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The Economics of International Student and Scholar Mobility

Directions for Research

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Abstract

International trade in higher education services in the form of international student mobility has increased sharply since the 1960s and especially from Eastern Europe and Central Asia since the fall of the Soviet Union. Many international students, especially those with graduate degrees, stay on in the host country after graduation. Although their impact on labor markets has been investigated by economists, geographers, and regional scientists in recent years, most studies on international students focus on education and spatial issues, with very little economic analysis. Furthermore, the application of a trade in services framework to international student mobility is virtually nonexistent. Four areas of research have emerged that need further investigation, particularly for the Europe and Central Asia region. First is the research gap on host and source country pull and push factors affecting the demand and supply of international students. Second, there is little or no understanding of the impact of foreign direct investment in higher education services, both through the establishment of branch campuses as well as direct investment by multinationals in universities. Third, there is virtually no study on the impact of international student and scholar mobility on global collaborative patents. Fourth, there are very few field experiments in international student or migration research. These issues need to be understood for the development of appropriate policies in industrialized, emerging and developing economies, on the global mobility of students as well as establishment of branch campuses abroad.

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The Economics of International Student and Scholar Mobility: Directions for Research

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INTERNATIONAL STUDENT AND SCHOLAR MOBILITY: DIRECTIONS FOR RESEARCH

1. Introduction

Over the past two thousand years, students and scholars have been traveling across the borders to either get or provide education. During the nineteenth and twentieth centuries these educators were mostly missionaries of the Christian faith[2] (Castello-Climent et al., 2018; Smith, 2017; Hanson and Xiang, 2013). However, in recent years, exchange scholars, such as the U.S. Fulbright Exchange Fellows, have been encouraging connectivity between the host and the parent countries.[3] There is anecdotal evidence that missionary schools have educated international students who had eventually moved abroad to get an education and contribute to global knowledge in the STEM[4] fields (Barret et al., 2001). However, despite large-scale movements by students and scholars among different countries, economic analysis of the factors affecting such movements remains rare and for most countries virtually nonexistent. Past studies on the economic factors and impacts of international students, teachers and scholars are mostly descriptive. Most other studies have a historical and socio-cultural focus and suggestions for future research focus mostly on education policy and spatial issues (Riano et al., 2018b). In addition, the economics of international education, particularly in the STEM field, is further complicated by a complex web of global connectivity. For instance, an international student from Azerbaijan in Turkey may be studying at a branch of a US or UK university but may be funded by a German corporation such as BMW (Regini, 2011). Such a situation involves four different countries. However, even simple economic analysis of cross-border movements of students between two countries is rare, let alone a complex analysis of four countries. Furthermore, although detailed data on international students exist for countries such as the US and the UK, they are widely scattered among different sources and a lack of a comprehensive database has resulted in little or no empirical analysis, particularly using an international trade in services theoretical framework.

The objective of this paper is to provide a literature review on international students, connectivity and development with particular emphasis on the Europe Central Asia (ECA) region and suggest directions for future research. The review is intended to advance the understanding of the factors that affect the demand and supply of international students, teachers and scholars with particular emphasis on connectivity between source and host countries. It also intends to discuss the role that students, scholars,

[2] http://www.bu.edu/missiology/missionary-biography/t-u-v/thoburn-isabella-1840-1901/
[3] http://www.cies.org/
https://scudder.org/about/history/india-medical-missions/scudders-in-india/
https://www.bu.edu/missiology/missionary-biography/t-u-v/thoburn-isabella-1840-1901/
http://www.bu.edu/missiology/missionary-biography/t-u-v/thoburn-james-mills-1836-1922/
[4] Science, Technology, Engineering and Mathematics

researchers, academics and scientists play in strengthening connectivity to enhance innovation and technological diffusion and in the process, contribute to the economic development of the poorer partners. This review proceeds as follows. The next section discusses the literature on factors determining international student mobility, section III reviews literature on FDI in education services, section IV discusses the literature on the impact of international student and scholar mobility on connectivity and section V provides directions for future research and concludes.

II. Factors Determining International Student and Scholar Mobility

The United States has a significant comparative advantage in the export of higher education services (Chellaraj et al., 2008) and industrialized countries remain a major part of the international student network (Findlay et al., 2012; Weber and Duderstadt, 2012; Findlay, 2011; Weber and Duderstadt, 2008; Chen and Barnett, 2000). A number of universities are increasingly competing across the globe for international students (King et al., 2013; Bhandari and Blumenthal, 2011). However, studies applying migration theory to international student and scholar mobility are limited and the application of international trade in services theories is virtually nonexistent although a few descriptive studies mention the concept (Bashir, 2007).

There has been a significant increase in international student enrollments in the UK from the EU and ECA since 2010 (Findlay et al., 2012; Ackers and Gill, 2009). However, unlike the United States (Marrow et al., forthcoming), the UK had the largest degree of outward international migration, compared to the Netherlands while the US had the lowest (King and Sondhi, 2018; Moed et al. 2013). At the same time opposition to migrants and international students (Browne, 2002)[5] has resulted in a one-way street of educated British citizens migrating abroad in large numbers (Winder, 2004). This has resulted in one of the highest net brain drains[6] globally including to developing countries such as China and NICs such as Singapore and the Republic of Korea.[7] It has been further exacerbated by the country denying resident visas to spouses of UK citizen professionals and academics in recent years.[8] The proposed cap on

[5] http://www.civitas.org.uk/pdf/cs23.pdf

[6] https://www.theguardian.com/politics/2016/dec/28/dutch-woman-with-two-british-children-told-to-leave-uk-after-24-years
http://www.bostonherald.com/business/technology/2016/12/brexit_uncertainties_threaten_brain_drain_for_uk_science

[7] https://www.youtube.com/watch?v=dBtK48Y5AEw

[8] https://www.theguardian.com/uk-news/2016/dec/29/german-neuroscientist-told-to-leave-uk-residency-application-rejected-monique-hawkins
https://www.theguardian.com/world/2017/feb/28/scottish-woman-and-french-husband-quit-uk-over-brexit
http://www.globaltimes.cn/content/1067368.shtml
http://www.bbc.com/news/uk-england-beds-bucks-herts-41012762

international students is also likely to adversely affect the UK economy.[9] At the same time competition for international students has increased from countries such as Switzerland (Riano et al., 2018a), Portugal (Patricio, 2010), Poland (Kubiciel-Lodzinska and Ruszczak, 2016), Croatia (Borozan and Bojanic, 2015), Turkey (Bostrom, 2010) and South Africa (Gunter and Raghuram, 2018).

The British exit from the EU (BREXIT) is expected to further reduce the number of international researchers and scholars from both ECA and EU (Moskal, 2017) due to large-scale cuts in research funding for British universities from the latter.[10] It is also likely to adversely affect both mobility between EU and the UK (Portes, 2019; Lulle et al., 2019; 2018) and scientific collaboration (Hu et al., 2018). The problem is further exacerbated by the UK government counting international students against permanent immigrant caps (Kone and Ozden, 2017; Schiller and Caglar, 2011). By 2017, Canada had overtaken the UK as the preferred destination for EU students[11] and Australia did the same by 2018 for all international students.[12]

(i) International Student Pull and Push Factors

Past studies have analyzed the factors affecting international student mobility and these can be categorized into pull and push factors. Most studies focused on pull rather than push factors. One of the earliest analyses was undertaken by Cummings (1984) who contrasted the development approach and the world-systems approach in national education systems.

Pull factors such as democratic traditions in source countries were important for study in Germany (Bessey, 2012). For Asian students the focus was also on critical thinking (Song and McCarthy, 2018). For the Erasmus exchange program, pull factors such as host country size, cost of living, distance from the birth country, host country university quality, language and climate are all important (Gonzales et al., 2011). Host country academic as well as welcoming environment was important for Korean students (Park, 2009). Meanwhile, improving quality abroad was also a major factor (Dubois et al., 2014). Changes in Australian skilled immigration policies to offset the effects of brain drain (Burkhauser et al., 2016) along with its democratic traditions (Gribble and Blackmore, 2012; Ramburuth and McCormick, 2001; Shu and Hawthorne, 1996) resulted in an increasing number of international students studying in Australia (Levatino, 2017). A limited number of studies have also been undertaken in other countries. Attempts to attract international students to Thailand focused on certain demographic groups mostly from Southeast Asia (Lavankura, 2013). Malaysian universities are also attempting to bring in international students in recent years (Tan and Goh, 2014; Tham, 2013; Morshidi et al., 2011) with limited success.

[9] http://www.independent.co.uk/news/education/education-news/cap-brexit-international-student-visas-cost-uk-economy-2bn-year-immigration-hepi-a7526026.html
[10] http://www.telegraph.co.uk/education/0/will-brexit-impact-british-universities/
[11] https://www.timeshighereducation.com/news/canada-overtakes-uk-most-desirable-country-eu-students
[12] https://www.bbc.com/news/education-44872808

Finally, tightening up of immigration policy reduced the number of Indian students studying in Australia (Hawthorne, 2014).

In addition to the country and region-specific studies discussed earlier, a few studies have been undertaken for a cross-section of countries across the globe regarding pull factors. Geographical distance (Abbott and Stiles, 2016; Bessey, 2012), fluctuations in exchange rates (Braymen and Briggs, 2017), housing prices and the quality of the universities in host countries (Beine et al., 2014; Perkins and Neumayer, 2014; Kahnec and Kralikova, 2011), tuition and fees (Beine et al., forthcoming), increasing merchandise trade and educational factors such as courses offered and size of universities (Wei, 2013) all had a significant impact on global student mobility. Evidence also indicates that there is a linkage between nonresident enrollment and the economic environment where the university is located (Baryla and Dotterweich, 2001).

In contrast to pull factors, very few studies exist on push factors. Countries with lower labor force participation rates such as those in the Former Soviet Union (FSU) had a higher share of students studying abroad (Chankseliani, 2016). Home country economic wealth and population, bilateral trade (Zheng, 2014) and visa approval rates (Jena and Reilly, 2013) were important for the UK. The push factors include social and cultural motivation (Van Mol and Timmerman, 2014) as well as financial interests (Caruso and de Wit, 2015). In other regions, a few non-empirical studies focused on the importance of push factors such as source country demographic changes, and human capital (Kim and Roh, 2017; Hira, 2003) and increases in source country incomes (Bird and Turner, 2014). Sending country tertiary supply was a major push factor due to shortage of space in domestic universities (Kritz, 2016).

(ii) Stay Rates of International Students

Globally it was shown that between 1970 and 2000, on average, an increase of international students by 10 percent increased the stock of tertiary educated workers in host countries by 0.9 percent (Felbermayr and Reczkowski, 2012). Until the early 1980s most international faculty members at the Australian universities were from the UK or the US (Saha and Klovdahl. 1979), but the composition changed since the 1980s (Naidoo, 2010; Verbik and Lasanowski, 2007). Finally, it was found that those Indians who study abroad are more likely to migrate than those who do not (Czaika and Toma, 2017).

A few studies are also available on factors affecting the stay rates of international students in their host countries. Settling down in the UK is not the main priority for international students (Pasztor, 2015). There are both host country and home country factors that affect stay rates. Among the host country factors, marriage-related migration was important for the Surinamese in the Netherlands (Bijwaard and Rodriguez, 2013) while the length of study resulting in migration to the country was important for other nationals (Oosterbeek and Webbink, 2009), with the well-educated more likely to stay (Bilgili and

Siegel, 2017). Constraints and opportunities were the main factors affecting stay rates in Denmark (Mosneaga and Winther, 2013). The expectations of the family to stay in the host country were of secondary importance for Germany's international students (Petzold and Moog, 2018). For the EU as a whole, it was found that the younger international students are more likely to stay than older students. For the ERASMUS programs, there was a 15 percent increase in the individual's probability of working abroad (Parey and Waldinger, 2011). Finally, due to increasing marriage with foreigners, educated Turkish women are less likely to return (Gungor and Tansel, 2014).

The US is the leading destination of migrants in the world (Ozden et al., 2011). The stock of international students is positively related to stay rates in the US (Dreher and Poutvaara, 2011, 2005; Li et al., 1996). Finn (1999-2014) found that stay rates varied by nationality. Research funding mattered for post-doctoral appointments (Cantwell and Taylor, 2013). However, it was also shown that most international students to the US are not intending immigrants, at least initially (Hazen and Alberts, 2006; Poston and Luo, 2007). In the long-run, stay rates depended on job satisfaction (Lawrence et al., 2014). Studies on stay intentions have also been carried out for other countries. For the Chinese students in Japan it depends on the occupational characteristics of corporate Japan and immigrant entrepreneurial practices (Liu-Farrer, 2009). Japan is also increasingly competing for global talent, including from Sub-Saharan Africa.[13] However, the most important driving force of international students staying on in particular host countries after graduation is the fact that these countries have allowed them to apply for resident status from within their country as a part of immigrant recruitment strategy (Baas, forthcoming; Thomas and Inkpen, 2017; Ziguras and Law, 2006; Tremblay, 2005). Singapore until recently followed similar strategies to offset brain drain from the country (Ziguras and Gribble, 2015). Thus, study abroad could be a deliberate strategy for future immigration (Levatino, 2017). The stock of international students is positively related to subsequent migration either to the host country or a third country (Dreher and Poutvaara, 2005). For the UK and Canada, Geddie (2013) found that relationship considerations, such as care for aging parents, managing dual careers, and future childcare and work-life balance concerns are important.

Source country factors were also important. In general, factors affecting the stay rates of Turkish students include the importance of family and homeland, economic and political instability in Turkey as well as the length of study abroad (Tezcan, 2019; Gungor and Tansel, 2008a, b; Tansel and Gungor, 2003). Students from East and South Asia and Eastern Europe were also more likely to stay (Migration Policy Group, 2015). Meanwhile, the political (Gao, 2009; Gao and Liu, 1998; Brastsberg, 1995) and

[13] https://www.bbc.co.uk/programmes/p065915t

economic (Grogger and Hanson, 2015; Kim et al., 2011) situation back home also mattered. along with the quality of life in host countries (Tan and Hugo, 2017).

(iii) Consequences of International Students

There were also consequences of international students and scholars for host countries which could be both negative and positive. Among the negative impacts, while a National Academy of Sciences (2016) study emphasized the need for skilled immigration and international students, Beckhausen et al. (2013) question its wisdom. However, both studies have drawbacks as they do not address the fact that nearly 40 percent of all migrants into the US are spouses and children of US citizens. Many of these immigrants, although skilled, do not enter under the skilled category. Contrary to economic evidence (Biavaschi et al., forthcoming; Breunig et al., 2017; Islam and Fausten, 2008; Chapman and Cobb-Clark, 1999), similar erroneous arguments have been made for skilled immigrants in Australia.[14] Furthermore, Cappelli (2015) claims that over-education is a major problem in the US without taking into consideration the problem of skill heterogeneity (quality), an issue that has been emphasized by Hanushek et al. (2017; 2015) and Hanushek and Woesmann (2012, 2011). Finally, these studies do not take into consideration the impact of FDI and trade and other benefits for both the migrant sending and receiving countries.

Borjas (2007) contends that the admission of international students has come at the expense of US males who have been crowded out. Hira and Gopalaswamy (2019) emphasize the need for reforming skilled immigration policies. However, both studies fail to identify the likely reasons for dependence on international students and talents: (i) cuts in US education budgets (Bound et al., 2016) which has forced universities to depend on international students and even multinationals for education finance and (ii) cuts in advanced placement classes at the pre-university levels, which short-changes many US students (Jackson et al., 2018; 2016; Hyman, 2017; Card and Payne, 2002).[15] Furthermore, although Bound et al. (2017) found that H-1B visas lead to decline in wages in the US, a result disputed by other studies (Peri et al., 2015; Kerr et al., 2015), it was also found that the lack of preparation of the US students[16], which results in poor quality, does matter (Richey and Rosburg, 2017; Bound et al. 2010). School segregation and inequality of opportunities also aggravate the problem (Golden, 2006).[17] However, labs in the US

[14] https://www.cis.org.au/app/uploads/2015/04/images/stories/policy-magazine/2010-autumn/26-1-10-bob-birrell.pdf

[15] In states such as Texas, budget cuts have been so severe that teachers have to spend their own money buying school supplies.
http://spectrumlocalnews.com/tx/austin/news/2018/05/21/study--texas-teachers-paying-more-for-school-supplies-out-of-pocket-

[16] http://www.pewresearch.org/fact-tank/2017/02/15/u-s-students-internationally-math-science/

[17] https://www.nbcnews.com/think/opinion/white-parents-are-enabling-school-segregation-if-it-doesn-t-ncna978446

directed by the foreign born tend to be populated by students from the same country than those directed by US faculty (Tanyilidz, 2015). As a result, many are not culturally engaged with their hosts or with each other (Urban, 2014). Developing country consequences of international mobility have also been studied. In the early 1980s, the loss of foreign exchange especially from countries such as Singapore was emphasized (Lee and Tan, 1984). However, it is not clear whether the students return home, stay in the host country, move to a third country (brain drain) or contribute globally (Chabe-Ferret et al., 2018; Dalglish et al., 2011).[18]

Evidence indicates that the positives of international student and scholar migration outweigh the negatives. For inter-Europe student and scholar mobility, diversity improved the performance of Germany (Niehbur, 2009) and several ECA countries (Ozgen et al., 2014) in the R&D sector. ECA-EU mobility also led to cultural enrichment in Austria, Belgium, Italy, Norway and Poland for the period 2008-2010 (Van Mol, 2013). Furthermore, empirical evidence also indicates that birthplace diversity leads to better economic performance (Ager and Brueckner, 2018; Zhu et al., 2018; Bove and Alia, 2017; Alesina et al., 2016; Ashraf and Galor, 2013; Berliant and Fujita, 2012). However, migration of Russian scholars and students resulted in a lack of mentors and professionals to train future PhD students back home (Ganguli, 2015; 2014).

Other benefits from international students and skilled immigrants including innovation (Fassio et al., 2019; Albarran et al., 2017; Akcigit et al., 2017a,b; Stephan et al., 2015; Franzoni et al., 2014; Gaule and Piacentini, 2013; Mattoo et al., 2012; Stuen et al., 2012; Kerr and Lincoln, 2010; Hunt and Gauthier Loiselle, 2010; Levin and Stephan, 2009; Chellaraj et al., 2008; Stephan and Levin, 2001) and increased STEM employment for natives (Hanson and Slaughter, 2019) have been confirmed. Finally, a recent study indicates that older US Medicare patients who consulted with foreign born doctors had lower mortality rates than those who consulted with US born doctors.[19] In general, evidence indicates that migrant scientists outperform domestic scientists and contribute globally (Franzoni et al., 2014).

III. FDI in Education Services

Global university governance is found to operate through 'steerage', networks including branch campuses, deliberation and communities of the knowledgeable and the expert (King, 2009). In the modern global era, there are two forms of Foreign Direct Investment (FDI) related to international education : (1) FDI abroad by universities themselves, i.e., the location of branch campuses in other countries; and (2) by profit seeking multinationals investing directly in universities. Examples include

https://www.yahoo.com/gma/actresses-ceos-arrested-nationwide-college-admissions-cheating-scam-142252158--abc-news-topstories.html

[18] http://www.dreambigfilm.com/team/menzer-pehlivan/

[19] http://www.bmj.com/content/356/bmj.j273

Rolls Royce investing in Purdue University,[20] Toyota's investment in the University of Michigan[21] and BMW investing in Clemson's Automotive Engineering Department.[22] The fundamental challenge for international branch campus administrators is balancing the competing demands of a range of internal and external stakeholders (Healey, 2005). Hence a need to develop strategies for international branch campuses based on the needs of the region where the branch will be located and the long-term goals of the university is emphasized (Wilkins and Neri, forthcoming; Knight, 2015; Girdzijauskaite and Radzeviciene, 2014).

In the EU-ECA region, branch campuses of foreign universities remain rare. In 2014, Tongii University in China established a branch campus in Florence, Italy, contributing to the internationalization of Chinese higher education (Bellini et al., 2016). Although foreign universities are setting up branch campuses in countries such as China for both teaching and research (Fang, 2012) and many receive private sector funding both from domestic and international firms (He, 2009; Ennew and Fujia, 2009), empirical literature on both forms of FDI is rare and applications of international trade theory to analyze such FDI is virtually nonexistent. Finally, Wilkins and Huisman (2012) hypothesize that the concepts of legitimacy, status, institutional distance, risk-taking, risk-avoidance and the desire to secure new sources of revenue are major factors in establishing universities abroad.

In a pathbreaking study for China, Xu and Silvester (2017) using contract theory studied the impact of foreign universities on human capital accumulation and brain drain. However, the major drawback of this study is that it does not take into consideration the impact of foreign universities on the entry of international students. To achieve the goal of human capital accumulation, China has not only been expanding its world class universities (Zhang et al., 2013) but is also recruiting world class science and engineering talent from abroad for its expanding universities, paying salaries competitive with top US universities (Science, 2016).

Specific studies have been undertaken for a few other countries such as Singapore and the United Arab Emirates but most focused on issues other than economics. During the 1990s and 2000s Singapore attempted to internationalize its universities as well as encourage world class universities to establish branch campuses in the country (Daquila, 2013; Toh, 2012). Olds (2007) focused on the planned establishment of the University of New South Wales in Singapore. However, by 2007 the University of

[20] https://www.purdue.edu/newsroom/releases/2016/Q2/rolls-royce,-purdue-combine-strengths-to-create-33-million-strategic-partnership-for-jet-engine-design.html

[21] http://www.engin.umich.edu/college/about/news/stories/2016/august/accelerate-artificial-intelligence-research

[22] http://www.engin.umich.edu/college/about/news/stories/2016/august/accelerate-artificial-intelligence-research
http://www.clemson.edu/cecas/departments/automotive-engineering/students/prospective/bmw-ms-fellowship.html

New South Wales shut its doors in Singapore after just one semester.[23] By 2016, the University of Chicago moved its Asian branch from Singapore to Hong Kong SAR, China.[24] Meanwhile, emphasis placed by domestic universities on hiring graduates of top international universities, to compete globally, has resulted in fewer Singaporean born professors and complaints from the population.[25]

For the United Arab Emirates (UAE), Wilkins and Huisman (2012) found that the main motivations of students who study at an international branch campus are different from those students who study at the home campuses. Furthermore, the evaluation of the international branch campuses in the UAE (Wilkins and Huisman, 2013) suggests that reputation, program quality and rankings all played a major role in the decision by students to attend colleges and universities (Wilkins and Huisman, 2010). Similar results were found for students attending Irish universities abroad (Dowling-Hetherington, forthcoming). Finally, the presence of international campuses in the Arab Gulf states also led to their overall economic development (Wilkins, 2011).

Salt and Wood (2014) developed a conceptual framework to analyze the branch campuses in the context of multinational enterprises (MNEs) as well as trade and FDI theories and conclude that many universities lack the infrastructure to manage overseas staff requirements, have different approaches to career development, view the role of intra-university transfers differently from MNEs and have a different attitude to dealing with contingency. It is evident that the resources cut by governments in both the US and Europe are being increasingly replaced by the private sector, both domestic and international (Sengupta and Ray, 2017). However, global firms tend to invest more in the US universities such as MIT or Purdue than their European counterparts (Regini, 2011).

Finally, although the motives of establishing international branch campuses are not clear, there is some anecdotal evidence that quotas on international student enrollments (Lomer, 2018) could encourage universities to open campuses abroad ("export controls jumping"). Quotas on international students are essentially export controls, as this is a restriction on export of higher education services. Some UK universities are also planning to open campuses abroad after BREXIT[26] (Lulle et al., 2019).

IV. Impact of International Student and Scholar Mobility and Branch Campuses on Connectivity

International research collaboration has emerged as an important area in the economics of innovation (Chen et al., 2019). It was shown that establishing the right connections within such dense networks appears to be more crucial than any other factor, thus highlighting the importance of linkages

[23] http://www.theaustralian.com.au/higher-education/unsw-singapore-campus-doomed-to-fail/news-story/f5e86304426b1b57df267345157a4397

[24] https://www.ft.com/content/e30e88e0-e8a5-11e2-aead-00144feabdc0

[25] https://www.timeshighereducation.com/opinion/singapores-fling-global-stars-sidelines-local-talent

[26] http://www.telegraph.co.uk/education/2017/02/19/exclusive-oxford-university-set-break-700-years-tradition-open/

(or the effects of their absence) within innovation systems (Ribiero et al., 2014; Monrone and Taylor, 2010). Among the first studies, Gould (1994) found that for the United States and Canada, immigrant links played a major role in increasing bilateral trade flows. Other studies have been undertaken during the past two decades (Taylor, 2016).

(i) Student and Scholar Mobility and Connectivity

Several factors work in favor of and against connectivity. Factors working against connectivity include xenophobia (Cuervo and Cook, forthcoming; Botterill, K. and Hancock, J. 2019; Guma and Jones, 2019; Jardina, 2019; Metzl, 2019; Lawson et al., 2019; McCarthy, 2019; Miller, 2019; Ranta and Nancheva, 2019; Tyrell et al., 2019),[27] cultural differences (Franca et al., 2018; Levatino et al., 2018; O'Connor, 2018), religious and ideological differences (Sadowski-Smith and Li, 2016), as well as restrictions on employment after graduation (Amuedo-Dorantes and Furtado, 2019). Factors which work to enhance connectivity include education, academic and global employment networks (Barrios et al., forthcoming; Chaminade et al., 2018; Richardson, 2017; Robertson et al., 2016; Leung, 2013; Glaeser, 2011; Teichler, 2004; Crul and Vermullen, 2003), as well as migration (Gentile, 2019; Triandafyllidou, 2018). The importance of differentiation between the bilateral and multilateral contingents in the assessment of international scientific collaboration has also been emphasized (Gorraiz et al., .2012).

Eastern Europe and the FSU began exchange programs with the EU in 1995 (Bollag, 1994), but the West European universities continue to be more internationalized relative to their Eastern counterparts (Bonaccorsi, 2014). Furthermore, Erasmus exchange students and brain circulation benefited the ECA (Marques et al., 2009). Teoddorescu and Andrei (2011) found that scientists from West European countries of the EU played a key role in stimulating the international collaboration of academics by engaging in research projects with East European scholars. Thissen et al. (2014) and Ackers (2005) found that deeper European integration facilitates knowledge spillovers among the EU countries. However, collaboration as well as connectivity among the CIS countries has declined significantly since the fall of the Soviet Union (Karamourzov, 2012) along with the collapse of Soviet science (Ganguli, 2015). Meanwhile, Acosta et al. (2011) found that differences in scientific resources (as measured by R&D expenditure) between countries of the EU-15 explained differences in connectivity rather than GDP. Membership in the EU had a positive impact on the co-publication intensity between the new

[27] https://www.cnn.com/2019/03/09/opinions/brexit-has-radicalized-british-politics-opinion-intl-gbr/index.html
https://www.bbc.com/news/magazine-33962179
https://www.theguardian.com/politics/2019/mar/07/amber-rudd-apologises-to-diane-abbott-for-calling-her-coloured
https://www.smh.com.au/nsw-election-2019/michael-daley-claims-foreigners-taking-young-people-s-jobs-20190318-p51591.html
https://www.theguardian.com/world/2019/mar/15/australian-senator-fraser-anning-criticised-blaming-new-zealand-attack-on-muslim-immigration

member states of Eastern Europe and old member states and, in particular, within the new member states (Makkonen and Mitze, 2016). The volume of international contacts among Norwegian university staff has increased substantially during the past 20 years, particularly for research collaboration and international publishing (Fitjar and Huber, 2015; Smeby and Trondall, 2005). Finally, free movement of EU citizens (Reechi and Favell, 2009) and proximity of partners (Hazir et al., 2018) significantly improved inter-European connectivity.

The trend towards more geographically dispersed scientific teams accelerated beginning with papers published at the start of the 1990s due to a sharp decline in the cost of collaboration (Adams et al., 2005). There is some evidence of South-South connectivity among the five BRICS countries (Brazil, the Russian Federation, India, China and South Africa). Research indicates that the trends of intra-BRICS collaboration remained stable over time (Finardi, 2015). However, Bouabid et al. (2016) found that both the intra-BRICS high-technology flows and the intra-BRICS scientific collaboration have remained very weak. Finally, He and Maskus (2012) developed a theoretical framework for "reverse" knowledge spillovers from developing to industrialized countries through FDI, although there are no empirical studies.

(ii) Benefits of Connectivity

Until the analysis by Gould (1994), most studies focused exclusively on brain drain (Grubel and Scott, 1966) and many still do (Boeri et al., 2012; Adnett, 2010; Gribble, 2008). However, this focus on developing and emerging market brain drain has been disputed by Szelenyi (2006), who emphasizes that this focus assumes a zero-sum game and by Theoharides (2017) who showed that an average year-to-year percent increase in migration causes a 3.5 percent increase in secondary school enrollment for the Philippines. Theoharides (forthcoming) has also shown that restrictions on migration from the Philippines to Japan has resulted in adverse effects in the latter. A recent study (Kim and Lee, 2016) found that brain drain from low income countries can be positive for the source countries and could lead to higher FDI flows and better connectivity. Global innovator networks led to increasing knowledge flows across borders (Ribeiro et al., 2014). Meanwhile evidence indicates that a positive shock to R&D in the US has a significant positive effect on the innovation of all other countries (Bottazi and Peri, 2007). Thus, an invention by an immigrant in the US has global benefits. The ethnic composition of inventors, their cross-border mobility as well as international interactions are important for innovation particularly for high tech industries as well as diffusion of knowledge (Akcigit et al., 2018; Branstetter et al., 2018; Kerr and Kerr, 2018; Breschi et al., 2017; Nathan, 2015; Kerr, 2008; Saxenian, 2005; Hu and Jaffe, 2003). This form of connectivity is transforming brain drain into brain circulation and providing a more flexible and responsive mechanism for promoting transfers of technology and skills for both China and India (Saxenian, 2002). Further, capacity of people, firms, and countries to successfully compete for global

talent will be critical to patenting and collaborative patents (Kerr et al., 2016). A recent study (Gould and Panterov, 2017) found that a combination of connectivity measures including migration have a positive impact on economic growth and business development along with years of schooling. Finally, despite all the focus on "loss" to developing countries, anecdotal evidence shows that brain drain is also a major problem for industrialized countries such as the UK[28] and Australia,[29] more so than even developing countries as they do not receive any free technical assistance from abroad.

Studies were also undertaken on the benefits of connectivity in the ECA region. Human capital is an essential driver for the growth of national and European innovation systems and evidence indicates that this happens partly through inter-European and global connectivity (Hazir et al., 2018; Kiuru and Inkinen, 2017). The 1999 Bologna Declaration (Capuano and Migali, 2017) aims to create a Europe of Knowledge through connectivity among the countries of the EU (Wedlin, 2016; Chou and Gomitzka, 2014; Georghoiu, 1998). Kazakhstan began to internationalize its research programs in 2015 (Jumakulov et al., 2019). Introduction of new research evaluation policies in most of the Eastern European countries was followed by a substantial growth in their scientific productivity (Pajic, 2015). EU funded R&D networks also led to positive immediate impacts on regional knowledge production (Wanzenbock and Piribauer, 2018). Benefits of connectivity such as improved research productivity have also been documented for the Russian Federation (Dyker, 2001), Italy (Abramo et al., 2011), Germany (Jons, 2009), Portugal (Baruffaldi and Landoni, 2013), Spain (Bordons et al., 2015; Canibano et al., 2011) and Turkey (Gokbayrak, 2012; Matthews, 2007). Finally, recent simulations also found that declines in international students in the UK as a result of BREXIT would lead to declines in intra-European economic connectivity and sharp declines in GDP (Tijssen et al., 2017; Portes and Forte, 2017).

In other regions, for China, Priebe and Rudolph (2015) found that the effect of the Chinese diaspora is transmitted to home countries via increased trade openness, enhanced investment, and general TFP effects. Chen et al. (2013) showed that the relative manufacturing strength, international trade exposure, and the respective economic standing have a positive effect on the propensity for engaging in international co-invention activities. Finally, Chinese immigrants and students traveling between China and Hong Kong SAR, China, increased scientific collaboration (Iredale and Guo, 2016; Freeman and Huang, 2015).

Studies on collaboration with specific countries were also undertaken for China. He (2009) found that international collaboration publication output between China and the G7 countries has shown exponential increase due to the growth of science in China, with the US the most important collaboration country. Barth et al. (2014) found evidence of increasing scientific cooperation between German and

[28] http://www.birminghampost.co.uk/news/regional-affairs/foreign-universities-try-poach-academics-12951636
[29] http://www.professionalsaustralia.org.au/scientists/blog/science-brain-drain-hurting-australia/

Chinese institutions in the field of life sciences between 2007 and 2011. Finally, Wang et al. (2013; 2012) found that nearly 95 % of the internationally co-authored papers are in collaboration with only 20 countries, among which the US accounted for more than 40 % of all publications.

Regarding other countries, skilled migration and mobility of scholars and students also benefitted those who were left behind in Nepal (Shrestha, 2017). Chachashivili-Bloom et al. (2016) found little or no evidence of scientific collaboration between Israel and the FSU countries despite the presence of a large number of Russian and other CIS émigré scholars and students in the former. Finally, connectivity between New Zealand and Melanesia was enhanced by international students and the Maori-Island Polynesian cultural linkages (Franken, 2012).

A few studies also focused on return migration and connectivity. It was found that return migration reversed the impact of brain drain in ECA (Mayr and Peri, 2009) and encouraged entrepreneurship and job creating activities in countries such as Albania (Piracha and Vadean, 2010; Germenji and Milo, 2009). Fulbright fellows return requirements mainly benefited countries that have weak scientific environments (Kahn and MacGarvie, 2016). For Korea, it was shown that foreign-educated labor accounted for a sizable portion of growth in FDI flows (Kim and Park, 2013). Iredale et al. (2003) found that for Bangladesh, China, and Vietnam, government policies in facilitating return migration through the promotion of entrepreneurship, education and training can play a crucial role. For India, it was shown through a natural experiment that returning managers disproportionately filed more patents (Choudhury, 2016). For Argentina, Jonkers and Cruz-Castro (2013) confirmed the expectation that having international work experience explained the propensity to co-publish internationally and researchers collaborate to a higher degree with their former host system. For Africa, Dinkelman and Mariotti (2016) estimated the net effects of migration from Malawi to South African mines and found that 20 years later, human capital is 4.8–6.9 percent higher among cohorts who were eligible for schooling in communities with the easiest access to migrant jobs. Finally, in 2008, the Government of Ecuador initiated a program for productive return dubbed the Cucayo Fund, aimed at financing small businesses for migrants who were returning to the country (Lacomba and Cloquell, 2017).

Blachford and Zhang (2014) found that brain circulation was frequent in the case of Chinese-Canadian academics but that certain conditions and factors, especially some disparity issues associated with international migration of human capital, have prevented a more effective brain circulation from taking place. Meanwhile, Jonkers and Tijssen (2008) found that while host countries may lose human capital when Chinese scientists return home, the so-called "return brain drain", they may also gain in terms of scientific linkages. Chinese return migrants accumulated more human and social capital, have more self-financed funds and are more likely to start a business (Yu et al., 2017) and they also improved productivity relative to those who never migrated from China (Wei et al., 2017). Chacko (2007) found

positive effects of return Indian migrants on various sectors of the regional economy as well as the social and physical infrastructure of Bangalore and Hyderabad and in forging and solidifying transnational linkages between India and the United States. Agarwal et al. (2011) found that knowledge access conferred by the diaspora is particularly valuable in the production of India's most important inventions as measured by citations received. However, unlike China, India has not been on the forefront of attracting international talent to the country (Chakrabarti et al., 2010).

Studies on the benefits of global and inter-continental connectivity have also been undertaken in recent years and its impact on technology diffusion emphasized (Keller, 2004). Networks and universities are playing an important role in global technological transfer (Acemoglu et al., 2016). Bauder et al. (2017) and Balaz and Williams (2004) established the link between migration and learning as well as technology transfer along with the importance of English language. Foreign R&D has beneficial effects on domestic productivity, and these are stronger the more open an economy is to international trade (Coe and Helpman, 2015). Abramo et al. (2011) found that both research productivity and average quality of output have positive effects on the degree of international collaboration achieved by a scientist. Globally, there is a need to reframe the role for science, technology and innovation institutions including higher education and to integrate local community, national and global technology objectives (Turpin and Krishna, 2007). International mobility of scientists and their role in technology transfer has also been documented (Scellato et al., 2015; Edler et al., 2011) although there are associated risks (Brew et al., forthcoming). For instance, internationally educated individuals promote democracy in their home country, but only if the international education is acquired in democratic countries (Spilimbergo, 2009). Overall, evidence suggests that migrants including international students contribute to the integration of their home-countries into the global economy (Rappaport, 2016). However, for developing countries, long-term benefits will not materialize unless LDCs themselves create the political and economic environment that will allow them to tap into overseas networks of their nationals so as to ensure that the 'brain drain' turns into 'brain gain' (Kapur, 2001).

A number of studies focus on policy issues related to globalization and connectivity. Freeman (2015, 2013, 2010) emphasized the importance of globalization of knowledge creation as the fundamental global driver of economic outcomes in today's information economy. The role of human capital and talent for creativity, entrepreneurship and regional development, the role of institutions and the influence of the global context on the location, export and innovation behavior of firms in a knowledge economy are all important (Karlsson et al., 2012). Gazni et al. (2012) found that the largest teams have become more diverse than the smaller teams and tend more toward inter-institutional and international collaboration. Jaffe and Trachtenberg (1999) found increasing patent citations among patents jointly taken out by inventors in the U.S., the U.K., France. Germany and Japan. Kato and Ando (2017) showed a positive

relationship between the international mobility of researchers and their performance. Finally, firm learning from diaspora has also increased sharply (Oettl and Agrawal. 2008).

V. Conclusions and Directions for Future Research

As is evident from the literature review, application of international trade and FDI theories to global mobility of students and scholars is virtually nonexistent. Furthermore, lack of research on the impact of returning and non-returning international students on international knowledge diffusion needs to be addressed (King and Raghuram, 2013). Raghuram (2013) suggests that an analysis of student migration where the inducements that universities offer to prospective students and the subjective responses of such students to these invitations will throw light on how the spatiality of knowledge is achieved and highlight the distinctiveness of student migration in a skilled migrant world. Research on international students whether at the regional, national or international levels has been hampered by a lack of a comprehensive international student and scholar database. Although detailed data on international students are available to the public for at least five countries-US, Canada, Australia, the UK and Turkey, and to some extent for New Zealand and a few EU countries, they are fragmented, hampering any meaningful analysis. Furthermore, for countries such as Denmark, database on stay rates is very expensive. Discussed below are suggestions for future research on international student mobility.

(i) Creation of an International Student Database

There is a need to create a database on international student mobility in the context of trade in services and migration. The most detailed data are available for the United States. However, these data are from different sources such as the National Science Foundation and the Institute for International Education. Detailed data by different schools such as engineering, level of study such as PhD as well as field, university, country and nationality of professors are available from various data sources published by the NSF at the national and state levels. Birthplace of the professors are available from the faculty information of the various universities by schools and departments. In addition, stay rates of international students have been published by the Oak Ridge National Labs (Finn, 1999-2014). Such details are not available for other countries, but the UK, Australia, Turkey and Canada publish data on international students by country and fields of study such as engineering. Other countries such as New Zealand, Ireland and Japan and a number of EU countries also have some detailed data on international students.

(ii) Application of International Trade Theories to Trade in Education Services

Global student mobility is an international trade in services phenomenon. The student sending country imports services, while the receiving country receives tuition and other expenses from the student and hence is the exporting country. Despite setbacks during the early post-9/11 period (2001-2006), the number of international students in the US has generally trended upwards (Bird and Turner, 2014; Niemen and Swagel, 2009; Alberts, 2007). In addition, for the host country national and sub-national

budgets, equality of opportunity, the exchange rates, host (exporting) country demography and GDP, the cost of education services, other factors such as the presence of diaspora from the student's country, as well as international faculty members, extent of industry involvement in research, faculty members trained in top universities such as MIT and Purdue in engineering and the ability to stay in the country after graduation, are all likely to play a major role. There is also a need to address the knowledge gaps on the factors affecting the trade in education services for specific fields such as engineering and medicine.

From the point of view of the source (importing) country, the level of education funding and demographic trends, GDP, exchange rates, family connection, equality of opportunity and quotas for certain groups are likely to be important. For the United States, deep cuts in state and national budgets continue to put many domestic students from kindergarten to university at a great disadvantage. For instance, recent cuts in the Oklahoma state education budgets which has reduced K-12 public school operations to four-day weeks[30] are likely to adversely impact the preparation of students for colleges and thus increase the dependence on international students to fill the gap.[31] The situation is similar in Colorado[32] and Kansas.[33] In addition, there is a concentration of resources in a few counties or school districts, depending upon the income levels, and in recent years some rich areas with fewer students in states such as Alabama (Gardendale) and North Carolina[34] plan to break away from poorer areas thus putting the lower income students in the US at a significant disadvantage.[35] As a result, fewer US students are trained for the rigors of university education.[36] There is a need to assess to what extent lack of equality of opportunity[37] and cuts in education budgets affect the quality of many US students and lead to increasing dependence on better prepared international students even from developing countries such as India and China. While cuts in budgets and concentration of education resources are likely the main

[30] https://www.washingtonpost.com/local/education/with-state-budget-in-crisis-many-oklahoma-schools-hold-classes-four-days-a-week/2017/05/27/24f73288-3cb8-11e7-8854-21f359183e8c_story.html?utm_term=.c916b3045825

[31] Anti-Immigration groups such as the Federation of American Immigration Reform (FAIR), Center for Immigration Studies (CIS) and Immigration Reform Law Institute (ILRI), despite asserting a need to train Americans first, have not lobbied against state education budgets cuts and four-day school weeks, as well as concentration of education resources in rich areas, which do not prepare the US students adequately for higher education.

[32] https://coloradosun.com/2019/02/15/denver-strike-lawmakers-seek-solutions-chronic-school-funding-problem/

[33] https://www.edweek.org/ew/articles/2019/03/15/kansas-gops-tax-bill-could-undercut_ap.html

http://www.charlotteobserver.com/news/local/education/article212517324.html

[35] http://www.nbcnews.com/news/us-news/judge-lets-white-alabama-town-secede-school-district-despite-race-n752581

http://www.newsweek.com/race-schools-592637

[36] For instance, the solution of FAIR, CIS, ILRI and the Californians for Population Stabilization is to double or quadruple the wages not withstanding its impact on costs of delivery, impact on health insurance, etc.

https://www.fairus.org/american-wages-campaign

[37] There are implied regulations against equality of opportunity in many US states and some people have been sent to jail for trying to get better education for their children

http://baltimoretimes-online.com/news/2019/mar/19/commentary-black-women-jailed-stealing-education/

reasons for the poor quality of US students which likely impacts international student enrollment in US universities, other industrialized countries face a different problem, i.e., brain drain. For the UK and Australia, skilled emigration remains high and this results in a need to import talent from abroad. Cuts to high skilled immigration, including temporary migration of students, without corresponding curbs on brain drain are likely to result in severe shortage of skills in the UK. Finally, for some countries (eg. those in the Middle East), research needs to be undertaken on cultural issues which restricts education to certain population groups increases dependence on international talent? These hypotheses need to be tested by applying both migration and international trade theories.

(iii) Consequences of Global Student Mobility

As is evident from this review, the consequences of international student mobility have been subject of intense debate. At the time of severe budget cuts by several state governments in the US, the focus has been on whether international students end up competing with domestic students for jobs and are hired at lower wages. However, other factors such as paying migrants based on salary history which tend to be lower in developing countries and discrimination are also likely to play a role in lowering wages and these factors need to be analyzed.[38] Although virtually no empirical evidence exists on the UK or most of Europe, this is likely the case for countries in the region based on anecdotal evidence documented above. Hence, there is a need to test the hypothesis as to whether international students bail out many of the EU universities and also to what extent are domestic tax payers subsidizing international students. Similarly, what are the consequences of the restrictions on international students in the UK for the UK universities? Is solvency likely to be threatened due to post-BREXIT restrictions?

While negative consequences have been discussed, studies on positive consequences have been rarely undertaken and most of these positive consequences have focused on innovation. However, one question on innovation has not been addressed. Some fields, such as Engineering and Sciences have been globalized for a long time, while others such as agriculture are essentially newcomers to globalization. Agriculture research had been stagnant until the turn of the century[39] relative to other fields such as engineering. Until recently, was lack of cultural and geographic diversity relative to fields such as engineering the main cause of low levels of innovation and patenting in agriculture during the final decades of the twentieth century?

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[38] Several nations and many US states have passed laws against using salary history to determine salaries, https://www.hrdive.com/news/salary-history-ban-states-list/516662/
but in many cases these laws are not enforced, and in some cases even governments of nations, states and provinces violate them while hiring staff and consultants.

[39] https://www.nap.edu/read/1767/chapter/8

While literature exists on the impact of cultural diversity on innovation, literature on its impact on services delivery is very rare, and in most cases virtually nonexistent. Anecdotal evidence indicates that organizations with proportionately lower levels of immigrants and lower cultural and geographical diversity have problems delivering services relative to those with higher levels. This is particularly true in the case of managerial and high skilled fields. Globally, anecdotal evidence indicates that occupations with cultural diversity have a better record of delivering services than those which do not have such diversity. In the past decade, airline crashes have declined significantly and so have medical mistakes. At the same time, the number of mistakes in the legal occupations increased particularly in the US, where nearly 30 percent of the criminal cases are overturned.[40] The big difference between the engineering and medical occupations on the one hand, and the legal occupation on the other is that the latter does not have much cultural diversity. Furthermore, anecdotal evidence of global institutions indicates that when these organizations were top heavy with two or three nationalities during the early 1980s, the share of projects that failed were considerably higher than during the 2000s when there was considerable cultural diversity, particularly among staff from developing countries. Finally, in the urban transport sector, many US mass transit systems such as the Washington Metropolitan Area Transit Authority (WMATA) and the New York City subway[41] perform worse[42] than the Singapore Mass Rapid Transit (SMRT)[43]. Is it due to lack of cultural and geographic diversity in management such as repeat chairmanship of the WMATA Board[44] which results in failure to understand or learn from other transit systems in the former relative to the latter? There is clearly a need for research on the impact of cultural diversity on services delivery. Finally, specifically for source developing countries, does the time spent staying abroad and return migration result in improving household welfare and decreasing poverty?

[40] https://www.youtube.com/watch?v=utG2BLAZj7w
https://www.stltoday.com/news/state-and-regional/missouri/dale-helmig-wrongly-convicted-of-mother-s-murder/article_92552f9f-4b01-5278-b7b4-a3fbcca9fa75.html
http://www.columbiatribune.com/313df23a-35fd-54a7-b815-9d3bd61f6e8f.html
http://www.columbiamissourian.com/news/local/kevin-crane-to-become-the-th-circuit-s-new-presiding/article_5cfae610-e00c-11e6-8951-53d922b36ead.html
http://usmclife.com/2016/05/how-this-marine-wife-was-wrongfully-convicted-of-killing-her-husband/
[41] https://www.cbsnews.com/news/mta-why-has-the-nyc-subway-gone-off-the-rails-60-minutes/
https://www.businessinsider.com/public-transit-ranking-cities-nyc-subway-2017-11
[42]https://patch.com/district-columbia/washingtondc/metro-train-gets-lost-wmata-blames-train-report
https://patch.com/virginia/arlington-va/metro-suspended-service-arlington-station-due-fire-report
https://wtop.com/tracking-metro-24-7/2018/12/cracked-rail-that-delayed-thousands-of-metro-riders-linked-to-water-leak/
[43] https://www.straitstimes.com/singapore/transport/spore-public-transport-system-tops-global-list
[44] https://wamu.org/story/16/01/28/jack_evans_elected_chair_of_metro_board_in_unanimous_vote/

(iv) FDI in Education Services

None of the existing literature on branch campuses has applied the theories of services FDI to study their motivations. As discussed earlier there are two types of FDI. One type of FDI is by multinationals in universities for the purposes of research, e.g. Rolls Royce investment in Purdue University and BMW at Clemson. The second type of FDI is the universities themselves setting up campuses abroad, e.g. INSEAD in Singapore.

There are several factors that are in play regarding investment by global multinationals at universities across the globe. FDI can be skill seeking or low wage seeking (Chellaraj et al., forthcoming; 2013; Awokuse et al., 2012; Markusen and Maskus, 2002; Carr et al., 2001). FDI in universities is likely to be skill seeking. A higher share of graduate students in Science and Engineering in the host country universities relative to the parent country universities is likely to result in higher investment in the host country universities. Thus, Rolls Royce's decision to invest in Purdue over Cambridge or Oxford or other British engineering schools probably reflects the higher share of graduate students, including international students, in STEM in the US. Similarly, restrictions on international students in the UK may be prompting the UK firms to invest more in US universities. Other factors, such as distance from the parent country, restrictions in the host country as well as institutional and infrastructure quality are also likely to matter as in the case of conventional FDI. Research on these issues will shed light on the factors that motivate corporate investment in universities, an area that has not yet been investigated.

The second form of FDI is the location of branch campuses abroad. The primary reason for this is likely to be "non-tariff export barrier jumping". Thus, with the restrictions on international students after BREXIT, British universities are likely to open branch campuses in other countries such as France and perhaps Eastern Europe and the countries of the FSU as well. To what extent do restrictions on immigration, both temporary and permanent result in the establishment of campuses abroad? Are countries more open to skilled migration and international students more likely to attract this form of FDI than countries which are not? What role does skills in host countries play in attracting this form of investment? There is virtually no empirical literature on this form of FDI.

(v) Impact of international student mobility on connectivity including technological diffusion

Past literature has disproportionately focused on brain drain. As discussed in the literature, brain circulation and return migration are occurring with increasing frequency. The question that needs to be answered is the extent to which global mobility of students and migrants results in achieving spatiality of knowledge and thus enhances connectivity and shared prosperity. Another question that needs to be answered is whether countries which restricted student mobility or post-graduate employment of international students in the past, such as Canada during the 1980s, suffered from declining connectivity as well as declining innovation.

The first question that needs to be answered is whether the increasing share of international students leads to academic collaboration between the source and the host countries both at the macro and micro level. For instance, does the increasing share of international students from one particular country such as Russia in Germany result in increasing collaboration between them? At the micro level, does it result in increasing collaboration between the home campus of the student and the university the student is attending abroad? Do universities that hire students returning from abroad have an advantage over universities that do not, and does it differ by fields? Finally, even if the student does not return does it result in collaboration between the student's home campus and the university of employment? Finally, the reasons for declines in collaboration between the CIS and Russia also need to be examined.

The second issue that needs to be addressed for ECA and EU is whether the harmonization of standards among the various countries of EU results in increasing connectivity between the various countries. For instance, harmonization of standards between the countries could result in more exchanges of students, scholars and faculty members which is likely to result in increasing connectivity among the countries. Did the Bologna Declaration result in increased connectivity?

The third issue that needs to be analyzed is whether increasing mobility among students and scholars within Europe and between Europe and other regions results in increasing innovation and joint patents and publications. Did joint patenting between the various European countries increase? Finally, the impact of return migration and circular migration also needs to be addressed. Not all return migration or returning students join universities. Many start their own businesses and develop markets through the contacts they establish abroad. Do returning students increase business activity, and do they attract FDI from student destination countries? Have they increased employment in their home countries? Similar research needs to be undertaken on the impact of circular migration.

(vi) Experiments

The importance of field experiments in migration research has been emphasized by Balaz and Williams (2017). Experiments are classified as: (i) natural experiments and (ii) true experiments. Natural experiments are quasi experiments and they take the form of treatment vs control groups, e.g. migrants versus non-migrants; skilled versus unskilled migrants and regular versus irregular migrants. They can also be classified into pre-treatment versus post-treatment. For instance, let us assume that Brexit is a treatment. Connectivity pre-BREXIT and post-Brexit can be analyzed using this form of experiment. Similarly, migration or international student mobility pre- and post-Brexit can be examined. Similar experiments can be carried out for another treatment, the expansion of the EU. What is the status of international student mobility pre- and post-expansion of EU? Did connectivity expand with the latter? Techniques such as Propensity Score Matching (PSM) could be used to analyze these issues. However, natural experiments face challenges. Causality links between treatment and outcome could be affected by

three types of mechanisms: (i) randomized experiments, where assignment probabilities to treatment does not change with policy outcomes; (ii) experiments where assignment probabilities does not affect potential outcomes and (iii) all remaining assignments where there is dependence on potential outcomes.

True experiments allocate participants to different treatment groups. There are two types of true experiments: field and laboratory experiments. Most true experiments are laboratory experiments because of resource constraints. However, the World Bank has conducted many field experiments in the past, particularly regarding remittances. Field experiments could advance migration and international student research in two main directions (Balaz and Williams, 2017). It can extend existing avenues of research in development studies, such as understanding migrant student behavior. For instance, they can study the stimulation of entrepreneurship among returning migrants or students. For laboratory experiments expectations are important regarding the role of international students and connectivity. There is no systematic research into how migrant and international student expectations, for instance, regarding future incomes and creation of future networks are formed. Experimental methods could be used to examine alternative approaches. Finally, laboratory experiments could help in differentiating the effects of: (a) risk and uncertainty attributes; (b) actual and perceived experience in international mobility; and (c) migration institutions such as family networks; student exchange programs and diaspora.

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