10th Anniversary Essay

© *Journal of International Students*
Volume 11, Issue 4 (2021), pp. 768-789
ISSN: 2162-3104 (Print), 2166-3750 (Online)
doi: 10.32674/jis.v11i4.4008
ojed.org/jis

Does Studying Abroad Influence Graduates' Wages? A Literature Review

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ABSTRACT

In this article, we review quantitative studies that empirically examine whether studying abroad influences graduates' wages. Our review suggests that studying abroad has a moderate positive effect on graduates' early-career wages in various national and institutional settings. However, this effect tends to vary across groups of graduates, employment contexts, and types of stays abroad. Employer change, access to large and multinational companies, and access to high-wage labor markets abroad appear to be the most relevant mechanisms mediating the effect of studying abroad on wages. Other mechanisms, such as improved language skills and a greater tendency to pursue further education, turn out to be less relevant. Overall, our review illustrates that this area of research has made great progress in recent years, but it can be further advanced by standardization of study designs, internationally comparative and longitudinal datasets, analyses of further mediating mechanisms, and new research questions.

Keywords: international student mobility, labor income, salary, study abroad, wage

INTRODUCTION

Policy makers and practitioners promote studying abroad by stressing the benefits accruing to students and graduates. Besides personality maturation, language skills, and other intercultural competences (e.g., Pinto, 2020; Richter et al., 2020; Sorrenti, 2017; Zimmermann et al., 2020), they often underscore the labor market benefits of studying abroad. For a long time, policy makers took these benefits for granted. In recent years, however, there has been a surge in the volume of studies empirically examining the labor market effects of studying abroad.

Among other things, these studies have examined the influence of studying abroad on the job search duration and likelihood of employment (e.g., d'Hombres & Schnepf, 2021; Di Pietro, 2015; Liwiński, 2019b; Petzold, 2020), skills mismatch (e.g., Wiers-Jenssen & Støren, 2020), involvement in international assignments (e.g., Wiers-Jenssen, 2008), international labor market migration (e.g., Di Pietro, 2012; Parey & Waldinger, 2011), the occupational status (e.g., Waibel et al., 2018), and wages (e.g., Jacob et al., 2019).

As wages constitute one of the most important indicators of labor market success, scholars have become particularly interested in the effect of studying abroad on wages in the past years. By now, a considerable number of empirical studies has examined this facet of labor market performance. However, the field still lacks a summary and critical assessment of this evidence. First useful literature reviews assessed how studying abroad influences labor market performance (e.g., Netz, 2018; Roy et al., 2019; Waibel et al., 2017). These reviews provided broad overviews of various labor market outcomes but no in-depth analysis of the wage effect of studying abroad. What is more, they did not consider the notable number of relevant studies that have been published in the past couple of years. Against this background, we provide a comprehensive overview of the effect of studying abroad on graduates' wages.

We identified relevant studies based on our knowledge of the research field and through comprehensive searches via Google Scholar and Scopus. We also investigated whether the identified studies referenced further relevant studies (backward reference search) and whether they were cited by other potentially relevant studies using Google Scholar (forward citation search).[1] Through these channels, we identified a total of 19 studies that empirically examine the effect of studying abroad on graduates' wages (for details on the identified studies see Table 1). With one exception (Cammelli et al., 2008), all studies employed multivariate methods.[2]

We define studying abroad—which we synonymously refer to as international student mobility (ISM)—as study-related stays outside the country where students obtained their higher education entrance qualification or where they first enrolled in higher education. These stays comprise entire degrees completed abroad as well as study periods, internships, language courses, and other study-related stays abroad. Most studies did not provide information on the exact duration of the examined stays abroad (12). Among those are studies that explored the influence of the Erasmus program (4) or national study abroad

grants (2). The remaining studies (7) examined stays abroad ranging from 3 weeks to 1 year.[3]

Most of the identified studies examined monthly wages (10), followed by studies on hourly wages (5). The remaining studies analyzed annual labor income (4).[4] Apart from 3 studies exclusively examining absolute wage changes (Euler et al., 2013; Kommers, 2020; Netz & Grüttner, 2020), all other studies assessed relative wage changes.

THE SIZE OF THE WAGE EFFECT OF STUDYING ABROAD

The identified studies reported bivariate wage differences associated with studying abroad that lie between –25% among older graduate cohorts of a 4-year liberal arts college in the United States (Schmidt & Pardo, 2017) and 56% among higher education graduates who left school between 1998 and 2005 in Poland (Liwiński, 2019a). Those studies reporting a bivariate ISM wage difference mostly concluded that graduates who study abroad receive higher wages than those who attend higher education in only one country (11 out of 13 studies). In many cases, the reported bivariate wage differences ranged between 2% and 16%. Several studies (6) did not provide any information on this difference (Table 1, column "Bivariate wage difference").

Notably, looking at the bivariate wage difference does not yield robust information on the size of the wage effect of studying abroad. As studies on the labor market effects of ISM have amply demonstrated (e.g., Di Pietro, 2015; Kratz & Netz, 2018; Messer & Wolter, 2007; Oosterbeek & Webbink, 2006; Rodrigues, 2013; Waibel et al., 2018), it is important to consider that students who spend part of their studies abroad are not randomly selected from the overall population of students. In most countries, they exhibit characteristics that positively influence both the likelihood of studying abroad and later wages. Consequently, the bivariate wage differences may be—at least partially—attributable to such selection effects. Thus, they may not exclusively result from studying abroad in a causal sense.

Selection effects considered in the ISM literature have included sociodemographics such as gender, age, ethnicity, and social origin (e.g., Jacob et al., 2019; Kratz & Netz, 2018), personality traits (e.g., Richter et al., 2020; Zimmermann et al., 2020), performance at school (e.g., Favero & Fucci, 2017; Wiers-Jenssen, 2011) and during higher education (e.g., Van Mol et al., 2020; Wiers-Jenssen & Try, 2005), field of study (e.g., Iriondo, 2020; Schmidt & Pardo, 2017), literacy, numeracy, technical, and foreign language skills (e.g., Kommers, 2020; Poot & Roskruge, 2013), as well as prior experience with spatial mobility (e.g., Liwiński, 2019a; Netz & Grüttner, 2020).

Once these and other selection effects were controlled for, the observed bivariate wage differences tended to decrease in size substantially. The selection-corrected effect sizes—also referred to as average treatment effects—mostly ranged between –5% and 12%, of which the larger positive estimates tended to be statistically significant (Table 1, column "Wage effect after controlling for selection"). In summary, the existing studies—including several ones with

sophisticated methodological designs—have concluded that studying abroad has a moderate positive effect on graduates' early-career wages in various national and institutional contexts.

Specific patterns are discernible regarding the employed methods. Estimates of ordinary least squares (OLS) regressions tended to be slightly larger in size than estimates of methods such as propensity score matching (PSM) or random effects (RE) models. Instrumental variable (IV) regressions produced the largest effect sizes (Table 1, column "Method"). While stressing its methodological appeal, authors using IV regressions have also raised concerns about the suitability and efficiency of the employed instruments for examining the wage effect of studying abroad.[5] Many authors have used PSM to assess the wage effect of studying abroad. Besides statistical advantages (for details, see, e.g., Netz & Grüttner, 2020; Waibel et al., 2018), PSM is well suited to study the effect of a treatment (studying abroad) that usually takes place before the first measurement of the relevant outcome variable (the wage). Unlike IV, however, PSM does not capture unobserved selection bias and may thus still overestimate the causal effect of studying abroad.

When interpreting and comparing the estimated wage effects, it is essential to remember that these effects refer to different national and institutional settings, graduation cohorts, types of stays abroad, and outcome variables (Table 1, columns "Population and country of employment", "Type of stay abroad", and "Outcome variable"). Some studies examined graduates of single institutions (Euler et al., 2013; Favero & Fucci, 2017; Schmidt & Pardo, 2017; in part also Iriondo, 2020) or applicants to a specific study abroad grant (Oosterbeek & Webbink, 2006), implying that these studies are unlikely to convey a nationally representative picture. Existing analyses have also differed regarding the choice of analytical samples. For instance, some studies have focused on graduates of specific fields of study (Netz & Grüttner, 2020; Wiers-Jenssen, 2011) or full-time workers (Netz, 2012; Wiers-Jenssen, 2011; Wiers-Jenssen & Try, 2005), while others have concentrated on graduates who stay in the country of graduation after completing their degree (Jacob et al., 2019; Kratz & Netz, 2018; Netz & Grüttner, 2020; Van Mol et al., 2020).

Moreover, our review reveals that not all studies precisely quantified a selection-corrected effect of studying abroad. In fact, many studies aimed at estimating a causal wage effect of studying abroad but included variables that the ISM literature has shown to mediate the influence of studying abroad on wages (Table 1, column "Wage effect after controlling for selection").[6] Relatedly, a few studies tried to tackle selection bias by including variables that referred to points in time after (potential) stays abroad, such as the field and adequacy of employment (e.g., Favero & Fucci, 2017; Kommers, 2020). In the case of time-variant variables, this implies that presumed selection variables can play out as mediation variables. Studies including such variables may thus have underestimated the causal effect of studying abroad on wages.

Table 1: Studies Examining the Effect of Studying Abroad on Graduates' Wages

Study	Population and country of employment	Type of stay abroad	Outcome variable	Method	Bivariate wage difference	Wage effect after controlling for selection
Cammelli et al. (2008)	Graduates of 36 universities in Italy Graduation: 2000–2004	Participation in Erasmus or other EU program vs. other study abroad experience	Net monthly wage 1, 3, and 5 years after graduation	Comparison of means and ANOVA	Erasmus: 11% at 5 years after graduation Other study abroad experience: 8% at 5 years after graduation	Selection effects not controlled for
Euler et al. (2013)	Graduates of the University of Linz, Austria Graduation: not specified (participation in the KIP 1991–2001)	Participation in the KIP	Gross monthly wage Early career (not specified)	PSM	No information	676 Euro/24% according to our own calculations
Favero and Fucci (2017)	Graduates of the University of Siena, Italy Graduation: 2010	Participation in Erasmus program	Logarithm of net monthly earnings 1–5 years after graduation (not specified)	RE PSM IV	No information	RE: 7% PSM: 9% IV: 23% (models include potential mediation variables)
Iriondo (2020)	Graduates of institutions in Spain and of the University of Madrid Graduation: 2009/2010 and 2001/2002	Participation in Erasmus program	Logarithm of net monthly wage Shortly, 4 and 6 years after graduation	PSM	No information	National level: −3% (insignificant) shortly after and 10% at 4 years after graduation University of Madrid: 9% (insignificant) shortly after and 12% at 6 years after graduation (models include potential mediation variables)
Jacob et al. (2019)	Graduates of institutions in 13 European countries Graduation: 1999/2000 and 2002/2003	Stay abroad of at least 1 month	Logarithm of gross hourly wage 5 years after graduation	Doubly robust estimation (treatment: logistic regression, outcome: OLS)	Between about −3% in Flanders (insignificant) and 16% in Poland	Between −3% in Flanders (insignificant) and 15% in Poland

Study	Population and country of employment	Type of stay abroad	Outcome variable	Method	Bivariate wage difference	Wage effect after controlling for selection
Kommers (2020)	Graduates who completed requirements for a bachelor's at institutions in the United States Graduation: 2007/2008	Stay abroad of at least 1 month during bachelor's	Annual salary 4 years after graduation from bachelor's	Doubly robust estimation (treatment: logistic regression, outcome: OLS)	1,069 U.S. Dollar (insignificant)/ 2% according to our own calculations	1,085 U.S. Dollar (insignificant)/ 2% according to our own calculations (model includes potential mediation variables)
Kratz and Netz (2018)	Graduates of institutions in Germany and the German federal state of Bavaria Graduation: 2005 (Germany) and 2003/2004 (Bavaria)	Cumulative time spent abroad of at least 3 months	Logarithm of gross hourly wage First 5 years after graduation	OLS Oaxaca-Blinder decompositions RE and FE growth curves	National level: 8% at 5 years after graduation Graduates of Bavarian institutions: 14% at 5 years after graduation	OLS: 5% at national level, 11% among graduates of Bavarian institutions, both at 5 years after graduation RE growth curves: 3% upon labor market entry (insignificant) and 10% at 5 years after graduation among graduates of Bavarian institutions
Liwiński (2019a)	Graduates of Polish institutions residing in Poland Graduation: not specified (school completion between 1998 and 2005)	Stay abroad of at least 1 month	Logarithm of net hourly wage First job after graduation	OLS PSM Heckman correction	4,306 Złoty (no significance test)/ 56% according to our own calculations	OLS: 22% PSM: 23% Heckman correction: 21%
Messer and Wolter (2007)	Graduates of institutions in Switzerland Graduation: between 1998 and 2000	Participation in exchange program between Swiss universities or program with institution abroad	Logarithm of gross monthly salary First job after graduation	OLS IV	No information	OLS: 4% IV: −5% (insignificant) (models include potential mediation variables)

Study	Population and country of employment	Type of stay abroad	Outcome variable	Method	Bivariate wage difference	Wage effect after controlling for selection
Netz (2012)	Graduates of institutions in Germany Graduation: 2005	Stay abroad of any duration	Logarithm of gross annual labor income 5 years after graduation	OLS	10%	6% (model includes potential mediation variables)
Netz and Grüttner (2020)	Graduates of institutions in Germany Graduation: 2005	Cumulative time spent abroad of at least 2 months	Gross annual labor income 1, 5, and 10 years after graduation	PSM RE growth curves	Graduates from an academic background: from 1,929 Euro at 1 year (insignificant) to 10,694 Euro at 10 years after graduation Graduates from a non-academic background: from −63 Euro at 1 year to 2,084 Euro at 10 years after graduation (both insignificant)	PSM Academic background: from 3,751 Euro at 1 year to 10,636 Euro at 10 years after graduation Non-academic background: from 883 Euro at 1 year to 1,509 Euro at 10 years after graduation (both insignificant) RE growth curves Academic background: from 3,151 Euro (insignificant) at 1 year to 7,767 Euro at 10 years after graduation Non-academic background: from 1,443 Euro at 1 year (insignificant) to 4,360 Euro at 10 years after graduation
Oosterbeek and Webbink (2006)	Applicants to the Program for the Talented in the Netherlands Graduation: not specified (program applicants between 1997 and 2002)	Stay abroad of 1 year	Logarithm of hourly wage First job after graduation	OLS IV	No information	OLS: 5% (insignificant) to 7% IV: −23% to −63% (both insignificant)

Study	Population and country of employment	Type of stay abroad	Outcome variable	Method	Bivariate wage difference	Wage effect after controlling for selection
Rodrigues (2013)	Graduates of institutions in 16 European countries Graduation: 1999/2000 and 2002/2003	Study period abroad of any duration	Gross hourly earnings 5 years after graduation	OLS PSM	1.87 Euro on average across all countries/ 16% according to our own calculations	OLS: 3% on average across countries/ Between −3% in the Netherlands and 18% in Lithuania (insignificant) PSM: 3% on average across countries/ Between −4% in the Netherlands and 16% in Poland
Schmidt and Pardo (2017)	Graduates of a 4-year liberal arts college in the northeastern United States Graduation: 1965–2008	3 weeks up to 1 academic term spent abroad	Logarithm of annual income Graduates 23–65 years of age	OLS IV	−25%	OLS: 2% (insignificant) (model includes potential mediation variables) IV: Between −7% and −10% (both insignificant) depending on the instrument
Sorrenti (2017)	Graduates of institutions in Italy Graduation: 2007–2010	Participation in Erasmus or other EU program	Logarithm of net monthly wage 3 years after graduation	OLS (Heckman correction and IV, but not for examining the wage effect of studying abroad)	No information	Between 5% and 6% (model includes potential mediation variables)
Teichler (2011)	Graduates of institutions in 13 European countries Graduation: 1999/2000	Stay abroad of any duration	Gross monthly wage 5 years after graduation	OLS	10% on average across all countries (no significance tests)	Significantly positive among (specific) graduates of institutions in Austria, Belgium, the Czech Republic, France, Germany, Italy, Norway, and Spain (no effect sizes)

Study	Population and country of employment	Type of stay abroad	Outcome variable	Method	Bivariate wage difference	Wage effect after controlling for selection
Van Mol et al. (2020)	Graduates of institutions in the Netherlands Graduation: 2013/2014	Stay abroad of any duration	Logarithm of monthly wage 1.5 years after graduation	OLS PSM	Overall: 3% Stay abroad during bachelor's: 0% (insignificant) Stay abroad during master's: 4%	OLS Stay abroad during bachelor's: 4% for study period, −2% for internship (insignificant), and −4% for both (insignificant) Stay abroad during master's: 1% for study period, 2% for internship, and 3% for both (all insignificant) PSM Stay abroad during bachelor's: 2% (insignificant) Stay abroad during master's: 2% (insignificant)
Wiers-Jenssen and Try (2005)	Graduates of institutions in Norway and of institutions abroad Graduation: 1997–1999	Degree from abroad or stay abroad of any duration as part of a degree from Norway	Logarithm of gross monthly wage 3–5 years after graduation	OLS	15% overall (no significance test)	Degree from abroad: 4% Stay abroad as part of a degree from Norway: Between −1% and 2% (both insignificant) depending on duration of stay abroad
Wiers-Jenssen (2011)	Graduates of institutions in Norway and of institutions abroad Graduation: 2003–2006	Degree from abroad or stay abroad of any duration as part of a degree from Norway	Logarithm of gross monthly wage About 3 years after graduation	OLS	Degree from abroad: 9% (no significance test) Stay abroad as part of a degree from Norway: 3% (no significance test)	Degree from abroad: 4% Stay abroad as part of a degree from Norway: 3% (insignificant)

Note: ANOVA = analysis of variance; EU = European Union; FE = fixed effects; IV = instrumental variable; KIP = Kepler Internationalization Program; OLS = ordinary least squares; PSM = propensity score matching; RE = random effects. Messer and Wolter (2007), Van Mol et al. (2020), and Wiers-Jenssen (2011) kindly provided information on request about whether they analyzed net or gross wages.

HETEROGENEITY IN THE WAGE EFFECT OF STUDYING ABROAD

As elaborated above, existing evidence suggests that studying abroad often has a moderate positive effect on graduates' wages. At the same time, it shows that the wage effect of studying abroad differs across groups of graduates, employment contexts, and types of stays abroad. While differences in effects across groups of graduates and employment contexts are examples of heterogeneous treatment effects depending on moderating variables, differences in effects across types of stays abroad are examples of treatment heterogeneity (for a conceptual and empirical overview, see Netz, 2021).

Research on how the (sociodemographic) characteristics of graduates moderate the wage effect of studying abroad is still very scarce. Looking at social origin, Netz and Grüttner (2020) showed that in Germany, the effect of studying abroad on labor income is somewhat larger among graduates with an academic family background than among graduates with a non-academic family background. Schmidt and Pardo (2017) tested whether the wage effect of studying abroad is gender-specific, but they did not find any significant gender differences among graduates of the examined 4-year liberal arts college in the United States. However, while the estimated effects were insignificant for both female and male graduates, they were substantially larger for women. Sorrenti (2017) found that compared to males, female graduates of institutions in Italy tended to benefit more from studying abroad in terms of language acquisition. Moreover, the effect of language skills on wages seemed to be slightly larger among women than among men, suggesting that studying abroad may reduce the often-observed gender wage gap. We are not aware of studies examining the wage effect of studying abroad contingent on other sociodemographics, such as graduates' ethnicity.

Research on how studying abroad pays off differently depending on specific employment contexts is far more developed (Waibel et al., 2017). To begin with, the type of employer moderates the wage effect of studying abroad. In Norway (Wiers-Jenssen, 2011; Wiers-Jenssen & Try, 2005), Italy (Cammelli et al., 2008), and Germany (Kratz & Netz, 2018; Netz, 2012), wage returns to studying abroad are detectable primarily in the private sector, and especially among graduates with large and internationally oriented employers.

Moreover, the wage effect of studying abroad depends on graduates' field of study, which is arguably strongly related to their later sector of employment. In Germany, studying abroad pays off more among graduates of vocationally unspecific fields of study, such as the humanities and economics, than in vocationally specific fields, such as teacher training and medicine (Netz & Grüttner, 2020). This suggests that studying abroad has a higher signaling value where educational and professional careers are less formalized and governed by professional associations, which structure career paths in specific labor market segments (Waibel et al., 2018). Beyond this finding, clear patterns are difficult to discern, as they seem to depend on country characteristics and case numbers for the examined subgroups (e.g., Cammelli et al., 2008; Netz, 2012; Rodrigues, 2013; Schmidt & Pardo, 2017).

Internationally comparative studies have shown that the wage effect of studying abroad also differs across countries (Rodrigues, 2013; Teichler, 2011). According to Jacob et al. (2019), wage returns to studying abroad are "larger in countries with poorer university quality, lower international trade volume, higher graduate unemployment, and with relatively few students going abroad" (p. 500), suggesting that ISM has a greater signaling value in such countries. Considering that ISM leads to international labor market mobility (Di Pietro, 2012; Parey & Waldinger, 2011), another explanation could be that graduates from such countries are more likely to find work in high-wage countries if they study abroad. Indeed, Liwiński (2019a) showed that the notably higher wages of graduates from Poland who have studied abroad are almost entirely explained by the fact that they found well-paid jobs abroad.

The wage effect of studying abroad can also vary throughout graduates' career.[7] Adopting a longitudinal perspective, Kratz and Netz (2018) showed that the effect of studying abroad on hourly wages increases during the first 5 years after labor market entry among graduates of universities in the German federal state of Bavaria. After controlling for selection effects, this effect becomes statistically significant at 4 percentage points only 2 years after graduation. Five years after graduation, it amounts to 10 percentage points. Netz and Grüttner (2020) replicated a similar finding by examining the annual labor income of graduates from all German federal states during the first 10 years after labor market entry. Similarly, Iriondo (2020) found no starting salary effect of studying abroad among graduates of Spanish institutions but an effect of 10%–12% at 4–6 years after graduation. In line with these findings but leaving aside the case of graduates from Poland (Liwiński, 2019a), studies examining the wage effect of studying abroad shortly after graduation have tended to report smaller effect sizes than studies examining the wage effect of studying abroad a few years after graduation (Table 1, column "Wage effect after controlling for selection").

Turning to treatment heterogeneity, there is evidence that the wage effect of studying abroad differs by type of ISM. Kratz and Netz (2018) suggested that even after controlling for selection into ISM, internships abroad pay off slightly more than study periods abroad in the German labor market. Differentiating study periods and internships during both the bachelor's and the master's degree, the OLS regressions presented by Van Mol et al. (2020) indicated that only study periods abroad during the master's degree are associated with slightly higher wages in the Dutch labor market. Yet, this effect vanished after more robust controls of selection effects through PSM. Wiers-Jenssen and Try (2005) and Wiers-Jenssen (2011) examined the wages of graduates in the Norwegian labor market, differentiating graduates who spent part of their studies abroad from those who completed their entire degree abroad. They suggested that graduates who complete their entire degree abroad receive slightly higher wages, presumably because graduates who spend part of their studies abroad are more positively self-selected into ISM. Cammelli et al. (2008) compared the early-career wages of graduates of institutions in Italy who go abroad with Erasmus to the wages of graduates who complete other types of stays abroad. The observed differences

were small and not corrected for selection effects. Still, the distinction of programmed versus self-organized mobility is relevant for future research.

A second example of treatment heterogeneity concerns the host country where graduates sojourn. Initial evidence has suggested that the wage effect of studying abroad varies depending on the host country. Iriondo (2020) reported that among graduates in Spain, the effect of participation in the Erasmus program on early-career wages is largest for sojourns in Germany (15.6%), followed by sojourns in France (12.9%), the Nordic Countries (10.6%), and the United Kingdom (9.4%). He did not observe significantly positive wage effects of Erasmus sojourns in destinations such as Italy and Portugal. Van Mol et al. (2020) found no significant differences in the effect of studying abroad on wages depending on the host country, which they explained by the well-performing higher education system and labor market in the Netherlands. On a broader note, these findings imply that the specific pairing of students' home and host country governs the potential for wage increases through studying abroad.

Focusing on the language acquisition related to stays in specific host countries, Sorrenti (2017) found that graduates of institutions in Italy experience the highest wage returns to proficiency in German, followed by proficiency in English, French, and Spanish. This evidence is in line with that of Iriondo (2020), as well as with the general literature studying wage returns to foreign language proficiency (Saiz & Zoido, 2005).[8]

Finally, the wage effect of studying abroad seems to vary depending on the time spent abroad. Referring to graduates from 16 European countries, Rodrigues (2013) found that after controlling for selection effects, studying abroad for 3–12 months associated with a wage increase of roughly 5%, while studying abroad for less than 3 or more than 12 months yielded no significant wage return. Schmidt and Pardo (2017) differentiated mini-terms (3–4 weeks) and full terms abroad but did not find significant differences in the effects of these types of ISM on graduates' wages.

MECHANISMS EXPLAINING THE WAGE EFFECT OF STUDYING ABROAD

Besides studies evaluating how the wage effect of studying abroad varies across groups of graduates, employment contexts, and types of stays abroad, there are also studies examining the mediating mechanisms through which studying abroad influences the wage. In research practice, these dimensions are closely related, and most existing studies have not neatly differentiated moderation and mediation effects—neither conceptually nor empirically.

As illustrated in the previous section, study abroad experience is related to working in contexts where employers pay higher wages. Some evidence has suggested that study abroad experience functions as a signal easing access to such contexts. Study abroad experience could also bring about changes in students making them self-select into favorable working contexts. As long as such experience influences the likelihood of gaining access to such contexts, the latter can be considered an intervening mechanism explaining the effect of studying abroad on wages. In line with this thought, existing evidence has shown that

improved access to the private sector (Cammelli et al., 2008; Netz, 2012; Wiers-Jenssen, 2011)—especially to large and internationally oriented employers (Kratz & Netz, 2018; Rodrigues, 2013; Wiers-Jenssen & Try, 2005)—and to labor markets in countries with generally high wage levels (Liwiński, 2019a) can largely explain the wage effect of studying abroad.

Relatedly, existing evidence supports the view that studying abroad lowers the costs of future mobility and of searching for jobs in spatially extended labor markets. Lower search costs should lead to a higher job search intensity and a larger job search radius. In turn, this could result in better job opportunities and eventually in an increased likelihood of gainful employer changes. Accordingly, Kratz and Netz (2018) showed that graduates from Germany who studied abroad increase their early-career wages more quickly than those who did not study abroad. This happens not only because graduates with study abroad experience are more likely to change their employer but also because they change it more frequently. Additionally, they achieve higher wage increases when changing their employer, partly because they are more likely to change from small to well-paying large employers.

Furthermore, several authors regarded studying abroad as a strategy to acquire human capital that increases the productivity and thereby leads to higher wages (e.g., Rodrigues, 2013; Waibel et al., 2017; Wiers-Jenssen & Try, 2005). A growing body of evidence has suggested that studying abroad improves various intercultural skills, the most prominent example being foreign language proficiency (Pinto, 2020; Roy et al., 2019; Teichler, 2011). Sorrenti (2017) showed for graduates of institutions in Italy that studying abroad improved foreign language proficiency, which in turn positively affected graduates' wages. However, a decomposition analysis by Kratz and Netz (2018) suggested that improved foreign language skills are only of minor importance for explaining the wage advantage of Germany-based graduates who studied abroad. To learn more about skill-related mediation mechanisms, we need better measures of changes in language proficiency and other competences.

Finally, some authors have suggested a link between studying abroad and pursuing (post)graduate education (d'Hombres & Schnepf, 2021; Kommers, 2020; Rodrigues, 2013). Following human capital theory, more education should further increase graduates' productivity and thus their wages. Messer and Wolter (2007) reasoned that studying abroad could increase the probability of taking up doctoral training. While they found a strong correlation between studying abroad and taking up doctoral training among graduates of Swiss institutions, an IV regression led them to conclude that this effect is not causal. Similarly, Kratz and Netz (2018) concluded from their decomposition analysis for Germany that completing a doctorate is unlikely to be a major mechanism mediating the effect of studying abroad on wages.

In summary, existing evidence suggests that an increased likelihood of employer change and of gaining access to large and multinational companies (Kratz & Netz, 2018), as well as improved access to high-wage labor markets abroad (Liwiński, 2019a), are the empirically most relevant mechanisms mediating the effect of studying abroad on wages. However, further research is

needed in this respect, as the sketched mechanisms are difficult to disentangle empirically.

DIRECTIONS FOR FUTURE RESEARCH

Our literature review illustrates that research on the wage effect of studying abroad has made great progress in recent years. However, it also points to limitations and directions for future research. These relate to methodological concerns, the employed data, and new research questions arising from existing evidence.

In methodological terms, research on the wage effect of studying abroad has evolved substantially in the past years. We identified various studies using methods suited to approximate a causal wage effect of studying abroad. Many robust studies concluded that studying abroad has a moderate positive effect on graduates' wages. Some studies also provided potential reasons (greater likelihood of accessing favorable working contexts, changing the employer, acquiring human capital, and pursuing further education) and explained in which contexts studying abroad pays off most. These studies offer reference points for future analyses.

However, our review also highlights that the examined research field is still characterized by a low degree of standardization. To begin with, existing studies differ regarding the perceived importance of neatly quantifying selection-corrected wage effects of studying abroad. As they used different datasets, they considered different selection variables to tackle unobserved heterogeneity between those who study abroad and those who do not. They also differed in terms of the inclusion of mediation variables. Some studies included variables that the ISM literature has shown to mediate the influence of studying abroad on wages, which implies that they may have underestimated the causal effect of studying abroad.

Moreover, existing studies have referred to different national and institutional settings, graduation cohorts, types of stays abroad, and outcome variables. Furthermore, not all studies provided results that are representative of the examined populations. Existing analyses also differ regarding the choice of analytical samples, e.g., concerning their focus on graduates of specific fields of study, full-time workers, and graduates working in the country where they completed higher education.

These are examples of methodological decisions that render a straightforward interpretation of results and the comparison of studies difficult. One solution would be a more transparent and critical reflection of such issues in further research. Another solution would be the collection and use of large-scale and internationally comparable data. Such data would allow for more robust comparisons of the wage effect of studying abroad across countries. Provided that sufficiently large numbers of countries were included, they would also enable researchers to examine the effect of studying abroad contingent on the specificities of national higher education systems and labor markets. At present, single-country studies have dominated research on the wage effect of studying

abroad. The few existing cross-country comparisons have been confined to Europe (Jacob et al., 2019; Rodrigues, 2013; Teichler, 2011). Generally, research on the wage effect of studying abroad has strongly concentrated on European countries (17 out of 19 identified studies). Two studies looked at graduates of U.S. institutions. We are not aware of studies from other world regions meeting our criteria for inclusion in this review. This indicates a pressing need to extend corresponding research beyond the European and U.S. sphere.

There are additional ways in which improved data would help advance research in the field and allow scholars to address new relevant research questions. For instance, research would benefit from data capturing further important selection variables, such as measures of personality traits, self-efficacy, motivation, and career aspirations. If such variables were captured multiple times through a longitudinal design, it would also be possible to examine whether they capture mechanisms mediating the effect of studying abroad on the wage—or even explain the already substantiated mediating mechanisms.[9]

A particularly relevant variable to capture through repeated measurements—both before and after potential stays abroad—is language proficiency. Ideally, it should be recorded not only through individual self-assessments but also through standardized tests. Such measurements would allow scholars to better model selection into study abroad experience and to examine whether and how language proficiency changes due to studying abroad—and how corresponding changes in skills influence graduates' wages. To date, language proficiency tends to be measured only once and usually after graduation, implying that we can hardly determine the role of ISM-related changes in languages and other skills in explaining the wage effect of studying abroad.

It is also important to survey graduates multiple times during their career. This allows for deeper insights into how and why the wage effect of studying abroad changes throughout graduates' career.[10] In this context, a critical question could be revisited: does studying abroad lead to higher wages because it allows graduates to develop wage-relevant human capital, or does studying abroad primarily have a signaling effect? Besides graduate surveys, employer surveys are valuable in this respect (for examples, see Van Mol, 2017, and Petzold, 2020). Employers are in a good position to assess whether internationally experienced graduates have developed unique human capital. Moreover, they can be asked directly whether they regard study abroad experience as a productivity signal in hiring decisions.

To the extent that graduate surveys capture different cohorts over extended time spans, scholars would be able to examine cohort and period effects properly. For instance, they could assess whether the wage effect of studying abroad has changed over the past decades (for a first analysis see Schmidt & Pardo, 2017). On the one hand, authors have hypothesized that returns to studying abroad have declined since the 1980s (e.g., Teichler & Janson, 2007). A possible reason is the significant increase in the share of graduates with study abroad experience, which has decreased the scarcity value of study abroad experience, and possibly also its influence on wages. On the other hand, it is also plausible that skills gained through studying abroad have become more crucial in an increasingly globalized

labor market. Hence, the wage effect of studying abroad may have remained constant or even increased. Whatsoever, it will be interesting to examine political and labor market-related explanations for a declining, stable, or increasing wage effect of studying abroad.

In the coming years, it will also be important to monitor how the COVID-19 pandemic may change students' potential to benefit from studying abroad. Many students had to abandon their study abroad intentions due to the pandemic. Have these students developed fewer skills that are needed in today's globalized labor market? And will they consequently earn less than previous generations of more internationally experienced graduates? Or has the pandemic engendered forms of online learning that have yielded learning outcomes similar to those of ISM? And have employers' skill demands changed, so that physical stays abroad have become substitutable?

In the wake of the COVID-19 pandemic, it will also remain highly relevant to investigate who benefits most from studying abroad and who cannot access its possible benefits. For social stratification research, education policy, and ISM practitioners, further analyses would be valuable that examine accurately whether and why the wage effect of studying abroad differs, for instance, depending on graduates' gender, ethnicity, and socioeconomic background. After all, such analyses enable us to recognize whether study abroad opportunities decrease or increase social inequalities in modern societies.

ACKNOWLEDGMENTS

We thank Lea Goldan, Katharina Reitsamer, and Christof Van Mol for helpful comments on our article.

NOTES

[1] Our review considers studies in various publication formats. Most of the identified analyses were published in peer-reviewed journals (11), and some as book chapters (3), research reports (2), discussion papers (2), or doctoral dissertation (1).

[2] There are further studies on labor income discussed in the study abroad literature (e.g., Waibel et al., 2017), which we did not include in our analysis because they did not focus on studying abroad during higher education. Hilmer (2002) concentrated on within-country migration between U.S. states. While also capturing study periods abroad, Orrù's (2014) independent variable largely reflected stays at institutions in Italian regions outside Sardinia. Other studies contributed to the literature on the value of degrees from abroad: Lianos et al. (2004) compared the performance of graduates from various countries in the Greek labor market, albeit without considering a control group of graduates from Greece. Using a controlled design, Poot and Roskruge (2013) examined the wage effect of education obtained in New Zealand and abroad. However, higher education graduates only made up a fraction of their analytical sample. Yet other studies examined higher education graduates in Germany (Sarcletti, 2007; Spangenberg et al., 2012) and in the Netherlands (van Ophem et al., 2011), thereby including proxies of study abroad experience. These studies focused on subjects other than labor market effects of education from abroad and did not specify models to quantify the wage effect of studying abroad.

[3] Rarely, studies compared the wage effect of internships abroad to that of study periods abroad (2). We are not aware of studies looking at the wage effect of other types of stays abroad.

[4] As most studies in the reviewed research field examined monthly or hourly wages, we use the term "wages" as an umbrella term. When summarizing the results of specific studies, we try to use the terms employed by the respective authors.

[5] Instruments used to estimate the wage effect of studying abroad have included the educational level of graduates' mother, residence in the canton of the attended university (Messer & Wolter, 2007), an index measure of the value of the U.S. Dollar relative to a broad basket of foreign currencies, a consumer price index for air travel (Schmidt & Pardo, 2017), the assignment of a Dutch study abroad grant (Oosterbeek & Webbink, 2006), and exposure to the Erasmus program (Favero & Fucci, 2017). Several authors have also used exposure to the Erasmus program to study other outcomes of studying abroad (Di Pietro, 2012, 2015; Parey & Waldinger, 2011; Sorrenti, 2017).

[6] In Table 1, we tried to report estimates that account for selection effects in the best possible way but did not include potential mediation variables. As indicated in the table, some studies only provided estimations that already controlled for potential mediation variables (Favero & Fucci, 2017; Iriondo, 2020; Kommers, 2020; Messer & Wolter, 2007; Netz, 2012; Schmidt & Pardo, 2017; Sorrenti, 2017). In such cases, we reported the estimates of the models including least potential mediation variables.

[7] In statistical terms, these so-called age effects (resulting from rising age over individuals' life courses) are distinguished from cohort effects (resulting from individuals belonging to groups with a common starting event) and period effects (resulting from events taking place in specific historical times).

[8] Conceptually, we can differentiate an effect of studying abroad being moderated by graduates' countries of employment (heterogeneous treatment effect) and effects of stays in different countries (treatment heterogeneity). Disentangling these effects in research practice is more difficult, as sufficiently large datasets including graduates working in different countries and with stays in various host countries are needed.

[9] Future studies could also integrate research on the wage effect of studying abroad and research on other labor market outcomes. Possibly, the wage effect of studying abroad can be further explained by an influence of studying abroad on the job search duration and the likelihood of employment, skills mismatch, involvement in international assignments, and access to high-status positions. Similarly, it could be fruitful to integrate research on the wage effect of studying abroad and research on the influence of studying abroad on academic achievement (e.g., Cardwell, 2020; Whatley & Canché, 2021) as well as creativity (e.g., Leung et al., 2008).

[10] In this regard, future research could also explore existing possibilities of record linkage. By combining survey data with administrative data from higher education institutions, social security offices, and tax bureaus, researchers could assess the wage effect of studying abroad based on very precise measures of graduates' educational, spatial, and wage trajectories.

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