IMMIGRANT-NATIVE WAGE GAPS OVER TWO GENERATIONS: DOES THE FIELD OF STUDY MATTER?

Kevin Pineda-Hernández, François Rycx, Thomas Senterre, Mélanie Volral

LIDAM Discussion Paper IRES
2026 / 11

UCLouvain

LIDAM
IRES | Louvain Institute of Data Analysis and Modeling in economics and statistics

Immigrant-Native Wage Gaps over Two Generations: Does the Field of Study Matter?

Kevin Pineda-Hernández
ULB (CEBRIG, DULBEA), UMONS (Soci&ter)

François Rycx
ULB (CEBRIG, DULBEA), UMONS (Soci&ter)
UCLouvain (IRES), GLO and IZA@LISER

Thomas Senterre*
ULB (CEBRIG, DULBEA), UMONS (Soci&ter)

Mélanie Volral
UMONS (Soci&ter), ULB (CEBRIG, DULBEA)

Abstract

Although a growing number of studies highlight the moderating role of educational attainment on the wage differential between immigrants and natives, the influence of the field of study remains largely unexplored. We aim to fill this gap by drawing on detailed, matched employer-employee data on workers holding a master's degree in Belgium for the period 1999-2016. After controlling for a wide range of covariates, our regression analyses show that the wage gap between immigrant and native workers with degrees in higher-paying fields (i.e. STEM and LEM) narrows considerably over two generations, but remains significant. By contrast, among workers with degrees in lower-paying fields (i.e. Other Social Sciences, Education, Services, Arts and Humanities) the wage gap between immigrants and natives disappears within two generations. Furthermore, our wage decompositions reveal that immigrant graduates are somewhat more likely to hold degrees in higher-paying fields than natives, which results in a small positive quantity effect. However, they also show that wage returns associated with fields of study are significantly lower for immigrants than for natives. This leads to a negative price effect, which, in percentage points, is halved over two generations. Altogether, the combined price and quantity effects – with the former far outweighing the latter – account for between 28 and 37% of the overall pay gap between natives and first- and second-generation immigrants, respectively. Sensitivity tests using a more detailed classification of fields of study further refine our results.

JEL classification:
I23, I24, I25, I26, J31.

Keywords:
Immigrant-native wage gap, first- and second-generation immigrants, field of study, matched employer-employee data.

*** Corresponding author:**
Thomas Senterre (Thomas.senterre@ulb.be)

1. Introduction

Over the past few decades, the population of European Union (EU) Member States has become more culturally and geographically diverse due to the influx of foreign-born people (i.e. first-generation (FG) immigrants) and, subsequently, their descendants (i.e. second-generation (SG) immigrants).[1] In 2021, this population of foreign origin accounted for around 13% of the population aged 15-74 in EU countries (Eurostat, 2023). Despite this cosmopolitan context, extensive empirical research shows that FG immigrants and their SG peers face substantial barriers in accessing the EU labour market, especially when originating from developing countries (e.g. Algan et al., 2010; OECD, 2023; Piton & Rycx, 2021). Studies also show that, in some EU countries, the pay gap between immigrants and the natives persists significantly across two generations (e.g. Athari et al., 2019; Pineda-Hernández et al., 2025b). It should be noted, however, that once factors related to human capital (such as age, experience and level of education) are taken into account, the immigrant-native wage gap narrows considerably for the first generation and often disappears for the second. Our paper contributes to this literature through an empirical analysis which, to the best of our knowledge, is the first to examine the role of another key characteristic of human capital – namely the field of study – in the wage gap between immigrants and natives over two generations.

At the EU level, the share of foreign-born people with a low level of education is significantly higher than that among natives (37% compared to 24% in 2021) (Eurostat, 2023). Accordingly, several papers show that the gap in educational attainment is one of the main factors behind the pay gap between immigrants and natives (e.g. Guzi et al., 2021; Pineda-Hernández et al., 2025b). That said, education's contribution to the immigrant-native wage gap can also be explained by the imperfect transferability of foreign human capital (Basilio et al., 2017). Indeed, the non-recognition or lower valuation of foreign qualifications in the host country is likely to affect the market value of an immigrant worker. Empirical studies support these hypotheses, showing notably that wage returns to education are generally lower for FG immigrants than for natives (e.g. Christl et al., 2020; Ingwersen & Thomsen, 2021) and that FG immigrants with a

[1] Throughout this paper, we use the following terms: i) 'natives' for people born in the host country whose parents were also born in the host country; ii) 'first-generation immigrants' and 'foreign-born people' for people born abroad; iii) 'second-generation immigrants' for people born in the host country who have at least one foreign-born parent; and iv) 'immigrants' for both first- and second-generation immigrants.

foreign tertiary degree may face a wage penalty due to their lack of proficiency in the host country's language (Himmler & Jäckle, 2018).

Moreover, signalling theory predicts that foreign education, mainly that obtained in developing countries, sends a poor signal to the employer when it comes to hiring high-skilled candidates, resulting in a persistent issue of concentration in low-paying occupations and overeducation (i.e. having a level of education higher than that required to perform a specific job) (Demireva & Zwysen, 2018). Several papers support this premise (e.g. Jacobs et al., 2022; Nielsen, 2011; Pineda-Hernández et al., 2025a; Wen & Maani, 2018). Likewise, job search theory highlights that a lack of knowledge about the labour market in the host country may lead FG immigrants with tertiary education to accept precarious jobs, which in turn would widen the wage gap between immigrants and natives. This prediction is also backed up by empirical evidence, particularly in the case of Canada (Akkaymak, 2017).

Nevertheless, the theories mentioned so far do not appear to be the most relevant for explaining the wage gap between natives and SG immigrants. In fact, classical assimilation theory states that, since SG immigrants are born, educated and socialised in the host country, they are expected to hold tertiary degrees issued by higher education institutions in the host country and to know how to use them appropriately (Alba et al., 2011; Park & Myers, 2010). Therefore, the quality of SG immigrants' education should, in principle, be equivalent to that of natives in the host country. In addition, Eurostat (2023) shows that, at the EU level, SG immigrants are almost on a par with natives in terms of educational attainment. This is also reflected in some empirical papers, which show that the level of education barely explains origin-based wage differences between natives and SG immigrants (e.g. Algan et al., 2010; Athari et al., 2019; Pineda-Hernández et al., 2025b).

Although holding a qualification from the host country should improve SG immigrants' chances of securing a higher salary and better working conditions, a more pessimistic scenario cannot be ruled out. Indeed, segmented assimilation theory posits that due to the parental transmission of cultural and physical characteristics (e.g. skin colour, surname or religion), SG immigrants with tertiary education may face additional barriers to accessing the primary segment of the labour market, which consists of well-paid jobs with stable working conditions (Heath et al., 2008; Portes & Rumbaut, 2001). Accordingly, employers would primarily offer low-skilled, poorly paid jobs to SG immigrants, because of negative ethnic stereotypes (i.e.

statistical discrimination) or a preference for natives (i.e. taste-based discrimination) (Becker, 1971; Phelps, 1972).

To a large extent, the underlying mechanisms linking immigrants' educational attainment to their wages have been established theoretically and tested empirically. However, when it comes to the horizontal dimension of education, empirical evidence is rather scarce, although evidence suggests that the field of study has a significant influence on the market value of a tertiary degree (e.g. Bol & Heisig, 2021; Britton et al., 2022; Kirkeboen et al., 2016). More specifically, there is a broad consensus that degrees in STEM (Sciences, Technology, Engineering and Mathematics) and LEM (Law, Economics and Management) lead to sizeable wage returns, due to the strong mathematical and analytical skills that employers expect graduates in these fields to possess. Similarly, several studies show that university graduates majoring in STEM and LEM fields earn significantly higher wages than those majoring in other fields (e.g. Art and Humanities, Services and Other Social Sciences), as the former are more concentrated in high-paying occupations and highly productive sectors (e.g. Bacovic et al., 2022; Croce & Ghignoni, 2020; Even et al., 2023; Grave & Goerlitz, 2012).

The role of origin in the choice of field of study is markedly less well documented than that of gender or socio-economic background (Borgen & Reimer, 2025), and existing studies remain inconclusive. On the one hand, a few studies conducted in the US highlight the under-representation of ethnic minorities in STEM and LEM fields, which would be due to environmental and psychological factors (for example, a lack of mentoring or academic mindset in their communities) and limited socioeconomic resources (e.g. Kricorian et al., 2020; Wang, 2013).[2] In a similar vein, Blake-Beard et al. (2011), Griffith (2010) and Johnson (2012) show that students of foreign origin in STEM fields are more likely to switch majors or drop out than their native peers. On the other hand, in the European context, Borgen & Reimer (2025) note that the children of immigrants tend to choose more prestigious fields with higher average returns, a phenomenon the authors attribute to several potential reasons: (i) immigrant parents may anticipate ethnic discrimination and therefore encourage higher education in secure and rewarding fields; (ii) children of immigrants may be more motivated by monetary returns due to economic insecurity; and (iii) the socioeconomic status of immigrants in host countries may mask positive selection, leading students with an immigrant background to aim at restoring

[2] To our knowledge, only one study focusing on the US concludes that there are no origin-based differences in the choice of major at university (e.g. Dickson, 2010).

their families' pre-migration status. In any case, it appears that the empirical literature on the link between fields of study, origin and wages is somewhat mixed, but also surprisingly underdeveloped. Furthermore, to the best of our knowledge, no study has yet examined the role of fields of study in explaining the wage gaps between native and immigrant workers over two generations.

Drawing on a detailed matched employer-employee database, which provides cross-sectional information on a nationally representative sample of 36,000 workers with a master's degree between 1999 and 2016, this paper aims to fill this gap by investigating the role of study fields on the relationship between origin and wages across two generations in Belgium, with a focus on the most vulnerable immigrants, namely those from developing countries.[3,4] Conforming to standard practice, we determine the origin of workers based on information regarding their country of birth and that of their parents. In other words, like most previous studies (e.g. Algan et al., 2010; Athari et al., 2019; Duncan & Trejo, 2018), our analysis does not aim to estimate the intergenerational evolution of immigrant-native wage gaps based on parent–child pairs, but rather to compare the wage gaps between natives and, respectively, FG and SG immigrants at a given point in time. Following the approach of Britton et al. (2022), we identify three main categories for the field of study: i) STEM (i.e. Sciences, Technology, Engineering and Mathematics), ii) LEM (i.e. Law, Economics and Management), and iii) Other fields (i.e. Other Social Sciences, Education, Services, Arts and Humanities). In a robustness test, we refine the analysis by breaking down the STEM and LEM fields, which leads us to distinguish the following 5 categories: i) Medical and Natural Sciences, ii) Computer and Engineering Sciences, iii) Management and Economics, iv) Law, and v) Other fields.

Controlling for a large set of worker, employment and firm characteristics, we first run log-linear regressions to estimate the effect of the field of study on the wages of natives, FG

[3] By 'developing countries', we mean either transition and developing countries listed in the United Nations' (2019) classification and/or emerging market and developing economies listed in the IMF's (2019) classification. See Appendix 1 for a chart of developed and developing countries.

[4] We do not focus on the situation of immigrants (first and second generation) from developed countries, as numerous studies show that they do not encounter major integration problems in Western countries, including Belgium (see, e.g. Abramitzky et al. (2021), Algan et al. (2010) and Fays et al. (2021)). This observation is also supported by our data. Indeed, our descriptive statistics – available on request – indicate that the wages of immigrants from developed countries (whether first- or second-generation) are similar to those of natives. Furthermore, after controlling for a large number of covariates, our results – available on request – show that the adjusted wage differentials between these two categories of immigrants and natives are very small and/or statistically insignificant.

immigrants and their SG peers. Next, we use an extension of the Gelbach's (2016) decomposition that can nest the traditional Oaxaca-Blinder decomposition in order to quantify the absolute contribution of the field of study to the immigrant-native wage gap over two generations. This approach uses the omitted variable bias formula to provide coefficients associated with quantity and price effects that are not influenced by the order of inclusion of the regressors in the econometric analysis.[5] The quantity effect stems from the difference in the distribution of native and (first-and second-generation) immigrant graduates across fields of study, while the price effect arises from the fact that a given field of study may not yield the same wage return for a native and an immigrant (being of the first or second generation).

The rest of our paper is organised as follows. In the next section, we present the methodology. Section 3 describes the structure of our database, while Section 4 discusses the findings of our regression and decomposition analyses. In Section 5, we conduct a sensitivity analysis using a more fine-grained classification of the field of study. Finally, Section 6 concludes.

2. Empirical strategy

2.1. Log-linear regression

Our paper examines wage differentials between native workers and immigrant workers from developing countries, with a focus on the moderating role of the field of study. To achieve this goal, we start with a log-linear regression. Our full benchmark specification is presented as follows:

$$log(wage_{it}) = \beta_0 + \sum_{s=1}^{8} \beta_s \, origin \times fos_{it} + z_{it}\,\vartheta + g_{it}\,\lambda + f_{it}\,\xi + \mu_t + \varepsilon_{it} \qquad (1)$$

where the dependent variable is the logarithm of the real gross hourly wage of a worker *i* at time *t*.[6] The main explanatory variable is the interaction between origin and the field of study ($origin \times fos$). The origin variable ($origin$) is categorised into three groups: i) workers born in Belgium with both parents born in Belgium (i.e. natives), ii) workers born in developing

[5] For example, the size of the coefficient associated with the field of study depends strongly on whether this variable is included in the regression before or after the inclusion of other demographic variables.
[6] Gross hourly wages are deflated to 2013 prices. They include base pay, overtime compensation, performance-related pay and commissions, and annual bonuses.

countries (i.e. FG immigrants), and iii) workers born in Belgium with at least one parent born in a developing country (i.e. SG immigrants).[7] As for the field of study variable (fos), in line with the approach adopted by Britton et al. (2022) based on the ISCED (International Standard Classification of Education), it consists of the following three categories: STEM (i.e. Science, Technology, Engineering and Mathematics), LEM (i.e. Law, Economics and Management/Business) and Other fields (i.e. Other social sciences, Education, Services, Arts and Humanities). Consequently, the interaction between origin and field of study results in an explanatory variable ($origin \times fos$) comprising nine categories, namely: 1) natives with a STEM degree, 2) natives with a LEM degree, 3) natives with a degree in Other fields, 4) FG immigrants with a STEM degree, 5) FG immigrants with a LEM degree, 6) FG immigrants with a degree in Other fields, 7) SG immigrants with a STEM degree, 8) SG immigrants with a LEM degree, and 9) SG immigrants with a degree in Other fields. The reference category consists of natives who hold a degree in a field of study other than STEM and LEM.

Our benchmark regression also contains a wide range of covariates. More precisely, z_{it} captures worker characteristics (i.e. gender, age, tenure and squared tenure); g_{it} employment characteristics (i.e. part-time work, type of employment contract and occupations at one-digit ISCO level), and f_{it} firm characteristics (i.e. sector of activity at one-digit NACE level and size of the firm in log). μ_t denotes year fixed effects (i.e. 17 dummies for the 1999–2016 period); and ε_{it} is the error term.

2.2. Gelbach's (2016) decompositions

After estimating the wage returns of the different fields of study according to the worker's origin, we quantify the absolute contribution of the field of study to the immigrant-native wage gaps over two generations, using a decomposition method proposed by Gelbach (2016). This method provides a unified and order-invariant extension of the Oaxaca–Blinder (1973) framework. It builds on the omitted variable bias formula and allows the origin-based wage gap to be decomposed into quantity and price effects (i.e. explained and unexplained components),

[7] To determine the origin of SG immigrants, in line with common practice (Corluy et al., 2015; FPS Employment & Unia, 2019; Pineda-Hernández et al., 2025a, 2025b; Piton & Rycx, 2021), the order of priority is based on the father's country of birth. Put differently, the father's country of birth is used to define the origin of a SG immigrant, except if the father was born in Belgium and the mother abroad. In that case, the mother's country of birth is retained. Therefore, in this study, SG immigrants from developing countries include workers born in Belgium: i) whose father was born in a developing country, and ii) those whose father was born in Belgium, but whose mother was born in a developing country.

while avoiding the sensitivity of sequential decompositions to the ordering of regressors. This proves particularly useful in our context, as we aim to isolate the contribution of the field of study (through both the associated price and quantity effects), treating all other explanatory variables as controls.[8]

The method proceeds in three steps. First, we estimate by OLS a baseline wage equation including only a dummy for origin D_i[9] and 17 year dummies μ_t, to obtain the raw origin-based wage gap. We then estimate a full wage equation including all explanatory variables X_i (including fields of study), and their interactions with the origin dummy. This regression yields estimates of the conditional (net) origin-based wage gap $\hat{\beta}_D$, the returns to observed characteristics $\hat{\beta}_X$, and origin differences in these returns $\hat{\beta}_{DX}$.

Second, for each worker i, we construct heterogeneity terms based on the estimated coefficients. The component associated with differences in characteristics is defined as $\widehat{H}_i^X \equiv X_i'\hat{\beta}_X$. Regressing this term on the origin dummy and year dummies yields coefficients that measure the contribution of differences in characteristics to the raw origin-based wage gap, corresponding to the quantity effect in the Oaxaca–Blinder decomposition. To isolate the role of the field of study, we focus on the part of $\widehat{H}_i^X$ associated with field-of-study dummies, while the remaining variables are treated as controls.

Third, the component associated with origin differences in returns is constructed from the origin-specific part of predicted wages. Following Gelbach (2016), the corresponding heterogeneity term for each worker i is defined as $\widehat{H}_i^{DX} \equiv \left(\hat{\beta}_D + \sum_k X_{ik}\hat{\beta}_{k,DX}\right)D_i$, where k indexes the variables in X. This term captures the part of predicted wages attributable to origin-specific returns, combining the residual conditional origin-based gap and the interaction effects between origin and observed characteristics. Regressing $\widehat{H}_i^{DX}$ on the origin dummies and year fixed effects yields coefficients that measure the contribution of differences in returns to the raw origin-based wage gap, corresponding to the price effect in the Oaxaca–Blinder framework. To isolate the role of the field of study, we focus on the part of $\widehat{H}_i^{DX}$ associated with field-of-study dummies, while the remaining variables are treated as controls.

[8] The set of control variables is identical to that used in the benchmark specifications presented in Section 2.1.
[9] In our first decomposition, the dummy variable takes the value 1 if the worker is a FG immigrant and 0 if s/he is a native. In the second decomposition, the dummy takes the value 1 for SG immigrants and 0 for natives.

As fields of study are categorical variables, the estimated price effects depend on the choice of the reference category. We use 'Other fields' as the reference category, as it provides an economically meaningful benchmark against which wage premia in STEM and LEM fields can be interpreted. This choice defines the point of evaluation for the price effects and is kept fixed throughout the analysis to ensure a consistent interpretation of differences in returns across fields of study.

3. Data

Our empirical investigation relies on a matched employer-employee database provided by Statistics Belgium (STATBEL). This database is the result of merging two datasets covering the period 1999-2016. The first dataset is the Structure of Earnings Survey (SES), which encompasses all firms operating in Belgium that employ more than ten workers and whose economic activities fall within sectors B to S (excluding O) of the NACE Rev. 2 nomenclature.[10] The SES contains granular information provided by firms on the characteristics of their workplaces (e.g. sector of activity and number of employees) and those of their workers (e.g. age, gender, education, field of study, tenure, occupation, type of contract and part-time status). The second dataset, provided by the Belgian National Register (BNR), contains exact information on every worker's country of birth and that of their parents. The linkage between the SES and the BNR datasets was carried out by STATBEL using workers' national register numbers, resulting in a cross-sectional sample to which we apply a number of filters.

We first limit the sample to the 77,848 workers holding a university master's degree, also filtering out those with a higher level of education (such as a PhD or an advanced master's degree). As we focus on the wage gap between natives and immigrants from developing countries and in order to avoid any errors in classification by origin and generation, we also exclude workers for whom information on their country of birth or that of at least one of their parents was missing, as well as immigrants from developed countries (14,299 observations deleted). We then restrict the sample to workers aged 25 and over in order to focus on individuals whose labour market position is sufficiently established and whose wages better reflect returns to completed tertiary education (2,829 observations). Additionally, as SG immigrants are significantly younger than both FG immigrants and natives, we exclude individuals aged 40 or older to ensure comparability (24,187

[10] The NACE-BEL 2008 Rev. 2 is the statistical classification of economic activities in the EU.

observations). We finally drop observations with missing information on the field of study (502 observations) and zero earnings observations in order to avoid any statistical bias in the estimation of wage gaps (52 observations), resulting in a final sample of 35,979 workers employed in 6,020 firms[11], from 1999 to 2016.

Belgium provides a suitable context for this analysis, not only because its population is highly diverse in terms of origin, but also because inequalities linked to migration background are particularly pronounced there. The country ranks among the EU Member States with the highest proportion of non-EU immigrants (mainly from developing countries). In 2021, this population of foreign origin accounted for 19.1% of the working-age population, comprising two-thirds of FG immigrants and one-third of SG immigrants (STATBEL, 2023). Belgium is also characterised by the second-largest immigrant-native employment gap at the EU level (Pina et al., 2015; Eurostat, 2023), and barriers to employment are found to persist from one generation to the next, especially for immigrants from developing countries (Corluy et al., 2015; De Cuyper et al., 2018; Piton & Rycx, 2021). Next, among the employed population, FG immigrants from developing countries are found to earn significantly less than natives, largely due to their lower level of human capital, their segregation in low-paying occupations and sectors, and an ethnic penalty (Fays et al., 2021; Jacobs et al., 2021; Pineda-Hernández et al., 2025b). In addition, results show that the overall wage gap between natives and immigrants from developing countries is highly persistent across two generations, but also that the wage penalty for the second generation is mainly driven by their younger age and fewer years of tenure. Employment segregation would therefore be relatively less problematic for the second generation, although it remains significant (Pineda-Hernández et al., 2025a; 2025b). Similarly, the ethnic penalty (i.e. adjusted wage gap) would no longer be statistically relevant for the second generation.[12]

[Take in Table 1 about here]

[11] Graduates from certain fields (such as medicine and law) are more likely to be self-employed. As our data relates exclusively to employees, our estimates should only be interpreted in relation to this segment of the labour force. It should be noted, however, that only around 15% of the working population in Belgium are self-employed (STATBEL, 2022).

[12] As noted in footnote 4, for immigrants from developed countries (both first and second generation), access to employment and wage inequality are not major issues.

Table 1 shows the statistical profiles of tertiary-educated workers (i.e. university graduates with a master's degree) by origin and generation. 92.2% of workers in our final sample are natives, while FG immigrants born in developing countries and their SG counterparts represent 3.2% and 4.6%, respectively. Regarding our dependent variable (i.e. the real gross hourly wage), we observe that FG immigrants earn, on average, 5 euros less per hour than natives (21.69 euros *vs.* 26.69 euros). This wage differential is reduced over two generations, albeit it remains important. Indeed, SG immigrants earn, on average, 2 euros less than natives (24.74 euros *vs.* 26.69 euros). Turning to our main explanatory variable, slightly more than one-third of natives and SG immigrants hold a STEM degree, compared to nearly one in two FG immigrants. The proportion of immigrants holding a LEM degree increases from 28.3% to 40% between the first to the second generation, thereby surpassing that among natives (35%), the latter being over-represented in the Other fields of study. Next, Table 1 shows that regardless of their origin, workers with a STEM or LEM degree earn higher wages than those with a degree in Other fields, without much difference between STEM and LEM fields. We further observe wage gaps between immigrants and native workers that are similar to those described above, i.e. without considering the field of study. More precisely, in any field of study, natives earn higher wages than immigrants, although there is a partial catch-up effect among the second generation. Then, for both generations of immigrants, the largest wage gaps relative to natives are observed among workers with a LEM degree, while the smallest ones are found among workers holding degrees in other fields than LEM and STEM.

The other statistics presented in Table 1 indicate that 44.2% of native and SG immigrant workers are women, this proportion being slightly lower for FG immigrants (39%). Natives have, on average, more tenure than immigrants over two generations, albeit this difference is limited to one year. Linked to this, it should be noted that SG immigrants are also younger. Regarding employment characteristics, the proportion of FG immigrants working part-time is about twice that of natives (6.9% *vs.* 3.5%). Similarly, FG immigrants are more concentrated in jobs with temporary contracts (5.5% *vs.* 2.5%). However, the employment conditions of immigrants improve over the course of two generations. Indeed, the shares of SG immigrants working part-time (3.8%) or having temporary contracts (3.2%) converge towards those of natives. Likewise, the share of FG immigrants working in elementary occupations (e.g. cleaners, farm labourers and construction workers) is more than twenty times that of natives (8.2% *vs.* 0.39%). This figure is much lower (1.02%) among SG immigrants, but still significantly higher than among natives. At the same time, the share of immigrants employed

in high-paid occupations, and particularly as managers, doubles from the first to the second generation (e.g. from 5.69% to 11.67%), but remains below that among the natives (12.85%). Finally, compared to natives, FG immigrants are particularly over-represented in Sectors I (Accommodation and food service activities, 3.96% *vs.* 0.57%) and H (Transportation and storage, 6.2% *vs.* 3.45%), and under-represented in Sectors E (Water supply, sewerage, waste management and remediation activities, 0.26% *vs.* 0.85%) and D (Electricity, gas, steam and air conditioning supply, 0.6% *vs.* 1.88%). Sectoral representation differences are less pronounced between natives and SG immigrants, the latter being the most over-represented in Sector P (Education, 0.3% *vs.* 0.17%) and under-represented in Sector B (Mining and quarrying, 0.24% *vs.* 0.32%). Lastly, native workers are employed by relatively smaller firms than immigrants (on average, firms with 279 employees, compared to around 315 for immigrants).

4. Results

4.1. Benchmark regressions

Table 2 presents our estimates regarding the intergenerational relationship between wages and origin moderated by the field of study. The first column takes native workers with a degree in a field of study other than STEM and LEM as the reference category. The results show that a native with a degree in LEM (STEM) earns 12.7% (9.8%) more than a native with a degree in another field.[13] Then, regardless of their field of study, FG immigrants are found to earn consistently less than the natives constituting the reference category. In other words, even with a LEM (STEM) degree, a FG immigrant worker earns, *ceteris paribus*, 7% *(*4.1%) less than a native with a degree in the lowest-paying field. The situation is improving for SG immigrants, with wage parity being fully achieved in non-LEM and non-STEM fields. However, although SG graduates in LEM or STEM earn more than native graduates in other disciplines, they still face lower earnings returns compared to natives with identical degrees.[14]

[13] Coefficients in the tables (and percentages reported in the text) must be interpreted as log points. In order to obtain the % change in euros following a unit change in a dummy variable, the following formula must be applied: $100*[\exp(\beta) - 1]$.

[14] Appendix 2 presents the detailed OLS estimates. We find that almost all covariates are significant with the expected sign. More precisely, we observe a wage penalty for women, part-time workers and those on temporary contracts. Conversely, wages increase with age and tenure, the relationship between wage and tenure being non-linear. The best-paid position is that of managers and wages are found to decline progressively for occupations typically associated with lower educational requirements. Larger firms also pay noticeably higher wages. We further observe considerable heterogeneity regarding sectors, most of them remunerating less than the reference

[Take in Table 2 about here]

More specifically, columns 2 and 3 further take as their reference group native holders of LEM and STEM degrees, respectively, in order to directly estimate wage penalties according to origin for these fields of study. Hence, among workers with a LEM (STEM) degree (column 2 (3)), our estimates suggest that FG immigrants earn 19.7% (13.8%) less than natives. This penalty is significantly reduced over two generations, albeit it remains important as SG immigrants with a LEM (STEM) degree still earn 4.3% (3.6%) less than natives with the same degree. Similarly, it is interesting to note that a SG immigrant with a degree in the LEM field earns the same wage as a native graduate in the STEM field.

4.2. Wage decompositions

Whilst wage regressions enable to estimate wage premia by field of study for workers of different origins, they do not permit to assess the overall contribution of fields of study to immigrant-native wage gaps. To this end, we draw on the decomposition proposed by Gelbach (2016) and, more specifically, on his extension of the Oaxaca-Blinder approach (see Section 2.2 for further details).

[Take in Table 3 about here]

Regarding the wage decomposition for the first generation of immigrants, shown at the top of Table 3, we note first that the overall wage gap stands at -21.6% (with respect to natives) and that our observables – although numerous (see equation (1) in Section 2) – account for only one-quarter (25.4%) of this gap. This suggests that, while differences in worker, employment and firm characteristics, help to explain why FG immigrants earn less than natives, a substantial part of their wage penalty remains unexplained, reflecting factors such as the non-transferability of foreign degrees, differences in unobserved characteristics (such as proficiency in the host-country languages) or potential labour market discrimination.

one (i.e. sector B – Mining and quarrying), except for sector E (i.e. Electricity, gas, steam and air conditioning supply), K (i.e. Financial and insurance activities) and L (i.e. Real Estate activities). Especially pronounced penalties are encountered in sectors I (Accommodation and food service activities), R (i.e. Arts, entertainment and recreation) and Q (i.e. Human health and social work activities).

As regards the specific contribution of fields of study to the overall pay gap, results show that it is substantial and entirely attributable to the price effect. Indeed, the latter is estimated at -0.065 and thus accounts for 30% of the total pay gap. In other words, the significantly higher wage returns associated with fields of study for natives compared to FG immigrants (documented in Section 4.1) explain almost one-third of the wage penalty faced by FG immigrants. As regards the quantity effect, it is close to zero but slightly positive (0.004). This is consistent with our descriptive statistics (see Section 3), which show that FG immigrants are over-represented (compared to natives) in STEM fields, but under-represented in LEM and Other fields. Given that STEM and LEM fields are associated with significantly higher wage premia than Other fields, it is ultimately not surprising to observe that the distribution of study fields by origin has almost no effect on the wage gap between FG immigrants and natives. More specifically, it reduces the overall pay gap for FG immigrants by 1.8%.

The wage decomposition for SG immigrant workers, presented at the bottom of Table 3, reveals a significant narrowing of the earnings disparity, as the overall wage gap between SG immigrants and natives drops to -7%. We also observe that our covariates (i.e. worker, employment and firm characteristics) now account for 55.7% of the overall pay gap. The proportion of the overall pay gap explained by differences in observable characteristics is therefore twice as high, compared to when focusing on FG immigrants. Given that SG immigrants were born, educated and socialized in the host country, in line with the existing literature (Pineda-Hernández et al., 2025b), it was expected that the role of unobservable characteristics and discriminatory factors would be significantly reduced in their case.

As regards the specific contribution of fields of study, the findings for SG immigrants show a similar pattern to that observed among their FG peers. However, a significant shift can be observed in the explanatory power of the price and of quantity effects. The price effect now stands at -0.032. In absolute terms, it is therefore half the value obtained when focusing on FG immigrants. This is because wage returns on fields of study are significantly higher for SG immigrants than for their FG peers, but remain lower than those for natives (see Section 4.1). That said, in relative terms, the price effect is greater than that estimated for FG immigrants. It accounts for around 46% of the overall pay gap between SG immigrants and natives (compared with 30% when focusing on the gap for FG immigrants). In short, as the overall pay gap is reduced by a factor of three between the first and second generations, although the price effect is halved in absolute terms, its relative magnitude increases significantly (by around 16

percentage points). As regards the quantity effect, it amounts to 0.006. It is thus only marginally bigger than that estimated for FG immigrants. However, it now accounts for -8.6% of the overall pay gap. In other words, results suggest that the distribution of fields of study, which is somewhat more favourable for SG immigrants, reduces their wage penalty relative to natives by nearly a tenth. Again, this is an expected result as descriptive statistics (presented in Section 3) show that, compared to natives, SG immigrants are slightly over-represented in LEM, equally represented in STEM, and somewhat under-represented in other, lower-paying fields.

5. Sensitivity analysis

Our benchmark results indicate that, regardless of their origin, STEM and LEM graduates earn substantially higher wages than those in other disciplines. However, these three broad fields of study may mask considerable diversity, as their specific sub-fields are likely to yield very different wage returns (Altonji et al., 2012; Britton et al., 2022). To examine this issue, as a sensitivity test, we therefore split the STEM field into 'Natural and Medical Sciences' and 'Computer and Engineering Sciences', and the LEM category into 'Law' and 'Management and Economics', while leaving the 'Other fields' category (which includes 'Other Social Sciences, Education, Services, Arts and Humanities') unchanged.

Descriptive statistics on average wages, broken down by workers' origin and detailed fields of study, are set out in Appendix 3. We note that, among STEM graduates, those with a master's degree in 'Natural and Medical Sciences' consistently earn lower salaries than those who studied 'Computer and Engineering Sciences'. This is particularly the case among FG immigrants, who actually earn less when they hold a degree in 'Natural and Medical Sciences' (18.37 EUR) than if they had obtained a degree in 'Other fields' (19.05 EUR). This can probably be explained by the fact that medical qualifications obtained abroad are often subject to strict accreditation requirements in the host country. In other words, regulatory barriers frequently prevent these qualifications from being fully recognised, thereby reducing their value in the labour market. Furthermore, we see that the average salaries of LEM graduates vary relatively little from one sub-field to another, except among FG immigrants. In this group, a degree in 'Law' is associated with significantly lower average earnings than a degree in 'Management and Economics' (17.4 vs. 23.49 EUR), and in fact ranks last among all fields in terms of pay. This result is most likely due to the fact that foreign law degrees are often poorly matched to domestic legal frameworks.

[Take in Table 4 about here]

Regression results are presented in Table 4. They show wage differentials according to workers' origin and detailed fields of study, all other things being equal. The reference category in column 1 consists of native workers graduated in 'Other fields', namely the lowest-paying area of specialisation for natives. Among native workers, 'Computer and Engineering Sciences' appears to be the best-paid field (15.6%), followed, in descending order, by 'Management and Economics' (14.2%), 'Law' (12.3%), and 'Natural and Medical Sciences' (4.9%).[15]

With regards to FG immigrants, the results show that the wage penalty relative to natives graduated in 'Other fields' (as found in our benchmark specification, see Table 2) disappears for those with a degree in 'Management and Economics', and even turns into a slight wage premium for those graduated in 'Computer and Engineering Sciences' (see column 1). However, when compared with natives who have the same field of specialisation, the returns associated with these degrees are significantly lower, i.e. -15.4% for 'Management and Economics' (see column 2) and -13.2% for 'Computer and Engineering Sciences' (see column 5). In line with our descriptive statistics' analysis, we also find that the most significant wage penalty among FG immigrants is encountered by those graduated in 'Law': *ceteris paribus*, they earn nearly 30% less than native law graduates (see column 3).

As for SG immigrants, we see that the highest returns (ranging from 9.1% to 11%) are associated with degrees in 'Law', 'Computer and Engineering Sciences' and 'Management and Economics'. Also noteworthy is that SG immigrants with a degree in 'Law' (see column 3), as well as in 'Natural and Medical Sciences' (see column 4), no longer face a wage penalty relative to their native counterparts with the same qualifications. Furthermore, the penalties encountered by those graduated in 'Management and Economics' (-5.1%, see column 2) and 'Computer and Engineering Sciences' (-5.5%, see column 5) are found to be considerably reduced over two generations (-15.4% and -13.2% respectively).

Finally, the results of Gelbach's (2016) wage decompositions, carried out using our refined classification of fields of study, are presented in Appendix 4. Overall, they corroborate those

[15] As shown by the results presented in columns 2 to 5 of Table 4, where the reference category has been adjusted to correspond to a group of natives with a distinct area of specialisation, all wage gaps between natives graduated in different fields are statistically significant.

obtained using three categories and presented in Section 4.2. Indeed, although fields of study now comprise five categories rather than three, their contribution to overall wage gaps remains almost unchanged. More specifically, the quantity and price effects account for -2.3% and 30.1% respectively when focusing on the first generation, and -10% and 52.9% when focusing on the second.

6. Conclusion

This paper provides first empirical evidence on the role of fields of study in explaining immigrant-native wage gaps across two generations. To this end, we draw on detailed, matched employer-employee data on workers holding a master's degree in Belgium for the period 1999-2016, apply Gelbach's (2016) decomposition approach alongside wage regressions, and focus on the most vulnerable immigrants, namely those from developing countries. In our benchmark specification, we follow the approach outlined by Britton et al. (2022), taking into account the three following fields of study: i) STEM (i.e. Sciences, Technology, Engineering and Mathematics), ii) LEM (i.e. Law, Economics and Management), and iii) Other fields (i.e. Other Social Sciences, Education, Services, Arts and Humanities). However, a more detailed breakdown is used for sensitivity analysis.

Our findings, based on wage regressions controlling for a wide range of covariates, show that LEM and STEM graduates, regardless of their origin, earn significantly higher wages than their counterparts specialised in 'Other fields'. Among natives, for instance, these premia are estimated at 12.7% and 9.8% respectively. However, irrespective of the field of study, we also find that first-generation (FG) immigrants earn consistently less than natives. Compared with natives holding the same degree, their wage penalty ranges between -10.8% and -19.7%. Furthermore, even those with a degree in LEM or STEM earn significantly less than natives with degrees in 'Other fields' (i.e. the lowest-paid category). At a more disaggregated level, the worst penalty appears to be encountered by FG immigrants graduated in 'Law': the pay gap stands at almost -30% compared with their native counterparts. Besides the issue of degree recognition, this outcome is likely due to the poor fit between foreign law degrees and the domestic legal framework. In contrast, FG immigrants holding a degree in 'Computer and Engineering Sciences' are found to be somewhat less disadvantaged (-13.2% compared with natives holding the same degree), probably because their qualifications are more easily transferable.

As for second-generation (SG) immigrants, our findings point to a marked improvement, albeit with some variation. For SG immigrants graduated in LEM and STEM, the gap with natives holding the same qualification narrows sharply (from -19.7% to -4.3% and from -13.8% to -3.6% respectively). For those graduated in 'Other fields', the gap with natives even disappears (it drops from -10.8% to zero). Interestingly, by breaking down LEM and STEM categories, we actually find that pay parity is also reached for SG immigrants with a degree in 'Law' as well as in 'Natural and Medical Sciences'. Conversely, for those graduated in 'Management and Economics' and 'Computer and Engineering Sciences', there is still a significant gap of around -5% compared with their native peers.

Our Gelbach's (2016) decompositions further highlight that fields of study contribute significantly to the explanation of immigrant-native wage gaps across two generations. The price effect – that is, differences in returns on fields of study by origin – accounts for around 30% of the overall pay gap between FG immigrants and natives (which stands at -21.6%). For SG immigrants, the price effect is halved in absolute terms (down from -0.065 to -0.032), as returns on fields of study improve across generations. However, in relative terms the magnitude of the price effect increases significantly (to 46%). This is because the overall pay gap is reduced by two-thirds between the first and second generations (falling to -7%). As regards the quantity effect, it is estimated at 0.004 and 0.006 depending on whether the focus is on first- or second-generation immigrants. It suggests, therefore, that the distribution of fields of study is slightly more favourable for immigrants than for natives, thereby reducing the overall immigrant-native pay gap by around 2% and 9% for the first and second generations respectively. This echoes the findings of Borgen and Reimer (2025) for European countries, according to which SG immigrants tend to choose more prestigious and better-paid fields of study than natives. That said, our findings suggest that this positive quantity effect has a fairly modest impact on the overall pay gap between immigrants and natives in the Belgian context, and that it is largely overshadowed by a much larger negative price effect (among both first and second-generation immigrants).

In conclusion, this study underscores the role of fields of study in the labour market integration of individuals with a migration background and sheds new light on the intergenerational challenges associated with it. While the lower market value of FG immigrants' degrees may stem from limited degree transferability or language barriers, these factors fail to explain the persistent disadvantages observed among the second generation, who possess host-country-

specific human and social capital. Consequently, our results suggest that wage discrimination against immigrants with a master's degree remains intergenerationally persistent in the Belgian labour market, despite clear signs of gradual improvement and significant differences across fields of study. In light of these findings, future research might benefit from a closer examination of the recruitment and promotion mechanisms relating to candidates and employees with foreign qualifications, particularly through experimental protocols that use the field of study as a moderating variable.

Acknowledgments

The authors are most grateful to Statistics Belgium for giving them access to the data. Financial support from the Belgian Science Policy Office (BELSPO, LAMIE project) is also kindly acknowledged.

Disclosure of interest

No potential conflict of interest was reported by the authors.

Funding

This work was supported by Belgian Science Policy Office (BELSPO) (LAMIE project).

References

Abramitzky, R., Boustan, L., Jacome, E. & Perez, S. (2021). Intergenerational Mobility of Immigrants in the United States over Two Centuries. *American Economic Review*, *111*(2), 580-608.

Akkaymak, G. (2017). A Bourdieuian analysis of job search experiences of immigrants in Canada. *Journal of International Migration and Integration*, *18*(2), 657-674.

Alba, R., Kasinitz, P., & Waters, M. C. (2011). The kids are (mostly) alright: Second-generation assimilation: Comments on Haller, Portes and Lynch. *Social Forces*, *89*(3), 763-773.

Algan, Y., Dustmann, C., Glitz, A. & Manning, A. (2010). The Economic Situation of First and Second-Generation Immigrants in France, Germany and the United Kingdom. *Economic Journal, 120*(542), F4-F30.

Altonji, J. G., Blom, E., & Meghir, C. (2012). Heterogeneity in human capital investments: High school curriculum, college major, and careers. *Annual Review of Economics*, *4*(1), 185-223.

Athari, E., Brinbaum, Y. & Lê, J. (2019). Le rôle des origines dans la persistance des inégalités d'emploi et de salaire. *Emploi, chômage, revenus du travail–Edition 2019* (pp.29-46). Paris : INSEE.

Bacovic, M., Andrijasevic, Z., & Pejovic, B. (2022). STEM education and growth in Europe. *Journal of the Knowledge Economy*, *13*(3), 2348-2371.

Basilio, L., Bauer, T. K., & Kramer, A. (2017). Transferability of human capital and immigrant assimilation: An analysis for Germany. *Labour*, *31*(3), 245-264.

Becker, G. (1971). The Economics of Discrimination (2 ed.). University of Chicago Press.

Blake-Beard, S., Bayne, M. L., Crosby, F. J., & Muller, C. B. (2011). Matching by race and gender in mentoring relationships: Keeping our eyes on the prize. *Journal of Social Issues*, *67*(3), 622-643.

Blinder, A. S. (1973). Wage discrimination: reduced form and structural estimates. *Journal of Human Resources*, *8*(4), 436-455.

Bol, T., & Heisig, J. P. (2021). Explaining wage differentials by field of study among higher education graduates: Evidence from a large-scale survey of adult skills. *Social Science Research*, *99*, 102594.

Borgen, N. T., & Reimer, D. (2025). Field of study choice and labor market outcomes. In *Handbook of Education and Work* (pp. 52-74). Edward Elgar Publishing.

Britton, J., Van Der Erve, L., Belfield, C., Vignoles, A., Dickson, M., Zhu, Y., ... & Buscha, F. (2022). How much does degree choice matter?. *Labour Economics*, *79*, 102268.

Christl, M., Köppl-Turyna, M., & Gnan, P. (2020). Wage differences between immigrants and natives: the role of literacy skills. *Journal of Ethnic and Migration Studies*, *46*(19), 4010-4042.

Corluy, V., Haemels, J., Marx, I. & Verbist, G. (2015). The labour market position of second-generation immigrants in Belgium. *NBB working paper*, n° 285. Brussels : National Bank of Belgium.

Croce, G., & Ghignoni, E. (2020). The evolution of wage gaps between STEM and non-STEM graduates in a technological following economy. *Applied Economics*, *52*(23), 2427-2442.

De Cuyper, P., Havermans, N., & Vandermeerschen, H. (2018). Labour market outcomes and activation of second generation jobseekers in Belgium. Working paper 2018-10. Leuven: HIVA-KU Leuven.

Demireva, N., & Zwysen, W. (2018). An examination of ethnic hierarchies and returns to human capital in the UK. *Social Inclusion*, *6*(3), 6-33.

Dickson, L. (2010). Race and gender differences in college major choice. *Annals of the American Academy of Political and Social Science*, *627*(1), 108-124.

Duncan, B., & Trejo, S.J. (2018). Socioeconomic integration of US immigrant groups over the long term: the second generation and beyond. NBER Working Paper Series, No. w2439. Cambridge, MA: National Bureau of Economic Research.

Eurostat (2023). Migrant integration statistics. Labour market indicators. Luxembourg : Eurostat.

Even, W. E., Yamashita, T., & Cummins, P. A. (2023). The STEM wage premium across the OECD. *New Horizons in Adult Education and Human Resource Development*, *35*(1), 5-19.

Fays, V., Mahy, B., Rycx, F., & Volral, M. (2021). Wage discrimination based on the country of birth: do tenure and product market competition matter? *Applied Economics*, *53*(13), 1551-1571.

FPS Employment & Unia (2019). Socio-economic Monitoring 2019, Labour Market and Origin. Brussels: FPS Employment and Unia Publishing.

Gelbach, J. B. (2016). When do covariates matter? And which ones, and how much?. *Journal of Labor Economics*, *34*(2), 509-543.

Grave, B. S., & Goerlitz, K. (2012). Wage differentials by field of study–the case of German university graduates. *Education Economics*, *20*(3), 284-302.

Griffith, A. L. (2010). Persistence of women and minorities in STEM field majors: Is it the school that matters?. *Economics of Education Review*, *29*(6), 911-922.

Guzi, M., Kahanec, M., & Kureková, L. M. (2021). What explains immigrant–native gaps in European labor markets: The role of institutions. *Migration Studies*, *9*(4), 1823-1856.

Heath, A. F., Rothon, C., & Kilpi, E. (2008). The second generation in Western Europe: Education, unemployment, and occupational attainment. *Annual Review of Sociology*, *34*(1), 211-235.

Himmler, O., & Jäckle, R. (2018). Literacy and the migrant–native wage gap. *Review of Income and Wealth*, *64*(3), 592-625.

IMF (2019). World Economic Outlook, Growth Slowdown, Precarious Recovery. International Monetary Fund, Washington, DC.

Ingwersen, K., & Thomsen, S. L. (2021). The immigrant-native wage gap in Germany revisited. *Journal of Economic Inequality*, *19*(4), 825-854.

Jacobs, V., Mahy, B., Rycx, F., & Volral, M. (2021). Over-education among immigrants: the role of demographics, time, and firm characteristics. *Applied Economics*, *53*(1), 61-78.

Jacobs, V., Rycx, F., & Volral, M. (2022). Wage effects of educational mismatch according to workers' origin: the role of demographics and firm characteristics. *De Economist*, *170*(4), 459-501.

Johnson, D. R. (2012). Campus racial climate perceptions and overall sense of belonging among racially diverse women in STEM majors. *Journal of College Student Development*, *53*(2), 336-346.

Kirkeboen, L. J., Leuven, E., & Mogstad, M. (2016). Field of study, earnings, and self-selection. *The Quarterly Journal of Economics*, *131*(3), 1057-1111.

Kricorian, K., Seu, M., Lopez, D., Ureta, E., & Equils, O. (2020). Factors influencing participation of underrepresented students in STEM fields: matched mentors and mindsets. *International Journal of STEM Education*, *7*, 1-9.

Nielsen, C. P. (2011). Immigrant over-education: evidence from Denmark. *Journal of Population Economics*, *24*(2), 499-520.

Oaxaca, R. (1973). Male-female wage differentials in urban labor markets. *International Economic Review*, *14*(3), 693-709.

OECD (2023). International Migration Outlook 2023. OECD Publishing, Paris.

Park, J., & Myers, D. (2010). Intergenerational mobility in the post-1965 immigration era: Estimates by an immigrant generation cohort method. *Demography*, *47*(2), 369-392.

Phelps, E. S. (1972). The Statistical Theory of Racism and Sexism. *American Economic Review*, *62*(4), 659-661.

Pina, Á., Corluy, V., & Verbist, G. (2015). Improving the labour market integration of immigrants in Belgium. OECD Economics Department Working Paper, 195. Paris: OECD Publishing.

Pineda-Hernández, K., Rycx, F., & Volral, M. (2025a). Immigrant overeducation across two generations: The role of gender and part-time work. *Oxford Economic Papers*, *77*(2), 445-465.

Pineda-Hernández, K., Rycx, F., & Volral, M. (2025b). Moving up the social ladder? Wages of first-and second-generation immigrants from developing countries. *Journal of Economic Inequality*, *23*(4), 1025-1055.

Piton, C., & Rycx, F. (2021). A broken social elevator? Employment outcomes of first-and second-generation immigrants in Belgium. *De Economist*, *169*(3), 319-365.

Portes, A., & Rumbaut, R. G. (2001). Legacies: The story of the immigrant second generation. University of California Press.

STATBEL (2022). “Hausse du nombre d’indépendants”, Emploi et formation, https://statbel.fgov.be/fr/nouvelles/hausse-du-nombre-dindependants.

STATBEL (2023). Labour force Survey. Ad-hoc module on migration and labour market. Brussels: Statistics Belgium.

United Nations (2019). World Economic Situation and Prospects. New York, NY: United Nations.

Wang, X. (2013). Why students choose STEM majors: Motivation, high school learning, and postsecondary context of support. *American Educational Research Journal*, *50*(5), 1081-1121.

Wen, L., & Maani, S. A. (2018). A panel study of immigrants’ overeducation and earnings in Australia. *International Migration*, *56*(2), 177-200.

Table 1: **Descriptive statistics by origin**

	Natives	**Immigrants from developing countries** [a]	
		First-generation	Second-generation [b]
Share of the sample by origin (%)	92.2	3.2	4.6
Number of observations	33,154	1,161	1,664
Real gross hourly wage (in EUR) [c]	26.69	21.69	24.74
Fields of study [d]			
Share of the sample by origin (%)			
STEM	36.0	48.4	36.1
LEM	35.0	28.3	40.0
Other fields	29.0	23.3	23.9
Real gross hourly wage (in EUR) [c]			
STEM	28.28	22.98	25.77
LEM	28.69	21.65	25.63
Other fields	22.28	19.05	21.68
Other worker characteristics			
Share of women (%)	44.2	39.0	44.2
Tenure (in years)	4.3	3.2	3.4
Age (%)			
[25-29]	32.4	21.6	42.0
[30-34]	35.7	36.2	36.7
[35-39]	31.9	42.2	21.3
Occupational categories - ISCO1 (%)			
Managers	12.85	5.69	11.67
Professionals	52.21	39.6	54.3
Technicians and associate professionals	12.15	10.7	12.93
Clerical support	18.33	18.81	15.51
Service and sales workers	2.81	5.87	3.19
Craft and related trades workers	0.6	5.95	0.6
Plant and machine operators and assemblers	0.65	5.18	0.78
Elementary occupations	0.39	8.2	1.02
Employment characteristics			
Part-time work (%) [e]	3.5	6.9	3.8
Type of contract (%)			
Permanent	97.1	93.6	96.2
Temporary	2.5	5.5	3.2
Internship	0.4	0.9	0.6
Firm characteristics			
Sector of activity - NACE1 (%)			
B - Mining and Quarrying	0.32	0.17	0.24
C - Manufacturing	23.85	23.26	18.63
D - Electricity, gas, steam and air conditioning supply	1.88	0.6	3
E - Water supply, sewerage, waste management and remediation activities	0.85	0.26	0.84

F - Construction	2.92	2.5	3.12
G - Wholesale and retail trade, repair of motor vehicles and motorcycles	15.17	16.02	15.56
H - Transportation and storage	3.45	6.2	3
I - Accommodation and food service activities	0.57	3.96	0.9
J - Information and communication	15.1	17.23	15.81
K - Financial and insurance activities	4.04	4.13	6.91
L - Real Estate activities	0.39	0.17	0.3
M - Professional, scientific and technical activities	17.29	12.66	17.91
N - Administrative and support service activities	12.05	10.42	11.3
P - Education	0.17	0.26	0.3
Q - Human health and social work activities	1.17	1.12	1.38
R - Arts, entertainment and recreation	0.18	0.17	0.3
S - Other service activities	0.6	0.86	0.48
Size of the firm (FTE number of employees)	278.8	319.3	314.5

Notes: Sample covers workers aged 25-40 and university graduates with a master's degree. [a] By 'developing countries', we mean either transition and developing countries listed in the United Nations' (2019) classification and/or emerging market and developing economies listed in the IMF's (2019) classification. See Appendix 1 for a chart of developed and developing countries. [b] Second generation immigrants' origin is defined based on the father's country of birth. However, if the father was born in Belgium and the mother was born in a developing country, the mother's country of birth is retained. [c] The real gross hourly wage is at 2013 constant prices. It includes base pay, overtime compensation, performance-related pay, commissions, and annual and/or irregular bonuses. [d] We categorise fields of study as follows: STEM (Science, Technology, Engineering and Mathematics), LEM (Law, Economics and Management), and Other fields (Other social sciences, Education, Services, Arts and Humanities). [e] We consider a part-time job to be one in which a worker works less than 30 hours per week, as defined by the OECD.
Source: STATBEL, 1999-2016.

Table 2: Wages, origins and fields of study: log-linear regressions

	(1)	(2)	(3)
	Log (Real gross hourly wage) [a]		
Natives			
Other fields [b]	Reference	-0.127***	-0.098***
		(0.004)	(0.004)
LEM fields	0.127***	Reference	0.029***
	(0.004)		(0.003)
STEM fields	0.098***	-0.029***	Reference
	(0.004)	(0.003)	
Immigrants from developing countries [c]			
First-generation			
Other fields [b]	-0.108***	-0.235***	-0.206***
	(0.015)	(0.015)	(0.015)
LEM fields	-0.070***	-0.197***	-0.168***
	(0.014)	(0.016)	(0.016)
STEM fields	-0.041***	-0.167***	-0.138***
	(0.011)	(0.011)	(0.011)
Second-generation [d]			
Other fields [b]	-0.004	-0.131***	-0.102***
	(0.013)	(0.013)	(0.013)
LEM fields	0.083***	-0.043***	-0.015
	(0.01)	(0.01)	(0.01)
STEM fields	0.062***	-0.065***	-0.036***
	(0.011)	(0.01)	(0.009)
Control variables [e]	yes	yes	yes
Observations	35,908	35,908	35,908
Adjusted R-squared	0.53	0.53	0.53

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. Sample covers workers aged 25-40 and university graduates with a master's degree. [a] The real gross hourly wage is at 2013 constant prices. It includes base pay, overtime compensation, performance-related pay, commissions, and annual and/or irregular bonuses. [b] The category 'Other fields' contains the following sub-categories: other social sciences, education, services, arts, and humanities. [c] By 'developing countries', we mean either transition and developing countries listed in the United Nations' (2019) classification and/or emerging market and developing economies listed in the IMF's (2019) classification. See Appendix 1 for a chart of developed and developing countries. [d] Second-generation immigrants' origin is defined based on the father's country of birth. However, if the father was born in Belgium and the mother was born in a developing country, the mother's country of birth is retained. [e] Gender, tenure, squared tenure, age, part-time work, type of contract, occupations (ISCO1), sector of activity (NACE1) and size of the firm. Source: STATBEL, 1999-2016.

Table 3: Gelbach's (2016) extension of the Oaxaca-Blinder decomposition between natives and immigrants: How much does the field of study matter?

Wage gaps in logs		
Natives vs. First-generation immigrants from developing countries		
Overall wage gap	Explained part	Unexplained part
-0.216***	-0.055***	-0.161***
(0.011)	(0.007)	(0.008)
	Quantity effect	Price effect [b]
Fields of study's contribution	0.004***	-0.065***
	(0.001)	(0.015)
Other variables' contribution [a]	-0.059	-0.096
Natives vs. Second-generation immigrants from developing countries		
Overall wage gap	Explained part	Unexplained part
-0.070***	-0.039***	-0.031***
(0.009)	(0.006)	(0.006)
	Quantity effect	Price effect [b]
Fields of study's contribution	0.006***	-0.032***
	(0.001)	(0.012)
Other variables' contribution [a]	-0.045	0.001

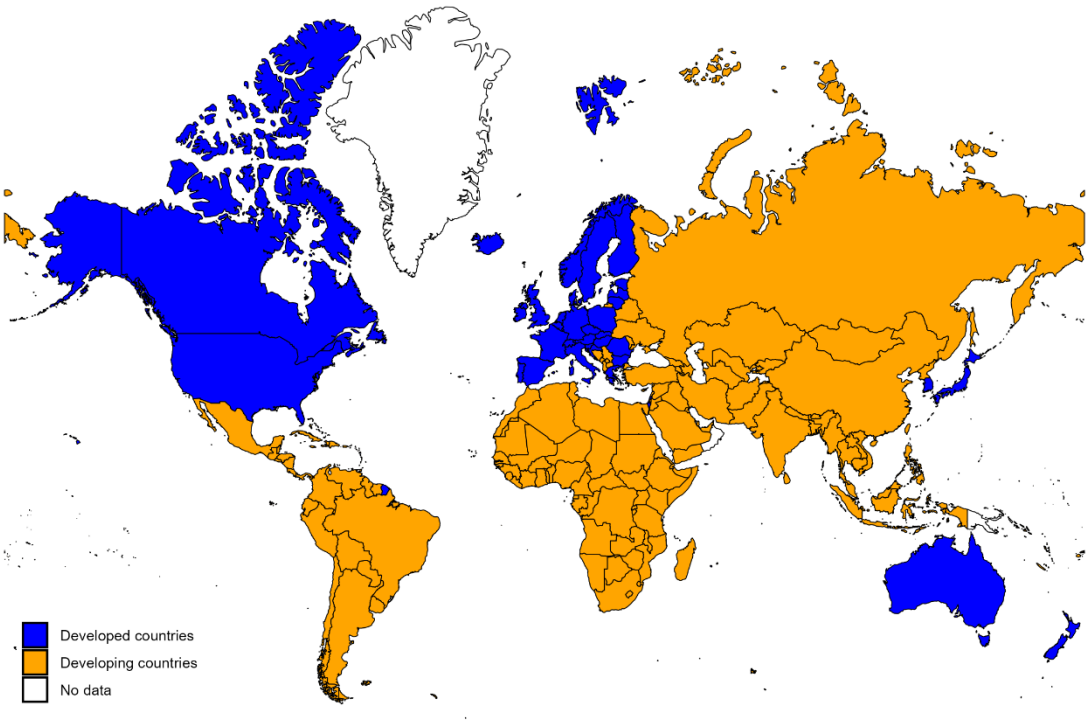
Notes: *** p<0.01, ** p<0.05, * p<0.1. Bootstrapped standard errors in parentheses. Sample covers workers aged 25-40 and university graduates with a master's degree. [a] Other explanatory variables are gender, tenure, squared tenure, age, part-time work, type of contract, occupations (ISCO1), sector of activity (NACE1) and size of the firm. [b] The 'Other fields' is the reference category used to estimate the price effect of the variable relating to the field of study. Source: STATBEL, 1999-2016.

Table 4: Wages, origins and fields of study (5 categories): log-linear regressions

	(1)	(2)	(3)	(4)	(5)
	Log (Real gross hourly wage) [a]				
Natives					
Other fields [b]	Reference [c]	-0.142***	-0.123***	-0.049***	-0.156***
		(0.004)	(0.007)	(0.005)	(0.004)
Management and Economics	0.142***	Reference	0.020***	0.093***	-0.014***
	(0.004)		(0.007)	(0.005)	(0.004)
Law	0.123***	-0.020***	Reference	0.073***	-0.034***
	(0.007)	(0.007)		(0.008)	(0.007)
Natural and Medical sciences	0.049***	-0.093***	-0.073***	Reference	-0.107***
	(0.005)	(0.005)	(0.008)		(0.005)
Computer and Engineering sciences	0.156***	0.014***	0.034***	0.107***	Reference
	(0.004)	(0.004)	(0.007)	(0.005)	
Immigrants from developing countries [d]					
First-generation					
Other fields [b]	-0.111***	-0.254***	-0.234***	-0.161***	-0.268***
	(0.015)	(0.015)	(0.016)	(0.015)	(0.015)
Management and Economics	-0.012	-0.154***	-0.134***	-0.061***	-0.168***
	(0.020)	(0.020)	(0.021)	(0.021)	(0.020)
Law	-0.175***	-0.317***	-0.298***	-0.224***	-0.331***
	(0.022)	(0.022)	(0.023)	(0.022)	(0.022)
Natural and Medical sciences	-0.128***	-0.270***	-0.251***	-0.177***	-0.285***
	(0.017)	(0.018)	(0.019)	(0.018)	(0.018)
Computer and Engineering sciences	0.024*	-0.118***	-0.098***	-0.025*	-0.132***
	(0.014)	(0.014)	(0.015)	(0.014)	(0.014)
Second-generation [e]					
Other fields [b]	-0.005	-0.148***	-0.128***	-0.054***	-0.162***
	(0.013)	(0.013)	(0.014)	(0.013)	(0.013)
Management and Economics	0.091***	-0.051***	-0.032**	0.042***	-0.065***
	(0.011)	(0.011)	(0.012)	(0.011)	(0.011)
Law	0.110***	-0.032	-0.013	0.061**	-0.046*
	(0.026)	(0.026)	(0.027)	(0.027)	(0.026)
Natural and Medical sciences	0.045**	-0.097***	-0.077***	-0.004	-0.111***
	(0.019)	(0.019)	(0.020)	(0.019)	(0.019)
Computer and Engineering sciences	0.102***	-0.041***	-0.021*	0.053***	-0.055***
	(0.011)	(0.011)	(0.012)	(0.011)	(0.010)
Control variables [f]	yes	yes	yes	yes	yes
Observations	35,908	35,908	35,908	35,908	35,908
Adjusted R-squared	0.54	0.54	0.54	0.54	0.54

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. Sample covers workers aged 25-40 and university graduates with a master's degree. [a] The real gross hourly wage is at 2013 constant prices. It includes base pay, overtime compensation, performance-related pay, commissions, and annual and/or irregular bonuses. [b] The category 'Other fields' contains the following sub-categories: other social sciences, education, services, arts, and humanities. [c] To enhance readability, we sequentially vary the reference category in the interaction terms. Results are presented for five alternative reference groups. [d] By 'developing countries', we mean either transition and developing countries listed in the United Nations' (2019) classification and/or emerging market and developing economies listed in the IMF's (2019) classification. See Appendix 1 for a chart of developed and developing countries. [e] Second-generation immigrants' origin is defined based on the father's country of birth. However, if the father was born in Belgium and the mother was born in a developing country, the mother's country of birth is retained. [f] Gender, tenure, squared tenure, age, part-time work, type of contract, occupations (ISCO1), sector of activity (NACE1) and size of the firm. Source: STATBEL, 1999-2016.

Appendix 1: Chart of developed and developing countries (IMF, 2019; United Nations, 2019)



Notes: Overseas territories are classified according to their neighbouring countries.

Appendix 2: Wages, origins and fields of study: detailed log-linear regressions

	Real Gross Hourly Wage (in log) [a]
Natives	
Other fields [b]	Reference
LEM fields	0.127***
	(0.004)
STEM fields	0.098***
	(0.004)
Immigrants from developing countries [c]	
First-generation	
Other fields [b]	-0.108***
	(0.015)
LEM fields	-0.070***
	(0.014)
STEM fields	-0.041***
	(0.011)
Second-generation [d]	
Other fields [b]	-0.004
	(0.013)
LEM fields	0.083***
	(0.010)
STEM fields	0.062***
	(0.011)
Control variables	
Gender (=1 if women)	-0.051***
	(0.003)
Age	
[25-29] (reference)	
[30-34]	0.177***
	(0.003)
[35-39]	0.304***
	(0.003)
Tenure	0.018***
	(0.001)
Tenure square	-0.001***
	(0.000)
Part-time work (=1 if less than 30 hours worked per week)	-0.066***
	(0.008)
Type of contract	
Permanent (reference)	
Temporary	-0.084***
	(0.008)
Internship	-0.041
	(0.025)

Occupations (ISCO1)	
Managers (reference)	
Professionals	-0.205***
	(0.005)
Technicians and associate professionals	-0.352***
	(0.006)
Clerical support	-0.41***
	(0.006)
Service and sales workers	-0.473***
	(0.006)
Craft and related trades workers	-0.614***
	(0.015)
Plant and machine operators and assemblers	-0.589***
	(0.017)
Elementary occupations	-0.61***
	(0.017)
Size of the firm	0.029***
	(0.001)
Sector of activity (NACE1)	
B - Mining and Quarrying (reference)	
C - Manufacturing	-0.087***
	(0.018)
D - Electricity, gas, steam and air conditioning supply	0.071***
	(0.021)
E - Water supply, sewerage, waste management and remediation activities	-0.076***
	(0.021)
F - Construction	-0.123***
	(0.02)
G - Wholesale and retail trade, repair of motor vehicles and motorcycles	-0.084***
	(0.019)
H - Transportation and storage	-0.135***
	(0.02)
I - Accommodation and food service activities	-0.273***
	(0.026)
J - Information and communication	-0.088***
	(0.019)
K - Financial and insurance activities	-0.016
	(0.02)
L - Real Estate activities	-0.028
	(0.026)
M - Professional, scientific and technical activities	-0.038**
	(0.019)
N - Administrative and support service activities	-0.119***
	(0.019)
P - Education	-0.076**

	(0.039)
Q - Human health and social work activities	-0.17***
	(0.021)
R - Arts, entertainment and recreation	-0.197***
	(0.031)
S - Other service activities	-0.154***
	(0.024)
Year dummies (17)	Yes
Constant	3.221***
	(0.02)
Observations	35,908
Adj R-squared	0.53

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. Sample covers workers aged 25-40 and university graduates with a master's degree. [a] The real gross hourly wage is at 2013 constant prices. It includes base pay, overtime compensation, performance-related pay, commissions, and annual and/or irregular bonuses. [b] The category 'Other fields' contains the following sub-categories: other social sciences, education, services, arts, and humanities. [c] By 'developing countries', we mean either transition and developing countries listed in the United Nations' (2019) classification and/or emerging market and developing economies listed in the IMF's (2019) classification. See Appendix 1 for a chart of developed and developing countries. [d] Second-generation immigrants' origin is defined based on the father's country of birth. However, if the father was born in Belgium and the mother was born in a developing country, the mother's country of birth is retained. Source: STATBEL, 1999-2016.

Appendix 3: Average wages (in EUR) by origin and fields of study (5 categories)

		Natives	Immigrants from developing countries	
			First-generation	Second-generation
Fields of study				
STEM	Natural and Medical sciences	25.59	18.37	24.16
	Computer and Engineering sciences	29.8	25.42	26.54
LEM	Management and Economics	28.65	23.49	25.49
	Law	28.95	17.4	26.38
Others [a]		22.27	19.05	21.68

Notes: Sample covers workers aged 25-40 and university graduates with a master's degree. The real gross hourly wage is at 2013 constant prices. It includes base pay, overtime compensation, performance-related pay, commissions, and annual and/or irregular bonuses. [a] Field of study named 'Others' contains the following fields: other social sciences, education, services, arts, and humanities. Source: STATBEL, 1999-2016.

Appendix 4: Gelbach's (2016) extension of the Oaxaca-Blinder decomposition between natives and immigrants: How much does the field of study matter? (5 fields of study)

Wage gaps in log		
Natives vs. First-generation immigrants from developing countries		
Overall wage gap	Explained part	Unexplained part
-0.216***	-0.053***	-0.163***
(0.011)	(0.007)	(0.008)
	Quantity effect	Price effect [b]
Fields of study's contribution	0.005***	-0.065***
	(0.002)	(0.015)
Other variables' contribution [a]	-0.058	-0.098
Natives vs. Second-generation immigrants from developing countries		
Overall wage gap	Explained part	Unexplained part
-0.070***	-0.038***	-0.032***
(0.009)	(0.006)	(0.006)
	Quantity effect	Price effect [b]
Fields of study's contribution	0.007***	-0.037***
	(0.001)	(0.012)
Other variables' contribution [a]	-0.045	0.005

Notes: *** p<0.01, ** p<0.05, * p<0.1. Bootstrapped standard errors in parentheses. Sample covers workers aged 25-40 and university graduates with a master's degree. [a] Other explanatory variables are gender, tenure, squared tenure, age, part-time work, type of contract, occupations (ISCO1), sector of activity (NACE1) and size of the firm. [b] The 'Other fields' is the reference category used to estimate the price effect of the variable relating to the field of study. Source: STATBEL, 1999-2016.

INSTITUT DE RECHERCHE
ÉCONOMIQUES ET SOCIALES

Place Montesquieu 3
1348 Louvain-la-Neuve

ISSN 1379-244X D/2026/3082/11

UCLouvain

IRES | LIDAM
Louvain Institute of Data Analysis and Modeling in economics and statistics