Immigrant Overeducation Across Generations

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Abstract

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A large body of literature shows that first-generation immigrants born in developing countries face a significantly higher likelihood of being overeducated than natives. However, when it comes to assessing their descendants' overeducation, evidence is remarkably scarce. Therefore, using granular employer-employee data for Belgium over the period 1999-2016 and generalized ordered logit regressions, we investigate the intergenerational relationship between overeducation and origin among tertiary-educated workers. We find that immigrant overeducation disappears across two generations, except for workers originating from the Maghreb. However, immigrant overeducation appears to be a persistent intergenerational issue within the cohort of part-time female and male workers.

Keywords: Immigrants, intergenerational studies, labor market integration, overeducation, generalized ordered logit, moderating factors.

JEL classification: I21, I22, J15, J24, J61, J62, J71.

1. Introduction

In 2022, the employment rate of first-generation (F-G) immigrants in the European Union (EU) was 67.3%, approximately 4% points lower than that of natives (Eurostat, 2023).[1] This immigrant-native employment gap also extended to second-generation (S-G) immigrants, whose employment rate was 66.1%. Focusing on this segment of the immigrant population, a growing number of studies show that while the wages of immigrants from developed countries are broadly comparable to those of natives, immigrants from transition and developing countries face persistent wage inequalities across generations (e.g. Athari et al., 2019; Hammarstedt and Palme, 2012; Pineda-Hernández et al., 2022). Nevertheless, intergenerational analyses are remarkably scarce regarding immigrants' employment conditions, especially in the context of overeducation (i.e. having a higher education level than that required to perform a specific job). Moreover, it is of general interest to investigate whether origin contributes to the probability of being overeducated for a worker and whether this relationship holds across generations, given that overeducation is likely to have negative micro- and macro-economic implications. More precisely, overeducation can lead to: i) lower wages and levels of job satisfaction and higher levels of absenteeism because overeducated workers are not paid according to their actual educational level, ii) lower productivity for firms due to the underutilized skills of overeducated workers and higher labor turnover, iii) higher income and wage inequality because overeducated workers can replace less-qualified workers and thereby push them into unemployment or low-paying occupations; and iv) lower economic growth for countries as a result of funding non-productive education (Brunello and Wruuck, 2019; Davia et al., 2017; McGuiness, 2006; Nielsen, 2011; Nugent, 2022).

The relationship between overeducation and origin has been brought to light by several theories. First, the human capital theory specifies that F-G immigrants face a disadvantageous position in the host country's labor market as their foreign education and experience are unlikely to be perfectly transferred across borders (e.g. educational qualifications acquired abroad are often non-recognized by host country institutions) (Basilio et al., 2017). Second, the screening theory underlines the poor signal that a foreign diploma sends to employers (i.e.

[1] Unless mentioned otherwise, this paper henceforth uses the words i) 'first-generation immigrants' and 'foreign-born people' for people born abroad; ii) 'second-generation immigrants', 'children of immigrants' and 'descendants of immigrants' for people born in the host country with at least one foreign-born parent; iii) 'immigrants' for first- and second-generation immigrants; and iv) 'natives' for people born in the host country with both parents born in the host country.

employers tend to undervalue schooling and language capabilities acquired abroad) (Chiswick and Miller, 2009; Zwysen and Demireva, 2018). Third, the job search theory states that F-G immigrants are likely to face a substantial search and adjustment process (e.g. being clustered in low-paid occupations and low-skilled sectors) due to their insufficient knowledge of the functioning of the host country's labor market (Akkaymak, 2017). Moreover, several empirical papers accord with these theories. Their principal findings can be summarized as follows: i) F-G immigrants are more likely to be overeducated than natives (e.g. Jacobs et al., 2021; Lindley, 2009; Nielsen, 2011; Wen and Maani, 2018); ii) F-G immigrants experience a higher probability of state dependence in overeducation[2] than natives (e.g. Joona et al., 2014; Kalfa and Piracha, 2017); and iii) the negative effect of overeducation on earnings is more substantial for F-G immigrants than for natives (e.g. Jacobs et al., 2022a; Maani and Le, 2021; Nielsen, 2011).

However, the abovementioned theoretical explanations are hardly applicable to S-G immigrants. Indeed, the classical assimilation theory stipulates that, since S-G immigrants were born, studied, and socialized in the host country, they should perform better than their F-G peers and be at par with natives (Alba et al., 2011; Park and Myers, 2010). More precisely, as S-G immigrants possess human and social capital linked to the host country's labor market, their likelihood of being overeducated should be similar to that of natives (i.e. immigrant overeducation should disappear across two generations). In contrast, the segmented-assimilation theory suggests that S-G immigrants may still have to deal with poor labor market outcomes, marginalization, and discrimination due to the parental transmission of physical, cultural, and social characteristics (e.g. religion, skin color, patronymic, educational background, concentration in immigrant-dense neighborhoods) (Blau et al .2013; Phalet and Heath, 2010). In line with this premise, immigrant overeducation could be a persistent intergenerational phenomenon because: i) employers can make recruitment decisions based on imperfect information and ethnic stereotypes (i.e. statistical discrimination), ii) employers can have ethnic preferences for certain occupations, regardless of observed abilities and qualifications (i.e. taste-based discrimination), and iii) employers can take advantage of the barriers that immigrants face in accessing the labor market to hire them for jobs that do not

[2] By state dependence in overeducation, the authors mean that overeducation in a previous period will have an independent effect on current overeducation.

match their actual level of education (e.g. monopsonistic discrimination[3]) (Becker, 1957; Zschirnt and Ruedin, 2016). Therefore, differences between immigrants and natives across generations cannot be completely ruled out (i.e. an intergenerational ethnic penalty[4]).

As far as we know, at the international level, only one study has explicitly accounted for S-G immigrants in the relationship between overeducation and origin.[5] Using survey data from 2016-2017 and multinomial logit regressions, Falcke et al. (2020) find that S-G immigrants from non-Western countries are more likely to be overeducated in the Netherlands than natives. Immigrant overeducation further appears to be more accentuated among female workers and workers originating from Morocco and Turkey. However, F-G immigrants are not included in this study, which impedes it from assessing the evolution of immigrant overeducation across generations[6].

Before delving into the details of our research, we should note that we exclusively focus on tertiary-educated workers because they are, *per se*, individuals that can be reasonably at risk of being overeducated. Several papers and reports follow a similar strategy (e.g. Nielsen, 2011; Nugent, 2022; Shi et al., 2022). We also devote particular attention to F-G immigrants born in developing countries[7] and their descendants since a robust body of literature shows that immigrants from developed countries are not considered a labor market integration concern for western societies (e.g. Abramitzky et al., 2021; Algan et al., 2010; Fays et al., 2021).

Using a unique and rich employer-employee database for Belgium between 1999 and 2016, a realized matches approach, and generalized ordered logit (GOLOGIT) regressions, we aim to

[3] Monopsonistic discrimination stipulates that in the context of a single buyer of the labor force, the more inelastic the labor supply, the lower wages relative to productivity (Barth and Dale-Olsen, 2009). This premise can also be extrapolated to employment conditions. For instance, if the immigrant labor supply is more inelastic than the native labor supply, immigrants would be more likely than natives to accept jobs that do not correspond to their actual level of education.

[4] By ethnic penalty, we refer to ethnic differences that cannot be explained by observable characteristics between natives and immigrants (e.g. human capital, demographics, employment, and workplace characteristics).

[5] This is understandable because databases that examine this research question (e.g. labor force survey) often lack information on parental country of birth.

[6] Falcke et al. (2020) further only account for worker characteristics (e.g. age, gender, experience) in their regressions, which may lead to an omitted variable bias in the estimates. Indeed, the likelihood of being overeducated for a worker may also depend on her employment characteristics (e.g. type of contract, part-time, overtime) and the characteristics of her workplace (e.g. firm-level collective agreement, sector of activity, firm size).

[7] By 'developing countries', we mean either transition and developing countries listed in the United Nations' (2020) classification and/or emerging market and developing economies listed in the IMF's (2020) classification. See Appendix 1.

contribute to the literature with the first empirical investigation of the intergenerational interplay between overeducation and origin. The novelty of our database is that it contains information on workers' country of birth and that of their parents to identify F-G immigrants and their descendants. In addition, it allows us to identify education-occupation mismatches at a granular level using the ISCED classification for seven educational levels, the ISCO classification of occupational groups at a 3-digit level, the NACE-classification of sectoral groups at a 2-digit level, and five age categories. This being said, we start with a benchmark specification where we estimate the likelihood of being overeducated for immigrants from developing countries while controlling for a wide range of covariates (e.g. worker, employment, and firm characteristics). Second, using a more fine-grained classification, we explore how geographical origins[8] (e.g. the Maghreb, sub-Saharan Africa or the Near and Middle East) shape the likelihood of being overeducated for immigrants from developing countries. Third, we investigate the moderating role of gender and part-time work in the intergenerational relationship between origin and overeducation. Third, using a three-way interaction, we test the interacted effect of gender, part-time work, and origin on the likelihood of being overeducated for immigrants from developing countries.

Our paper is structured in the following way. Section 2 documents the educational and labor market framework for tertiary-educated workers in Belgium. Our methodology is presented in Section 3. Section 4 describes our database, while Section 5 shows descriptive statistics. We present and discuss our empirical findings in Section 6. The final Section 7 concludes.

2. Belgian context for tertiary-educated workers

In Belgium, there are three tertiary education institutions[9]: universities, university colleges (also called universities of applied sciences), and art colleges. They are based on a three-cycle degree system: Bachelor, Master, and Ph.D. Besides, some universities also offer Advanced master's degrees (i.e master programs with more specialized training). For people who studied abroad, two possible scenarios exist for getting their diplomas recognized in Belgium.

[8] For the sake of accuracy in correctly classifying immigrants by geographical origin and economic development level, we construct our own classification of countries based on both the United Nations' (2020) classification and the IMF's (2020) classification. See Appendix 2.

[9] Access to the Belgian tertiary education system is granted upon: i) a certificate of higher secondary education (CESS for its acronym in French) delivered by a Belgian secondary education institution, ii) a CESS equivalence of a foreign diploma delivered by Belgian institutions in charge of higher education, or iii) a certificate attesting success in a qualifying exam organized by each Belgian university.

First, if the diploma was awarded in a European Economic Area (EEA) country after the implementation of the Bologna process[10] in 1999, it can be directly processed by the Belgian higher education system (i.e. a fast-track procedure). Second, if the diploma was awarded in a non-EEA country, it must first be analyzed by an Equivalency Commission (i.e. a lengthy procedure).

In 2018, the share of people aged 20-64 holding a recognized tertiary diploma in Belgium was as follows: 39.9% for Belgian natives, 22.1% for people of EU origin, and 17.6% for people with non-EU origin (primarily immigrants from developing countries) (FPS Employment and Unia, 2022).[11] Although there is a consensus regarding the positive role of education in boosting employment and wages, it appears that having a tertiary diploma in Belgium is more profitable for natives than for people with a migration background. Indeed, in 2018, tertiary-educated people born in non-EU countries experienced a sizeable immigrant-native employment gap, which varied between 17 and 30 percentage points depending on their geographical origin (FPS Employment and Unia, 2022). From an intergenerational perspective, Piton and Rycx (2021) further show that the descendants of people born in non-EU countries also face difficulties accessing the Belgian labor market.

Once in employment, Pineda-Hernández et al. (2022) find that in Belgium, the wages of S-G immigrants from developing countries are similar to those of their F-G peers and lower than those of natives. Only after controlling for observables (including firm fixed effects), the authors find that, unlike their F-G peers, the adjusted wage gap (i.e. wage discrimination) for immigrants from developing countries disappears across two generations. Regarding employment conditions, Jacobs et al. (2021) point out that F-G immigrants born in developing countries are much more likely to be over-educated than natives, and tertiary-educated workers entirely drive this higher likelihood between immigrants and natives.[12] Nevertheless,

[10] The Bologna process implies, *inter alia*, the establishment of a harmonized nomenclature (bachelor, master, advanced master, and Ph.D.) and the use of the European Credit Transfer and Accumulation System (ECTS) in order to facilitate the recognition of academic qualifications and study periods abroad.

[11] FPS Employment and Unia (2022) define people of foreign origin as follows: people with a nationality other than Belgian or who were born with a nationality other than a Belgian one or Belgian-born people with at least one parent born with a foreign nationality or having a foreign nationality. FPS Employment and Unia (2022) further defines the second generation as people with Belgian nationality, Belgian-born or born in Belgium with a foreign nationality, having at least one parent with a foreign nationality.

[12] Pineda-Hernández et al. (2022) and Jacobs et al. (2021) use workers born in developed countries, including Belgian natives, as the reference group in their empirical strategy. However, it should be noted that Belgian natives represent more than 80% of that group. Therefore, their results can be largely interpreted as labor market differences between Belgian natives and immigrants from developing countries.

as far as we know, intergenerational mobility issues concerning overeducation remain unaddressed in Belgium and much of the developed world.

3. Methodology

3.1. Realized matches approach

Given the structure of our data (i.e. a matched employer-employee database), we follow a realized matches (RM) approach to measure overeducation.[13] The RM approach uses the information on workers' educational level to calculate the modal value by occupation (i.e. workers' educational level that repeats the most in an occupation), which is then used as a reference to identify overeducation (Kiker et al., 1997).[14] For instance, a cashier is overeducated if she holds a tertiary diploma, whereas most workers in that occupation only hold a secondary diploma.

Moreover, it should be noted that the level of education required in an occupation may vary by workers' age and firms' sector of activity (i.e. cohort effects) (Lindley, 2009). For instance, Voets (2022) show that in the EU, whereas overeducation decreases over time among the youngest age groups, the opposite path is observed among the oldest age groups. Therefore, to minimize a potential bias related to occupational skill upgrading or downgrading across sectors, we determine the required educational level by using the mode of education in each occupation-age-sector cell. More precisely, we define the required level of education by measuring the modal value of education (ISCED: 7 categories)[15] by occupation

[13] Two other approaches are also available in the literature to measure overeducation: i) a job analysis approach that gauges overeducation by occupation based on analysts' criteria; and ii) a worker self-assessment approach that uses surveys to ask workers if they consider or not themselves in a situation of overeducation given their current educational attainment. However, our data do not contain the necessary information to implement them.

[14] In an RM approach, the mean by occupation can also be used as a reference (Verdugo and Verdugo, 1989). However, the mean is very likely to be influenced by outliers.

[15] Information on workers' educational attainment, available in 7 categories in our dataset, has been reported by firms' human resources departments (based on their registers). We converted that information into years of education, applying the following rule: i) primary education: 6 years of education; ii) lower secondary education: 9 years; iii) general, technical, and artistic upper secondary education: 12 years; iv) higher non-university education, short type (i.e. bachelor): 15 years; v) university and non-university education, long type (i.e. master): 17 years; vi) postgraduate education (i.e. advanced master): 18 years; and vii) doctoral education (i.e. Ph.D.): 21 years. Given that firms' human resources departments have provided information on workers' educational attainment, this might be somewhat underestimated for F-G immigrants who obtained their educational qualifications abroad. The findings reported for that group of workers in this paper should therefore be considered as a lower bound.

(ISCO-classification at 3-digit level), sector (NACE-classification at 2-digit level), and age group (5 categories)[16].

3.2. Generalized ordered logit regressions

Ordered logit (OLOGIT) regressions and multinomial logit (MLOGIT) regressions, ditto for probit versions, are the two main econometric methods used in the literature to estimate education-occupation mismatches (i.e. undereducation[17] and overeducation). The choice between these two models depends on the possibility of establishing a ranking for the ordinal dependent variable (De Vreyer and Roubaud, 2013). Initially, assuming an unequivocal order for education-occupation mismatches (i.e. undereducation, required education, and overeducation), OLOGIT regressions seem the right choice. However, OLOGIT regressions are based on the parallel regression assumption (i.e. the effect of any explanatory variable is consistent or proportional across the different categories), which is often violated.[18] An alternative solution is the use of MLOGIT regressions, which are well-suited to estimate likelihoods without the need for the parallel regression condition. However, MLOGIT regressions are based on the assumption of independence of irrelevant alternatives (IIA) (i.e. the characteristics of one particular option do not impact the relative probabilities of choosing other options), which rarely holds in the analysis of education-occupation mismatches.[19]

Against this background, Williams (2016) states that "*generalized ordered logit (GOLOGIT) regressions can fit estimates that are less restrictive than OLOGIT regressions, whose parallel regression assumption is often violated, but more parsimonious and interpretable that those fitted by MLOGIT regressions*".[20] Moreover, GOLOGIT regressions present an

[16] We consider the following age groups: 20-24, 25-29, 30-39, 40-49, and > 50.

[17] A worker is considered undereducated if her educational attainment is lower than that required for her job. Undereducation may notably result from periods of labor shortages (i.e. bottleneck vacancies) and technologically induced changes in job content and complexity.

[18] The null hypothesis of the Wald test of parallel regression assumption specifies that the coefficients should be the same in each cumulative logistic regression. If the null hypothesis of this test is rejected, OLOGIT estimates can be highly misleading (Williams and Quiroz, 2020). Using our database, we reject the null hypothesis of the Wald test. The results of the test can be obtained on request.

[19] The null hypothesis of the IIA assumption (i.e. Hausman test) states that there is no systematic change in the coefficients if a category of the dependent variable is excluded from the model. If the null hypothesis of this test is rejected, the disturbances of the categories are not independent (Hausman and McFadden, 1984). Using our database, we reject the null hypothesis of the IIA assumption. The results of the test can be obtained on request.

[20] Alternative specific multinomial probit (ASMP) regressions can also deal with the issues of OLOGIT regressions and MLOGIT regressions, as it relaxes both the IIA and the parallel regression assumptions. However, ASMP regressions are highly time-consuming, which prevent them from generating simulated

additional advantage compared to standard regressions. They allow the parallel regression assumption to be relaxed for estimates that do not satisfy it while imposing it on those that do. (i.e. partial proportional odds) (Williams, 2006). Therefore, to assess the intergenerational nexus between overeducation and origin among tertiary-educated workers in Belgium, we estimate a GOLOGIT model. Our benchmark regression is written as follows:

$$P(Y_{it} > j) = g(\beta_j X) = \frac{\exp(\alpha_j + \beta_{1j}\sum_{k=1}^{5} \boldsymbol{Origin_{itk}} + \beta_{2j}W_{it} + \beta_{3j}E_{it} + \beta 4_j F_{it} + \delta_t)}{1+\{\exp(\alpha_j + \beta_{1j}\sum_{k=1}^{5} \boldsymbol{Origin_{itk}} + \beta_{2j}W_{it} + \beta_{3j}E_{it} + \beta 4_j F_{it} + \delta_t)\}} \quad (1)$$

$$where\ j\ =\ 1\ (undereducated), 2\ (adequately\ educated)\ and\ 3\ (overeducated)$$

From the above, it can be established that the estimates (β) vary for each category j.[21,22] Moreover, the probabilities that a worker *i* within an occupation-age-sector cell at a specific time *t* will be undereducated, adequately educated, and overeducated are equal to:

$$P(Y_i = 1 = undereducated) = 1 - g(\beta_1 X)$$

$$P(Y_i = 2 = adequately\ educated) = g(\beta_1 X) - g(\beta_2 X)$$

$$P(Y_i = 3 = overeducated) = g(\beta_3 X)$$

As we are interested in overeducation, the GOLOGIT regression estimates the probability of being in the category 3 (overeducated) compared to being in a lower category (undereducated or adequately educated). Besides, we use the average marginal effects of GOLOGIT regressions to facilitate the interpretation of non-linear estimations.

In equation (1), the main explanatory variable is'$Origin$'[23], which categorizes workers in the following manner: i) natives, i.e. workers born in Belgium with two parents born in Belgium (the reference group); ii) F-G immigrants born in developing countries;[24] iii) S-G immigrants from developing countries, i.e. workers born in Belgium with at least one parent born in a

maximum likelihoods in granular and large databases. Indeed, using our data, the expected optimization performance in ASMP models was never achieved through the iteration process.

[21] The OLOGIT regression is a special case of the GOLOGIT regression, where the coefficients associated with independent variables are the same for each category of the dependent variable (i.e. the parallel regression assumption).

[22] In equation (1), α_j represents the threshold parameter for each of the *j* ordered categories.

[23] We use parental country of birth instead of parents' nationality or ethnicity to avoid ethnic attrition. Relying on nationality or ethnicity may lead to substantial classification errors in the groups of workers by origin (Kone, 2018).

[24] See footnote 7.

developing country;[25] iv) immigrants from developed countries, excluding Belgian natives;[26] and v) others, i.e. workers born abroad with both parents born in Belgium[27] (See Appendix 1 for a chart of developed and developing countries).

We further introduce in our benchmark regression an extensive range of covariates, which are described as follows: W is a vector of worker characteristics (i.e. gender, tenure, squared tenure, and type of household); E is a vector of employment characteristics (i.e. type of contract and dummies for part-time and overtime); F is a vector that contains information on the firm where the worker is employed (i.e. size of the firm, region where the firm is located, and dummies for the existence of firm-level collective agreement and type of economic and financial control); and δ represents year fixed effects.

In a subsequent analysis, we split F-G and S-G immigrants from developing countries into six geographical groups: i) Sub-Saharan African countries, ii) the Maghreb countries, iii) the Near and Middle East countries, iv) non-EU Eastern European countries, v) emerging and developing Asian countries, and vi) Latin American and Caribbean countries (see Appendix 2 for a list of countries by geographical region). The aim is to consider more fine-grained characteristics linked to workers' country of birth or those of their parents (e.g. human capital transferability, patronymic, physical appearance, religion, and economic and political stability of the country).

Third, we investigate the moderating role of gender and part-time work in the intergenerational relationship between overeducation and origin. To achieve this goal, we re-

[25] Regarding S-G immigrants from developing countries, it should be noted that their origin has been firstly determined by the father's country of birth, except if the father was born in Belgium and the mother in a developing country. In that case, the mother's country of birth has been retained. This is a common approach in recent empirical studies covering the labor market outcomes of immigrants across generations (e.g. Corluy et al., 2015; Jacobs et al., 2022b; Piton and Rycx, 2021).

[26] F-G immigrants born in developed countries and their descendants present similar labor market outcomes to those of Belgian natives (Fays et al., 2021; Jacobs et al., 2021; Piton and Rycx, 2021; Pineda-Hernandez et al., 2022). Therefore, as they do not represent an intergenerational integration issue for Belgium, we merge F-G immigrants born in developed countries and their descendants into a unique group.

[27] The category 'others' has been created because, in our database, workers born abroad with both parents born in Belgium earn more and have better employment characteristics than any other group of origin, including natives. Two potential, non-exclusive explanations could be behind this finding. First, after the decolonization in Africa and Asia, Belgian expatriates and their children, characterized by having high socioeconomic outcomes, returned to Belgium. Second, children with two parents born in Belgium were born abroad due to their parents' professional occupations (primarily employed in high-skilled and well-paid jobs). Therefore, based on these premises, classifying workers born in developing countries with both parents born in Belgium as F-G immigrants born in developing countries would have led to underestimating the likelihood of being overeducated for the latter.

estimate our equation (1) with an explanatory variable that varies according to origin and each moderator as follows:

$$(Y_{it} > j) = g(\beta_j X) = \frac{\exp(\alpha_j + \beta_{1j}\sum_{k=1}^{10} \boldsymbol{Origin\_gender_{itk}} + \beta_{2j}W_{it} + \beta_{3j}E_{it} + \beta_{4j}F_{it} + \delta_t)}{1+\{\exp(\alpha_j + \beta_{1j}\sum_{k=1}^{10} \boldsymbol{Origin\_gender_{itk}} + \beta_{2j}W_{it} + \beta_{3j}E_{it} + \beta_{4j}F_{it} + \delta_t)\}} \quad (2)$$

where the reference group of'$Origin\_gender$'is male natives[28].

$$(Y_{it} > j) = g(\beta_j X) = \frac{\exp(\alpha_j + \beta_{1j}\sum_{k=1}^{10} \boldsymbol{Origin\_part\_time_{itk}} + \beta_{2j}W_{it} + \beta_{3j}E_{it} + \beta_{4j}F_{it} + \delta_t)}{1+\{\exp(\alpha_j + \beta_{1j}\sum_{k=1}^{10} \boldsymbol{Origin\_part\_time_{itk}} + \beta_{2j}W_{it} + \beta_{3j}E_{it} + \beta_{4j}F_{it} + \delta_t)\}} \quad (3)$$

where the reference group of'$Origin\_part\_time$'is natives in full-time jobs[29].

Finally, we simultaneously test the interacted role of origin, gender, and part-time in the likelihood of being overeducated by re-estimating our equation (1) with an explanatory variable that varies according to origin, gender, and part-time (i.e. a three-way interaction) as follows:

$$(Y_{it} > j) = g(\beta_j X) =$$
$$\frac{\exp(\alpha_j + \beta_{1j}\sum_{k=1}^{18} \boldsymbol{Origin\_gender\_part\_time_{itk}} + \beta_{2j}W_{it} + \beta_{3j}E_{it} + \beta_{4j}F_{it} + \delta_t)}{1+\{\exp(\alpha_j + \beta_{1j}\sum_{k=1}^{18} \boldsymbol{Origin\_gender\_part\_time_{itk}} + \beta_{2j}W_{it} + \beta_{3j}E_{it} + \beta_{4j}F_{it} + \delta_t)\}} \quad (4)$$

where the reference group of'$Origin\_gender\_part\_time$'is male natives in full-time jobs. [30, 31]

[28] More precisely, the explanatory variable that varies according to origin and gender is categorized in the following manner: 1) Male natives, 2) Female natives, 3) F-G male immigrants born in developing countries, 4) F-G female immigrants born in developing countries, 5) S-G male immigrants from developing countries, 6) S-G female immigrants from developing countries, 7) Male immigrants from developed countries, 8) Female immigrants from developed countries, 9) Other male workers, and 10) Other female workers.

[29] More precisely, the explanatory variable that varies according to origin and part-time work is categorized in the following manner: 1) Natives in full-time jobs, 2) Natives in part-time jobs, 3) F-G immigrants born in developing countries in full-time jobs, 4) F-G immigrants born in developing countries in part-time jobs, 5) S-G immigrants from developing countries in full-time jobs, 6) S-G immigrants from developing countries in part-time jobs, 7) Immigrants from developed countries in full-time jobs, 8) Immigrants from developed countries in part-time jobs, 9) Other workers in full-time jobs, and 10) Other workers in part-time jobs.

[30] Our equations (2), (3), and (4) deliver the same results as regressions with interaction effects. The advantage of our specifications is that they directly (and parsimoniously) estimate coefficients associated with the overall effect of origin, the corresponding moderator, and the interaction between these variables for each group. In contrast, in regressions with interaction effects, each coefficient associated with origin, the corresponding moderator, and the interaction variable must be summed to obtain the overall effect for each group.

[31] More precisely, the explanatory variable that varies according to origin, gender and part-time work is categorized in the following manner: 1) Male natives in full-time jobs, 2) Male natives in part-time jobs, 3) Female natives in full-time jobs, 4) Female natives in part-time jobs, 4) F-G male immigrants born in developing countries in full-time jobs, 5) F-G male immigrants born in developing countries in part-time jobs, 6) F-G female immigrants born in developing countries in full-time jobs, 7) F-G female immigrants born in developing countries in part-time jobs, 8) S-G male immigrants from developing countries in full-time jobs, 9) S-G male

4. Data

Our empirical strategy uses a granular, matched employer-employee database for the Belgian labor market between 1999 and 2016, which was provided by Statistics Belgium (STATBEL). This database was obtained by merging two datasets: the Structure of Earnings Survey (SES) and administrative data from the Belgian National Register (BNR).

The SES covers all firms operating in Belgium with economic activities defined by the NACE-BEL 2008 Rev. 2 nomenclature.[32,33] Based on a sophisticated stratified sampling design, the SES further provides a nationally representative sample of workers in the Belgian labor market.[34] Last but not least, the SES contains granular information on the structural characteristics of the firms (e.g. sector of activity, number of employees, type of collective agreement) and the demographic and employment characteristics of workers (e.g. age, gender,

immigrants from developing countries in part-time jobs, 10) S-G female immigrants from developing countries in full-time jobs, 11) S-G female immigrants from developing countries in part-time jobs, 12) Male immigrants from developed countries in full-time jobs, 13) Male immigrants from developed countries in part-time jobs, 14) Female immigrants from developed countries in full-time jobs, 15) Female immigrants from developed countries in part-time jobs, 15) Other male workers in full-time jobs, 16) Other male workers in part-time jobs, 17) Other female workers in full-time jobs, and 18) Other female workers in part-time jobs,

[32] The NACE-BEL 2008 Rev. 2 is the statistical classification of economic activities in the European Union (Belgian Version).

[33] More precisely, our data cover the following sectors: (B) mining and quarrying, (C) manufacturing, (D) electricity, gas, steam and air conditioning supply, (E) water supply, sewerage, waste management and remediation, (F) construction, (G) wholesale and retail trade, repair of motor vehicles and motorcycles, (H) transportation and storage, (I) accommodation and food service activities, (J) information and communication, (K) financial and insurance activities, (L) real estate activities, (M) professional, scientific and technical activities, (N) administrative and support service activities, (P) Education, (Q) Human health and social work activities, (R) Arts, entertainment and recreation, and (U) Other service activities.

[34] The stratification criteria refer sequentially to the region (NUTS-groups), the principal economic activity (NACE-groups) and the size of the firm. The sample size in each stratum depends on the size of the firm. Sampling percentages of firms are respectively equal to 10, 50 and, 100 percent when the number of workers is lower than 50, between 50 and 99, and above 100. Within a firm, sampling percentages of employees also depend on size. Sampling percentages of employees reach respectively 100, 50, 25, 14.3, and 10 percent when the number of workers is lower than 20, between 20 and 50, between 50 and 99, between 100 and 199, and between 200 and 299. Firms employing 300 workers or more must report information for an absolute number of employees. This number ranges between 30 (for firms with between 300 and 349 workers) and 200 (for firms with 12,000 workers or more). They are asked to follow a specific procedure to guarantee that firms report information on a representative sample of their workers. First, they must rank their employees in alphabetical order. Next, Statistics Belgium gives them a random letter (e.g. the letter O) from which they must start when reporting information on their employees (following the alphabetical order of workers' names in their list). If they reach the letter Z and still must provide information on some of their employees, they must continue from the letter A in their list. Moreover, firms that employ different categories of workers, namely managers, blue- and/or white-collar workers, must set up a separate alphabetical list for each of these categories and report information on the number of workers in these different groups that is proportional to their share in the firm's total employment. For example, a firm with 500 employees (namely, 80 managers, 100 white-collar workers, and 320 blue-collar workers) will have to report information on 50 workers (namely, 8 managers, 10 white-collar workers, and 32 blue-collar workers).

educational attainment, tenure, occupation, type of contract, part-time). Regarding the BNR, it provides reliable information on workers' countries of birth, those of their parents, and the type of household where they live. The original sample contains 1,604,835 observations across 20,375 firms.

After calculating education-occupation mismatches by occupation-age-sector cell (see Section 3.1 for more details), two filters have been applied to the original sample. First, as overeducation is very unlikely to occur among people with at most upper secondary education[35] (Nielsen, 2011; Nugent, 2022; Shi et al., 2022), we restricted our sample to tertiary-educated workers to avoid underestimation issues (1,147,473 observations deleted). Second, we dropped workers with missing information on the country of birth of at least one of their parents to avoid misclassification issues regarding groups of origin (33,826 observations deleted). Therefore, our final sample consists of 396,462 observations in 13,628 occupation-age-sector cells.[36]

Needless to say, thanks to STATBEL, we have access to the 2021 Labour Force Survey (LFS)[37] and its ad-hoc module on 'Migration and labour market'. This dataset contains around 22,000 observations and is representative of the whole population of Belgium. We use this dataset to produce statistics that reinforce the findings of our GOLOGIT regressions.

5. Descriptive statistics

Table 1 shows the statistical profiles of tertiary-educated workers by origin and generation.[38, 39] About 79% of workers in our sample are Belgian natives, while F-G and S-G immigrants from developing countries represent 3.8% and 2.9%, respectively. Within the cohort of immigrants originating from developing countries, we observe that most of them are geographically originating from Sub-Saharan Africa and the Maghreb, regardless of

[35] Using our database, we find that among workers with at most upper secondary education, there is no statistical difference in the likelihood of being overeducated between natives and immigrants from developing countries. Those estimates can be obtained on request.
[36] The distribution of occupation-age-sector cells by size is as follows: 7.3% have less than 10 observations, 38.7% have between 10 and 100 observations, 45.2% have between 101 and 1000 observations, and 8.8% have more than 1000 observations.
[37] The LFS is the official survey for labor markets in Europe. It is constructed to produce quarterly labor force estimates.
[38] In order to shorten the term that describes tertiary-educated workers, tertiary-educated natives or tertiary-educated immigrants in the remainder of this paper, we refer to them simply as workers, natives or immigrants, respectively.
[39] The descriptive statistics for 'immigrants born in developed countries' and 'others' are available on request.

generation, which is in line with the distribution of the working-age population in Belgium by geographical origin between 2008 and 2016 (FPS Employment and Unia, 2019).

[Insert Table 1]

Regarding worker characteristics, S-G immigrants from developing countries are younger than their F-G peers and natives. For instance, the percentage of S-G immigrants from developing countries aged 20-29 amounts to 42.1%, while those of their F-G peers and natives are 17.9% and 24.4%, respectively. According to their age, S-G immigrants also have a lower tenure level than natives. The shares of workers holding a bachelor's degree or a master's degree are similar between natives and immigrants from developing countries across two generations. About 2 in 3 workers are in a household with child(-ren), regardless of origin and generation.

Turning to employment and firm characteristics, F-G immigrants born in developing countries and their descendants are more clustered in fixed-term contracts than natives. The share of immigrants from developing countries in part-time jobs decreases across two generations, from 7.7% to 4.4%, and further becomes slightly lower than that of natives (4.7%). In a similar vein, the distribution of immigrants from developing countries by occupation converges towards that of natives across two generations, except for managerial positions. Focusing on the most representative sectors of activity, the share of immigrants from developing countries in sector C (Manufacturing) decreases across two generations, while those in sector G (wholesale and retail trade, including repair of motor vehicles and motorcycles), sector J (information and communication) and sector N (administrative and support service activities) increase. In addition, the share of immigrants from developing countries in sector M (professional, scientific and technical activities) remains stable across two generations.

[Insert Table 2]

Table 2 documents the incidence of overeducated workers by origin and generation. Column (1) shows that F-G immigrants born in developing countries have a higher share of overeducated workers than natives (53.7% vs 43.5%). By contrast, the incidence of overeducation for S-G immigrants from developing countries is 42.1%, slightly lower than that of natives. Moreover, breaking down the groups of interest by gender, we observe that female natives and S-G female immigrants from developing countries are more overeducated

than their corresponding S-G male peers. By contrast, F-G female immigrants born in developing countries have a lower share of overeducated workers than their F-G male peers. Considering the role of part-time work, we find that the incidence of overeducation is much higher for part-time workers than full-time workers, regardless of origin and generation. Our statistics also show that the incidence of overeducation for immigrants from developing countries in part-time jobs decreases across two generations, from 83.9% to 72.5%. However, this incidence remains higher than that of natives (61.3%).

6. Results

6.1 Benchmark scenario

In order to investigate the intergenerational relationship between origin and overeducation over almost two decades (1999-2016), Table 3 shows the marginal effects of a GOLOGIT regression (see equation (1) in Section 3.2). We first find that *ceteris paribus*, the likelihood of being overeducated for a worker increases by 10.5% points if the worker was born in a developing country. In other words, F-G immigrants born in developing countries are more likely to be overeducated than natives, whose overeducation incidence is 43.5% (see column 1 in Table 2). Our finding also goes in the same direction as that of Jacobs et al. (2021) for Belgium between 1999 and 2010. However, the magnitude of our estimate is more extensive than that of Jacobs et al. (2021) (i.e. 5.6% points vs. 10.5% points), which suggests that in terms of overeducation, the employment situation of F-G immigrants born in developing countries has deteriorated after 2010.

Moreover, although we cannot ultimately assert whether the higher likelihood of being overeducated for F-G immigrants born in developing countries than natives is completely related to origin (e.g. ethnic penalty) or unobserved individual heterogeneity (e.g. motivation, communication or organization skills), the large number of covariates included in our benchmark regression enables us to feel confident to at least partially attribute our findings to an ethnic penalty.[40]

[40] Our results in Table 3 also show that immigrants from developed countries are less likely to be overeducated than natives and that workers born in developing countries with both parents born in Belgium (i.e. others) are just as likely to be overeducated as natives.

[Insert Table 3]

Turning to S-G immigrants from developing countries, we find no significant relationship between their origin and their likelihood of being overeducated. Put differently, S-G immigrants from developing countries are, *ceteris paribus*, just as likely to be overeducated as natives.[41] From an intergenerational perspective, it further means that immigrant overeducation disappears across two generations (i.e. the classical assimilation theory). Unlike their F-G peers, S-G immigrants from developing countries may be treated as natives in the recruitment or promotion process due to the following three arguments. First, as the children of immigrants completed their tertiary education in Belgium, they can prove that they master at least one of the languages used in Belgium. Indeed, Chachashvili-Bolotin and Kreiner (2022) point out that academic proficiency in the host country's language is crucial in bridging differences between immigrants and natives. Second, employers may rely more on S-G immigrants than their parents because the former accumulate human capital in Belgium. Third, due to socialization in Belgium, S-G immigrants probably built up better social networks than their parents, which can be helpful in their job search or getting promoted.

Of course, overeducation is not exclusively associated with workers' origin or that of their parents. Actually, most of our estimates associated with our control variables are statistically significant and have the expected signs. More precisely, being a woman, having children at home or having a non-permanent contract is positively linked to overeducation. Also, having a part-time job, working overtime or working in a firm located outside Belgium's capital (i.e. Brussels) seems to significantly increase the likelihood of being overeducated.[42] By contrast, firm size is negatively associated with overeducation. Similarly, tenure reduces the likelihood of being overeducated, albeit up to a certain level because its squared term's estimate is statistically significant and positive.[43] Regarding the type of tertiary education, a worker

[41] However, it should be noted that, although origin no longer influences the likelihood of being overeducated for S-G immigrants from developing countries, their incidence of overeducation still reaches 43.5% (see column 1 in Table 2).

[42] Unlike the results of Jacobs et al. (2021) on the relationship between collective bargaining and overeducation, we find that firm-level collective agreements increase the likelihood of being overeducated. In this regard, however, it should be noted that Jacobs et al. (2021) consider all types of workers in their benchmark specification, whereas we exclusively focus on tertiary-educated workers. Thus, our estimates suggest that decisions that tackle educational mismatches among tertiary-educated workers are embedded in industry-wide and national collective agreements rather than in firm-level collective ones.

[43] The quadratic effect of tenure on overeducation is in line with theoretical predictions. For example, a young, overeducated worker may benefit from accumulating tenure in a firm to be promoted to an occupation that accords with his current level of education. By contrast, a worker with many years of tenure could end up being

holding master's degree is less likely to be overeducated than a worker holding a bachelor's degree. However, holding an advanced master or Ph.D.'s degree increases the likelihood of being overeducated substantially.

6.2 Geographical origin and overeducation

Our estimates regarding immigrant overeducation across generations may also vary depending on workers' geographical origin or that of their parents. In this respect, Fleischmann and Dronkers (2010) and Levels and Dronkers (2008) underline the role of source-country characteristics at the individual level (e.g. patronymic, physical appearance, religion or cultural manners) and the macro level (e.g. economic and political stability, the quality of the education system, or reasons for migration) in shaping the labor market performance of F-G immigrants and their descendants. Several studies motivate this premise, as they show that the labor market outcomes of immigrants across generations significantly depend on their geographical origin (e.g. Athari et al., 2019; Lindley, 2009; Pineda-Hernández et al., 2022; Piton and Rycx, 2021). Thus, using a more fine-grained geographical classification, Table 4 reports the results on the moderating role of geographical origin in the likelihood of being overeducated for a worker.

[Insert Table 4]

We first observe that F-G immigrants born in the Maghreb are the geographical group that experiences the highest probability of being overeducated (18.0% points higher than natives). To a lower extent, F-G immigrants born in Sub-Saharan Africa are also more likely to be overeducated than natives by 12.1% points. Moreover, the probability of being overeducated for F-G immigrants born in the Near and Middle East and non-EU Eastern Europe is about 9.3% points higher than that of natives. By contrast, F-G immigrants born in emerging and developing Asia, Latin America, and the Caribbean experience no penalty in their likelihood of being overeducated due to their origin.

Turning to S-G immigrants from developing countries, we find three intergenerational patterns for them. First, immigrant overeducation vanishes across two generations for the

overeducated, as her skills and educational credentials may not match the current level of technology used by the firm.

following geographical groups: the Near and Middle East, non-EU Eastern Europe, emerging and developing Asia, Latin America and the Caribbean. Second, although S-G immigrants from the Maghreb perform better than their F-G peers, their likelihood of being overeducated remains 3.2% points higher than natives. Third, S-G immigrants from Sub-Saharan Africa reverse the overeducation penalty than their F-G face *vis-à-vis* natives. Put differently, S-G immigrants from Sub-Saharan Africa experience a 2.0% points lower probability of being overeducated than natives. This finding might be explained, among other things, by the fact that the share of workers holding a master's degree is 7.5% points higher for S-G immigrants from Sub-Saharan Africa than for natives (see Appendix 3). This being said, it should be reminded that in our benchmark regression, the probability of being overeducated is lower for workers holding a master's degree than a bachelor's degree (see education's estimate in Table 3).

6.3 Gender and overeducation

Regarding overeducation, gender is an important moderating factor to consider. In fact, women are more likely than men to accept jobs for which they are overeducated due to being involved in childcare and home production. For instance, when women become mothers, they are sorted into jobs with flexible work schedules and short commutes (e.g. clerical or administrative jobs) (Petrongolo, 2019), which hardly accord with their educational attainment. Moreover, European Commission (2019) reveals that high-educated women are still underrepresented in professional or managerial occupations (i.e. decision-making positions) in Europe. When zooming in on the immigrant population, the home country's cultural norms (i.e. fertility, gender norms and partnership choices) can also affect the labor market expectations of female immigrants across generations (i.e. female immigrants struggle to balance their professional career and ethnic identity) (Blau et al., 2013; Jacobs et al., 2022b; Noghanibehambari et al., 2022).

The empirical literature does not broadly support the abovementioned premises on the overeducation of F-G immigrants[44]. However, turning to intergenerational studies, Falcke et

[44] For instance, in Belgium, Jacobs et al. (2021) find that F-G female immigrants born in developing countries experience a moderately higher likelihood of being overeducated than their F-G male peers. In Sweden, Joona et al. (2014) show that F-G male immigrants are more likely to be overeducated than their F-G female peers. At the

al. (2020) find that in the Netherlands, the likelihood of being overeducated for S-G female immigrants from non-Western countries is higher than that for their S-G male peers. However, the authors estimate regressions separately for men and women (i.e. no interaction between origin and gender), which prevents them from providing clear evidence on the separate contribution of gender and immigration background to potential immigrant overeducation. Therefore, we investigate the effect of origin and gender on the likelihood of being overeducated for a worker using equation (2). Results are displayed in Table 5.

[Insert Table 5]

We find that F-G male immigrants born in developing countries experience a 13.5% points higher likelihood of being overeducated than male natives. However, the ethnic penalty considerably decreases for their S-G male peers. Indeed, S-G male immigrants from developing countries are slightly more likely to be overeducated than natives (2.2% points). In order to evaluate the performance of female immigrants correctly, it is important to show first that female natives experience a 5.2% points higher likelihood of being overeducated than male natives (i.e. the gender penalty). This being said, F-G female immigrants born in developing countries face a 10.2% points higher likelihood of being overeducated than male natives. This last estimate is statistically different from that for female natives (see the test for equality of coefficients at the bottom of Table 5), which implies that F-G female immigrants born in developing countries undergo a double penalty due to their gender and foreign background. However, it should be noted that although we observe a double penalty for F-G female immigrants born in developing countries, their likelihood of being overeducated appears to be lower than that for their F-G male peers.

In contrast, our estimates suggest that S-G female immigrants from developing countries no longer face a double penalty. More precisely, their likelihood of being overeducated is 3.4% points higher than that for male natives but somewhat lower than that for female natives. However, this estimate is not statistically different from that for female natives (see the test for equality of coefficients at the bottom of Table 5). Therefore, in terms of overeducation, although S-G female immigrants from developing countries perform similarly to female natives (i.e. there is no evidence of an ethnic penalty).

European level, Byrne and McGuinness (2014) find no relationship between origin and overeducation among female immigrants.

6.4 Part-time work and overeducation

People with household and childcare duties may be forced to accept part-time jobs as they are more suitable for reconciling family and work. However, the level of education required for part-time jobs rarely corresponds to that of workers (Davia et al., 2017). For instance, column (5) in Table 2 shows that around 60.0% of part-time workers are overeducated in our sample. This incidence attains about 80% and 70% for F-G immigrants born in developing countries and their descendants. Moreover, when it comes to full-time, high-skilled jobs, employers may prefer natives due to imperfect information about immigrants (i.e. statistical discrimination) or employers' prejudice or aversion to immigrants (i.e. taste-based discrimination). Thus, the ethnic selection in the type of employment may force immigrants to accept part-time jobs (i.e. involuntary part-time work). Based on these statements, part-time work can be considered an important moderating variable in the intergenerational relationship between origin and overeducation. In this regard, it is also worth noting that part-time work has never been investigated as a moderating variable in the literature on immigrant overeducation so far.

[Insert Table 6]

Table 6 shows the estimates of equation (3) regarding the interacted role of origin and part-time work in the likelihood of being overeducated for a worker. Among full-time workers, F-G immigrants born in developing countries are 9.4% points more likely to be overeducated than natives. In contrast, there is no evidence of an ethnic penalty in the likelihood of being overeducated for S-G immigrants from developing countries in full-time jobs. These estimates mirror those of our benchmark regression in Table 3.

Nevertheless, part-time work skyrockets the likelihood of being overeducated for a worker, with a more substantial effect on immigrants and their descendants. Among the native population, part-time workers face a 14.1% points higher likelihood of being overeducated than full-time workers. Compared to part-time native workers, F-G immigrants born in developing countries are 25.7% points more likely to be overeducated. Although this ethnic penalty is partly reduced across generations, it remains important. In other words, S-G immigrants from developing countries experience a 12.4% higher likelihood of being overeducated than part-time male natives.

Focusing on part-time immigrant workers, it becomes apparent that this group experiences persistent inequalities related to their origin, although these are partly reduced across generations. More precisely, while and employed in part-time jobs are d than part-time native workers, this difference reaches 12.4% points for their S-G peers.

6.5 Three-way interaction: origin, gender, and part-time work

In our sample, we observe that the incidence of part-time work is considerably higher for women than men, regardless of origin (see Appendix 4). These statistics accord with previous papers that show that part-time work mainly concerns women (e.g. McIntosh et al., 2012; Fernández-Kranz et al., 2013). More specifically, this literature states that, unlike men, women are pushed to accept part-time jobs in flexible or low-skilled occupations when they become mothers to conciliate family and work (the so-called motherhood penalty[45]). Using a probit regression, our estimates support this premise since, unlike male workers, female workers' likelihood of being in a part-time job significantly increases when they have children at home (see Appendix 5). This likelihood further appears to be moderated by workers' origin and generation. Accordingly, we analyze the role of the three-way interaction (origin, part-time work and gender) in the likelihood of being overeducated for a worker. Results are shown in Table 7.

[Insert Table 7]

Within the cohort of full-time female and male workers, our estimates largely accord with those of our GOLOGIT regression in Table 5. However, regarding part-time workers, our three-way interaction reveals interesting new outcomes. First, we find that female natives are 3.3% points more likely to be overeducated than their male peers in part-time jobs, who already face a 15.7% points higher likelihood of being overeducated than male natives in full-time jobs. Second, being born in a developing country skyrockets the likelihood of being overeducated for a part-time worker, regardless of gender. More precisely, F-G male immigrants born in developing countries are 29.2% points more likely to be overeducated than male natives in part-time jobs. Similarly, the likelihood of being overeducated for F-G

[45] The motherhood penalty in the labor market affects women's earnings and the number of hours worked (e.g. moving from a full-time job to a part-time one).

female immigrants born in developing countries is 22.3% higher than that of female natives in part-time jobs. In this regard, it should also be noted that in terms of overeducation, there is no statistically significant difference between F-G male immigrants born in developing countries and their F-G female peers (see the test for equality of coefficients at the bottom of Table 7).

Third, immigrant overeducation is intergenerationally persistent within the cohort of part-time female and male workers, although its extent depends on workers' gender. More precisely, S-G male immigrants from developing countries experience a 21.5% points higher likelihood of being overeducated than male natives in part-time jobs, while their S-G female peers are 8.0% points more likely to be overeducated than female natives in part-time jobs. Focusing on the likelihood of being overeducated for the descendants of immigrants, we also find that S-G male immigrants from developing countries fare worse than their S-G female peers (37.3% points vs. 27.0% points). Indeed, there is a difference of about 10% points in their likelihoods, which is further statistically significant (see the test for equality of coefficients at the bottom of Table 7).

[Insert Figure 1]

Within the cohort of part-time workers, there are solid grounds for considering that the persistent ethnic penalty in the likelihood of being overeducated for female immigrants from developing countries across two generations can be attributed to gender roles (e.g. motherhood, childcare, household tasks), which are more exacerbated among the immigrant population due to ethnic norms (e.g. fertility and partner choices, family hierarchy). Although, the family-work balance in immigrant households may also explain the ethnic penalty in the likelihood of being overeducated for F-G male immigrants born in developing countries and their same-sex descendant, the availability of full-time jobs and the employment selection according to origin (i.e. taste-based or statistical discrimination) must also be considered. In this respect, using the 2021 ad-hoc module LFS on 'Migration and labour market' for Belgium, we actually find that the involuntary part-time employment rate of F-G male immigrants born in developing countries stood at 57.4% in 2021, while that of male natives was 15.4% (see Figure 1). This employment issue further extends to S-G male immigrants from developing countries, whose involuntary part-time employment rate was 45.6%. In contrast, involuntary part-time work appears to be less problematic for female immigrants.

About 20.0% of F-G female immigrants born in developing countries and their same-sex descendants declared themselves in an involuntary part-time job in 2021.

7. Conclusion

In the OECD area, the population with tertiary education increased from 26.1% in 2000 to 47.1% in 2020 (OECD, 2023). However, although educational expansion accords with the growing demand for highly educated workers, it also leads to a substantial number of education-occupation mismatches (e.g. an economist employed as a cashier in a supermarket) (Green and Henseke, 2016). Indeed, overeducation has become a persistent social and economic issue in the developed world, especially since the 2008 financial crisis (McGuinness et al., 2018; Nugent, 2022). Moreover, Davia et al. (2017) find that overeducation rates are higher in developed countries with more immigrant labor. Indeed, several papers find that F-G immigrants born in developing countries are more likely to be overeducated than natives (e.g. Jacobs et al., 2020; Wen and Maani, 2018). However, little is known about S-G immigrants' overeducation. In addition, no study has investigated immigrant overeducation from an intergenerational perspective. Therefore, using rich employer-employee data, a realized matches approach, and GOLOGIT regressions, we investigate the intergenerational interplay between origin and overeducation among tertiary-educated workers in Belgium.

After accounting for differences in worker, employment, and firm characteristics, our estimates suggest that F-G immigrants born in developing countries are substantially more likely to be overeducated than Belgian natives. However, when it comes to S-G immigrants from developing countries, their likelihood of being overeducated is not different from that of natives. In other words, immigrant overeducation disappears across two generations, thus illustrating the positive effect of birth, education, and socialization in Belgium on the labor market integration of immigrants across two generations (i.e. the classical assimilation theory). Using a more fine-grained geographical classification, these results hold, except for workers originating from the Maghreb. Moreover, we find that, while F-G female immigrants born in developing countries experience a double penalty in their likelihood of being overeducated due to their gender and migration background, their S-G female peers perform similarly to female natives (i.e. only evidence of a gender penalty). Last but not least, our

estimates suggest that part-time work makes immigrant overeducation intergenerationally persistent (i.e. the segmented-assimilation theory), which may be, *inter alia*, the consequence of gender roles and ethnic norms (e.g. childcare, household tasks, family hierarchy) for female immigrants and involuntary part-time work for male immigrants.

Data availability statement

The data used in this paper are available from Statistics Belgium. However, restrictions may apply to the availability of these data as confidentiality agreements and licenses must be signed with Statistics Belgium. The STATA do-files supporting this paper's findings are available upon request from the authors.

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Table 1. Descriptive statistics by origin and generation – means and percentages, 1999-2016

	Sample of tertiary-educated workers born in or from:		
	Belgium	**Developing countries[a]**	
		First generation	**Second generation[b]**
Share of the sample by origin and generation (%)[c]	78.5	3.7	3.0
Region of birth (%)			
Belgium (n = 311,447)	100.0		
Developing countries[d]			
Sub-Saharan African countries (n = 9,318)		27.1	46.0
Maghreb countries (n = 7,151)		25.1	29.9
Near and Middle East countries (n = 2,729)		11.0	9.7
Emerging and developing Asian countries (n = 2,811)		15.1	5.4
Other Eastern European countries (n = 2,475)		12.0	6.3
Latin American and Caribbean countries (n = 1,729)		9.8	2.7
Worker characteristics			
Women (%):	38.3	35.1	44.3
Age categories (%):			
20-24	6.1	2.8	10.5
25-29	18.3	15.1	32.9
30-39	37.5	40.5	41.9
40-49	26.2	27.5	11.9
50+	11.9	14.2	2.8
Tenure	7.8	5.2	4.3
Education (%):			
Bachelor	57.9	56.9	57.9
Master	39.5	38.8	39.5
Advanced Master, doctoral candidate or PhD	2.4	4.3	2.6
Household (%):			
Couple without children living at home	18.6	16.1	18.3
Couple with children living at home	61.7	54.0	54.5
Single parent	6.1	5.6	9.2
Single person	12.0	17.2	15.1
Other households[e]	1.6	7.2	2.9
Employment characteristics			
Type of contract (%):			
Permanent	96.3	91.7	92.7
Fixed-term	3.2	7.6	6.6
Internship or apprenticeship	0.5	0.8	0.7
Part-time (%)[f]	4.5	6.9	4.3
Overtime (%)[g]	1.7	2.3	1.6
Occupational categories - ISCO1 (%):			
Managers	12.3	9.4	8.4
Professionals	37.7	36.1	38.4
Technicians and associate professionals	18.0	14.3	19.2
Clerical support	24.2	20.5	24.5
Service and sales workers	3.8	5.5	5.1
Craft and related trades workers	1.9	4.1	1.8
Plant and machine operators and assemblers	1.6	4.3	1.6
Elementary Occupations	0.5	5.7	0.9

Table 1. (Continued)

Table 1. Continued

	Sample of tertiary-educated workers born in or from:		
	Belgium	**Developing countries[a]**	
		First generation	**Second generation[b]**
Firm characteristics			
Sector of activity - NACE1 (%):			
B - Mining and Quarrying	0.2	0.1	0.1
C - Manufacturing	30.3	24.5	20.4
D - Electricity, gas, steam and air conditioning supply	2.4	0.8	2.1
E - Water supply, sewerage, waste management and remediation activities	1.0	0.6	0.7
F - Construction	3.9	2.5	3.2
G - Wholesale and retail trade, repair of motor vehicles and motorcycles	17.2	15.7	16.6
H - Transportation and storage	4.7	6.2	4.8
I - Accommodation and food service activities	0.8	3.4	1.4
J - Information and communication	11.1	12.1	13.6
K - Financial and insurance activities	3.2	4.3	5.2
L - Real Estate activities	0.5	0.4	0.5
M - Professional, scientific and technical activities	12.6	14.5	14.3
N - Administrative and support service activities	9.2	11.6	14.1
P - Education	0.2	0.3	0.3
Q - Human Health and social work activities	2.1	2.0	1.7
R - Arts, entertainment and recreation	0.1	0.3	0.2
U - Other service activities	0.5	0.6	0.8
Size of the firm (FTE number of employees)	459.0	505.3	481.2
Firm-level collective agreement (%)	26.0	24.4	23.3
More than 50% privately owned (%)	95.5	96.3	95.8
Region where the firm is located (%):			
Brussels	20.8	37.5	39.4
Flanders	60.5	40.2	34.9
Wallonia	18.7	22.4	25.7

Notes: Worker and firm weights are used. [a] By 'developing countries', we mean either transition and developing countries listed in the United Nations' (2020) classification and/or emerging market and developing economies listed in the IMF's (2020) classification. For the sake of accuracy in correctly classifying immigrants by geographical origin and economic development level, we construct our own classification of countries based on both the United Nations' (2020) classification and the IMF's (2020) classification. [b] Second-generation workers' origin is defined based on the father's country of birth. However, if the father was born in a developed country and the mother was born in a developing country, the mother's country of birth is retained. [c] The groups' immigrants from developed countries' and 'others' are also considered in the sample (see Section 3.2 for more details). Therefore, the sum of shares does not add up to 100%. [d] Appendix 2 shows the list of developing countries by region of birth. [e] 'Other households' refer to brothers/sisters living together, friends living together, students or workers' homes, etc. [f] A worker is recognized as a part-time employee if she works less than 30 hours per week. [g] Overtime is any time worked by an employee in excess of her contractual working hours. Source: STATBEL, 1999-2016.

Table 2. Incidence of overeducation (%) by origin and generation, 1999-2016

	Total	Gender		Employment	
		Men	Women	Full-time work	Part-time work
Tertiary-educated workers born in/from:	(1)	(2)	(3)	(4)	(5)
Belgium	43.5	40.7	48.0	42.6	61.3
Developing countries[a]					
First Generation	53.7	54.6	52.1	51.2	83.9
Second generation	42.1	40.7	43.9	40.7	72.5
Total	43.6	41.0	47.9	42.6	63.5

Notes: Worker and firm weights are used. Using a realized matches approach, overeducation is measured within each occupation-age-sector cell (see Section 3.1 for more details). [a] S-G 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.

Table 3. Benchmark: average marginal effects - GOLOGIT regression

	Probability of being overeducated
Tertiary-educated workers born in/from:	(1)
Belgium (n = 311,222)	Reference
Developing countries[a]	
First-generation (n = 14,459)	0.105***
	(0.010)
Second-generation (n = 11,748)	0.008
	(0.007)
Developed countries (n = 54,524)	-0.013***
	(0.005)
Others[b] (n = 4,509)	0.008
	(0.010)
Control variables	
Women	0.050***
	(0.005)
Tenure	-0.002***
	(0.001)
Squared tenure	0.000***
	(0.000)
Education (ref. Bachelor)	
Master	-0.060***
	(0.010)
Advanced Master or PhD	0.543***
	(0.009)
Type of household (ref. without child(-ren) living at home)	
With child(-ren) living at home	0.009***
	(0.003)
Other households	-0.014*
	(0.008)
Type of contract (ref. permanent)	
Fixed term	0.104***
	(0.029)
Internship	0.067**
	(0.028)
Part-Time	0.156***
	(0.011)
Overtime	0.145***
	(0.015)
Size of the firm (FTE number of employees in log)	-0.021***
	(0.003)
Firm-level collective agreement (Yes)	0.018**
	(0.008)
More than 50% privately owned	0.008
	(0.024)
Region (ref. Brussels)	
Flanders	0.076***
	(0.010)
Wallonia	0.084***
	(0.013)
Year fixed effects[c]	Yes
Occupation-age-sector cells[d]	13,628
Observations	396,462

Notes: *** p<0.01, ** p<0.05, * p<0.1. Worker and firm weights are used. Robust standard errors are in parentheses, which are clustered at the firm level. [a] S-G 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. [b] The category 'others' refers to workers born in developing countries with both parents born in Belgium (see Section 3.2 for more details). [c] 17 year dummies. [d] Using a realized matches approach, overeducation is measured within each occupation-age-sector cell (see Section 3.1 for more details). Source: STATBEL, 1999-2016.

Table 4. Geographical origin: average marginal effects - GOLOGIT regression

		Probability of being overeducated
Tertiary-educated workers born in/from:		(1)
Belgium (n = 311,222)		Reference
Developing countries[a]		
Sub-Saharan African countries	First generation (n = 3,913)	0.121***
		(0.015)
	Second generation (n = 5,403)	-0.020**
		(0.009)
Maghreb countries	First generation (n = 3,634)	0.180***
		(0.016)
	Second generation (n = 3,517)	0.032**
		(0.015)
Near and Middle East countries	First generation (n = 1,589)	0.093***
		(0.023)
	Second generation (n = 1,138)	0.032
		(0.021)
Emerging and developing Asian countries	First generation (n = 2,175)	0.020
		(0.016)
	Second generation (n = 634)	-0.023
		(0.029)
Non-EU Eastern European countries	First generation (n = 1,733)	0.092***
		(0.019)
	Second generation (n = 742)	0.026
		(0.024)
Latin American and Caribbean countries	First generation (n = 1,415)	0.018
		(0.021)
	Second generation (n = 314)	0.019
		(0.035)
Control variables		
Year fixed effect[b]		Yes
Worker characteristics[c]		Yes
Employment characteristics[d]		Yes
Firm characteristics[e]		Yes
Occupation-age-sector cells[f]		13,628
Observations		396,462

Notes: *** p<0.01, ** p<0.05, * p<0.1. Worker and firm weights are used. Robust standard errors are in parentheses, which are clustered at the firm level. The category' immigrants from developed countries' and 'others' are also included in the regression, but their estimates are not portrayed in this table (available on request). [a] Second-generation workers' 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. [b] 17 year dummies. [c] Gender, type of tertiary education, tenure, squared tenure and type of household. [d] Type of contract, dummy for part-time, and dummy for overtime. [e] Size of the firm (FTE number of workers in log), dummy for more than 50% privately owned, dummy for firm-level collective agreement, and region where the firm is located (Brussels, Flanders or Wallonia). [f] Using a realized matches approach, overeducation is measured within each occupation-age-sector cell (see Section 3.1 for more details). Source: STATBEL, 1999-2016.

Table 5. Gender and origin: average marginal effects - GOLOGIT regression

		Probability of being overeducated
Tertiary-educated workers born in/from:		(1)
Belgium		
Men (n = 191,913)		Reference
Women (n = 119,309) [1]		0.052***
		(0.005)
Developing countries[a]		
Men	First generation (n = 9,382)	0.135***
		(0.012)
	Second generation (n = 6,541)	0.022**
		(0.009)
Women	First generation (n = 5,077) [2]	0.102***
		(0.012)
	Second generation (n = 5,207) [3]	0.034***
		(0.013)
Control variables		
Year fixed effects[b]		Yes
Worker characteristics[c]		Yes
Employment characteristics[d]		Yes
Firm characteristics[e]		Yes
Test for equality of coefficients (p-value)[f]		
[1] = [2]		0.00
[1] = [3]		0.12
[2] = [3]		0.00
Occupation-sector-age cells[g]		13,628
Observations		396,462

Notes: *** p<0.01, ** p<0.05, * p<0.1. Worker and firm weights are used. Robust standard errors are in parentheses, which are clustered at the firm level. The categories' immigrants from developed countries' and 'others' are also included in the regression, but their estimates are not portrayed in this table (available on request). [a] Second-generation workers' 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. [b] 17 year dummies. [c] Level of tertiary education, tenure, squared tenure and type of household. [d] Type of contract, dummy for part-time, and dummy for overtime. [e] Size of the firm (FTE number of workers in log), dummy for more than 50% privately owned, dummy for firm-level collective agreement, and region where the firm is located (Brussels, Flanders or Wallonia). [f] The null hypothesis of the test specifies that the estimates are not statistically different from each other if the p-value is higher than 0.10. [g] Using a realized matches approach, overeducation is measured within each occupation-age-sector (see Section 3.1 for more details). Source: STATBEL, 1999-2016.

Table 6. Part-time work and origin: average marginal effects - GOLOGIT regression

		Probability of being overeducated
Tertiary-educated workers born in/from:		(1)
Belgium		
Full-time work (n = 297,169)		Reference
Part-time work (n = 14,053)		0.141***
		(0.011)
Developing countries[a]		
Full-time work	First generation (n = 13,463)	0.094***
		(0.010)
	Second generation (n = 11,247)	-0.001
		(0.008)
Part-time work	First generation (n = 996)	0.398***
		(0.022)
	Second generation (n = 501)	0.265***
		(0.033)
Control variables		
Year fixed effects[b]		Yes
Worker characteristics[c]		Yes
Employment characteristics[d]		Yes
Firm characteristics[e]		Yes
Occupation-sector-age cells[f]		13,628
Observations		396,462

Notes: *** p<0.01, ** p<0.05, * p<0.1. Worker and firm weights are used. Robust standard errors are in parentheses, which are clustered at the firm level. The categories' immigrants from developed countries' and 'others' are also included in the regression, but their estimates are not portrayed in this table (available on request). [a] Second-generation workers' 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. [b] 17 year dummies. [c] Gender, level of tertiary education, tenure, squared tenure and type of household. [d] Type of contract and dummy for overtime. [e] Size of the firm (FTE number of workers in log), dummy for more than 50% privately owned, dummy for firm-level collective agreement, and region where the firm is located (Brussels, Flanders or Wallonia). [f] Using a realized matches approach, overeducation is measured within each occupation-age-sector (see Section 3.1 for more details). Source: STATBEL, 1999-2016.

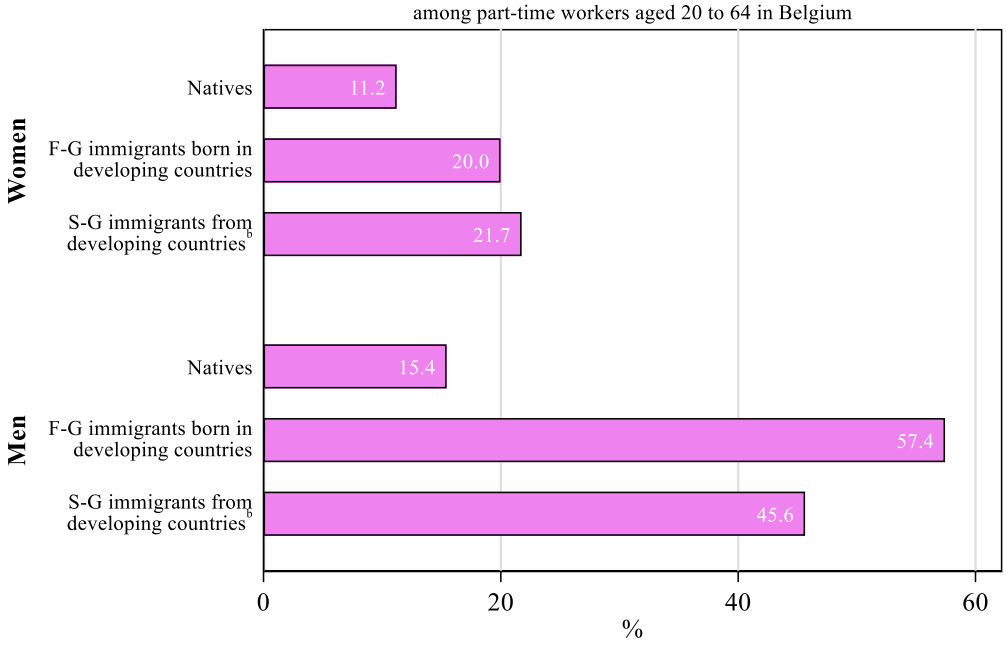
Table 7. Gender, part-time work and origin: average marginal effects - GOLOGIT regression

			Probability of being overeducated
Tertiary-educated workers born in/from:			(1)
Belgium			
Men	Full-time jobs (n = 188,859)		Reference
	Part-time jobs (n = 3,054)		0.157***
			(0.011)
Women	Full-time jobs (n = 108,310)		0.054***
			(0.002)
	Part-time jobs (n = 10,999)		0.190***
			(0.006)
Developing countries[a]			
Men	Full-time jobs	First generation (n = 8,995)	0.128***
			(0.007)
		Second generation (n = 6,393)	0.018**
			(0.007)
	Part-time jobs	First generation (n = 387) [1]	0.449***
			(0.024)
		Second generation (n = 148) [2]	0.373***
			(0.048)
Women	Full-time jobs	First generation (n = 4,468)	0.080***
			(0.010)
		Second generation (n = 4,854)	0.028***
			(0.010)
	Part-time jobs	First generation (n = 609) [3]	0.413***
			(0.018)
		Second generation (n = 353) [4]	0.270***
			(0.035)
Control variables			
Year fixed effects[b]			Yes
Worker characteristics[c]			Yes
Employment characteristics[d]			Yes
Firm characteristicse			Yes
Test for equality of coefficients (p-value)[f]			
[1] = [3]			0.23
[2] = [4]			0.08
Occupation-sector-age cells[g]			13,628
Observations			396,462

Notes: *** p<0.01, ** p<0.05, * p<0.1. Worker and firm weights are used. Robust standard errors are in parentheses, which are clustered at the firm level. The groups' immigrants from developed countries' and 'others' are also included in the regression, but their estimates are not portrayed in this table (available on request). [a] S-G 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. [b] 17 year dummies. [c] type of tertiary education, tenure, squared tenure and type of household. [d] type of contract and dummy for overtime. [e] Size of the firm (FTE number of workers in log), dummy for more than 50% privately owned, dummy for firm-level collective agreement, and region where the firm is located (Brussels, Flanders or Wallonia). [f] The null hypothesis of the test specifies that the estimates are not statistically different from each other if the p-value is higher than 0.10. [g] Using a realized matches approach, overeducation is measured within each occupation-age-sector (see Section 3.1 for more details). Source: STATBEL, 1999-2016.

Figure 1. Involuntary part-time employment rate[a] in 2021

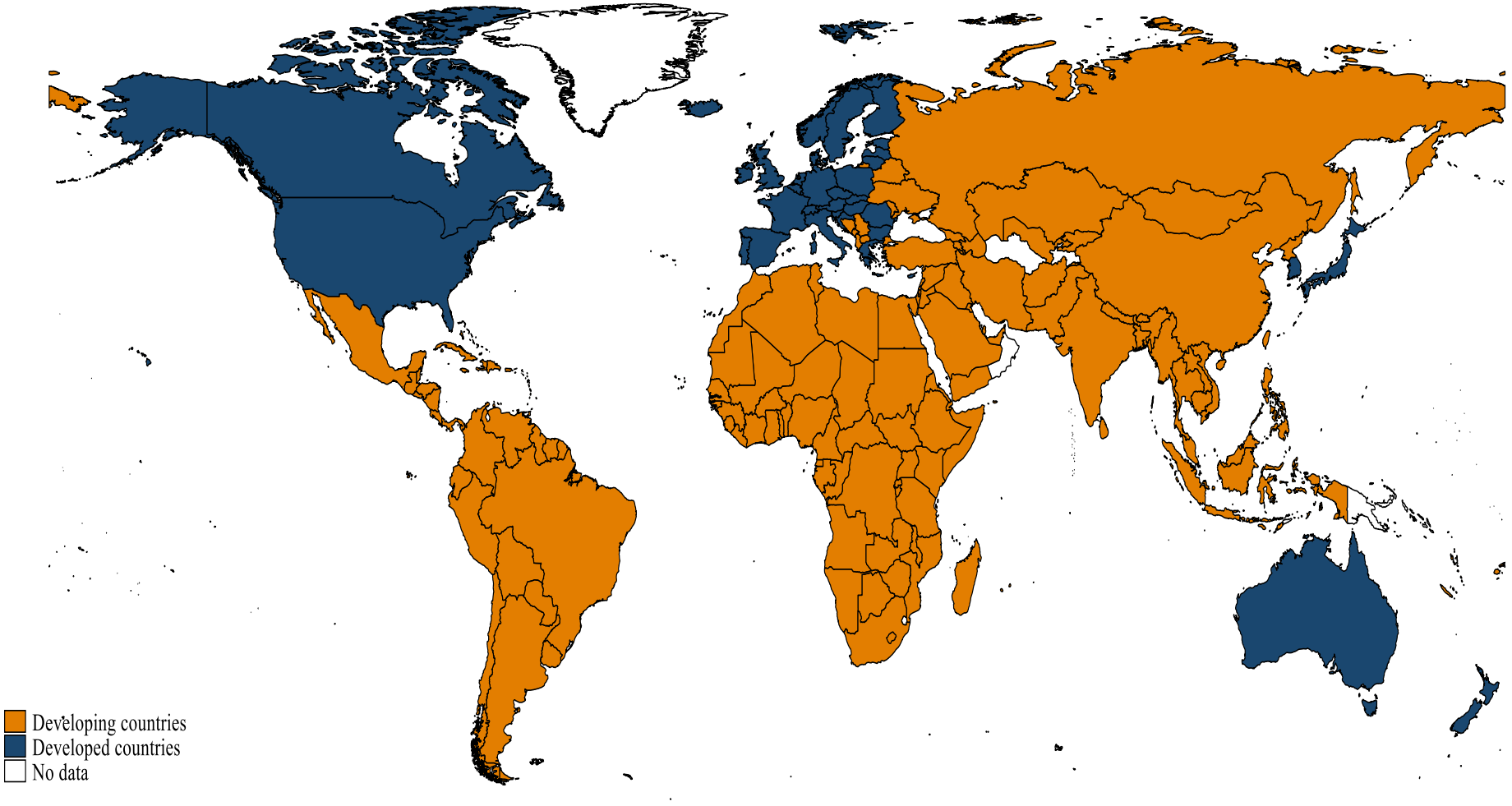
among part-time workers aged 20 to 64 in Belgium



Source : Labour Force Survey, 2021.

Notes: The LFS was provided by STATBEL. [a] The involuntary part-time employment rate is defined as the percentage of part-time workers who want to work more hours and are available in the next two weeks at the time of the survey. [b] S-G 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. It should be noted that the LFS only allows us to identify if a worker's parent was born in an EU country or in a non-EU country. However, since immigrants from non-EU developed countries represent about 5.0% of the total immigrant population from non-EU countries in Belgium (FPS Employment and Unia, 2022), S-G immigrants from non-EU countries can be largely treated as S-G immigrants from developing countries.

Appendix 1: Chart of developed and developing countries



Notes: Overseas territories are classified depending on their neighboring countries. No data stipulates that no observation for workers born in or from these countries (Greenland (Denmark), Oman, Papua New Guinea, Tajikistan and Turkmenistan) is presented in our database.

Appendix 2: List of countries by geographical region in our database

Developed countries

Belgium

EU-14 countries[a]: Austria, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom.

Other EU countries: Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovak Republic and Slovenia.

Other Developed countries: Andorra, Australia, Canada, Iceland, Japan, Liechtenstein, Monaco, New Zealand, Norway, Saint-Marin, Singapore, South Korea, Switzerland, Taiwan and United States.

Developing countries

The Maghreb countries: Algeria, Libya, Mauritania, Morocco and Tunisia.

Sub-Saharan African countries: Angola, Benin, Botswana. Burkina Faso, Burundi, Cabo Verde, Cameroon, Central Africa Republic, Chad, Comoros, Congo, Congo DRC, Côte d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritius, Mozambique, Namibia, Niger, Nigeria, Reunion (French Department), Rwanda, Sao Tome and Principe, Sierra Leone, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia and Zimbabwe.

The Near and Middle East countries: Afghanistan, Bahrein, Egypt, United Arab Emirates, Iran, Iraq, Israel, Jordan, Kuwait, Pakistan, Palestine, Qatar, Saudi Arabia, Syria, Turkey and Yemen.

Non-EU Eastern European countries: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Georgia, Kosovo, North Macedonia, Moldova, Montenegro, Russia, Serbia and Ukraine.

Emerging and Developing Asian countries: Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, Fiji, French Polynesia (French Department), India, Indonesia, Kazakhstan, Kyrgyz Republic, Laos, Malaysia, Mongolia, Myanmar, Nauru, Nepal, North Korea, Nauru, New Caledonia, Philippines, Sri Lanka, Thailand, Uzbekistan, Vanuatu, Vietnam, and Wallis and Futana (French Department).

Latin American and Caribbean countries: Argentina, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Dutch Antilles, Ecuador, Grenada, Guadeloupe (French Department), Guatemala, Guyana, French Guyana (French Department), Haiti, Honduras, Jamaica, Martinique (French Department), Mexico, Nicaragua, Panama, Paraguay, Peru, Saint Lucia, Suriname, Trinidad and Tobago, Uruguay and Venezuela.

[a] EU countries are defined as during the time span of the database (1999-2016). Therefore, the United Kingdom is still considered as an EU country.

Appendix 3. Shares of tertiary-educated workers (%) by type of diploma, 1999-2016

Tertiary-educated workers born in/from:		Bachelor (1)	Master (2)	Advanced master or PhD (3)
Belgium		57.6	39.7	2.7
Developing countries[a]				
Sub-Saharan African countries	First generation	58.8	37.2	4.0
	Second generation	49.2	47.2	3.6
Maghreb countries	First generation	64.0	32.4	3.6
	Second generation	66.8	31.8	1.5
Near and Middle East countries	First generation	57.6	39.0	3.4
	Second generation	69.1	30.1	0.7
Emerging and developing Asian countries	First generation	51.2	43.3	5.5
	Second generation	46.8	47.6	5.6
Non-EU Eastern European countries	First generation	55.3	40.8	3.9
	Second generation	59.8	36.4	3.9
Latin American and Caribbean countries	First generation	48.8	43.2	8.0
	Second generation	59.5	38.4	2.2

Notes: Worker and firm weights are used. [a] S-G 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 4. Incidence of part-time work (%) by gender, 1999-2016

	Total	Men	Women
Tertiary-educated workers born in/from:	(1)	(2)	(3)
Belgium	4.7	1.6	9.8
Developing countries[a]			
First generation	7.8	4.8	13.5
Second generation	4.4	2.3	7.2
Total	4.8	1.8	9.7

Notes: Worker and firm weights are used. [a] S-G 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 5. Parenthood, gender and origin in part-time work – PROBIT regression

			Probability of being in a part-time job	
Tertiary-educated workers born in/from:			(1)	(2)
Belgium				
Men	Without child(-ren) (n = 56,415)		Reference	Reference
	With child(-ren) (n = 132,102)		-0.003***	-0.003***
			(0.001)	(0.001)
Women	Without child(-ren) (n = 38,762)		0.031***	0.027***
			(0.002)	(0.002)
	With child(-ren) (n = 78,868)		0.102***	0.091***
			(0.002)	(0.002)
Developing countries[a]				
Men	Without child(-ren)	First generation (n = 2,969)	0.035***	0.035***
			(0.005)	(0.005)
		Second generation (n = 2,139)	-0.004	-0.002
			(0.003)	(0.003)
	With child(-ren)	First generation (n = 5,676)	0.028***	0.031***
			(0.004)	(0.004)
		Second generation (n = 4,190)	0.008**	0.009**
			(0.003)	(0.004)
Women	Without child(-ren)	First generation (n = 1,840)	0.071***	0.075***
			(0.009)	(0.009)
		Second generation (n = 1,779)	0.028***	0.026***
			(0.006)	(0.006)
	With child(-ren)	First generation (n = 2,932)	0.145***	0.142***
			(0.009)	(0.009)
		Second generation (n = 3,294)	0.068***	0.063***
			(0.007)	(0.007)
Control variables				
Year fixed effects[b]			Yes	Yes
Worker characteristics[c]			No	Yes
Employment characteristics[d]			No	Yes
Firm characteristics[e]			No	Yes
Observations			386,555	386,555

Notes: *** p<0.01, ** p<0.05, * p<0.1. Worker and firm weights are used. Robust standard errors are in parentheses, which are clustered at the firm level. The categories' immigrants from developed countries' and 'others' are also included in the regression, but their estimates are not portrayed in this table (available on request). [a] S-G 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. [b] 17 year dummies. [c] type of tertiary education, tenure and squared tenure. [d] type of contract and dummy for overtime. [e] Size of the firm (FTE number of workers in log), dummy for more than 50% privately owned, dummy for firm-level collective agreement, and region where the firm is located (Brussels, Flanders or Wallonia). Source: STATBEL, 1999-2016.