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**Benefits and costs of transnational collaborative
partnerships in higher education**

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Benefits and costs of transnational collaborative partnerships in higher education

Daniela Craciun and Kata Orosz

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Executive summary (English)

Governments have been looking for ways to reduce the costs and maximise the benefits of higher education. Fostering cooperation between higher education institutions is one of the strategic options chosen by European countries in order to enhance the effectiveness and efficiency of their higher education systems.

This report draws on a systematic review of empirical evidence to summarise what is known and what is not known about the economic and non-economic benefits and costs associated with transnational cooperation in higher education. The analytical framework used to review empirical evidence on the benefits and costs of transnational collaborative partnerships reflects the understanding that: 1) benefits and costs occur at different levels: macro (regional/national), meso (institutional) and micro (individual); and 2) benefits and costs can be: economic or non-economic (academic, socio-cultural and political).

The report finds that while there is a plethora of anecdotal evidence about the benefits and costs of transnational collaborative partnerships, there are relatively few empirical studies testing these causal claims. The table below summarises the findings from these studies.

		LEVEL OF ANALYSIS		
		MACRO (regional/national)	MESO (institutional)	MICRO (individual)
TYPES OF BENEFITS AND COSTS	ECONOMIC	<ul style="list-style-type: none"> - <i>More and better patents</i> - <i>Economies of scale</i> 	-	<ul style="list-style-type: none"> - <i>Higher likelihood of employment at home and abroad</i>
	NON-ECONOMIC	<ul style="list-style-type: none"> - <i>Positive attitudes towards open borders and democracy</i> 	<ul style="list-style-type: none"> - <i>Strengthened research and teaching capacity</i> - <i>More and better scientific output</i> - <i>Attractiveness to foreign academics</i> 	<ul style="list-style-type: none"> - <i>Better foreign language proficiency</i> - <i>Increased mobility</i> - <i>More and better publications</i>

Looking at the findings summarised in the table above, a couple of issues become immediately apparent. On the one hand, there are empirical studies clearly showing that transnational cooperation leads to both economic and non-economic benefits. On the other hand, studies that empirically investigate the costs of transnational collaborative partnerships do so in an exploratory manner only, without quantifying said costs or attempting to test causal links between collaboration and costs. This represents a significant weakness of the state of the art. To compensate for this weakness, the report discusses cross-cutting challenges identified in qualitative studies on transnational collaborative partnerships.

Résumé (Français)

Les gouvernements ont cherché des moyens de réduire les coûts et de maximiser les avantages découlant de l'enseignement supérieur. La promotion de la coopération entre les établissements d'enseignement supérieur constitue l'une des options stratégiques retenues par les pays européens afin d'améliorer l'effectivité et l'efficacité de leurs systèmes d'enseignement supérieur.

Le présent rapport s'appuie sur une étude systématique de données empiriques dans le but de résumer ce que l'on sait et ce que l'on ignore à propos des avantages économiques et non économiques et des coûts associés à la coopération transnationale dans l'enseignement supérieur. Le cadre analytique utilisé pour étudier les données empiriques afférentes aux avantages et aux coûts des partenariats collaboratifs transnationaux reflète la vision selon laquelle : 1) les avantages et les coûts interviennent à différents niveaux : macro (régional/national), méso (institutionnel) et micro (individuel) ; et 2) les avantages et les coûts peuvent être : économiques ou non-économiques (universitaires, socio-culturels et politiques).

Le rapport conclut que malgré l'existence d'une multitude de données anecdotiques concernant les avantages et les coûts des partenariats collaboratifs transnationaux, les études empiriques qui évaluent ces thèses causales sont relativement rares. Le tableau ci-dessous résume les conclusions de ces études.

		NIVEAU D'ANALYSE		
		MACRO (régional/national)	MÉSO (institutionnel)	MICRO (individuel)
TYPES D'AVANTAGES ET DE COÛTS	ÉCONOMIQUES	<ul style="list-style-type: none"> - <i>Brevets plus nombreux et de meilleure qualité</i> - <i>Économies d'échelle</i> 	-	<ul style="list-style-type: none"> - <i>Probabilité plus élevée de trouver un emploi dans son propre pays ou à l'étranger</i>
	NON ÉCONOMIQUES	<ul style="list-style-type: none"> - <i>Attitudes positives vis-à-vis des frontières ouvertes et de la démocratie</i> 	<ul style="list-style-type: none"> - <i>Renforcement des capacités en matière de recherche et d'enseignement</i> - <i>Publications scientifiques plus nombreuses et de meilleure qualité</i> - <i>Attractivité pour les universitaires étrangers</i> 	<ul style="list-style-type: none"> - <i>Meilleure maîtrise des langues étrangères</i> - <i>Mobilité accrue</i> - <i>Publications plus nombreuses et de meilleure qualité</i>

Si l'on observe les constatations résumées dans le tableau ci-dessus, deux questions apparaissent immédiatement. D'une part, il existe des études empiriques qui démontrent clairement que la coopération transnationale génère des avantages aussi bien économiques que non économiques. D'autre part, les études qui enquêtent de façon empirique sur les coûts des partenariats collaboratifs transnationaux ne le font que d'une façon exploratoire, sans quantifier lesdits coûts ou tenter de mettre à l'épreuve les liens de causalité entre la collaboration et les coûts. Cet état de fait constitue une faiblesse importante de l'état de la question. Afin de compenser cette faiblesse, le présent rapport évoque les enjeux transversaux identifiés dans les études qualitatives concernant les partenariats collaboratifs transversaux.

Kurzversion (Deutsch)

Regierungen suchen schon länger nach Möglichkeiten, um die Kosten der Hochschulbildung zu senken und ihren Nutzen zu maximieren. Um die Effizienz und Leistungsfähigkeit des Hochschulsystems zu verbessern, setzen die europäischen Länder unter anderem auf die Option, die Zusammenarbeit zwischen Hochschuleinrichtungen zu fördern.

Dieser Bericht basiert auf einem systematischen Überblick des Forschungsstands und fasst zusammen, was wir über die wirtschaftlichen und nicht-wirtschaftlichen Nutzen und Kosten einer grenzüberschreitenden Kooperation im Hochschulwesen wissen, und was nicht. Dem Analyserahmen, mit dessen Hilfe die empirischen Daten zu Kosten und Nutzen von grenzüberschreitenden Kooperationspartnerschaften untersucht wurden, liegen die folgenden Annahmen zugrunde: 1) Nutzen und Kosten entstehen auf unterschiedlichen Ebenen: Makro (regional/national), Meso (institutionell) und Mikro (individuell) und 2) es gibt wirtschaftliche und nicht-wirtschaftliche (akademische, soziokulturelle und politische) Nutzen.

Dieser Bericht kommt zu dem Schluss, dass zwar zahlreiche anekdotische Belege für die Nutzen und Kosten grenzüberschreitender Kooperationspartnerschaften vorliegen, die behaupteten kausalen Zusammenhänge jedoch relativ selten in Studien empirisch getestet werden. Die Ergebnisse dieser Studien werden in der folgenden Tabelle zusammengefasst.

		ANALYSEEBENE		
		MAKRO (regional/national)	MESO (institutionell)	MIKRO (individuell)
NUTZEN UND KOSTEN	WIRTSCHAFTLICH	- <i>Mehr und bessere Patente</i> - <i>Skaleneffekte</i>	-	- <i>Bessere Jobchancen im In- und Ausland</i>
	NICHT-WIRTSCHAFTLICH	- <i>Positive Sicht auf offene Grenzen und Demokratie</i>	- <i>Bessere Forschungs- und Lehrkapazität</i> - <i>Mehr und bessere wissenschaftliche Leistung</i> - <i>Attraktivität für ausländische Wissenschaftler</i>	- <i>Bessere Fremdsprachenkenntnisse</i> - <i>Erhöhte Mobilität</i> - <i>Mehr und bessere Publikationen</i>

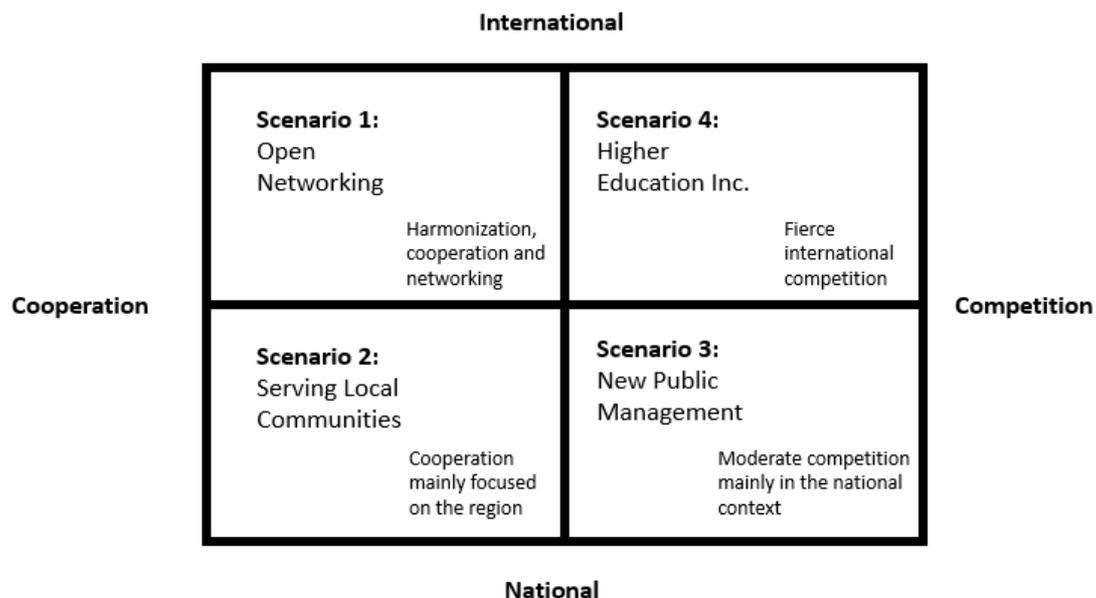
Ein Blick auf die in der Tabelle zusammengefassten Ergebnisse weist deutlich auf eine Reihe von Problemen hin. Einerseits liegen empirischen Studien vor, die klar zeigen, dass grenzüberschreitende Kooperation sowohl wirtschaftliche als auch nicht-wirtschaftliche Nutzen bringt. Andererseits untersuchen die Studien, die die Kosten von grenzüberschreitenden Kooperationspartnerschaften erforschen, diese Kosten nur stichprobenartig ohne sie zu quantifizieren oder kausale Zusammenhänge zwischen Zusammenarbeit und Kosten nachzuweisen. Dies ist eine signifikante Lücke im derzeitigen Forschungsstand. Um diese Lücke auszugleichen, analysiert dieser Bericht die bereichsübergreifenden Probleme, die in qualitativen Studien zu grenzüberschreitenden Kooperationspartnerschaften häufig genannt werden.

1. Introduction: Transnational cooperation in higher education

The provision of higher education is associated with various benefits and costs (McMahon, 2009). Higher education institutions (HEIs) produce knowledge in many forms, such as research, graduates or new technologies, and thus provide the foundation for economic growth in knowledge economies (Toutkoushian & Paulsen, 2016). Societal benefits may include a higher national income, a better-functioning society and a healthier population (Johnston, 2004). Insights from micro- and macro-economic theories suggest that graduates may realise private economic benefits in the form of a greater likelihood of employment and higher earnings, while firms may realise higher profits due to the increased productivity of workers with tertiary education (Becker, 1994). At the same time, higher education does not come cheap. Taxpayers usually pay the brunt of the cost and subsidise the functioning of HEIs, while students have to forgo earnings and share the cost of their education.

Governments have been looking for ways to maximise the benefits and reduce the costs of higher education. Fostering cooperation between HEIs is one of the strategic options available to countries that aim to enhance the effectiveness and efficiency of their higher education system (van der Wende, 2007; van der Wende, 2001). Another strategic option is to promote competition among HEIs, with the expectation that limiting government involvement and introducing market mechanisms will improve the effectiveness and efficiency of higher education (OECD, 2006). Cooperation and competition can be fostered either at the national or international level. **Figure 1** combines these dimensions and summarises the four types of higher education policies that are available to governments to enhance the effectiveness and efficiency of HEIs and, in turn, increase their competitiveness in a globalised economy. The figure was adapted from works by the OECD (2006) and van der Wende (2007).

Figure 1. Cooperation versus competition scenarios for higher education policy



Cooperation and networking (referred to as Scenario 1: “Open Networking” in **Figure 1**) characterises most aptly the activities of the European Union (EU) member states and the Bologna Declaration signatory countries, as harmonization, cooperation and networking are central to the Bologna Process (Barblan, 2002; Callan, 2000). In fact, when it comes to transnational cooperation, European HEIs are

considered the most active because of the funding available for such partnerships from the European Commission (Dixon, Slanickova, & Warwick, 2013).

In a forthcoming report, the Joint Research Centre (JRC) has attempted to map transnational collaborative partnerships across the European Union by surveying HEIs. From this exercise, the Commission's science and knowledge service found that: 1) transnational collaborative partnerships are fairly recent, with one-half of them being established after 2012; 2) all EU member states participate in such partnerships; 3) large countries (e.g. France, Germany) participate in more partnerships in absolute terms, but if the number of partnerships is normalised by taking into account the number of HEIs or students per country, small countries take the lead; 4) the number of partners within each network of universities varies greatly (from 2 to 16 or more), but the majority of networks have up to 9 members and one-third have between 4 and 6 members; 5) partnerships include a variety of types of institutions (comprehensive universities, technical universities, public research organizations, and private enterprises); 6) most partnerships do not involve the entire HEI, and almost one-half of the partnerships are at departmental or faculty level; and 7) most collaborative partnerships have multiple aims: supporting collaboration in the provision of education, joint research and innovation activities (JRC, 2018).

While increasing the effectiveness, efficiency and global competitiveness of European HEIs is a priority for the European Union (European Commission, 2013), there is a dearth of systematic research about the benefits and costs associated with the “open networking” approach to higher education policy that has characterised most transnational higher education activity in the European Higher Education Area. To better understand the extent to which, and at what cost, the “open networking” approach to higher education policy achieves its aforementioned objectives in the European Higher Education Area, this report aims to systematically review existing empirical studies with a view to answering the following research questions:

- (1) What are the economic and non-economic benefits of transnational cooperation in higher education?
- (2) What are the economic and non-economic costs of transnational cooperation in higher education?

The focus of this report is specifically on what is known about the economic benefits and costs that transnational collaborative partnerships bring about. Non-economic benefits and costs will also be considered, however, in order to get a fuller picture of the empirical evidence available for such institutional arrangements.

2. Analytical framework: Understanding the benefits and costs of transnational cooperation in higher education

There are myriad types of international institutional arrangements: thematic/ disciplinary associations, institutional associations, project partnerships, thematic/disciplinary partnerships, institutional partnerships, project networks, thematic/disciplinary networks, and institutional networks. These arrangements differ according to the number of participants (bilateral, multilateral), the temporal scope (short term, indefinite), and scope of activities (i.e. thematic/disciplinary, institutional) (Beerkens, 2002). There are many kinds of activities that can be included in higher education partnerships: student and staff exchanges; teaching and curriculum development; online teaching collaborations; joint degree programmes; professional development for staff; managerial links for benchmarking and staff development purposes; exchange of knowledge and information through reports, publications and training; resource sharing; collaborative research projects; joint publications, etc. (Dixon et al., 2013; Kot, 2016).

Transnational collaborative partnerships in higher education are very similar to higher education consortia and can be defined as “multi-point groupings of higher education institutions which have a limited amount of members and where membership is restricted to particular institutions that are allowed by the other partners to enter the arrangement” (Beerkens & Derwende, 2007). They generally include multiple members, which cooperate on an equitable basis across national boundaries, have an indefinite temporal scope, and collaborate on a variety of activities (e.g. education, research and innovation) through coordination (Beerkens & Derwende, 2007).

The previously mentioned report from the Joint Research Centre (2018), which maps transnational collaborative partnerships in the European Union, found that these kinds of institutional partnerships not only bring about benefits, but they also encounter barriers. It is worth remembering that these are self-reported benefits and barriers. The direct causal links between them and transnational collaborative partnerships must still be empirically documented.

The ten most-frequently identified benefits of transnational partnerships between higher education institutions in comparison to national partnerships or no partnerships were: improved internationalization, improved student skills, improved and diversified educational offerings, increased mobility of students and staff, improved students’ employability, increased numbers of foreign students, increased level of scientific excellence, more interdisciplinary research, improved capacity of teaching staff, improved research skills (JRC, 2018). The ten most-frequently identified barriers of transnational partnerships in comparison to national partnerships or no partnerships were: lack of sustainable funding, administrative barriers, complexity of funding instruments, legal barriers, need to respond to multiple calls every year, lack of suitable funding instruments, lack of common accreditation standards, lack of incentives for the university staff involved, different academic calendars, and student visas (JRC, 2018).

As such, transnational collaborative partnerships are expected to bring about a wide range of benefits and also to encounter various barriers. The academic literature recognise four broad groups of motivations and impediments to internationalisation, which can easily be applied to transnational collaborative partnerships: economic, academic, socio-cultural and political (Knight, 2004). Since the focus of this report is on the economic aspects of transnational cooperation, the academic, socio-cultural and political categories are conflated into non-economic benefits and costs.

Economic rationales include both direct and indirect benefits and costs. Direct economic benefits of cooperation may include increases in the efficiency of higher education systems and institutions in producing graduates and research, which may in turn decrease the funding pressure on national and

European budgets (Luijten-Lub, van der Wende, & Huisman, 2005). If transnational cooperation in higher education motivates more and better-skilled individuals to relocate for education and work purposes to the institutions and countries that collaborate, then tuition and fees from mobile students and tax revenues from mobile academics are all direct economic benefits of the cooperation (Lange, 2009).

Higher education institutions that cooperate transnationally may realise increased commercial revenues not only from fee-paying students, but also from more and higher-quality patents (Mowery, Nelson, Sampat, & Ziedonis, 2001). Individuals who participate in transnational higher education collaborations (e.g., as exchange students or visiting researchers) may realise economic benefits in the form of a higher likelihood of employment and higher earnings over a lifetime (Di Pietro, 2015).

Economic growth can be conceptualised as an indirect economic benefit of transnational cooperation, which may result from more and better stocks of human capital brought about by either higher-quality higher education, increased brain gain and brain circulation, or both (Beine, Docquier, & Rapoport, 2001). Transnational cooperation in higher education may also contribute to economic growth through technological innovation brought about by more and better basic and applied research (Mohrman, Ma, & Baker, 2008).

The direct economic costs of transnational cooperation in higher education include the governmental and institutional subsidies given to institutions and individuals to encourage them to participate in collaborative projects (Luijten-Lub et al., 2005). Private expenditures on participation in collaboration (e.g., study abroad programmes, international research visits) also constitute a direct economic cost. Tax revenues foregone due to brain drain are an indirect economic cost of transnational cooperation in higher education (Lange, 2009).

Non-economic rationales for transnational cooperation in higher education include academic, socio-cultural and political benefits and costs. Academic rationales for transnational cooperation involve activities related to the three common missions of higher education institutions: teaching, research, and engagement with community partners. Transnational cooperation can boost the overall quality of teaching, researching and learning in HEIs or change the national demand for education (Altbach & Knight, 2007). It may influence the quality of teaching, learning, and research production not only at higher education institutions that participate in transnational collaborative partnerships, but also at non-participating higher education institutions through a process of knowledge spillover (European Institute of Innovation and Technology, 2016; Pfothenauer, Jacobs, Pertuze, Newman, & Roos, 2013). But transnational cooperation in higher education can happen at the expense of intra-national partnerships or lead to academic colonialization through exploitative partnerships and the imposition of norms and standards (Knight, 2013; Le Ha, 2013). It can enhance the intercultural experience, awareness, and understanding of students, faculty and staff or reinforce their stereotypes and prejudices (Williams, 2005). At the same time, participation in a transnational collaborative partnership may impose significant psychological costs associated with securing stakeholder support for partnerships, and with negotiating differences between cultures, policies, and practices (Spencer-Oatey, 2013). Finally, political benefits and costs may accrue as a result of collaboration in terms of serving local communities, foreign policy, security and peace, and offering and receiving technical assistance (de Wit, 2010).

The analytical framework used to review the empirical evidence of the benefits and costs of transnational collaborative partnerships reflects the understanding that:

- (1) Benefits and costs occur at different levels: macro level (regional/national), meso level (institutional) and micro level (individual)
- (2) Benefits and costs can be: economic or non-economic (academic, socio-cultural, political)

Table 1 operationalises this understanding and lists the expected economic and non-economic benefits of transnational collaborative partnerships as they are presented in the literature.

Table 2 does the same for costs. The current study makes use of this analytical framework in order to survey the academic literature in search of empirical evidence that verifies the benefits and costs expected from transnational cooperation between HEIs.

Table 1. Framework for the systematic review of empirical evidence of the benefits of transnational collaborative partnerships

		LEVEL OF ANALYSIS		
		MACRO (regional/national)	MESO (institutional)	MICRO (individual)
TYPES OF BENEFITS	ECONOMIC	<ul style="list-style-type: none"> – <i>Improve the efficiency and effectiveness of the higher education system</i> – <i>Contribute to the economic development of the community</i> – <i>Alleviate scarcity of work force in strategic sectors</i> – <i>Improve quality of human capital</i> – <i>Increase rate of technological innovation and use</i> – <i>Economic growth</i> – <i>Brain gain</i> 	<ul style="list-style-type: none"> – <i>Increase institutional revenue: more and better patents, fees from international students and scholars, research grants, access to/exchange of financial resources,</i> – <i>Increase efficiency in using time and resources</i> – <i>Enhance competitiveness on the global/national educational market</i> 	<ul style="list-style-type: none"> – <i>International scholarships and grants</i> – <i>Improve labour market outcomes (higher employment rates, lower unemployment rates, higher earnings)</i>
	NON-ECONOMIC	<ul style="list-style-type: none"> – <i>Improve and diversify knowledge</i> – <i>Promote the reputation of the higher education system abroad</i> – <i>Increase quality of education</i> – <i>Improved higher education standards</i> – <i>Contribute to the country's influence on the international scene</i> – <i>Improve country image</i> – <i>Improve diplomatic relations, foreign policy, national security, peace and democracy</i> – <i>Increase linguistic diversity</i> – <i>Increase access to education</i> 	<ul style="list-style-type: none"> – <i>Provide additional uses for educational content</i> – <i>Develop and/or internationalise the curriculum</i> – <i>Enhance the diversity of programmes/expand educational offerings</i> – <i>Offer mobility opportunities to students, faculty and staff</i> – <i>Enrich library holdings and e-learning platforms</i> – <i>Diversify faculty, staff and student body</i> – <i>Increase research output and quality</i> – <i>Reach and recruit more and better international students</i> – <i>Develop/strengthen institutional capacity</i> – <i>Advance campus internationalization</i> – <i>Improve standing in global rankings</i> – <i>Knowledge about operating in foreign jurisdictions</i> – <i>Consolidate partnerships, academic research collaborations and alliances</i> – <i>Gain prestige and reputation</i> 	<ul style="list-style-type: none"> – <i>Access wide range of online & offline academic resources</i> – <i>Enable faculty to improve their teaching and research skills</i> – <i>Exposure to world-class facilities, faculty and staff</i> – <i>Increase research productivity</i> – <i>Mobility capital</i> – <i>Developing international cooperation and collaboration skills</i> – <i>Enhance intercultural experience, awareness and understanding</i> – <i>Improve foreign language skills</i>

Sources: Aguirre & Quemada, 2012; Akuffo et al., 2014; Albert, Davia, & Legazpe, 2016; Amare, Lutale, Derbew, Mathai, & Langeland, 2017; Arantes do Amaral & Frazão, 2016; Arlitsch, Lombardo, & Gregory, 2008; Asgary & Robbert, 2010; Beerkens & Derwende, 2007; Begin-Caouette, 2012; Boehm et al., 2010; Brooks & Waters, 2010; Bruffaerts et al., 2013; Cainelli et al., 2012; Canto et al., 2013; Carillo et al., 2013; Cronin, Cochrane, & Gordon, 2016; Di Pietro, 2012, 2015; Eisend & Schmidt, 2014; European Commission, 2014; Fabrizi et al., 2016; Frenken et

al., 2010; González, Mata-Benito, & Ubachs, 2013.; Gugglberger & Hall, 2014; Haaranen, Saarti, Miettola, & Erkkilä, 2016; He et al., 2009; Hird & Pfothenauer, 2017; Huisman, Schrier, & Vossensteyn, 1998; Inoue et al., 2017; Jacobone & Moro, 2015; Jonkers & Cruz-Castro, 2013; Koda & Yuki, 2013; Kot, 2016; Kwiek, 2013; Lepori et al., 2015; Lissoni et al., 2011; Llanes, Arnó, & Mancho-Barés, 2016; Llurda et al., 2016; Netz & Jaksztat, 2017; Parey & Waldinger, 2011; Qiu et al., 2017; Ray et al., 2012; Wiers-Jenssen, 2011; and Zhang et al., 2017.

Table 2. Framework for the systematic review of empirical evidence of the costs of transnational collaborative partnerships

		LEVEL OF ANALYSIS		
		MACRO (regional/national)	MESO (institutional)	MICRO (individual)
TYPES OF COSTS	ECONOMIC	<ul style="list-style-type: none"> - Subsidies to domestic and international students, faculty, staff and joint degree programmes - Direct and opportunity costs of competition - Brain drain - Costs of registration, licensing and recognition of foreign degrees 	<ul style="list-style-type: none"> - Operational and administrative costs of maintaining partnership - Costs of providing services for domestic and international students, faculty and staff; additional costs of services (beyond what would have been spent in a non-collaborative scenario) on domestic, students, faculty, and staff - Costs of training staff to manage international collaboration programmes 	<ul style="list-style-type: none"> - Tuition and fees - Living and housing expenses - Forgone earnings
	NON-ECONOMIC	<ul style="list-style-type: none"> - Crowding out of local students and faculty - Loss of cultural/national identity - Loss of linguistic pluralism - Loss/diversion of traditional higher education mission (commercialization of higher education) 	<ul style="list-style-type: none"> - Loss of autonomy due to partnership power imbalance (e.g. setting research agendas) - Time and effort spent on securing stakeholder support for partnership - Time and effort spent on negotiating differences between institutional cultures, policies, and practices 	<ul style="list-style-type: none"> - Worse academic results due to studies in a foreign language - Recognition and transfer of credits earned abroad - Emotional costs/stress

Sources: Akuffo et al., 2014; Bartram, 2013; Beerkens & Derwende, 2007; Camiciottoli, 2010; de Haan & Sherry, 2012; Dixon et al., 2013; Fabricius, Mortensen, & Haberland, 2016; Gerard, 2007; Leng, 2015; Maldonado-Maldonado & Cantwell, 2008; Pfothenauer et al., 2013; and Spencer-Oatey, 2013.

3. Research design: A systematic literature review

This report draws on a systematic review of empirical evidence to summarise what is known and what is not known about the economic and non-economic benefits and costs associated with transnational cooperation in higher education. As such, the research design proposed here follows the methodology employed by previous systematic literature review studies in higher education (Caruana, 2016; Grosemans, Coertjens, & Kyndt, 2017; Kyndt & Baert, 2013). To ensure that the literature review presented in this report is representative of previously published research on transnational cooperation in higher education, a systematic search and selection procedure was designed.

First, two comprehensive databases were selected for relevant literature on the topic: 1) the *ERIC* database, the world's largest educational database and the most-frequently used index for carrying out educational research, and 2) the *Econlit* database, which indexes research in the field of economics from around the world. Article abstracts in these two databases were searched for a combination of keywords related to topics, areas, and outcomes that resulted from the operationalization of the analytical framework. (For the list of keywords used in the searches, see Appendix 1). After restricting the search to peer-reviewed articles published from 1990 onwards, these search terms led to **13,174** hits. Removing the duplicates within and between databases yielded a total of **3,687** unique references.

Second, a number of exclusion criteria were designed in order to reduce the pool of articles to the most relevant ones for the subject at hand. These criteria aimed to exclude references that 1) were not related to the tertiary level of education; 2) were not in English; 3) did not focus on international collaboration, but merely on the situation within one country or institution; 4) were focused on collaboration carried out by institutes that operate within universities abroad but are very narrow in scope (e.g. the Confucius institutes promoting Chinese language and culture); 5) were theoretical, not empirical; and 6) were not available for consultation.

The selection was conducted in several stages ensuring that at each stage those articles that met any of the exclusion criteria were removed from the pool of references. If at any stage there were doubts about whether the reference should remain in the pool, it was retained until the next stage. To begin with, a selection was made based on the title of the articles. Subsequently, **1,444** references were kept. After a review of the abstracts of the articles, **360** references remained. The full texts of these references were retrieved where available. A small group of empirical studies on relevant topics that the authors were familiar with prior to the database search were also added to the list of studies to be reviewed. A total of **310** studies moved to an initial review where they were categorised according to relevance to the topic (yes/no) and type of study (theoretical/empirical). From this initial analysis, only the studies that focused on relevant topics and were empirical in nature were kept, leaving **134** studies.

These studies were critically appraised during a detailed review that aimed to exclude studies of low quality. As such, we adapted the Critical Appraisal Skills Programme (CASP, 2018) guidelines and evaluated the references according to clarity of research question(s), appropriateness of methodology and research design.

We made the decision to divide the results of our detailed review into two groups of studies to facilitate synthesis of findings. In the first group, we only included studies that adopted a quantitative or mixed methodological approach to establish a causal relationship between transnational cooperation in higher education and relevant outcomes. We excluded quantitative studies that were descriptive (e.g., Kot, 2016) and quantitative studies that only used self-reported measures of cognitive, linguistic, and

interpersonal skills to identify the impact of collaborative activities on such skills (e.g., Culver, Puri, Spinelli, DePauw, & Dooley, 2012; Salajan & Chiper, 2012). We decided not to include studies that use self-reported measures because the European Commission (2014) and others have demonstrated that individuals' perception of their own cognitive improvement tends to overestimate the actual change that may have occurred. Moreover, self-reported measures of proficiency gains tend to be affected by social desirability bias and may be biased by halo effects (Bowman & Hill, 2011). Section 4 of the report discusses findings from a total of **29 quantitative or mixed method** studies that met our inclusion criteria for relevance and methodological rigor. In line with the aim of the report, these studies are analysed according to the level at which the benefits and costs of transnational cooperative partnerships manifest themselves (e.g. macro, meso or micro), and not on the unit of analysis employed by the study.

In the second group, we included studies that adopted a qualitative approach to explore the challenges associated with establishing and operating transnational partnerships in higher education. We excluded qualitative studies that were descriptive (e.g., Adshead & Dubula, 2016; Kushnarenko & Cojocari, 2012) or that did not meet the Critical Appraisal Skills Programme quality standards (CASP, 2018). Section 5 of the report discusses findings from a total of **eight qualitative studies** that met our inclusion criteria for relevance and methodological rigor.

4. Evidence of the impact of transnational cooperation in higher education

This section synthesises empirical evidence on the causal impact of various forms of transnational cooperation in higher education on individuals, higher education institutions, and societies at large. The discussion is based on those quantitative studies that passed the criteria set for relevance and methodological rigor; (for more details on the review criteria, see Section 3). The section first discusses evidence pertaining to the macro level (national, regional) benefits of international research collaboration and international student mobility. This is followed by the discussion of meso level (institutional) benefits of international research collaborations. The section concludes with a discussion of micro level (individual) benefits of international student mobility, international researcher mobility, and international collaborative educational programmes. A table that summarises information about all studies discussed in this section can be found in Appendix 2.

4.1 Macro-level benefits

4.1.1 Economic benefits: More and better patents

Patents can be considered proxies for economic benefits at both the meso and macro levels. Higher education institutions that have obtained patents may earn revenue based on them – that is, the number of patents may serve as a proxy for institutional commercial revenue. Patents may also proxy technology/innovation, which is a key component of economic growth.

Fabrizi et al. (2016) used data from the European Patent Office to test whether the Framework Programmes (FP) of the EU, which require private sector entities, governmental agencies and universities to collaborate both within and across country borders, increased the number of patents in the period 1994-2009. The study found that the number of international collaborative links generated by FPs in European countries was significantly and positively linked with the number of patents owned by entities in that country. Due to the non-experimental design of the study, it is not clear whether the positive association between international research collaboration and patent quantity is causal.

Studies outside of Europe also provide evidence that international collaboration in higher education may contribute to innovation. Qiu et al. (2017) used data from the Statistical Yearbook of Science and Technology of China showing the number of invention patent applications filed to test the relationship between domestic and international higher education collaboration and firm-level innovation in the Chinese economy. The authors compiled a panel data set that covers the years 1999 through 2012 and includes information about the patent applications of firms in 20 Chinese provinces and 3 municipalities.

The outcome variable in the study by Qiu et al. (2017) was the number of invention patent applications by a given firm, and the explanatory variables included the R&D expenditures of the firm and the number of papers that universities in the same province/municipality co-authored with Chinese or foreign universities. Control variables included GDP per capita, the number of high-tech industrial firms, the proportion of the population with university degrees, and the amount of R&D funding that local universities received from firms in each province. Separate regressions were run for regional clusters based on the level of economic development (first-, second- and third-tier regions). Separate

regressions were run for the periods 1999-2004 and 2005-2012. The outcome variable (number of patent applications) was lagged with two years in every model.

Qiu and colleagues (2017) found that in the 1999-2004 period, “only in first-tier regions of China do domestic and international university collaborations show a positive relation with local corporate innovation. In the period from 2005 to 2012, the positive spillover effect of both types of collaboration spreads to second-tier regions” (p. 1299). In other words, in those economically more-developed regions of China where universities collaborated more frequently with other Chinese universities and with universities from other countries, the Chinese firms located in the same region filed a higher number of invention patent applications, suggestive of the presence of knowledge spillover from universities to firms.

Qiu et al. (2017) also found that the international collaborative activities of Chinese universities in the least developed regions were negatively associated with the patenting activity of firms in the same region. This suggests that knowledge spillover from international research collaborations is dependent on the absorptive capacity of firms in the local economy. If the region in which universities are located is not sufficiently developed economically, research collaboration with universities from other countries may not translate into increased innovative activity among local firms.

Last but not least, Qiu et al. (2017) found that the positive association between domestic collaboration and innovation was more substantive in recent years (2005-2012), but the association between international research collaboration in higher education and patenting activity also remained significantly positive. This finding suggests that even as national capacity for impactful higher education research increases, international research collaboration in higher education remains an important driver of innovation in the Chinese economy.

4.1.2 Economic benefits: Economies of scale in providing higher education

A long-standing question concerning the benefits and costs of transnational cooperation in higher education is whether costs increase with increased cooperation or economies of scale and scope can be achieved when higher education institutions in different countries cooperate to produce graduates and research. The study by Zhang et al. (2017) does not focus on transnational cooperation itself but looks at cost economies in higher education in Australia, a country in which higher education is provided to a heterogeneous group of domestic and international students. The joint education of domestic and international students is a common occurrence in the context of transnational partnerships, and therefore, findings from this study have implications for understanding cost economies in cooperative settings.

Using a panel data set that included information on 37 public universities in Australia in the period 2003-2012, Zhang et al. (2017) tested whether economies of scale and scope were present in the provision of higher education services in Australia. Economies of scale describes a situation “in which average costs per student ... fall as fixed costs spread over increasing numbers of students” (p. 728). Economies of scope exist when the cost of jointly producing outputs – in this case, jointly producing domestic and international graduates – is lower compared to the cost of specialised production (e.g., if domestic and international students were taught separately).

The dependent variable in the cost functions of Zhang et al. (2017) was the total operating expenditure of universities, which was related to the number of “completions”, i.e., the number of graduates at each

university in each year of the panel. Completions were disaggregated by residency status (domestic, international), level of education (undergraduate, graduate) and field of education (science, non-science). Control variables included the attrition rate at each university (to proxy the quality of higher education services), as well as the region where the university was located and the alliance group of which the university was a member.

Zhang et al. (2017) found evidence of economies of scale in Australian higher education. Their estimates indicated that Australian public universities could increase the number of graduates by up to 200% of current completions and still remain efficient. This result was driven by economies of scale in the production of international students enrolled in science degree programmes; Zhang et al. (2017) argued that the relatively low proportion of international students in Australian science degree programmes and the shorter completion time of international science graduates (compared to domestic graduates) might explain this result. The authors found no evidence of economies of scope on the national level but found that smaller institutions (that produced graduates at 25% to 50% of the mean national output) realised some cost savings from the joint education of domestic and international students.

Findings from the study by Zhang et al. (2017) are important because they suggest that the additional costs of educating international students (e.g., expenses associated with educational and language support) do not necessarily translate into decreases in efficiency in higher education provision. Under the right circumstances, higher education systems may even increase their efficiency by enrolling more international students.

4.1.3 Socio-cultural benefits: Positive attitudes towards open borders and democracy

Transnational cooperation in higher education, particularly in the form of student exchanges, is assumed to positively influence the attitudes of participants about other countries and cultures. In the specific case of the Erasmus mobility programme, the exchanges are meant to engender a heightened sense of attachment to Europe as a result of the academic mobility experience. A handful of studies examined whether participation in academic mobility (and specifically, in an Erasmus exchange) is associated with any socio-cultural benefits.

Llurda et al. (2016) conducted a small (n=46) mixed methods study that explored attitudes about European identity in a group of students from the Universitat de Lleida (Catalonia, Spain), who participated in the Erasmus student mobility programme. The authors used data from focus group interviews, as well as responses to questionnaires with 5-point Likert-scale items, administered four months prior to departure and after the students completed their Erasmus programme abroad.

Some evidence from Llurda et al. (2016) suggests that the Erasmus mobility experience may have positively influenced participating students' attitudes about Europe as a political entity that is characterised by open borders and democracy. On an item that asked students to "rate the extent to which these aspects characterise European identity", participating students rated elements of "mobility" and "democratic values" statistically significantly higher after their Erasmus mobility experience, compared to their pre-departure attitudes.

Llurda et al. (2016) found little to no evidence that the Erasmus mobility experience changed students' attitudes about a European identity. The authors found that for the nine items that probed students' attitudes about various aspects of European identity, there was no statistically significant difference in pre- and post-test attitudes. One exception pertained to the item that asked students to rate their degree of agreement with the statement that "the European project will eventually fail". The authors found that although students on average did not find it likely that "the European project will eventually fail" (pre-test mean: 2.41), their assessment of the likelihood of failure grew somewhat after studying abroad in another European country (post-test mean: 2.74; difference statistically significant at $\alpha = 0.05$).

The analysis of focus group interviews led Llurda et al. (2016) to conclude that "a sense of European identity is felt when the students position themselves in contrast to other supranational entities, such as Asia, or countries seen to be outside the 'Western' bloc" (p. 342) – a benefit from a European integration perspective. However, the authors noted that the Catalan students who participated in the focus groups did not "seem to see themselves not as distinctively Europeans but rather as 'Westerners', thus leading to a potential conclusion that what is promoted through the Erasmus programme may not so much be a European identity as a more general 'Western' identity" (p. 342).

Jacobone & Moro (2015) studied whether participating in an Erasmus exchange positively impacted students' attitudes about Europe. The authors used a pre- and post-test design on a group of undergraduate students from the University of Bari (Italy), some of whom ($n=190$) participated in an Erasmus exchange in 2011-2012, while some ($n=162$) did not. The two groups were matched on gender and field of study in a broad sense, but students who participated in an Erasmus exchange had a statistically significantly higher socioeconomic background, as measured by parental education and occupation.

A survey item in the study by Jacobone and Moro (2015) measured the degree of attachment that university students reported towards Europe. The authors found that Erasmus participants rated their attachment to Europe higher post-test, compared to students who did not participate in an Erasmus exchange.

Jacobone & Moro (2015) also found that the group of Erasmus participants rated their national identity on the post-test in the civic-instrumental dimension statistically significantly lower than students who did not participate in an Erasmus exchange. At the same time, Erasmus participants rated their European identity on the post-test in the civic-instrumental dimension statistically significantly higher than students who did not participate in an Erasmus exchange. The authors interpreted these findings as increasing European identification and decreasing national identification as a result of the Erasmus exchange. However, Jacobone & Moro (2015) pointed out that there was no statistically significant change in either the national or the European identity measures on the cultural-symbolic dimension among Erasmus participants. The authors argued that these findings suggest that the students "place[d] more importance on certain political structures representing them and share less certain common cultures, social similarities, values and religions" (Jacobone & Moro, 2015, p. 324).

Not all studies, however, found evidence of a link between international higher education experiences and cultural attitudes. A study by Boehm et al. (2010) tested whether online international collaborative learning experiences between Polish and American university students decreased ethnocentric attitudes among either student group.

A total of six online international collaborative learning modules, each lasting five weeks, were carried out between one American and one Polish university in the period 2006-2009. Participating students (n=204) were administered the Generalized Ethnocentrism (GENE scale) developed by Neuliep and McCroskey (1997) both before the collaborative module began and after it concluded. Pre- and post-test results were compared to the GENE scores of observationally similar control groups of students (n=459) attending the same two universities. Boehm et al. (2010) found that there was no statistically significant evidence that participating in the online international collaborative learning module decreased ethnocentric attitudes among participating students.

4.2 Meso-level benefits

4.2.1 Economic benefits: Increased institutional efficiency

Transnational cooperation in higher education may lead to increases in institutional efficiency, although available evidence does not support this claim. Bruffaerts et al. (2013) studied a small group (n=124) of elite American universities to understand the relationship between various institutional characteristics and the extent to which the universities are efficient in producing research. The authors identified research efficiency as “the ability of universities to transform efficiently a set of research inputs into outputs” (p. 2). In other words, the study asked not merely whether universities that participated in international collaborative research had greater research output, but also whether such universities could produce comparable levels of research output with lower institutional expenses and fewer human resources than observationally similar institutions that did not participate in international collaborative research.

Data on university research output were obtained from the CWTS Leiden Ranking from 2013, while data on institutional characteristics were obtained from the Integrated Postsecondary Education Data System (IPEDS) of the US federal government. Bruffaerts et al. (2013) considered the following research outputs in their study: number of publications associated with the university, number of citations that these publications received, and number of PhD degrees awarded. Inputs that the authors considered included institutional expenses and the number of assistant and associate professors. The authors were testing whether any of the following “environmental indicators” could explain differences in research efficiency across their study sample: institutional type (public/private); size (measured as total student enrolment); teacher/student ratio; proportion of collaborative publications with industry; proportion of international collaborative publications; proportion of inter-institutional collaborative publications; average salary of professors; proportion of articles that were published in the top 10% of journals; and proportion of students in human/social sciences.

Using nonparametric frontier approaches to estimate conditional efficiencies, Bruffaerts et al. (2013) found no evidence that the extent to which elite American universities are co-publishing with researchers from other countries explains the variation in their research efficiency. The generalizability of this finding is limited due to differences between the American and European higher education systems, but also due to the fact that their analytic sample focused on a very small set of elite institutions (i.e., those 124 American universities that were ranked in the Top 500 of the CWTS Leiden Ranking 2013).

4.2.2 Academic benefits: Strengthened research and teaching capabilities

Transnational partnerships in higher education may strengthen the research and teaching capabilities of participating institutions – and may even have spillover benefits for non-participating institutions. Hird & Pfothenhauer (2017) focused on the case of one international collaboration that involved five Portuguese universities, one American university (MIT), as well as Portuguese national research laboratories and industry partners. Their study demonstrated that the international research consortium had a positive impact on various research-related outcomes.

Among other, meso- and micro-level benefits (see below), Hird & Pfothenhauer (2017) found evidence that the international higher education consortium contributed to the strengthening of national research clusters, as the number of intra-Portuguese research connections (measured as co-authorship) for the MPP-affiliated group compared to the control group in the observed period was “two or three standard deviations above their control group counterparts” (p. 565). MPP-affiliated researchers also co-published more with MIT researchers compared to their non-MPP affiliated peers. The analysis of faculty interviews and student surveys by Pfothenhauer et al. (2013) also provided evidence of how the MPP strengthened both domestic and international networks of research collaboration.

The case study of the MPP also demonstrated that funding an international higher education consortium may also shift research activities towards priority areas, as defined by the policy-makers. Using the method of Content Overlay Maps, Hird & Pfothenhauer (2017) found that among researchers affiliated with the Bioengineering Systems, the publication pattern of MPP-affiliated researchers shifted towards new research areas (biochemistry and bioengineering/stem cell engineering), while a similar shift did not occur in the control group. Among researchers affiliated with the Sustainable Energy Systems, the publication pattern of MPP-affiliated researchers did not shift but expanded towards two priority areas (Environmental Science and Transportation Systems), while a similar expansion did not occur in the control group.

In a companion study, Pfothenhauer et al. (2013) noted that the launching of the international partnership had curricular benefits. The authors documented that “for junior [Portuguese] faculty, it has become common practice to audit MIT classes as part of their stay to gain a comparative perspective on teaching engineering in MIT’s entrepreneurial ecosystem and to adopt courses for use in Portugal” (p. 230). Portuguese faculty members also reported that “MPP has affected how they teach outside the programme (i.e. in regular, non-MPP courses in their institutions), creating a channel through which MPP practice spills over into their home departments. MPP faculty report that they have been actively approached by their non-MPP colleagues to inquire about teaching contents and methods, as well as the MPP course evaluation system, with particular interest in incorporating elements of innovation and entrepreneurship in engineering teaching” (p. 234). Indeed, there have been cases where “MPP courses and curricula have served as blueprints for the design of new educational programmes at Portuguese universities” (Pfothenhauer et al., 2013, p. 234). One Portuguese university which was originally not included in the MPP consortium decided to re-structure its academic activities in order to be able to participate, and was subsequently included, in MPP.

4.2.3 Academic benefits: More and better scientific output of research units

Available evidence strongly supports the assumption that transnational collaboration in higher education is conducive to research productivity. Carillo et al. (2013) adopted a two-stage regression approach with

instrumental variables to test whether an openness to collaborate with non-affiliated (but domestic) researchers, and openness to collaborate internationally have an impact on the productivity of Italian research units. Productivity was defined as the number of publications per research unit that received “excellent” rating during Italy’s first Research Excellence Assessment (REA), which was conducted in 2005.

Collaboration with external (domestic) researchers was instrumented on the relative number of same-field researchers within 100 kilometres of the research unit. Openness to international collaboration (which was operationalised as the sum of incoming and outgoing researchers who visited from/visited a research unit abroad) was instrumented on indicators of international student mobility at the academic department that hosted the research unit. Control variables included average age of unit members, number of PhD students and post-doctoral fellows per FTE researcher, age of academic institution, number of administrative staff members per researcher, and field of study (science vs. social science).

Carillo et al. (2013) found that, after mitigating the bias assumed to arise from the “likely endogeneity of international visiting periods of researchers and the share of external authors” (p. 31), both measures of collaborative activity were significantly positively related to the number of “excellent” publications. The findings were qualitatively similar when research productivity was measured at the individual (rather than at the unit) level.

4.2.4 Academic benefits: Greater attractiveness to foreign academics

International collaboration may make universities more attractive places of employment for academics from abroad. Foreign academics may in turn increase the research productivity of the university or improve the quality of teaching and learning through innovative teaching methods. The presence of foreign faculty members is an indicator used in some global university rankings, which means that increasing the number of international faculty members may also increase the visibility of universities for prospective domestic and international students, academics, and staff. The Joint Research Centre (2018) mapping study of partnerships between universities found that European university leaders recognize the mobility of academics as an important benefit of international cooperation.

Lepori et al. (2015) found that the international network of a higher education institution – measured as the number of publications co-authored with researchers working in other countries – is a significant predictor of the extent to which European universities are able to attract international academic staff. The cross-sectional dataset that Lepori et al. (2015) used included information on 277 higher education institutions in eight European countries: Germany, Italy, Lithuania, Latvia, Slovenia, Spain, Switzerland and the United Kingdom in the year 2009.

Lepori et al. (2015) tested whether the presence of an international collaborative network (measured as the proportion of publications at a HEI that were co-authored with an author from abroad) was associated with the attractiveness of the university for international staff (measured as the proportion of university staff that were citizens of a country other than the country in which the university was located). Their multilevel regression models included information not only about institutional characteristics (e.g., whether a university was private or public, whether it was located in an urban area, how many staff members it employed, its position on the SCIMAGO 2011 ranking, its student-teacher ratio, etc.) but also about “country attractiveness”, a composite variable that captured information on GDP per capita,

higher education R&D expenditures per capita, the share of academic researchers in the country's workforce, and the average impact of national scientific publications.

Lepori et al. (2015) found that the extent to which academics at the European universities in their analytic sample collaborated with academics in other countries on publications was significantly positively related to the proportion of staff at the university who were international. Due to the limitations of the cross-sectional dataset, it is unclear whether international collaborations attracted international staff or the other way around. Nevertheless, these findings suggest that there is a relationship between international collaboration and the internationalization of staff at European universities.

4.3 Micro-level benefits

4.3.1 Economic benefits: Higher likelihood of employment, at home and abroad

Higher education is conceptualised, from an economic perspective, as an investment in human capital that has returns over the individual's lifetime, in the form of increased earnings. Several studies have investigated whether higher education that was at least in part undertaken in a transnational collaborative setting has any direct economic benefits in terms of labour market outcomes.

Di Pietro (2015) used data from a nationally representative 2007 survey of graduates of Italian universities (Inserimento professionale dei laureate - Indagine 2007) to estimate whether participation in study abroad during university studies was related to the likelihood of being employed three years after graduation. The author used an instrumental-variable (IV) approach. The instrument was university graduates' exposure to study abroad opportunities, measured as the number of places that were potentially available at foreign universities during students' university years. The author controlled for differences in university graduates' gender, age, nationality, area of residence, marital status, children, parental education, type of degree, final degree classification, work experience during university, department and university attended.

Using this quasi-experimental estimation approach, Di Pietro (2015) found that Italian university graduates who participated in any form of study abroad during their university years were statistically significantly more likely to be employed three years after graduation than observationally similar university graduates who did not study abroad.

A study by the same author (Di Pietro, 2012), using the same dataset and the same IV estimation strategy found that Italian university graduates who participated in any form of study abroad during their university years were statistically significantly more likely to work abroad (i.e., not in Italy) three years after graduation than observationally similar university graduates who did not study abroad. This finding suggests that study abroad promotes cross-border labour mobility.

Parey & Waldinger (2011) adopted a very similar empirical approach – using exposure to Erasmus programmes as an instrument – to estimate the causal impact of academic mobility on international labour mobility later in the individuals' lives. The authors used data from nationally representative surveys of university graduates in Germany from the years 1989, 1993, 1997, and 2001 (total n=29,213).

They controlled for a variety of personal differences (e.g., time since university graduation, parental education, receipt of federal financial assistance), as well as differences in cohort, field of study, and graduating institution.

Parey and Waldinger (2011) found that German university graduates who participated in any form of study abroad during their university years were statistically significantly more likely to work abroad after graduation than observationally similar university graduates who did not study abroad. Their IV estimates suggest that the difference in likelihood of working abroad was 15 and 20 percentage points higher than in the comparison group.

It is not clear from the studies of Parey & Waldinger (2011) and Di Pietro (2012) in which country the academically mobile graduates worked. If they worked predominantly in EU member states, then this finding would suggest that study abroad is beneficial from a macro (European) perspective, as it increases cross-border labour mobility within the EU. If, however, the Italian university graduates predominantly worked outside the EU, this finding may suggest the cost of study abroad in the form of (temporary or permanent) “brain drain”.

Wiers-Jenssen (2011) tested whether having a degree from abroad or having a study abroad experience is linked to better labour market outcomes: unemployment immediately after graduation, higher wages, and international jobs. The author used data from the Nordic Graduate Survey of 2007 and focused on three subject fields only: business and administration; science, technology, and engineering; and social sciences. The total sample size was $n=1,874$, out of which $n=466$ were “exchange students”, i.e., university graduates who received their degrees from a university in Norway but studied abroad during their university years.

Wiers-Jenssen (2011) documented that both exchange students and students with degrees from abroad were a highly selected group in terms of their abilities and socioeconomic background. Attempting to mitigate selection bias, the author controlled for gender, age, parental education, marital status, prior study abroad experience, field of study, academic performance in upper-secondary education, and relevant work experience prior to graduation. After controlling for these personal characteristics, Wiers-Jenssen (2011) found no evidence that “exchange students” were different from non-mobile students as regards to any of the three labour market outcomes. University graduates with degrees from abroad were found to be statistically significantly more likely to be unemployed compared to non-mobile students; and statistically significantly more likely to have international jobs. Neither university graduates with foreign degrees, nor university graduates with study abroad experiences earned significantly more or less than their observationally similar, non-mobile peers.

Although it does not compare the labour market outcomes of graduates of transnational collaborative programmes with those of graduates of domestic higher education institutions and is focused on a geographical region other than Europe, the study by Koda & Yuki (2013) provide some interesting insights regarding the labour market outcomes of Malaysian graduates who earned their degrees abroad in Japan. The authors focused on three labour market outcomes: the probability of being employed one month after graduation, the probability of being employed in a job that required a university degree (i.e., a non-entry level job), and the monthly salary of graduates.

The analytical sample consisted of 356 Malaysian students, who graduated from one of two types of collaborative degree programmes: a “traditional” degree abroad programme or a “twinning” programme between 2004 and 2009. Students in the “traditional” degree abroad programme studied at

a university in Malaysia for two years and then attended a Japanese university for four years. Students in the “twinning” degree programme also studied at a university in Malaysia for two years but attended a Japanese university for three years only.

Koda & Yuki (2013) found that, after controlling for differences in the students’ backgrounds (gender, years since graduation, pre-university aptitude test scores), fields of study, and the ranking of the universities that the students attended, there was no evidence of a difference in the probability of employment one month after graduation and in the probability of holding a graduate-level job. After controlling for differences in internship experiences, as well as post-graduation qualifications and work experiences, the authors did not find evidence of a significant difference between the monthly salaries of graduates of the “traditional” versus the “twinning” degree programmes.

The study of Koda & Yuki (2013) is limited by its small, non-representative sample of graduates, as well as by its narrow focus on graduates of only two undergraduate degree programmes that were delivered as part of a transnational cooperation in higher education between two non-European countries. Nevertheless, the findings from this study are important as they indicate that twinning programmes in which graduates study in their own country for some years and complete their degrees abroad “could be a good alternative [to lengthier degree-abroad programmes]” because they take less time to complete and hence are presumed to have lower costs.

4.3.2 Economic benefits: More employable skills and traits

It is often hypothesised that participation in a transnational higher education collaboration (for example, as an exchange student) may increase employability through an impact on non-cognitive skills and personal traits. There is a dearth of evidence to support this claim.

An impact evaluation study of the Erasmus programme by the European Commission (2014) conducted a psychometric assessment of mobile students to determine whether there was any improvement in six personality traits linked with employability as a result of cross-border academic mobility. The six personality traits measured on a 49-item questionnaire included: confidence, curiosity, serenity, tolerance of ambiguity, decisiveness, and vigour. The authors used a pre- and post-test design and had an analytic sample of 40,208 mobile students who participated in some form of academic mobility or exchange (including Erasmus exchange) in 2013. The comparison of means from the pre- and post-test showed no statistically significant change in any of the six personality traits in this group of academically mobile European students.

4.3.3 Academic benefits: Better foreign language proficiency

While there is no evidence of an impact of studying abroad on personal traits connected to employability, there is some evidence that academic mobility may positively impact cognitive skills – and specifically language skills. Llanes et al. (2016) conducted a small (n=37) quantitative study that explored gains in English language proficiency among a group of students from two universities in Catalonia, Spain, who participated in a 15-week long Erasmus student mobility exchange in non-English-speaking countries in which English was used as an academic lingua franca.

Measuring general language proficiency as well as three specific writing proficiencies (syntactic complexity, lexical complexity, and subordination complexity) in a pre- and post-test design, Llanes et al. (2016) found that participating students' general language proficiency and lexical complexity statistically significantly improved over time; there were no improvements to syntactic and subordination complexity. When controlling for initial differences in language proficiency, the authors found that students with higher initial levels of proficiency significantly improved their subordination complexity upon returning from their Erasmus exchange. These findings suggest that studying abroad may be beneficial for English proficiency, even if the exchange experience takes place in a non-English-speaking country.

Canto et al. (2013) explored the impact of a collaborative intervention on the Spanish language proficiency of a group of Dutch university students. A total of 36 first-year university students who were enrolled at a Spanish language course at Utrecht University were randomly assigned to one of three conditions. In one of the treatment conditions, participating language students were connected to a native speaker of Spanish via web-conferencing to carry out specific language-learning tasks; in the other treatment condition, language learners were connected to a native speaker via a virtual world platform; while students assigned to the control condition had to carry out the tasks without any involvement of native speakers. The native Spanish speakers who contributed to the treatment conditions were pre-service teachers enrolled at the University of Valencia (Spain).

Proficiency gains were measured in a pre- and post-test format; students in all three conditions had to orally respond to prompts in Spanish both before and after the course. The students' responses to the prompts were videotaped and scored by two native speakers of Spanish. The scoring assessed students' proficiency along five dimensions (range of language, grammatical accuracy, fluency, thematic development and coherence), which were collated into a single measure of proficiency due to the high correlation between the five indicators.

Canto et al. (2013) found that while Dutch university students in each condition had higher scores post-test, students in the two treatment conditions that involved a native speaker from the partner university realised higher gains, compared to the post-test scores of students from the control group. Canto et al. (2013) also found that the treatments had a differential impact by pre-existing proficiency level: Dutch university students who had poor oral skills in Spanish at pre-test realised higher gains in the two treatment groups than their Dutch peers who had better oral skills in Spanish at pre-test.

4.3.4 Academic benefits: Gains in content knowledge

A question about higher education services that are delivered in the form of an international collaboration is whether the outcomes of students who participate in such collaborative programmes is comparable to, better, or worse than the outcomes of students who participate in similar programmes that are not the result of international collaboration. Ray et al. (2012) evaluated an online, university-level geography course that was implemented as an international collaborative learning experience in some countries but not in others.

The online geography course was developed by the Center for Global Geography Education (CGGE), which "aims to internationalise geography in higher education by supporting international collaborations that promote active learning and cross-cultural student inquiry and discovery" (Ray et al., 2012, p. 26). The CGSE online geography course was piloted in a total of ten different higher education settings in 2009-2011. Four of the ten pilots were implemented in an international collaborative setting. Countries that participated in the international collaborative trials included Chile,

China, Northern Ireland, Spain and the US. A total of 351 university students from these five countries enrolled in these online geography courses. Modules in the course addressed topics such as migration, population and natural resources, and national identity.

Ray et al. (2012) assessed whether students' content knowledge increased as a result of taking the online geography course. The authors used a pre-test post-test survey design to measure gains in content knowledge. The authors found that students' content knowledge of geography significantly increased in all ten of the pilot sites, including in the four sites where the course was implemented in a transnational collaborative setting. Ray et al. (2012) reported that "no significant differences were detected when comparing the normalised gain scores of students who participated in an international collaboration compared to those who utilised the CGGE modules without an international collaboration" (p. 34). The latter finding suggests that in terms of content knowledge, students enrolled in international collaborative programmes do not perform either better or worse than students enrolled in non-collaborative programmes.

4.3.5 Academic benefits: Mobility breeds mobility

A specific channel through which participating in studying abroad may have academic benefits is that it appears to be connected to the likelihood of participation in transnational academic cooperation later in an individual's life. As noted earlier, the international mobility of academics may be conceptualized as an intermediate benefit of transnational cooperation that may positively impact the research and teaching output of universities and may increase the domestic and global visibility of HEIs that host mobile academics. Netz & Jaksztat (2017) studied predictors of international mobility among German academics, using cross-sectional data from an online survey of scientists employed at German universities, conducted in 2010. Based on a nationally representative analytical sample (n=3,850), using a structural equation modelling (SEM) approach, the authors found that early experiences of international mobility (i.e., study abroad experiences) were statistically significantly positively linked to both plans for international academic mobility, as well as to actual (realised) international academic mobility experiences during the academics' career.

Netz & Jaksztat (2017) also found that academics whose parents attained higher education (a proxy for higher socio-economic status) were more likely to have had early experiences of international mobility, which in turn made them more likely to participate in international mobility during their academic careers. The authors noted that this finding suggests that "early mobility experiences may thus contribute to the reproduction of social inequality" (p. 512).

4.3.6 Academic benefits: More and better publications

There is a preponderance of evidence showing a link between transnational partnerships in higher education and the research productivity of academics. Research-related benefits of international collaboration may emerge as a result of either international academic mobility or participation in international research teams (which may or may not entail cross-border mobility).

Before discussing results from this body of evidence, it is important to note that just as students are selected and self-select into international mobility experiences (e.g., Di Pietro, 2015; Lörz, Netz, & Quast, 2015; Netz & Jaksztat, 2017; Parey & Waldinger, 2011), academics are also selected and self-select into international visits and international collaborative experiences. For example, academics who

speak better English may publish more in English-language journals, and they may also be more likely to participate in international collaborations. Reverse causation may be another issue: academics who publish more may have more opportunities to participate in international collaborative research. Due to the concerns about omitted variables and reverse causation, no causal claims can be made regarding the positive association between international collaborative experiences and publication output detected by most of the studies discussed in the following paragraphs: Albert et al., 2016; Frenken et al., 2013; He et al., 2009; Inoue et al., 2017; Eisend & Schmidt, 2014; Jonkers & Cruz-Castro, 2013; and Kwiek, 2015.

Albert et al. (2016) used data from the 2006 Spanish Survey on Human Resources in Science and Technology (*Encuesta sobre Recursos Humanos en Ciencia y Tecnología, 2006*) and negative binomial regression analyses to identify predictors of publication output among the analytic sample of 3,846 Spanish individuals who obtained a PhD from a university in Spain between 1990 and 2003, and who worked at an academic institution in Spain in the period 2004-2006. Relevant survey items measured whether the academics have participated in a post-doctoral international research visit, whether they collaborated with research teams abroad, or both.

Controlling for field of study, institution, year of graduation, as well as personal and family characteristics, study and employment characteristics, and personal motivation for doing research, Albert et al. (2016) found that academics who had collaborated with research teams abroad and academics who both collaborated with research teams abroad and participated in a post-doctoral international research visit published a statistically significant higher average number of books and articles than the reference category (i.e., academic with neither international visit nor collaborative experience). The publication output of academics who only participated in international research visits but did not collaborate with research teams abroad was not statistically significantly different from the reference category.

Kwiek (2015) tested the relationship between international collaborative activities and research productivity – the latter measured as the number of journal articles and book chapters published over a three-year period. He used data from the “Changing Academic Profession” (CAP) and “Academic Profession in Europe: Responses to Societal Challenges” (EUROAC) surveys, which were conducted in 2007 and 2010, respectively. The combined CAP/EUROAC dataset includes information on over 17,000 researchers in the following 11 European countries: Austria, Finland, Germany, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Switzerland, and the United Kingdom.

Kwiek (2015) compared the publication output of university-based, full-time employed European researchers (n=10,777) who reported to have participated in international collaboration with the publication output of researchers who reported no international collaborative activity. Using t-tests to compare conditional means, Kwiek (2015) found that across all countries and all academic disciplines, researchers who participated in international collaboration had significantly higher publication output than their peers in the same countries and the same academic disciplines who did not collaborate internationally.

Eisend & Schmidt (2014) used an ordinary least squares (OLS) regression approach with interaction terms to test whether collaborating with foreign scholars increased the research quality of German scholars of business research. Research quality was measured as the number of citations a journal article received in the Social Science Citation database (SSCI) through the end of 2008. The dataset used in the

analyses included information on 493 German scholars engaged in business research, and a total of 1,829 articles.

Independent variables included the presence/absence of foreign co-authors (and specifically, US-based co-authors); the age of researcher at time of publication); and whether the German scholar worked in Germany or abroad at the time of the article's publication. Control variables included researcher quality (i.e., whether a scholar was ranked in either of Germany's two trade publications as a top scholar) and journal quality (also a dichotomous variable: top vs. other journals).

Eisend & Schmidt (2014) found that "collaboration [with foreign scholars] enhances research quality only under certain circumstances, such as the writing of conceptual papers or researchers' lack of experience or market knowledge" (p. 56). International collaboration in general was associated with a higher number of citations, but especially when the co-author worked in the US. Eisend & Schmidt (2014) found that there was no difference in the number of citations for empirical/analytical papers, regardless of whether they were a result of international collaboration or not. Likewise, there was no evidence of a significant difference in the number of citations for experienced researchers (i.e., those who were older at the time of publication), regardless of the presence/absence of international collaboration. Last but not least, collaboration with foreign scholars when the German scholars themselves were working abroad was not associated with a higher number of citations.

The results of Eisend & Schmidt (2014) suggest that international collaboration (in terms of co-authorship) may be particularly beneficial for younger scholars, scholars working on conceptual papers, and scholars working at domestic institutions.

Inoue et al. (2017) tested the relationship between the number and quality of academic researchers' co-authors and the number and quality of the researchers' publications in a global sample of medical research articles. Their analytic sample included a total of 160,355 papers and 322,748 researchers who published in journals categorised as Cardiac and Cardiovascular Systems in the World of Science database in the period 2008-2014; their econometric approach included fitting Tobit regression models.

Frenken et al. (2010) tested the relationship between the type of collaboration (international, national, or sub-national; academic or hybrid) in applied life sciences research and applied physical sciences research, and the number of citations that the publication received. Using panel data regression techniques, they analysed the citation patterns in an analytic sample of over 150,000 publications that were published in the period 1998-2004 and in which at least one of the authors was affiliated with an academic organization, a firm, or a governmental/non-profit organization based in the Netherlands. The reference category consisted of papers whose author(s) were affiliated with a single (academic or non-academic) institution located in the Netherlands.

Frenken et al. (2010) found that the presence of an academic institution among the co-authors was positively associated with the number of citations that a paper received. Moreover, they found that papers co-authored by an academic affiliated with a Dutch institution and another academic affiliated with an institution in either the United States or another EU15 country had higher citation counts than the reference category, *ceteris paribus*. However, papers co-authored by Netherlands-affiliated authors and authors affiliated with institutions in foreign countries other than the US or EU15 member countries, on average, received fewer citations compared to the reference category. These findings suggest that transnational higher education collaboration may lead to increased visibility of research, although it also

highlights that this positive association is not uniformly present across all kinds of transnational collaborations.

Evidence from outside Europe also attests to the link between international collaboration and research output. Jonkers and Cruz-Castro (2013) studied predictors of research productivity and research quality among a group of Argentinian life scientists (n=124) who were employed at one of 11 research institutes in Buenos Aires in 2009-2010. The authors used a panel data set that included information on 2,764 publications and fitted negative binomial regression models. Dependent variables included the number of publications, number of internationally co-authored publications, number of publications in high-impact journals, and number of citations received by January 2010. The independent variable was whether the researcher had research experience in a foreign country. Control variables included the researchers' academic rank, whether they were a PhD student at the time of data collection, and the researchers' gender.

Jonkers & Cruz-Castro (2013) attempted to mitigate concerns about reverse causation by controlling for differences in the early publication record of the researchers, which presumably influenced their likelihood of international mobility. They found that Argentinian researchers in the life sciences who had foreign work experience published on average 43% more in a given year than their observationally similar peers without foreign work experience. Argentinian researchers who worked abroad in a particular region (North America or the EU) were more likely to co-publish with authors from that region than with foreign researchers from other regions.

Only between one fifth and one quarter of the publications of internationally mobile Argentinian researchers were co-authored with colleagues from their former host institutions, which suggests that the internationally mobile life scientists were productive researchers on their own, too. Jonkers & Cruz-Castro (2013) found that internationally mobile researchers on average did not publish more articles and did not receive more citations than their peers with no mobility experience, but they did publish more articles in high-impact journals and they publish more articles as first and last authors.

He et al. (2009) conducted a similar study that involved a total of 2,240 publications from 65 biomedical researchers who were employed at a single New Zealand university over the period 1990-2003. After controlling for various characteristics of the publications (e.g., length of paper, number of references cited in it) as well as for various characteristics of the author (gender, academic rank, whether they held an administrative position, whether they had a PhD or MD degree from abroad) and the department with which the author was affiliated, He et al. (2009) found that the number of international co-authors was significantly positively related to the quality of the research articles. Article quality was measured as the five-year average of the impact factor of the journal in which the paper was published, and the number of citations that the article received in a two-year period, excluding self-citations.

He et al. (2009) also tested whether the research productivity of the 65 biomedical scientists included in their panel data set was predicted by previous collaborators with scientists abroad. Using one-year and three-year lags in their fixed effects panel data regression models, they found that having international co-authors was significantly positively related to research output (number of publications and number of citations) one year and three years down the line. The panel data approach with lagged outcome variables strengthens the causal interpretation of this study's findings, namely that it was international collaboration that resulted in higher productivity later in the researchers' career, rather than the other way around. Lagging the outcome variables does not, of course, mitigate the bias that likely results from omitted variables such as differences in researchers' abilities.

Inoue et al. (2017) found that there is a significant, positive association between the number of “overseas” co-authors and the quality of publications in this field of medical research. Specifically, the authors found that membership in an academic network of co-authors in which at least some of the members of the network work overseas (i.e., in countries other than the author in question) was positively associated with the number of citations that the co-authored publication received.

Cainelli et al. (2012) attempted to account for the problems of omitted variable bias and reverse causation by using a two-stage Heckman selection model with an instrumental variable. The authors used data from the *Econlit* database of the American Economic Association and from the official database of the Italian Ministry of Universities and Research to estimate the extent to which domestic and international cooperation explains variation in scientific productivity in the population of Italian economists who were employed at Italian universities in 2006 (n=1,620).

Scientific productivity was measured as the number of journal articles published in the period 1969-2006. In addition to controlling for institutional (location, faculty) and individual (gender, age cohort, tenure, disciplinary group) differences in the propensity to publish, Cainelli et al. (2012) also instrumented their independent variables – propensity to cooperate domestically and propensity to cooperate internationally – on the number of chapters published in an edited volume. Cainelli et al. (2012) selected book chapter authorship as an instrument for measuring academics’ propensity to collaborate independently of the quality of their research output, because authors in edited volumes are typically chosen based on their membership in social and professional networks rather than based on the quality of their research. The authors found that a track-record of collaboration with foreign economists was significantly positively related to the number of journal articles that Italian economists published in the observed period.

Lissoni et al. (2010) also attempted to address concerns about selection effects by adopting a two-stage selection approach to identify predictors of scientific productivity in a sample of more than 3,600 French and Italian academic physicists. In the first stage, the authors estimated the probability of promotion to a higher academic rank, while in the second stage they identified predictors of research productivity (measured as the number of publications and the average impact factor of journals where the papers were published). In the regression models, Lissoni et al. (2010) controlled for differences in the academics’ age, gender, the year in which they were promoted, and their research field. Independent variables in the models predicting research productivity included measures of domestic and international collaboration (measured as the number of domestic and international co-authors).

Lissoni et al. (2010) found that academic physicists in both France and Italy published more articles and their publications were published in journals deemed to have high impact if they had a track record of international co-authorship. Participation in a large-scale international research project was especially strongly linked with research productivity, but researchers who participated in smaller-scale international projects were also more productive, on average, than observationally similar peers who had no track record of international co-authorship.

Hird & Pfothauer (2017) focused on the case of the MIT-Portugal Programme (MPP), discussed above. Using quasi-experimental analytical approaches (difference-in-differences and statistical matching techniques), the authors found that Portuguese researchers (n=234) who were affiliated with the MPP international consortium published between 13% and 31% more in the period 2007-2013 than Portuguese researchers who had similar observable characteristics but who were not affiliated with the

MPP consortium during the same time period (n=120). The authors also found that the publications of MPP-affiliated researchers had statistically significantly higher impact factors and citations than the non-MPP affiliated control group.

The results of Hird & Pfothenauer (2017) suggest that the international higher education consortium was particularly beneficial for MPP-affiliated junior faculty, whose publication output increased 40%-70% over the period of collaboration, compared to MPP-affiliated senior faculty, who also increased their research output but only by 15% to 50%.

5. Challenges of transnational collaborative partnerships

Looking at the findings from the quantitative studies discussed in Section 4, it becomes apparent that evidence of the impact of transnational cooperation in higher education is limited to the benefits that derive from such arrangements. As previously mentioned, Section 4 only included studies with quantitative and mixed methodologies that adopted a rigorous empirical approach to establish a relationship between transnational collaborative partnerships and relevant outcomes. Nevertheless, the keyword search also yielded a number of rigorous qualitative studies. The findings from these qualitative studies suggest two sets of recurring challenges faced by transnational partnerships in higher education: those associated with building symmetric relationships, and those associated with negotiating different viewpoints.

The studies discussed in this section mostly focus on the costs and benefits of North-South collaborative partnerships between higher education institutions. As such, the insights they provide do not directly apply in the European Union context. Nevertheless, the challenges of negotiating different viewpoints and the nature of the relationships developing in partnerships between old and new member states – i.e., where the latter are net receivers and the former net contributors of EU funding, where funding mechanisms are not necessarily compatible, and where some higher education systems and institutions are considered to be of varying quality – viewpoints resonate with European concerns. Moreover, in the absence of robust evaluations of European partnerships, the findings of the studies discussed in this section help to illustrate the complexity of interrelationships between partners and, more importantly, shed light on the costs that can be expected to arise from such partnerships.

5.1 Building symmetric relationships

When studying transnational partnerships, many qualitative studies look at the nature of relationships between higher education institutions from the so-called “global North” and “global South” (e.g., Leng 2015; Li et al. 2016; Maldonado-Maldonado & Cantwell 2008). The main concern of these studies is whether strategic partnerships bring about symmetrical or asymmetrical power relations between the various counterparts. In other words, how are costs and benefits distributed between partners? While not all the findings are directly transferable to the European context, there are lessons to be learned from these experiences in terms of the costs of cooperation.

Leng (2015) examines multiple partnerships between Cambodian universities and their French, American, Japanese, and South Korean counterparts. Analysing the extent to which international university partnerships are characterised by mutuality – understood as equity, autonomy, solidarity, and participation – the study finds that partnership programmes demonstrated each aspect of mutuality to some degree if the “academics from all sides had already built close relationships with each other before moving to establish formal institutional agreements” (Leng, 2015, p. 261). This was the case with the partners from France, the US, and Japan, but not with those from South Korea.

Having a previous professional and personal relationship before establishing formal institutional partnerships translated into fewer conditionalities imposed on Cambodian universities, a willingness by foreign partners to learn about the local culture, and a better management of expectations about the outcomes of the partnership. No existing relationships, as was the case with the South Korean partnerships, meant the opposite and resulted in a “mismatch of collaborative programmes between the two sides” (Leng, 2015, p. 269). For example, many students participating in exchanges ended up in

religious institutions that offered courses that were irrelevant to their field of study and professional development.

Regardless of the outcome, it can be extrapolated from findings of the qualitative studies that there is a non-economic cost sustained by higher education institutions (see **Table 2**). These costs take the form either of lost autonomy due to partnership power imbalance (as in the case of the Cambodian and South Korean partnership), or in the form of time and effort spent on negotiating differences between institutional cultures, policies, and practices and establishing professional relationships (as in the case of the Cambodian and French, American and Japanese partnerships).

Moreover, there are also economic costs associated with fulfilling the aims of the collaborative programmes. In fact, it is precisely these economic costs and the matter of who is covering them that give rise to concerns over the mutuality of relationships between institutions. It is the foreign counterparts – either governments, higher education institutions, or aid agencies – that financially support the major direct costs of these cooperation programmes with Cambodia. In turn, “Cambodian universities could offer only an in-kind contribution, including accommodation, transportation and food” (Leng, 2015, p. 272). The concern being that when one partner is the donor and the other is the recipient, a patron-client relationship might ensue because of the asymmetric power balance. Leng (2015) shows that academic colonialism can be avoided if time is invested in building trust between counterparts by fostering professional and personal relationships.

While valuable, Leng’s study (2015) is one-sided in that it only looks at the experience of Cambodian higher education institutions involved in such partnerships. Using a comparative case study of a partnership of flagship universities from adjoining countries – La Universidad the Sonora (Mexico) and the University of Arizona (US) – Maldonado-Maldonado & Cantwell (2008) examine the fears and desires of participants on both sides of the border. The case study illustrates the intricate relationship between benefits and costs deriving from transnational collaborative partnerships. It finds that the partnering universities shared “financial concerns, safety and publishing interests”, but that the partners also expressed concerns about “exploitation, hegemony, and unfairness” (Maldonado-Maldonado & Cantwell, 2008, p. 321). “In terms of desires, both universities want to get what they can from the “Other”.”(Maldonado-Maldonado & Cantwell, 2008, p. 321). Specifically, the study uncovers asymmetric graduate and non-degree-seeking student exchanges and asymmetric research collaborations.

First, there is an unequal exchange of graduate students because of the discrepancy between demand and supply. As a result of the limited amount of graduate-level courses offered by La Universidad de Sonora (UNISON), faculty and students want to go to the University of Arizona (U of A) to pursue further studies in their domain of interest. However, “virtually no U of A students study at UNISON” (Maldonado-Maldonado & Cantwell, 2008, p. 324). U of A is happy to accommodate the demand from UNISON because it helps it to diversify their student body, advance research by offering new perspectives on issues, and increase institutional revenue as they “often come with funding from Mexico and therefore require little support” (Maldonado-Maldonado & Cantwell, 2008, p. 324). Because there is no reciprocation from the American counterpart, UNISON professors see this as causing brain drain and revenue loss and, thus, feeding a mechanism that “increases the disparities in higher education between countries” (Maldonado-Maldonado & Cantwell, 2008, p. 324) and contributing to further power asymmetries between them. While the study explicitly reports on these economic costs of cooperation (see **Table 2**) from the participants’ perspective, it makes no attempt to quantify them.

Second, there is an unequal exchange of non-degree-seeking students following the same pattern of demand and supply as the exchange of graduate students. The authors argue that this asymmetry can be explained by cultural imprints and “othering” where U of A students fear endemic corruption, UNISON

students fear discrimination and racism, and both groups fear violent crime on the other side of the border. Coupled with the different perceptions about the reputation and quality of the two higher education systems, American students “tend to see little value in studying in Mexico” (Maldonado-Maldonado & Cantwell, 2008, p. 326) and do not even show interest in courses offered jointly between the two partner universities. The opposite is true for Mexican students.

Thirdly, the partnership exhibits asymmetric research collaborations. Even though in terms of institutional research expenditures “the amount spent by the U of A is thousands of times the amount spent by UNISON” (Maldonado-Maldonado & Cantwell, 2008, p. 324), the Mexican counterpart often bears the majority, or all of the relative costs associated with research collaboration because of the rigidity of the American funding mechanisms. The different (perceived) academic practices also cause tensions between the partners. Nevertheless, both partners find value in cooperating because it cuts costs in terms of travel, fieldwork, and access to data when researching issues in the country or region where the partnering institution is located. Also, it leads to more publications, ability to access external grants, better research, and “helps to change stereotypes people have about the ‘Other’” (Maldonado-Maldonado & Cantwell, 2008, p. 325).

This study illustrates that it is not always the partner from the “global North” who bears the direct financial costs of collaboration. Moreover, because many times the costs of one partner translate into benefits for the other, findings from Maldonado-Maldonado & Cantwell (2008) demonstrate how difficult it can be to disentangle the benefits and costs of transnational collaborative partnerships on a large scale. On the one hand, through the partnership, the US university increased its institutional revenue through fees from international students and scholars, gained access to financial resources such as research grants, and increased its efficiency in using time and resources. On the other hand, these benefits came at the expense of the Mexican government, institutions and individuals. In return, the Mexican university benefited from increased research output and quality, enhanced prestige and reputation, and an expansion in its educational offerings.

These complex interactions between benefits and costs often lead to tensions between project partners. Cultural differences put a further strain on the relationship. Like Leng (2015), Maldonado-Maldonado & Cantwell (2008) find that tensions between parties can be overcome by establishing personal and professional relationships that ultimately lead to trust. Li et al. (2016) analysed ten China-UK strategic alliances in higher education and found that increased interaction between partners “facilitated the establishment of sound working relationships and built trust, which is conducive to resolving cultural problems” (2016, p. 793). Getting to this point, however, requires partners to overcome a second challenge: learning how to negotiate different viewpoints in terms of goals, pedagogy, and quality of higher education in a manner that produces optimal outcomes for all parties involved.

5.2 Negotiating different viewpoints

International collaborative educational projects have to accommodate different partner viewpoints. When this is appropriately done, the power relations can be symmetric and produce synergetic relationships in which all parties benefit from the projects. When not, the asymmetry of power relations leads to the imposition of outside norms on the partner in the weaker position. Communication between partners is a way of alleviating this challenge, but it is not easy to achieve, and circumstantial evidence from qualitative studies looking into the development of innovative pedagogies (Spencer-Oatey, 2013) and curriculum development (Pyvis, 2011; Sutrisno & Pillay, 2015) shows that the costs in terms of time and resources are high. Nevertheless, findings from qualitative and mixed-method studies suggest

that the adoption of innovative pedagogies and novel curricula is favourably received by students (Ray et al., 2012; Wilmot et al., 2016) and it can increase the attractiveness of higher education institutions that offer such novel pedagogies and curricula in the form of transnational partnerships (European Institute of Innovation and Technology, 2016; Pfothner et al., 2013).

Spencer-Oatey (2013) analyses the interaction challenges of academic staff in four international collaborative education projects between paired top-ranked British and Chinese universities meant to innovate pedagogy by developing e-based teacher training materials. She finds that negotiating common goals that are acceptable to both parties, managing language and communication between partners that do not share a common language, and negotiating different pedagogic viewpoints arising from dissimilar academic cultures, are major hurdles faced by academic staff.

True collaboration is impeded if, first, there is inequality between partners in terms of funding because they are most likely to pursue different goals – i.e., developing course materials as an “end in itself” versus “as a means of conducting applied research and gaining generic insights” into pedagogy (Spencer-Oatey, 2013, p. 251). Second, collaboration is jeopardised if one of the parties has difficulty in accepting a certain level of openness to “experimentation, tolerance of uncertainty, and trust that the details of the project goals will gradually unfold” (Spencer-Oatey, 2013, p. 256). Third, collaboration can be challenging because “implementing projects was very time consuming if there was to be true collaboration” (Spencer-Oatey, 2013, p. 256). This includes time spent doing the work in a foreign language, building personal and professional connections, engaging with cultural and academic differences, building trust, and navigating conflicts.

While the qualitative and mixed-method studies did not attempt to quantify the costs ensuing from the transnational partnerships (for an exception, see European Institute of Innovation and Technology, 2016), the costs entailed in substantive collaborations are not marginal. Perhaps as a result of the political and psychological costs associated with negotiating these differences, what often happens in practice is a unidirectional transfer of practices and knowledge in the name of quality assurance.

Pyvis (2011) looks at one collaborative project between Australia and China to deliver an innovative degree programme to Chinese students. He finds that the current approach to quality assurance in transnational education “encourages educational imperialism, not educational diversity” (p. 741). The Australian degree programme is taken as the reference point for quality, and the policies and practices designed into the collaboration aim to achieve quality in the new locale through sameness – i.e., same curriculum, same teaching philosophy and methodologies, same assessment tools, same language of instruction, with little regard for contextual factors and traditions (Pyvis, 2011). In “the understanding that ‘sameness of quality’ requires sameness in approach” (Pyvis, 2011, p. 741), educational materials and practices are to be adopted without any adjustment to local contexts and needs.

In the case analysed by Pyvis (2011), issues of inequality, closedness to new ideas, and time pressures meant that different viewpoints were not negotiated and collaboration did not bring about educational diversity or innovation, casting doubt on the value of the transnational partnership. In order to deliver a quality educational programme in a transnational collaborative setting, O’Rourke & Al Bulushi (2010) argue that it is essential that HEI partners seriously consider matters of “academic freedom, local contextualization, cultural sensitivity, language level, professional development, comparability across multi-campus delivery and preparation for international postgraduate study” (p. 200).

By analysing the delivery of a dual degree programme by an Indonesian and Australian university, Sutrisno & Pillay (2015) emphasise the importance of articulating the knowledge transfer processes that are to occur *between* the institutional partners and *within* institutions. For example, in order to develop the programme curriculum, the universities engaged in “curriculum mapping” whereby they not only

validated “each other’s existing curriculum to ensure equivalence” (Sutrisno & Pillay, 2015, p. 384), but also verified and customised the transferred knowledge to ensure appropriateness and applicability in the context where it was to be taught. However, the study also found that internal and external communication problems made intra- and inter-institutional knowledge transfer difficult for the Indonesian university, which prevented it from fully achieving its aim of building institutional capacity through the partnership. The authors argue that hiring a liaison person and designing internal mechanisms for knowledge dissemination could solve the communication problem, but they involve additional costs (Sutrisno & Pillay, 2015).

When implemented in a fashion that addresses the challenges highlighted above, collaborative projects can lead to innovative pedagogies that may result in better student learning outcomes. Wilmot et al. (2016) analyse a small-scale cooperative project between the UK and Brazil aimed at engaging students through participative pedagogy in a virtual collaboration. They find that despite an initial “reluctance to communicate and share experiences and ideas” in a virtual environment, students perceived that “the experience had enabled them to develop their intercultural skills, and to gain confidence when engaging with cultural others” (Wilmot et al., 2016, p. 122). Moreover, the communication challenges they encountered allowed students to better understand the topic they were studying: cross-cultural business management. Students who participated in online geography courses implemented in a transnational cooperative setting by universities in Chile, China, Northern Ireland, Spain and the US also perceived that the content and multicultural setting of the courses facilitated the learning experience and made them more aware of global issues (Ray et al., 2012).

The MIT-Portugal Programme, referred to in the previous section and discussed by Pfothenhauer et al. (2013), shows that transnational collaborative programmes can be scaled up successfully. The study demonstrates that the external expertise and legitimacy of transnational partners was instrumental for Portugal “in jump-starting international visibility and attraction, creating critical mass networks and research clusters, overhauling traditional engineering curricula and teaching practices towards a greater role for innovation and entrepreneurship, and building an ecosystem of industrial, entrepreneurial, and venture partners” (Pfothenhauer et al., 2013, p. 237). Nevertheless, these results did not come cheaply. Portugal’s investment in these partnerships was significant, representing 1.8% of its annual higher education expenditure over a five year period (Pfothenhauer et al., 2013).

The current section has attempted to present the main cross-cutting issues emerging from the qualitative studies that analysed transnational collaborative projects. The aim was to highlight the main challenges faced by such institutional arrangements, e.g., building symmetric relationships and accommodating different viewpoints in negotiations between partners. In the process, we tried to extrapolate some of the costs that emerged from cooperation. Moreover, we highlighted the intricate relationships between the costs and benefits of cooperation that make these so difficult to isolate and study at an aggregate level.

6. Discussion and conclusions: Putting benefits and costs in the balance

The main driver for transnational collaborative partnerships between higher education institutions is considered the global competition in the higher education market (Middlehurst & Woodfield, 2007). As shown by the Joint Research Centre study (JRC, 2018), universities expect many benefits from such partnerships, but also anticipate a number of barriers and costs. Our systematic literature review revealed a plethora of anecdotal evidence about the benefits and costs of transnational collaborative partnerships (see **Table 1** and **Table 2**), but relatively few empirical studies have tested these causal claims. Moreover, the systematic literature review found no quantitative studies on the costs of transnational cooperation, only studies that attempt to quantify the relationship between transnational cooperation and various economic and non-economic benefits. **Table 5** summarises the findings from those quantitative studies that found evidence of a positive (non-null) relationship between transnational cooperation and various micro-, meso- and macro-level benefits.

Table 3. Findings from quantitative studies that positively link transnational cooperation in higher education with micro-, meso- and macro-level outcomes

		LEVEL OF ANALYSIS		
		MACRO (regional/national)	MESO (institutional)	MICRO (individual)
TYPES OF BENEFITS	ECONOMIC	<ul style="list-style-type: none"> - <i>More and better patents</i> (Fabrizi et al., 2016; Qiu et al., 2017) - <i>Economies of scale</i> (Zhang et al., 2017) 	-	<ul style="list-style-type: none"> - <i>Higher likelihood of employment at home and abroad</i> (Di Pietro, 2012, 2015; Parey & Waldinger, 2011; Wiers-Jenssen, 2011)
	NON-ECONOMIC	<ul style="list-style-type: none"> - <i>Positive attitudes towards open borders and democracy</i> (Jacobone & Moro, 2015; Llurda et al., 2016) 	<ul style="list-style-type: none"> - <i>Strengthened research and teaching capacity</i> (Hird & Pfothner, 2017) - <i>More and better scientific output</i> (Carillo et al., 2013) - <i>Attractiveness to foreign academics</i> (Lepori et al., 2015) 	<ul style="list-style-type: none"> - <i>Better foreign language proficiency</i> (Canto et al., 2013; Llanes et al., 2016) - <i>Increased mobility</i> (Netz & Jaksztat, 2017) - <i>More and better publications</i> (Albert et al., 2016; Cainelli et al., 2012; Carillo et al., 2013; Eisend & Schmidt, 2014; Frenken et al., 2010; He et al., 2009; Hird & Pfothner, 2017; Inoue et al., 2017; Jonkers & Cruz-Castro, 2013; Kwiek, 2015; Lissoni et al., 2010)

Some 25 quantitative studies reported evidence of a positive link between transnational cooperation in higher education and various economic and non-economic benefits. At the macro level, transnational cooperation between HEIs may lead to more and better patents, produce economies of scale in higher education provision, strengthen national research and teaching capacities, and may lead to the

development of positive attitudes towards open borders and democracy on the part of participants in exchange programmes.

At the meso level, partnerships between HEIs in different countries may lead to more and better research output and may make higher education institutions more attractive for foreign academics. We found no methodologically rigorous quantitative studies that assessed the economic benefits and costs of transnational cooperation at the meso level. This is a definite weakness of the current state of the art. A number of qualitative studies provide circumstantial evidence on these issues, but they are mostly descriptive single case studies that discuss self-reported benefits and costs of cooperation from the participants who set up the partnership and their reflections on its achievements and costs. Although imperfect and not always an explicit mission of transnational higher education collaborative partnerships, patents could be considered as proxies for economic benefits not only at the macro level, but also at the meso level, since HEIs that develop patents may realise institutional commercial revenue based on them.

At the micro level, there is empirical evidence showing that transnational collaborative partnerships may lead to economic benefits for individuals through their association with labour market outcomes: individuals with higher education experiences in foreign countries may have a higher likelihood of employment both abroad and when returning to their home country. The link between higher education abroad and favourable labour market outcomes may be due to the various non-economic benefits that individuals enjoy owing to their participation in transnational collaborative projects. For example, academic mobility was shown to positively impact cognitive skills, especially foreign language skills. Moreover, evidence from a relatively large number of quantitative studies shows that transnational cooperation is beneficial for the research productivity of academics and may increase the quality of their publications. Finally, participating in international mobility increases the likelihood that individuals will participate in more international mobility later in their life. In turn, this would strengthen the benefits previously acquired.

Micro-level benefits were the most studied aspects of transnational collaborations: 20 studies looked into the individual benefits that arise from such institutional arrangements, compared to 6 studies analysing macro-level and 5 studies analysing meso-level benefits (see Appendix 2 for details). The over-representation of micro-level studies may be the result of the availability of and access to data: it is typically easier to get quantitative data on individuals than on more complex units such as institutions or countries.

Looking at all the studies summarised in the findings sections, the inquiries mostly focused on whether **academic benefits** occur as a result of cooperation (n=18), followed by inquiries into **economic benefits** (n=10) and **socio-cultural benefits** (n=4) (see Appendix 2 for details). We found no studies that looked at the political benefits of transnational collaboration in higher education. A major limitation of the existing body of evidence is that rigorous empirical research on academic benefits is dominated almost exclusively by studies related to the effect of collaboration on research quantity and quality. There are only a few quantitative studies that assess the impact of transnational cooperation on teaching and learning outcomes, and the evidence on links between transnational cooperation in higher education and the quality of higher education provision is predominantly qualitative.

Our systematic review of relevant literature revealed that there are empirical studies that did *not* find evidence of a link between transnational collaborative partnerships and the expected benefits. At the macro level, Boehm et al. (2010) found no evidence that participating in an online international collaboration learning module decreased ethnocentric attitudes among participating students. Future

research should investigate whether other forms of delivering courses based on international collaboration can lead to a decrease in ethnocentric views.

At the meso level, one study found no evidence that co-publishing with researchers from other countries is linked to differences in research efficiency among American elite universities (Bruffaerts et al., 2013). Because of the different way in which American universities are structured and funded, further research could look in whether the link between transnational collaboration and institutional research efficiency exists between European universities.

At the micro level, a large-scale study by the European Commission (2014) concluded that there was no change in the personality traits of students participating in the Erasmus programme. A study by Ray et al. (2012) found that the geography content knowledge of students participating in an online course increased over time, but the gains in content knowledge were no different between groups of students who participated in an international collaborative version versus those in a non-collaborative version of the same course. In order to establish not just the benefits of international collaboration but also its cost-effectiveness, it is essential that future research compares the outcomes of individuals who participated in international collaborative exchanges, courses, and degree programmes not only to their own past traits or performance, but also to the traits and performance of comparable peers who were not exposed to such international collaborative experiences.

The systematic literature review did not reveal any quantitative studies assessing the costs of transnational cooperation. This is another significant weakness of existing research. Even theoretical and descriptive studies have much less to say about the costs of cooperation than its benefits, as evidenced by comparing **Table 1** and **Table 2**. A possible explanation for the lack of publications on costs is that transnational cooperation in higher education has been supported so much (both financially and discursively) by supranational, international and regional organisations, national governments, and higher education institutions that the expected benefits may be taken for granted and are not systematically researched.

Another possible explanation for the dearth of research on the costs of transnational cooperation in higher education is the constant fluidity of benefits and costs through time and between partners, which makes them difficult to isolate and study at an aggregate level. As the findings in Section 5 show, it can be difficult to disentangle the benefits and costs of transnational collaborative challenges on a large scale. Nevertheless, the evidence from qualitative studies clearly points to both economic and non-economic costs ensuing from building symmetric relationships between partners and negotiating different viewpoints in terms of goals, pedagogy and quality of higher education in a manner that produces optimal outcomes for all parties involved.

Our systematic review of the literature confirmed that that “there was a shortage of universities’ partnership studies till the late 1990s” and that most of the initial studies “focus on university-business partnerships, rather than university-university partnerships” (Ayoubi, 2013, p. 220). All of the studies that passed the detailed review and were analysed in this report were published in the last decade, between 2009 and 2017 (see Appendix 2 for details). This finding resonates with results of the Joint Research Centre survey of transnational collaborative partnerships in the European Union, which found that the majority of such institutional arrangements date from 2012 onwards, with very few dating from before 2000 (JRC, 2018). In fact, the majority of the studies analysed were published in the last 5 years, from 2013 onwards (n=20), and a quarter of these just in 2017 (n=5). These developments indicate that

solid empirical research on the topic is emerging in line with real-world developments of such institutional arrangements.

An important limitation of the body of available empirical evidence is the limited geographical scope of relevant and methodologically rigorous studies. There are relatively few quantitative studies that compare results across multiple countries. Evidence from Europe is over-represented in the sample of studies analysed (n=22), compared to studies presenting evidence from non-European areas (n=6) or from around the globe (n=1). This could be explained by the fact that European countries have a long history of collaboration in higher education. Moreover, European higher education institutions are supported by additional funding from the European Commission for cooperating across borders, which provides an added incentive to do so. Regarding the evidence pertaining to Europe, it is noteworthy that the overall picture of benefits is driven largely by evidence from a handful of Western and Southern European countries. Evidence from Italy, Spain and Germany seems to be over-represented in the study. Nevertheless, this could be explained by the findings of the JRC (2018) that even though all EU member states participate in transnational collaborative partnerships, large European countries (as is the case of Italy, Spain and Germany) participate in more partnerships in absolute terms. Hence, researchers from these countries might have better access to quantitative data on this topic. Appendix 3 provides more information on the geographical distribution evidence on the benefits of transnational collaboration in higher education.

In conclusion, the results from a relatively small but growing body of empirical research provide evidence that transnational cooperation in higher education is linked to various micro-, meso- and macro-level benefits in Europe and elsewhere. Further research is needed to address existing knowledge gaps in this body of literature, especially regarding the benefits related to teaching and learning, the quality of cooperative higher education provision, the political benefits of cooperation, and the costs of transnational cooperation. Further research is also needed to expand the geographical scope of the available body of evidence, as countries from the Nordic region and from Central and Eastern Europe are currently underrepresented in this body of evidence.

As the mapping study by the Joint Research Centre (2018) revealed, there is already a large number of transnational collaborative partnerships between higher education institutions in all the European Union member countries. Rigorous empirical evaluation of the benefits brought about by these existing institutional arrangements could better inform European evidence-based policy-making in this area. In order for research on transnational higher education partnerships to be policy-relevant, it is especially important for more quantitative studies to adopt rigorous experimental or quasi-experimental methodologies, so that a causal link between various forms of transnational higher education partnerships and relevant macro-, meso- and micro-level outcomes could be properly established. Rigorous case studies are also needed to better understand the challenges associated with implementing and sustaining transnational higher education partnerships, and the contextual forces that may amplify or mitigate the benefits of such partnerships. Last but not least, it is essential to develop a detailed documentation of the costs associated with various forms of transnational higher education partnerships. Only with solid evidence of both the benefits and costs of such partnerships can policy-makers' questions about the cost-effectiveness of transnational cooperation in higher education be answered.

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Appendix 1. List of keywords used in the database searches

Topic keyword	Area keyword	Outcome keyword
higher/ tertiary/ postsecondary/ university + education	international/transnational/ cross-border/European + cooperation/collaboration/ partnership/network	outcome, impact, benefit, human capital, externalities, aid, innovation/research and development/R&D, GDP, economic growth, diplomacy/security/peace/ democracy, diversity, cost, obstacle, challenge, consequence, subsidies, brain
university/ college/higher education institution	international/transnational/ cross-border/European + cooperation/collaboration/ partnership/ network	outcome, impact, benefit, effective/ness, efficient/efficiency, economies of scale/ scope, teaching and learning/ curriculum, research, policy/practice/service, quality, publication, patent, trust, attractiveness, performance, competitiveness, pedagogies, cost, obstacle, challenge, consequence
student/faculty/ researcher/ academic/ staff	international/European/ foreign + cooperation/ collaboration/joint	outcome, income, benefit, degree/ diploma, employment, earnings, skills, competency/competencies, promotion/publication/grant, intercultural, capital, cost, obstacle, challenge, consequence, tuition/fee, recognition, identity, stereotype, cultural shock

Source: Authors' own elaboration.

Appendix 2. Summary table of quantitative studies

Full citation	Level of benefit	Type of benefit	Relevant outcome(s)	Geographic focus	Methodology
Albert, C., Davia, M. A., & Legazpe, N. (2016). Determinants of research productivity in Spanish academia. <i>European Journal of Education</i> , 51(4), 535-549.	Micro	Academic	Publication quantity	Europe (Spain)	Non-experimental
Boehm, D., Kurthen, H., & Aniola-Jedrzejek, L. (2010). Do international online collaborative learning projects impact ethnocentrism? <i>E-Learning and Digital Media</i> , 7(2), 133-146.	Macro	Socio-cultural	Ethnocentrism	Europe (Poland)	Quasi-experimental (matched group design)
Bruffaerts, C., De Rock, B., & Dehon, C. (2013). The research efficiency of US universities: A nonparametric frontier modelling approach. <i>Universite Libre de Bruxelles, Working Papers ECARES: ECARES 2013-31</i> .	Meso	Economic	Institutional efficiency	Other (United States)	Non-experimental
Cainelli, G., Maggioni, M. A., Uberti, T. E., & de Felice, A. (2012). Co-authorship and productivity among Italian economists. <i>Applied Economics Letters</i> , 19(16-18), 1609-1613.	Micro	Academic	Publication quantity	Europe (Italy)	Quasi-experimental (instrumental variable design)
Canto, S., Jauregi, K., & van, d. B. (2013). Integrating cross-cultural interaction through video-communication and virtual worlds in foreign language teaching programs: Is there an added value? <i>Recall</i> , 25(1), 105-121.	Micro	Academic	Spanish language proficiency	Europe (Netherlands, Spain)	Non-experimental (pre- and post-test design)

Carillo, M. R., Papagni, E., & Sapio, A. (2013). Do collaborations enhance the high-quality output of scientific institutions? Evidence from the Italian research assessment exercise. <i>Journal of Socio-Economics</i> , 47, 25-36.	Meso	Academic	Publication quality	Europe (Italy)	Quasi-experimental (instrumental variable design)
Di Pietro, G. (2012). Does studying abroad cause international labor mobility? Evidence from Italy. <i>Economics Letters</i> , 117(3), 632-635.	Micro	Economic	Employment abroad	Europe	Quasi-experimental (instrumental variable design)
Di Pietro, G. (2015). Do study abroad programs enhance the employability of graduates? <i>Education Finance and Policy</i> , 10(2), 223-243.	Micro	Economic	Employment	Europe	Quasi-experimental (instrumental variable design)
Eisend, M., & Schmidt, S. (2014). The influence of knowledge-based resources and business scholars' internationalization strategies on research performance. <i>Research Policy</i> , 43(1), 48-59.	Micro	Academic	Publication quality	Europe (Germany)	Non-experimental
European Commission. (2014). The Erasmus impact study. (No. NC-04-14-545-EN-N). Luxembourg: Publications Office of the European Union.	Micro	Economic	Personality traits linked to employability	Europe	Non-experimental (pre- and post-test design)
Fabrizi, A., Guarini, G., & Meliciani, V. (2016). Public knowledge partnerships in European research projects and knowledge creation across R&D institutional sectors. <i>Technology Analysis and Strategic Management</i> , 28(9), 1056-1072.	Macro	Economic	Patent quantity	Europe	Non-experimental
Frenken, K., Ponds, R., & van Oort, F. (2010). The citation impact of research collaboration in science-based industries: A spatial-institutional analysis. <i>Papers in Regional Science</i> , 89(2), 351-371.	Micro	Academic	Research visibility	Europe (Netherlands)	Non-experimental
He, Z., Geng, X., & Campbell-Hunt, C. (2009). Research collaboration and research output: A longitudinal study of 65 biomedical scientists in a New Zealand university. <i>Research Policy</i> , 38(2), 306-317.	Micro	Academic	Publication quality	Other (New Zealand)	Non-experimental (panel data regression)

Hird, M. D., & Pfothenauer, S. M. (2017). How complex international partnerships shape domestic research clusters: Difference-in-difference network formation and research re-orientation in the MIT Portugal program. <i>Research Policy</i> , 46(3), 557-572.	Meso, Micro	Academic	Research quantity, quality, and visibility; empowerment of young researchers; within-country research collaboration; redirection of research activities towards priority areas	Europe (Portugal)	Quasi-experimental (difference-in-differences & statistical matching approaches) & Qualitative (Content Overlay Maps)
Inoue, H., Saito, H., Sugihara, S., Hirota, S., & Kameda, T. (2017). Agglomeration and networking in academic research. <i>Keizai Bunseki</i> , (194), 93-124.	Micro	Academic	Publication quality	Global	Non-experimental
Jacobone, V., & Moro, G. (2015). Evaluating the impact of the Erasmus programme: Skills and European identity. <i>Assessment & Evaluation in Higher Education</i> , 40(2), 309-328.	Macro	Academic, economic, socio-cultural	Attitudes about Europe	Europe (Italy)	Quasi-experimental (matched group pre- and post-test design)
Jonkers, K., & Cruz-Castro, L. (2013). Research upon return: The effect of international mobility on scientific ties, production and impact. <i>Research Policy</i> , 42(8), 1366-1377.	Micro	Academic	Publication quantity & quality	Other (Argentina)	Non-experimental
Koda, Y., & Yuki, T. (2013). The labor market outcomes of two forms of cross-border higher education degree programs between Malaysia and Japan. <i>International Journal of Educational Development</i> , 33(4), 367-379.	Micro	Economic	Employment, salary	Other (Malaysia, Japan)	Non-experimental
Kwiek, M. (2015). The internationalization of research in Europe: A quantitative study of 11 national systems from a micro-level perspective. <i>Journal of Studies in International Education</i> , 19(4), 341-359.	Micro	Academic	Publication quantity	Europe (Austria, Finland, Germany, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Switzerland, the United Kingdom)	Non-experimental

Lepori, B., Seeber, M., & Bonaccorsi, A. (2015). Competition for talent: Country and organizational-level effects in the internationalization of European higher education institutions. <i>Research Policy</i> , 44(3), 789-802.	Meso	Academic	Proportion of academic staff that is international	Europe (Germany, Italy, Lithuania, Latvia, Slovenia, Spain, Switzerland, United Kingdom)	Non-experimental
Lissoni, F., Mairesse, J., Montobbio, F., & Pezzoni, M. (2011). Scientific productivity and academic promotion: A study on French and Italian physicists. <i>Industrial and Corporate Change</i> , 20(1), 253-294.	Micro	Academic	Publication quantity & quality	Europe (France, Italy)	Non-experimental (panel data regression)
Llanes, Á., Arnó, E., & Mancho-Barés, G. (2016). Erasmus students using English as a "lingua franca": Does study abroad in a non-English-speaking country improve L2 English? <i>Language Learning Journal</i> , 44(3), 292-303.	Micro	Academic, socio-cultural	English language proficiency	Europe (Spain/Catalonia)	Non-experimental (pre- and post-test design)
Llurda, E., Gallego-Balsà, L., Barahona, C., & Martin-Rubió, X. (2016). Erasmus student mobility and the construction of European citizenship. <i>Language Learning Journal</i> , 44(3), 323-346.	Macro	Socio-cultural	Attitudes about European identity	Europe (Spain/Catalonia)	Non-experimental (pre- and post-test design) & Qualitative (focus group interviews)
Netz, N., & Jaksztat, S. (2017). Explaining scientists' plans for international mobility from a life course perspective. <i>Research in Higher Education</i> , 58(5), 497-519.	Micro	Academic	International academic mobility	Europe (Germany)	Non-experimental (structural equation modeling)
Parey, M., & Waldinger, F. (2011). Studying abroad and the effect on international labor market mobility: Evidence from the introduction of ERASMUS. <i>Economic Journal</i> , 121(551), 194-222	Micro	Economic	Employment abroad	Europe	Quasi-experimental (instrumental variable design)
Qiu, S., Liu, X., & Gao, T. (2017). Do emerging countries prefer local knowledge or distant knowledge? Spillover effect of university collaborations on local firms. <i>Research Policy</i> , 46(7), 1299-1311.	Macro	Academic	Invention patent applications	Other region (China)	Non-experimental

Ray, W. C., Muniz-Solari, O., Klein, P., & Solem, M. (2012). Effective online practices for international learning collaborations. <i>Review of International Geographical Education Online</i> , 2(1), 25-44.	Micro	Academic	Content knowledge in geography	Europe (Spain, Northern Ireland)	Non-experimental (pre- and post-test design) & Qualitative (online survey with open-ended questions)
Wiers-Jenssen, J. (2011). Background and employability of mobile vs. non-mobile students. <i>Tertiary Education and Management</i> , 17(2), 79-100.	Micro	Economic	Earnings, unemployment, international job	Europe (Norway)	Non-experimental
Zhang, L., Worthington, A. C., & Hu, M. (2017). Cost economies in the provision of higher education for international students: Australian evidence. <i>Higher Education: The International Journal of Higher Education Research</i> , 74(4), 717-734.	Macro	Economic	Economies of scale and scope in higher education provision	Other (Australia)	Non-experimental (panel data regression)

Appendix 3. Geographical distribution of quantitative studies surveyed in the study

Map of countries supplying quantitative evidence on transnational collaborative outcomes with European involvement



Notes: Countries shown on the map in light grey were analysed up to 3 times (n=13): Austria (1), Finland (1), France (1), Ireland (1), Latvia (1), Lithuania (1), Slovenia (1), Norway (2), Poland (2), Portugal (2), Switzerland (2), The Netherlands (3), and UK (3). Countries shown on the map in dark grey were analysed more than 3 times (n=3): Germany (5), Spain (6), Italy (8). In addition to the countries represented on the map, two additional studies were synthesised in this report that look at evidence from across Europe (Di Pietro, 2012, 2015).

Source: Authors' own elaboration based on tabular information presented in Appendix 2.

EENEE Analytical Reports

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|----|---|--|
| 36 | Daniela Craciun
Kata Orosz | Benefits and costs of transnational collaborative partnerships in higher education |
| 35 | George
Psacharopoulos | Education for a better citizen: An assessment |
| 34 | Daniel Münich
George
Psacharopoulos | Education externalities – What they are and what we know |
| 33 | Edwin Leuven
Hessel Oosterbeek | Class size and student outcomes in Europe |
| 32 | Michel
Vandenbroeck
Karolien Lenaerts
Miroslav Beblavý | Benefits of early childhood education and care and the conditions for obtaining them |
| 31 | Holger Bonin | The Potential Economic Benefits of Education of Migrants in the EU |
| 30 | Giorgio Brunello
Maria De Paola | School Segregation of Immigrants and its Effects on Educational Outcomes in Europe |
| 29 | Mette Trier
Damgaard
Helena Skyt Nielsen | The use of nudges and other behavioural approaches in education |
| 28 | Marius Busemeyer
Philipp Lergetporer
Ludger Woessmann | Public Opinion and the Acceptance and Feasibility of Educational Reforms |
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| 26 | Daniel Münich
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| 24 | Maria Knoth
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Nina Smith | The impact of school size and school consolidations on quality and equity in education |
| 23 | Torberg Falch
Constantin Mang | Innovations in education for better skills and higher employability |

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18	Reinhilde Veugelers Elena Del Rey	The contribution of universities to innovation, (regional) growth and employment
17	Giorgio Brunello Maria de Paola	The costs of early school leaving in Europe
16	Samuel Muehleemann Stefan C. Wolter	Return on investment of apprenticeship systems for enterprises: Evidence from cost-benefit analyses
15	Hessel Oosterbeek	The Financing of Adult Learning
14	Susanne Link	Developing key skills: What can we learn from various national approaches?
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12	Daniel Münich Erik Plug George Psacharopoulos Martin Schlotter	Equity in and through Education and Training: Indicators and Priorities
11	Adrien Bouguen Marc Gurgand	Randomized Controlled Experiments in Education
10	Torberg Falch Hessel Oosterbeek	Financing lifelong learning: Funding mechanisms in education and training
9	Reinhilde Veugelers	A Policy Agenda for Improving Access to Higher Education in the EU
8	Giorgio Brunello Martin Schlotter	Non Cognitive Skills and Personality Traits: Labour Market Relevance and their Development in E&T Systems
7	Eric A. Hanushek Ludger Woessmann	The Cost of Low Educational Achievement in the European Union
6	George Psacharopoulos Martin Schlotter	Skills for Employability, Economic Growth and Innovation: Monitoring the Relevance of Education and Training Systems
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