (2006) argue that competing for global talent (both highly skilled labour and students) has become a vital route to enriching the stock of human capital available within the labour markets of knowledge-based economies. Student mobility is one of the options for attracting foreign skills, under what is called the 'academic-gate approach', which is aimed at attracting talent from the pool of foreign students graduating from local educational institutions and encouraging them to stay and work (Abella, 2006). Member States that supply high-level educational opportunities in higher education institutions (HEIs) clearly have a huge advantage for capturing global talent by this route and have made great efforts to ensure that they benefit from this approach, as it brings some of the best and brightest into their countries as students (Findlay, 2010). There is already considerable consensus on the positive growth effects of additional human capital on receiving countries (Parey and Waldinger, 2010). For host countries, mobile students can represent a resource in multiple ways. In the short term, these students often pay tuition fees and contribute to the local economy through their living expenses. Students at masters or doctoral level can contribute to research and development in the host country, initially as students and later on, potentially, as researchers or highly qualified professionals. In the long term, they are likely to integrate into domestic labour markets, contributing to knowledge creation, innovation and economic performance (OECD, 2016, 2017), and to contribute to building business networks with their home countries (Docquier and Lodigiani, 2010; Flisi and Murat, 2011).

([3]) Council Recommendation of 28 June 2011 'Youth on the move' – promoting the learning mobility of young people. Available here.

([4]) Resolution of the Council and of the representatives of the Governments of the Member States, meeting within the Council of 14 December 2000 concerning an action plan for mobility, 2000/C 371/03.

Table 1. EU mobility legislation and policy

Year	Legislation and policy	Main content
2000	Council resolution concerning an action plan for mobility (available here)	This resolution defines a mobility action plan with three major objectives: (a) to define and democratise mobility in Europe through measures to train people who help to implement mobility, develop multilingual skills and access useful information; (b) to promote appropriate forms of funding for mobility and seek to identify a series of measures that will mobilise all possible financial resources; and (c) to increase mobility and improve the conditions for mobility by increasing the number of different forms that it can take, and by improving reception facilities and the organisation of timetables.
2001	Recommendation of the Parliament and of the Council on mobility for students, persons undergoing training, volunteers, teachers and trainers (available here)	This recommendation calls for EU countries to remove legal, administrative, linguistic and cultural obstacles to people studying or undergoing training, volunteering or teaching, or providing training in another EU country. Among the issues, aims and suggestions put forward are the goal of learning at least two EU languages, with linguistic and cultural preparation before travel; encouraging awareness of EU citizenship in young people as well as respect for differences; easy access to information about opportunities in other EU countries; financial support (grants, scholarships, subsidies, loans, etc.) to be facilitated and simplified; assistance with transport costs, accommodation and meals, and access to cultural resources on the same basis as host country citizens; and better awareness of financial entitlements and reciprocal social security cover.
2006	European Quality Charter for Mobility (available here)	This charter offers guidance for mobility undertaken by individual young people or adults, for the purposes of formal and non-formal learning and for their personal and professional development.
2007	Council conclusions on monitoring progress towards the Lisbon objectives in education and training (available here)	Regarding the indicators and benchmarks for monitoring progress towards the Lisbon objectives in education and training, the Commission was invited to make full use of the existing data on, among other topics, cross-national mobility of students in higher education.
	Conclusions of the Council and of the representatives of the governments of the Member States on youth mobility (available here)	In the conclusions of the Council on youth mobility, Member States were invited to develop the scope for mobility for all young persons, provide better information about existing mobility programmes, simplify procedures, widen and diversify the sources of funding for youth mobility, and apply the principles enshrined in the European Quality Charter for Mobility in education and training to all forms of youth mobility.
2008	Council recommendation on the mobility of young volunteers across the European Union (available here)	The recommendation for volunteers promotes the mobility of young volunteers across Europe by enhancing the conditions for cooperation between the organisers of voluntary activities in different countries, whether civil society or public authorities, so that every young person shall have the opportunity to volunteer in Europe if she or he wishes to do so.
	Council conclusions on youth mobility (available here)	The conclusions on youth mobility invite Member States to (a) develop the scope for mobility for all young persons; (b) provide better information about existing mobility programmes; (c) simplify procedures; (d) widen and diversify the sources of funding for youth mobility; and (e) increase knowledge of youth mobility.
2009	Green Paper promoting the learning mobility of young people (available here) Results of the consultation (available here)	The Green Paper includes three sections: Section 1 deals with issues regarding the preparation of a mobility period, i.e. information, motivation, linguistic preparation, etc.; Section 2 deals with the actual period spent abroad and examines the follow-up to a mobility period, such as validation and recognition of the experience; and Section 3 presents proposals for a new partnership on youth mobility. In the results of the consultation, the vast majority of respondents were strongly in support of the Green Paper.

Table 1 (continued). EU mobility legislation and policy

Year	Legislation and policy	Main content
2009	Impact Assessment – Accompanying document to the Proposal for a Council Recommendation on promoting the learning mobility of young people (available here)	The impact assessment report supports a policy action at the EU level to improve the cross-border mobility of young people for learning purposes, which includes formal, non-formal and informal learning and volunteering. The report defines the problem at stake as well as the rationale for policy action at the EU level and addresses the aims of the initiative in terms of general and specific objectives. Finally, it presents a range of different policy options to achieve such objectives and an analysis and comparison of their possible impacts.
2010	Youth on the Move package (available here)	'Youth on the Move' is the EU's flagship initiative to respond to the challenges that young people face and to help them succeed in the knowledge economy. Among other things, it promotes learning and employment mobility.
	Council conclusions on European researchers' mobility and careers (available here)	The conclusions identify the following areas for which specific action is required: (a) the provision to individual researchers of information on social security rights in cases of transnational mobility; (b) solutions for the social security needs of researchers; (c) the issue of supplementary pensions for researchers; (d) apply the common principles of flexicurity to research careers; and (e) contributions to the 'new skills for new jobs' agenda.
2011	Council recommendation 'Youth on the Move' – promoting the learning mobility of young people (available here)	This recommendation specifically recommends to Member States that they: (a) inform and guide on opportunities for learning mobility; (b) motivate students to participate in transnational learning mobility activities; (c) prepare opportunities for learning mobility, particularly with regard to foreign language skills and intercultural awareness; (d) take care of administrative and institutional issues relating to the learning period abroad; (e) provide information about the portability of grants and loans; (f) take care of the quality of learning mobility; (g) recognise learning outcomes; (h) provide opportunities for disadvantaged learners; (i) encourage partnerships and funding; and (j) monitor progress.
	Council conclusions on a benchmark for learning mobility (available here)	With a view to increasing the participation of higher education students in learning mobility, by 2020, an EU average of at least 20% of higher education graduates should have had a period of higher education-related study or training (including work placements) abroad, representing a minimum of 15 ECTS credits or lasting a minimum of three months.
2016	EU 2016–2018 Work Plan for Youth (available here) Evaluation of the EU Youth Strategy and the Council recommendation on the mobility of young volunteers across the EU (available here)	The evaluation (a) assesses the past and continued relevance of the EU Youth Strategy and the Youth Cooperation Framework to Member States' needs and interests (policymakers, youth organisations, young people); (b) identifies the effects on policy and practices in Member States at the national, regional and local levels, which can be attributed to the EU Youth Strategy and Youth Cooperation Framework at the EU level; (c) assesses the cost-effectiveness of the EU Youth Strategy and Youth Cooperation Framework and the level of burden associated with it; (d) assesses the added value to the EU of the EU Youth Strategy and its instruments in comparison with what Member States could have achieved alone; and (e) assesses the sustainability of the cooperation structures at the EU, national and local levels that are set up to achieve the EU Youth Strategy's objectives.
2017	Commission progress report on a learning mobility benchmark (available here)	This report fulfils the obligation of the Commission to report back to the Council on the progress made regarding the mobility benchmark with a view to continuing the work towards 2020. It presents the work undertaken since 2011 and the evidence available, and draws conclusions for the benchmark.

Table 1 (continued). EU mobility legislation and policy

Year	Legislation and policy	Main content
2017	Communication on a renewed EU agenda for higher education (available here)	The Modernisation Agenda for Higher Education provides strategic direction for EU and Member State activities to support the international mobility of students, staff and researchers as a way for them to develop their experience and skills (Erasmus+ and Marie Skłodowska-Curie Actions).
	Communication on Strengthening European Identity through Education and Culture (available here)	The Communication sets out the European Commission's vision for the creation of a European Education Area, which should include, among other things: a) making mobility a reality for all, by building on the positive experiences of the Erasmus+ programme and the European Solidarity Corps and expanding participation in them as well as by creating an EU Student Card to offer a new user-friendly way to store information on a person's academic records; b) the mutual recognition of diplomas, by initiating a new 'Sorbonne process', building on the "Bologna process", to prepare the ground for the mutual recognition of higher education and school leaving diplomas; c) creating a network of European universities, so that world-class European universities can work seamlessly together across borders.

Source: Adapted from the Mobility Scoreboard web page (here).

From a policy point of view, the identification of the key determinants of international student mobility is central to designing efficient policies aimed at attracting mobile students.

Evidence on the benefits of student mobility shows that studying abroad helps a person to cope more successfully with increasing international dimensions at work and helps with career enhancement (Teichler, 2007). This is based on the assumption that student mobility has a genuine effect on later job mobility (Parey and Waldinger, 2010), driven by the search for better labour market opportunities. Rosenzweig (2008) showed that international students are likely to stay and work in the host country once they have completed their studies and OECD (2009) estimated that the stay rate of foreign students is between 15% and 35% for most countries ([5]). According to Oosterbeek and Webbink (2011) and Parey and Waldinger (2010), studying abroad, and the number of months spent studying abroad, increases the probability of working abroad later in life. Student mobility also helps to improve international competences, enabling former students to be placed in visible international professional positions (Bracht et al., 2006). The Erasmus impact studies (European Commission, 2014, 2016) analyse the effects of Erasmus student mobility (for both study and placement periods abroad) on individual skills enhancement, employability and institutional development. At the global level, these studies conclude that enhancing employability abroad is increasingly important for Erasmus students; they are in a better position to find their first job and enhance their career development, and they are more likely to live and work abroad in the future. This economic discourse, regarding the benefits of studying abroad, overlaps with a socio-cultural discourse, related to European integration and shared European cultural values, which underlies the relevance of student mobility as a prime mechanism for fostering a sense of European identity and citizenship (Rodríguez-González et al., 2011).

Different strands of academic literature have advanced different reasons for the migration of students between countries or regions. First, from a human capital perspective, migration is considered an investment and the decision to move is made to access better education and job opportunities and/or to increase future income. Second, migration can also be viewed as a consumption choice. In that case, people move for non-pecuniary reasons, looking for better local amenities; students not only focus on the return to higher education in the future, but also take into account the context in which they will live and study (Sá et al., 2004; Agasisti and Dal Bianco, 2007; Beine et al., 2014).

There are push and pull factors that affect student mobility. Push factors relate to the home country/region and the student's decision to study overseas, while pull factors relate to the host country and those factors that make countries/regions more attractive than other potential destinations. This report focuses on the role of pull factors and, in particular, on the main characteristics of institutions and regions that attract students to specific places. In other words, the study focuses on university and regional attractiveness, in an attempt to understand how effective university characteristics are in accounting for student mobility vis-à-vis the role played by socio-economic characteristics of university locations, i.e. of the host regions (Agasisti and Dal Bianco, 2007). The value added of including regional information as a determinant of student mobility is based on the argument that the mobility of students can be explained by the same determinants that apply to the migration of workers (Beine et al., 2014).

Papers on the migration and mobility of students are useful for gaining a better understanding of the pull factors that constitute the attractiveness of countries and regions. The unit of analysis could be students either as individuals (McCann and Sheppard, 2001; Van Mol and Timmerman, 2014) or as flows between countries or institutions (Sá et al., 2004; Agasisti and Dal Bianco, 2007; Beine et al., 2014); some studies focused on cross-country comparisons using credit mobility based on the Erasmus

([5]) However, the exact numbers of students staying on after the completion of their studies is known for only a few countries.

programme (Souto Otero, 2008; Engel, 2010; Rodríguez-González et al., 2010) while others looked at within-country mobility (e.g. in Italy – Agasisti and Dal Bianco, 2007 – or in the Netherlands – Sá el al., 2004). Other studies put the emphasis on the relationship between mobility and labour market outcomes (Parey and Waldinger, 2010; Oosterbeek and Webbinkz, 2011; Sorrenti, 2015) or on the link between the European identity phenomenon and civic values (Mitchell, 2012). Although there are some studies that analysed both economic and education factors as determinants of mobility (Sá et al., 2004; Agasisti and Dal Bianco, 2007; Wei, 2013), they either did not explicitly differentiate between institutional and regional levels, or did not check for differences between short- and long-term mobility. More details of the main results of these studies are provided in Annex 1.

This study contributes to this literature by analysing the pull factors in relation to student mobility at the tertiary level in the EU, following the latest definition of student mobility proposed by the European Commission (European Commission, 2015) and taking into account differences between types of mobility (degree vs credit mobility) as well as between ISCED levels (ISCED 6–8, i.e. from bachelor to PhD level). To our knowledge, this is the first study that investigates the factors associated with student mobility by distinguishing between degree and credit mobility, combining regional and institutional levels of analysis. The literature reviewed does not differentiate between short- and long-term mobility determinants, while in this study we look at both as factors potentially associated with student mobility. More details about the variables are presented in Section 5.1.

3 Data sources and methodology

The main data source for this report is ETER, which is a register of HEIs in Europe that provides – for each HEI – information on institutional characteristics, location, number of students, graduates and staff, expenditures and revenues, and research activity. What makes this dataset particularly suitable and interesting for this report is that it also collects information on degree and credit (here limited to the Erasmus programme) mobility ([6]).

Information on degree mobility – under the heading 'International/Mobile students' – is collected within the ETER data collection. Following the official definitions of UOE, i.e. the joint UIS (UNESCO Institute of Statistics)/OECD/Eurostat data collection on education statistics, 'International/Mobile students' are defined as foreign students who have physically crossed a national border and moved to another country with the objective of studying. The individuals taken into account here are therefore those who have moved from their country of origin ([7]) to the reporting country of study (i.e. the country of destination) with the purpose of enrolling in a degree programme at the tertiary level. Non-mobile students are defined as 'resident'. Given that all the information is collected at the level of the receiving HEI, the available figures concern inward mobility ([8]).

Data on credit mobility, on the other hand, are provided in ETER using official information from Erasmus+. In particular, the dataset includes the aggregate number (for all ISCED levels together) of incoming and outgoing Erasmus students for each participating HEI([9]). Although credit mobility can also take place outside of Erasmus programme exchanges, in this report credit mobility only refers to Erasmus because of the availability of data. Information about Erasmus incoming students is therefore used in this report to compute the credit mobility indicator.

ETER data are available for the calendar years 2011 (academic year 2011/2012), 2012 (2012/2013), 2013 (2013/2014) and 2014 (2014/2015). No information is currently available for Erasmus students for 2014. Moreover, not all information needed for the analysis is available for all the years. An overview of data availability over time is presented in Section II of Annex 2, for degree and credit mobility separately.

As explained above, the aim of this report is to analyse what factors (those related to the characteristics of the HEIs and/or with the region where they are located) are associated with the level of attractiveness of a certain destination for mobile students. In this report, the level of attractiveness will be proxied by the rate of inward degree and credit mobility in a certain destination – defined as the share of inward mobile students, that is, the number of inward mobile students as a proportion of the total number of students (i.e. total student population) in the HEI, region and/or country. This will be the main variable of interest throughout the analysis. Two main reasons motivate this choice. First, it allows the size of the host HEI to be taken into account; since larger institutions will most probably have more mobile students in absolute values, looking at the phenomenon without controlling for the size of the host could produce confounding results, giving more relevance to size than to any other possible factor driving mobility ([10]). Second, this

([6]) A detailed description of the features of the ETER dataset is presented in Section I of Annex 2.

([7]) As per the UOE definition, the country of origin is defined as the country of prior education, i.e. the country where the upper secondary education qualification was obtained. The status of mobile student is maintained throughout the whole education at tertiary level (i.e. students who entered at bachelor level are still considered mobile at the PhD level if they stay in the same country or move to a country that is different from their country of origin). It should be noted that while the definition of mobile students adopted in ETER is consistent with the official UOE definition, three countries provide data based on a different definition, i.e. country of permanent or usual residence for EE, permanent domicile prior to enrolment for IE and normal residence prior to commencing the programme of study for the UK.

([8]) No information is available on the country of origin of incoming degree mobile students.

([9]) No further information is provided in the ETER documentation about these data. The only available information reports the availability of data by ISCED level, which is, however, not included in the dataset.

([10]) An alternative approach would be to look at mobility irrespective of the size of the student population; this could be done either by using the absolute number of mobile students or by considering the number of

way of measuring mobility rates is coherent with the definition adopted for the learning mobility benchmark. Although the benchmark was originally formulated in terms of outward mobility, the idea of using shares of inward mobile students (i.e. numbers as a proportion of total students) has also been adopted by Eurostat (and by the OECD) to compute mobility indicators based on UOE data.

The share of degree mobile students is therefore calculated as:

$$Share\ of\ degree\ mobile\ students = \frac{number\ of\ mobile\ students}{number\ of\ mobile\ students + number\ of\ resident\ students}$$

where mobile students are defined as students that received their upper secondary education degree in another country and resident students are defined as students that received their upper secondary education degree in the same country ([11]). This share is computed at the individual HEI level; in Chapter 4, the shares are computed at the regional and national levels as well. Shares of degree mobile students are calculated for each separate ISCED 2011 level (6, 7 and 8 corresponding to undergraduate, masters and PhD students respectively), and for ISCED 6–8 together ([12]). Given the lower coverage of ETER at ISCED 5 (HEIs delivering only professional diplomas), this level was discarded in the analysis of degree mobility.

While ETER in theory covers all 28 EU Member States, not all countries/HEIs provided information on degree mobile students. As a consequence, the sample for this part of the analysis includes 20 countries, namely AT, BE, BG, CY, DE, DK, EE, ES, FI, FR, HR, HU, IE, LT, LU, LV, MT, PT, SE and the UK ([13])([14]). As explained in Section I of Annex 2, for BE only Flanders (and part of the Brussels region) provided data, while for ES no data are available for ISCED 8.

The share of Erasmus students over the total student population is calculated as follows:

$$Share\ of\ Erasmus\ students = \frac{number\ of\ Erasmus\ incoming\ students}{number\ of\ students\ in\ ISCED\ 5-8}$$

No disaggregation by ISCED level for incoming Erasmus students is available, so this figure can only be computed for ISCED 5–8. Data availability is better for Erasmus than for degree mobility, allowing this report to cover 26 EU countries (all EU countries with the exception of RO and SI) ([15]).

Section III of Annex 2 provides an assessment of the reliability and consistency over time of the ETER dataset in capturing student degree mobility, also through a comparison with the official UOE data on degree mobility at the national level. The evidence provided shows that, apart from a few cases, ETER indeed proves to be a reliable source of information for the analysis carried out in this report.

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mobile students in a certain destination as a proportion of the total mobile student population. This approach can be very useful in providing descriptive information on the phenomenon and will in fact be used in Section 4.1 to determine the top destinations of mobile students; however, when analysing the attractiveness of a destination by comparing institutional and regional characteristics, we consider it a less preferable option than the one adopted in the report.

([11]) This formula is also used in Lepori (2016).

([12]) Section II of Annex 2 provides a more detailed explanation of the procedure used to build the indicators, in particular for (a) the treatment of cases where missing values were recorded in ETER; (b) the construction of indicators for ISCED 7, which was built by combining two different levels that ETER distinguishes between, namely ISCED 7 and ISCED 7 long; and (c) the construction of aggregate indicators for ISCED 6–8 combined.

([13]) The information is not always available for all years. Section II of Annex 2 provides an overview of data availability over time.

([14]) LU and MT have only one region and information is available for only one university. On account of the lack of variability within these countries, they are not included in the majority of the analyses, although they do appear in the regional comparisons to provide the full picture of mobility patterns (Section 4.4).

([15]) Section II of Annex 2 provides a more detailed explanation of the procedure used to build the credit mobility indicators, as well as an overview of data availability across countries and over time.

4 Student mobility in the European Union

This chapter provides a picture of student mobility in the EU. As explained in the previous chapter, on account of data availability, the analysis of degree and credit mobility will cover 20 and 26 EU countries, respectively ([16]). The chapter will start with an overview of the main destinations of mobile students and will then move on to show the share of inward mobility across and within countries. The snapshot of the situation presented here refers to the latest year available for the two types of mobility data, i.e. 2014 (2014/2015) for degree mobility and 2013 (2013/2014) for Erasmus mobility ([17]). When information on the latest year was not available, the value for each country was replaced by the value for the share of mobile students for the closest year available. In particular, for DK, data on degree mobility refer to 2013, while for HU and LU (when included), data for 2011 were used. This procedure applies to all graphs and tables presented in this chapter. Degree mobility figures refer to tertiary education overall (ISCED 6–8) and to single ISCED levels; Erasmus data, on the other hand, are presented for only combined ISCED 5–8, as no disaggregation by ISCED level is available.

4.1 Main destinations of mobile students

This section identifies the major destinations of mobile students in the EU, relative to the overall size of the mobile student population and in absolute terms. Figure 1 shows the relevance of the main destination countries to the total degree and credit mobile student populations. The rates presented in this figure are calculated as the percentage of mobile students in a specific country on total mobile students. It should be highlighted that the figures were computed using the available data and, since data for some destination countries were not available (in particular for degree mobility), the rates were computed discarding these countries.

What emerges from Figure 1 is that degree mobility appears to be very concentrated in certain countries, with the top three destinations (the UK, DE and FR) covering almost 80% of the mobile student population. The UK alone attracts 38.4% of degree mobile students, DE attracts 21.5% and FR attracts 16.9%, while the next most attractive country, AT, receives only 6.1% of degree mobile students. A different pattern emerges for credit mobility, which appears to be more equally distributed among EU countries, with the top five destinations (which are also the five largest countries in the EU) receiving, altogether, just over half of the EU's total credit mobile students. The main destination among Erasmus students is ES, which received more than 16.3% of the total number of credit mobile students in 2013. DE (12.2%) and FR (9.6%) are again the second and third most attractive countries, while the UK is in fourth position, receiving 9.4% of total Erasmus students. In this case, IT is also a popular destination, receiving 9.1% of total Erasmus students. This result is likely to be the consequence of the way in which the Erasmus+ programme functions, where the total number of scholarships and their distribution across countries are centrally determined by the Erasmus programme.

Going beyond the national data, and looking at the single HEIs and NUTS2 regions of destination ([18]), allows a more precise picture of the distribution of mobile students in the EU. Table 2 and Table 3 provide rankings for the top 10 destinations as they emerge in the ETER dataset, looking at degree and credit mobility and considering both individual

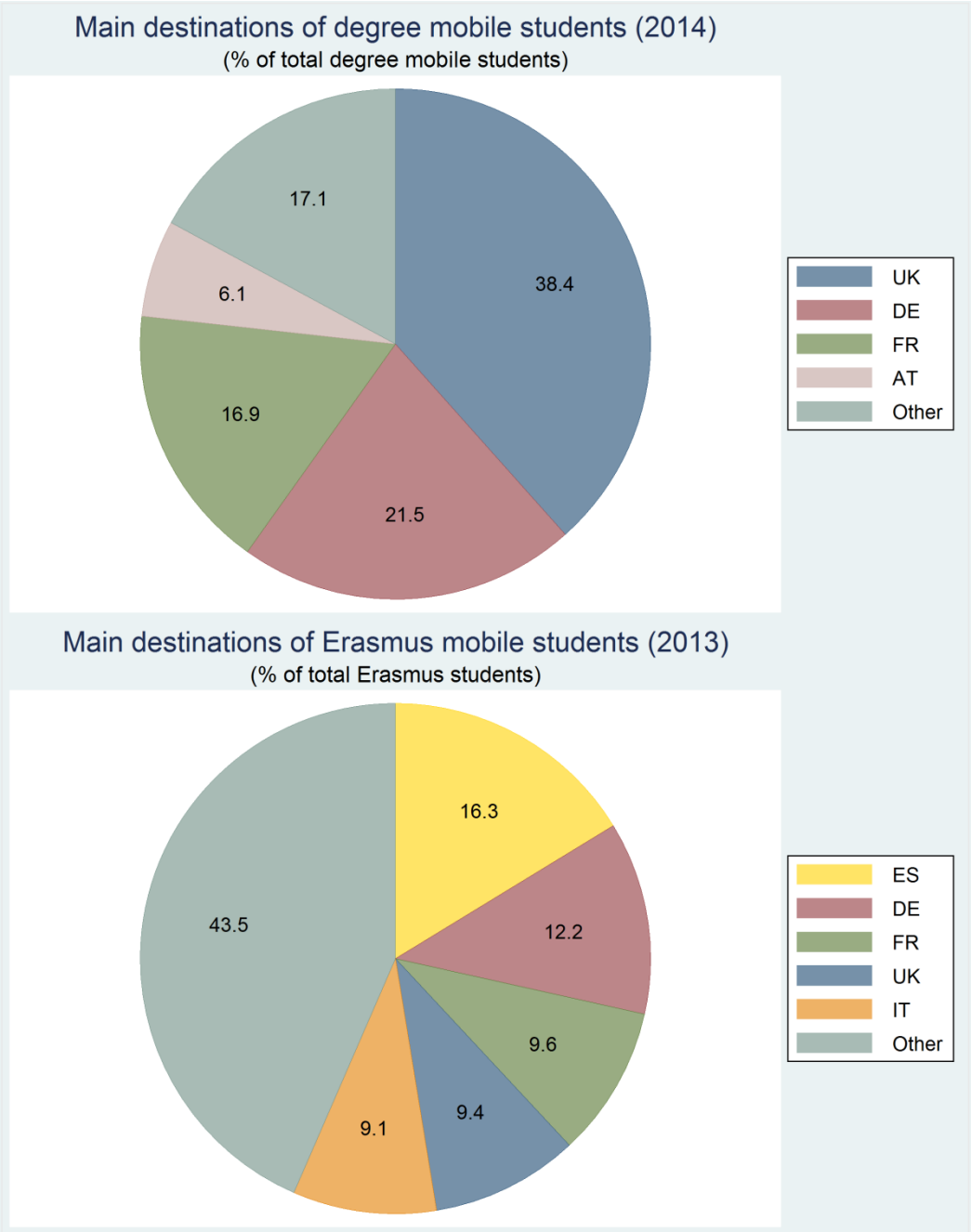
([16]) To preserve coherence throughout the document, here we present results only for countries available in ETER. Additional national-level information on more countries is available from UOE data.

([17]) As shown in Section III of Annex 2, data on degree mobility are relatively stable over time, so the conclusions that can be drawn by looking at one year or the next will not be significantly different.

([18]) The Nomenclature des Unités Territoriales Statistiques (NUTS) classification is a hierarchical system for dividing up the economic territory of the EU for the purpose of the collection, development and harmonisation of European regional statistics. The NUTS2 classification identifies basic regions for the application of regional policies, while NUTS3 refers to small regions for specific diagnoses. More information is available here.

institutions and regions. Table 2 shows the top destinations of degree and Erasmus mobile students, based on the absolute number of inward mobile students for each typology.

Figure 1. Main destinations for degree and credit mobile students



Notes: For degree mobility, 2013 data were used for DK and 2011 data were used for HU and LU; no data were available for CZ, EL, IT, NL, PL, RO, SI or SK. For credit mobility, 2011 data were used for LU; no data were available for RO or SI.
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

Table 2 shows that eight of the top 10 HEIs that receive degree mobile students are based in the UK; three of these are located in London. A similar situation, in terms of the dominance of one country, is apparent for Erasmus mobility, but the top destinations are completely different. Seven of the top 10 HEIs that receive Erasmus students are Spanish, with the University of Granada, the Complutense University of Madrid and the University of Valencia being the top three. The only non-Spanish universities are the Italian University of Bologna, the Czech Charles University in Prague and KU Leuven in Belgium.

Table 2. Top destination HEIs and regions for degree and credit mobile students

	Degree mobile students – top destinations (ISCED 6–8)				Erasmus mobile students – top destinations (ISCED 5–8)			
	Top HEIs							
Ranking	Country	Top HEIs	No of students	NUTS 2	Country	Top HEIs	No of students	NUTS 2
1	AT	University of Vienna	19,553	AT13	ES	University of Granada	1,918	ES61
2	UK	University College London	12,930	UKI3	ES	Complutense University of Madrid	1,731	ES30
3	UK	The University of Manchester	12,200	UKD3	ES	University of Valencia	1,722	ES52
4	AT	University of Innsbruck	10,126	AT33	IT	University of Bologna	1,678	ITH5
5	UK	The University of Edinburgh	9,975	UKM2	CZ	Charles University in Prague	1,353	CZ01
6	UK	Coventry University	9,030	UKG3	ES	Technical University of Valencia	1,293	ES52
7	UK	The University of Sheffield	8,410	UKE3	ES	University of Sevilla	1,141	ES61
8	UK	The University of Birmingham	8,150	UKG3	ES	University of Barcelona	1,103	ES51
9	UK	Imperial College of Science, Technology and Medicine	7,965	UKI3	BE	KU Leuven	1,041	BE24
10	UK	King's College London	7,850	UKI3	ES	University of Salamanca	1,041	ES41
	Top regions							
	Country	Top regions	No of students	NUTS 2	Country	Top regions	No of students	NUTS 2
1	UK	Inner London – west	64,690	UKI3	ES	Andalucía	6,915	ES61
2	FR	Île de France	59,209	FR10	ES	Comunidad de Madrid	6,486	ES30
3	AT	Wien	37,609	AT13	FR	Île de France	5,510	FR10
4	UK	West Midlands	32,170	UKG3	ES	Cataluña	4,356	ES51
5	UK	Eastern Scotland	26,085	UKM2	ES	Comunidad Valenciana	4,282	ES52
6	DE	Berlin	23,559	DE30	IE	Southern and Eastern	3,904	IE02
7	FR	Rhône-Alpes	22,417	FR71	CZ	Praha	3,163	CZ01
8	DE	Köln	20,451	DEA2	IT	Lombardia	2,963	ITC4
9	UK	Greater Manchester	18,115	UKD3	HU	Közép-Magyarország	2,794	HU10
10	DE	Oberbayern	16,341	DE21	DE	Berlin	2,727	DE30

Notes: Figures for degree mobile students refer to 2014/15, with the exception of DK (2013), HU and LU (2011); no data were available for CZ, EL, IT, NL, PL, RO, SI or SK, nor for ES at ISCED 8 level. The figures refer to 2013/14 for Erasmus data, with the exception of LU (2011); no data were available for RO or SI.

Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

Table 3. Top destination HEIs and regions for degree mobile students by ISCED level

	ISCED 6			ISCED 7			ISCED 8		
Top HEIs									
Ranking	Country	Top HEIs	No of students	Country	Top HEIs	No of students	Country	Top HEIs	No of students
1	AT	University of Vienna	10,741	AT	University of Vienna	6,801	UK	University of Cambridge	2,945
2	UK	The University of Manchester	5,455	UK	University College London	6,260	UK	The University of Oxford	2,535
3	UK	University of the Arts, London	5,335	UK	The University of Manchester	5,075	UK	University College London	2,205
4	UK	Coventry University	5,245	UK	The University of Birmingham	4,825	AT	University of Vienna	2,011
5	AT	University of Innsbruck	5,132	DE	Technical University of Munich	4,687	UK	Imperial College of Science, Technology and Medicine	1,810
6	UK	The University of Edinburgh	4,835	UK	Imperial College of Science, Technology and Medicine	4,605	BE	KU Leuven	1,754
7	UK	The University of Liverpool	4,720	UK	London School of Economics and Political Science	4,595	UK	The University of Manchester	1,670
8	UK	University College London	4,465	AT	University of Innsbruck	4,154	UK	The University of Edinburgh	1,555
9	AT	Vienna University of Technology	4,119	UK	The City University	4,000	FR	Université de Grenoble	1,442
10	DE	University of Hagen	3,967	UK	The University of Sheffield	3,880	BE	Ghent University	1,397
Top regions									
Ranking	Country	Top regions	NUTS2	No of students	Country	Top regions	NUTS2	No of students	Country	Top regions	NUTS2	No of students
1	UK	Inner London – West	UKI3	25,680	FR	Île de France	FR10	32,539	FR	Île de France	FR10	10,439
2	AT	Wien	AT13	20,160	UK	Inner London – West	UKI3	31,845	UK	Inner London – West	UKI3	7,165
3	FR	Île de France	FR10	16,231	UK	West Midlands	UKG3	14,730	AT	Wien	AT13	3,983
4	UK	West Midlands	UKG3	14,830	DE	Berlin	DE30	13,837	UK	Berkshire, Buckinghamshire and Oxfordshire	UKJ1	3,400
5	UK	Eastern Scotland	UKM2	12,990	AT	Wien	AT13	13,466	DE	Berlin	DE30	3,351
6	UK	Surrey, East and West Sussex	UKJ2	8,960	FR	Rhône-Alpes	FR71	11,952	UK	East Anglia	UKH1	3,330
7	UK	Greater Manchester	UKD3	8,745	DE	Köln	DEA2	10,042	UK	Eastern Scotland	UKM2	3,320
8	DE	Arnsberg	DEA5	8,572	DE	Oberbayern	DE21	9,950	FR	Rhône-Alpes	FR71	3,169
9	DE	Köln	DEA2	7,996	UK	Eastern Scotland	UKM2	9,775	SE	Stockholm	SE11	2,717
10	FR	Rhône-Alpes	FR71	7,296	DE	Karlsruhe	DE12	7,368	UK	West Midlands	UKG3	2,610

Notes: Figures refer to 2014/2015, with the exception of DK (2013), HU and LU (2011); no data were available for CZ, EL, IT, NL, PL, RO, SI or SK, nor for ES at ISCED 8 level.

Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

One of the reasons for this considerable difference between Erasmus and degree mobility destinations ([19]) is likely to be the presence of students from outside the EU: while Erasmus mainly applies to EU students, a consistent number of degree mobile students come from outside the EU, going, in particular, to the UK, FR and DE, as Eurostat official statistics show. These are also the countries that appear in the top 10 destination regions of degree mobile students (see Table 2), together with AT, where the top receiver is located. In fact, the top destination in terms of the absolute number of students is the University of Vienna, hosting almost 20,000 degree mobile students. This HEI is the top destination at both the ISCED 6 and ISCED 7 levels, while it ranks fourth for the PhD level ([20]), as shown in Table 3. When analysing top destinations of degree mobile students for the single ISCED levels, we find that only three HEIs – namely the University of Vienna, the University of Manchester and University College London – appear in the top 10 for all levels, therefore showing an international dimension throughout the entire tertiary level. It is interesting to note that some universities appear among the top receivers at only specific ISCED levels. The University of Cambridge, for example, is the main single destination for mobile PhD students, but does not appear among top receivers in the lower ISCED levels. The University of Oxford, which ranks second at the PhD level, does not appear at all in the top 10 at the bachelor or masters level (although in the latter it ranks in the top 20). A few more technical or field-specific institutions also appear at only one ISCED level, such as the University of the Arts (London) or the Vienna University of Technology at the ISCED 6 level, and the Technical University of Munich and the London School of Economics and Political Science at the ISCED 7 level. Other HEIs, such as Imperial College of Science, Technology and Medicine in London, rank among the top 10 at both the masters and PhD levels.

The other level of analysis for this report is the regional one. In order to see what the territorial distribution of mobile students is, Table 2 and Table 3 also present lists of NUTS2 regions with the highest absolute numbers of incoming students ([21]). The main destinations in this case are defined not only by the number of individuals hosted by a single HEI, but also by the number of institutions that are present in a NUTS2 region. A high position in the ranking of receiving regions could also be determined by the presence of one or two large institutions making up most of the regional pool of incoming students, or by many smaller destination HEIs with no big scorer. As emerges from Table 2, the main destination regions clearly reflect the list of HEIs presented above, with four of the top 10 destinations of degree mobile students being in the UK, and four of the top 10 Erasmus receiving regions being Spanish.

As far as degree mobile students are concerned, the region with the highest number of incoming students (considering all tertiary education levels together) is Inner London – West, where most of the universities in London (22 out of 32) are located. The dominance of this region is reflected in Table 2: three of the top 10 universities are based in this city (with University College London ranking 2nd overall, and Imperial College of Science, Technology and Medicine and King's College in the 9th and 10th positions, respectively). Among the top 10 regions, Vienna in AT, and the West Midlands, Eastern Scotland and Greater Manchester in the UK all also appear in the ranking of top destination HEIs. The high position of these regions is therefore highly dependent on the presence of top HEIs. The other regions, on the other hand, are characterised by the absence of top scorers and therefore by a consistent number of medium-level (not in the top 10 but in the top 50) or even low-level receivers, which in number make up for the lack of large destinations. In particular, a situation similar to that for Erasmus holds for the French regions, with Île de France and Rhône-Alpes ranking 2nd and 7th,

([19]) It is worth noting that some of the universities in the Erasmus ranking are not covered by the analysis on degree mobility on account of a lack of data, which, as mentioned, applies to, for example, Italian and Czech universities.

([20]) It should be borne in mind that Spanish destinations are missing at ISCED 8 because of a lack of data.

([21]) A graphical overview of the number of incoming Erasmus and degree mobile students in the EU is provided in Annex 3.

respectively; the former has only two HEIs in the top 50 receivers (Pantheon-Sorbonne University and Paris 8 University), with more than 5,000 degree mobile students each; the latter has no university in the top 50, the largest destination being Jean Moulin University Lyon 3, ranking 65th. The German region of Berlin (in 6th position) has no HEI in the top 10, but does have three universities in the top 50 (Free University of Berlin, with more than 6,000 mobile students, and the Technical University of Berlin and Humboldt University of Berlin, both with fewer than 5,000 mobile students). Finally, in the region of Köln, only one HEI is in the top 50 (Aachen University, with nearly 6,000 students).

For Erasmus, the concentration of Spanish regions is even more significant at the very top of the ranking, with four of the top five regions being in this country. The main destination is Andalucía, reflecting the presence of the top HEI – the University of Granada – and the University of Sevilla, which ranks 7th (see Table 2). Andalucía is followed by Comunidad de Madrid (where the 2nd HEI, Complutense University of Madrid, is located), Île de France and Cataluña. Île de France is a very different case, with a high number of institutions counterbalancing the lack of HEIs at the top of the ranking (the first university from this region ranks 47th overall). A similar situation applies to Southern and Eastern Ireland, which ranks 6th among the top regions, but has no HEI among the top 50 destinations: University College Dublin and University College Cork are the top Irish destinations, with between 550 and 600 Erasmus students, placing them in the 51st and 56th positions, respectively.

Looking at the relevance of destination regions for degree mobile students at the individual educational levels, Table 3 clearly shows how the top regions are mostly consistent across ISCED levels. Six regions (Inner London – West, Wien, Île de France, West Midlands, Eastern Scotland and Rhône-Alpes) appear in the top 10 at all levels; Greater Manchester, Köln and Berlin appear in two out of three levels.

Some regions, on the other hand, appear in only one ISCED level. At the bachelor level, the German region of Arnsberg ranks 8th among regions; this is mainly because of the presence of the University of Hagen, which is among the top 10 receiving HEIs and which covers almost half of the incoming students in the region. At the PhD level, the region of Berkshire, Buckinghamshire and Oxfordshire appears in fourth position, which is mainly as a result of the performance of the University of Oxford, while East Anglia's position in the ranking is the result of the number of students choosing Cambridge, which – as mentioned before – is the top destination at this level.

The numbers presented so far provide a first overview of the distribution of mobile students across institutions and regions in the EU. They show which destinations are the main destinations for mobile students in absolute terms. However, what these figures show is likely to be affected, and in some cases driven, by the size of the institutions. The other side of the coin is therefore the student mobility rate, which in this report is defined as inward mobile students as a share of the total number of students (i.e. total student population) in the HEI, region and/or country. As explained in Chapter 3, this is the main indicator used in this report to capture the level of attractiveness of a certain destination.

4.2 Degree and credit mobility rates at the country level

Figure 2 shows the overall student degree and credit mobility rates in the latest year for which data are available (2014 for degree mobility and 2013 for credit mobility). On average, around 10% of students enrolled at ISCED 6–8 in the EU are degree mobile students. The most popular destinations in relative terms are the UK and AT with 20.2% and 19.2% of degree mobile students, respectively. The figures clearly show a considerable difference between degree and credit mobility in terms of share of total students: the inward credit mobility rates are much lower than those of degree mobility

for all countries, with only around 1.1% of the total students in the EU being Erasmus students. The most popular destinations in this case are BE (2.5%), IE (2.5%) and FI (2.2%). CY has a relatively high share of inward degree mobile students (17.2%); this high share is driven by institutions that are foreign colleges of US universities (e.g. the American College), universities that have agreements with British universities for students to obtain UK degrees (e.g. Alexander College, Global College) or open universities (e.g. the Open University of Cyprus). Apart from AT, CY and the UK, only FR is above the EU average (11.58%). The rest of the countries have lower values, with ES, BG, HR and LT at the bottom end of the distribution (with shares of 1.9%, 3.15%, 2.3% and 3.5%, respectively).

For credit mobility, some countries, such as FR (1.0%), NL (1.1%) and LV (1.2%), are close to the EU average, while BG (0.2%), EL (0.5%) and HR (0.5%) are the countries with the lowest shares of credit mobile students (Figure 2).

Mobility varies greatly across educational levels for degree mobility. Figure 3 represents student mobility rates across countries in 2014 by level of education, i.e. from ISCED 6 (at the top) to ISCED 8 (at the bottom).

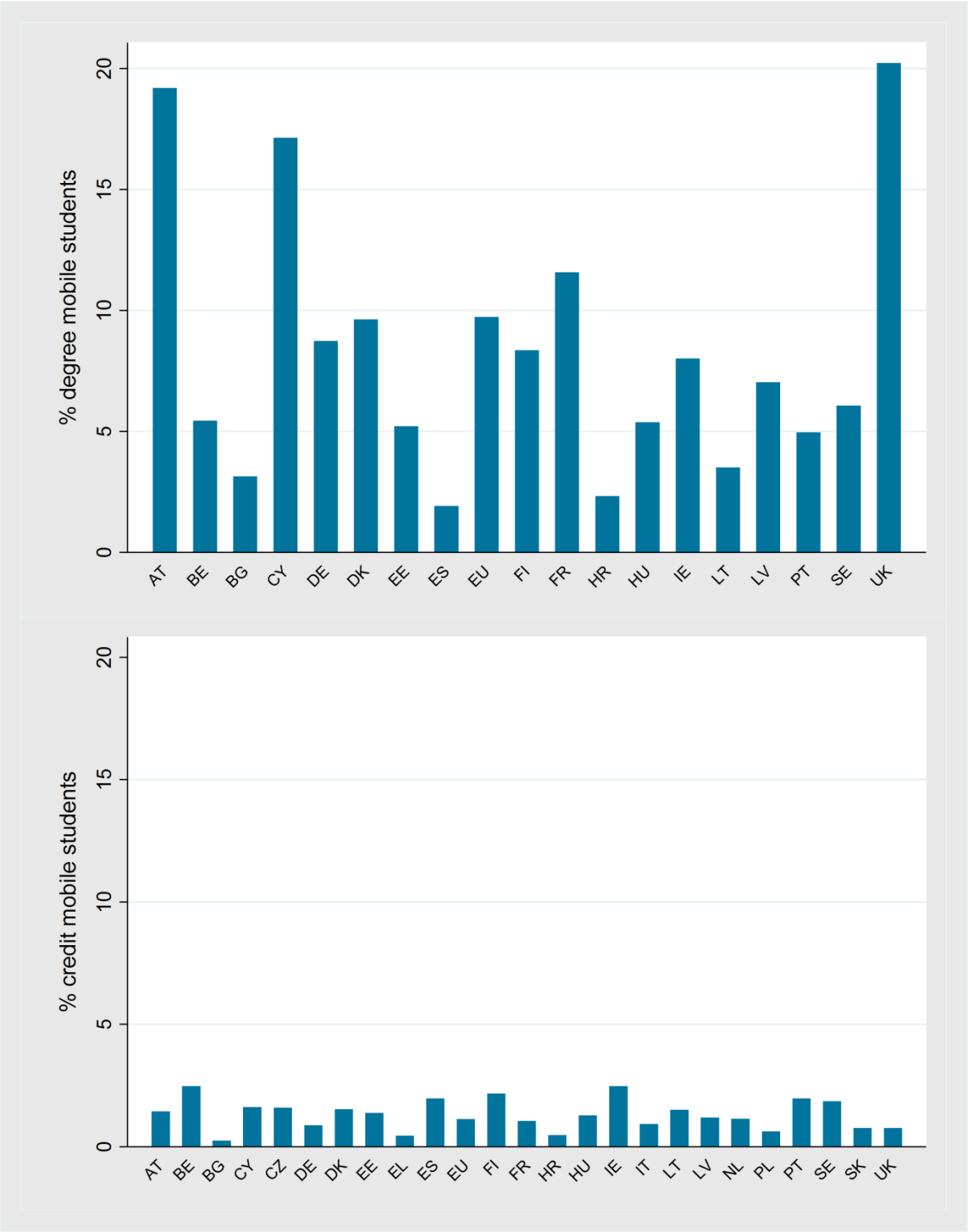
In general terms, the higher the level of education, the greater the share of mobile students. With a few exceptions, degree mobility rates among ISCED 8 students are higher than among ISCED 7 students, and both are higher than among undergraduates. The EU average for 2014 shows that 6.6% of undergraduates are mobile students, compared with 14% for masters students and 26.8% for PhD students. CY, LT and LV are the exceptions, where the percentage of mobile students at ISCED 7 is higher than at ISCED 8 (17.3% in ISCED 7 vs 11.1% in ISCED 8 for CY; 6.6% in ISCED 7 vs 3.1% in ISCED 8 for LT; and 12.7% in ISCED 7 vs 8.0% in ISCED 8 for LV).

At the ISCED 6 level, the pattern of country attractiveness is similar to the general one described previously, where CY, AT and the UK are the most attractive countries, with shares of mobile students of 17.4%, 18.4% and 13.7%, respectively. By contrast, ES (0.7%), HR (1.8%), SE (2.2%), BE (2.4%), BG (2.5%) and LT (2.7%) are the countries with the lowest shares of mobile students. For masters students (ISCED 7), the UK (33.3%), AT (19%), DK (17.5%), CY (17.3%) and FI (14.7%) receive relatively more students than the EU average. At the other end of the distribution, BE, EE, ES, HR, LT, PT and SE have a share of inward degree mobile students of below 10%. The UK (43%), FR (38.1%), BE (35.7%), SE (34%), DK (30.9%) and AT (27%) are the countries with the highest shares of mobile students at ISCED 8, while BG, HR, HU and LT have shares below 10%.

4.3 Institutional variability of degree and credit mobility within countries

The figures in the previous section provide an overview of the national average of inward degree and credit mobility. It is, however, interesting to go beyond the mean and look at the entire distribution of the share of mobile students within countries to capture the institutional variability of mobility rates. The purpose of this section is to understand how much HEIs in one country differ from each other in terms of inward mobility. In fact, the same mean level of mobility for two countries could arise from very different situations, ranging from countries with a widespread distribution of mobile students across HEIs to countries where a few universities account for very high shares of inward mobility and other HEIs receive no mobile students. In other words, the shares of inward mobile students are likely to vary considerably across HEIs located in the same country, which can be captured by looking at the concentration of mobility across HEIs.

Figure 2. Share of degree (ISCED 6–8, 2014) and credit (ISCED 5–8, 2013) mobile students on the total student population



Notes: Data from 2013 used for DK and from 2011 for HU for degree mobility. LU and MT not included.
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

Figure 3. Share of degree mobile students on the total student population by ISCED level (2014)

Notes: Data from 2013 used for DK and from 2011 for HU. LU and MT not included.
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

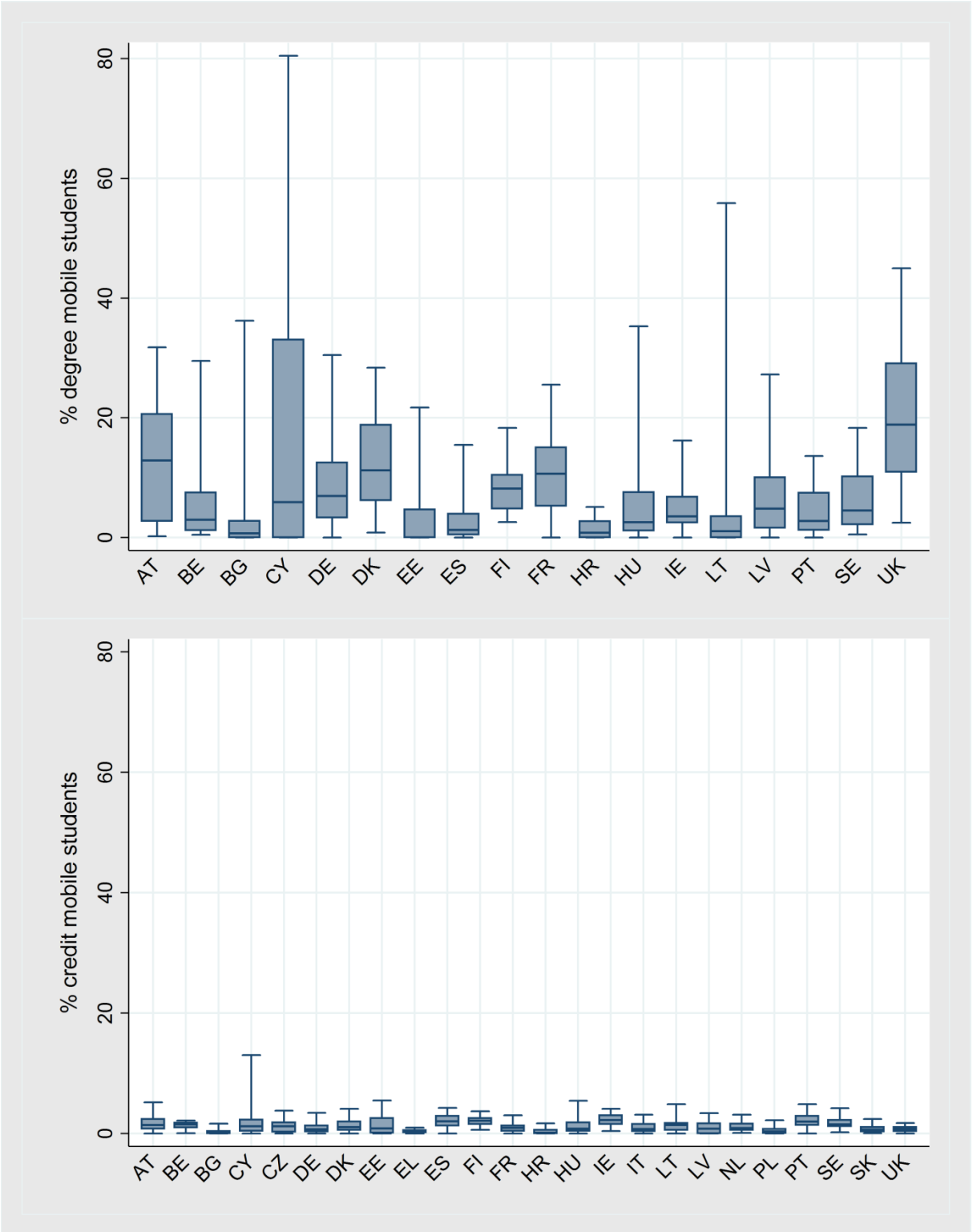
The boxplots in Figure 4 present our analysis of this institutional variability. Boxplots are charts aimed at graphically showing the distributional characteristics of a set of data, and they are used here to study the distribution and concentration of mobility rates. In order to facilitate the interpretation of the boxplot, they have been created to cover the 5th to 95th percentiles ([22]) of the mobility distribution. The boxplots can therefore be interpreted as follows: (a) the upper whiskers represent the institutions in the 95th percentile of the (mobility rates) distribution; (b) the upper value of a box is the 75th percentile of the distribution; (c) the horizontal line within a box represents the value of the median institutions, i.e. institutions with the median value of inward mobility rates; (d) the lower value of a box represents the institutions in the 25th percentile of the distribution; and (e) the values of the lower whiskers are the 5th percentile. The distance between the upper and lower parts of each boxplot indicates the degree of concentration/dispersion and skewness in the share of mobile students within a country. A relatively large boxplot (with a large distance between the percentiles shown) represents a high level of institutional variability in the share of mobile students in a country (e.g. the UK), while a relatively small one shows a situation where the different HEIs in a country do not differ much in terms of their share of inward mobile students (e.g. PT). LU and MT are not included in Figure 4 because they each have only one university in the ETER register.

For degree mobility, presented in the top panel of Figure 4, BG, CY, HU and LT are the countries where the highest differences across universities exist, i.e. where only a few universities receive a significant number of mobile students. For example, in CY, half of the universities have less than 5.9% of mobile students, while only two institutions have more than 75.5% of mobile students, with Philips College being the institution with the highest share of degree mobile students. Similarly, in LT, three quarters of the institutions receive less than 3.6% mobile students, while only nine institutions receive more than 3.6%, with LCC International University and European Humanities University being the institutions with the highest percentages (53.9% and 93.4%, respectively). In BG, EE, ES, HR and IE, the vast majority of universities have a very low share of degree mobile students: three quarters of the HEIs in each country have shares of inward degree mobile students of below 7%.

In AT, DE, DK, FI, FR, LV and the UK, the distribution of degree mobile students is more homogeneous. For example, in AT half of the universities have a share of mobile students below 13%, while in the other universities, the share of mobile students represents between 13% and 40% of the total population; only in Lauder Business School do degree mobile students represent 90.5% of the total population. Similarly in FR, while one quarter of the universities (43 institutions) have less than 5% of mobile students, another one quarter of the universities have more than 15% of mobile students. In this case, Université Paris-Est (40.4%), School for Advanced Studies in the Social Sciences (41.9%) and Télécom Bretagne (46.9%) have the highest shares. In FI and the UK, there are not many universities that receive relatively small shares of mobile students, with only one institution in each country receiving less than 2.5% of mobile students. As expected, the UK is the country with the highest median share of mobile students at the institutional level, representing almost 19% of the total student population. At the top of the distribution, institutions are located in the London area (e.g. London School of Economics and Political Science with 66.6% inward mobility and Imperial College of Science, Technology and Medicine with 48%).

([22]) A percentile is a value below which a given percentage of observations in a group of observations falls. The 5th percentile is the value (here, inward mobility share) below which 5% of the observations are found; the 95th percentile is the value below which 95% of the observations are found.

Figure 4. Institutional distribution (5th/95th) of the share of degree (ISCED 6–8, 2014) and credit (ISCED 5–8, 2013) mobile students



Notes: Data from 2013 used for DK and from 2011 for HU. LU and MT not included. The lower and upper whiskers of the boxplot represent the 5th and 95th percentiles of the distribution, respectively. The lower, middle and upper lines of the boxes represent the 25th, 50th and 75th percentiles, respectively.
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

The bottom panel of Figure 4 presents the distribution of credit mobility within countries. In this case, the distribution of Erasmus students across universities in EU countries is more homogenous than in the case of degree mobility. With the exception of one university in CY, in which the share of Erasmus students is higher than 13% (The Philips College), in the rest of the institutions in this country credit mobility does not represent more than 5.5% of the total student population. BG, EL, HR and NL are the countries where the majority of the universities have low shares of inward Erasmus mobility. Specifically, three quarters of universities in these countries have less than 0.8% credit mobile students.

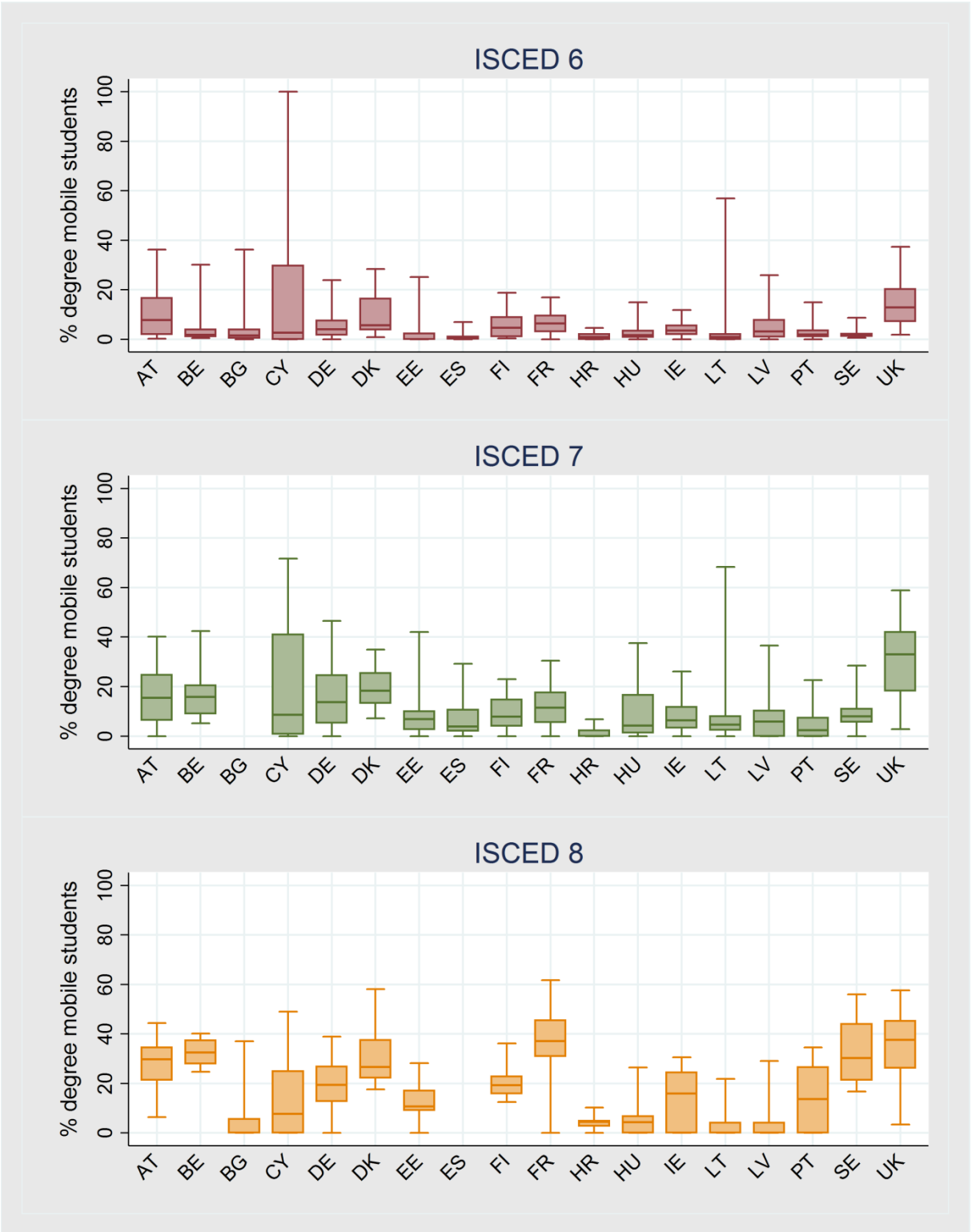
ES, FI, IE, PT and SE are the countries with the highest median level of credit mobility; in these countries, more than half of the universities have at least 2% of Erasmus students, with the universities receiving the highest shares of Erasmus students being Comillas Pontifical University in ES (5.6%), Hanken School of Economics in FI (3.7%), Institute of Technology (Tralee) in IE (7.4%), Higher School of Arts of Oporto (7.1%) and Chalmers University of Technology in SE (4.3%). In AT, DK, FR and the UK, the attractiveness of the universities for credit mobility is limited, with only one quarter of the universities in each country receiving more than 2.4% (AT), 2% (DK), 1.4% (FR) and 2.3% (UK) credit mobility students, respectively. The most attractive institutions in this case are Kolding School of Design in DK (5.1%), Paris Institute of political studies in FR (7.0%), Academy of Fine Arts Vienna in AT (5.8%) and Cranfield University in the UK (7.7%).

Figure 5 shows the distribution of degree mobile students for the three different ISCED levels in 2014. As in Figure 4, the boxplots have been modified in order to cover the 5th to 95th percentiles of the distributions. The variation in degree mobility is more pronounced the higher the level of education, i.e. at ISCED 8 level, there are more differences within countries in relation to the attractiveness of their universities.

At the ISCED 6 level, with the exception of CY (where four universities have more than 30% of degree mobile students), in three quarters of the universities, degree mobile students represent less than 20% of the total student population. This homogeneity is even clearer in ES and HR, where 95% of the universities (70 institutions in ES and 23 in HR) received less than 7% of mobile undergraduate students, with the institutions with the highest shares of degree mobile students at ISCED 6 level being IE University (38.6%) and Zagreb School of Economics and Management (5.2%). As in the general case, AT and the UK are the countries with the highest average shares of mobile students at institutional level. While in AT 50% of universities (32 universities) received more than 7.7% of undergraduate mobile students, in the UK half of the universities (70 universities) had shares of mobile students of at least 12.8%.

At the ISCED 7 level, EE, ES, HR, IE, LT, LV and PT are the countries with the lowest levels of mobile students. In all these countries, three quarters of their universities received less than 12% of degree mobile students. In contrast, all universities in BE (11 institutions) and in DK (12 institutions) have more than 5% degree mobility, with the institutions with the highest percentages being Erasmus University College Brussels in BE (42.4%) and Aarhus School of Architecture in DK (35.0%). In CY and LT, there are extreme cases where one university has more than 68% of mobile students (A.C. American College in CY and European Humanities University in LT). The UK remains the country with the highest average of attractive universities, where half of the institutions receive more than 33% of mobile students, with the London School of Economics and Political Science being the institution with the highest percentage of masters mobile students (81.8%).

Figure 5. Distribution (5th/95th) of the share of degree mobile students by ISCED level (2014)



Notes: Data from 2013 used for DK and from 2011 for HU. LU and MT not included. The lower and upper whiskers of the boxplot represent the 5th and 95th percentiles of the distribution, respectively. The lower, middle and upper lines of the boxes represent the 25th, 50th and 75th percentiles, respectively.
Source: own elaborations on data from the ETER project. Data downloaded in June 2017.

The highest cross-country variation in degree mobility is seen at the ISCED 8 level. In BE, DK, FI and SE, almost all universities (95% of the total number of institutions) received more than 12% of mobile students, with IT University of Copenhagen in DK (58.1%), KU Leuven in BE (40.1%), Hanken School of Economics in FI (36.2%) and KTH Royal Institute of Technology in SE (56.9%) being the most attractive institutions. In contrast, three quarters of the universities in BG, HR, LT, LV and HU host less than 7% of degree mobile students. While the UK is the country with, on average, the highest number of 'attractive' universities in the ISCED 6 and 7 levels, institutions located in other countries are also attractive in the case of PhD students (ISCED 8). In the case of the ISCED 8 level, half of the universities located in AT, BE, FR, SE and the UK received more than 30% of mobile students, the institutions with the highest rate in each country being the Academy of Fine Arts Vienna in AT (45.9%), KU Leuven in BE (40.1%), Université de Technologie de Troyes in FR (78.1%), KTH Royal Institute of Technology in SE (56.9%) and London School of Economics and Political Science in the UK (71.1%).

4.4 Degree and credit mobility rates at the regional level

One of the advantages of using the ETER database is the possibility of quantifying the number of mobile students not only at the level of the institution, but also at the level of the region, therefore allowing a comparison of the characteristics associated with the level of attractiveness of a destination for mobile students. This section presents statistics related to degree and credit mobile students at the NUTS2 level. Specifically, Figure 6 and Figure 7 show the share of degree (for the combined ISCED 6–8 levels) and credit mobile students (for the combined ISCED 5–8 levels) at the regional level, while Figure 8, Figure 9 and Figure 10 show the shares of degree mobility at the single ISCED level. The colours in the maps represent groups with different levels of inward mobility in the region. Four levels are distinguished, based on the quartiles of the distribution (p25, p50 and p75) ([23]) of mobile student shares. The exact values of the quartiles in each case, which serve as cut-off points between the four groups distinguished in the maps, are reported in the legend of the corresponding map and vary considerably across type of mobility and ISCED level. The lighter blue regions represent less attractive regions (located in the first quartile of the degree mobility distribution), while darker blue shows regions with the highest share of mobile students. The four groups correspond to 'low', 'medium-low', 'medium-high' and 'high' levels of attractiveness.

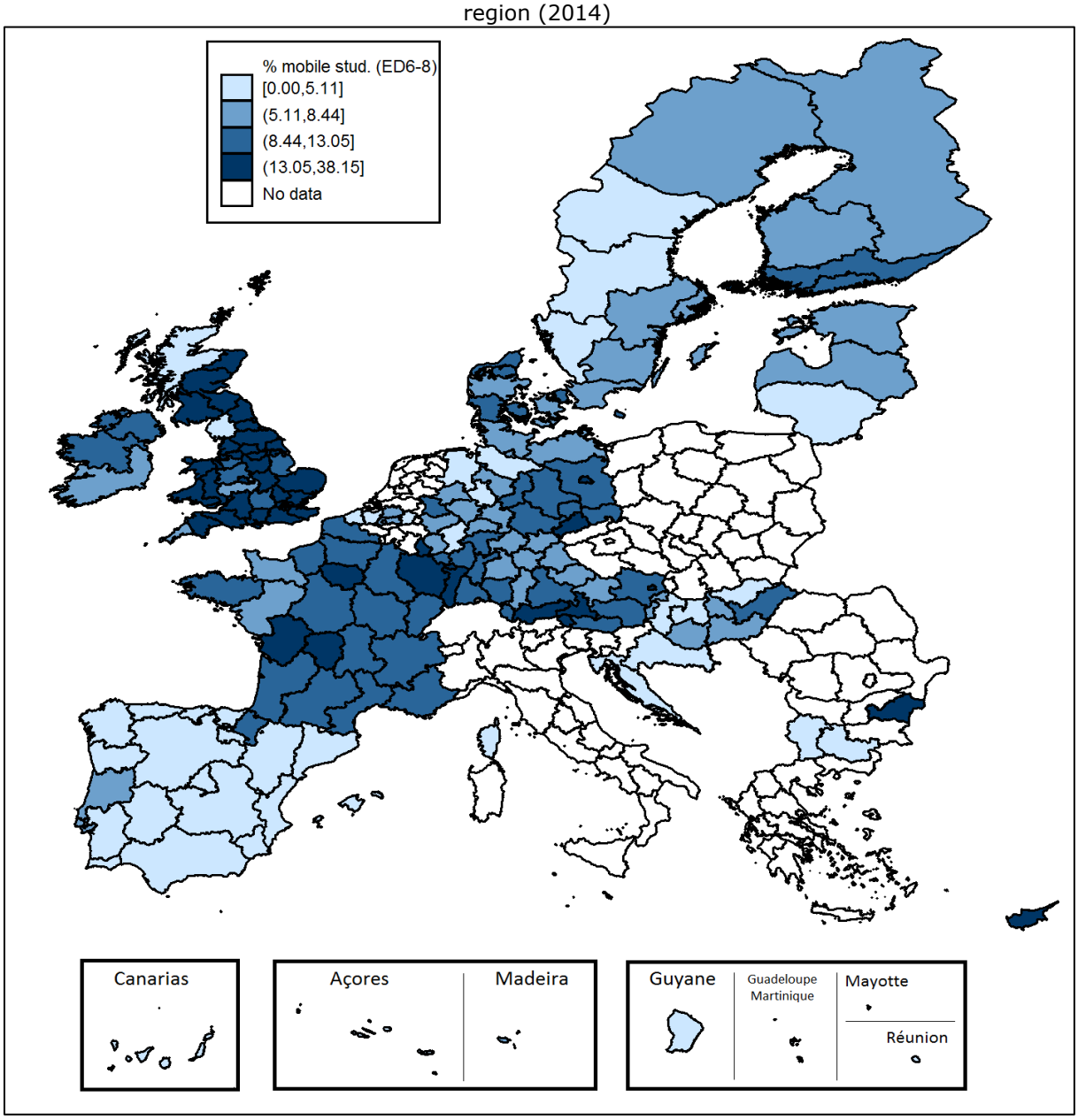
Figure 6 shows the distribution of degree mobility rates across regions in 2014 for ISCED 6–8 combined. CY, EE, LT, LV, LU and MT are countries with only one region at the NUTS2 level and so no within-country variability can be shown ([24]). However, when compared with other regions in Europe, EE, LT and MT are considered less attractive countries as they are located in the first quartile of the distribution, while LU is positioned in the last quartile of the degree mobility distribution. AT is a moderately attractive country, with only three regions (Wien, Salzburg and Tirol) having shares of mobile students above 20% of the total student population. All regions in BE, HU, IE, PT and SE have low and medium-low levels of attractiveness, with values of degree mobility lower than 8.4%. In BG, while the levels of attractiveness of Sliven and Burgas are low, 36.2% of students in Shumen are mobile. Regions in DE have shares of mobile students of between 5.8% (Unterfranken) and 15.6% (Chemnitz). Similarly, in DK, the highest share of degree mobility is 11.3% (Hovedstaden). In ES, the attractiveness of all regions is

([23]) The quartiles of a ranked set of values are the three points that divide the set into four equal groups, each comprising a quarter of the data. In this case, once all regions are ordered by increasing percentage of inward mobile students, the quartiles – p25, p50 and p75 – represent the values of the indicator leaving 25%, 50% and 75% of the regions under these values.

([24]) We acknowledge that there is no within-country variability in EE, CY, LV, LT, LU and MT; however, in order to present the full European picture of regional student mobility, it is important to consider all these countries as part of the analysis so that they can be compared with other NUTS2 regions.

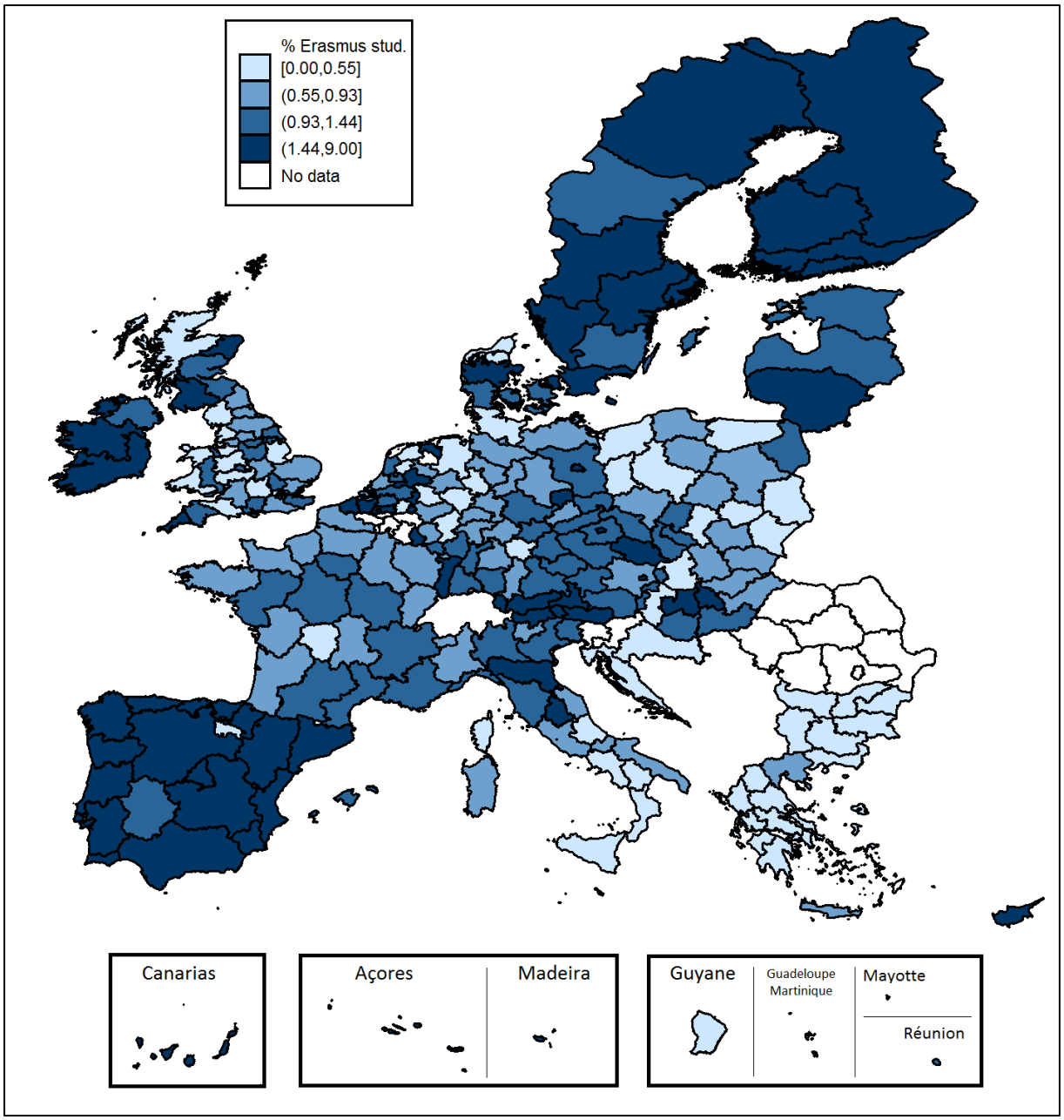
considered low, with the exception of Comunidad Foral de Navarra, in which almost 9% of students are mobile and it is therefore considered a region with a medium-high level of attractiveness. In FI, Helsinki-Uusimaa and Åland are the most attractive regions, with mobile students representing 10.4% and 25.5% of the total student populations, respectively. Regions in FR are quite homogeneous, with a minimum share of degree mobility of 8.9% (Nord – Pas-de-Calais) and a maximum share of 17.1% (Alsace) – excluding the *départements d'outre-mer* region. The two regions in HR have around 2.3% of mobile students. Finally, in the UK, the majority of regions have high and medium-high levels of attractiveness with the exception of Cumbria and the Highlands and Islands, which are located in the first quartile of the distribution.

Figure 6. Share of degree mobile students on the total student population at ISCED 6–8 levels by region (2014)



Notes: Data from 2013 for DK and from 2011 for HU and LU. Four levels are distinguished based on the quartiles of the distribution (p25, p50 and p75) of mobile student shares (see legend for the thresholds). The lightest blue regions represent regions with 'low' levels of attractiveness (located in the first quartile of the degree mobility distribution), while the darkest blue represents regions with the highest share of degree mobile students ('high' levels of attractiveness).
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

Figure 7. Share of credit mobile students on the total student population at ISCED 5–8 levels by region (2013)



Notes: Data from 2011 used for LU. Four levels are distinguished based on the quartiles of the distribution (p25, p50 and p75) of mobile student shares (see legend for the thresholds). The lightest blue regions represent regions with 'low' levels of attractiveness (located in the first quartile of the degree mobility distribution), while the darkest blue represents regions with the highest share of degree mobile students ('high' levels of attractiveness).
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

Figure 7 presents the statistics for Erasmus students at the regional (NUTS2) level. Although differences within CY, EE, LT, LV, LU and MT cannot be analysed (as they have only one NUTS2 region), these regions have medium-high and high levels of attractiveness, because they are located in the third and fourth quartiles of the mobility distribution, when compared with other regions in Europe. AT is a heterogeneous country, receiving between 0.8% (Niederösterreich) and 3.8% (Vorarlberg) of credit mobiles students. Regions in BE have medium-high and high levels of attractiveness,

with the exception of Provincie Limburg, which is located in the first quartile of the distribution (0.48% of its student population are Erasmus students). In HU, only Közép-Dunántúl has a high level of attractiveness, receiving 2.4% of Erasmus students. Regions in IE, PT and FI have high levels of attractiveness, with values for credit mobility of more than 2% in almost all regions (with the exception of Åland in FI and Área Metropolitana de Lisboa and Alentejo in PT, where the share of Erasmus students is lower, but the regions are still very attractive). Regions in SE have high levels of attractiveness with the exception of Mellersta Norrland and Småland med öarna. Similarly, in ES all regions have high levels of attractiveness, with the exception of La Rioja, Extremadura and Illes Balears with less than 1.2% of mobile students. All regions in BG are among the 25% of regions with the lowest rates of Erasmus students in the EU, with less than 0.3%. All regions in DE receive between 0.4% (Arnsberg) and 1.7% (Berlin) of credit mobile students. Similarly, in DK, the highest share of credit mobility is 2.0% (Midtjylland). In FR, with the exception of *départements d'outre-mer*, the region receiving the lowest share of Erasmus students is Corse (0.5%), and Alsace is the most attractive region (1.7%). The two regions in HR have low levels of attractiveness because they have around 0.5% Erasmus students. The case of credit mobility in the UK is particularly different from degree mobility. While for degree mobile students, the majority of UK regions have high and medium-high levels of attractiveness, for credit mobile students only Cornwall and the Isles of Scilly, north-eastern Scotland and south-western Scotland have high levels of attractiveness.

Figure 8-Figure 10 present the cross-regional comparisons of degree mobile students distinguished by single ISCED levels. In particular, Figure 8 represents degree mobility at ISCED 6, Figure 9 at ISCED 7 and Figure 10 at ISCED 8.

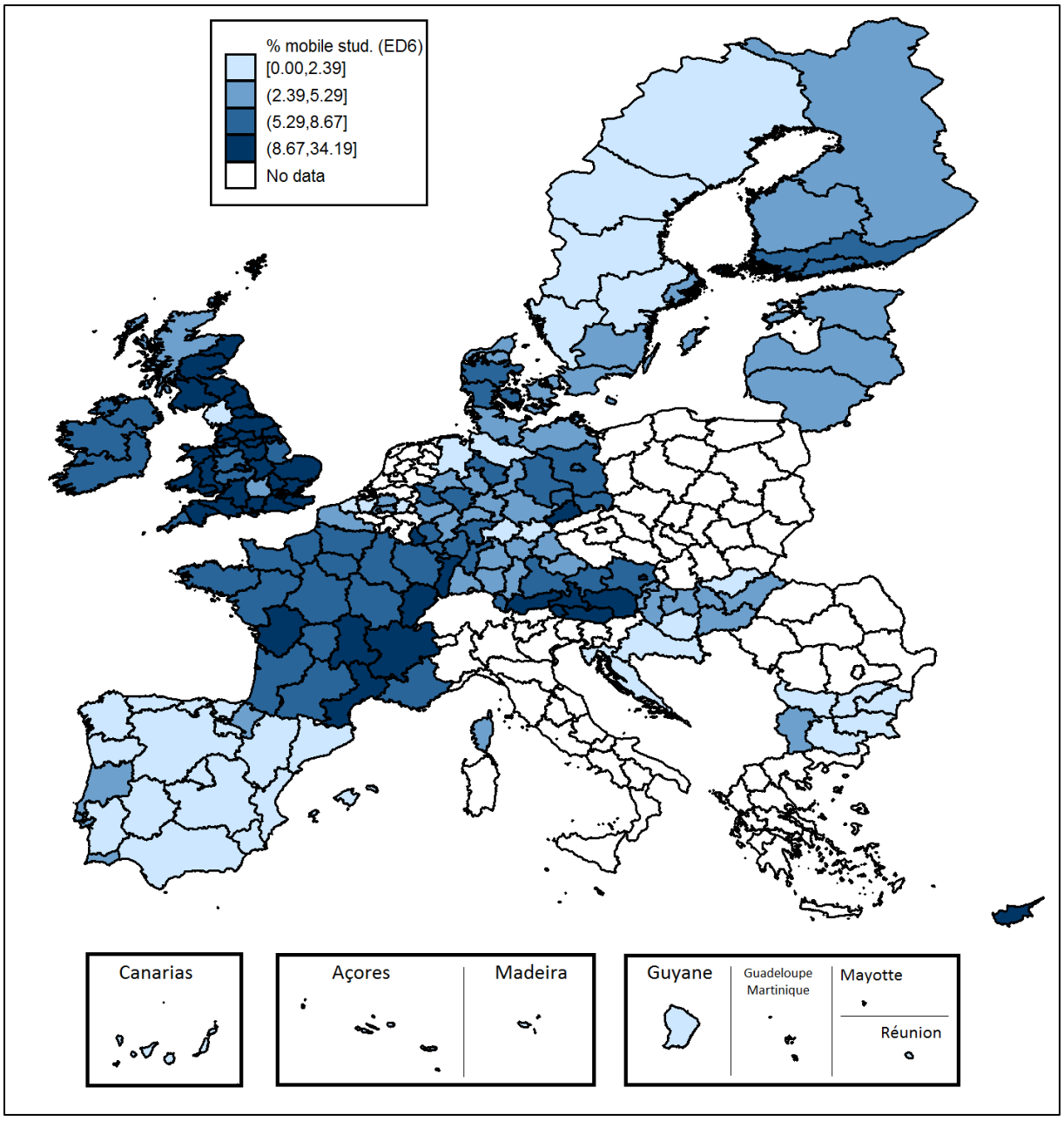
Looking at the different countries in Figure 8, AT has a medium-high to high level of attractiveness, with all its regions (with the exception of Burgenland) located in the third and fourth quartiles. All regions in BE, HU, PT and SE, and (also in this case) BG and ES, have low and medium-low levels of attractiveness, with values of degree mobility lower than 4% among undergraduate students. Unlike the case of tertiary education overall, for ISCED 6, the attractiveness of IE is medium-high, with its two regions having shares of mobile students of 6% (Southern and Eastern) and 7.4% (Border, Midland and Western). Regions in DE are heterogeneous and are mainly located in the second and third quartiles, with only four regions (Lüneburg, Weser-Ems, Oberfranken and Unterfranken) having low levels of attractiveness and one region (Chemnitz) above the top quartile. DK does not show considerable cross-regional differences, with mobility shares of between 5% (Hovedstaden) and 6.3% (Midtjylland). In FI, Åland is the most attractive region for undergraduate students, with one quarter of undergraduate students being mobile. Regions in FR are quite homogeneous, with a minimum share of degree mobility of 5.2% (Nord – Pas-de-Calais) and a maximum share of 15.5% (Alsace) – excluding the *départements d'outre-mer*. Both regions in CY have around 2% of mobile students. Finally, in the UK, the majority of regions have high and medium-high levels of attractiveness, with the exception of Cumbria, Berkshire, Buckinghamshire and Oxfordshire, and the Highlands and Islands, which are located in the first and second quartiles of the distribution.

Figure 9 shows the situation for ISCED 7. Among masters students, AT has regions in all quartiles of the distribution, with a minimum value of degree mobility of 7.7% in Oberösterreich and a maximum of 35.4% in Tirol. BE is quite heterogeneous as well, with regions located in all quartiles of the distribution. HU appears to be more attractive to masters students, with the majority of its regions having more than 12% of mobile students in this student population. All regions in PT have medium-low levels of attractiveness, with the exception of Madeira, where the share of mobile students is above 21%. In SE, the region with the lowest inward mobility rate is Norra Mellansverige (4.7%), while the most attractive is Sydsverige (14.8%). As in the general case, in ES, Comunidad Foral de Navarra is the most attractive region (20.2%). IE, again, is a

destination of medium-high attractiveness, with its two regions having mobility shares of around 13%. As for the ISCED 6 level, regions in DE are heterogeneous for ISCED 7 and are mainly located in the second and third quartiles, with only two regions (Berlin and Chemnitz) with more than 20% of mobile students. Regions in DK show high variability, with rates of degree mobile students of between 7.2% (Sjælland) and 21.0% (Hovedstaden). In FI, three out of the four regions with available information have medium-high levels of attractiveness (with the exception of Pohjois – ja Itä-Suomi). In FR, regions are relatively less attractive at ISCED 7 than at lower ISCED levels, with the maximum value of degree mobility being 16.8% in the case of Poitou-Charentes. The two regions in HR have around 3% mobile students among masters students. Finally, in the UK the majority of regions have high (only four medium-high) levels of attractiveness, with the exception of Herefordshire, Worcestershire and Warwickshire, Cumbria and the Highlands and Islands, which are located in the first quartile of the distribution.

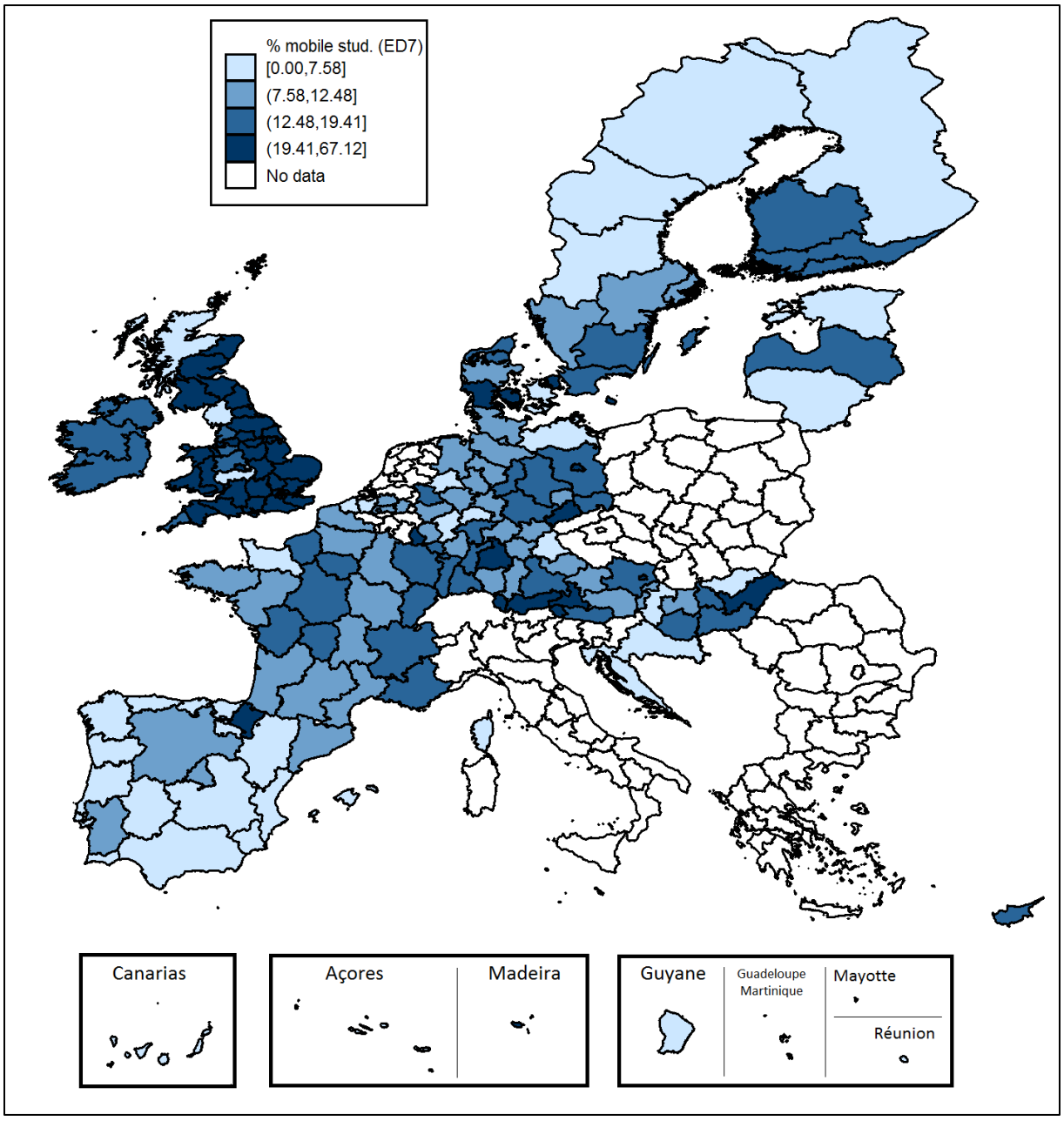
Finally, Figure 10 shows the distribution of degree mobility across regions at the PhD (ISCED 8) level. In this case, AT is a moderately attractive country with shares of mobile students of between 18.1% (Oberösterreich) and 32.4% (Tirol). In contrast to the lower levels of education, Provincie Vlaams-Brabant in BE is an attractive region, with 40.1% of mobile students. All regions in HU and BG have shares of PhD mobility below 10%. IE is moderately attractive, with both regions located in the second and third quartiles. In SE, PhD degree mobility figures vary between 22% (Norra Mellansverige) and 40.8% (Stockholm). PT regions are quite heterogeneous, ranging from a minimum of 2.6% mobile students in Algarve to 31.3% in Madeira. DE includes only one region among the most attractive territories in the EU, i.e. Kassel, with 38.2% of mobile students as a proportion of the total number of PhD students. A similar rate is found in the highest performing region in DK (i.e. Nordjylland), with 37.5%. Regions in FI have low and medium-low levels of attractiveness, with a maximum of 23% of mobile students in Etelä-Suomi. In FR, all regions are located among the 50% most attractive regions in the EU, with the exception of *départements d'outre-mer* and Corse. The two regions in HR have around 5.5% of mobile students. As in FR, the majority of regions in the UK have high levels of attractiveness, reaching a maximum share of PhD degree mobility of 53.1% in north-eastern Scotland.

Figure 8. Share of degree mobile students on the total student population at ISCED 6 level by region (2014)



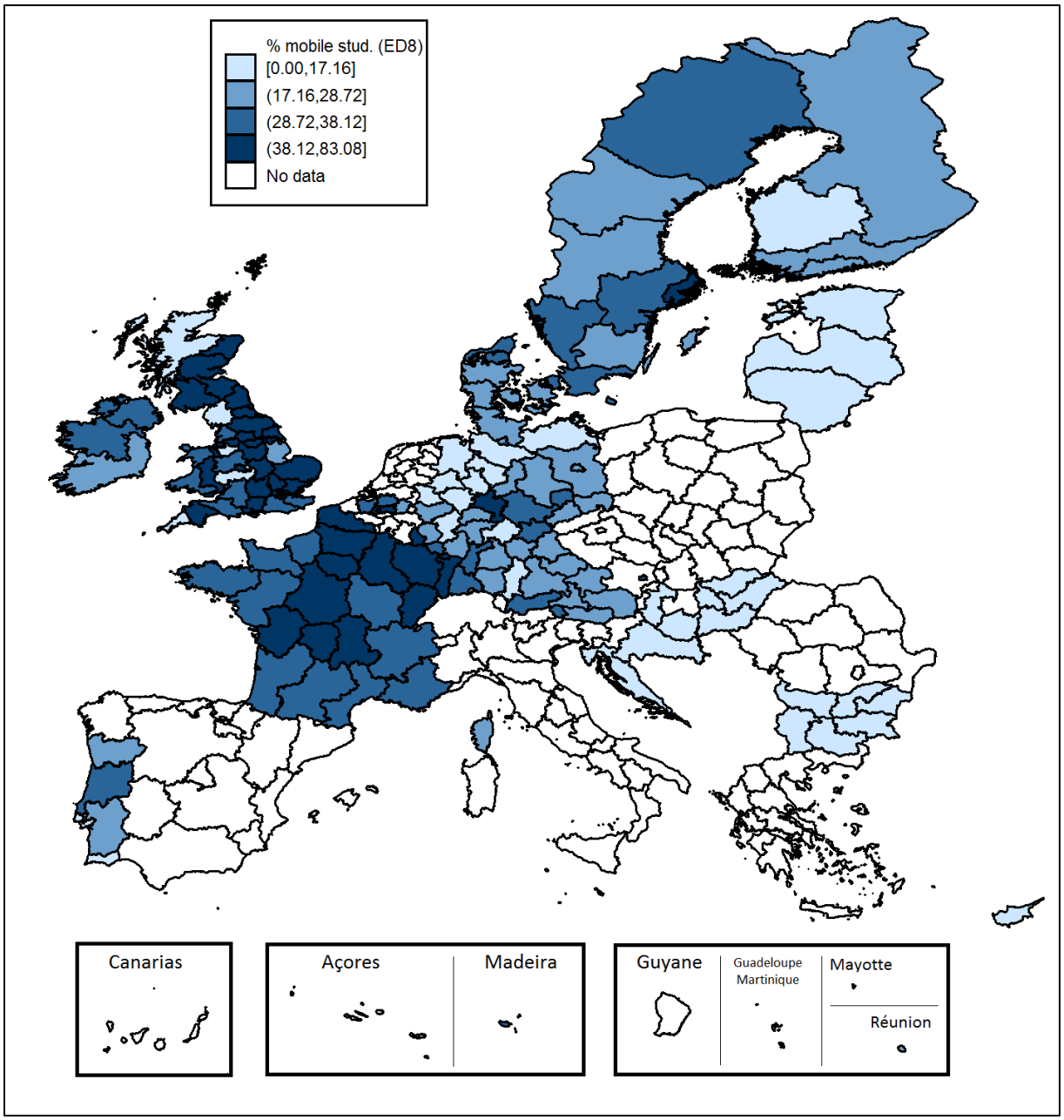
Notes: Data from 2013 for DK and from 2011 for HU and LU. Four levels are distinguished based on the quartiles of the distribution (p25, p50 and p75) of mobile student shares (see legend for the thresholds). The lightest blue regions represent regions with 'low' levels of attractiveness (located in the first quartile of the degree mobility distribution), while the darkest blue represents regions with the highest share of degree mobile students ('high' levels of attractiveness).
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

Figure 9. Share of degree mobile students on the total student population at ISCED 7 level by region (2014)



Notes: Data from 2013 for DK and from 2011 for HU and LU. Four levels are distinguished based on the quartiles of the distribution (p25, p50 and p75) of mobile student shares (see legend for the thresholds). The lightest blue regions represent regions with 'low' levels of attractiveness (located in the first quartile of the degree mobility distribution), while the darkest blue represents regions with the highest share of degree mobile students ('high' levels of attractiveness).
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

Figure 10. Share of degree mobile students on the total student population at ISCED 8 level by region (2014)



Notes: Data from 2013 for DK and from 2011 for HU and LU. Four levels are distinguished based on the quartiles of the distribution (p25, p50 and p75) of mobile student shares (see legend for the thresholds). The lightest blue regions represent regions with 'low' levels of attractiveness (located in the first quartile of the degree mobility distribution), while the darkest blue represents regions with the highest share of degree mobile students ('high' levels of attractiveness).
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

5 Where should I go? Factors associated with student mobility

One of the main objectives of this report is to analyse differences between institutional and regional factors associated with student mobility for both degree and credit mobility. This part of the analysis aims to better understand the characteristics that influence the attractiveness of particular destinations; in other words, it investigates the association between possible pull factors and mobility. In particular, the study focuses on the attractiveness of HEIs and the attractiveness of the regions in which the HEIs are located as possible factors associated with the choice of certain destinations by mobile students. Section 5.1 links the scientific literature that analyses the determinants of student mobility with the definition of the variables used in the empirical section of this report. Section 5.2 provides information about the methodology. Section 5.3 presents the empirical results for degree and credit mobility for higher education overall, as well as for the three ISCED levels (for degree mobile students). Finally, Section 5.4 analyses the factors associated with intra-EU mobility flows for credit mobility based on gravity models.

Before proceeding, it should be highlighted that this report does not claim that there is any causality between the institutional/regional factors and the share of student mobility in that institution/region. Despite sometimes talking about 'determinants', these should be interpreted in a very broad sense, as the study only investigates associations between these factors and mobility. Given the data available, it is not possible to draw conclusions on a real causal impact of the various factors on mobility.

5.1 Description of the variables

This section summarises the main variables used in the analysis of factors associated with mobility at the institutional and regional levels, as well as the theoretical explanation behind their selection based on the scientific literature. As mentioned previously, the importance of looking at the institutional and regional levels for student mobility is twofold. First, at the institutional level, attracting students from other countries is expected to improve the quality of HEIs' education and research systems, which benefit from the externalities of human capital accumulation (Beine et al., 2014), improve the reputation and revenues of HEIs, and increase the ability of HEIs to recruit talented students (Lepori, 2016). These arguments are based on the good practices of countries such as the UK and FR, which have made good use of their established reputations as centres for higher education and research to attract the world's best and brightest students (Findlay, 2010). Second, as mentioned in Findlay (2010), for some students 'migrating to learn' may be a route to 'migrating to work', and the academic gate is aimed at drawing talent from the pool of foreign students graduating from local educational institutions and encouraging them to stay and work or do research in the destination location. At the regional level, the attraction and retention of students can increase the pool of highly skilled human capital that is available to the workforce (Abella, 2006; Kuptsch and Pang, 2006), and might have an influential role in regional development and growth, contributing to knowledge creation, innovation and economic performance (OECD, 2016, 2017), and to building business networks with home countries (Docquier and Lodigiani, 2010; Flisi and Murat, 2011). Moreover, putting the emphasis on regions instead of countries has the additional advantage of combining differences between and within countries.

5.1.1 Factors defining institutional attractiveness

Institutional factors shape university attractiveness based on the nature and quality of the institutions (Baryla and Dotterweich, 2001). The main factors that might be associated with the level of attractiveness of an institution are related to the key activities carried out by HEIs, i.e. teaching and research. In order to capture these aspects, a number of related variables available in ETER are included in the analysis.

With regard to teaching activities, the scientific literature suggests that students move away from their home countries for better university resources and high-quality HEIs (McCann and Sheppard, 2001; Sá et al., 2004). The first variable included in the model is therefore the student–teacher ratio (or teaching load), which is considered a measure of the teaching quality of the destination institution (Agasisti and Dal Bianco, 2007). Fewer students per teacher means more time to spend with individual students and more time to concentrate on improving teaching activities, while more students per teacher is likely to reduce the time that teachers can spend on pupils. For this reason, we expect a lower student–teacher ratio to be positively associated with a higher share of mobile students, because of the potentially higher teaching quality ([25]). To capture this dimension of the teaching quality of institutions, and using the available information included in ETER, and following Agasisti and Dal Bianco (2007) and Lepori et al. (2015), we define ***teaching load*** as the number of undergraduate students ([26]) per unit of academic staff in head counts (HC). The formula applied is as follows ([27]):

$$Teaching\ load = \frac{Total\ students\ ISCED5 + Total\ students\ ISCED6}{Academic\ staff\ (HC)}$$

A second measure related to teaching and considered as an important driver of student mobility is fees paid per student. Using the human capital perspective to explain mobility, students move on the basis of investment decisions, where both present and future costs and earnings are taken into account. Under the rational choice approach of the cost–benefit models for migration, a potential migrant is likely to move if the present value of the anticipated benefits is greater than the monetary costs of moving (Rodríguez-Gonzalez et al., 2011). Following this approach, fees can be interpreted as a cost component of education mobility, which means that the higher the fees, the more students will need to pay to study in a particular institution. From this point of view, higher fees are expected to discourage mobility to a destination and are therefore considered as a barrier to moving. However, the direction of the relationship between student fees and mobility is not always clear a priori. Using an additional perspective, some studies highlight that fees could also exert a signal of quality: high fees might reflect high quality, which could attract more students, resulting in a positive relationship between fees and mobility. This result is confirmed in Beine et al. (2014), where the authors provide evidence in support of a signalling effect of quality for fees. Our argument for this different relationship goes a step further and we expect that the relationship between fees and mobility will change depending on the type of mobility; in particular, we expect fees to be considered an educational cost in the case of degree mobility, while they could be understood as a synonym of quality in the case of credit mobility. The argument is that, while degree mobile students should pay the specific fees of the host university, which in these cases represent an educational cost, credit mobile students (such as in the case of Erasmus students) usually pay fees to the home

([25]) While teaching load is often used in the literature as a proxy for teaching quality, it should be highlighted that this is not to be understood as a measure of an individual teacher's quality (which we can in no way take into account in this study), but rather as a general proxy for the quality of the teaching capacity of an institution.

([26]) ETER double counts students enrolled in joint degrees if possible.

([27]) In the case of academic staff in DK, information about the denominator is missing in 2011 and 2012, while it is available in 2013. We recover this information imputing the values of total staff in 2011 and 2012 as the total staff in full-time equivalents (FTE) multiplied by the ratio of total staff in HC to total staff in FTE in 2013.

university at the time of enrolment, regardless of the destination in the exchange programme. In this latter case, students could choose the host university based on the quality of the institution, with no effect on the fees they pay at the time of enrolment. We therefore expect a negative relationship between this variable and degree mobility (most likely not affecting PhD students, as they are often covered by scholarships) and a positive one with Erasmus mobility. In order to analyse the relationship between ***student fees*** and mobility, we define 'fees paid per student' as the funding derived from student fees ([28]) divided by the total number of enrolled students at ISCED 5–8:

$$Student\ fees = \frac{Student\ fees\ funding}{Total\ students}$$

'Student fees funding' is defined as the amount of money the institutions raises from student fees paid by households and students to HEIs for participation in educational programmes (UOE, 2013). These include (a) tuition fees, (b) other fees charged for educational services and other services, and (c) fees paid for other welfare services provided to students by the institution. It should be noted here that this variable is an overall mean of student fees, and does not vary across ISCED levels.

Another fundamental aspect of the activity of an institution is its research capacity. Lepori et al. (2015), in their work on competition for talent and attracting international researchers, considered the research capacity of HEIs as an important driver of their level of internationalisation, and argued that mobility (in their case, of researchers) increases with the level of research quality of an institution. Following Beine et al. (2014), we extend this argument to analyse the relationship between the research activities of HEIs and student mobility. Specifically, we include two variables capturing research activities based on the research intensity and excellence of the institution. Following the same argument as Lepori et al. (2015), who hypothesised that the share of international staff of HEIs increases with the research orientation of the HEI, our a priori expectation is that there will be a positive relationship between the research activities of HEIs and the number of mobile students received, in particular for PhD students, where the research component of the studies is stronger.

Research intensity is an indicator frequently used to characterise the level of orientation to research of an HEI, with respect to the volume of educational activities at the undergraduate level. Following Lepori et al. (2015), we include a variable available in ETER (where it is called 'PhD intensity'), which is computed as:

$$Research\ intensity = \frac{number\ of\ graduates\ at\ ISCED\ level\ 8}{number\ of\ graduates\ at\ ISCED\ levels\ 5, 6\ and\ 7}$$

The second component we take into account is the 'research excellence' of the institution based on research activities. Lepori et al. (2015) suggested using the institutional reputation based on the publications' portfolio of universities. However, we consider that this is a relatively raw measure of scientific production that does not take into account the impact and quality of the papers produced. As a consequence, we have captured the research excellence with a composite indicator that takes into account both the number of publications and the citations of these publications ([29]). Specifically, we measure ***research excellence*** as the number of a university's publications that, compared with other publications in the same field and in the same year, belong to the top 10% most

([28]) The formula returns values below 0 in student fee funding for two universities in BE and one in SE. These universities have not been included in the model.

([29]) Despite the limitations of employing citations as an indicator of the impact of scientific research, measures based on citation counts are frequently used as a proxy for scientific impact. Moreover, in recent years there has been a shift from indicators based on average values towards the use of indicators reflecting the top of the citation distribution (i.e. the top 10% most cited publications), under the assumption that they better reflect the most outstanding contributions to science and 'research excellence' (Bornmann, 2014).

frequently cited ([30]). This information was obtained from the Leiden Ranking ([31])([32]), which is based on publications in the Web of Science database produced by Clarivate Analytics for the years 2011–2014 (based on publications in the period (t-5)–(t-2) including citations until (t-1)). For those universities that are not ranked ([33]), the indicator was set to 0.

As highlighted above, institutional quality is one of the factors driving student mobility (McCann and Sheppard, 2001; Sá et al., 2004); so, as an overall measure of university quality, we include an indicator based on prestige and reputation (Cattaneo et al., 2017). An important set of academic work proxies research quality through rankings, arguing that the position of an HEI in international rankings gives an indication of the reputation of that institution. For example, Rodríguez-González et al. (2011), Beine et al. (2014) and Cattaneo et al. (2017) used the Shanghai Ranking and found a positive relationship between being part of the ranking and having more internationally mobile students. In our particular case, ***reputation*** is captured through a dummy variable: if a university has been included in the Times Higher Education (THE) World University Rankings in the corresponding year (2011/12 to 2014/15), it was given a value of 1; otherwise, it was given a value of 0. This ranking is based on 13 performance indicators grouped into five areas, namely (a) teaching: the learning environment (worth 30% of the overall ranking score); (b) research: volume, income and reputation (worth 30%); (c) citations: research influence (worth 30%); (d) industry income: innovation (worth 2.5%); and (e) international outlook: staff, students and research (worth 7.5%) ([34]). The decision to use the THE ranking is based on its capacity to capture more aspects of a university; in particular, almost one third of the overall ranking score of the THE methodology is related to the teaching component, which we believe allows better capturing of the overall reputation of a university, rather than the research component only (which is predominant in other renowned rankings, such as the Shanghai Ranking) ([35]). The multicollinearity tests we carried out confirmed that this variable captures a different dimension from the one grasped by research excellence and that the two variables can reliably be used jointly in the model (see Annex 4). Following the argument that students move lookingfor high-quality education systems, we expect this reputation variable to be positively associated with inward mobility at all levels of education.

Apart from the teaching and research dimensions of HEIs, we use a number of variables to control for other institutional characteristics, such as size, decentralisation, the legal status of the institution and funding. In this case, there are no specific hypotheses on the direction of the relationships, because the goal of these controls is to guarantee that our results are not biased as a result of the features of the institutions. We measure ***size*** on the basis of the total number of students in ISCED 5–8 ([36]). ***Decentralisation*** (Agasisti and Dal Bianco, 2007) is captured by a dummy variable with a value of 1 for universities with local establishments in NUTS3 region(s) that are different from the main seat and

([30]) We have tested two alternative variables to capture the reputation of a university, namely the total absolute number of publications and the percentage of total publications that, compared with other publications in the same field and in the same year, belong to the top 10% most frequently cited. Results are in the same direction as those presented here.

([31]) The match between the Leiden Ranking and the ETER database has been performed in the framework of the RISIS project. More information available here.

([32]) Leiden Ranking information is available here. See here for more information about the criteria of the Leiden Ranking.

([33]) On average, 200 of the HEIs covered in our analysis appear in the Leiden Ranking.

([34]) More details on the methodology underlying this ranking are available here.

([35]) The Shanghai Ranking uses six objective indicators to rank world universities: the number of alumni and staff winning Nobel Prizes and Fields Medals; the number of highly cited researchers selected by Thomson Reuters; the number of articles published in journals of Nature and Science; the number of articles indexed in Science Citation Index – Expanded and Social Sciences Citation Index; and per capita performance of a university.

([36]) Lepori et al. (2015) used as a proxy for size the value of total staff in FTE; however, this variable is highly correlated with the reputation of the university. Results do not change when compared with those presented here.

with a value of 0 otherwise. The legal status variable controls for the entity that has ultimate control over the institution and determines its general policies and activities. ETER distinguishes between public, private and private government-dependent institutions. This last group includes either institutions that receive more than 50% of their core funding from government agencies or institutions whose teaching staff is paid by a government agency ([37]). Because of these specifications, and for simplicity, this study includes a dummy variable (***public HEI***) with a value of 1 if the university is public or government dependent, and with a value of 0 if it is private.

Finally, we include a variable related to the composition of the university funding sources, in order to capture the degrees of freedom that individual HEIs have in fund-seeking and, possibly, some specialisation towards education ([38]) (Lepori et al., 2007). According to these authors, the ratio of tuition fees to total revenues tends to be similar for institutions in the same country, while differences between countries are more distinctive. The variable we use, ***teaching revenues***, is calculated from ETER and is defined as revenues from students' fees as a percentage of total budget ([39]). Student fees are defined as above; total budget refers to the amount of money received by the HEI, either as a general allocation from the state/public authorities or from other funding for research, education and other services (which could come from public and/or private sources).

5.1.2 Geographical factors contributing to regional attractiveness

A second set of factors that we believe might affect the level of attractiveness of a destination are regional characteristics. As mentioned in Section 2.2, two broad sets of reasons for student migration can be identified. The first one, which is based on the human capital theory, is related to investment choices, whereby the decision to move is made to pursue better education and job opportunities, and/or to increase future income. The second set relates to students migrating on the basis of consumption choices, i.e. for non-pecuniary reasons, for better local amenities and a better quality of life, and to benefit from the pleasure of studying (Sá et al., 2004; Agasisti and Dal Bianco, 2007; Beine et al., 2014). The literature highlights a number of proxies that can capture these aspects, which we consider at the level of the destination region. ETER includes information about the geographical location of the headquarters of the universities based on the NUTS2 level code. This report uses these data and merges information about regional characteristics based on data collected by Eurostat. The information relates to the 2011–2014 period. In particular, we measured regional attractiveness through three main groups of variables: the level of urbanisation of the region, employment opportunities and regional education systems. Each of these groups is defined below.

In relation to the cost of education at the regional level, the literature highlights that the cost of living affects the affordability of education in that it increases the total amount of money required to complete each year of study. Different proxies are used to capture this socio-economic characteristic of regions. For example, Usher and Cervenan (2005) and Beine et al. (2014) included the costs of rent and food for an academic year in their studies. In these cases, a negative relationship between the cost of living and the mobility of students was found. On the other hand, Beine et al. (2014) also included the

([37]) For example, as reported in ETER metadata, the vast majority of HEIs in the UK are reported under this category, since, despite being publicly funded, the UK government does not have ultimate control over any institution.

([38]) This occurs, for example, in the UK, where higher teaching revenues as a percentage of total university revenues means a more teaching-oriented university, since in this country the state has ceased to be the main founder of institutions (Lepori et al., 2007).

([39]) This indicator returns values below 0 for two universities in BE and one in SE because of negative values in the numerator of the equation. These universities have not been included in the model. Similarly, there are 35 institutions in DE with values above 1. After checking these institutions in other years and because of the high values they have for the share of fees (higher than 90% in all cases), the share of fees in these 35 institutions has been replaced by 1.

total population of the host country as a proxy for the host capacity of a destination. Sá et al. (2004) and Agasisti and Dal Bianco (2007) used the population density of a region (number of inhabitants per km^2) as a proxy for both the cost of living (places with higher population densities, i.e. those that are more urbanised, are characterised by higher costs of living) and the preference for an 'urban style of life'. In this case, a positive relationship between the socio-economic characteristics of a region and the reception of mobile students is interpreted as a symptom of the concentration of mobile students in more urbanised regions with better local amenities and more opportunities for leisure activities and socialisation. In our study, the level of urbanisation of a region is proxied by the level of urbanisation of the destination, measured by the ***density*** of the region (the number of inhabitants per km^2) ([40]). In particular, information on the number of inhabitants per km^2 was obtained from Eurostat's online dataset *demo_r_d3dens*. The expected direction of the coefficient of this variable is not clear a priori. If seen as a proxy for living costs, it could be negative, and, therefore, in this regard, we would expect degree mobile students to be more negatively affected than credit mobile students. This is because, first of all, the former spend more time in the destination for their studies than the latter; second, Erasmus students benefit from grants that help to support living expenses. If, on the other hand, urbanisation is seen as a proxy for a more urban life style and for more cultural and recreation opportunities, then the sign of the density variable is expected to be positive; in this case, it would point in the direction of a consumption decision from the point of view of mobile students.

From a human capital point of view, migration is treated as an investment and the decision to move is based on the expectation that it will improve future income and/or employment opportunities (Sá et al., 2004). For this reason, future economic opportunities are considered an important determinant of educational mobility, specifically at the tertiary level, where entry into work is the next step in the life cycle of students. In this regard, Beine et al. (2014) focused on the gross annual wage of workers with tertiary education level to capture the wage conditions at destination. Their finding supports the argument for a positive impact of wage on the destination choice. Although this argument relates mainly to degree mobile students, a positive relationship with labour market outcomes also applies to credit mobility because, according to the Erasmus impact study at the regional level, the second main reason to study abroad is to enhance future employability in a foreign country (the main reason relates to developing language skills; see European Commission, 2016). Therefore, our hypothesis in relation to employment opportunities is that employment rates and wages have a positive relationship with student mobility at the tertiary level. Specifically, we expect better employment opportunities to be more closely associated with degree mobility than with credit mobility, because, as concluded by Rosenzweig (2008), international students are likely to stay and work in the host country once they have completed their studies. This assumption clearly relates to only degree mobile students, because Erasmus students need to return to their home country to finish their degree after spending a period abroad.

In order to capture the employment opportunities in a region, this report focuses on two main variables: (a) ***employment rates*** of recent tertiary graduates and (b) ***expected earnings***. The employment rate of recent tertiary graduates is defined as the employment rate of the population aged 20–34 that has successfully completed tertiary education one to three years before the reference year of the survey and that is no longer in education or training. This definition is coherent with the Education and Training 2020 (ET 2020) benchmark on the employment rate of recent graduates, but focuses on only the population with higher education. The source of data used was the Eurostat online dataset *edat_lfse_33*. Expected earnings refer to the compensation of employees. Specifically, we use the value of the compensation received by the employees in millions

([40]) GDP per capita was also tested as an alternative proxy for the socio-economic characteristics of a region. Results are not affected by using this variable instead of density.

of euros from the allocation of the primary income account of households (Eurostat online dataset *nama_10r_2hhpri*) ([41])([42]). We expect both variables to be positively associated with mobility rates.

The third key factor affecting student mobility relates to the quality of the education system. Students tend to move away from regions with low levels of university resources to those with higher levels of resources (Sá et al., 2004). For this reason, having education policies at the tertiary level that facilitate the mobility of students could increase the pool of (potentially) highly skilled workers. In this regard, Rodríguez-González et al. (2011) and Beine et al. (2014) used the total population of the destination as a proxy for the host capacity of destination countries. In addition, Rodríguez-González et al. (2011) captured the total population with tertiary-level education (ISCED 1997, levels 5–6) in the home country as a proxy for the educational background. We consider that both variables are important for capturing the host capacity of destination countries in relation to tertiary-level students based on the *peer effect.* That is, regions with a higher proportion of higher education graduates in the population are expected to attract more mobile students.

Two variables are used to characterise the regional education system, namely: (a) ***the percentage of universities in the THE ranking***, which is calculated from the number of universities classified in the THE ranking over the number of total institutions in a region; and (b) ***the tertiary educational attainment*** ([43]), defined as a measure of the average level of educational attainment among young people in the destination region. This is proxied by the Europe 2020 headline target for tertiary educational attainment, defined as the share of the population aged 30–34 years that has successfully completed university or university-like (tertiary-level) education (ISCED levels 5–8). This information was obtained from the Eurostat online dataset *edat_lfse_12*. Both variables are expected to be positively associated with mobility rates.

Variables and definitions are summarised in Table 4. Some of the variables presented above, particularly teaching load, student fees, research intensity, research excellence, size, density and expected earnings, are transformed into natural logarithms (ln) in order to correct for their skewed distributions.

Because of the missing values, the inclusion of these variables reduces the number of countries that can be taken into account in the regression analysis to assess the factors related to mobility. Section II of Annex 4 presents the number of universities for which information about degree mobility is available (at the institutional or regional level) by country. The final sample covers 716 universities (for a total of 2,329 observations over the period considered) located in 116 regions and 12 EU countries (BE, CY, DE, DK, FR, HU, IE, LT, LV, PT, SE and the UK). This information is used in the rest of this section for degree mobile students. Descriptive statistics, as well as the correlation matrix and tolerance (variance inflation factor – VIF) values ([44]) for the abovementioned countries, highlighting the absence of collinearity problems among the selected variables, are included in Section I of Annex 4.

([41]) LU did not provide information on this variable. We have replaced the value for this country with the compensation of employees available in *nama_10r_2coe*. The variables *nama_10r_2coe* and *nama_10_2hhpri* are closely correlated (the correlation between the two being 0.9471). The decision to include the second variable was based on the availability of data.

([42]) A variable measuring expected earnings of recent graduates or, at least, of young people (around 16–25 years) would probably be a better proxy in this case. Unfortunately, there is no information about wages by age range.

([43]) Two alternative variables were used here: (a) education background, measured as the percentage of the population aged 25–64 with tertiary studies; and (b) the share of employees with tertiary education. In both cases, results are in the same direction as those presented here.

([44]) As a rule of thumb, a value of 0.10 is recommended as the minimum level of tolerance, i.e. a maximum value of 10 for the VIF (Hair et al., 1995; Tabachnick and Fidell, 2001).

Table 4. Summary of variables included in the analysis

Name	Definition	Source	Type of variable
Institutional-level variables			
1) Teaching activities			
Teaching load	Number of undergraduate students per unit of academic staff (in ln)	ETER	Quantitative
Student fees	Average fees paid per student	ETER	Quantitative
2) Research activities			
Research intensity	Ratio of the number of students at the PhD level (ISCED 8) to the total number of students at ISCED 5, 6 and 7 (in ln)	ETER	Quantitative
Research excellence	Number of a university's publications that, compared with other publications in the same field and in the same year, belong to the top 10% most frequently cited	Leiden Ranking	Quantitative
3) Reputation	Dummy variable: value of 1 if the institution is included in the THE ranking; value of 0 otherwise	THE ranking	Dummy
4) Institutional controls			
Size	Total number of students at ISCED 5–8 (in ln)	ETER	Quantitative
Decentralisation	Dummy variable: value of 1 if the university has a campus in another NUTS3 region; value of 0 otherwise	ETER	Dummy
Public HEI	Dummy variable: value of 1 if the university is public; value of 0 if it is private	ETER	Dummy
Teaching revenues	Revenues from students' fees as a percentage of the total budget of the institution	ETER	Quantitative
Regional-level variables			
5) Urbanisation			
Density	Number of inhabitants per km^2 (in ln)	Eurostat	Quantitative
6) Employment opportunities			
Employment rate of recent tertiary graduates	Employment rate of recent tertiary graduates (population aged 20–34 that has successfully completed tertiary education one to three years before the reference year of the survey and that is no longer in education or training) *(ET 2020 benchmark)*	Eurostat	Quantitative
Expected earnings	Compensation of employees in millions of euros (in ln)	Eurostat	Quantitative
7) Education system			
Percentage of universities in the THE ranking	Number of institutions at the regional level included in the THE ranking as a percentage of the total number of universities in the region	THE ranking	Quantitative
Tertiary educational attainment	Share of the population aged 30–34 years with tertiary educational attainment *(Europe 2020 headline target)*	Eurostat	Quantitative

Source: Own elaboration.

Similarly, Section IV of Annex 4 presents the number of universities for which information is available with regard to credit mobility (at the institutional or regional level) by country. The final working sample in this case includes 724 universities (for a total of 1,975 observations over the time frame taken into account) located in 142 regions and 13 EU countries ([45]) (BE, CY, DE, DK, HU, IE, IT, LT, NL, PT, SE, SK and the UK). This information is used in the rest of this section for credit mobile students. Section III of Annex 4 presents the corresponding correlation matrix and the values for tolerance, as well as the descriptive statistics for the abovementioned countries, again confirming the absence of collinearity problems among the selected variables.

5.1.3 Other factors associated with student mobility

The scientific literature covers other determinants of student mobility, such as individual characteristics, distance between home and host universities, language, climate, or network. Although we recognise the importance of such other determinants, they are not covered in this report on account of the lack of data for the empirical section as well as the difficulty of generalising policy implications. However, we summarise some of them here.

Studies analysing student mobility usually use the individual as the unit of analysis. In that case, personal characteristics (such as gender, socio-economic background and parents' education) or motivations to study abroad are considered important determinants of a student's decision to move (e.g. Rodríguez-González et al., 2011; Van Mol and Timmerman, 2014). However, this report puts the emphasis on the role played by institutions and regions; as a consequence, the individual characteristics of students are not taken into account.

A determinant of student mobility covered in an important set of studies relates to the spatial separation between home and host universities. There are different measures that capture this spatial separation: distance, travel time and travel cost. In general, the longer the distance between a student's home and the host university, the higher the financial and social costs to the students. This means that the three variables are interconnected and, in fact, that the correlation between travel time and distance is fairly high (Rietveld et al., 1999). Most studies document a negative association between distance and student mobility, that is, the shorter the distance, the higher the likelihood of moving (Sá et al., 2004). Although we recognise the importance of capturing the distance between home and host countries or regions, its relationship with student mobility at the tertiary level is only partially tested in this report (see Section 5.4) because of a lack of data.

Language is considered a large barrier to moving, which can prevent people from taking part in international student mobility (Findlay et al., 2006). On the other hand, specifically in the case of Erasmus mobility, students may go abroad not only to complement their studies in the host university for academic reasons, but also to improve their knowledge of foreign languages, especially the most common languages (Rodríguez-González et al., 2011). In this regard, Beine et al. (2014) concluded that having a common language between the home and host destinations influences the decision to study abroad.

Putting the emphasis on the new migration theory literature, the presence of social/migrant networks is becoming an important determinant of mobility. In this regard, factors such as the number of peers that have previously moved to the destination (Rodríguez-González, 2011) and the stock of migrants with a certain level of education from the place of origin in the place of destination for the student (Beine et al., 2014) are considered to have a positive influence on the decision to move, based on the

([45]) Information is not available for all countries for all years. We include here those countries with information on all independent variables for at least one year.

idea that mobile students might have knowledge about other places from direct contact with friends or relatives. This report cannot include variables related to the country of origin (such as language or migrant networks) in the empirical section because there is no information about the origin of mobile students, and so a link between places of origin and destination cannot be established. Moreover, no information is available in ETER on the languages in which degrees are taught.

Finally, the migration literature sometimes takes into account differences in climate conditions as a possible determinant of migration flows, under the hypothesis that warmer countries might be more attractive. In their analysis of Erasmus flows, Rodríguez-González et al. (2011) found that, indeed, Mediterranean countries appear to attract more Erasmus students than continental/oceanic ones, which led the authors to the conclusion that Erasmus flows are somewhat driven by leisure/consumption reasons. For the purposes of our study, this variable has not been included because geographical location has little policy relevance and cannot be used to formulate policy recommendations for Member States.

5.2 Methodology

We ran regression models in order to analyse the relationship between institutional and/or regional attractiveness and student mobility. Specifically, two main regression models, which share the same regressors but differ in terms of the dependent variable, were used. In the case of degree mobility, the dependent variable is the number of mobile students as a proportion of the total student population, while for credit mobility it is the number of inward Erasmus students as a proportion of the total student population (for more details, see Chapter 3). The data have a two-level hierarchical structure: at level 1, we consider institutional-level variables such as teaching and research orientation, as well as institutional controls; level 2 variables include regional variables such as urbanisation, employment opportunities and education systems.

Because of the nature of the dependent variable (i.e. a share), we based our analysis on a mixed method approach, where y_{ir} denotes the number of mobile students as a proportion of the total student population in a specific university *i* in region *r*, x_{ir} denotes institutional-level explanatory variables and x_r denotes regional-level explanatory variables. Accordingly, we estimate the following multilevel model:

$$y_{ir} = \beta_0 + \beta_1 x_{ir} + \beta_2 x_r + u_r + e_{ir}$$

where the group effects or level 2 residuals, u_r, and the level 1 residuals, e_{ir}, are assumed to be independent, to be heteroskedastic and to follow normal distributions with zero means:

$$u_r = N(0, \sigma_u^2) \qquad e_{ir} = N(0, \sigma_e^2)$$

The coefficients in this specification are identified by the variation among the independent variables. To mitigate any bias induced by potential omitted variables, we include year and country fixed effects to control for unobserved characteristics.

5.3 Results

This section presents the main results analysing the factors related to degree and credit mobility overall, as well as those affecting degree mobility distinguishing between different ISCED levels.

Table 5 presents the results of the analysis of the factors associated with mobility, distinguishing between degree and credit mobility. Before describing the results, it is important to note two important caveats related to the evidence for credit mobility

presented in this section. As mentioned previously, credit mobility is analysed in this report based on Erasmus students. Erasmus mobility grants have two main constraints. First, a student can only choose her or his Erasmus destination based on the agreements between two universities, i.e. the flows of students from one university to another are limited to situations where an explicit agreement between the two universities exists. Second, Erasmus grants have *quotas*, which limit the capacity of students to choose their first preference of destination to move to; it is therefore possible that the actual destinations are based not solely on preferences, but also on availability. Taking into account these limitations, the results presented here for credit mobility should be treated cautiously.

Table 5. Factors associated with degree (ISCED 6–8) and credit (ISCED 5–8) mobility

	Degree mobility		Credit mobility	
	Coefficient	**Standard error**	**Coefficient**	**Standard error**
Institutional-level variables				
Teaching activities				
Teaching load (ln)	−3.536***	(0.325)	−0.375***	(0.046)
Student fees (ln)	1.343***	(0.170)	0.141***	(0.026)
Research activities				
Research intensity (ln)	−2.063	(3.454)	−0.731	(0.454)
Research excellence (ln)	0.243	(0.137)	0.002	(0.021)
Reputation (HEI in THE ranking)	2.418**	(0.779)	0.137	(0.119)
Regional-level variables				
Urbanisation				
Density (ln)	1.252**	(0.384)	−0.051	(0.037)
Employment opportunities				
Employment rate of recent tertiary graduates	−0.012	(0.038)	0.008*	(0.004)
Expected earnings (ln)	−1.029	(0.760)	0.036	(0.058)
Education system				
Percentage of universities in THE ranking	0.020	(0.024)	−0.004	(0.003)
Tertiary educational attainment	0.052	(0.044)	0.009*	(0.004)
Constant	6.293	(7.670)	−0.434	(0.648)
No obs.	2,329		1,975	
No of NUTS2 regions	116		142	
No of HEIs	716		724	
chi^2	866.496		347.603	
p	0.000		0.000	

Notes: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. Institutional controls (size, decentralisation, legal status and funding) and country and year fixed effects are included but not reported.
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

In general terms, and looking at the factors associated with mobility for the combined indicator (ISCED 6–8), results suggest that institutional variables are more strongly associated with degree and credit mobility than regional characteristics are. In particular, for degree mobility, indicators related to teaching activities suggest that quality is somewhat rewarded in terms of attractiveness of the HEI as a destination. A lower teaching load is associated with higher shares of mobile students, while the average level of fees paid is positively related to inward degree mobility, suggesting that, contrary to our expectations, higher fees are a proxy for the quality of the teaching capacity of institutions, rather than a cost component of education mobility. In fact, as Beine et al.

(2014) argued, high fees might reflect high-quality institutions, which, in turn, attract more students. A very similar picture is drawn for Erasmus students. In addition, the research activities of a university are not associated with mobility rates for either type of mobility. However, the reputation of the university in terms of its presence in the THE ranking is strongly correlated with degree mobility, suggesting that appearing in the ranking is associated with a higher level of attractiveness of the HEI as a destination for degree mobile students. This does not appear to be the case for credit mobility.

In relation to regional-level variables, the results suggest a weak relationship between the variables selected and both types of mobility. Only the level of urbanisation appears to be significantly correlated with degree mobility. In this case, high-density regions, i.e. those with more inhabitants per km^2 (normally cities), attract more mobile students. This result is in line with the evidence provided by Agasisti and Dal Bianco (2007), who found that density is a positive determinant of college student migration in Italy. Neither employment opportunities nor the regional education system appear to be related to degree mobility. However, both do have a weak relationship with credit mobility. That is, regions with higher employment rates of recent tertiary graduates and those with higher levels of tertiary educational attainment attract more Erasmus students, although the relationship is quite weak. This result is in line with the Erasmus impact study, which found that one of the main motivations of Erasmus students to move abroad is the expectation that it will increase future job opportunities (European Commission, 2016).

Looking at the differences among levels of education in relation to degree mobility, Table 6 shows that the analyses at the single ISCED level follow similar patterns to those shown in the overall model presented previously. At all educational levels, the institutional characteristics of the destination HEI are more strongly associated with degree mobility than regional-level variables are, that is, institutional attractiveness appears to be more relevant than regional characteristics for explaining differences in the share of degree mobile students. Regardless of the level of education, lower teaching loads and higher fees (both possibly capturing teaching quality to some extent) are still positively associated with higher rates of inward mobility. The magnitude of the teaching load indicator is higher at the bachelor level. At all ISCED levels, the relationship between fees paid per student and degree mobility is positive, but this signalling effect of student fees appears to be more relevant at the masters level ([46]).

The research activities of the university, which were not significant in the overall equation, show different patterns by ISCED level. They appear to be particularly important for PhD-level students, suggesting that the higher the orientation of the university towards research activities, the higher the share of degree mobile PhD students. A relatively high presence of PhD students in an HEI is strongly correlated with the share of inward mobility, somewhat suggesting that PhD students attract their peers and that universities with larger pools of PhD students in the total student population are more attractive for this type of students; the opposite holds for masters students. However, the direction of the relationship between the two variables is not clear. Similarly, the research excellence of the institution (measured through the number of highly cited publications) is an important factor that is associated with the level of attractiveness of an institution for mobile PhD students. This is not a surprising result, given the importance of publications in relation to future career prospects of PhD students.

The reputation of a university is significantly related to degree mobility for ISCED 6, while there is no relationship at higher levels of education, where the overall quality of the institutions is most likely better captured by specific teaching and research indicators.

([46]) It is worth noting again here that this variable is defined at the level of the institution, not at the single ISCED level; therefore, it does not refer specifically to average fees for bachelor, masters or PhD students, but to an overall mean.

Table 6. Factors associated with degree mobility by ISCED level

Percentage of degree mobile students	(1) ISCED 6		(2) ISCED 7		(3) ISCED 8	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Institutional-level variables						
Teaching activities						
Teaching load (ln)	−2.004***	(0.329)	−1.249*	(0.597)	−0.581	(0.855)
Student fees (ln)	0.781***	(0.164)	2.577***	(0.323)	1.321***	(0.388)
Research activities						
Research intensity (ln)	0.491	(4.098)	−13.515*	(5.949)	24.032***	(5.698)
Research excellence (ln)	0.024	(0.132)	0.190	(0.240)	0.780***	(0.221)
Reputation (university in THE ranking)	1.922**	(0.736)	1.930	(1.346)	−0.725	(1.152)
Regional-level variables						
Urbanisation						
Density (ln)	1.331***	(0.357)	1.976**	(0.705)	1.016	(0.669)
Employment opportunities						
Employment rate recent tertiary graduates	−0.011	(0.036)	−0.020	(0.067)	−0.032	(0.063)
Expected earnings (ln)	−1.319	(0.707)	−0.983	(1.392)	−2.446	(1.362)
Education system						
Percentage of universities in THE ranking	0.029	(0.022)	0.067	(0.043)	0.095*	(0.039)
Tertiary educational attainment	−0.004	(0.042)	0.111	(0.081)	0.113	(0.076)
Constant	11.977	(7.173)	−12.193	(13.951)	30.234*	(14.077)
No obs.	2273		2142		1204	
No of NUTS2 regions	116		115		105	
No of HEIs	698		642		357	
chi^2	425.121		361.131		403.522	
p	0.000		0.000		0.000	

Notes: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. Institutional controls (size, decentralisation, legal status and funding) and country and year fixed effects are included but not reported.
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

At the regional level, the most significant variable (as in the general model) is the population density of the region, although this holds for only ISCED 6 and 7. Institutions in more urban areas attract more undergraduates and masters students. On the other hand, this is not the case for PhD students, for whom none of the regional variables are significantly related to mobility, with the exception of a weak positive relationship between the quality of the regional higher education system and mobility at ISCED 8. Neither employment opportunities nor regional education system variables show significant associations with mobility at lower levels of education.

5.4 Factors associated with intra-EU student mobility flows: a gravity model approach

As mentioned previously, ETER does not provide any information on the country of origin of mobile students. This prevents us from analysing a number of factors related to the home country, in particular how such factors might affect the level of attractiveness of particular destinations. This shortcoming of ETER data can be overcome when considering Erasmus students only. In fact, while information on the home country is not reported in ETER, it is available from a different source, namely the Erasmus mobility statistics provided by the EU Open Data Portal ([47]). The portal hosts datasets containing a statistical overview of mobility for students under the EU Erasmus programme, with raw data at the individual level and information on age, gender, grant, duration, subject area, level of study, sending and receiving country, and sending and receiving institutions. The last piece of information allows student-level data to be matched to the HEIs present in the ETER database. This section uses this matched dataset to take the analysis about credit mobility presented in the previous section one step further, taking into account Erasmus student flows from different regions. In order to do this, we have relied on a gravity model approach.

5.4.1 The gravity model, data and variables

Gravity models assume that bilateral flows between countries are directly proportional to their size (e.g. in terms of population or gross domestic product – GDP) and inversely proportional to the physical distance between them, similar to Newton's gravitational law (Ramos, 2016). Such models have traditionally been used to analyse economic flows between countries, such as trade or investment; however, thanks to the availability of data on bilateral migration flows, they have increasingly also been used to investigate the determinants of movements of people.

We analyse flows of students from regions to HEIs with a gravity model based on the work done by Sá et al. (2004) ([48]). In order to do this, additional information is needed. First, using the information available in the Open Portal on Erasmus students, we define flows of students as the number of students from region *i* who are taking part in a student exchange under the Erasmus programme in university *j*, and this constitutes our new dependent variable. The data are restricted to analysing intra-EU student mobility flows, i.e. only flows of students from an EU region to an EU university are taken into account in the analysis.

The base version of the gravity model relates these mobile student flows to the size of the student population in the origin region *i* and in the destination university *j*, and to the distance between them. The first variable (student population in the home region) is defined as the total number of students enrolled in tertiary education in region *i*; this is what Sá et al. (2004) defined as home-region propulsiveness. This information was

([47]) More information available here.
([48]) Other recent works, such as Bratti and Verzillo (2017) and Cattaneo et al. (2017), also use the gravity model approach to analyse student flows.

collected from Eurostat (*educ_renrlrg1* for 2011 and 2012, and *educ_uoe_enrt06* for 2013 and 2014) ([49]). The second variable, the size of the student population in the destination HEI, is the same 'size' variable used in the previous part of the analysis (included as part of the institutional controls), i.e. the number of total students at ISCED 5–8 in the host university. The last of the three base variables is distance, which is a proxy for factors capturing resistance to moving. We define distance (d_{ij}) as road distances between region *i* and region *j*, region *i* being the home region of the student and region *j* being the region where the host university is located. This information is drawn from Eurostat's TERCET NUTS-postal code matching tables ([50]). The calculation is based on a detailed road network and information pairs between islands and mainland, which is, however, missing between islands ([51]). The distance NUTS2–NUTS2 matrix is based on NUTS2010 codes; however, we have adapted the information to the NUTS2013 codes using the Eurostat correspondence matrix between codes ([52]) in order to merge this information with ETER. Both distance and home-region propulsiveness variables have been transformed using logarithms. As mentioned previously, according to the structure of gravity models in general and the literature related to student mobility in particular, we expect mobility to have a negative relationship with distance (Sá et al., 2004; Agasisti and Dal Bianco, 2007) and a positive relationship with the home region and host HEI student populations.

The base gravity model is then enlarged to include all the other variables identified in previous sections, related to the various pull factors of the destination HEI and region, i.e. host institutional and host regional attractiveness.

More formally, again following Sá et al. (2004), we describe S_{ij} as the distribution function of student flows from region *i* to university *j* as:

$$S_{ij} = A_i O_i h(d_{ij})$$

where O_i is the total number of university students in region *i*, measuring the home-region propulsiveness; $h(d_{ij})$ is a deterrence function that captures the resistance to mobility between *i* and *j* depending on the spatial separation between *i* and *j*, measured by the distance d_{ij}; and $A_i = \left[\sum_{j=1}^{r}\left(\prod_{k=1}^{p} w_{kj}^{\alpha_k}\right)h(d_{ij})\right]^{-1}$ is a balancing factor that includes distance as well as information on university and region characteristics (w_{kj}); the parameter α_k represents the elasticities of student flows with respect to university and regional features. On account of the multicountry nature of the analysis and the panel component in the data, home country and host region as well as year fixed effects have been included in the models.

The final working sample (full model) in this case includes 19,415 unique combinations of student flows from home region *i* to host university *j* (for a total of 39,471 observations over the time frame taken into account), with 25 home EU countries (AT, BE, BG, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, SE, SK and the UK) and 11 host countries (BE, DE, DK, HU, IE, LT, LU, MT, PT, SE and the UK) ([53]). Section V of Annex 4 presents the corresponding correlation matrix and the values for tolerance, as well as the descriptive statistics for the abovementioned countries, again confirming the absence of collinearity problems among the selected variables.

([49]) Eurostat does not include information about UK and DE at NUTS2 level (only NUTS1 data are available). The number of enrolled students at the NUTS2 level in these countries has been calculated using the information available in ETER (total number of enrolled students at ISCED levels 5-8).
([50]) More information available here.
([51]) There is no information about CY, nor for islands such as Canarias (ES) and Madeira (PT).
([52]) There is no distance NUTS2–NUTS2 matrix that uses NUTS2013 codes.
([53]) There are fewer host countries than those included in the degree mobility analysis because: (a) LV and FR are not included now because of the lack of information in all the years for student fees; and (b), for CY, there is no information about distance from this country to the mainland.

5.4.2 Results of the gravity model

The results of the gravity models presenting the factors associated with intra-EU student mobility flows are included in Table 7. The results suggest that, as expected, the spatial separation between regions is negatively associated with mobility, which means that the larger the distance between regions, the smaller the flows of students moving from the home to the host region. Similarly, as expected in the gravity model, there is a positive relationship between mobility and the size of the student population at both the origin and the destination. That is, the larger the total population of students in a region, the higher the chances that students from this region will study abroad with an Erasmus grant, and the larger the destination institution, the higher the number of Erasmus students received.

Table 7. Determinants of intra-EU student mobility flows

	Coefficient	Standard error
Distance (ln)	−0.093***	(0.013)
Home-region propulsiveness (ln)	0.397***	(0.008)
Size of host HEI (ln)	0.248***	(0.009)
Institutional-level variables		
Teaching activities		
Teaching load (ln)	−0.033*	(0.016)
Student fees (ln)	0.045***	(0.009)
Research activities		
Research intensity (ln)	0.252	(0.177)
Research excellence (ln)	−0.006	(0.036)
Reputation (university in THE ranking)	0.119***	(0.017)
Regional- level variables		
Urbanisation		
Density (ln)	−2.714*	(1.236)
Employment opportunities		
Employment rate of recent tertiary graduates	−0.001	(0.002)
Expected earnings (ln)	0.251	(0.266)
Education system		
Percentage of universities in THE ranking	−0.001	(0.003)
Tertiary education attainment	−0.000	(0.000)
Constant	−2.038	(2.672)
No obs.	39,471	
chi^2	0.230	

Notes: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. Institutional controls (decentralisation, legal status and funding) and home country and host region as well as year fixed effects are included but not reported.
Source: Own elaborations on data from Erasmus Mobility Statistics and ETER project. Data downloaded in June 2017.

In addition, the results corroborate the importance of institutional variables relative to regional characteristics. In this regard, variables related to teaching activities are found to be even more relevant than in the model presented in the previous section. The two indicators (teaching load and student fees) still suggest that a higher quality of teaching capacity of an institution is associated with a higher share of Erasmus students. As previously mentioned, the positive relationship between fees and credit mobility, pointing at the identification of fees as a measure of the quality of institutions, could be further reinforced by the fact that Erasmus students do not pay fees at the destination institution. As before, research activities are not significantly correlated with mobility. The reputation of universities (captured as the presence of an institution in the THE ranking), on the other hand, is found to be positively associated with the flow of inward Erasmus students in this model.

In relation to regional variables, only the level of urbanisation of a region appears to be significantly related to the flows of Erasmus students, with a negative relationship between the two. This means that HEIs located in regions with lower population densities do have a higher share of Erasmus students than HEIs in regions with higher population densities, all other factors in the model being equal. Following the argument provided by Agasisti and Dal Bianco (2007), who argued that cities with higher densities are characterised by higher costs, our results could be interpreted as a symptom of the selection of places with lower costs of living. The other regional characteristics that were significant in the previous section lose their relevance in this model.

6 Conclusions

The number of mobile students has increased considerably in recent years. According to ETER figures, more than a million degree mobile students – as well as more than 185,000 Erasmus students – are enrolled in the EU countries investigated here. Considered as a form of migration, the movement of skilled and talented people has been part of the worldwide process of globalisation. Specifically, increasing the mobility of students within the EU is a crucial element in the development of Europe's highly skilled labour force, enabling the EU to strengthen its position as a knowledge-based economy.

This report has provided a picture of student mobility in the EU between 2011 and 2014, analysing both degree and credit mobility (based on Erasmus data) from the information provided in the European Tertiary Education Register (ETER) and from Erasmus mobility statistics. This report provides a detailed description of the learning mobility variable included in the database and its availability by country, comparing and validating it using official information on learning mobility available from Eurostat. After this validation process, we consider that ETER represents a useful and relevant source of information to analyse the learning mobility topic in Europe, even though far from ideal: as a matter of fact, this dataset has some limitations in relation to country coverage (especially for degree mobility) and to the lack of identification of country of origin of mobile students, which prevent a more comprehensive analysis of learning mobility. While the establishment of solid graduate tracking systems might ensure better-suited data for future studies, given current data availability ETER still represents the best possible option.

By relying on this dataset, in Chapter 4, the report provides a description of the main destinations of mobile students and then moves on to show inward mobility rates across and within countries, with a particular focus on institutions and regions. In Chapter 5, the report analyses the pull factors that make regions and institutions more attractive. In other words, it analyses the main factors associated with degree and credit mobility in the EU, taking into account different education levels (i.e. undergraduate, masters and PhD levels), through the comparison of institutional factors (teaching and research activities of universities and their reputation) and regional attractiveness (level of urbanisation, employment opportunities and regional education systems). The value added of the perspective adopted, based on institutions and regions, is twofold: first, at the institutional level, attracting students from other countries is expected to improve the quality of HEIs; second, at the regional level, the attraction and retention of students can increase the pool of highly skilled human capital that is available to the workforce, and can play an influential role in regional development and growth. In addition, putting the emphasis on regions instead of countries has the additional advantage of shedding light on the differences between and within countries.

6.1 Summary of the main results

There are five main conclusions from this report. First, in relation to the most attractive destinations, degree mobility appears to be very concentrated in a few countries, while credit mobility tends to be more equally distributed across Member States. Second, degree mobility is more common than credit mobility across and within countries. Third, institutional characteristics tend to be associated with student mobility more than regional characteristics are. Fourth, among institutional characteristics, universities of higher quality and with better reputations are associated with higher shares of mobile students, while research orientation and excellence are more relevant for degree mobile PhD students. Fifth, among regional characteristics, the level of urbanisation of the region is an important factor in shaping students' mobility; high-density regions have

higher degree mobility rates, but lower shares of credit mobile students. All of these results are detailed below.

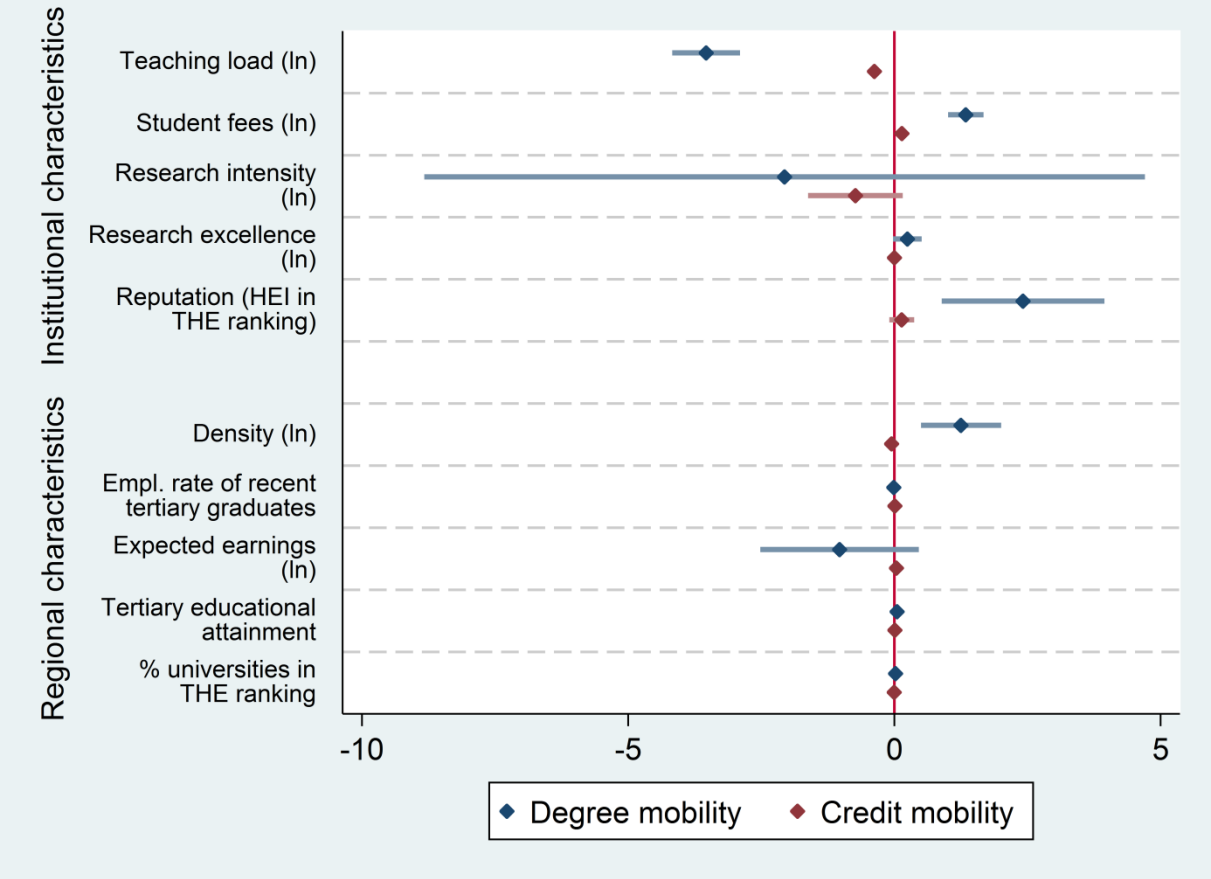
First, in relation to the main destinations of students, degree mobility appears to be very concentrated, with the top three destinations (the UK, DE and FR) covering almost 80% of the mobile student population. These countries are also the destinations of a consistent share of degree mobile students from outside the EU, as shown by official Eurostat statistics. Credit mobility, on the other hand, appears to be more equally distributed, with the larger countries in terms of population attracting more Erasmus students and receiving altogether just above half of the total number of credit mobile students. According to the number of students received, ES, DE, FR, the UK and IT are the main destinations for credit mobility. This result is likely to be the consequence of the functioning of the Erasmus+ programme, where the total number of scholarships and their distribution across countries are centrally determined by the Erasmus programme. This result is in line with the work done by Rodríguez-González et al. (2011), who also found a relationship between the population of countries and the main destination of Erasmus students.

At the lower educational levels, there is a concentration of institutions and regions among the top receivers in terms of the number of mobile students. Specifically, eight of the top 10 receiving HEIs of degree mobile students are based in the UK (University College London, University of Manchester, University of Edinburgh, Coventry University, University of Sheffield, University of Birmingham, Imperial College of Science, Technology and Medicine, and King's College London), while seven of the top 10 receiving HEIs of Erasmus students are Spanish (University of Granada, Complutense University of Madrid, University of Valencia Technical, University of Valencia, University of Sevilla, University of Barcelona and University of Salamanca). It is also interesting to note how some universities appear among top receivers at only specific ISCED levels. Similarly, when considering the regional level, four of the top 10 destinations of degree mobile students are in the UK (Inner London – West, West Midlands, Eastern Scotland and Greater Manchester), and four of the top 10 Erasmus-receiving regions are Spanish (Andalucía, Comunidad de Madrid, Cataluña and Comunidad Valenciana).

Second, degree mobility is more common than credit mobility. According to ETER figures, more than a million degree mobile students are enrolled in the EU countries we investigated, in contrast to around 185,000 Erasmus students. When looking at the share of mobile students on the total student population we find that, on average, around 10% of students enrolled at ISCED levels 6–8 (combined) in the EU are degree mobile students, while the average share of credit mobility is 1.1% of the total number of students in the EU. The most attractive destinations in terms of mobility rates are the UK and AT, with 20.2% and 19.2%, respectively, for degree mobility, and BE, IE and FI, with 2.5%, 2.5% and 2.2%, respectively, for credit mobility. The distribution of Erasmus students across universities in the different EU countries is more homogenous than in the case of degree mobility. For degree mobility, in general terms, the higher the level of education, the greater the share of mobile students; with a few exceptions, the degree mobility rate among ISCED 8 students is higher than among ISCED 7 students, and both are higher than among undergraduates. The EU average for 2014 shows that 6.6% of undergraduates are degree mobile students, compared with 14% of masters students and 26.8% of PhD students.

Third, when looking at the factors associated with mobility, results from the multilevel and gravity models suggest that institutional characteristics have a stronger association with degree and credit mobility than regional factors (Figure 11).

Figure 11. Summary of regression results comparing degree and credit mobility determinants



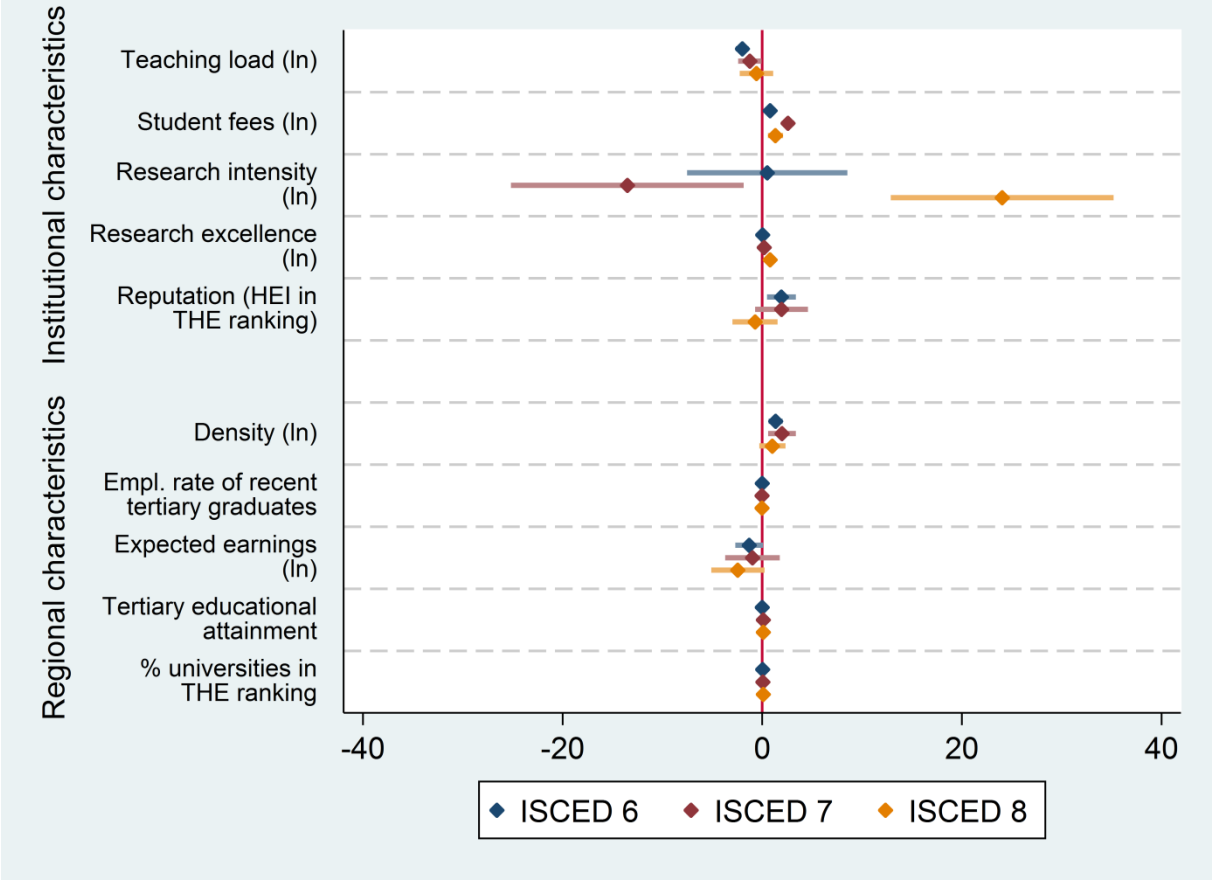
Note: For each variable, the diamond represents the value of the coefficient of the multilevel model, while the horizontal line indicates the confidence interval representing the significance of the results. Those variables for which the horizontal line does not overlap with the vertical red line (0 value) are significantly correlated with mobility, while those that do overlap with the vertical line are not significantly different from 0.
Source: Own elaborations on data from Erasmus Mobility Statistics and ETER project. Data downloaded in June 2017.

Figure 11 and Figure 12 summarise the results of the regression models comparing degree and credit mobility, as well as distinguishing between degree mobility results across the different ISCED levels ([54]). With regard to institutional characteristics (Figure 11), the results suggest that the quality of teaching activities is positively correlated with both degree and credit mobility. In particular, the lower the student–teacher ratio, the higher the share of mobile students, and the higher the student fees, the higher the level of inward mobility. This suggests that, contrary to our expectations and in line with the evidence provided by Beine et al. (2014), higher fees are a proxy for the quality of the teaching capacity of institutions, rather than a cost component of education mobility. Research activities of universities are significantly associated with only the degree mobility of PhD students (Figure 12). This result is in line with our hypothesis that institutions more focused on research activities capture a larger share of degree mobile students at higher levels of education than at lower levels of education. Complementing the results presented in Lepori et al. (2015), our results suggest that the research orientation of HEIs is not only associated with the share of international staff, but also the share of students from abroad. In addition, the overall reputation of an HEI is

([54]) For simplicity and for consistency among the results, results of only the multilevel models are presented here.

positively related to degree and credit mobility ([55]), with a particularly strong association at the lower levels of education (undergraduate level). These results constitute the fourth conclusion of this report, namely that universities of higher quality and with better reputations are associated with higher shares of mobile students, while research orientation and excellence attract more degree mobile PhD students.

Figure 12. Summary of regression results comparing degree mobility determinants at ISCED 6, ISCED 7 and ISCED 8



Note: For each variable, the diamond represents the value of the coefficient result of the multilevel model, while the horizontal line indicates the confidence interval representing the significance of the results. Those variables for which the horizontal line does not overlap with the vertical red line (0 value) are significantly correlated with mobility, while those that do overlap with the vertical line are not significantly different from 0.
Source: Own elaborations on data from ETER project. Data downloaded in June 2017.

Fifth, in relation to regional attractiveness, only the level of urbanisation of regions is significantly associated with mobility ([56]). In particular, the evidence shows a positive relationship between population density and degree mobility, while the relationship is negative for credit mobility. The former might be related to the interpretation provided in some of the literature (Sá et al., 2004;Agasisti and Dal Bianco, 2007), arguing that density is linked to a more 'urban style of life', with better local amenities and more opportunities for leisure activities and socialisation, which is attractive for students. The negative relationship between density and credit mobility, on the other hand, could be interpreted as being related to the higher costs of living in more urban areas. In this

([55]) Although reputation is not significant for credit mobility in the multilevel model, it is significant in the gravity models for flows of Erasmus students.
([56]) Although density is not significant for credit mobility in the multilevel model, it is significant in the gravity models for flows of Erasmus students.

case, our hypothesis that degree mobile students would be more affected by the regional level of urbanisation than credit mobile students – because, according to Rosenzweig (2008), international students are likely to stay and work in the host country once they have completed their studies and that this mainly applies to degree mobile students – cannot be supported. On the other hand, the other regional characteristics – employment opportunities and the characteristics of the regional education system – do have a (weak) relationship with credit mobility. That is, regions with higher employment rates among recent tertiary graduates and those with higher levels of tertiary educational attainment attract higher numbers of Erasmus students. In fact, the first result is in line with the Erasmus impact study which found that one of the main motivations of Erasmus students to move abroad is the expectation that it will increase future job opportunities (European Commission, 2016). The second result relates to the influence of the peer effect, i.e. regions with more population with tertiary educational attainment are expected to have more credit mobile students.

6.2 Potential policy implications

Some policy implications are derived from the results presented here for both the European Commission itself and Member States.

Tthe identification of key factors associated with international student mobility is central to designing efficient policies aimed at attracting mobile students. Specifically, policies in destination countries related to the management of international students could act on two complementary grounds.

First, policy could focus on attracting international students by increasing the quality of higher education systems. According to our results, institutional characteristics are associated with student mobility more than regional factors are. The relevance of institutional characteristics found in this study suggests possible avenues through which HEIs could increase their level of attractiveness to mobile students, for instance by reinforcing the quality of their teaching activities and increasing their research outputs in order to attract mobile students of different types (degree and credit) and at different ISCED levels. This is coherent with the good practices of countries such as the UK and FR, which have made good use of their established reputations as centres for higher education to attract the world's best and brightest students. Member States can indirectly contribute to this effort through policies promoting quality in the activities of their universities and their reputations. On a different level, Member States could aim to lower some costs for mobile students, such as housing expenses, through subsidies. This is particularly important in the case of credit mobility, where the cost of living of the destination locations appears to be a possible regional-level obstacle to attracting students.

Second, the finding that employment opportunities at the regional level (particularly the employment rate of recent tertiary graduates) are significantly related to credit mobility could be interpreted as evidence that the provision of student exchange opportunities can allow regions to attract talented and highly skill human capital. This encourages more support for student mobility programmes and/or extension of current schemes.

References

Abella, M. (2006). Global competition for skilled workers and consequences, in C. Kuptsch and E. Pang (Eds), Competing for Global Talent. ILO, Geneva, pp. 11–32.

Agasisti, T. and Dal Bianco, A. (2007). Determinants of college student migration in Italy: empirical evidence from a gravity approach (December 5, 2007). Available at: https://ssrn.com/abstract=1063481 (September 2007).

Baryla, E.A. and Dotterweich, D. (2001). Student migration: do significant factors vary by region? Education Economics 9(3): 269–280. DOI: 10.1080/09645290110086135.

Beine, M., Romain, N. and Ragot, L. (2014). Determinants of the international mobility of students. Economics of Education Review 41(2014): 40–54, http://dx.doi.org/10.1016/j.econedurev.2014.03.003.

Bornmann, L. (2014). How are excellent (highly cited) papers defined in bibliometrics? A quantitative analysis of the literature. Research Evaluation 23(2): 166–173, https://doi.org/10.1093/reseval/rvu002.

Bracht, O., Engel, C., Janson, K., Over, A., Schomburg, A. and Teichler, U. (2006). The Professional Value of Erasmus Mobility. International Centre for Higher Education Research, University of Kassel, Kassel, Germany.

Bratti, M. and Verzillo, S. (2017). The 'Gravity' of Quality: Research Quality and Universities' Attractiveness in Italy. IZA DP No 11026. IZA – Institute of Labor Economics, Bonn, Germany.

Caruso, R. and de Wit, H. (2015). Determinants of mobility of students in Europe. Empirical evidence for the period 1998–2009. Journal of Studies in International Education 19(3): 265–282.

Cattaneo, M., Malighetti, P., Meoli, M. and Paleari, S. (2017). University spatial competition for students: the Italian case. Regional Studies 51(5): 750–764. DOI: 10.1080/00343404.2015.1135240.

Docquier, F. and Lodigiani, E. (2010). Skilled migration and business networks. Open Economies Review 21(4): 565–588.

European Commission (2014). The Erasmus Impact Study. Publications Office of the European Union, Luxembourg. Available at: http://ec.europa.eu/education/library/study/2014/erasmus-impact_en.pdf

European Commission (2015). Methodological Manual on Learning Mobility in Tertiary Education. Available at: https://circabc.europa.eu/sd/a/3bc0cfff-6ba0-462b-a799-5b75490868b7/Methodological%20manual%20on%20LM_rev_28072015.pdf

European Commission (2016). The Erasmus Impact Study: Regional Analysis. Publications Office of the European Union, Luxembourg. Available at: http://ec.europa.eu/education/library/study/2016/erasmus-impact_en.pdf

Engel, C. (2010). The impact of Erasmus mobility on the professional career: empirical results of international studies on temporary student and teaching staff mobility. Belgeo Revue Belge de Géographie 4: 1–16.

Findlay, A.M. (2010). An assessment of supply and demand-side theorizations of international student mobility. International Migration 49: 162–190, DOI: 10.1111/j.1468–2435.2010.00643.x.

Findlay, A., King, R., Stam, A. and Ruiz-Gelices, E. (2006). The changing geographies of UK students studying and working abroad. European Urban and Regional Studies 13(4): 291–318.

Flisi, S. and Murat, M. (2011). The hub continent. Immigrant networks, emigrant diasporas and FDI. Journal of Socio-Economics 40(6): 796–805. DOI: 10.1016/j.socec.2011.08.025.

Hair, J.F. Jr., Anderson, R.E., Tatham, R.L. and Black, W.C. (1995). Multivariate Data Analysis (3rd ed.). Macmillan, New York, NY.

ICEF (2013). ICEF Monitor. European Migration Network. Available at: http://monitor.icef.com/2013/12/a-year-of-icef-monitor-in-one-post-2013-in-review/

Kuptsch, C. and Pang, E. (2006). Competing for Global Talent. ILO, Geneva.

Lepori, B. (2016). What ETER tells us about student mobility in European higher education. Available at: https://www.eter-project.com/assets/pdf/ETER_student_mobility.pdf

Lepori, B., Benninghoff, M., Jongbloed, B.W.A., Salerno, C.S. and Slipersæter, S. (2007). Changing models and patterns of higher education funding: some empirical evidence, in A. Bonaccorsi and C. Daraio (Eds), Universities and Strategic Knowledge Creation: Specialization and Performance in Europe. Edward Elgar, Cheltenham, pp. 85–111.

Lepori, B., Seeber, M. and Bonaccorsi, A. (2015). Competition for talent. Country and organizational-level effects in the internationalization of European higher education institutions. Research Policy 44: 789–802.

Lepori, B., Bonaccorsi, A., Daraio, A., Daraio, C., Gunnes, H., Hovdhaugen, E., Ploder, M., Scannapieco, M. and Wagner-Schuster, D. (2016a). Establishing a European Tertiary Education Register – Final Report. Publications Office of the European Union, Luxembourg, DOI: 10.2766/755061, ISBN: 978-92-79-52368-7. Available at: https://www.eter-project.com/assets/pdf/ETER_final_report_exec_en.pdf.

Lepori, B., Bonaccorsi, A., Daraio, A., Daraio, C., Gunnes, H., Hovdhaugen, E., Ploder, M., Scannapieco, M. and Wagner-Schuster, D. (2016b). Establishing a European Tertiary Education Register – Annex I. Technical Report on the Data Collection. Available at:https://www.eter-project.com/assets/pdf/ETER_final_report_annexI.PDF.

Lepori, B., Bonaccorsi, A., Daraio, A., Daraio, C., Gunnes, H., Hovdhaugen, E., Ploder, M., Scannapieco, M. and Wagner-Schuster, D. (2017). Establishing a European Tertiary Education Register – Handbook for Data Collection. Updated version for data collection 2014.

McCann, P. and Sheppard, S. (2001). Public investment and regional labour markets: the role of UK higher education, in D. Felsenstein, R. McQuaid, M. McCann and R. Shefer (Eds), Public Investment and Regional Economic Development: Essays in Honour of Moss Madden. Edward Elgar, Cheltenham, pp. 135–153.

Mitchell, K. (2012). Student mobility and European identity: Erasmus study as a civic experience. Journal of Contemporary European Research 8(4): 491–518.

Mixon, F.G. and Hsing, Y. (1994). The determinants of out-of-state enrollments in higher education: a tobit analysis. Economics of Education Review 13(4): 329–335.

OECD (2009). International Migration Outlook. SOPEMI 2009. OECD Publishing, Paris.

OECD (2015). Indicator C4 Who studies abroad and where? In Education at a Glance 2015: OECD Indicators. OECD Publishing, Paris.

OECD (2016). International mobility of highly skilled, in OECD Science, Technology and Innovation Outlook 2016. OECD Publishing, Paris, http://dx.doi.org/10.1787/sti_in_outlook-2016–17-en.

OECD (2017). Indicator C4 What is the profile of internationally mobile students? In Education at a Glance, 2017: OECD Indicators. OECD Publishing, Paris.

Oosterbeek, H. and Webbink, D. (2011). Does studying abroad induce a brain drain? Economica 78: 347–366.

Parey, M. and Waldinger, F. (2010). Studying abroad and the effect on international labour market mobility: evidence from the introduction of Erasmus. The Economic Journal 121: 194–222.

Ramos, R. (2016). Gravity models: a tool for migration analysis. IZA World of Labor 2016: 239.

Rietveld, P., Zwart, B., Van Wee, B. and van den Hoorn, T. (1999). On the relationship between travel time and travel distance of commuters: reported versus network travel data in the Netherlands. The Annals of Regional Science 33(3): 269–287.

Rodríguez-González, C., Bustillo-Mesanza, R. and Mariel, P. (2011). The determinants of international student mobility flows: an empirical study on the Erasmus programme. Higher Education 62: 413–430.

Rosenzweig, M.R. (2008). Higher Education and International Migration in Asia: Brain Circulation. In Higher Education and Development, edited by J.Y. Lin and B. Pleskovic. Washington D.C.: The Wold Bank

Sá, C., Florax, R. and Rietveld, P. (2004). Determinants of the regional demand for higher education in the Netherlands: a gravity model approach. Regional Studies 38(4) 375–392. DOI: 10.1080/03434002000213905.

Sorrenti, G. (2015). The Spanish or the German Apartment? Study Abroad Outcomes and their Recognition by the Labour Market. Paper presented at the 3rd Lyon–Turin Economics and Management PhD Workshop, Lyon, 29–30 June 2015.

Souto Otero, M. (2008). The socio-economic background of Erasmus students: a trend towards wider inclusion? International Review of Education 54: 135–154. DOI: 10.1007/s11159–007–9081–9.

Tabachnick, B.G. and Fidell, L.S. (2001). Using Multivariate Statistics (4th ed.). Allyn and Bacon, Boston, MA.

Teichler, U. (2007). International Dimensions of Higher Education and Graduate Employment. In J. Allen and R. van der Velden (eds.). The Flexible professional in the Knowledge Society: General Results of the REFLEX project. Available at: https://link.springer.com/content/pdf/.../978-94-007-1353-6_7.pdf

UOE (2013). UOE data collection on education systems, Volume 1 – Manual: concepts, definitions and classifications. Montreal, Paris, Luxembourg, 2013.

Usher, A. and Cervenan, A. (2005). Global Higher Education Rankings 2005. Educational Policy Institute, Toronto, ON.

Van Mol, C. and Timmerman, C. (2014). Should I stay or should I go? An analysis of the determinants of intra-European student mobility. Population, Space and Place 20: 465–479.

Wei, H. (2013). An empirical study on the determinants of international student mobility: a global perspective. Higher Education 66: 105–122.

List of country codes and abbreviations

Country codes

AT	Austria	IE	Ireland
BE	Belgium	IT	Italy
BG	Bulgaria	LT	Lithuania
CY	Cyprus	LU	Luxembourg
CZ	Czech Republic	LV	Latvia
DE	Germany	MT	Malta
DK	Denmark	NL	Netherlands
EE	Estonia	PL	Poland
EL	Greece	PT	Portugal
ES	Spain	RO	Romania
FI	Finland	SE	Sweden
FR	France	SI	Slovenia
HR	Croatia	SK	Slovakia
HU	Hungary	UK	United Kingdom

Abbreviations

ECTS	European Credit Transfer System
ET 2020	Education and Training 2020
ETER	European Tertiary Education Register
EU	European Union
FTE	Full-time equivalent
GDP	Gross domestic product
HC	Head count
HEI	Higher education institution
ISCED	International Standard Classification of Education
ln	Normal logarithm
NUTS	Nomenclature des Unités Territoriales Statistiques
OECD	Organisation for Economic Co-operation and Development
THE	Times Higher Education
UOE	UIS (UNESCO Institute of Statistics)/OECD/Eurostat data collection
VIF	Variance inflation factor

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Annexes

Annex 1. Literature review

Study	Years of data	Unit of analysis	Dependent variable	Results
Agasisti and Dal Bianco (2007)	n.a.	Students in IT	Flows of students	Frictional role of distance, the number of faculties, the resources invested in student aid and the socio-economic conditions of the area have a positive impact.
Baryla and Dotterweich (2001)	1998	Institutional and regional info. in USA	Student migration	Student migration tends to be influenced by similar factors in all regions. HEIs that have regionally recognised high-quality programmes have a greater ability to attract non-resident students.
Beine et al. (2014)	2004–2007	Students in 13 OECD countries	Flows of students	Significant positive network effect, negative roles for cost factors, such as housing prices, and attractiveness variables, such as the reported quality of universities. No important role for registration fees.
Caruso and de Wit (2015)	1998–2009	Inflow of students in 33 EU countries	Flows of students	The expenditure per student is a crucial determinant. Other determinants are the actual level of safety, the degree of openness of the host country and the GDP per capita of the host country.
Engel (2010)	2000/2001	Erasmus students and employers	Assessment of mobility period	Positive assessment of Erasmus study period and the positive impact on the competences of the mobile students and on their career development after graduation. However, the impact of a period of study abroad has been declining over time.
Findlay, et al. (2006)	2003	Students in UK	Flows of students	Decline in UK outward student mobility within the Socrates–Erasmus scheme has been paralleled by the emergence of new international destinations. Language and financial factors are barriers. Embeddedness of personal mobility in relation to social class.
Lepori et al. (2015)	2009	Academics in 8 EU countries	Flows of academics	Country factors are more important than HEI characteristics in driving internationalisation; research-oriented HEIs in attractive countries have a larger share of international staff; the association of research orientation with internationalisation is mediated by a HEI's international network.
McCann and Sheppard (2001)	1995, 1996	Graduates in UK	Choice to move	Gender, economic activity at origin and wage at the destination are positively related. Unemployment rates at the destination, density of population at origin and destination, wage at origin and distance have negative effects.
Mitchell (2012)	2010/2011	Students in 25 EU countries	Civic experience	Erasmus students engage in significantly more contact with other Europeans, become more interested in Europe and other Europeans as a result, and self-identify more as Europeans than non-mobile students.

Study	Years of data	Unit of analysis	Dependent variable	Results
Oosterbeek and Webbinkz (2011)	1997–2002	Higher education graduates in NL	Working abroad	Assignment of a scholarship increases the probability of studying abroad and the number of months spent studying abroad. Studying abroad and the number of months spent studying abroad increase the probability of currently living abroad.
Parey and Waldinger (2010)	1988/1989, 1992/1993, 1996/1997, 2000/2001 and 2004/05 graduate cohorts	University graduates, DE	Working abroad	Causal effect of undergraduate student mobility (Erasmus) on later international labour migration. Students who studied abroad are about 6 percentage points more likely to work abroad later on, and this probability is even higher (15 percentage points) when the model is controlled by the availability of Erasmus grants. The most disadvantaged students have the highest returns from studying abroad.
Rodríguez-González et al. (2011)	1995–2006	Erasmus students in EU countries	Flows of students	Country size, cost of living, distance, educational background, university quality, the host country's language and climate are significant determinants. A country's characteristics and time effects can affect mobility flows.
Sá et al. (2004)	2000	High school graduates in NL	Flows of students	The behaviour of prospective students is governed by a distance deterrence effect and a downwards rent effect, but a positive impact results from regional/urban amenities rather than from the educational quality of the university programmes.
Sorrenti (2015)	2007–2010	Graduates in IT (AlmaLaurea)	Foreign language proficiency	Strong effect of studying abroad on foreign language proficiency, although the effect seems stronger for languages that are less valuable in terms of recognition of a wage premium by the labour market.
Souto Otero (2008)	2004/2005	Erasmus students	– (only descriptive analysis)	Importance of having access to the Erasmus programme for students from lower socio-economic backgrounds. In spite of socio-economic barriers to the take-up of the programme, which are still important, access has been moderately widened.
Van Mol and Timmerman (2014)[(a)]	2010/2011	Students enrolled in AT, BE, IT, NO, PL and UK	Choice to move	Importance of the surrounding macro context, students' social environment and personal biographies. Students from the upper class are more likely to move. Main motivations: education, leisure, travel and experience goals as well as economic elements. Influence of social networks (family and friends).
Wei (2013)	1999–2008	Students in 48 countries	Flows of students	Volume of merchandise trade facilitates student mobility; international students from developing countries put the same weight on educational and economic factors for peer-developing countries as potential destinations, while only economic factors are taken into consideration for developed countries as potential destinations.

Notes: (a)This refers to the quantitative part of the paper. 'n.a.', not available data.

Annex 2. Description of the dataset, the methodology and validation

I. Description of the European Tertiary Education Register

The main data source for this report is ETER.

ETER is a register of HEIs in Europe, providing data on the number of students, graduates, international doctorates, staff, fields of education, income and expenditure, as well as descriptive information on their characteristics. In ETER, the unit of observation is therefore the single HEI. ETER defines the perimeter of institutions as those that fit the following criteria:

— They are recognised as distinct organisations. A distinct organisation has an internal organisational structure and its own budget.

— They are nationally recognised as HEIs. An HEI is nationally recognised if it is officially accredited as such by an authorised organisation in a country.

— Their major activity is providing education at the tertiary level (ISCED 2011 levels 5, 6, 7 and/or 8). Research and development activities might be present, but are not a necessary condition for inclusion in the perimeter. The major activity criterion excludes organisations that deliver training at the tertiary level as a side activity, such as professional associations that provide education in a specific economic sector or secondary education institutions that offer preparatory classes before entering university – these specific curricula are classified at the tertiary level by Eurostat.

— There is a formal size criterion of HEIs with less than 30 FTE of academic staff and fewer than 200 students being only included in exceptional cases, specifically for HEIs from which students graduate mostly at the ISCED 8 level.

Using the above criteria, coverage is extensive in most countries and includes not only universities, but also universities of applied sciences (colleges, hogescholen, etc.) and a number of specialised institutions. In many countries, the perimeter exactly matches the national-level definition of HEIs, exceptions being HEIs that do not conform to the ETER size criterion. Overall, ETER includes almost all HEIs from which students graduate at ISCED levels 6 (bachelor), 7 (masters) or 8 (doctorate), while HEIs delivering only professional diplomas (ISCED level 5) are mostly excluded. For the purposes of the report, the analysis therefore mainly focuses on ISCED 6–8, except for the analysis of Erasmus mobility, which combines ISCED levels 5–8.

ETER covers 28 EU Member States, the EEA-EFTA countries (Iceland, Liechtenstein, Norway and Switzerland) and candidate countries (the former Yugoslav Republic of Macedonia, Montenegro, Serbia and Turkey). Data are available for 32 countries; Montenegro, Romania, Slovenia, Turkey and the French-speaking region of Belgium only provided the list of HEIs but no other information. For the purposes of this report, only EU countries are taken into account. However, as explained in Chapter 3, not all EU countries can be included in the analysis, because of a lack of data related to mobility.

The ETER dataset includes the following main groups of variables:

— Institutional descriptors: the name of the institution, the foundation year and the type of institution.

— Geographical descriptors: NUTS2 and 3 levels, the city of the main seat and its postcode, geographical coordinates and information on other campuses.

— Data on numbers of students and graduates by ISCED 2011 level, gender, fields of education, nationality and mobility, including Erasmus incoming and outgoing students.

— Data on HEI expenditures (personnel, non-personnel, capital) and revenues (core, third party and fees).

— Data on the number of staff, categorised by academic and non-academic staff, as well as on the number of professors.

— Data on research activities: PhD students and graduates and research and development expenditures.

A full list of variables can be found here. The availability of data is evaluated by ETER to be 'excellent' for descriptors and geographical information, 'very good' for student and graduate information (with a few breakdowns missing), 'reasonable' for staff data and 'limited' for financial data.

As explained in Chapter 3, information on degree mobility is collected within the ETER data collection and provides the number of students and graduates by mobile status. Data on credit mobility, on the other hand, are provided in ETER using official information from Erasmus+.

Before going into a more detailed explanation of the mobility data available and before explaining the procedure for building the variables of interest for the analysis in this report, some explanations are required about the structure and features of ETER data.

Whenever a variable is missing, ETER includes a special code that substitutes the missing figure in order to identify the different possible cases. As reported in Lepori et al. (2016a, 2017), special codes are necessary in order to identify cases where data are not available, for example to distinguish between cases where the data are truly missing ('m') from cases where the variable is not applicable to the unit of observation ('a', e.g. the number of PhD students in an HEI that does not have the right to award doctorates) ([57]).

Moreover, as explained in Lepori et al. (2016b, p. 18), 'ETER adopted usual good statistical practices concerning data that are below some threshold, which would allow the identification of individuals, specifically for data on students and staff. To this aim, all cells below or equal to a count of 3 are set to "s" in the publicly available data. For breakdowns, the unclassified category is set to "s" in order to avoid the reconstruction of the concerned value by using the totals'.

Special codes need to be considered carefully when doing an analysis; for example, the 'not applicable' code could be recoded in many instances as '0' in order to avoid cases that are excluded from the analysis.

II. Data availability and the construction of indicators: degree and credit mobility

As explained before, the aim of this report is to analyse what factors (those related to the characteristics of HEIs and/or to the region where they are located) are associated with

([57]) Other cases of missing values include:
- cases when a specific breakdown is not available, but the data are included in the total (code 'x'), or when the value is included in another subcategory (e.g. private funding, which is included in third-party funding but cannot be singled out; code 'xc');
- cases where data are included in other rows, which can occur when an institution is part of another institution (code 'xr');
- cases where data have not been collected in the reference year (e.g. the gender breakdown of full professors was not collected for the academic year 2011/2012, but was introduced in the next data collection; code 'nc');
- data with restricted access (code 'c').

the level of attractiveness of a certain destination for mobile students. The inward degree and credit mobility rates in a certain destination will be used as proxies for the level of attractiveness. In the following sections, a detailed explanation of the procedure used to build the indicators of degree and credit mobility is presented.

Degree mobility

Chapter 3 presented an overview of the information on degree mobility available in ETER. However, information on the breakdown of students by mobile status is not available for some countries for some years and these countries therefore had to be discarded from the analysis. An overview of the years with available degree mobility data for each country is provided in Table A2.1.

Table A2.1. Overview of years where information on degree mobility is available for each country

	2011	2012	2013	2014
AT				
BE				
BG				
CY				
DE				
DK				
EE				
ES				
FI				
FR				
HR ([a])				
HU				
IE				
LT				
LU				
LV				
MT				
PT				
SE				
UK				

Notes: ([a]) For 2011–2012, data are available for only ISCED 8.
Green cells indicate years for which information on mobile students is available; red cells highlight years for which it is not. No data are available for CZ, EL, IT, NL, PL, RO, SI or SK.
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

In order to calculate the main variable of interest for degree mobility, i.e. the number of degree mobile students as a proportion of the total student population, the following procedure was adopted. For each institution that made information on mobile students available, ETER provides data about mobile (i.e. students that received their upper secondary education degree in a country) and resident (i.e. students that received their upper secondary education degree in the same country) students for each ISCED level. A third category is present for this classification, namely 'unclassified' students. The share of mobile students is initially calculated following the same procedure adopted by ETER, i.e. as:

$$Share\ of\ degree\ mobile\ students = \frac{number\ of\ mobile\ students}{number\ of\ mobile\ students + number\ of\ resident\ students}$$

The individuals under the 'unclassified' category are therefore not taken into account in the calculation. However, when compared with ETER, we add an additional step in the calculation. In fact, ETER does not compute this indicator whenever the figure for mobile students is coded as 's', i.e. cases where the value (larger than 0 and below or equal to

3) was recoded for confidentiality reasons; for all these cases, the corresponding number of non-mobile (i.e. resident) students is available. The choice to not calculate the figure when an 's' is present implies that institutions with a very small number of mobile students will be excluded from the analysis. As a consequence, this would produce an upwards bias in student mobility rates, as, by definition, cases where this number is close to 0 would be excluded. In order to overcome this bias, it was decided to produce a somewhat 'pessimistic' scenario in the estimation of mobility figures, replacing the 's' with 0. This procedure allows the recovery of a good number of observations, therefore considerably increasing the coverage of the study, creating only a very small downwards bias in the estimates (since these 'anonymised' cases are indeed close to 0).

Shares of mobile students are calculated for each separate ISCED 2011 level (6, 7 and 8, corresponding to undergraduates, masters and PhD students, respectively), and for ISCED 6–8 together. For the single education levels, the indicator is calculated if figures are available and if the number of mobile students is coded as 's' and the number of resident students is provided. For ISCED level 7, ETER makes a distinction between ISCED 7 and ISCED 7 long; the former relates to the standard masters programmes that normally last two to three years, and have ISCED 6 as an entry requirement; the latter are longer programmes, with a cumulative theoretical duration (at the tertiary level) of at least five years and which do not require prior tertiary education for enrolment. For the purposes of this report, it is not necessary to single out these programmes, so the two categories are considered jointly and the mobility indicators take into account the sum of the two levels. It should be noted that, for some countries/institutions, one or the other might be coded as 'not applicable' ('a'); in this case, only the one that is applicable is considered for the calculations ([58]). For the bachelor and doctorate levels, the indicator is not computed when the level is not applicable.

When computing the overall mobility indicator, considering ISCED levels 6 to 8 jointly, cases where the number of mobile students is coded as 's' are again considered as 0. The overall indicator takes into account all applicable ISCED levels in the institutions, so it can cover different levels depending on the HEI that is being considered. As a consequence, while this indicator will be used to give a broad picture of the situation in the country, it should be borne in mind that it can cover different ISCED levels in different HEIs and the results at the individual ISCED level are therefore needed to understand the full picture.

The general mobility indicator is not computed whenever one of the ISCED levels is considered 'missing', i.e. any type of missing apart from 'not applicable' or 'not reported' because it is close to 0. These cases therefore cover situations for which data are not reported for one HEI at one level, or for which the overall number of students is available, but no breakdown by mobile status is provided. This implies that one institution might be considered for the analysis for a specific ISCED level, but not for ISCED 6–8 overall, in case it fails to provide data on a level that is applicable.

An overview of the availability of data is provided in Table A2.2. This table shows the number of HEIs that are present in ETER for each year, and, for each single ISCED level, the share of HEIs that provided data on degree mobile students, as a proportion of the total number of institutions for which the relevant ISCED level is applicable (therefore excluding those with special code 'a' for that level from the denominator).

([58]) At the country level, ISCED 7 long is considered not applicable in BE, HU (for the available years) and IE. As a consequence, only the ISCED 7 category is considered. For BG, on the other hand, information is available for ISCED 7 long, but is missing for ISCED 7; the indicator is therefore not calculated. For FI, a peculiar situation arises: ISCED 7 long is missing for 2012, while coded 0 for 2013–2014, even for the same institutions; while this difference over time casts some doubts on the data for these HEIs, coherently with the procedure for computing shares described above, no ISCED 7 mobile share is computed for 2012, while it is for the following year. A partly similar situation arises for LV, for which information is missing in 2012–2013, available for 2014 and only partly available for 2011. As will be clear from Table A2.2, 2011 has such a low coverage of HEIs that the mobility indicator for this year is not provided.

Table A2.2. Total number of HEIs by country and ISCED level, and share of HEIs for which data on degree mobile students are available (calculated based on the total number of HEIs for which the reference ISCED level is applicable)

	No of HEIs included in ETER				Share of HEIs for which data on degree mobile students are available (total number of HEIs for which the level is applicable)											
					ISCED 6				ISCED 7				ISCED 8			
Country	**2011**	**2012**	**2013**	**2014**	**2011**	**2012**	**2013**	**2014**	**2011**	**2012**	**2013**	**2014**	**2011**	**2012**	**2013**	**2014**
AT	68	68	68	69	0.96	0.96	0.97	0.97	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00
BE	70	70	65	65	***0.40***	***0.40***	***0.35***	***0.35***	***0.36***	***0.36***	***0.25***	***0.24***	***0.12***	***0.12***	***0.13***	***0.13***
BG ([a])	52	52	52	52	0.94	0.94	0.94	0.94	–	–	–	–	0.90	0.93	0.91	0.90
CY	25	25	25	23	0.94	0.95	0.90	1.00	0.94	1.00	0.94	1.00	1.00	0.89	0.89	1.00
DE	374	386	390	396	0.92	0.91	0.92	0.91	0.87	0.88	0.89	0.89	0.84	0.89	0.88	0.88
DK	34	34	33	33	0.91	0.91	0.94	–	0.81	0.80	0.86	–	0.79	0.79	0.75	–
EE	30	29	26	25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ES	77	80	80	81	0.99	0.99	0.99	1.00	0.97	0.99	0.99	1.00	–	–	–	–
FI ([b])	44	44	42	41	–	1.00	1.00	1.00	–	–	0.83	0.83	–	1.00	1.00	1.00
FR	285	286	316	323	***0.60***	***0.61***	***0.58***	***0.58***	***0.76***	***0.76***	***0.77***	***0.76***	***0.61***	***0.60***	***0.62***	***0.61***
HR	32	33	36	37	–	–	1.00	1.00	–	–	0.94	0.91	1.00	0.86	0.86	1.00
HU	52	52	52	52	1.00	–	–	–	0.98	–	–	–	1.00	–	–	–
IE	27	27	27	27	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88	0.88	0.92	0.92
LT	43	43	44	43	–	–	0.89	0.88	–	–	0.86	0.86	–	–	0.79	0.73
LU	1	1	1	1	1.00	–	–	–	1.00	–	–	–	1.00	–	–	–
LV ([c])	49	49	46	45	0.97	0.97	0.96	0.96	***0.04***	–	–	0.96	0.95	0.90	0.86	0.86
MT	1	1	2	2	1.00	–	–	1.00	1.00	–	–	1.00	–	–	–	1.00
PT	113	106	94	91	1.00	1.00	0.97	0.97	0.99	1.00	0.99	0.96	1.00	1.00	0.96	1.00
SE	39	39	40	37	1.00	1.00	0.98	1.00	1.00	1.00	0.98	1.00	0.93	0.96	1.00	1.00
UK	162	161	160	161	1.00	0.99	0.99	1.00	0.98	0.98	0.99	0.98	1.00	0.99	1.00	0.99

Notes: Countries for which no information is available are denoted by '–'. ([a]) Data for ISCED 7 long missing for all years. ([b]) Data for ISCED 7 long missing for 2012. ([c]) Data for ISCED 7 long missing for 2012/2013. Figures in bold italic highlight cases where coverage is below 80%.

Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

What emerges from Table A2.2 is that the coverage of data on mobile students in ETER is good for the vast majority of countries, with shares of HEIs providing data on the mobile status of students that are above 80% for all countries apart from BE and FR (and DK and LT for ISCED 8); many countries have shares above 90% and even reach complete or nearly complete coverage in some cases (e.g. AT, EE, ES, PT, SE and the UK). The main exception is BE, for which, as already stated, information in ETER is available for only part of the country. A second case of a relatively low share of HEIs providing data on student mobility is FR, where only around 60% of HEIs provide information on mobile students at the ISCED 6 and 8 levels and around 76% at the ISCED 7 level ([59])([60]).

Credit mobility

For each university, the indicator measuring the number of Erasmus students as a proportion of the total students population is calculated as follows:

$$Share\ of\ Erasmus\ students = \frac{number\ of\ Erasmus\ incoming\ students}{number\ of\ students\ in\ ISCED\ 5-8}$$

The figure included at the numerator derives from Erasmus data and is less problematic than that concerning mobile students. It is coded as 'missing' ('m') for only 25 HEIs in the dataset, in most cases because of the lack of a matching code ([61]) between the Erasmus and ETER datasets. The variable on incoming Erasmus students is coded as 'not applicable' ('a') for around 400 HEIs. Lacking further explanations on the issue, it is assumed that these institutions do not participate in the Erasmus exchange programme. No disaggregation by ISCED level of the number of incoming Erasmus students is available, and so this figure can only be computed for ISCED levels 5–8. The denominator is computed from ETER data on the total number of students enrolled in the HEI (i.e. total student population). In particular, it is the sum of the students enrolled at all ISCED levels, including ISCED 5 ([62]). In principle, this denominator is the same as the one used for the degree mobility indicator (i.e. the sum of resident and mobile students); however, in practice, as some HEIs provide the total number of students, but not a breakdown by mobility status, using the information about total students allows the recovery of a great deal of observations when compared with the analysis of degree mobility. In fact, the only cases where the indicator cannot be computed is when Erasmus data are coded as not applicable to the HEI, and where ETER information on total students enrolled is not available. This latter case affects RO and SI, which are therefore discarded in the analysis, but the analysis does cover the other 26 EU countries. A similar issue affects HU for 2012 and LU for 2012–2013. An overview of the years available for each country is provided in **Error! Not a valid bookmark self-reference.**.

As mentioned previously, the shares of credit mobile students for HEIs for which the Erasmus student variable is coded as not applicable is not calculated. However, it should be noted that these HEIs are still taken into account in the denominator when the indicator is computed at the regional or national level; this is coherent with the procedure

([59]) A more detailed overview of the institutions providing and not providing data is available from the authors on request and includes information on the exact numbers of HEIs, distinguishing the following categories: (a) HEIs with available information on mobile students; (b) HEIs, among these, that reported an 's' and which were considered as 0; (c) HEIs for which the ISCED level is recorded as not applicable; (d) HEIs with missing data; and (e) HEIs that present the special case where the number of mobile and resident students are both 0 or 's', for which it was not possible to compute a share of mobile students. For the purposes of Table A2.2, these HEIs are considered among those not available, therefore contributing to decreasing the coverage of the ETER data.

([60]) Another special case is ISCED 7 for LV in 2011. As explained in a previous footnote, the very low coverage in 2011 is followed by two years where information on the same HEIs is not provided at all. The 2011 coverage is considered too low to provide a reliable picture of the phenomenon in the country and will therefore not be used to calculate national/regional mobility indicators for the country.

([61]) The matching code is the 'Erasmus code' identifying HEIs in the Erasmus dataset, which is available in the ETER dataset.

([62]) It should be noted that the denominator for ES does not include ISCED 8, as no information at this level is available in the country. Therefore, the estimate of inward credit mobility will be upwardly biased, as this education level is included in the numerator.

followed for degree mobility and allows the taking into account of the entire student population as a reference group, which is the ideal situation in this scenario. Country coverage is therefore low only for BE, since only part of the country provides data to ETER. An overview of the availability of data is provided in Table A2.4, which presents information comparable to that available in Table A2.2. The table clearly shows that the coverage is significantly higher for credit mobility than for degree mobility, with only BE showing shares below 80%.

Table A2.3. Overview of years for which Erasmus mobility information is available for each country

	2011	2012	2013
AT			
BE			
BG			
CY			
CZ			
DE			
DK			
EE			
EL			
ES			
FI			
FR			
HR			
HU			
IE			
IT			
LT			
LU			
LV			
MT			
NL			
PL			
PT			
SE			
SK			
UK			

Notes: Green cells indicate years for which information on Erasmus students is available; red cells highlight years for which it is not. No data are available for RO or SI.

III. *Source*: Validation and coherence of the dataset

Stability of the degree mobility indicator over time

As for all the other data in ETER, the information on degree mobility is collected at the level of the receiving HEI, and so the available figures concern inward mobility ([63]). This, together with the way in which country of origin is defined, in principle makes the information comparable to the administrative data collected by UOE, which is the basis for the construction of the learning mobility benchmark, and which also builds on information provided by the country of destination of mobile students and graduates.

The rest of this section provides a first overview of mobility in the EU, with a view to assessing the level of reliability and consistency over time of the information provided in ETER.

([63]) No information is available on the country of origin of the incoming mobile students.

Table A2.4. Total number of HEIs by country and ISCED level and share of HEIs for which data on credit (Erasmus) mobile students are available (calculated based on total number of HEIs for which the reference ISCED level is applicable)

	No of HEIs included in ETER			Share of HEIs for which data on credit mobile students is available (as a proportion of HEIs for which it is applicable)		
Country	**2011**	**2012**	**2013**	**2011**	**2012**	**2013**
AT	64	64	64	1.00	1.00	1.00
BE	64	61	53	***0.41***	***0.43***	***0.36***
BG	49	49	49	0.92	0.92	0.92
CY	16	16	15	0.94	0.94	0.93
CZ	64	63	62	0.95	1.00	1.00
DE	315	314	311	1.00	1.00	1.00
DK	29	29	28	0.97	0.97	0.96
EE	22	22	21	1.00	1.00	1.00
EL	39	39	34	0.95	0.95	0.94
ES	75	75	75	1.00	1.00	1.00
FI	43	43	40	1.00	1.00	1.00
FR	233	233	228	0.81	0.81	0.82
HR	24	24	23	1.00	1.00	1.00
HU	48	52	48	1.00	–	1.00
IE	27	27	27	1.00	1.00	1.00
IT	160	160	160	0.96	0.98	0.98
LT	41	41	41	0.93	0.93	0.95
LU	1	1	1	1.00	–	–
LV	40	40	39	0.98	0.98	0.97
MT	1	1	1	1.00	1.00	1.00
NL	49	48	47	0.92	0.92	0.91
PL	238	222	222	1.00	1.00	1.00
PT	81	77	69	1.00	1.00	1.00
SE	37	37	37	1.00	1.00	0.97
SK	31	31	32	1.00	1.00	0.84
UK	150	150	147	0.93	0.93	0.93

Notes: Countries for which no information is available are denoted by '–'. Figures in bold italic highlight cases where coverage is below 80%.

Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

Table A2.5 provides an overview of the overall shares of inward degree mobility in the countries considered, taking into account ISCED levels 6–8 combined. The last column includes the average growth rate for each country. The average growth rate is calculated as the average of the single growth rates for the years 2011/2012, 2012/2013 and 2013/2014 ([64]). This average growth rate reports the stability of degree mobility rates in EU countries and can also be useful to check the consistency over time of mobility indicators calculated from ETER data.

([64]) Growth rates calculated as $(Y_t - Y_{t-1})/Y_{t-1}$.

Table A2.5. Evolution of the share of inward degree mobile students (ISCED levels 6–8).

Country	2011	2012	2013	2014	Avg. change (%)
EU	*9.58*	*9.92*	*9.48*	*9.74*	*0.62*
AT	18.1	18.99	18.74	19.2	2.02
BE	5	4.55	5.88	5.45	4.31
BG	1.55	2.44	2.64	3.15	28.31
CY	21.89	21.66	13.5	17.15	–3.90
DE	8.1	8.2	8.38	8.75	2.61
DK	8.15	9.27	9.63	–	8.81
EE	2.32	2.87	3.7	5.22	31.24
ES	1.83	1.66	1.79	1.93	2.12
FI	–	–	8.22	8.37	1.82
FR	12.45	12.09	11.85	11.58	–2.39
HR	–	–	2.4	2.34	–2.50
HU	5.39	–	–	–	–
IE	5.88	7.46	8.3	8.02	11.59
LT	–	–	2.65	3.51	32.45
LU	38.15	–	–	–	–
LV	5.76	7.92	7.43	7.04	8.69
MT	–	–	–	4.95	–
PT	4.74	5.96	4.16	4.97	5.00
SE	6.72	5.53	5.77	6.07	–2.72
UK	19.35	19.51	20	20.23	1.50

Notes: Countries for which no information is available are denoted by '–'.

Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

On average, at the EU level, degree mobile students represent almost 10% of the student population; this share is more or less constant in the four years studied, with an average increment of 0.6% from 2011 to 2014. However, important differences emerge across countries. LT, EE and BG are the countries that exhibit the highest growth (32.5%, 31.2% and 28.3%, respectively), although their shares of mobile students are still well below the EU average (less than 5%), which explains the high relative growth. For AT and the UK, the shares of mobile students are quite constant over time, with a growth of 2% and 1.5%, respectively; the figures that these countries report for degree mobility are the highest in the EU, with mobile students representing around 20% of the total student population. BE, DE, DK, FI, IE and LV have shares of degree mobile students close to the EU average, although they have not exhibited significant increments in mobility figures. The same holds for ES and PT, despite the low starting level (less than 2% in ES and 5% in PT). CY, FR, HR and SE are the only countries with negative growth in terms of mobile students, all showing a moderate decrease – between 5% (PT) and 2.39% (FR) – in the numbers of students received. Overall, and with a few exceptions, such as CY, it appears that the inward degree mobility rate has not drastically changed, which suggests that ETER information is quite consistent over time.

As mentioned previously, while this overall mobility indicator is useful for giving a general picture of mobility across countries, it should be borne in mind that the shares include the information available in the country in a certain year, which can vary over time and across countries. For example, the overall share for ES refers to ISCED levels 6 and 7 only, as no information is provided for the PhD level (ISCED 8); BG, on the other hand, does not provide information on ISCED 7, and so the overall indicator covers ISCED levels 6 and 8. In addition, differences arise between HEIs because some of them do not provide data for all levels. As a consequence, a more reliable cross-country comparison –

and validation of the data – can be made at the single ISCED level. Degree mobility indicators by educational level are provided in Table A2.7, Table A2.8 and Table A2.9 for ISCED 6, 7 and 8, respectively.

Stability of the credit mobility indicator over time

Table A2.6 provides an overview of the overall shares of inward credit mobility in the countries considered based on incoming Erasmus students. The last column includes the average growth rate for each country, calculated as in the previous case. This growth rate shows how the shares of credit mobility in EU countries have evolved.

As for degree mobility, this table also suggests that the data are quite consistent over time.

Table A2.6. Evolution of the share of inward credit mobility

Country	2011	2012	2013	Avg. change (%)
EU	*1.04*	*1.14*	*1.12*	*4.34*
AT	1.34	1.43	1.44	3.91
BE	2.39	2.62	2.48	2.11
BG	0.56	0.24	0.25	–27.32
CY	0.74	1.74	1.61	64.15
CZ	1.51	1.41	1.60	3.28
DE	1.14	0.89	0.87	–11.87
DK	0.87	1.79	1.52	45.09
EE	0.80	1.27	1.38	34.02
EL	0.77	0.36	0.45	–14.11
ES	2.13	1.99	1.97	–3.89
FI	1.32	2.11	2.17	31.20
FR	1.13	1.11	1.05	–3.52
HR	0.44	0.33	0.47	9.17
HU	0.97	–	1.28	–
IE	1.06	2.39	2.47	64.61
IT	1.08	0.90	0.92	–7.15
LT	1.54	1.26	1.51	0.89
LU	9.00	–	–	–
LV	1.52	1.00	1.19	–7.53
MT	0.89	3.58	3.96	156.02
NL	0.86	1.14	1.14	16.34
PL	0.62	0.52	0.62	1.69
PT	1.28	2.19	1.97	30.96
SE	0.70	1.93	1.86	85.22
SK	1.00	0.59	0.76	–5.69
UK	0.35	0.75	0.76	58.00

Notes: Countries for which no information is available are denoted by '–'.

Source: own elaborations on data from the ETER project. Download data June 2017.

On average, at the EU level, the number of Erasmus students has increased by around 4% between 2011 and 2013 as a proportion of the total number of students. As in the case of degree mobile students, important differences emerge across countries. Although for LU there is information for only 2011, in this year Erasmus students represented 9% of the total student population. MT is the country with the highest positive growth of Erasmus students (156%), followed by SE (85.2%), IE (64.6%), CY (64.1%) and the UK (58%). In AT, BE, CZ, ES, FR, LT, PL and SK, figures suggest that credit mobility remained quite constant during the study period. The country that exhibited the highest negative growth is BG (–27.3%), followed by EL (–14.1%), DE (–11.9%), LV (–7.5%) and IT (–7.1%).

Validation: comparison between ETER and UOE data

As a further step in the validation of the ETER information on student mobility, this part provides a comparison between ETER and official UOE data. As mentioned in Chapter 3, the figures created for degree mobility ([65]), based on ETER data, can be considered as comparable to inward mobile students available in the UOE dataset in that these datasets follow the same fundamental rule for defining a mobile student (although with some caveats and country exceptions) ([66]) and are also provided by the host country. This section aims to present a comparison between ETER and UOE data, in order to ascertain whether or not the former can be used as a reliable reference to look at mobility rates at the regional level. We use, as a reference, data from the online Eurostat dataset *educ_uoe_mobs03*, which reports the share of mobile students by education level for academic years 2012/2013 to 2014/2015, based on UOE data.

Table A2.7 to Table A2.9 present the results of the comparison, by ISCED level and year ([67]), between degree mobility indicators calculated from ETER and those reported by UOE. No comparison is provided for the overall shares (of all education levels together) because of the limitations in the comparability issues explained above. That is why the comparisons within the single education levels are more reliable. UOE data are only available from academic year 2012/2013 onwards, and so no comparison is provided for 2011/2012, which is available only in ETER. Each table presents, for each year separately, the share of inward mobile students at the relevant ISCED level computed using ETER data and the share provided by Eurostat based on UOE. An additional column, 'Diff.', shows whether the difference between the ETER and UOE shares is significant or not and, if so, at which level. This information is based on the hypothesis that the average share of degree mobile students calculated using ETER is equal to the average reported in the UOE, and a one-sample t-test (considering the UOE value as the real mean of the population) was performed to check the hypothesis for each country.

The tables clearly show that, for most of the countries, no significant difference arises between the ETER and UOE figures, which means that both means cannot be considered as different. On average, around 80% of ISCED 6 and 8 and 70% of ISCED 7 mobility shares are not significantly different from the UOE figures. The most problematic country is BE, for which, as already highlighted, coverage of national HEIs is quite low because information is available for only Flanders and part of the Brussels region. This explains the considerable differences that emerge from the tables and in particular the underestimation of mobility at ISCED 6 and 7. A similar explanation could apply to FR for ISCED 8, for which information is available for around 60% of HEIs. On the other hand, the same issue of low coverage affects ISCED 6, for which no significant difference arises when compared with UOE data.

For other countries, it is not as easy to identify a possible explanation for discrepancies between ETER and UOE or to establish which data source might be more reliable. In some cases, only one year in the series shows differences (e.g. ES in 2014, where UOE data show an increase in mobility that is not captured by ETER); in some other cases, these affect only one educational level (e.g. ISCED 7 for the UK). Different definitions of country of origin therefore do not appear to explain the discrepancies.

Despite these cases where some differences between ETER and UOE arise, this section shows that the ETER dataset appears to be, in most cases, a reliable source of information.

([65]) Credit mobility information is not yet available from UOE data, and so no similar comparison can be made at this stage.

([66]) Although in UOE, country of origin should in principle refer to the 'country of prior secondary education', up to the reference year of 2016 (2015/16) countries might have used, instead, country of prior residence or citizenship or other. The list of country-specific definitions for each country is available here.

([67]) It should be noted that ETER and Eurostat adopt different practices in the way in which they label years. As mentioned previously, academic year 2012/2013 is labelled as 2012 in ETER, while Eurostat refers to it as 2013. This is taken into account in the comparisons presented here.

Table A2.7. Comparison between ETER and UOE shares of inward mobile students at the ISCED 6 level

	2011			2012			2013			2014		
Country	**ETER**	**UOE**	**Diff.**	**ETER**	**UOE**	**Diff.**	**ETER**	**UOE**	**Diff.**	**ETER**	**UOE**	**Diff.**
AT	17.9	–	–	18.6	19.7	n.s.	18.6	18.6	n.s.	18.4	18.4	n.s.
BE	2.4	–	–	1.8	7.0	***	2.7	8.2	***	2.4	8.6	***
BG	3.1	–	–	3.0	3.1	n.s.	2.8	2.7	n.s.	2.5	2.5	n.s.
CY	20.9	–	–	18.9	16.8	n.s.	15.0	16.1	n.s.	17.4	18.4	n.s.
DE	4.9	–	–	4.9	4.4	**	5.0	4.4	**	5.2	4.7	*
DK	4.6	–	–	5.4	5.8	n.s.	5.6	5.5	n.s.	–	5.6	–
EE	1.5	–	–	2.2	2.2	n.s.	2.9	2.9	n.s.	3.9	4.6	n.s.
ES	1.0	–	–	0.7	0.8	n.s.	0.8	0.9	n.s.	0.7	1.5	**
FI	–	–	–	5.0	5.0	n.s.	5.2	5.2	n.s.	5.2	5.2	n.s.
FR	8.6	–	–	8.3	7.6	n.s.	8.0	7.3	n.s.	7.7	7.3	n.s.
HR	–	–	–	–	0.2	–	1.9	0.2	***	1.8	0.2	***
HU	2.9	–	–	–	3.7	–	–	5.0	–	–	5.0	–
IE	4.3	–	–	5.7	5.8	n.s.	6.4	5.8	n.s.	6.3	6.0	n.s.
LT	–	–	–	–	2.2	–	2.2	2.4	n.s.	2.7	2.6	n.s.
LU	22.8	–	–	–	24.4	–	–	25.3	–	–	25.5	–
LV	3.4	–	–	4.5	4.5	n.s	6.0	6.0	n.s.	5.1	5.1	n.s.
MT	2.4	–	–	–	3.2	–	–	3.3	–	2.0	3.2	n.s.
PT	4.0	–	–	5.2	2.6	***	2.7	2.6	n.s.	2.8	2.9	n.s.
SE	2.2	–	–	2.2	2.4	n.s.	2.3	2.4	n.s.	2.2	2.4	n.s.
UK	12.6	–	–	13.0	13.2	n.s.	13.4	13.7	n.s.	13.7	14.0	n.s.

Notes: For each academic year, the number of inward mobile students as a proportion of total students in the country at the ISCED 6 level computed from ETER data is provided, together with the Eurostat value calculated from UOE data. The column 'Diff.' reports the level of significance of the difference between ETER and UOE rates. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; 'n.s.', difference is not significant. Countries for which no information is available and no difference can be computed are denoted by '–'.
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017. UOE data from educ_uoe_mobs03 (available here).

Table A2.8. Comparison between ETER and UOE shares of inward mobile students at the ISCED 7 level

	2011			2012			2013			2014		
Country	**ETER**	**UOE**	**Diff.**	**ETER**	**UOE**	**Diff.**	**ETER**	**UOE**	**Diff.**	**ETER**	**UOE**	**Diff.**
AT	17.2	–	–	18.1	19.3	n.s.	17.8	17.8	n.s.	19.0	19.0	n.s.
BE	9.4	–	–	8.3	14.7	***	11.0	20.3	***	9.7	17.7	***
BG	–	–	–	–	6.5	–	–	6.7	–	–	7.9	–
CY	26.9	–	–	30.2	11.1	**	11.4	11.5	n.s.	17.3	17.4	n.s.
DE	11.4	–	–	11.8	11.7	n.s.	12.3	12.2	n.s.	12.9	12.9	n.s.
DK	14.6	–	–	16.5	17.6	n.s.	17.5	17.4	n.s.	–	18.0	–
EE	3.8	–	–	4.0	4.0	n.s.	5.0	5.0	n.s.	7.1	5.4	n.s.
ES	7.6	–	–	3.8	4.9	n.s.	4.8	4.8	n.s.	6.3	10.9	***
FI	–	–	–	–	11.5	–	14.5	11.9	*	14.7	12.3	n.s.
FR	13.7	–	–	13.4	13.1	n.s.	13.2	13.5	n.s.	13.0	13.3	n.s.
HR		–	–	–	0.4	–	3.1	0.6	***	3.1	0.9	***
HU	12.8	–	–	–	14.4	–	–	15.1	–	–	14.1	–
IE	8.8	–	–	11.5	10.2	n.s.	13.7	13.8	n.s.	13.4	13.2	n.s.
LT	–	–	–	–	3.2	–	4.4	5.3	n.s.	6.6	6.8	n.s.
LU	67.1	–	–	–	67.1	–	–	67.7	–	–	71.1	–
LV	–	–	–	–	3.4	–	–	4.5	–	12.7	12.7	n.s.
MT	8.8	–	–	–	11.7	–	–	13.0	–	10.7	14.2	n.s.
PT	5.3	–	–	6.2	4.7	***	4.8	4.9	n.s.	6.0	6.1	n.s.
SE	11.7	–	–	8.8	9.3	n.s.	8.9	9.1	n.s.	9.8	9.9	n.s.
UK	33.5	–	–	33.3	36.1	*	33.5	36.9	**	33.3	36.9	**

Notes For each academic year, the share of inward mobile students on total students in the country at the ISCED 7 level computed from ETER data is provided, together with the Eurostat value calculated from UOE data. The column 'Diff.' reports the level of significance of the difference between ETER and UOE rates. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; 'n.s.', difference is not significant. Countries for which no information is available and no difference can be computed are denoted by '–'.
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017. UOE data from educ_uoe_mobs03 (available here).

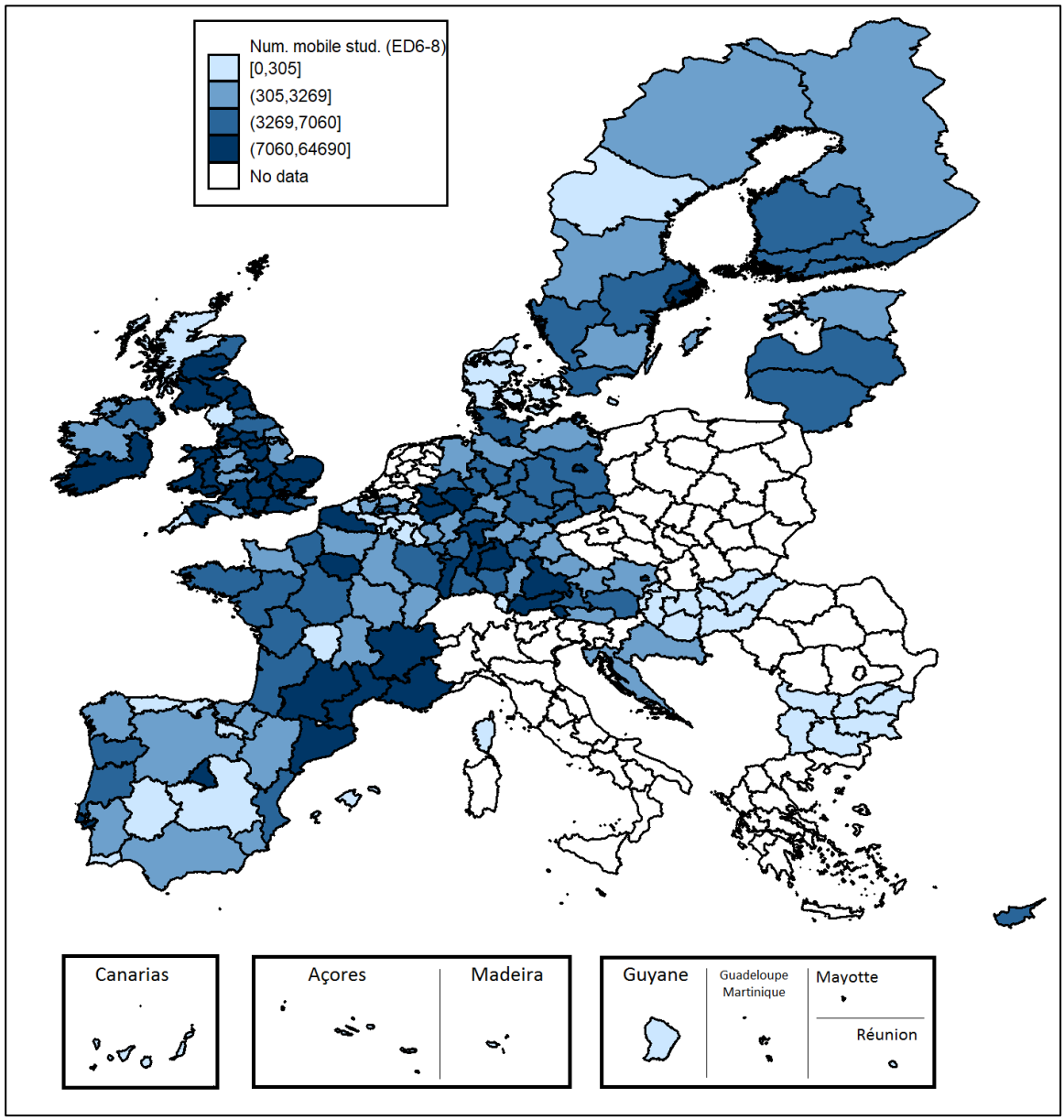
Table A2.9. Comparison between ETER and UOE shares of inward mobile students at the ISCED 8 level

	2011			2012			2013			2014		
Country	**ETER**	**UOE**	**Diff.**	**ETER**	**UOE**	**Diff.**	**ETER**	**UOE**	**Diff.**	**ETER**	**UOE**	**Diff.**
AT	24.5	–	–	26.5	27.5	n.s.	25.1	25.1	n.s.	27.0	27.0	n.s.
BE	32.7	–	–	33.0	36.0	n.s.	35.0	36.6	n.s.	35.7	42.3	*
BG	2.5	–	–	3.1	4.0	n.s.	3.9	4.2	n.s.	5.0	5.1	n.s.
CY	6.6	–	–	5.2	4.8	n.s.	6.4	6.8	n.s.	11.1	11.4	n.s.
DE	20.5	–	–	21.0	7.1	***	21.7	7.4	***	22.5	9.1	***
DK	24.5	–	–	29.9	29.5	n.s.	30.9	30.5	n.s.	–	32.1	–
EE	6.4	–	–	7.0	7.2	n.s.	8.0	8.1	n.s.	10.7	10.4	n.s.
ES	–	–	–	–	16.2	–	–	–	–	–	–	–
FI	–	–	–	16.8	16.8	n.s.	18.7	18.7	n.s.	19.9	19.9	n.s.
FR	37.8	–	–	38.0	39.9	*	38.1	39.9	*	38.1	40.1	*
HR	4.6	–	–	4.4	2.6	n.s.	4.9	3.4	n.s.	5.1	3.2	n.s.
HU	6.3	–	–	–	7.5	–	–	8.5	–	–	7.2	–
IE	20.7	–	–	22.5	25.3	*	22.5	23.1	n.s.	24.5	25.4	n.s.
LT	–	–	–	–	2.8	–	0.5	3.0	***	3.1	3.9	n.s.
LU	83.1	–	–	–	84.1	–	–	85.0	–	–	87.0	–
LV	2.8	–	–	5.8	5.9	n.s.	6.3	6.5	n.s.	8.0	8.8	n.s.
MT	–	–	–	–	7.7	–	–	7.4	–	12.4	12.4	n.s.
PT	10.4	–	–	13.4	15.0	n.s.	16.0	15.8	n.s.	21.2	21.2	n.s.
SE	29.0	–	–	31.5	31.5	n.s.	32.8	32.8	n.s.	34.0	34.0	n.s.
UK	40.8	–	–	41.4	41.4	n.s.	42.5	42.5	n.s.	43.0	42.9	n.s.

Notes: For each academic year, the share of inward mobile students on total students in the country at the ISCED 8 level computed from ETER data is provided, together with the Eurostat value calculated from UOE data. The column 'Diff.' reports the level of significance of the difference between ETER and UOE rates. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; 'n.s.,' difference is not significant. Countries for which no information is available and no difference can be computed are denoted by '–'.
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017. UOE data from educ_uoe_mobs03 (available here).

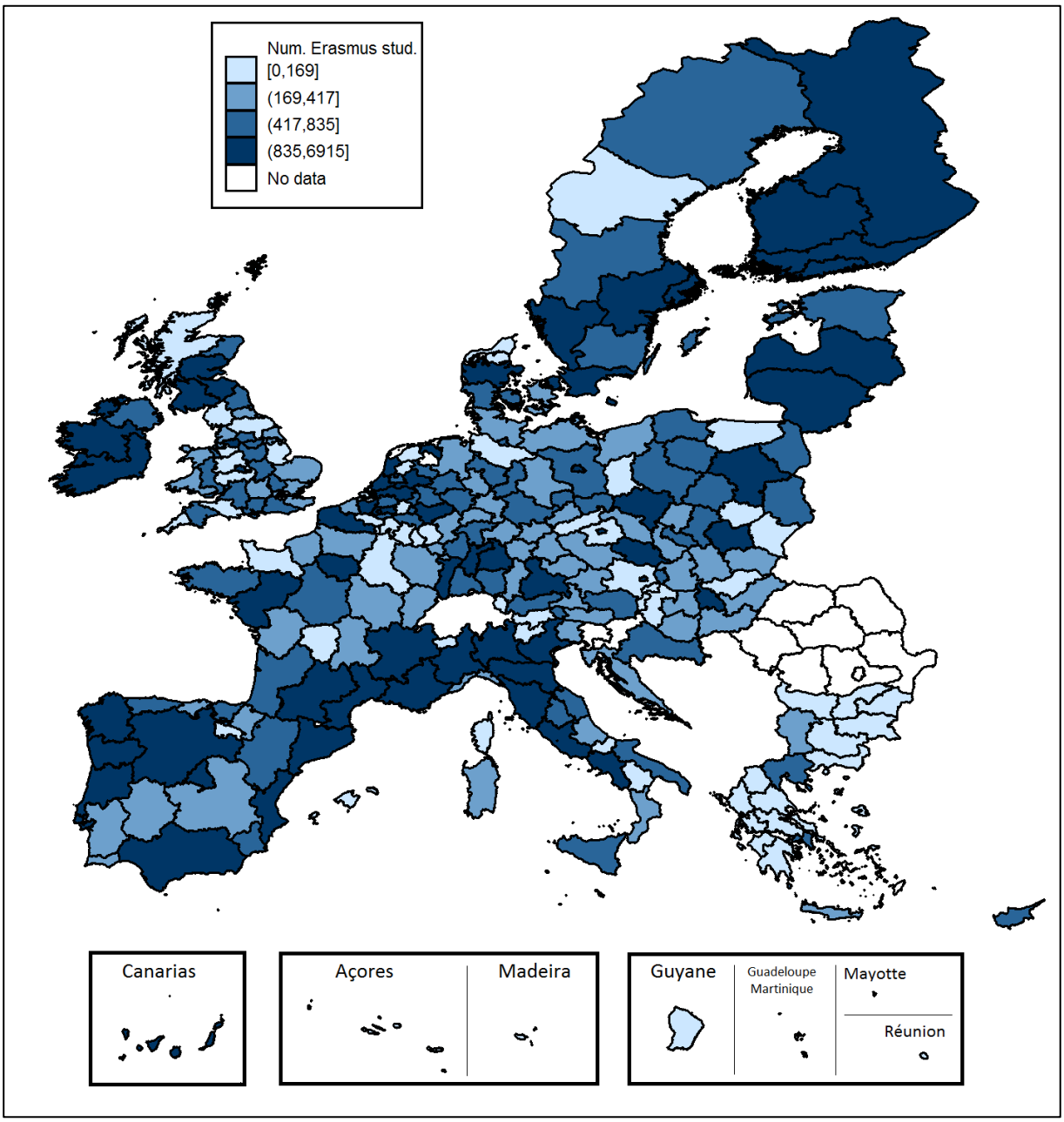
Annex 3. Cross-regional comparison of degree and credit mobility receivers

Figure A3.1. Number of degree mobile students at the ISCED 6–8 levels by region (2014)



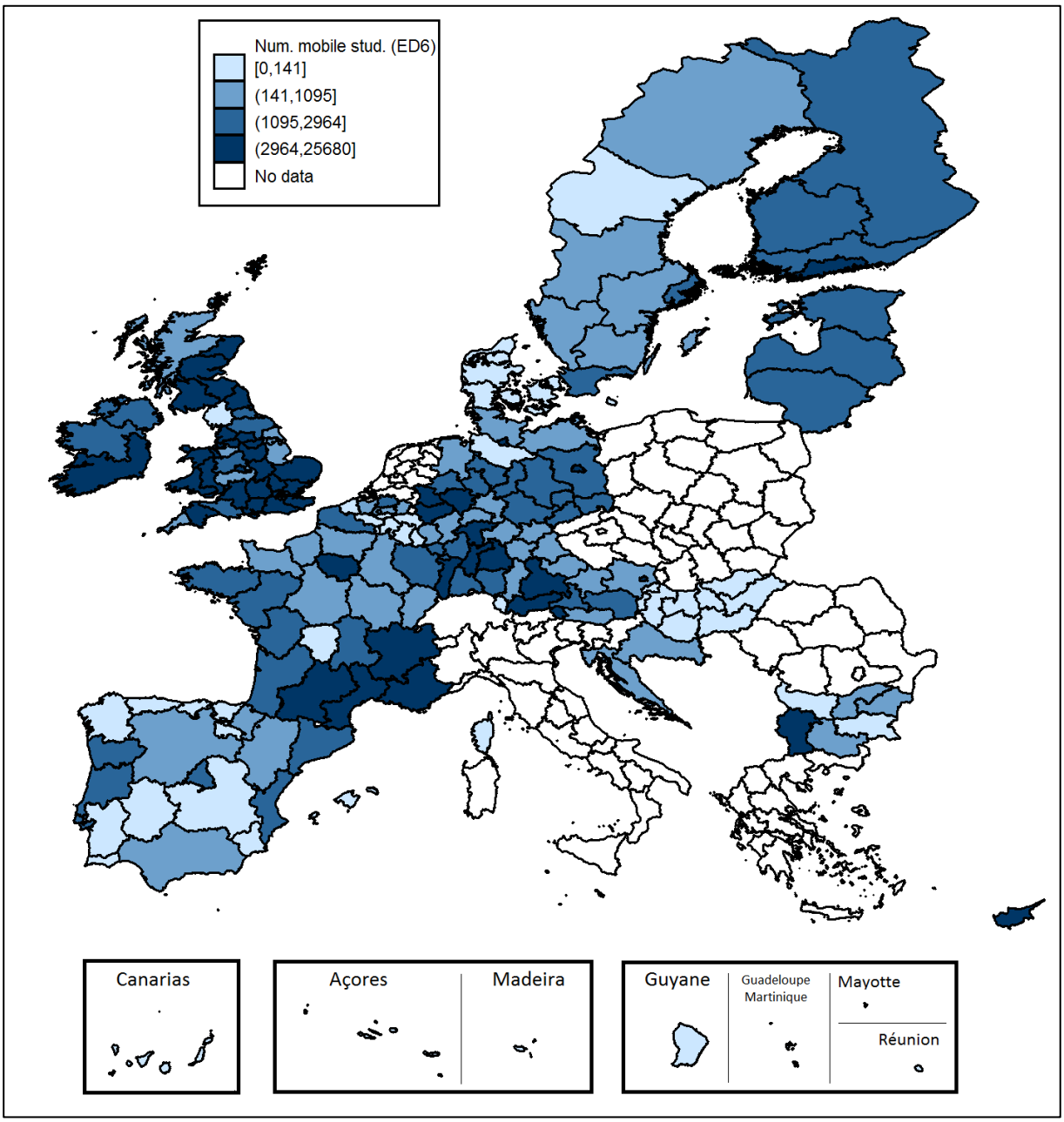
Note: Four levels are distinguished based on the quartiles of the distribution (p25, p50 and p75) of mobile students (see legend for the thresholds). The lightest blue regions represent regions with 'low' levels of attractiveness (located in the first quartile of the degree mobility distribution), while the darkest blue represents regions with the highest number of degree mobile students ('high' levels of attractiveness).
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

Figure A3.2. Number of credit mobile students by region (2013)



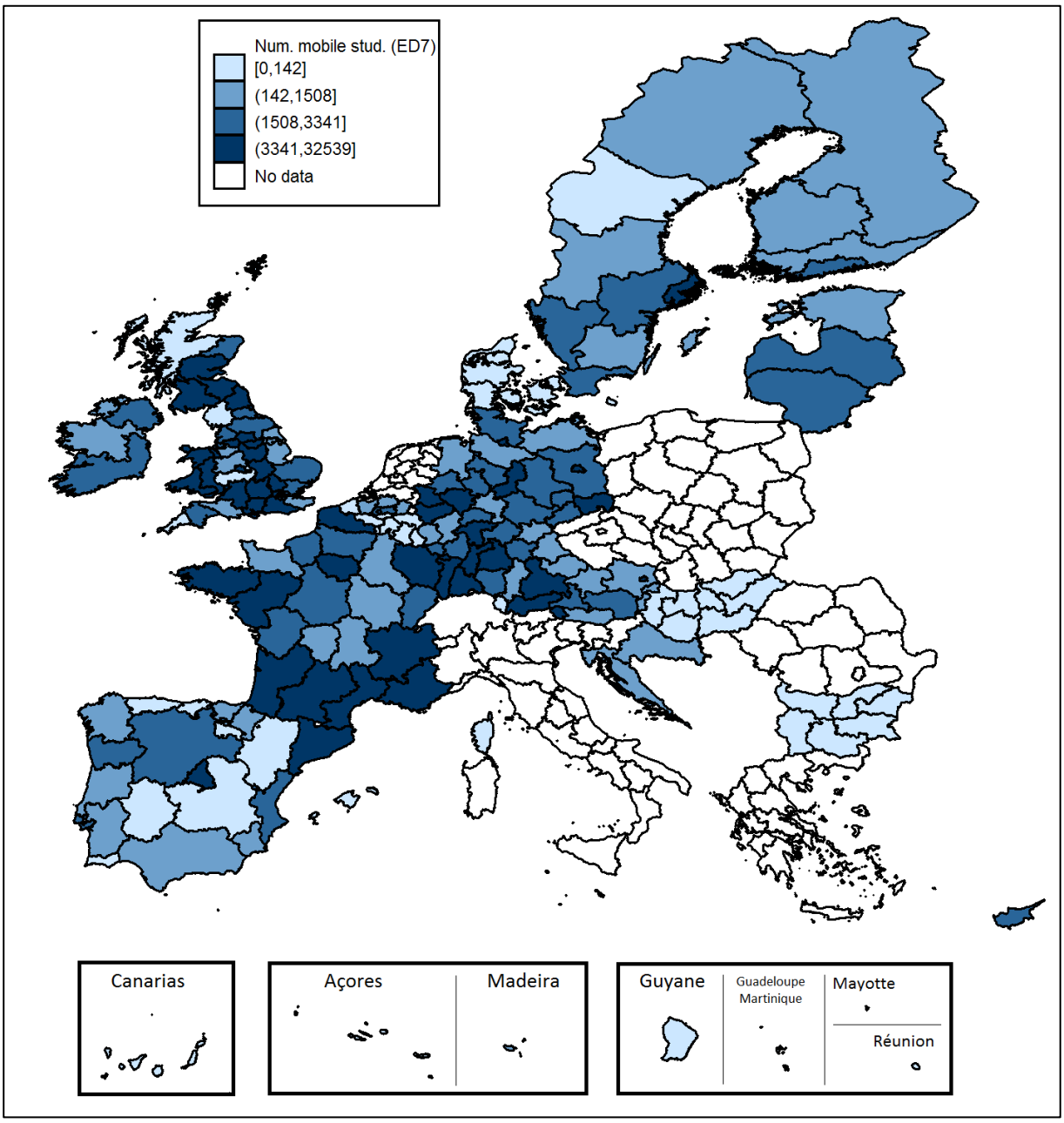
Note: Four levels are distinguished based on the quartiles of the distribution (p25, p50 and p75) of mobile students (see legend for the thresholds). The lightest blue regions represent regions with 'low' levels of attractiveness (located in the first quartile of the degree mobility distribution), while the darkest blue represents regions with the highest number of degree mobile students ('high' levels of attractiveness).
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

Figure A3.3. Number of degree mobile students at the ISCED 6 level by region (2014)



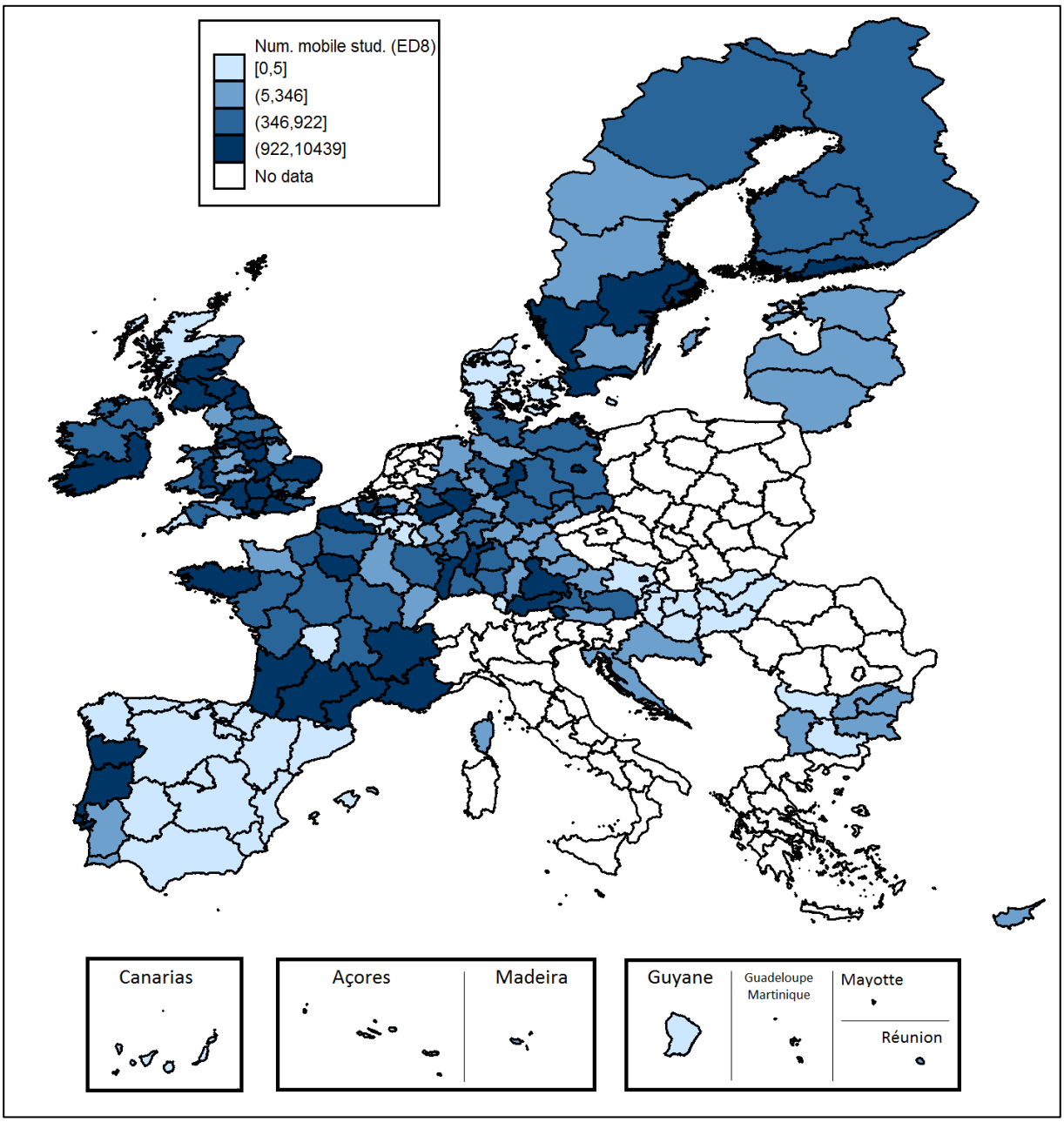
Note: Four levels are distinguished based on the quartiles of the distribution (p25, p50 and p75) of mobile students (see legend for the thresholds). The lightest blue regions represent regions with 'low' levels of attractiveness (located in the first quartile of the degree mobility distribution), while the darkest blue represents regions with the highest number of degree mobile students ('high' levels of attractiveness).
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

Figure A3.4. Number of degree mobile students at the ISCED 7 level by region (2014)



Note: Four levels are distinguished based on the quartiles of the distribution (p25, p50 and p75) of mobile students (see legend for the thresholds). The lightest blue regions represent regions with 'low' levels of attractiveness (located in the first quartile of the degree mobility distribution), while the darkest blue represents regions with the highest number of degree mobile students ('high' levels of attractiveness).
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

Figure A3.5. Number of degree mobile students at the ISCED 8 level by region (2014)



Note: Four levels are distinguished based on the quartiles of the distribution (p25, p50 and p75) of mobile students (see legend for the thresholds). The lightest blue regions represent regions with 'low' levels of attractiveness (located in the first quartile of the degree mobility distribution), while the darkest blue represents regions with the highest number of degree mobile students ('high' levels of attractiveness).
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

Annex 4. Summary of the independent variables included in the regression analysis

I. Correlation matrix and descriptive statistics for degree mobility regressions

Correlation matrix	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**VIF**
1-Teaching load	1													2.02
2-Fees/student	0.008	1												2.97
3-Research intensity	−0.140***	0.018	1											1.74
4-Reputation	−0.144***	0.161***	0.239***	1										3.69
5-Prestige	−0.128***	0.163***	0.189***	0.662***	1									3.04
6-Size	0.120***	0.007	0.107***	0.476***	0.409***	1								2.61
7-Decentralisation	0.088***	−0.012	−0.063***	0.025*	0.002	0.194***	1							1.11
8-Public HEI	−0.087***	−0.158***	0.049***	0.171***	0.186***	0.301***	0.141***	1						2.79
9-Teaching revenues	0.241***	0.560***	−0.177***	−0.085***	−0.032*	−0.074***	−0.036**	−0.530***	1					4.01
10-Density	−0.069***	0.437***	0.048***	0.109***	0.080***	0.026*	−0.079***	0.036***	0.247***	1				1.52
11-Employment rate of recent tertiary graduates	−0.044***	−0.039**	0.071***	0.048***	0.063***	−0.055***	−0.052***	0.115***	−0.038**	0.126***	1			1.30
12-Expected earnings	−0.040**	−0.088***	0.010	0.022	0.017	0.032**	0.117***	−0.038***	−0.092***	0.067***	0.024*	1		1.37
13-Tertiary educational attainment	0.009	0.379***	0.002	0.160***	0.156***	0.102***	0.018	0.087***	0.205***	0.481***	−0.020	0.338***	1	1.61
14-% universities in THE ranking	0.017	0.345***	0.050***	0.276***	0.433***	0.225***	0.013	0.204***	0.219***	0.167***	0.153***	0.005	0.345***	1.77

Notes: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. LU and MT are excluded.

Descriptive statistics	**Mean**	**Standard deviation**	**Min.**	**Max.**
1-Teaching load	10.74	12.827	0	226
2-Fees/student	2,424.13	4,232.09	0	77,356.55
3-Research intensity	0.026	0.096	0	4.5
4-Reputation	47.86	173.09	0	2510
5-Prestige	0.082	0.274	0	1
6-Size	7,842.69	11,916.35	0	201,270
7-Decentralisation	0.239	0.427	0	1
9-Public HEI	0.760	0.427	0	1
9-Teaching revenues	0.248	0.291	0	1
10-Density	761.749	1,739.511	3	10,780.3
11-Employment rate of recent tertiary graduates	84.708	9.342	41.5	100
12-Expected earnings	48997,84	64033.54	581.05	293,243.9
13-Tertiary educational attainment	39.783	10.955	16.7	83.9
14-% universities in THE ranking	8.206	12.094	0	100

Note: LU and MT are excluded.
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

II. Number of universities with available information on the variables included in the analysis – degree mobility regressions

		AT	BE	BG	CY	DE	DK	EE	ES	FI	FR	HR	HU	IE	LT	LU	LV	MT	PT	SE	UK
	n	**68**	**28**	**49**	**18**	**369**	**30**	**30**	**76**		**216**	**7**	**52**	**27**		**1**	**29**	**1**	**113**	**39**	**162**
	Teaching load	0	27	46	15	365	8	0	74		0	0	51	25		1	28	1	110	39	157
	Fees/student	0	26	0	3	367	24	0	0		0	0	24	26		1	0	1	32	39	160
	Research intensity	68	28	48	14	327	29	28	70		195	6	47	22		1	20	1	111	34	145
	Reputation	68	28	49	18	369	30	30	76		216	7	52	27		1	29	1	113	39	162
	Prestige	68	28	49	18	369	30	30	76		216	7	52	27		1	29	1	113	39	162
	Size	68	27	48	17	369	30	30	76		213	7	52	27		1	29	1	113	39	162
2011	Decentralisation	68	28	49	18	369	30	30	76		216	7	52	27		1	29	1	113	39	162
	Public HEI	68	28	49	18	369	30	30	76		216	7	52	27		1	29	1	113	39	162
	Teaching revenues	0	27	0	3	345	22	0	0		0	0	24	26		1	0	1	32	33	160
	Density	68	28	49	18	369	30	30	76		212	7	52	27		1	29	1	113	39	162
	Employment rate of recent tertiary graduates	61	28	48	18	360	30	30	76		211	7	52	27		1	29	1	107	39	160
	Expected earnings	68	28	49	18	369	30	30	76		216	7	52	27		1	29	1	113	39	162
	% universities in THE ranking	68	28	49	18	369	30	30	76		216	7	52	27		1	29	1	113	39	162
	Tertiary educational attainment	68	28	49	18	369	30	30	76		211	7	52	27		1	29	1	112	39	162
	n	**68**	**28**	**49**	**21**	**381**	**30**	**29**	**76**	**44**	**218**	**6**		**27**			**29**		**106**	**39**	**160**
	Teaching load	0	27	46	17	377	8	0	74	0	0	0		26			29		103	39	155
	Fees/student	0	26	0	3	379	21	0	0	0	109	0		25			0		35	39	159
	Research intensity	68	28	46	15	344	30	29	71	44	196	6		23			19		106	34	149
	Reputation	68	28	49	21	381	30	29	76	44	218	6		27			29		106	39	160
	Prestige	68	28	49	21	381	30	29	76	44	218	6		27			29		106	39	160
	Size	68	27	48	20	381	30	29	76	44	212	6		27			29		106	39	160
2012	Decentralisation	68	28	49	21	381	30	29	76	0	218	6		27			29		106	39	160
	Public HEI	68	28	49	21	381	30	29	76	44	218	6		27			29		106	39	160
	Teaching revenues	0	27	0	3	344	21	0	0	0	112	0		25			0		35	33	159
	Density	68	28	49	21	381	30	29	76	44	214	6		27			29		106	39	160
	Employment rate of recent tertiary graduates	61	28	48	21	379	30	29	76	43	212	6		27			29		96	39	151
	Expected earnings	68	28	49	21	381	30	29	76	44	218	6		27			29		106	39	160
	% universities in THE ranking	68	28	49	21	381	30	29	76	44	218	6		27			29		106	39	160
	Tertiary educational attainment	68	28	49	21	381	30	29	76	43	212	6		27			29		105	39	160

		AT	BE	BG	CY	DE	DK	EE	ES	FI	FR	HR	HU	IE	LT	LU	LV	MT	PT	SE	UK
	n	**68**	**23**	**48**	**21**	**385**	**30**	**26**	**79**	**42**	**246**	**36**		**27**	**39**		**27**		**93**	**39**	**159**
	Teaching load	0	22	46	18	384	30	0	77	0	0	35		26	38		27		92	38	154
	Fees/student	0	20	0	3	383	22	0	0	0	106	0		25	35		0		33	38	158
	Research intensity	66	23	47	15	346	30	26	72	42	228	35		24	35		19		90	37	146
	Reputation	68	23	48	21	385	30	26	79	42	246	36		27	39		27		93	39	159
	Prestige	68	23	48	21	385	30	26	79	42	246	36		27	39		27		106	39	160
	Size	68	23	47	20	385	30	26	79	42	244	36		27	39		27		93	39	159
2013	Decentralisation	68	23	48	21	385	30	26	79	0	246	36		27	39		27		93	39	159
	Public HEI	68	23	48	21	385	30	26	79	42	246	36		27	39		27		93	39	159
	Teaching revenues	0	20	0	3	347	22	0	0	0	104	0		25	34		0		33	32	158
	Density	68	23	48	21	385	30	26	79	42	241	36		27	39		27		93	39	159
	Employment rate of recent tertiary graduates	61	23	47	21	385	30	26	79	41	231	36		27	39		27		83	39	154
	Expected earnings	68	23	48	21	385	30	26	79	42	246	36		27	39		27		93	39	159
	% universities in THE ranking	68	23	48	21	385	30	26	79	42	246	36		27	39		27		93	39	159
	Tertiary educational attainment	68	23	48	21	385	30	26	79	41	235	36		27	39		27		92	39	159
	n	**69**	**23**	**49**	**22**	**387**		**25**	**81**	**41**	**247**	**37**		**27**	**38**		**26**	**2**	**90**	**37**	**160**
	Teaching load	0	22	47	20	386		0	79	0	91	37		26	38		26	2	88	37	154
	Fees/student	0	22	0	3	380		0	0	0	101	0		23	36		16	2	34	36	159
	Research intensity	68	23	47	19	353		25	74	41	131	37		23	30		19	2	85	36	149
	Reputation	69	23	49	22	387		25	81	41	247	37		27	38		26	2	90	37	160
	Prestige	69	23	49	22	387		25	81	41	247	37		27	38		26	2	90	37	160
	Size	69	23	48	21	385		25	81	41	247	37		27	38		26	2	90	37	160
2014	Decentralisation	69	23	49	22	387		25	81	0	247	37		27	38		26	2	90	37	160
	Public HEI	69	23	49	22	387		25	81	41	247	37		27	38		26	2	90	37	160
	Teaching revenues	0	22	0	3	346		0	0	0	57	0		23	36		16	2	34	32	159
	Density	69	23	49	22	387		25	81	41	242	37		27	38		26	2	90	37	160
	Employment rate of recent tertiary graduates	65	23	49	22	387		25	81	40	230	37		27	38		26	2	81	37	153
	Expected earnings	69	23	49	22	387		25	81	41	247	37		27	38		26	2	90	37	160
	% universities in THE ranking	69	23	49	22	387		25	81	41	247	37		27	38		26	2	90	37	160
	Tertiary educational attainment	69	23	49	22	387		25	81	40	240	37		27	38		26	2	87	37	160

Source: Own elaborations on data from the ETER project. Data downloaded in June 2017. Green cells show countries that are included in the regressions because of no missing information in any of the independent variables.

III. Correlation matrix and descriptive statistics for Erasmus mobility regressions

Correlation matrix	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**VIF**
1-Teaching load	1													1.92
2-Fees/student	0.009	1												2.54
3-Research intensity	−0.169***	0.041**	1											1.57
4-Reputation	−0.159***	0.243***	0.331***	1										3.87
5-Prestige	−0.142***	0.260***	0.269***	0.681***	1									3.31
6-Size	0.140***	0.016	0.164***	0.373***	0.318***	1								2.23
7-Decentralisation	0.095***	−0.036*	−0.053***	0.021	0.007	0.173***	1							1.09
8-Public HEI	−0.125***	−0.241***	0.119***	0.141***	0.154***	0.277***	0.031**	1						2.29
9-Teaching revenues	0.309***	0.667***	−0.153***	−0.059***	−0.002	−0.068***	−0.016	−0.527***						3.55
10-Density	−0.059***	0.391***	0.041**	0.143***	0.120***	0.043***	−0.050***	0.017	0.209***	1				1.51
11-Employment rate of recent tertiary graduates	−0.082***	0.015	0.044***	0.096***	0.108***	−0.059***	0.008	−0.031**	−0.055***	0.139***	1			1.48
12-Expected earnings	−0.071***	−0.047**	0.032**	0.061***	0.064***	0.064***	0.062***	0.001	−0.074***	0.101***	0.074***	1		1.33
13-Tertiary educational attainment	0.005	0.340***	−0.002	0.181***	0.188***	0.061***	0.016	−0.018	0.178***	0.413***	0.311***	0.286***	1	1.71
14-% universities in THE ranking	−0.002	0.415***	0.099***	0.325***	0.477***	0.173***	0.011	0.163***	0.234***	0.173***	0.216***	0.085***	0.356***	1.81

Notes: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. LU and MT are excluded.

Descriptive statistics	**Mean**	**Standard Deviation**	**Min.**	**Max.**
1-Teaching load	11.147	12.520	0	226
2-Fees/student	2,201.89	3,686.005	0	63,838.81
3-Research intensity	0.023	0.075	0	2.966
4-Reputation	33.07	143.60	0	2,339
5-Prestige	0.081	0.273	0	1
6-Size	7,936.876	12,212.24	0	201,270
7-Decentralisation	0.243	0.429	0	1
8-Public HEI	0.730	0.444	0	1
9-Teaching revenues	0.232	0.270	0	1
10-Density	639.489	1,499.11	3	10589.2
11-Employment rate of recent tertiary graduates	82.098	12.265	26.1	100
12-Expected earnings	41,256.43	56,232.24	581.05	289,314.1
13-Tertiary educational attainment	37.536	11.188	9.6	83.9
14-% universities in THE ranking	8.29	10.554	0	66.67

Note: LU and MT are excluded.
Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

IV. Number of universities with available information on the variables included in the analysis – Erasmus mobility regressions

		AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	SE	SK	UK
	n	**64**	**26**	**45**	**15**	**61**	**315**	**28**	**22**	**37**	**75**	**43**	**189**	**24**	**48**	**27**	**153**	**38**	**1**	**39**	**1**	**45**	**238**	**81**	**37**	**31**	**140**
	Teaching load	0	25	44	14	36	314	8	0	36	73	0	0	0	47	25	153	37	1	37	1	32	0	79	37	20	139
	Fees/student	0	25	0	3	0	314	22	0	0	0	0	0	0	20	26	77	34	1	0	1	44	0	31	37	20	139
	Research intensity	64	26	45	12	59	278	27	20	36	70	43	172	23	43	22	149	35	1	30	1	45	206	80	32	27	124
	Reputation	64	26	45	15	61	315	28	22	37	75	43	189	24	48	27	153	38	1	39	1	45	238	81	37	31	140
	Prestige	64	26	45	15	61	315	28	22	37	75	43	189	24	48	27	153	38	1	39	1	45	238	81	37	31	140
	Size	64	26	45	15	61	315	28	22	37	75	43	189	24	48	27	153	38	1	39	1	45	238	81	37	31	140
2011	Decentralisation	64	26	45	15	61	315	28	22	37	75	0	189	24	48	27	153	38	1	39	1	45	238	81	37	31	140
	Teaching revenues	0	25	0	3	0	301	20	0	0	0	0	0	0	20	26	77	34	1	0	1	44	0	31	32	20	139
	Public HEI	64	26	45	15	61	315	28	22	37	75	43	189	24	48	27	153	38	1	39	1	45	238	81	37	31	140
	Density	64	26	45	15	61	315	28	22	37	75	43	185	24	48	27	153	38	1	39	1	45	238	81	37	31	140
	Employment rate of recent tertiary graduates	57	26	44	15	61	307	28	22	32	75	42	184	24	48	27	150	38	1	39	1	45	238	76	37	31	138
	Expected earnings	64	26	45	15	61	315	28	22	37	75	43	189	24	48	27	153	38	1	39	1	45	238	81	37	31	140
	% universities in THE ranking	64	26	45	15	61	315	28	22	37	75	43	189	24	48	27	153	38	1	39	1	45	238	81	37	31	140
	Tertiary educational attainment	64	26	45	15	61	315	28	22	37	75	42	184	24	48	27	152	38	1	39	1	45	238	80	37	31	140
	n	**64**	**26**	**45**	**15**	**63**	**314**	**28**	**22**	**37**	**75**	**43**	**188**	**24**		**27**	**156**	**38**		**39**	**1**	**44**	**221**	**77**	**37**	**31**	**139**
	Teaching load	0	25	44	14	35	313	8	0	36	73	0	0	0		26	156	37		38	1	31	0	75	37	20	138
	Fees/student	0	25	0	3	0	314	19	0	0	0	0	106	0		25	79	34		0	1	44	0	34	37	20	139
	Research intensity	64	26	43	12	62	282	28	22	36	71	43	173	23		23	151	36		29	1	44	122	77	32	26	131
	Reputation	64	26	45	15	63	314	28	22	37	75	43	188	24		27	156	38		39	1	44	221	77	37	31	139
2012	Prestige	64	26	45	15	63	314	28	22	37	75	43	188	24		27	156	38		39	1	44	221	77	37	31	139
	Size	64	26	45	15	63	314	28	22	37	75	43	188	24		27	156	38		39	1	44	221	77	37	31	139
	Decentralisation	64	26	45	15	63	314	28	22	37	75	0	188	24		27	156	38		39	1	44	221	77	37	31	139
	Teaching revenues	0	25	0	3	0	289	19	0	0	0	0	106	0		25	79	34		0	1	44	0	34	32	20	139
	Public HEI	64	26	45	15	63	314	28	22	37	75	43	188	24		27	156	38		39	1	44	221	77	37	31	139
	Density	64	26	45	15	63	314	28	22	37	75	43	185	24		27	156	38		39	1	44	221	77	37	31	139
	Employment rate of recent tertiary graduates	57	26	44	15	63	312	28	22	32	75	42	183	24		27	155	38		39	1	44	221	68	37	31	131

		AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	SE	SK	UK
	Expected earnings	64	26	45	15	63	314	28	22	37	75	43	188	24		27	156	38		39	1	44	221	77	37	31	139
	% universities in THE ranking	64	26	45	15	63	314	28	22	37	75	43	188	24		27	156	38		39	1	44	221	77	37	31	139
	Tertiary educational attainment	64	26	45	15	63	314	28	22	37	75	42	183	24		27	155	38		39	1	44	221	76	37	31	139
	n	**64**	**19**	**45**	**14**	**62**	**311**	**27**	**21**	**32**	**75**	**40**	**187**	**23**	**48**	**27**	**156**	**39**		**38**	**1**	**43**	**222**	**69**	**36**	**27**	**137**
	Teaching load	0	18	44	13	41	311	27	0	31	73	0	0	23	48	26	155	38		37	1	26	0	69	36	20	136
	Fees/student	0	18	0	3	0	311	19	0	0	0	0	103	0	46	25	80	34		0	1	43	0	32	36	21	137
	Research intensity	62	19	45	11	61	275	27	21	32	72	40	172	22	39	24	153	36		30	1	43	131	67	34	26	128
	Reputation	64	19	45	14	62	311	27	21	32	75	40	187	23	48	27	156	39		38	1	43	222	69	36	27	137
	Prestige	64	19	45	14	62	311	27	21	32	75	40	187	23	48	27	156	39		38	1	43	222	69	36	27	137
	Size	64	19	45	14	62	311	27	21	32	75	40	187	23	48	27	156	39		38	1	43	222	69	36	27	137
2013	Decentralisation	64	19	45	14	62	311	27	21	32	75	0	187	23	48	27	156	39		38	1	43	222	69	36	27	137
	Public HEI	64	19	45	14	62	311	27	21	32	75	40	187	23	48	27	156	39		38	1	43	222	69	36	27	137
	Teaching revenues	0	18	0	3	0	285	19	0	0	0	0	100	0	19	25	80	33		0	1	43	0	32	31	21	137
	Density	64	19	45	14	62	311	27	21	32	75	40	184	23	48	27	156	39		38	1	43	222	69	36	27	137
	Employment rate recent tertiary graduates	57	19	44	14	62	311	27	21	28	75	39	181	23	48	27	153	39		38	1	43	222	59	36	27	133
	Expected earnings	64	19	45	14	62	311	27	21	32	75	40	187	23	48	27	156	39		38	1	43	222	69	36	27	137
	% universities in THE ranking	64	19	45	14	62	311	27	21	32	75	40	187	23	48	27	156	39		38	1	43	222	69	36	27	137
	Tertiary educational attainment	64	19	45	14	62	311	27	21	32	75	39	182	23	48	27	155	39		38	1	43	222	68	36	27	137

Source: Own elaborations on data from the ETER project. Data downloaded in June 2017. Green cells show countries that are included in the regressions because of no missing information in any of the control variables.

V. Correlation matrix and descriptive statistics for gravity regressions

Correlation matrix	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1-Distance	1							
2-Propulsiveness	0.036***	1						
3-Size host HEI	−0.003	−0.089***	1					
4-Teaching load	0.136***	−0.021***	−0.054***	1				
5-Fees/student	0.036***	0.015***	−0.005	0.097***	1			
6-Research intensity	−0.081***	0.002	0.259***	−0.499***	0.003	1		
7-Reputation	−0.109***	0.015***	−0.047***	0.017***	0.0484***	−0.020***	1	
8-Prestige	−0.045***	−0.030***	0.373***	−0.312***	0.283***	0.479***	−0.016***	1
9-Decentralisation	−0.098***	−0.014***	0.048***	0.065***	−0.040***	−0.200***	−0.022***	−0.072***
10-Public HEI	−0.028***	−0.032***	0.246***	−0.061***	−0.132***	0.113***	0.020***	0.149***
11-Teaching revenues	0.099***	0.012***	−0.094***	0.398***	0.795***	−0.262***	0.055***	0.040***
12-Density	−0.132***	0.044***	0.048***	−0.075***	0.325***	0.055***	0.218***	0.056***
13-Employment rate of recent tertiary graduates	−0.295***	0.071***	−0.136***	−0.159***	−0.081***	0.193***	0.093***	0.163***
14-Expected earnings	−0.127***	0.025***	0.1***	−0.072***	−0.143***	−0.010***	−0.124***	−0.019***
15-Tertiary educational attainment	0.015***	0.0022	0.055***	0.100***	0.349***	−0.058***	−0.107***	0.139***
16-% universities in THE ranking	-0.004	-0.006*	0.097***	0.016***	0.470***	0.114***	-0.024***	0.513***

Notes: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Correlation matrix (continued)	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**VIF**
1-Distance								1.12
2-Propulsiveness								1.02
3-Size of host HEI								4.27
4-Teaching load								2.73
5-Fees/student								3.63
6-Research intensity								2.77
7-Reputation								1.18
8-Prestige								2.13
9-Decentralisation	1							1.83
10-Public HEI	0.069***	1						1.10
11-Teaching revenues	−0.035***	−0.228***	1					1.43
12-Density	−0.076***	0.031***	0.240***	1				1.51
13-Employment rate of recent tertiary graduates	0.008**	0.093***	−0.178***	0.111***	1			1.27
14-Expected earnings	0.106***	−0.042***	−0.185***	0.033***	−0.018***	1		1.37
15-Tertiary educational attainment	0.029***	−0.029***	0.258***	0.343***	0.039***	0.313***	1	1.59
16-% universities in THE ranking	−0.065***	0.091***	0.362***	0.041***	0.158***	−0.059***	0.299***	1.74

Notes: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Descriptive statistics	**Mean**	**Standard Deviation**	**Min.**	**Max.**
1-Distance	1695.417	889.196	28.04	6564.75
2-Propulsiveness	121,254.1	101403.7	0	628015
3-Size host HEI	19,032.21	14,490.82	74	167,332
4-Teaching load	8.594	6.283	0	117.83
5-Fees/student	2,272.67	3,210.468	0	21,025.86
6-Research intensity	0.045	0.050	0	0.788
7-Reputation	27.37	109.63	0	2,184
8-Prestige	0.274	0.446	0	1
9-Decentralisation	0.318	0.466	0	1
10-Public HEI	0.941	0.236	0	1
11-Teaching revenues	0.177	0.208	0.000	1
12-Density	711.58	1,601.54	3.3	10589.2
13-Employment rate of recent tertiary graduates	83.485	10.431	41.5	100
14-Expected earnings	49,017.84	56,671.6	581.05	289,314.1
15-Tertiary educational attainment	41.313	10.235	16.7	83.9
16-% universities in THE ranking	12.29	15.22	0	100

Notes: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Source: Own elaborations on data from the ETER project. Data downloaded in June 2017.

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