Moving up the social ladder?
Wages of first- and second-generation immigrants from developing countries

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Abstract

Using matched employer-employee data for Belgium, covering 1.3 million workers over almost two decades, we find that first-generation immigrants born in developing countries and their second-generation peers receive significantly lower wages than workers born in developed countries (i.e. evidence of persistent wage penalty across two generations). However, controlling for a large set of covariates (including firm fixed effects), our estimates suggest that while first-generation immigrants still experience a significant adjusted wage gap, there is no evidence of such a gap for their second-generation peers. Moreover, reweighted, recentered influence function Oaxaca-Blinder decompositions show that first-generation immigrants receive lower wages due to their lower levels of human capital, segregation in low-paying occupations and sectors, and an unexplained component (e.g. wage discrimination). In contrast, second-generation immigrants earn less, mainly because they are younger and have fewer years of tenure. Finally, moderators for geographical origin, gender and position in the wage distribution refine these findings.

Keywords: Immigrants, intergenerational studies, labour market integration, wage decompositions, unconditional quantile regressions, employer-employee data.

JEL classification: J15, J16, J21, J24, J31, J61.

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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 on request.

Declarations of interest

None

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1. Introduction

One of the mainstays of poverty and inequality disparities is the intergenerational transmission of socioeconomic status from parents to children, which is particularly strong among high-educated natives and low-educated immigrants (Bloome et al., 2018; Ryabov, 2020; Sharkey, 2008).[1] Focusing on the immigrant population, Card (2005) points out that since the descendants of immigrants are born, educated and socialised in the host country, their relative success or failure is often considered the ultimate benchmark for integration. In this respect, Duncan and Trejo (2015) state that the ultimate indicator of labour market integration for immigrants and their children may be wages, as they reflect the market's final valuation of a worker, which encompasses individual characteristics such as age, gender, education, abilities, family background and social capital. Therefore, in light of these premises, Belgium offers an interesting case study to investigate the legacy of immigration in the labour market through the lens of wages, as people of foreign origin represented 31.1% of the total population aged 18-64 in 2016, of which 14.2% are first-generation (F-G) immigrants and 16.9% are second-generation (S-G) immigrants (FPS Employment and Unia, 2019).[2]

In the developed world, the empirical literature on the intergenerational evolution of immigrants' wages has considerably broadened in recent decades (e.g. Aydemir et al., 2009; Borjas, 1994; Card, 2005; Flake, 2013; Melzer et al., 2018; van Ours and Veenman, 2004). Nonetheless, several studies consider immigrants as a homogenous group of origin, which may mask specific features related to their country of birth or that of their parents (e.g. economic conditions, quality of the education system and reasons for migration), which in turn may influence their labour market outcomes (Fleischmann and Dronkers, 2010). In a similar vein, the labour market integration of immigrants across generations is likely to be influenced by source-country characteristics such as patronymic, physical appearance, religion and cultural customs (Levels and Dronkers, 2008).

[1] Unless mentioned otherwise, we use 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 iii) 'natives' for people born in the host country with both parents born in the host country.

[2] FPS Employment and Unia (2019) define people of foreign origin according to their nationality and that of their parents. The 31.1% of the population of foreign origin aged 18-64 in Belgium can be broken down as follows: 13.2% from EU-14, 3.0% from EU-13, 2.3% from EU candidates, 1.5% from other European countries, 5.0% from the Maghreb, 2.4% from other African countries, 0.8% from the Near and Middle East, 1.7% from Asian countries and Oceania, 0.2% from North America, 0.6% from Central and South America and 0.3% of unknown origin.

Following these statements, a limited yet growing number of studies classifying immigrants by origin shows that in Europe and North America, S-G immigrants from developed countries perform similarly to natives in terms of wages. In contrast, they still find evidence of a significant wage gap between natives and S-G immigrants from transition and developing countries (i.e. Africa, non-EU Eastern Europe, the Maghreb, the Near and Middle East, and Latin America) (e.g. Abramitzky et al., 2021; Athari et al., 2019; Dustmann et al., 2011). However, it should be noted that most of the existing literature must be interpreted with caution because of significant methodological and/or data limitations, such as: i) small samples or short time spans under study, ii) a restricted number of control variables (i.e. scarce or no information on the characteristics of workers' jobs and workplaces), iii) incomplete framework (i.e. no F-G immigrants in the sample), and iv) standard OLS regressions, computed at the mean, which are likely to be affected by outliers and vary significantly along the wage distribution.

Moreover, it should be noted that the intergenerational relationship between origin and wages is likely to be moderated by workers' gender. Indeed, the labour market aspirations of female immigrants are likely to be strongly shaped by the traditional values, gender stereotypes and cultural habits that exist in their country of birth or that of their parents (Blau et al., 2013; Kulu et al., 2015). Similarly, OECD (2020a) highlights the role of work-life balance (i.e. working while being involved in childcare and household tasks) in explaining different labour market trajectories between female and male immigrants. In accordance with these statements, some studies find that immigrant-native wage gaps across generations differ significantly by gender (e.g. Algan et al., 2010; Duncan and Tejo, 2018; Sakamoto et al., 2010). However, it is worth noting that all those existing studies estimate regressions separately for female and male workers (i.e. they include no interaction effects between origin and gender), which prevents them from providing clear evidence on the separate contribution of gender and immigration background to potential double immigrant-native wage penalties.

Regarding the wages of immigrants across generations, it is also essential to take into account workers' position in the wage distribution. Indeed, although the standard approach is to estimate exclusively immigrant-native wage gaps at the mean, these can only be taken as a representative picture of the group of interest if the underlying data-generating process is homoscedastic (i.e. estimates are not reversed or do not diverge substantially along the wage distribution). Moreover, some studies that exclusively focus on F-G immigrants show that immigrant-native wage gaps considerably vary along the wage distribution and identify a heterogeneous

contribution of observable characteristics (e.g. age, experience, education and occupation) to these gaps (e.g. Hofer et al., 2017; Ingwersen and Thomsen, 2021; Lehmer and Ludsteck, 2011).

However, as far as we know, only one study has investigated the wages of S-G immigrants beyond the mean (Athari et al., 2019 for France). Using unconditional quantile regressions, the authors show that the overall wage gaps for S-G immigrants from the Maghreb and Turkey (Sub-Saharan Africa and Southern Asia) increase (remain somewhat constant) along the wage distribution. Athari et al. (2019) also point out that across quantiles, the overall wage gaps for S-G immigrants from Turkey and Southern Asia are wholly explained by worker and employment characteristics (i.e. quantity effects). In contrast, adjusted wage gaps (i.e. price effects) are only observed for S-G immigrants from the Maghreb and Sub-Saharan Africa. However, the authors do not comprehensively discuss how observable characteristics shape these gaps, leaving unexplored the role of composition effects (e.g. do immigrants receive lower wages because they are segregated in low-paying occupations?). Last but not least, it should be noted that migration flows to Western Europe at the end of the 20th century have been mainly characterized by the arrival of low-educated immigrants (Schoonvaere, 2013). Therefore, if S-G immigrants succeeded in earning more than their F-G peers and, potentially, in closing the gap with natives, it is of particular interest to investigate whether this occurs all along the wage distribution.

Before delving into the details of our work, we describe other features of the country under study that also motivate this research. First, Belgium is one of the worst OECD economies in terms of F-G immigrants' access to the labour market (Pina et al., 2015; OECD, 2020a).[3] Nonetheless, employment outcomes differ considerably according to geographical origin in Belgium. For instance, only 46% of the working-age population born in non-EU (i.e. non-European Union) countries had a job in 2017, while the employment rate of EU-born people (68.3%) was much closer to that of natives (73.7%) (OECD/EU 2018). This issue also extends to the descendants of non-EU immigrants, whose employment rate amounted to 53.4% in 2017 (Eurostat, 2023b). In addition, a robust body of empirical literature accords with these figures, stating that the employment outcomes of S-G immigrants from transition and developing countries (i.e. non-EU origin) are hardly any better than those of their F-G counterparts, i.e. that they are far worse than those of Belgian natives (e.g. Corluy et al., 2015; De Cuyper et al., 2018;

[3] Only Greece, Mexico and Turkey show lower employment rates for F-G immigrants in the OECD area.

Heath and Cheung, 2007; Piton and Rycx, 2021). Nevertheless, to the best of our knowledge, once employment in Belgium is secured for people from transition and developing countries, the intergenerational evolution of their wages has never been empirically investigated.[4] Furthermore, any analysis of S-G immigrants from transition and developing countries in Belgium requires careful attention, as previous studies reveal the existence of poor earnings outcomes, a higher wage penalty associated with overeducation and wage discrimination for F-G immigrants born in transition and developing countries (e.g. Fays et al., 2021; Jacobs et al., 2021; Kampelmann and Rycx, 2016; Grinza et al., 2020; Vertommen and Martens, 2006).

We attempt to shed new light on the intergenerational interplay between origin and wages, placing our main emphasis on workers originating from developing countries.[5] In order to achieve this goal, we leverage a rich, matched employer-employee database of 1.3 million observations for the Belgian private sector. The richness of our database is that it provides cross-sectional information on a nationally representative sample of workers between 1999 and 2016. It also contains information on workers' country of birth and that of their parents, alongside a wide range of covariates (e.g. age, tenure, education, type of household, type of contract, occupation, working time, firm size, level of collective agreement and firm fixed effects), which makes it well suited for providing reliable empirical findings.[6]

It should be noted that we merge natives (i.e. workers born in Belgium with both parents born in Belgium) with immigrants from developed countries because previous studies show that the employment outcomes of these two groups of workers in Belgium are comparable across two generations (e.g. Corluy et al., 2015; Piton and Rycx, 2021). This is also corroborated by descriptive statistics and regression analyses based on our data. Indeed, Appendix 2 shows that: i) F-G immigrants born in developed countries receive similar wages as those of natives and S-G immigrants from developed countries earn slightly less than natives (see column 1), and ii)

[4] Only some descriptive statistics show that the incidence of low pay among immigrant workers of non-EU origin increases across two generations (Corluy et al., 2015).

[5] 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).

[6] Our empirical analysis is consistent with that used in the vast majority of existing (also more recent) studies documenting the intergenerational evolution of immigrant wages (e.g., Algan et al., 2010; Athari et al., 2019; Card et al., 2000; Duncan and Trejo, 2018; Gueye and Ceci-Renaud, 2022). Indeed, we identify F-G immigrants and their S-G counterparts on the basis of workers' country of birth and that of their parents. In other words, like most previous studies, our analysis does not focus on clearly identified parent-child pairs. To our knowledge, only four studies - three in Sweden and one in the United States – have used this 'paired approach' so far (see Table 1 for a review).

controlling for observables (including firm fixed effects), there are no significant adjusted wage gaps between natives and immigrants from developed countries across two generations (see column 2).[7]

That having been said, we implement our empirical strategy as follows. First, using weighted multilevel log-linear regressions, we estimate the overall and adjusted wage gaps between workers born in developed countries with both parents born in developed countries and workers originating from developing countries across two generations. Second, using a more fine-grained classification of workers' country of birth and that of their parents, we explore the role of geographical origin (e.g. the Maghreb or Sub-Saharan Africa) in overall and adjusted wage gaps across two generations.[8] Third, we scrutinize the role of gender in overall and adjusted wage gaps across two generations by including in our econometric analysis interaction effects between origin and gender (rather than estimating separate regressions by gender as is done in the existing literature). Fourth, we use an advanced econometric methodology, the so-called reweighted, recentered influence function Oaxaca-Blinder (RIF-OB) decompositions (Firpo and Pinto, 2016; Firpo et al., 2018), in order to investigate: i) how the position in the wage distribution shapes overall wage gaps across two generations, ii) how worker, employment and firm characteristics contribute to these gaps across two generations (i.e. analysing the contribution of quantity and price effects in overall wage gaps), and iii) to provide a more fine-grained assessment of the role of gender along the wage distribution.

The body of our paper is organized as follows. In the next section, we discuss the relationship between origin and labour market integration from an intergenerational perspective and document previous intergenerational studies on the wages of immigrants from developing countries. We present our methodology in Section 3, while Section 4 describes the structure of our database. Section 5 discusses the findings of our weighted multilevel log-linear regressions and reweighted RIF-OB decompositions. Finally, Section 6 concludes.

[7] This approach could be subject to some comment, as there could potentially be somewhat larger wage differentials between natives and immigrants from non-EU developed countries (e.g., Australia, Canada, New Zealand and the USA). However, it should be noted that as these immigrants represent less than 0.4% of our final sample, in any case, estimation bias can only be marginal and is, therefore, unlikely to affect our conclusions. Regression results, available on request, confirm this.

[8] For the sake of accuracy in correctly classifying immigrants by geographical origin and economic development level, we constructed our geographical classification of countries based on both the United Nations' (2019) classification and the IMF's (2019) classification (see Appendix 3).

2. Labour market integration of immigrants across generations

Classic assimilation theory states that, since S-G immigrants are born, educated and socialised in the host country, their socioeconomic outcomes should be better than those of their F-G peers and eventually comparable to those of natives (Alba et al., 2011; Greenman and Xie, 2008; Park and Myers, 2010). Nevertheless, another strand of literature views this assumption as too optimistic and instead supports the segmented assimilation theory (Heath et al., 2008; Portes and Rumbaut, 2001; Rumbaut, 2005). The latter asserts that descendants of immigrants may still encounter low levels of social mobility (e.g. difficulties in entering the labour market or overconcentration in the least favourable segments of the labour market) and persistent integration problems (i.e. discrimination and marginalisation). This more pessimistic view is explained in particular by the parental transmission of cultural capital, social norms and physical characteristics, which can vary according to immigrants' geographical origin (Blau et al., 2013; Blau, 2015; Phalet and Heath, 2010). It should be noted, however, that although the segmented and classic assimilation theories diverge in insights, both have overlapping explanations for assessing the integration of immigrants across generations. Indeed, both theories highlight the influence of immigrant parents' backgrounds and preferences in shaping the level of failure or success of their descendants.

In this context, the worker characteristics of the foreign-born workforce (e.g. education, experience and training acquired in the country of origin) are often associated with poor labour market outcomes in the host country due to the imperfect international transferability of foreign human capital (i.e. a low valuation of pre-migration skills in the host country) (Basilio et al., 2017; Chiswick and Miller, 2009). However, this issue should, in principle, disappear for S-G immigrants, given that they possess human capital linked to the host country's labour market. In addition, several studies show that in EU countries, S-G immigrants exhibit, on average, higher levels of education than their F-G peers (e.g. Algan et al., 2010; Ekberg et al., 2010; Eurostat, 2023a; OECD, 2016). Therefore, since education in the host country is one of the drivers for boosting the opportunities of people of foreign origin to access the labour market and get well-paid jobs, this can be interpreted as a sign of upward mobility, in line with the classical assimilation theory.

Nevertheless, S-G immigrants' educational outcomes depend on their origin. Indeed, in 2014, at the EU level, the share of tertiary graduates of non-EU origin was more than two percentage

points lower than that of their counterparts of EU origin (Eurostat, 2023c). This achievement gap may result from additional barriers that S-G immigrants from developing countries face to accumulate host country education, as previously highlighted by the segmented assimilation theory. More precisely, F-G immigrants born in developing countries tend to be less educated, less proficient in the host country's language and less informed about how the school system works, which reduces the degree of support in their children's learning (FPS Employment and Unia, 2017; OECD, 2020b).

Along the same line, immigrant parents' attitudes in the home environment can slow or hinder their children's academic success. For instance, in 2018, on average across OECD countries, 62% of F-G immigrant students and 41% of S-G immigrant students did not speak the host country's language at home (OECD, 2020c). The COVID-19 crisis has also shown how fragile the education of children of immigrants can be. For example, the OECD (2020d) shows that children from immigrant households have seen their command of the host country's language decline as a result of studying at a distance (i.e. solely from home).

Moreover, the labour market performance of immigrants across generations is also influenced by pre-existing immigrant communities in the host country. In principle, immigrants can benefit from immigrant networks to foster their socioeconomic and residential mobility (i.e. the classical assimilation theory) (Lin et Zhou, 2005). Nonetheless, this positive role may be reversed over time and across generations in specific immigrant communities. Previous research actually shows that immigrant networks from developing countries tend to furnish limited, precarious job opportunities (Kalter and Logan, 2014; Kazemipur, 2006), thus delaying familiarity with the functioning of the primary labour market and strengthening earnings status-quo across generations (i.e. the segmented assimilation theory) (OECD, 2014).

In a similar vein, immigrant networks tend to trigger a pattern of strong concentration of immigrants in lower-graded or run-down neighbourhoods, which reinforces the overrepresentation of their children in disadvantaged schools and the parental transmission of poor labour market and socioeconomic outcomes (Pina et al., 2015; Ryabov, 2020; Zhou, 1997). In this regard, OECD (2021) further documents that S-G immigrants exhibit strong stability for living in immigrant-dense neighbourhoods from childhood to adulthood in Europe.

Regarding the interacting role of origin and gender, the segmented assimilation theory states that the parental transmission of the home country's cultural norms (i.e. fertility, gender norms and partnership choices) is likely to affect the labour market expectations of female immigrants from developing countries across generations (Blau et al., 2013; Kulu et al., 2015). More specifically, several studies find that S-G female immigrants who marry partners with similar ethnic characteristics present lower socioeconomic status and labour market outcomes than those who enter interethnic marriages (e.g. Flake, 2013; Meng and Gregory, 2005; Wiik and Bergsvik, 2022). In this regard, it is worth mentioning that ethnic marriages seem to be persistent in immigrant communities with non-white ethnicity (i.e. mainly communities from developing countries) (Dupont et al., 2017; Furtado and Theodoropoulos, 2011).

Moreover, earlier motherhood in the mother's home country is strongly correlated with earlier motherhood among S-G female immigrants, which has a long-lasting, negative effect on their wages and working hours in the host country (Noghanibehambari et al., 2022). Similarly, OECD (2020b) shows that female immigrants with a non-EU background in specific households (e.g. couples with children at home and single parents) face a substantial employment penalty because they are more involved in housework and motherhood than native mothers. A series of empirical studies go in the same direction, stating that even after controlling for observables, F-G and S-G female immigrants from developing countries still face a double employment penalty based on their gender and migration background (e.g. Athari et al., 2019; OECD, 2020a; Piton and Rycx, 2021).

Last but not least, ethnic discrimination can be an ultimate barrier to the labour market integration of immigrants across generations (i.e. the segmented-assimilation theory), which may occur through two main channels: i) employers make employment or wage-setting decisions based on ethnic preferences (i.e. taste-based discrimination); and ii) employers discriminate based on ethnic stereotypes due to incomplete information on immigrants' productivity and human capital (i.e. statistical discrimination) (Becker, 1957; Zschirnt and Ruedin, 2016).

Although there are solid grounds for establishing an intergenerational relationship between origin and labour market integration, especially for immigrants from developing countries, other external factors should also be considered in this relationship. Indeed, host country institutions, workplaces' environments, integration policies and social stratification can

mitigate or exacerbate immigrant-native labour market inequalities across generations (Crul et al., 2012). For example, in countries with high levels of inequality, there are few opportunities for upward mobility for F-G immigrants and their children situated at the bottom of the income distribution (Zhou, 1997). In workplaces with high wage inequalities, F-G immigrants and their descendants also experience more significant immigrant-native wage gaps (Melzer et al., 2018). By contrast, anti-discrimination policies and wage subsidies are linked to a better labour market integration of immigrants (Butschek and Walter, 2014; Platt et al., 2022). Active labour market policies also reduce the share of immigrants in low-skilled and temporary jobs (Guzi et al., 2021). Similarly, firm-level and industry-wide collective wage agreements seem to attenuate immigrant-native wage gaps (Kampelmann and Rycx, 2016; Melzer et al., 2018).

As far as intergenerational analysis of the wages of immigrants is concerned, although the first studies date back to the 1990s, the empirical literature on this key issue is far less abundant than that on access to employment (e.g. Belzil and Poinas, 2010; Midtbøen, 2016; OECD, 2020a; Piton and Rycx, 2021). However, getting a job is only the first step to success in the job market, and any intergenerational improvement in access to employment may mask persistent wage inequalities between natives and people of foreign origin. To our knowledge, the intergenerational evolution of wages by origin, with a particular focus on immigrants from developing countries, has so far been studied in only six developed countries (i.e. France, Germany, the Netherlands, Sweden, the United Kingdom and the Unites States).[9]

Table 1 presents a comprehensive list of previous studies, their data, methodology and main findings. We always refer to the adjusted immigrant-native wage gap (i.e. the wage gap while controlling for covariates) when documenting the results of previous research. Nevertheless, it should be noted that the number of covariates considerably differs according to the study (see Table 1 for a list of covariates included in each study).

[9] In Switzerland, Maskileyson et al. (2021) conduct an intergenerational study on immigrants' income. However, strictly speaking, we cannot consider that to be a study on the wages of F-G and S-G immigrants because its main variable of interest is 'personal net monthly income', which includes more than wages (i.e. pay leave, interests, and dividends) and represents workers' disposable income (i.e. the income after deduction of compulsory social insurance contributions and pension fund contributions, plus or minus any alimony (maintenance) payments).

Table 1: Previous intergenerational studies on the wages of immigrants from developing countries

Authors	Country	Data (1) / Time span (2) / Methodology (3)	Covariates	Main findings
First generation vs. Second generation vs. Natives				
Abramitzky et al. (2021)	United States	(1) Cross-sectional sample and father-child linkage: * (2) 1880, 1910, 1940, 1994-2000, 2006-2015 (3) OLS regressions	Parent's age, son's age, and gender	The earnings gaps for S-G immigrants are substantially smaller than those for their F-G peers, except for immigrants from Latin America and the Caribbean.
Algan et al. (2010)	France, Germany and United Kingdom	(1) FR: Labour force survey: 93,002 observations DE: Microcensus: 685,994 observations UK: Labour force survey: 1,327,893 observations (2) FR: 2005-2007, DE: 2005-2006, UK: 1993-2007 (3) FR-DE-UK: OLS regressions	Worker characteristics**	FR: Immigrant-native wage gaps are persistent across generations for immigrants from Africa and Turkey. F-G and S-G immigrants from Asia out-earn or receive similar wages as natives. DE: There is no evidence of wage improvement across generations for immigrants from non-EU Eastern Europe and Turkey. UK: S-G immigrants from Asia, Africa and the Caribbean receive higher wages than their F-G peers but still lag behind natives.
Athari et al. (2019)***	France	(1) Labour force survey: 233,000 observations (2) 2013-2018 (3) Unconditional quantile regressions	Worker characteristics**, part-time work and sectors (NACE1)	S-G immigrants perform better than their F-G peers, irrespective of their geographical origin and position in the wage distribution. S-G immigrants from the Maghreb and Sub-Saharan Africa still experience immigrant-native wage gaps, to an increasing extent along the wage distribution. S-G immigrants from Turkey and Southern Asia perform on par with natives at any quantile.
Belfi et al. (2021)	Netherlands	(1) Individual survey: 5,984 observations (2) 2008-2012, 2015 (3) OLS regressions	Worker characteristics**, study province and dummy for living abroad.	Among recent university graduates, there is evidence of wage parity between Dutch natives and immigrants from non-Western countries across two generations.
Borjas (1993)	United States	(1) Decennial censuses: 783,020 observations (2) 1940, 1950, 1960, 1970 (3) OLS regressions	Age, education, marital status and metropolitan residence	S-G immigrants from Cuba, Mexico and the Philippines perform better than their F-G peers but worse than natives. S-G immigrants from China reverse the negative immigrant-native wage gap their F-G peers face.
Card et al. (2000)	United States	(1) Population surveys: 920,993 observations (2) 1940, 1970, 1994-1996 (3) OLS regressions	Age, region and origin composition	The wages of S-G female and male immigrants from Latin America are higher than those of their F-G same-gender peers but remain behind those of natives. Female and male immigrants from Asia and the Caribbean out-earn or perform similarly to same-gender natives across two generations.
Duncan and Trejo (2018)	United States	(1) Population survey: around 60,000 observations (2) 2003-2016 (3) Weighted OLS regressions	Worker characteristics**	S-G male immigrants from Latin America, Africa and Asia face immigrant-native wage gaps, although to a much lesser extent than those experienced by their F-G same-gender peers. S-G female immigrants from Asia out-earn female natives, while S-G female immigrants from Latin America attain wage parity with female natives.

(Continued)

Table 1 - (Continued)

Authors	Country	Data (1) / Time span (2) / Methodology (3)	Covariates	Main findings
Ekberg et al. (2010)	Sweden	(1) Grandparent-parent-child linkage: 25,118 pairs (2) 1960, 1980, 2003 (3) OLS regressions and SUR models	Age, education, gender, marital status and region of residence	F-G male immigrants born in non-Western European countries experience an immigrant-native wage advantage, which disappears for their sons. Female immigrants experience no immigrant-native wage gap across generations.
Hammarstedt (2009)	Sweden	(1) Grandparent-parent-child linkage: 9,560 pairs (2) 1968, 1970, 1980, 1985, 1999, 2001, 2003 (3) OLS regressions	Age, education, marital status and region of residence	There is downward intergenerational earnings mobility among immigrants from non-Western European countries.
Hammarstedt and Palme (2012)	Sweden	(1) Parent-child linkage: * (2) 1975, 1980, 1997-1999 (3) OLS regressions	Age, gender, region of residence and occupations (ISCO3)	Immigrant-native wage gaps for immigrants from Africa, Turkey and the Middle East expand across generations. In contrast, S-G immigrants from Eastern Europe, Latin America and Asia reverse the immigrant-native wage gap their parents face.
Second generation vs. Natives				
Aeberhardt et al. (2010)	France	(1) Household survey: 40,000 observations (2) 2003 (3) Weighted OLS, MLE and two-step Heckman regressions, and Oaxaca-Blinder decompositions	Worker characteristics** and part-time work	S-G immigrants from Africa experience a sizeable overall wage gap. However, between two- and three-quarters of this gap is explained by covariates.
Dustmann et al. (2011)	United Kingdom	(1) Labour force survey: * (2) 1998-2009 (3) OLS regressions	Worker characteristics** and part-time work	S-G immigrants with non-white ethnicity earn substantially less than white British natives. There is wage parity between British natives and S-G immigrants from Bangladesh and China.
Gueye and Ceci-Renaud (2022)	France	(1) Administrative wage data: 394,446 observations (2) 2002-2014 (3) Random effects regressions	Worker characteristics, parents' profession, part-time work, occupations (ISCO2) and firm size	S-G immigrants from the Maghreb and Sub-Saharan Africa experience a significant immigrant-native wage gap, while there is no wage gap between French natives and S-G immigrants from Turkey.
Langevin et al. (2013)	France	(1) Individual survey: 6,778 observations (2) 2008-2009 (3) Weighted OLS and two-step Heckman regressions, Oaxaca-Blinder decompositions	Worker characteristics**, city size, occupations and sectors	S-G immigrants from Africa and Turkey receive lower wages than French natives, while S-G immigrants from Asia and Eastern Europe attain wage parity with French natives.
Rooth and Ekberg (2003)	Sweden	(1) Cross-sectional sample: 192,443 observations (2) 1998 (3) Oaxaca-Blinder decompositions	Age, education, gender, marital status and region of residence	The earnings outcomes of S-G immigrants with a non-European background are worse than those of Swedish natives.
Sakamoto et al. (2010)	United States	(1) Population survey: 4,011,429 observations (2) 1994-2006 (3) OLS regressions	Age, education, gender, region of residence and people with disability	S-G male immigrants with an African background earn substantially less than white male natives. The wages of S-G female immigrants with an African background are comparable to those of white female natives.

Notes: * The number of observations is not specified in the empirical study. **Worker characteristics: age, gender, education, experience or tenure, and region of residence. *** Using the same database but with a shorter period (2013-2016), Boutchenik and Le (2017) find similar results for S-G immigrants from the Maghreb.

Algan et al. (2010), Hammarstedt (2009) and Rooth and Ekberg (2003) find that in Germany and Sweden, the adjusted wage gap between natives and immigrants from developing countries remains relatively constant across generations. By contrast, Belfi et al. (2021) show that in the Netherlands, among recent graduates, there is no adjusted wage gap between Dutch natives and immigrants from developing countries across two generations. More nuanced findings have emerged for France, the United Kingdom and the United States, where although S-G immigrants from developing countries perform better than their F-G peers, the former still experience adjusted wage gaps (e.g. Abramitzky et al., 2021; Athari et al., 2019; Duncan et Trejo, 2018).

Moreover, focusing on the second generation, existing evidence also varies according to geographical origin and gender. For instance, in France and the United Kingdom, some studies show that while there is an adjusted wage gap for S-G immigrants from Africa, the Maghreb and the Near and Middle East, there is no evidence of such a gap for S-G immigrants from Asia and Eastern Europe (e.g. Aeberhardt et al., 2010; Langevin et al., 2013; Dustmann et al., 2011). In the United States, Duncan and Trejo (2018) and Sakamoto et al. (2010) find that, while S-G female immigrants from developing countries perform similarly or better than female natives, their S-G male counterparts still face an adjusted wage penalty.

Finally, it is worth noting that most studies that take an intergenerational perspective on the wages of immigrants from developing countries present some econometric and data limitations such as: i) some studies focus exclusively on the wage gaps between natives and S-G immigrants, which does not enable us to build up a comprehensive picture of the evolution of immigrants' wages across generations; ii) some studies cover small samples or short periods, which considerably reduces the external validity of their results; and iii) some studies only conduct standard OLS regressions and/or control exclusively for worker characteristics (e.g. age, gender and education) in their regressions, leading to potential estimation issues such as omitted variable bias and heterogeneity along the wage distribution (i.e. immigrant-native wage gaps at the mean are likely to differ from those at the upper and lower parts of the wage distribution).

Moreover, only a few studies focus on the overall wage gaps between natives and immigrants across generations (i.e. the wage gap without controlling for covariates or fixed effects) (e.g. Abramitzky et al., 2021; Belfi et al., 2021). However, these gaps are also crucial in

intergenerational studies as they capture the evolution of immigrants' wages across generations without accounting for compositional effects. In other words, adjusted wage gaps may hide endogenous discrimination that might result from occupational and sectoral segregation, overconcentration in part-time jobs and non-recognition of foreign tertiary diplomas. Therefore, against this background, more research is needed using granular data and advanced econometric methods.

3. Methodology

Our paper investigates the wage gap between workers born in developed countries and workers from developing countries across two generations. To achieve this goal, we begin with a weighted multilevel log-linear approach.[10] Our full benchmark specification is written as follows:

$$\log(w_{it}) = \beta_0 + \sum_{k=1}^{3} \beta_k origin_{itk} + \underline{\mathbf{z}_{it}}\underline{\boldsymbol{\vartheta}} + \underline{\mathbf{g}_{it}}\underline{\boldsymbol{\lambda}} + \underline{\mathbf{f}_{it}}\underline{\boldsymbol{\xi}} + \psi_s + \delta_t + \varepsilon_{it} \quad (1)$$

where the dependent variable is the logarithmic real gross hourly wage of a worker *i* at time *t*.[11] The main explanatory variable is $origin_{itk}$, which is categorized into four groups *k*: 1) workers born in developed countries with both parents born in developed countries (i.e. the reference group), 2) workers born in developing countries (i.e. F-G immigrants born in developing countries), 3) workers born in Belgium with at least one foreign parent born in a developing country (i.e. S-G immigrants from developing countries), and 4) workers born in developing

[10] Log-linear estimates can be misleading in the presence of heteroskedasticity, as OLS regressions assume homoscedasticity for consistency (Silva and Tenreyro, 2006). Consequently, as a robustness test, we also relied on the so-called Poisson pseudo-maximum-likelihood estimator with multiple high-dimensional fixed effects (STATA code: *ppmlhdfe*) in order to deal with potential heteroskedasticity problems in our log-linear regressions with firm and year fixed effects (Correia et al., 2020; Motta, 2019). The findings with this robust estimator (available on request) are largely similar to those obtained using a log-linear estimator. Therefore, we can conclude that the potential presence of heteroscedasticity in our benchmark regressions does not lead to misleading conclusions (based on our log-linear estimates). Moreover, since the use of a log-linear approach facilitates the implementation of reweighted RIF-OB decompositions, this is the approach we have adopted throughout our analysis.

[11] Gross hourly wages are deflated to 2013 prices. They include base pay, overtime compensation, performance-related pay and commissions, and annual and irregular bonuses.

countries with both parents born in developed countries (i.e. others).[12] To do so, we use the classifications of the IMF (2019) and the United Nations (2019), which have been constructed according to the geographic location of countries and their primary economic conditions (e.g. gross national income per capita, export diversification and degree of integration into the global financial system). Appendix 1 presents a chart of developed and developing countries.

There are often classification issues when S-G immigrants' parents have different countries of birth. In principle, those cases would imply identifying workers of mixed origin. However, this procedure is statistically inappropriate because origin combinations may result in several workers' groups with few observations and challenging coefficient interpretations (see Heath and Cheung (2007) for further discussion). Hence, we do not attempt to identify mixed groups but to define particular groups of origin. More precisely, the second generation in our empirical strategy has been firstly determined by the father's country of birth, except if the father was born in a developed country and the mother in a developing country. In that case, the mother's country of birth has been used. This approach is common in recent intergenerational studies (e.g. Corluy et al. 2015; Piton and Rycx 2021).[13]

Moreover, as wages do not only depend on workers' origin, we also introduce an extensive range of covariates and fixed effects in our benchmark model. In order to facilitate the presentation of our covariates and their corresponding coefficients in equation (1), they are written as vectors in the following manner:

$$\underline{\mathbf{z}}_{\boldsymbol{it}} = (\mathrm{z}_{it1}, \dots, \mathrm{z}_{itM})^{\mathrm{T}} \qquad \underline{\boldsymbol{\vartheta}} = (\vartheta_1, \dots, \vartheta_M)^{\mathrm{T}}$$

$$\underline{\mathbf{g}}_{\boldsymbol{it}} = (\mathrm{g}_{it1}, \dots, \mathrm{g}_{itL})^{\mathrm{T}} \qquad \underline{\boldsymbol{\lambda}} = (\lambda_1, \dots, \lambda_L)^{\mathrm{T}}$$

$$\underline{\mathbf{f}}_{\boldsymbol{it}} = \left(\mathrm{f}_{it1}, \dots, \mathrm{f}_{itQ}\right)^{\mathrm{T}} \qquad \underline{\boldsymbol{\xi}} = (\xi_1, \dots, \xi_Q)^{\mathrm{T}}$$

[12] The category 'others' was created because workers born in developing countries with both parents born in developed countries earn more than any other group of origin and have better worker and employment characteristics than immigrants from developing countries (see Table 3). One might expect these workers to be the children of expatriates, who are generally highly educated and have a high socio-economic level. Consequently, considering these workers as F-G immigrants born in developing countries could lead to misleading conclusions.

[13] S-G immigrants from developing countries are likely to perform better in the labour market if one of their parents is native (or born in a developed country). Consequently, we also tested this hypothesis with our data. The results show that S-G immigrants whose two parents were born in a developing country receive wages similar to those of S-G immigrants whose father was born in a developed country (including Belgium) and whose mother was born in a developing country. On the other hand, the wages of S-G immigrants whose mother was born in a developed country (including Belgium) and whose father was born in a developing country are lower than those of other S-G immigrants. However, after controlling for the complete set of covariates, we find that all S-G immigrant groups perform similarly in terms of wages. These results are available on request.

where $\underline{\mathbf{z}}_{\boldsymbol{it}}$ is a M x 1 vector of observations on worker characteristics (i.e. age, squared age, gender, educational attainment, tenure, squared tenure and type of household); $\underline{\mathbf{g}}_{\boldsymbol{it}}$ is a L x 1 vector of observations on employment characteristics (i.e. type of contract, occupations at the two-digit ISCO level and dummies for part-time and overtime work); $\underline{\mathbf{f}}_{\boldsymbol{it}}$ is a Q x 1 vector that contains observations on the firm where the worker is employed (i.e. size of firm, region where firm is located and dummies for the existence of firm-level collective agreements and the type of economic and financial control); ψ_s denotes firm fixed effects (sector fixed effects at a two-digit NACE level are also used in one of our benchmark specifications); δ_t represents year fixed effects; and ε_{it} is the error term, which is clustered at the firm level.[14] It should be noted that the error term follows the distribution $\varepsilon_{it} \backsim N(0, \frac{\sigma^2}{\omega_{it}})$, where ω_{it} are known weights for workers and firms and σ^2 is an unknown parameter that is estimated in the regression.[15]

We also extend our analysis to the role of three moderating variables. First, in order to take into account more fine-grained characteristics linked to workers' country of birth or that of their parents (e.g. degree of human capital transferability, quality of the education system, socioeconomic background, labour market outcomes, patronymic, physical appearance and religion), immigrants from developing countries are also classified by geographical origin, as follows: i) the Maghreb countries, ii) Sub-Saharan African 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 3 for a list of countries by geographical region).

Furthermore, in order to fully assess the extent to which being a woman, in interaction with origin, shapes overall and adjusted wage gaps, equation (1) has been reformulated (and estimated) as follows:

$$\log(w_{it}) = \beta_0 + \sum_{k=1}^{7} \beta_k gender\_origin_{itk} + \boldsymbol{Z_{it}\beta_i} + \boldsymbol{E_{it}\beta_i} + \boldsymbol{F_{it}\beta_i} + \psi_s + \delta_t + \varepsilon_{it} \quad (2)$$

[14] The clustering procedure is at the firm level because the sampling design of our database is based on workers randomly selected within each firm. The clustering procedure is further at the firm level rather than the firm-year level to account for serial correlation across years within a firm.
[15] The stratification of our database implies the use of weights. For details, see Footnote 22.

where the main explanatory variable '*gender_origin*' is categorised in the following manner: 1) male workers born in developed countries with both parents born in developed countries (reference group), 2) female workers born in developed countries with both parents born in developed countries, 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) Other male workers, and 8) Other female workers.[16]

Finally, we use reweighted RIF-OB decompositions to explore how the position in the wage distribution shapes overall wage gaps and identify the contribution of observables to these gaps. In addition, we further investigate the role of gender along the wage distribution by conducting reweighted RIF-OB decompositions for female and male workers, separately. It should be noted that we do not use standard OLS regressions because although conditional quantile estimates at the mean can be generalized to the population through the law of iterated expectations, this generalization cannot be applied to the quantiles[17] (i.e. OLS regressions do not focus on the actual quantiles of wages and affect the whole wage distribution, leading to unexpected results in any quantile under study). Firpo et al. (2009) solve this issue by suggesting the use of unconditional quantile regressions via a recentered influence function (RIF). The RIF represents the contribution of an individual observation to the distributional statistic of interest (e.g. mean, variance or quantiles) and replaces the dependent variable in the regression model.

The RIF can estimate *ceteris paribus* the marginal effect of an infinitesimal change in the explanatory variable on the unconditional distribution of the dependent variable (i.e. unconditional quantile regressions). However, the RIF cannot be used to estimate the effect of large changes in the distribution of the explanatory variable (e.g. changes in dummy or categorical variables), as RIF regressions only provide local approximations. To deal with this statistical issue, Firpo and Pinto (2016) propose the use of a reweighted RIF. This methodology implements parametric or nonparametric strategies (e.g. logit regressions) to obtain inverse

[16] Our equation (2) delivers the same results as a regression with interaction effects. The advantage of our specification is that it directly (and parsimoniously) estimates coefficients associated with the overall effect of gender, origin, and the interaction between these variables for each group. In contrast, in a regression with interaction effects, each coefficient associated with gender, origin, and the interaction variable must be summed to obtain the overall effect for each group.

[17] The law of iterated expectations states that at the mean, the expected value of a dependent variable Y conditioning on an explanatory variable X is equal to the expected value of that dependent variable: $E[Y|X] = E[Y]$. However, this property is not available for any quantile τ: $Q_\tau[Y|X] \neq Q_\tau[Y]$.

probability weights that can be used to identify counterfactual distributions and, consequently, obtain treatment effects on the distributional statistic.

Moreover, the reweighted RIF can extend and refine the Oaxaca-Blinder (OB) decompositions when researchers are interested in distributional statistics beyond the mean. Specifically, Firpo et al. (2018) suggest the use of RIF regressions with a reweighted strategy to decompose differences between a control group and a treatment group into two components: the gap attributed to differences in observable characteristics (a composition effect) and the gap attributed to differences in the relationships between the dependent variable and covariates (a wage structure effect). This multistep technique is referred to as reweighted RIF-OB decompositions.[18] It is worth noting that in the framework of a standard OB, a composition effect is equivalent to quantity effects (i.e. differences in average characteristics), and a wage structure effect is associated with price effects (i.e. differences in the returns to average characteristics).

In our paper, reweighted RIF-OB decompositions between male (female) workers born in developed countries and male (female) workers from developing countries can be defined as follows:[19]

$$\hat{\Delta}^{q}_{\substack{reweighted \\ RIF-OB}} = \underbrace{(\bar{X}_0^C - \bar{X}_0)'\hat{\beta}_0^q}_{\hat{\Delta}^q_{X,p}} + \underbrace{(\beta_C^q - \beta_0^q)\bar{X}_0^{C\prime}}_{\hat{\Delta}^q_{X,e}} + \underbrace{(\beta_1^q - \beta_C^q)\bar{X}_1{}'}_{\hat{\Delta}^q_{S,p}} + \underbrace{(\bar{X}_1 - \bar{X}_0^C)'\beta_C^q}_{\hat{\Delta}^q_{S,e}} \qquad (3)$$

where $\bar{X}$ corresponds to the vector of all observables mentioned in equation (1), $\bar{X}_0$ being that for male (female) workers born in developed countries, $\bar{X}_1$ that for male (female) workers from developing countries, and $\bar{X}_0^C$ that for counterfactual male (female) workers born in developed countries but with the distribution of observed and unobserved characteristics of male (female) workers from developing countries; β_0^q represents the RIF-regression coefficients of male (female) workers born in developed countries; β_1^q represents the RIF-regression coefficients of male (female) workers from developing countries; and β_C^q represents the reweighting RIF-regression coefficients when the data of male (female) workers born in developed countries are

[18] We use the STATA codes *oaxaca_rif* and *rwlogit*, provided by Rios-Avila (2020), to estimate reweighted RIF-OB decompositions.

[19] By 'workers from developing countries', in reweighted RIF-OB decompositions, we refer to F-G immigrants born in developing countries and S-G immigrants from developing countries, respectively.

reweighted using logit regressions in order to have the same distribution of characteristics as the data of male (female) workers from developing countries.

Furthermore, the aggregate four terms on the right-hand side of equation (3) can be read as follows: the sum of $\Delta_{X,p}^{q}$ and $\Delta_{X,e}^{q}$ represents the total composition effect (i.e. the quantity effects for the counterfactual group), where $\Delta_{X,p}^{q}$ is the pure composition effect delivered by covariates and $\Delta_{X,e}^{q}$ is the specification error that assesses the quality of the regression model (i.e. RIF approximation); and the sum of $\Delta_{S,p}^{q}$ and $\Delta_{S,e}^{q}$ indicates the total wage structure effect (i.e. the price effects for the counterfactual group), where $\Delta_{S,p}^{q}$ is the pure wage structure and $\Delta_{S,e}^{q}$ is the reweighting error that assesses the quality of the reweighting procedure. It should be noted that bootstrap standard errors must be estimated in reweighted RIF-OB decompositions because these are based on a multi-stage procedure (i.e. RIF regressions and predicted inverse probability weights) (Firpo et al., 2018; Rios-Avila, 2020).[20]

As our database contains a large number of worker, employment and firm characteristics, we group them in the following manner to facilitate the presentation of the reweighted RIF-OB decompositions: i) Age: age and squared age; ii) Tenure: tenure and squared tenure; iii) Education: dummies for at most lower secondary, upper secondary and tertiary education; iv) Household: dummies for single persons, couples without children living at home, couples with children living at home, single parents and other households; and v) Employment and firm: type of contract (dummies for permanent, fixed term, apprenticeship and internship contracts), dummies for part-time and overtime work, 36 occupational dummies, size of the firm (FTE number of workers in log), a dummy for more than 50% privately owned firms, a dummy for firm-level collective agreement, region where the firm is located (dummies for Brussels, Flanders and Wallonia), 66 sectoral dummies and 18 year dummies. When it comes to categorical and dummy variables, the detailed reweighted RIF-OB decompositions are influenced by the choice of the omitted category. To deal with this issue, we compute the decompositions based on the normalized effects of categorical variables or sets of dummies (i.e. effects that are expressed as deviations from the mean).

[20] Firpo et al. (2018) suggest using 500 repetitions to estimate bootstrap standard errors in reweighted RIF-OB decompositions. However, their suggestion is based on small samples. Using our database, we observe that as of 100 repetitions, bootstrap standard errors tend to be largely stable. In addition, a bootstrap procedure is highly time-consuming in large and granular databases. Therefore, the bootstrap standard errors of our decompositions are estimated using 100 repetitions.

Table 2. Descriptive statistics by origin – means and percentages, 1999-2016

	Sample of workers born in or from		
	Developed countries	**Developing countries[a]**	
		First generation	**Second generation[b]**
Share of the sample by origin (%)[c]	88.7	7.1	3.4
Region of birth (%)[d]			
Developed countries			
Belgium (n = 969,398)	83.5		
EU-14 countries (n = 179,765)	14.6		
Other EU countries (n = 17,018)	1.5		
Other developed countries (n = 4,621)	0.4		
Developing countries			
Maghreb countries (n = 50,175)		36.7	43.3
Sub-Saharan African countries (n = 27,253)		18.9	23.3
Near and Middle Eastern countries (n = 25,444)		19.4	22.6
Non-EU Eastern European countries (n = 12,419)		10.9	6.7
Emerging and developing Asian countries (n = 8,979)		8.5	3.2
Latin American and Caribbean countries (n = 5,777)		5.6	1.7
Worker characteristics			
Real gross hourly wage (in EUR)[e]	20.3	16.8	17.4
Age	38.2	38.2	30.2
Women (%)	31.6	28.7	34.1
Tenure	9.1	5.1	4.0
Education (%):			
At most lower secondary	28.9	50.9	29.4
Upper secondary	42.2	35.3	45.1
Tertiary	28.9	13.7	25.5
Household (%):			
Single person	12.0	14.3	12.0
Couple without children living at home	18.1	11.8	12.3
Couple with children living at home	59.5	61.5	62.0
Single parent	7.8	6.5	10.6
Other households	2.6	6.0	3.1
Employment characteristics			
Part-time work (%)	9.7	18.9	16.3
Overtime work (%)	4.5	4.8	4.6
Type of contract (%):			
Permanent	92.5	86.0	82.4
Fixed-term	6.1	12.7	15.4
Apprenticeship	0.2	0.1	0.6
Internship	1.2	1.2	1.5
Occupational categories - ISCO1 (%):			
Managers	4.3	1.5	2.4
Professionals	12.6	5.8	11.2
Technicians and associate professionals	9.9	4.4	9.3
Clerical support	19.5	10.9	17.6
Service and sales workers	9.9	9.8	15.1
Craft and related trades workers	17.6	18.3	12.9
Plant and machine operators and assemblers	16.1	15.2	16.4
Elementary Occupations	10.1	33.9	15.1

Table 2. (Continued)

Table 2. Continued

	Sample of workers born in or from		
	Developed countries	**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	35.6	24.6	25.0
D - Electricity, gas, steam and air conditioning supply	1.3	0.2	1.0
E - Water supply, sewerage, waste management and remediation activities	0.9	0.8	0.6
F - Construction	8.1	8.3	5.6
G - Wholesale and retail trade, repair of motor vehicles and motorcycles	19.7	12.4	17.1
H - Transportation and storage	9.6	9.1	11.8
I - Accommodation and food service activities	2.4	8.8	5.4
J - Information and communication	5.0	2.8	6.1
K - Financial and insurance activities	1.2	0.9	1.6
L - Real Estate activities	0.3	0.3	0.3
M - Professional, scientific and technical activities	5.3	3.1	5.1
N - Administrative and support service activities	10.4	28.9	20.2
Size of the firm (FTE number of employees)	513.3	460.8	554.1
Firm-level collective agreement (Yes) (%)	27.4	21.6	28.4
More than 50% privately owned (Yes) (%)	93.9	96.8	94.2
Region where the firm is located (%):			
Brussels	12.9	26.6	28.9
Flanders	65.3	56.8	50.1
Wallonia	21.9	16.5	21.0

Notes: Sample covers workers aged 15-64. Worker and firm weights are used. [a] By 'developing countries', we actually 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 2 for a chart of developed and developing countries). [b] S-G immigrants' 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 category 'others' is also considered in the sample (0,8%). Therefore, the sum of shares in the table does not add up to 100%. [d] Appendix 3 shows the list of countries by region of birth. [e] At 2013 constant prices. It includes base pay, overtime compensation, performance-related pay and commissions, and annual and irregular bonuses. Source: STATBEL, 1999-2016.

4. Data

4.1 Structure of the matched employer-employee database

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 covers 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.[21] The SES contains a wealth of information provided by the management of firms, both on the characteristics of firms (e.g. sector of activity, number of employees and type of collective

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

agreement) and those of their workers (e.g. age, gender, education, tenure and occupation).[22] The second dataset stems from the Belgian National Register (BNR). It contains information on workers' country of birth and that of their parents, as well as the type of household where workers live (e.g. single person, single parent or couple with children). 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 of 1,609,543 observations.

Four filters were applied to the original database. First, we dropped firms with less than ten observations to ensure sufficient variation in estimating wage gaps at the firm level (i.e. regressions with firm fixed effects) (58,252 observations deleted)[23]. Second, in order to focus exclusively on the working-age population employed in the Belgian private sector, we kept only data for workers aged between 15 and 64 and firms operating in sectors B to N of the NACE-BEL 2008 Rev. 2 nomenclature (47,240 observations deleted).[24] Third, zero earnings observations were excluded to avoid statistical bias in estimating wage gaps (3,813 observations deleted). Fourth, to avoid misclassification by origin and generation, we filtered out workers for whom information on their country of birth was missing (27,131 observations deleted) or

[22] The SES is conducted on the basis of a two-stage random sampling approach of enterprises or local units (first stage) and employees (second stage). The establishments, randomly chosen from the population, report data on a random sample of their workers. The SES is thus a stratified sample. 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 equal to 10, 50 and 100 percent, respectively, when the number of workers is lower than 50, between 50 and 99, and above 100, respectively. Within a firm, sampling percentages of employees also depend on size. Sampling percentages of employees reach 100, 50, 25, 14.3 and 10 per cent, respectively, 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, respectively. Firms employing 300 or more workers 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). To guarantee that firms report information on a representative sample of their workers, they are asked to follow a specific procedure. First, they have to rank their employees in alphabetical order. Next, Statistics Belgium gives them a random letter (e.g. the letter O) from which they have to 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 have a number of employees on which they need to provide information, they have to continue from the letter A on their list. Moreover, firms that employ different categories of workers, namely managers, blue- and/or white-collar workers, have to set up a separate alphabetical list for each of these categories and to report information on the number of workers in these different groups that is proportional to their share of the firm's total number of employees. For example, a firm with 500 employees (e.g. 80 managers, 100 white-collar workers and 320 blue-collar workers) will have to report information on 50 workers (e.g. 8 managers, 10 white-collar workers and 32 blue-collar workers).

[23] Our results remain largely unchanged if this restriction is not imposed (estimates are available on request).

[24] More precisely, our final sample covers 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, and (N) administrative and support service activities.

on at least one of their parents' countries of birth. (162,343 observations deleted).[25] After applying the four filters, our final sample consists of 1,310,764 observations across 18,057 firms from 1999 to 2016.

4.2 Descriptive statistics

The population breakdown by origin and generation is at the top of Table 2. We first observe that workers born in developed countries constitute about 89% of our final sample. Among them, natives (i.e. workers born in Belgium with both parents were born in Belgium) and workers originating from EU-14 countries are the largest groups. Turning to our groups of interest, F-G immigrants born in developing countries represent 7.1% of our final sample, whereas their S-G counterparts make up 3.4%. Most originate from the Maghreb, Sub-Saharan Africa and the Near and Middle East, regardless of their generation. It is worth noting that, as expected, the distribution of workers by geographical origin in our sample mirrors that of the working-age population in Belgium (FPS Employment and Unia, 2019).

Table 2 also displays descriptive statistics for all variables included in our empirical strategy. Regarding our main variable of interest (i.e. wages), we observe that workers born in developed countries earn, on average, 20.3 euros per hour, while F-G immigrants born in developing countries and their S-G peers earn 16.8 and 17.4 euros per hour, respectively. When it comes to worker characteristics, around 1 in 3 workers in our final sample are women. The average age is similar for workers born in developed countries and F-G immigrants born in developing countries (38 years old). By contrast, S-G immigrants from developing countries are eight years younger than the other groups, which further explains their low level of job tenure. In terms of tertiary education, S-G immigrants from developing countries perform much better than their F-G peers (25.5% vs. 13.7%), although they still lag somewhat behind workers born in developed countries (28.9%).

Regarding job characteristics, the shares of workers from developing countries in part-time jobs are almost twice those of workers born in developed countries, regardless of their generation.

[25] Around 10% of the observations in our sample were thus deleted because of missing information on the country of birth of at least one of the workers' parents. However, this is unlikely to affect our conclusions regarding adjusted wage differentials, particularly for S-G immigrants from developing countries. Indeed, our results (available on request), with and without covariates, show that the wages of workers born in developed countries for whom information on the country of birth of at least one of their parents is missing are similar to those of our reference group (i.e. workers born in developed countries with both parents born in developed countries).

Workers from developing countries are also more likely to have fixed-term contracts than workers born in developed countries, irrespective of their generation. As regards occupations, we find that the share of F-G immigrants born in developing countries and employed in elementary occupations (e.g. cleaner, agricultural worker and labourer in construction) is more than three times higher than that of workers born in developed countries (33.9% vs. 10.1%). However, this share decreases by more than half for their S-G counterparts (15.1%).

Among workers from developing countries, we also observe that the proportion of managers, professionals and technicians increases across two generations. Finally, F-G immigrants born in developing countries are considerably overrepresented in sector I (accommodation and food service activities) and sector N (administrative and support service activities) relative to workers born in developed countries. However, this overrepresentation decreases somewhat across two generations. Indeed, S-G immigrants from developing countries are more clustered in sector G (wholesale and retail trade, repair of motor vehicles and motorcycles), sector J (information and communication) and sector M (professional, scientific, and technical activities) than their F-G counterparts.

5. Results

5.1. Benchmark specification

Table 3 presents our benchmark estimates regarding the real gross hourly wage gaps between workers born in developed countries and workers from developing countries across two generations.[26] In column (1), when only year fixed effects are included, our findings show that the overall wage gap for F-G immigrants born in developing countries stands at 17.1%, while that for their S-G peers is 14.4%.[27] Put another way, the wages of S-G immigrants from developing countries are not, on average, markedly better than those of their F-G counterparts.[28]

[26] The term 'wage gap', as used in the discussion of our findings, refers to the real gross hourly wage gap.
[27] The coefficients in the tables (and percentages reported in the text) must be interpreted as log points. However, in order to obtain the % change in euros following a unit change in a dummy variable, the following formula must be applied: $100 * [\exp(\beta) - 1]$.
[28] We also find that workers born in developing countries with both parents born in Belgium, called 'others' in this paper, earn 12.8% more than workers born in developed countries, thus performing far better than immigrants from developing countries. As our empirical analysis focuses on the labour market performance of immigrants from developed countries, the results associated with the category 'others' are no longer explicitly shown in Table 4 and onwards. However, they are available on request.

Table 3. Baseline: weighted multilevel log-linear regressions

	Log (Real gross hourly wage)				
Workers born in or from:	(1)	(2)	(3)	(4)	(5)
Developed countries (n = 1,170,802)	Reference	Reference	Reference	Reference	Reference
Developing countries[a]					
First generation (n = 87,693)	-0.171***	-0.062***	-0.033***	-0.034***	-0.029***
	(0.007)	(0.004)	(0.004)	(0.003)	(0.002)
Second generation (n = 42,354)	-0.144***	0.005	0.010*	-0.001	-0.002
	(0.007)	(0.005)	(0.006)	(0.004)	(0.002)
Others[b] (n = 9,915)	0.128***	0.042***	0.027***	0.027***	0.022***
	(0.009)	(0.006)	(0.004)	(0.004)	(0.003)
Control variables					
Women		-0.131***	-0.092***	-0.088***	-0.078***
		(0.004)	(0.005)	(0.003)	(0.003)
Age		0.030***	0.023***	0.023***	0.021***
		(0.001)	(0.001)	(0.001)	(0.001)
Squared age		-0.000***	-0.000***	-0.000***	-0.000***
		(0.000)	(0.000)	(0.000)	(0.000)
Tenure		0.013***	0.011***	0.010***	0.009***
		(0.001)	(0.001)	(0.000)	(0.000)
Squared tenure		-0.000***	-0.000***	-0.000***	-0.000***
		(0.000)	(0.000)	(0.000)	(0.000)
Education (ref. at most lower secondary)					
Upper secondary		0.109***	0.066***	0.051***	0.050***
		(0.004)	(0.006)	(0.003)	(0.003)
Tertiary		0.493***	0.209***	0.171***	0.147***
		(0.007)	(0.012)	(0.005)	(0.007)
Type of household (ref. single person)					
Couple without children living at home		0.010***	0.004***	0.004***	0.005***
		(0.002)	(0.001)	(0.001)	(0.001)
Couple with children living at home		0.016***	0.012***	0.012***	0.014***
		(0.002)	(0.001)	(0.001)	(0.001)
Single parent		-0.016***	-0.009***	-0.006***	-0.003**
		(0.002)	(0.002)	(0.001)	(0.001)
Other households		0.007**	0.002	0.004*	0.002
		(0.003)	(0.003)	(0.002)	(0.002)
Type of contract (ref. permanent)					
Fixed term			-0.031***	-0.038***	-0.037***
			(0.006)	(0.010)	(0.008)
Apprenticeship			-0.225***	-0.223***	-0.227***
			(0.022)	(0.022)	(0.021)
Internship			-0.002	-0.003	-0.028**
			(0.037)	(0.027)	(0.014)
Part-time work			-0.045***	-0.029***	-0.025***
			(0.006)	(0.005)	(0.003)
Overtime work			0.016*	0.017***	0.004
			(0.009)	(0.004)	(0.003)

Table 3. (Continued)

Table 3. Continued

	Log (Real gross hourly wage)				
	(1)	(2)	(3)	(4)	(5)
Size of the firm (FTE number of employees in log)				0.025***	0.006***
				(0.002)	(0.002)
Firm-level collective agreement (Yes)				0.024***	0.002
				(0.004)	(0.003)
More than 50% privately owned (Yes)				0.008	0.025
				(0.014)	(0.029)
Region (ref. Brussels)					
Flanders				-0.007	-0.008
				(0.005)	(0.005)
Wallonia				-0.035***	-0.027***
				(0.007)	(0.010)
Year fixed effects[c]	Yes	Yes	Yes	Yes	Yes
Occupations (ISCO2)[d]	No	Yes	Yes	Yes	Yes
Sector fixed effects (NACE2)[e]	No	No	No	Yes	No
Firm fixed effects[f]	No	No	No	No	Yes
Observations	1,310,764	1,305,599	1,304,303	1,303,510	1,303,510
Adjusted R-squared	0.04	0.49	0.60	0.64	0.70

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in parentheses, which are clustered at the firm level. Worker and firm weights are used in all our regressions. Sample covers workers aged 15-64. [a] S-G immigrants' 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. [b] The category 'others' refers to workers born in developing countries with both parents born in Belgium (see Section 3 for more details). [c] 17 year dummies. [d] 35 occupation dummies. [e] 65 sector dummies. [f] 17,899 firm dummies. Source: STATBEL, 1999-2016.

However, although our estimates in column (1) show a clear picture of the level of overall wage inequality by origin and generation in Belgium, it is unlikely that workers' country of birth or that of their parents entirely explain their wages. Thus, covariates are progressively included in Table 3. In column (2), we find that after controlling for worker characteristics (i.e. gender, age, squared age, education, tenure, squared tenure and type of household), the adjusted wage gap for F-G immigrants born in developing countries stands at 6.2%. By contrast, there is no evidence of a statistically significant adjusted wage gap for their S-G counterparts.

Then, the inclusion of employment characteristics (i.e. type of contract, part-time and overtime work and occupation at ISCO two-digit level) in column (3) reduces by almost half the adjusted wage gap for F-G immigrants born in developing countries observed in column (2), now 3.3%. The inclusion of firm characteristics (i.e. size of the firm, firm-level collective agreement, type of economic and financial control and region where the firm is located) and sector fixed effects at the NACE two-digit level in column (4) does not significantly affect the adjusted wage gap for F-G immigrants born in developing countries. Moreover, columns (3) and (4) show no evidence of an adjusted wage gap for S-G immigrants from developing countries.

Table 4: Geographical origin: weighted multilevel log-linear regressions

Workers born in or from:		Log (Real gross hourly wage) (1)	(2)
Developed countries (n = 1,170,802)		Reference	Reference
Developing countries[a]			
Maghreb countries	First generation (n = 32,365)	-0.178***	-0.037***
		(0.011)	(0.003)
	Second generation (n = 17,810)	-0.184***	-0.003
		(0.011)	(0.004)
Sub-Saharan African countries	First generation (n = 16,472)	-0.159***	-0.029***
		(0.008)	(0.003)
	Second generation (n = 10,781)	-0.042***	-0.009***
		(0.008)	(0.003)
Middle and Near Eastern countries	First generation (n = 16,644)	-0.177***	-0.018***
		(0.010)	(0.003)
	Second generation (n = 8,800)	-0.206***	0.014***
		(0.009)	(0.003)
Non-EU Eastern European countries	First generation (n = 9,589)	-0.196***	-0.024***
		(0.008)	(0.003)
	Second generation (n = 2,830)	-0.045***	-0.004
		(0.012)	(0.006)
Emerging and developing Asian countries	First generation (n = 7,609)	-0.151***	-0.026***
		(0.011)	(0.004)
	Second generation (n = 1,370)	-0.104***	-0.037***
		(0.018)	(0.009)
Latin America and Caribbean countries	First generation (n = 5,014)	-0.136***	-0.016***
		(0.016)	(0.005)
	Second generation (n = 763)	-0.141***	-0.039***
		(0.019)	(0.009)
Control variables			
Year fixed effects[b]		Yes	Yes
Worker characteristics[c]		No	Yes
Employment characteristics[d]		No	Yes
Firm characteristics[e]		No	Yes
Occupations fixed effects (ISCO2)[f]		No	Yes
Sector fixed effects (NACE2)[g]		No	No
Firm fixed effects[h]		No	Yes
Observations		1,310,764	1,303,510
Adjusted R-squared		0.04	0.70

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in parentheses, which are clustered at the firm level. Sample covers workers aged 15-64. Firm and worker 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 a developed country and the mother was born in a developing country, the mother's country of birth is retained. [b] 17 year dummies. [c] gender, age, squared age, educational attainment, tenure, squared tenure and type of household. [d] type of contract and dummies for part-time and overtime work. [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] 35 occupation dummies. [g] 64 sector dummies. [h] 17,990 firm dummies. The category 'Others' is also included in the regressions, but its estimates are not portrayed in this table. Source: STATBEL, 1999-2016.

We now place particular emphasis on the results of column (5) as they represent the estimation of our full benchmark specification (i.e. estimating adjusted wage gaps between workers with identical observable characteristics but different origins working at the same firm).[29] Our estimates suggest that F-G immigrants born in developing countries experience an adjusted wage gap of 2.9%. Although one might not entirely exclude the role of unobservable characteristics (e.g. motivation or language proficiency) in explaining the adjusted wage gap for F-G immigrants born in developing countries, given the large number of covariates we control for, there are solid grounds for assuming that this adjusted wage gap is at least in partly associated with wage discrimination. Finally, S-G immigrants from developing countries experience no adjusted wage gap. To put it in another way, all other things being equal within a firm, S-G immigrants from developing countries outperform their F-G counterparts and are equivalent to workers born in developed countries in terms of wages.

5.2. Geographical origin

The overall and adjusted wage gaps for immigrants from developing countries may vary depending on their geographical origin. Hence, Table 4 presents the intergenerational relationship between origin and wages using a more fine-grained geographical classification. In column (1), where no covariate is included, except year fixed effects, our estimates suggest that the overall wage gaps for F-G immigrants born in non-EU Eastern Europe (19.6%), the Maghreb (17.8%) and the Near and Middle East (17.7%) are relatively greater than those for F-G immigrants born in Sub-Saharan Africa (15.9%), emerging and developing Asia (15.1%), and Latin America and the Caribbean (13.6%).

We also find heterogeneity in the magnitude of the overall wage gaps for S-G immigrants from developing countries. On the one hand, the overall wage gaps for S-G immigrants from Sub-Saharan Africa (4.2%), non-EU Eastern European countries (4.5%), and emerging and developing Asia (10.4%) are significantly lower than those for their F-G peers. On the other hand, the overall wage gaps for S-G immigrants from the Maghreb (18.4%), the Near and

[29] Most covariates are significant coefficients and have the expected signs. Specifically, wages increase with age and seniority, but only up to a point, as the relationships are quadratic. Wages are higher for better-educated workers and those living in couples (with or without children). Conversely, single parents and part-time or temporary workers earn less. Wages are also found to increase with firm size and to be lower in Wallonia (the southern part of the country).

Middle East (20.6%), and Latin America and the Caribbean (14.1%) are somewhat higher than those for their F-G peers.

Controlling for our complete set of covariates – including firm fixed effects – in column (2), the adjusted wage gaps for F-G immigrants born in developing countries also vary according to geographical origin, being 1.6% for those born in Latin America and the Caribbean, 1.8% for those born in the Near and Middle East, 2.6% for those born in emerging and developing Asia, 2.4% for those born in non-EU Eastern Europe, 2.9% for those born in Sub-Saharan Africa, and 3.7% for those born in the Maghreb.

Moreover, we find three patterns for the adjusted wage gaps for S-G immigrants from developing countries, depending on their geographical origin. Firstly, the adjusted wage gaps for S-G immigrants from the Maghreb, Sub-Saharan Africa and non-EU Eastern Europe are statistically insignificant or around zero (i.e. *ceteris paribus*, within a firm, these S-G immigrants attain wage parity with workers born in developed countries). Secondly, S-G immigrants from the Near and Middle East experience a positive adjusted wage gap of 1.4%, suggesting that, all else being equal, within a firm, they outperform workers born in developed countries and their F-G counterparts. Thirdly, the adjusted wage gaps for S-G immigrants from emerging and developing Asia, Latin America and the Caribbean range from 3.7% to 3.9%, thus being lower than those for their F-G counterparts.

5.3. Gender and origin

As our findings in our full benchmark specification show that female workers earn 7.8% less per hour than male workers (column (5) of Table 3), the role of gender in shaping the wages of immigrants from developing countries across two generations deserves to be investigated in detail. Columns (1) and (2) of Table 5 show that the overall and adjusted wage gaps for male immigrants from developing countries are comparable to those of the benchmark scenario in Table 3. In other words, while the overall wage gap for male immigrants from developing countries remains substantial over two generations (between 15.9% and 18.6%), the adjusted wage gap decreases from 3.8% to almost zero.

Table 5: Gender and Origin: weighted multilevel log-linear regressions

Workers born in or from:		Log (Real gross hourly wage) (1)	(2)
Developed countries			
Men (n = 800,464)		Reference	Reference
Women (n= 370,338) [1]		-0.149***	-0.081***
		(0.006)	(0.004)
Developing countries[a]			
Men	First generation (n = 64,439)	-0.186***	-0.038***
		(0.008)	(0.002)
	Second generation (n = 27,922)	-0.159***	-0.006**
		(0.008)	(0.003)
Women	First generation (n = 23,254) [2]	-0.302***	-0.086***
		(0.009)	(0.004)
	Second generation (n = 14,432) [3]	-0.257***	-0.076***
		(0.011)	(0.005)
Control variables			
Year fixed effects[b]		Yes	Yes
Worker characteristics[c]		No	Yes
Employment characteristics[d]		No	Yes
Firm characteristics[e]		No	Yes
Occupations fixed effects (ISCO2)[f]		No	Yes
Sector fixed effects (NACE2)[g]		No	No
Firm fixed effects[h]		No	Yes
Test for equality of coefficients (p-value)[i]			
[1] = [2]		0.00	0.06
[1] = [3]		0.00	0.18
[2] = [3]		0.00	0.00
Observations		1,310,764	1,303,510
Adjusted R-squared		0.07	0.70

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in parentheses, which are clustered at the firm level. Sample covers workers aged 15-64. Firm and worker 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 a developed country and the mother was born in a developing country, the mother's country of birth is retained. [b] 17 year dummies. [c] age, squared age, educational attainment, tenure, squared tenure and type of household. [d] type of contract and dummies for part-time and overtime work. [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] 35 occupation dummies. [g] 64 sector dummies. [h] 17,990 firm dummies. [i] The null hypothesis of the test specifies that the estimates are not statistically different from each other. The category 'Others' is also included in the regressions, but its estimates are not portrayed in this table. Source: STATBEL, 1999-2016.

By contrast, there are significant differences between male workers born in developed countries and female workers, irrespective of their origin and generation. More precisely, our gender-interacted estimates in column (1) show that overall wage gaps are as follows: 14.9% for female workers born in developed countries, 30.2% for F-G female immigrants born in developing countries, and 25.7% for S-G female immigrants from developing countries. Consequently, these findings highlight the existence of a significant double overall wage gap for female immigrants from developing countries across two generations (see the test for equality of coefficients at the bottom of column (1)).

However, the sizeable overall wage penalties experienced by female workers, regardless of their origin and generation, may in part be explained by some disadvantages in their statistical profiles (see Appendix 4 for descriptive statistics by origin, generation and gender). In line with this premise, we observe that female workers are strongly over-represented in part-time jobs compared to male workers, regardless of their origin and generation. Similarly, female workers are more concentrated in clerical support, service and sales jobs, and elementary occupations (i.e. occupations characterized by a high proportion of low-paying jobs) than male workers, whatever their origin and generation.

With this in mind, we have re-estimated our model, including all covariates and fixed effects. Results are reported in column (2) of Table 5. As expected, our gender-interacted estimates now indicate that the adjusted wage gaps are as follows: 8.1% for female workers born in developed countries, 8.6% for F-G female immigrants born in developing countries, and 7.6% for S-G female immigrants from developing countries. Furthermore, if we consider the tests for equality of coefficients at the bottom of column (2), we can conclude that: i) S-G female immigrants from developing countries outperform their F-G same-gender counterparts; ii) F-G female immigrants born in developing countries experience a double adjusted wage gap, albeit relatively small (i.e. compared to the adjusted gender wage gap experienced by female workers born in developed countries, a significant difference of 0.5 percentage points is estimated); and iii) there is no evidence of a double adjusted wage gap for S-G female immigrants from developing countries.

5.4. Wage distribution

In order to estimate overall wage gaps beyond the mean, identify the contribution of observables to these gaps, and provide a more advanced econometric analysis of gender roles, we conduct reweighted RIF-OB decompositions for male and female workers, separately.[30] In this sub-section, reweighted RIF-OB decompositions represent same-gender wage gaps between workers born in developed countries and counterfactual workers from developing countries across two generations. Tables 6 and 7 show the unconditional quartile coefficients of

[30] The limits of STATA, i.e. the econometric software used for our estimations, do not allow us to include thousands of firm dummies in our reweighted RIF-OB decompositions. Therefore, we were constrained to work with sector fixed effects (i.e. 65 sector dummies) in this part of our empirical analysis. However, it should be noted that the estimates of our benchmark specification using sector fixed effects are very similar to those obtained using firm fixed effects (see columns (4) and (5) of Table 3).

reweighted RIF-OB decompositions at the lower, median and upper quartiles for male and female workers, respectively.[31] In addition, complete quantile functions are reported as graphs in Figures 1 and 2.[32]

Our unconditional quantile coefficients in column (1) of Tables 6 and 7 first show that the overall wage gaps between male (female) workers born in developed countries and F-G male (female) immigrants born in developing countries increase substantially along the wage distribution. A similar pattern, albeit to a lower extent, is identified for the evolution of the overall wage gaps for S-G male immigrants from developing countries along the wage distribution. By contrast, the overall wage gaps for S-G female immigrants from developing countries appear to be almost constant along the wage distribution. Moreover, important differences can be highlighted when comparing overall wage gaps across two generations. More precisely, at the lower quartile, the overall wage gaps for S-G female and male immigrants from developing countries remain quite similar to those for their F-G same-gender peers. By contrast, at the median and upper quartiles, the overall wage gaps for S-G female and male immigrants from developing countries are less pronounced than those for their F-G same-gender peers.

Moreover, our reweighted RIF-OB decompositions in column (2) of Tables 6 and 7 show that the overall wage gaps for F-G female born in developing countries and their S-G female and male peers are fully explained by compositional effects (i.e. worker, employment and firm characteristics) along the wage distribution. Regarding the overall wage gaps for F-G male immigrants born in developing countries, although they are mainly driven by compositional effects, a negative wage structure effect (i.e. an adjusted wage gap) can also be pinpointed (see column (9) of Table 6). We also find that this wage structure effect increases while ascending the wage distribution (see Figure 1). In this regard, although we cannot ultimately assert whether wage structure effects are caused by wage discrimination or potential differences in unobservable characteristics, the large number of covariates included in our reweighted RIF-OB decompositions, which further create counterfactual workers from developing countries, enable us to feel confident to attribute these effects at least partially to wage discrimination.

[31] Reweighted RIF-OB decompositions produce two errors to inform about the quality of the estimates along the wage distribution. The reweighting errors provide information on the quality of the counterfactual distributions' identification (see columns (8) of Tables 6 and 7). The specification errors provide information on the quality of the RIF regressions (see columns (10) of Tables 6 and 7).

[32] Insofar as can be ascertained, insignificant or small wage structure effects at the quantiles 10 and 20 can be taken as evidence of sticky floors (i.e. minimum wages).

Table 6: Reweighted RIF-OB decompositions for MALE workers - unconditional quartile coefficients

Reference group: male workers born in developed countries		Overall wage gap	Total composition effect (Quantity effects)[a]							Total wage structure effect (Price effects)[c]	
			Total = (I) + (II)	Pure composition effect (I)					Specification error (II)	Pure wage structure effect	Reweighting error
				Age	Tenure	Education	Household	Employment and firm[b]			
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Counterfactual group: male workers from developing countries[e]											
25th percentile	First generation	-0.119***	-0.089***	0.007***	-0.020***	-0.017***	-0.001***	-0.059***	0.002	-0.031***	0.001
		(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)
	Second generation	-0.116***	-0.124***	-0.071***	-0.027***	-0.003***	-0.002***	-0.023***	0.002	0.008***	0.001
		(0.002)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.002)	(0.000)
50th percentile	First generation	-0.156***	-0.110***	0.004***	-0.024***	-0.027***	-0.001***	-0.073***	0.010***	-0.046***	0.001
		(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)
	Second generation	-0.118***	-0.127***	-0.072***	-0.031***	-0.005***	-0.001***	-0.017***	-0.001	0.008***	0.000
		(0.002)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.002)	(0.000)
75th percentile	First generation	-0.245***	-0.188***	-0.000	-0.022***	-0.047***	0.001*	-0.117***	-0.002	-0.058***	0.000
		(0.002)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.002)	(0.000)
	Second generation	-0.178***	-0.178***	-0.101***	-0.028***	-0.010***	0.001***	-0.040***	0.000	0.001***	-0.001
		(0.003)	(0.002)	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)	(0.001)	(0.000)	(0.002)

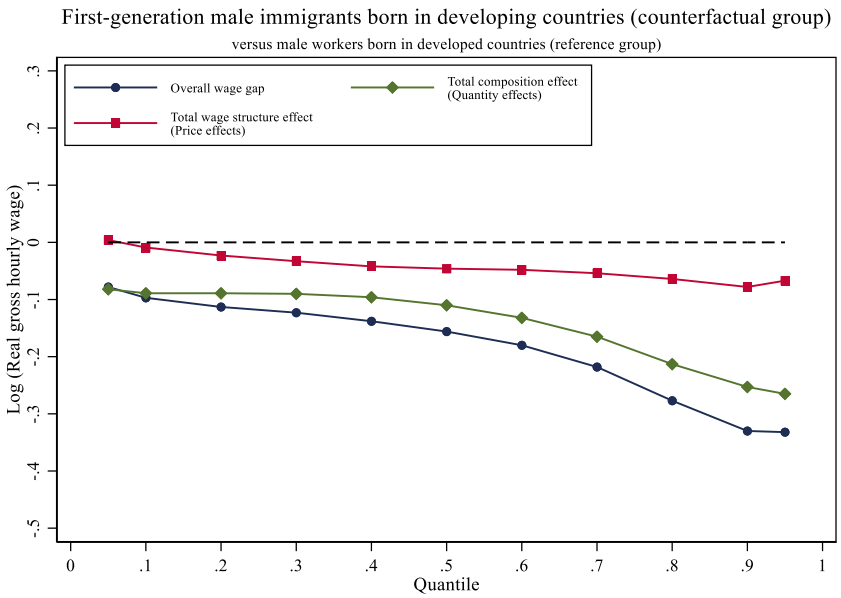
Notes: *** p<0.01, ** p<0.05, * p<0.1. Bootstrap standard errors are in parentheses. Sample covers workers aged 15-64. [a] Total composition effect is the sum of a pure composition effect and a specification error. The pure composition effect reflects the part of the overall wage gap attributed to differences in observable characteristics. [b] The pure composition effect of each variable included in 'Employment and firm' can be found in Appendix 5.1. [c] Total wage structure effect is the sum of a pure wage structure effect and a specification error. The pure wage structure effect refers to wage differentials between the reference group and the counterfactual group. [d] The detailed composition of the pure wage structure effect is available upon request. [e] 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. Source: STATBEL; 1999-2016

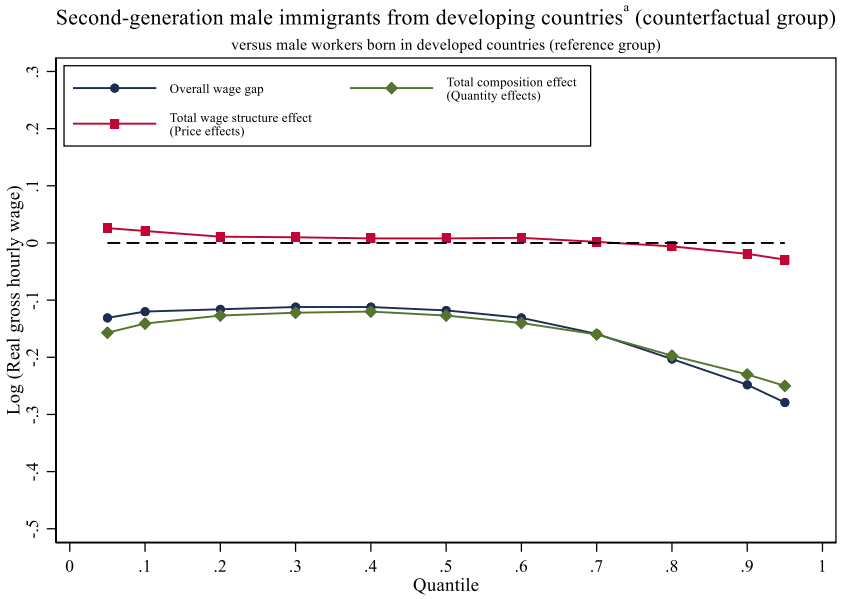
Table 7: Reweighted RIF-OB decompositions for FEMALE workers - unconditional quartile coefficients

Reference group: female workers born in developed countries		Overall wage gap	Total composition effect (Quantity effects)a							Total wage structure effect (Price effects)c	
			Total = (I) + (II)	Pure composition effect (I)					Specification error (II)	Pure wage structure effectd	Reweighting error
				Age	Tenure	Education	Household	Employment and firm[b]			
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Counterfactual group: female workers from developing countries[e]											
25th percentile	First generation	-0.088***	-0.089***	0.006***	-0.023***	-0.022***	-0.001*	-0.101***	0.052***	0.002	-0.001
		(0.002)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.001)	(0.013)	(0.001)
	Second generation	-0.087***	-0.092***	-0.057***	-0.024***	0.000*	-0.002***	-0.019***	0.009***	0.005***	0.000
		(0.003)	(0.002)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.002)
50th percentile	First generation	-0.162***	-0.156***	0.006***	-0.031***	-0.027***	0.000	-0.108***	0.005***	-0.006	-0.001
		(0.002)	(0.002)	(0.000)	(0.000)	(0.001)	(0.000)	(0.002)	(0.002)	(0.015)	(0.002)
	Second generation	-0.110***	-0.112***	-0.064***	-0.033***	0.000	-0.001***	-0.006***	-0.008***	0.001	0.000
		(0.003)	(0.002)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.002)	(0.000)
75th percentile	First generation	-0.225***	-0.200***	0.005***	-0.030***	-0.046***	0.002***	-0.099***	-0.032***	-0.024	-0.000
		(0.004)	(0.002)	(0.000)	(0.001)	(0.001)	(0.000)	(0.002)	(0.002)	(0.020)	(0.003)
	Second generation	-0.116***	-0.117***	-0.079***	-0.031***	0.000	0.001***	0.007***	-0.015***	-0.001	-0.000**
		(0.005)	(0.003)	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)	(0.001)	(0.004)	(0.000)

Notes: *** p<0.01, ** p<0.05, * p<0.1. Bootstrap standard errors are in parentheses. Sample covers workers aged 15-64. [a] Total composition effect is the sum of a pure composition effect and a specification error. The pure composition effect reflects the part of the overall wage gap attributed to differences in observable characteristics. [b] The pure composition effect of each variable included in 'Employment and firm' can be found in Appendix 5.2. [c] Total wage structure effect is the sum of a pure wage structure effect and a specification error. The pure wage structure effect refers to wage differentials between the reference group and the counterfactual group. [d] The detailed composition of the pure wage structure effect is available upon request. [e] 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. Source: STATBEL; 1999-2016

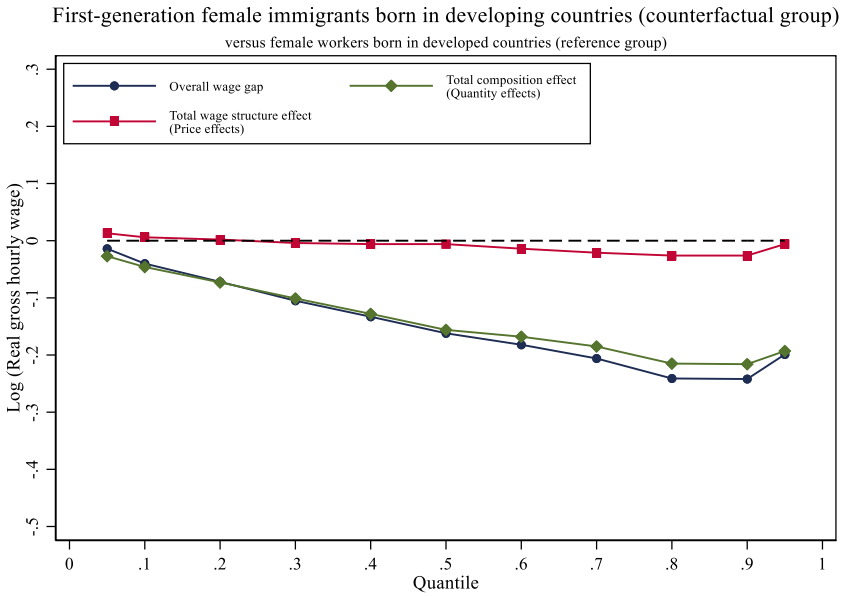
Figure 1: Reweighted RIF-OB decompositions: complete unconditional quantile coefficients for male workers

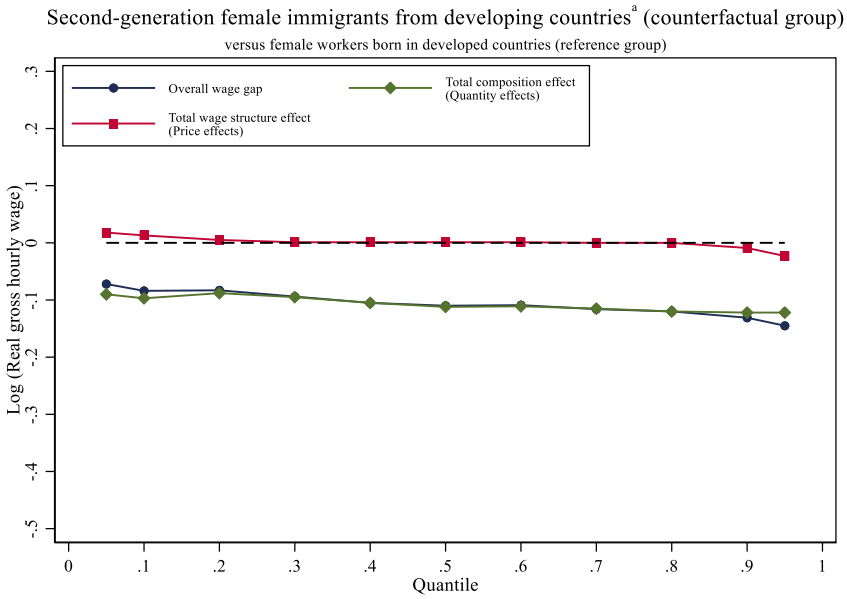




Notes: Sample covers workers aged 15-64. [a] S-G immigrants' origin is defined based on the father's country of birth. However, if the father was born in a developed country and the mother was born in a developing country, the mother's country of birth is retained. All the unconditional quantile coefficients associated with overall wage gaps and total composition effects for male immigrants from developing countries are statistically significant at the 1% level. For F-G male immigrants born in developing countries, while all the unconditional quantile coefficients associated with total wage structure effects between quantiles 10 and 20 are not statistically significant at 1%, 5% and 10% levels, those between quantiles 30 and 90 are statistically significant at the 1% level. For S-G male immigrants from developing countries, all the unconditional quantile coefficients associated with total wage structure effects are not statistically significant at 1%, 5% and 10% levels. Source: STATBEL, 1999-2016.

Figure 2: Reweighted RIF-OB decompositions: complete unconditional quantile coefficients for female workers





Notes: Sample covers workers aged 15-64. [a] S-G immigrants' 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. All the unconditional quantile coefficients associated with the overall wage gaps and total composition effects for F-G female immigrants born in developing countries and their S-G same-gender counterparts are statistically significant at the 1% level. All the unconditional quantile coefficients associated with the total wage structure effects for F-G female immigrants born in developing countries and their S-G same-gender counterparts are not statistically significant at 1%, 5% and 10% levels. Source: STATBEL, 1999-2016.

Given that compositional effects explain all (or most) of the gaps mentioned above, the question: "How do worker, employment and firm characteristics shape the overall wage gaps for immigrants from developing countries across two generations?", requires further investigation. Regarding worker characteristics, our reweighted RIF-OB decompositions in columns (3)-(6) of Tables 6 and 7 show that along the wage distribution, the overall wage gaps for F-G female and male immigrants born in developing countries are very weekly explained by their age. In contrast, their lower education and tenure play a significant role. At the upper end of the wage distribution, in particular, we observe that F-G female and male immigrants born in developing countries are considerably penalized by their lower education attainment compared to same-gender workers born in developed countries.

As regards employment and firm characteristics (e.g. occupation, type of contract, part-time work and sectors of activity), we find that they also account for a substantial part of overall wage gaps experienced by F-G female and male immigrants born in developing countries (see column (7) of Tables 5 and 6). Indeed, columns (6) and (8) of appendices 5.1 and 5.2 suggest that, throughout the wage distribution, the concentration of F-G immigrants born in developing countries, both women and men, in low-paying occupations and (to a lesser extent) low-paying sectors explains a significant proportion of the overall wage gaps they encounter (i.e. occupational/sectoral segregation).

Turning to S-G female and male immigrants from developing countries, we find that along the wage distribution, their lower tenure and, above all, their younger age explain most of their overall wage gaps (see columns (3)-(6) in Tables 6 and 7). In contrast, education appears to play a marginal role in the explanation of these wage gaps (especially for S-G female immigrants), which is consistent with our descriptive statistics showing that S-G male immigrants (and even more so female immigrants) from developing countries have similar levels of education to male (female) workers from developed countries.

In addition, our reweighted RIF-OB decompositions in columns (6)-(7) of Appendixes 5.1 and 5.2 show that along the wage distribution, occupational/sectoral characteristics also contribute – albeit modestly and more among men than women - to the overall wage gaps for S-G immigrants from developing countries. In other words, compared to their same-gender F-G peers, S-G female and male immigrants from developing countries have better employment characteristics and are much less concentrated in low-paying sectors and occupations. However,

compared to same-gender workers born in developed countries, S-G male and (to a lesser extent) female immigrants from developing countries still experience some occupational and sectoral segregation. In principle, their younger age and lower tenure with respect to their counterparts born in developed countries may explain this remaining segregation. S-G could indeed experience occupational and sectoral upgrading when they get older. However, we cannot rule out a status quo scenario throughout their careers, namely a situation where S-G immigrants find it difficult to move out of lower-paid professions and sectors despite their greater professional experience. In future research, it would be interesting to test which of these scenarios is the most verified on the basis of longitudinal data.

6. Conclusion

In a developed world marked by demographic ageing, the labour market integration of immigrants born in developing countries and their descendants plays a key role in ensuring the sustainability of social security systems (e.g. healthcare, pensions and unemployment benefits). Indeed, good results on the labour market for the immigrant population go hand in hand with a positive net contribution to economic growth and the tax base. (Christl et al., 2021; OECD, 2021). In this respect, although the access to employment of immigrants from developing countries across two generations has been well-documented at the international level (e.g. Belzil and Poinas, 2010; Midtbøen, 2016; OECD, 2020a; Piton and Rycx, 2021), the intergenerational evolution of their wages has received less attention due, among other things, to data availability (e.g. Athari et al., 2019; Card et al., 2000; Duncan and Trejo, 2018). Moreover, it should be noted that most evidence on immigrant-native wage gaps across generations is characterized by sampling and econometric limitations: small samples, short periods, a limited number of control variables and/or standard OLS regressions (mainly computed at the mean). Therefore, using a matched employer-employee database of 1.3 million observations over the period 1999-2016 for the Belgian private sector and two econometric techniques (i.e. weighted multilevel log-linear regressions and reweighted RIF-OB decompositions), we contribute to the existing literature with a comprehensive assessment of the wages of immigrants from developing countries over two generations.

Our weighted multilevel log-linear estimates suggest that the wages of S-G immigrants from developing countries are somewhat higher than those of their F-G peers. However, the overall wage gaps between workers born in developed countries and workers from developing

countries remain highly persistent across two generations (17.1% for F-G immigrants and 14.4% for S-G immigrants). As overall wage gaps can also be explained by factors other than workers' origin, we include a wide range of covariates (e.g. age, tenure, education, type of contract, occupation and firm fixed effects) in our regressions. We find that the adjusted wage gap for F-G immigrants born in developing countries is 2.9%, whereas there is no evidence of an adjusted wage gap for their S-G peers.

The estimates associated with F-G immigrants born in developing countries remain largely similar when we divide them by geographical origin. However, it is worth noting that S-G immigrants from Sub-Saharan Africa and non-EU Eastern Europe face lower overall wage gaps than their S-G peers from other developing regions. Similarly, S-G immigrants from emerging and developing Asia, Latin America and the Caribbean experience adjusted wage gaps, while S-G immigrants from other developing regions perform on par with workers born in developed countries. Moreover, after including an interaction between origin and gender in our regressions, we find that F-G immigrants born in developing countries and their S-G same-gender peers receive considerably lower wages than female workers born in developed countries, who experience a gender wage gap with respect to their male counterparts (i.e. evidence of a double overall wage gap for female immigrants from developing countries across two generations). However, controlling for covariates, the adjusted wage gaps for F-G immigrants born in developing countries and their S-G same-gender peers are broadly comparable to those for female workers born in developed countries (i.e. only evidence of an adjusted gender wage gap, regardless of female workers' origin).

When it comes to analysing the wages of immigrants beyond the mean, the unconditional quantile coefficients of our reweighted RIF-OB approach suggest that the overall wage gaps for F-G female and male immigrants born in developing countries and their S-G male peers increase along the wage distribution. In contrast, the overall wage gap for S-G female immigrants from developing countries remains relatively constant along the wage distribution. Furthermore, our reweighted RIF-OB decompositions show that along the wage distribution, the overall wage gaps for F-G male (female) immigrants born in developing countries are mainly (wholly) explained by their lower levels of education and tenure and their overconcentration in low-paying occupations and (to a lesser extent) low-paying sectors. We also find that the overall wage gap for F-G male immigrants born in developing countries is

partly explained by a wage structure effect (i.e. an adjusted wage gap), which increases along the wage distribution.

Turning to S-G female and male immigrants from developing countries, our reweighted RIF-OB decompositions show that along the wage distribution, their overall wage gaps are essentially explained by their younger age and (to a lesser extent) lower tenure in comparison to their counterparts from developed countries. Occupational/sectoral characteristics also contribute - albeit modestly and more so for men than women - to explaining the overall wage gaps experienced by S-G immigrants from developing countries. That said, it should be stressed that in the decomposition of overall wage gaps, the contribution of sectoral and particularly occupational segregation is clearly weaker for S-G immigrants from developing countries than for their F-G peers. Finally, along the wage distribution, we find no evidence of a significant (and economically meaningful) wage structure effect for S-G female and male immigrants from developing countries.

Overall, our paper sheds light on the importance of the legacy of immigration in explaining persistent overall wage gaps for immigrants from developing countries across two generations. However, we also show that *ceteris paribus*, within a firm, although F-G immigrants born in developing countries are paid somewhat less than workers born in developed countries, this is no longer the case for their S-G peers (i.e. no adjusted wage gap). Indeed, the overall wage gaps for F-G immigrants born in developing countries (and their S-G peers) are largely (wholly) explained by compositional effects. This said, it should be recalled that some compositional effects often reflect pre-labour market inequalities (e.g. educational attainment gaps or additional difficulties in accessing the primary labour market related to origin) and/or occupational/sectoral segregation. Hence, these integration issues should not be overlooked when designing policies aimed at tackling wage inequalities between natives and immigrants.

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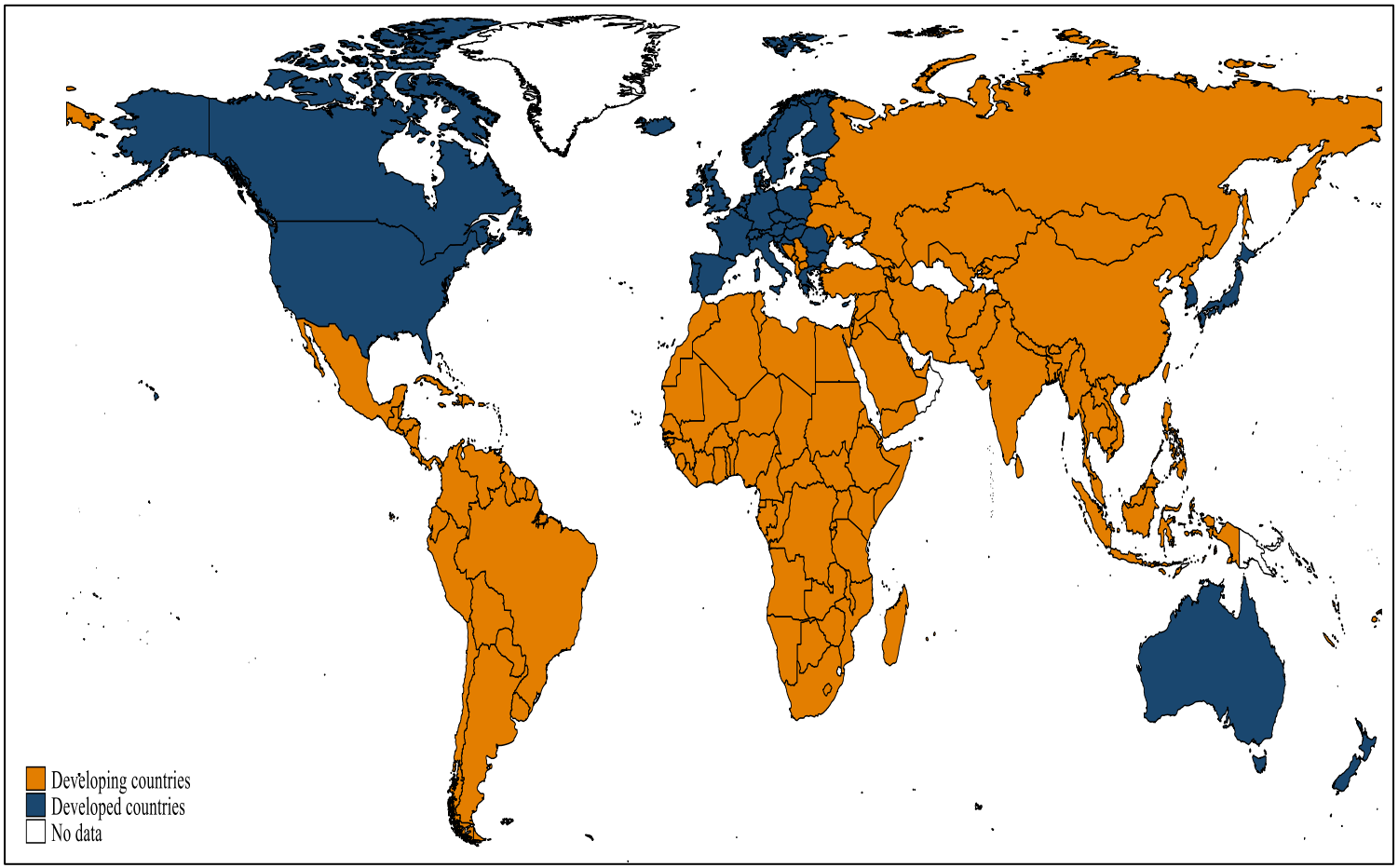
Appendices – Chapter 2: Moving Up the Social Ladder? Wages of First- and Second-Generation Immigrants

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



Notes: Overseas territories are classified depending on their neighbouring 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 found in our database.

Appendix 2: Natives and immigrants from developed countries: weighted multilevel log-linear regressions

	Log (Real gross hourly wage)	
Workers born in or from:	(1)	(2)
Belgium (n = 1,170,802)	Reference	Reference
Developed countries[a]		
First generation (n = 86,481)	0.002	-0.002
	(0.008)	(0.002)
Second generation (n = 114,923)	-0.040***	-0.005***
	(0.004)	(0.001)
Control variables		
Year fixed effects[b]	Yes	Yes
Worker characteristics[c]	No	Yes
Employment characteristics[d]	No	Yes
Firm characteristics[e]	No	Yes
Occupations fixed effects (ISCO2)[f]	No	Yes
Sector fixed effects (NACE2)[g]	No	No
Firm fixed effects[h]	No	Yes
Observations	1,170,802	1,164,183
Adjusted R-squared	0.02	0.71

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in parentheses, which are clustered at the firm level. Sample covers workers aged 15-64. Firm and worker 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 a developed country and the mother was born in a developing country, the mother's country of birth is retained. [b] 17 year dummies. [c] gender, age, squared age, educational attainment, tenure, squared tenure and type of household. [d] type of contract, dummy for part-time work, and dummy for overtime work. [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] 35 occupation dummies. [g] 64 sector dummies. [h] 17,990 firm dummies. Source: STATBEL, 1999-2016

Appendix 3: List of countries by geographical region in our database (IMF, 2019; United Nations, 2019)

Developed countries

Belgium

EU-14 countries*: 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.

Near and Middle Eastern 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.

* 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 4. Descriptive statistics by origin and gender – means and percentages, 1999-2016

	Sample of workers born in or from					
	Developed countries		**Developing countries[a]**			
			First generation		**Second generation[b]**	
	Men	Women	Men	Women	Men	Women
Share of the sample by origin and gender (%)[c]	60.7	28.0	5.1	2.0	2.3	1.1
Region of birth (%)[d]						
Developed countries						
Belgium (n = 969,398)	83.8	82.7				
EU-14 countries (n = 179,765)	14.8	14.3				
Other EU countries (n = 17,018)	1.1	2.5				
Other developed countries (n = 4,621)	0.3	0.5				
Developing countries						
Maghreb countries (n = 50,175)			41.8	23.8	43.9	42.1
Sub-Saharan African countries (n = 27,253)			18.4	20.2	22.2	25.5
Near and Middle East countries (n = 25,444)			21.0	15.4	23.8	20.2
Non-EU Eastern European countries (n = 12,419)			9.4	14.8	6.1	5.8
Emerging and developing Asian countries (n = 8,979)			5.7	15.7	2.5	4.4
Latin American and Caribbean countries (n = 5,777)			3.7	10.1	1.5	2.0
Worker characteristics						
Real gross hourly wage (in EUR)[e]	21.3	18.2	17.4	15.4	17.9	16.3
Age	38.7	37.2	38.4	37.5	30.5	29.7
Tenure	9.6	7.8	5.6	3.8	4.2	3.5
Education (%):						
At most lower secondary	29.9	26.7	50.5	51.9	31.1	25.9
Upper secondary	42.3	41.9	36.5	32.5	46.0	43.2
Tertiary	27.8	31.4	13.0	15.5	22.9	30.9
Household (%):						
Single person	12.5	10.8	15.3	11.7	12.7	10.5
Couple without children living at home	17.3	20.0	10.7	14.6	11.5	13.9
Couple with children living at home	61.3	55.5	64.1	55.2	63.7	58.4
Single parent	6.1	11.4	3.5	13.9	8.6	14.8
Other households	2.8	2.3	6.5	4.6	3.5	2.5
Employment characteristics						
Part-time work (%)	3.5	23.2	10.1	40.8	10.3	28.5
Overtime work (%)	5.8	1.8	6.1	1.6	6.1	1.5
Type of contract (%):						
Permanent	93.5	90.3	87.1	83.4	84.0	79.1
Fixed-term	5.0	8.5	11.7	15.1	14.1	18.2
Apprenticeship	0.2	0.3	0.1	0.1	0.5	0.9
Internship	1.3	1.0	1.1	1.3	1.4	1.8

Appendix 3. (Continued)

Appendix 4. Continued

	Sample of workers born in or from					
	Developed countries		**Developing countries[a]**			
			First generation		**Second generation[b]**	
	Men	Women	Men	Women	Men	Women
Occupational categories - ISCO1 (%):						
Managers	5.0	2.9	1.6	1.4	2.3	2.7
Professionals	13.1	11.5	5.6	6.3	11.2	11.2
Technicians and associate professionals	10.3	8.9	4.6	4.1	9.0	10.0
Clerical support	13.4	32.7	9.8	13.9	11.8	29.3
Service and sales workers	6.5	17.1	8.2	13.8	11.2	23.1
Craft and related trades workers	23.3	5.4	24.0	4.2	17.8	3.1
Plant and machine operators and assemblers	20.2	7.3	19.9	3.7	22.6	3.7
Elementary Occupations	8.1	14.2	26.3	52.7	14.2	17.1
Firm characteristics						
Sector of activity - NACE1 (%):						
B - Mining and Quarrying	0.3	0.1	0.1	0.0	0.2	0.0
C - Manufacturing	40.6	24.8	30.2	15.1	30.9	13.0
D - Electricity, gas, steam and air conditioning supply	1.5	1.0	0.2	0.3	0.9	1.3
E - Water supply, sewerage, waste management and remediation activities	1.0	0.6	1.0	0.4	0.7	0.3
F - Construction	10.9	2.0	11.4	0.8	7.8	1.3
G - Wholesale and retail trade, repair of motor vehicles and motorcycles	16.3	27.1	12.0	15.0	13.6	24.3
H - Transportation and storage	10.5	7.5	11.7	3.2	14.2	6.7
I - Accommodation and food service activities	1.7	4.1	7.5	11.6	4.7	7.0
J - Information and communication	5.1	4.9	2.7	3.1	5.8	6.6
K - Financial and insurance activities	0.9	1.8	0.7	2.2	1.2	2.5
L - Real Estate activities	0.2	0.4	0.2	0.5	0.2	0.5
M - Professional, scientific and technical activities	4.5	7.1	2.6	5.5	4.1	7.2
N - Administrative and support service activities	6.6	18.6	19.8	42.1	15.8	29.2
Size of the firm (FTE number of employees)	583.2	361.9	485.6	399.1	624.9	409.8
Firm-level collective agreement (%)	28.9	24.2	23.8	15.9	31.2	22.9
More than 50% privately owned (%)	93.7	94.4	96.6	97.2	93.4	95.9
Region where the firm is located (%):						
Brussels	11.7	15.4	24.4	32.2	26.5	33.9
Flanders	65.6	64.6	57.9	54.2	51.5	47.4
Wallonia	22.7	20.0	17.7	13.6	22.1	18.7

Notes: Sample covers workers aged 15-64. Worker and firm weights are used. [a] By 'developing countries', we actually 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 for a chart of developed and developing countries). [b] S-G immigrants' 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 category 'Others' is also considered in the sample (0.8%). Therefore, the sum of shares in the table does not add up to 100%. [d] Appendix 2 shows the list of countries by region of birth. [e] At 2013 constant prices. It includes base pay, overtime compensation, performance-related pay and commissions, and annual and irregular bonuses. Source: STATBEL, 1999-2016.

Appendix 5.1: Reweighted RIF-OB decompositions for MALE workers - Detailed composition effects

Reference group: male workers born in developed countries		Total composition effect (Quantity effects)[a]									
			Pure composition effect[b] (I)								
		Total = (I) + (II)	Worker characteristics	Type of contract	Part-time	Overtime	ISCO2	Firm characteristics	NACE2	Year fixed effects	Specification error (II)
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Counterfactual group: male workers from developing countries[c]											
25th percentile	First generation	-0.089***	-0.032***	-0.005***	-0.004***	0.000***	-0.037***	-0.002***	-0.015***	0.003***	0.002
		(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)
	Second generation	-0.124***	-0.103***	-0.006***	-0.004***	0.000***	-0.012***	0.005***	-0.009***	0.004***	0.002
		(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
50th percentile	First generation	-0.110***	-0.048***	-0.004***	-0.001*	0.000***	-0.056***	-0.002***	-0.013***	0.003***	0.010***
		(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
	Second generation	-0.127***	-0.109***	-0.004***	-0.001*	0.000***	-0.016***	0.007***	-0.005***	0.003***	-0.001
		(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
75th percentile	First generation	-0.188***	-0.068***	-0.002***	0.003***	-0.000*	-0.093***	-0.001	-0.019***	-0.005***	-0.002
		(0.002)	(0.001)	(0.001)	(0.000)	(0.000)	(0.002)	(0.001)	(0.002)	(0.000)	(0.002)
	Second generation	-0.178***	-0.138***	-0.001*	0.003***	-0.000	-0.033***	0.007***	-0.010***	-0.005***	0.000
		(0.002)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)

Notes: *** p<0.01, ** p<0.05, * p<0.1. Bootstrap standard errors are in parentheses. Sample covers workers aged 15-64. Weights for firms and workers are used. [a] Total composition effect is the sum of a pure composition effect and a specification error. [b] The pure composition effect reflects the part of the overall wage gap attributed to differences in observables characteristics. [c] S-G immigrants' 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. Source: STATBEL, 1999-2016

Appendix 5.2: Reweighted RIF-OB decompositions for FEMALE workers - Detailed composition effects

Reference group: female workers born in developed countries		Total composition effect (Quantity effects)[a]									
			Pure composition effect[b] (I)								
		Total = (I) + (II)	Worker characteristics	Type of contract	Part-time	Overtime	ISCO2	Firm characteristics	NACE2	Year fixed effects	Specification error (II)
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Counterfactual group: female workers from developing countries[c]											
25th percentile	First generation	-0.089***	-0.039***	-0.006***	-0.007***	-0.000**	-0.083***	0.003***	-0.022***	0.013***	0.052***
		(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.003)	(0.001)	(0.003)	(0.001)	(0.003)
	Second generation	-0.092***	-0.083***	-0.010***	-0.002***	-0.000***	-0.008***	0.003***	-0.007***	0.006***	0.009***
		(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)
50th percentile	First generation	-0.156***	-0.053***	-0.002***	-0.003***	-0.000**	-0.093***	0.007***	-0.025***	0.008***	0.005***
		(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.003)	(0.001)	(0.002)	(0.001)	(0.002)
	Second generation	-0.112***	-0.098***	-0.002***	-0.001***	-0.000**	-0.004***	0.006***	-0.008***	0.003***	-0.008***
		(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)
75th percentile	First generation	-0.200***	-0.070***	0.002***	-0.003***	0.000	-0.080***	0.013***	-0.031***	-0.000	-0.032***
		(0.002)	(0.002)	(0.000)	(0.001)	(0.000)	(0.003)	(0.001)	(0.003)	(0.001)	(0.002)
	Second generation	-0.117***	-0.109***	0.005***	-0.001***	0.000	-0.001	0.012***	-0.008***	-0.000	-0.015***
		(0.002)	(0.002)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)

Notes: *** p<0.01, ** p<0.05, * p<0.1. Bootstrap standard errors are in parentheses. Sample covers workers aged 15-64. Weights for firms and workers are used. [a] Total composition effect is the sum of a pure composition effect and a specification error. [b] The pure composition effect reflects the part of the overall wage gap attributed to differences in observables characteristics. [c] S-G immigrants' 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. Source: STATBEL, 1999-2016

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