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Uptake of formal childcare among second generation and native mothers in Belgium: can increasing local childcare availability narrow migrant-native gaps?

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Abstract

Research indicates that the uptake of formal childcare for children under age 3 is lower among migrant origin parents than among native parents in most European countries, and that these differentials extend to the second generation. Despite considerable investments in formal childcare availability in many European countries, it remains unclear whether and to what extent expanding local childcare availability effectively diminishes migrant-native uptake differentials due to the lack of longitudinal research. Therefore, this study assesses for Belgium to what extent expansions in childcare availability within municipalities in the period 2010–2014 has increased the uptake of formal childcare for children under age 3 among households where the mother has a second generation Southern European, Maghreb or Turkish background, versus no migration background. We use longitudinal census and register data for Belgium that were linked to longitudinal tax return data on childcare expenses and municipality-level data on childcare availability for children aged 0–3. Our results show that Southern European and Turkish origin mothers become more likely to use formal childcare when childcare places become more widely available within their municipalities, but also that the uptake gap with native mothers persists, since there is no differential effect of increasing local childcare availability. Since local childcare expansions entail a slightly stronger increase in formal childcare uptake among Maghreb origin mothers compared to native mothers, this results in slightly decreasing migrant-native uptake gaps, although considerable uptake gaps remain. To our knowledge, this is the first longitudinal study addressing the relationship between local childcare availability and uptake differentials by migration background. This study can inspire avenues for follow-up research which could provide additional insight into the possible mechanisms behind the varying effects of increasing local childcare availability by migration background and the persisting migrant-native uptake gaps.

Keywords: Formal childcare, Second generation migrants, Childcare availability, Belgium

Introduction

Over the past decades, European countries have progressively adopted a social investment perspective, which implies a shift in social policy from solely protecting against social risks to increasingly supporting labour market integration and human capital accumulation (Cantillon & Van Lancker, 2013; Hemerijck, 2018). In this view, many countries have increasingly invested in the provision of formal childcare services for children aged 0–3. However, these investments seem to disproportionately benefit parents without a migration background (i.e., native parents),¹ since research has shown that migrant origin parents display a lower uptake of formal childcare compared to native parents in most European countries (Biegel et al., 2021b; Driessen, 2004; Schober & Spiess, 2013; Teppers et al., 2019). While available studies mainly focus on migrant origin parents of the first generation, prior research for Belgium shows that these differentials extend to the second generation (Biegel et al., 2021b). This is unfortunate, since reducing migrant-native gaps in the uptake of formal childcare may be advantageous for children, parents and the society at large. On the one hand, several authors have suggested that enrolment in formal childcare may entail benefits for children's cognitive, linguistic and socio-emotional development, highlighting that high quality is crucial in this respect (Burger, 2010; Camilli et al., 2010). These developmental benefits may in turn contribute to enhancing children's educational and labour market careers, entailing economic returns at the country-level. Moreover, since this strand of literature suggests that the benefits of high-quality childcare are presumably larger for children with a migration background, formal childcare may be an effective tool to mitigate social inequalities over the life course. On the other hand, access to formal childcare plays a crucial role in enabling parents'—and especially mothers'—labour market participation (Hegewisch & Gornick, 2011). In the European context of accelerated population ageing and shrinking working age populations, the successful labour market participation of the large and growing share of second generation women is considered increasingly important to cover welfare state costs (e.g., pensions or health care). However, second generation women—particularly of non-European origin—display lower employment rates compared to native women and the migrant-native employment gap is larger among women with children than among childless women (Holland & de Valk, 2017). Besides the societal relevance of migrant origin mothers' labour market participation, a reduced labour market participation after family formation can jeopardise women's financial independence, may increase poverty risks at the household level and has long-term implications for future labour market opportunities and social security protection (e.g., pensions) at later stages of the life course (Koelet et al., 2015; Neels et al., 2018).

Theoretical perspectives on migrant-native differentials in formal childcare uptake identify demand-side and supply-side factors and highlight economic as well as ideational theories. First, researchers attribute the lower uptake of migrant origin parents to a lower demand for formal childcare compared to native parents as a result of a weaker labour market attachment which entails lower net income gains from employment and

¹ In this study, natives are defined as individuals who have a Belgian nationality at birth and with two parents that have a Belgian nationality at birth. Due to a lack of information on nationality at birth of the grandparents, we were not able to distinguish the third generation from natives.

for which several explanations have been suggested in the literature. On the one hand, European labour markets have been shown to be stratified with differential access and strong variation in employment characteristics in terms of migration background (FOD OECD, 2015; WASO & UNIA, 2019). On the other hand, work-family preferences may differ between origin groups as a result of (i) selective migration (e.g., family migration versus employment), (ii) differences in socialization resulting from exposure to norms and expectations of both the majority group and the origin group to which women belong (de Valk, 2008), or (iii) normative adaption to a context offering limited economic opportunities (Friedman et al., 1994). Besides differential labour market attachment, migrant-native differentials in the uptake of formal childcare may be further induced by differential availability and use of informal childcare (Biegel et al., 2021b; Wall & José, 2004), as well as differential access to formal childcare (Vandenbroeck & Lazzari, 2014). Regarding the latter, available research highlights that a limited availability of formal childcare places entails a differential access for parents with different socio-economic backgrounds (Pavolini & Van Lancker, 2018; Vandenbroeck & Lazzari, 2014). In a context of supply shortages, long waiting lists occur and particularly parents with limited institutional knowledge of enrolment procedures, as well as parents with unstable employment trajectories and irregular working hours face more barriers in accessing childcare, since their demand for care is more difficult to predict (Farfan-Portet et al., 2011; Vandenbroeck et al., 2008). As second generation parents—particularly of non-European origin—may lack the social capital to navigate the complex childcare system, generally have lower employment stability and are overrepresented in jobs with irregular working hours (Elloukmani & Ou-Salah, 2018; Maes et al., 2019), they may be less likely than native parents to secure a childcare slot in time. Given that especially native parents are more likely to overcome the barriers induced by the lack of childcare places, increasing local childcare availability may particularly improve access for migrant origin parents, which may in turn reduce uptake gaps with native parents. Although cross-national studies indicate that socio-economic gradients in the uptake of formal childcare are smaller in countries with a higher availability of childcare places (e.g., Sweden) (Pavolini & Van Lancker, 2018), it is hitherto unclear whether increasing childcare availability effectively narrows inequalities in formal childcare uptake due to the lack of longitudinal research, especially with respect to uptake differentials by migration background (Farfan-Portet et al., 2011; Jessen et al., 2020; Sibley et al., 2015). This is remarkable, since the provision of formal childcare has increased in many European countries from the late 1990s onwards and expanding formal childcare availability further is an explicit European policy target (Daly & Ferragina, 2018).

Therefore, this study explores the relationship between local childcare availability and differentials in the uptake of formal childcare for children under age 3 between native and second generation parents in Belgium. To this end, we use longitudinal census and register data for Belgium that were linked to longitudinal tax return data on childcare expenses and municipality-level data on childcare availability for children aged 0–3. More specifically, we assess whether and to what extent expansions in childcare availability within municipalities in the period 2010–2014 increase the uptake of formal childcare for children under age 3 among households where the mother has a second generation Southern European, Maghreb or Turkish background, versus no migration

background. If local childcare expansions entail a stronger increase in formal childcare uptake among migrant origin parents compared to native parents, this would result in decreasing migrant-native uptake gaps. The Belgian context provides an interesting case to examine this research question. Although Belgium is, alongside France and the Nordic countries, a forerunner country with respect to formal childcare provision since the early 2000s, supply does not yet meet demand and Belgium exhibits larger socio-economic differences in the uptake of formal childcare compared to other European countries (Ghysels & Van Lancker, 2009; Pavolini & Van Lancker, 2018). In addition, Belgium exhibits large variation between municipalities in the availability of formal childcare, as well as in the degree to which childcare availability has changed over time. Whereas the supply of formal childcare increased in most municipalities, it decreased in others. Furthermore, Belgium is an old immigration country with a large share of second generation migrants, but also exhibits one of the largest employment gaps between native and second generation women across Europe (Eurostat, 2014; Heath et al., 2008).

The Belgian formal childcare context

Since mothers are entitled to 15 weeks of maternity leave,² which is a relatively short period compared to most other European countries (OECD, 2022), it is common that children enter formal childcare from the age of 3 months. Children are generally enrolled in formal childcare until the age of 2.5, as all children are legally entitled to pre-primary education (i.e., kindergarten) from that age, which is free of charge and part of the Belgian educational system. Whereas school is only obligatory from the age of 6, enrolment in kindergarten is virtually universal from the age of 2.5 onwards. Besides formal childcare, parents may also adopt alternative strategies to combine work and family, such as parental leave or informal childcare. In Belgium, parents can take up parental leave until the child is 12 years—which is an individual right conditioned by parents' recent labour market trajectories—while receiving a relatively low flat-rate benefit. The Belgian parental leave system is relatively flexible and parents can reduce their working hours by (i) 100% for 4 months (3 months until 01.06.2012), (ii) 50% for 8 months, (iii) 20% for 20 months, or (iv) 10% for 40 months, or combine periods of full-time and part-time leave. Furthermore, a study for Flanders indicates that a considerable share of parents with children under age 3 use informal childcare, but mostly in combination with formal childcare³ (Teppers et al., 2019).

The provision of formal childcare is very fragmented in Belgium. As formal childcare falls under the responsibility of the Communities,⁴ it is regulated by three institutions: the Bureau of Birth and Childhood (Office de la Naissance et de l'Enfance—ONE) for the French Community, Child and Family (Kind en Gezin—K&G) for the Flemish Community and Kaleido for the German-speaking Community. Formal childcare can be

² Self-employed mothers have a separate system and are entitled to 12 weeks of maternity leave.

³ In 2018, 18% of parents with children under age 3 in Flanders used only formal childcare, 10% only informal care and 58% a combination of formal and informal care.

⁴ The Flemish Community covers Flanders and the Dutch language area of the Brussels-Capital Region, the French Community covers the French language area of Wallonia and of the Brussels-Capital Region, and the German-speaking Community covers the German language area, which is a small part of the province of Liège in Wallonia. Since the inhabitants of the German-speaking Community represent approximately 0.70 percent of the Belgian population, we only discuss the childcare system in the French and Flemish Community.

provided centre-based (i.e., crèches) or home-based (i.e., caregivers providing care in their own residence), with the majority of childcare places being centre-based during the observation period considered in this paper⁵ (Kind en Gezin, 2020; ONE, 2020). Furthermore, childcare services can be subsidised or non-subsidised by ONE/K&G,⁶ which implies specific conditions regarding, e.g., pricing (income-related fees) and opening hours. The majority of all childcare places is subsidised in both Communities during our observation period. Studies for Flanders show that non-subsidised childcare is more often used by higher income households and highly educated parents than lower income households and low educated parents (Ghysels & Van Lancker, 2009; Teppers et al., 2019).

The availability, price, flexibility and quality are considered as important characteristics of childcare provision that affect parents' use of formal childcare. Supply does not meet demand in Belgium (European Commission, 2014). In 2010, childcare coverage rates for children aged 0–3 (i.e., the ratio of the number of available childcare places to the number of children aged 0–3) amounted on average to 27% and 37% in the French and Flemish Community, respectively (Kind en Gezin, 2010; ONE, 2020). Besides this differential availability of childcare in the Communities, there is also considerable variation between municipalities, with a generally higher supply in more affluent municipalities (Van Lancker & Vandebroek, 2019). Variation between municipalities aside, the availability of formal childcare has increased substantially within most municipalities from the early 2000s onwards. However, municipalities also vary in the degree to which childcare coverage rates have changed. Whereas some municipalities experienced a larger increase in their coverage rates than average, other municipalities encountered decreasing coverage rates (Dujardin et al., 2018; Van Lancker & Vandebroek, 2019). As a result of these supply shortages, long waiting lists occur and parents have to arrange childcare almost as soon as the pregnancy is known (MAS, 2007). To ensure inclusiveness, subsidised childcare services⁷ have to adopt priority criteria depending on parents' employment status, family status or socio-economic status, such as priority to working parents,⁸ single parents or low-income parents (European Commission, 2014; Kind en Gezin, 2010). However, since the heads of childcare services have large autonomy in applying these criteria, priority is in practice predominantly given to working parents, parents who register early on waiting lists or siblings of children who are already enrolled (Vandebroek & Bauters, 2016; Vandebroek et al., 2008). Giving priority to these parents with a more stable demand for care is more convenient for childcare providers, since subsidised childcare services need to ensure a 75% occupancy rate each year.

⁵ In 2014, on average 32% of all childcare places in the French Community and 38% of all childcare places in the Flemish Community were home-based.

⁶ Since 01.04.2014, the Flemish Community adopts different subsidy steps. In 2014, 16% of all available places was not subsidised and had therefore no specific conditions regarding their opening hours and prices (step 0), 12% received only the basic subsidy implying that they must be open for at least 220 days a year (step 1), and 72% received income-related subsidies on top of the basic subsidy implying that they must also be opened 11 h a day between 6 a.m. and 8 p.m. and have to adopt income-related fees (step 2). In 2014, there were not yet childcare places receiving an additional subsidy on top of the income-related subsidy (step 3) for having a proactive admission policy that favours children from vulnerable families.

⁷ Since 01.04.2014 only services receiving income-related subsidies (step 2) in the Flemish Community.

⁸ During our observation period, the Flemish Community also refers to parents who are actively seeking employment or to parents who are in education or training.

Regarding the price, childcare costs for parents are relatively affordable in Belgium compared to other European countries, as all subsidised childcare services have to adopt income-related fees⁹ (European Commission, 2019). In 2010, 72% of all childcare places in the French Community and 71% in the Flemish Community had income-related fees, which remained stable during our observation period. Although fees are set freely on the market in non-subsidised childcare services, most adopt fees around the maximum fee in subsidised childcare (Farfan-Portet et al., 2011). In addition, childcare expenses from all approved childcare services (both subsidised and non-subsidised) are tax deductible.¹⁰ With respect to flexibility, all subsidised childcare services must be opened at least 220 days a year and 10 h a day between 6.30 a.m. and 6.30 p.m. on weekdays (11 h a day in the Flemish Community). In contrast, non-subsidised services have no requirements regarding opening hours in both Communities. Finally, ONE and K&G set quality guidelines for all approved childcare services regarding, e.g., the rooms and equipment, child–staff ratio and staff level of education, but the specific requirements differ between the Communities and types of childcare (centre-based versus home-based).

Migration history of Turkish, Maghreb and Southern European origin groups

Belgium is an old immigration country, which resulted in a substantial and increasing share of the population having a migration background. Apart from neighbouring countries, the largest foreign origin groups in Belgium originate from Southern Europe (mainly Italy), Maghreb countries (with the overwhelming majority originating from Morocco) and Turkey. As a result of their long migration history, these origin groups also consist of a large second generation at childbearing age (FOD WASO & UNIA, 2019). Although these origin groups were initially recruited in the context of labour migration after the Second World War, they differ considerably regarding their subsequent patterns of migration. This has shaped the socio-economic and ideational contexts of Turkish, Maghreb and Southern European origin groups in Belgium, which may in turn affect the childcare strategies of the second generation.

Turkish and Maghreb origin groups

During the time period considered in this paper, second generation Turkish and Maghreb mothers consist mainly of the children of post-WWII labour migrants. Turkish and Moroccan labour migrants were recruited from 1964 onwards to address labour shortages in sectors such as industry, mining and construction (Reniers, 1999; Van Mol & De Valk, 2016). Consequently, these origin groups were characterised by specific settlement patterns and are still concentrated in the more disadvantaged neighbourhoods where they originally settled (Kesteloot, 1985), which is partly due to the housing market and the generally lower socio-economic status of migrants and their descendants (Imeraj et al., 2018). Turkish origin groups settled in the former industrial areas in Limburg and Wallonia, but also in and around large cities in Flanders (e.g., Antwerp, Ghent) and Brussels, characterised by large secondary labour markets. Moroccan origin groups are

⁹ From 16.02.2009 to 01.04.2014 also non-subsidised childcare services in the Flemish Community could adopt income related fees.

¹⁰ All parents are eligible for the tax deduction as long as at least one parent has a work-related income, including unemployment benefits or other replacement incomes.

mainly concentrated in and around Brussels and Antwerp. There are, however, suburbanisation processes in which particularly migrants with better socio-economic positions move outside the city centres (de Valk & Willaert, 2012; Pannecoucke & De Decker, 2015).

Due to the specific migration history of their parents, second generation Turkish and Maghreb women have been disproportionately raised in working-class and low-income families by low educated parents with limited Dutch language skills. Turkish immigration had a pronounced rural character and also a large proportion of Moroccan labour migrants were predominantly recruited from low-educated rural areas characterised by rigid gender roles, resulting in a very selective profile of non-European labour migrants in Belgium (Reniers, 1999). Since their stay in Belgium was considered to be temporary, there were very few civic integration and language programmes available at the time (Höhne, 2013). With the passing of time, however, many Turkish and Moroccan labour migrants decided to settle permanently in Belgium and to bring their spouses and family members over from their respective origin countries in anticipation of or following the “migration stop” related to the oil crises in the early 1970s (Reniers, 1999). In contrast to the close link between migration and labour market participation that existed among Turkish and Moroccan men, the migration of their female partners was not related to employment. This may have affected the labour market opportunities for first generation Turkish and Moroccan women, since the people in their social networks were predominantly employed in male-oriented sectors, such as industry, mining and construction (Surkyn & Reniers, 1997). Besides the fact that the initial first generation predominantly originated from low-educated rural areas, the specifically gendered migration patterns of these first generation migrants may additionally have fostered favourable attitudes towards the male-breadwinner model among Turkish and Moroccan origin groups in Belgium. This may have continued to affect work–family strategies among the second generation. Due to restrictive migration policies towards non-European migrants, family reunification and formation have become and remain major migration channels for Turkish and Moroccan origin groups (FOD WASO & UNIA, 2019). The specific settlement patterns of Turkish and Moroccan labour migrants resulted in so called “transplanted communities” that maintain strong bonds with the communities in the region of origin and facilitate transnational marriages and new migrations (Surkyn & Reniers, 1997). A substantial share of second generation Turkish and Moroccan migrants continue to marry a first generation partner from their country of origin (Corijn & Lodewijckx, 2009; Hartung et al., 2011; Heyse et al., 2006; Timmerman et al., 2009).

This specific migration history has shaped the socio-economic and ideational contexts of second generation Turkish and Maghreb origin women in Belgium. Although migrant-native differentials in labour market positions are most pronounced among first generation women, research for Belgium consistently shows that second generation Turkish and Maghreb origin women not only display lower employment rates than native Belgian women, but are also characterised by less stable employment trajectories and overrepresented in lower segments of the labour market (i.e., part-time employment, temporary contracts and employment sectors with low wages and irregular working hours) (Maes et al., 2019; FOD WASO & UNIA, 2019). In the Belgian context of supply shortages in formal childcare and long waiting lists, this may in turn entail more

difficulties in accessing childcare compared to native women. In addition, second generation Moroccan and particularly Turkish origin women may potentially exhibit differential work–family attitudes and childcare preferences compared to native women (Adam & Torrekens, 2015; de Valk, 2008; Güngör & Bornstein, 2009; Idema & Phalet, 2007; Maliapaard & Alba, 2016; Van Kerckem et al., 2013).

Southern European origin groups

Second generation Southern European mothers in this paper consist not only of the children and grandchildren from the initial guest workers, but also of the children from more recent Southern European migrants. The recruitment of guest workers from Southern Europe already started in 1946 as a result of agreements with Italy to send workers to the Belgian mines (Myria, 2016). The majority of Southern European origin groups still resides close to the former mining sites in Wallonia (e.g., Charleroi, Liège, Mons) and North–East Flanders (i.e., Limburg), and the former industrial belt in Wallonia. The vast majority of the Italian guest workers originated from poor regions, mostly in Southern Italy, with relatively rigid gender roles (Levi, 1953; Morelli, 1988). After the mine disaster of Marcinelle in 1956, the Belgian government started to recruit guest workers in Spain, Portugal and Greece. Since Southern Europeans could move within Europe without legal restrictions since the 1960s and due to economic growth in their origin countries during that period, there was a large extent of return migration among Southern European guest workers, but Southern European immigration flows continued. Compared to the predominantly male and low-educated migration flows after WWII, Southern European migrants that arrived after 1980 are characterised by a more diverse profile in terms of their socio-economic position and gender, and display a mainly urban background (Myria, 2016). Hence, the migration history of Southern Europeans resulted in diverse socio-economic and ideational contexts among second generation Southern European women during the observation period of this study. Regarding their labour market outcomes, second generation Southern European origin women hold an intermediate position between the labour market positions of native Belgian women on one hand and those of Turkish and Moroccan origin women on the other hand (FOD WASO & UNIA, 2019). Unfortunately, less is known about the work–family attitudes and childcare preferences of second generation Southern Europeans in West-European countries.

Data and methods

Data

We use data from the Belgian Census of 2011 that covers the entire population legally residing in Belgium on January 1, 2011. The 2011 Census data has been linked to (i) longitudinal microdata on household composition and place of residence from the population registers for the period 2010–2014, (ii) longitudinal microdata on childcare expenses from the tax return register for the period 2010–2014, and (iii) data from K&G and ONE on the availability of formal childcare places for children aged 0–3 at the municipality-level for the period 2010–2014. Since the population registers provide information on descent, we can derive individuals' migration background. In this study, the operationalisation is based on a two-step approach. First, we identify whether an individual has a migration background by considering the nationality at birth of individuals and their

parents. An individual is considered to be of migrant origin when the person himself or one of the parents has a nationality at birth that is not Belgian.¹¹ Natives are defined as individuals who have the Belgian nationality at birth and with two parents that had the Belgian nationality at birth. Subsequently, we use the country of birth to identify the migrant generation of individuals of migrant origin. Individuals with a migration background who are born in Belgium are defined as the second generation and individuals with a migration background who are not born in Belgium are defined as the first generation.¹² When both parents of second generation individuals have a different nationality at birth that is not Belgian, origin reflects the nationality at birth of the mother.

For the analyses, we selected heterosexual two-parent households with one (first) child between the ages of 9 months and 2.5 years. We use the mother as the unit of analysis and examine the uptake of formal childcare between 2010 and 2014 among households in which the mother is at least 18 years and has (i) a second generation Southern European background¹³ (N : 15,246; hereafter, 2G South-EU), (ii) a second generation Maghreb background¹⁴ (N : 9301; hereafter, 2G Maghreb), or (iii) a second generation Turkish background (N : 4629; hereafter, 2G Turkey). These migrant origin households are each compared to households in which the mother has no migration background (N : 220,542; hereafter, native mothers). Formal childcare uptake is a time-varying dummy coded variable with a value of 1 if the father or mother declared childcare expenses in their annual tax return form in view of tax reduction, and a value of 0 if they did not declare any expenses for formal childcare.¹⁵ In each year, we limit our analyses to households with only one (first) child, since we are unable to distinguish between expenses for the use of formal childcare and expenses for children older than 2.5 years such as out-of-school care in case households have more than one child.¹⁶ This selection also allows us to capture parents' first experience with formal childcare. Furthermore, we only consider households whose first child is at least 9 months at the end of the year to exclude mothers on maternity leave (mothers have 3 months of maternity leave) and mothers who immediately take up full-time parental leave afterwards.¹⁷ In addition, we only include households whose first child is maximum 2.5 years at the end of that year, since enrolment in kindergarten is virtually universal from that age onwards. Finally, we focus only on mothers who are co-residing with the father of the child, since a lack of information

¹¹ According to the Belgian law, a child gets the Belgian nationality automatically at birth in case it is (i) born in Belgium and has at least one Belgian parent, (ii) born abroad and has at least one Belgian parent who is born in Belgium, or (iii) born in Belgium and has at least one non-Belgian parent who is born in Belgium and whose main residence was Belgium for 5 years during the 10 years preceding the birth of the child. Hence, children from two immigrants do not get the Belgian nationality at birth, but the nationality of their parents.

¹² Individuals who immigrated before the age of 18 (i.e. generation 1.5) are considered as first generation migrants and therefore excluded from this study.

¹³ In our data, individuals with a Southern European background originate from Italy, Spain, Portugal or Greece.

¹⁴ In our data, individuals with a Maghreb background predominantly originate from Morocco, and to a lesser extent from Algeria, Tunisia, Libya and Mauritania.

¹⁵ The indicator of parents' childcare use based on the tax return data allow an accurate estimation of formal childcare uptake, consistent with the use of formal childcare for children under age 3 that is reported by K&G and ONE (results available on request).

¹⁶ This is due to the fact that parents can declare only one amount for childcare expenses in view of tax reduction for all children under the age of 12.

¹⁷ Considering children who are at least 9 months old at the end of the year implies that they could have been enrolled in formal childcare for 6 months during that year (or 3 months in case full-time parental leave is directly used after maternity leave). The validation indicated that the selection of this age best approximates the use of formal childcare for children under age 3 that is reported by K&G and ONE.

on shared custody arrangements in the tax return data does not allow to reliably identify whether single mothers effectively use formal childcare. In case the living arrangement of the children is evenly distributed, both parents are allowed to use the system of tax deduction for childcare expenses. Table 1 in Appendix indicates how many households are omitted for each step of our sample selection.

Methods

Since Belgium is characterised by substantial variation in childcare availability between municipalities and the origin groups considered display specific settlement patterns compared to the native Belgian population as a result of their migration history, they are exposed to a different local availability of formal childcare (Biegel et al., 2021b; Vandebroek et al., 2008). To avoid biased estimates of the relationship between childcare availability and parents' uptake of formal childcare that would result from confounding variation in availability between municipalities with variation within municipalities over time, we use municipality-level fixed-effects models that only exploit within-municipality variation (Allison, 1984; Stock & Watson, 2015). Hence, as our data provides annual information on individuals' uptake of formal childcare and their place of residence, we compare the uptake of formal childcare among households with second generation versus native mothers living in the same municipality. As such, we assess whether and to what extent their uptake increases when the availability of formal childcare within their municipality increases. This method implies the inclusion of municipality dummies that control for all time-constant differences between municipalities. Since the considered origin groups reside in considerably different municipalities, we perform separate analyses for each migrant origin group (2G South-EU/2G Maghreb/2G Turkey) and distinguish for each migrant origin group the municipalities where at least 100 households with a second generation migrant mother reside. All municipalities of a province where less than 100 migrant origin mothers reside are clustered into one group (e.g., other municipalities in Antwerp).¹⁸ This approach allows us to include all native mothers in all three sets of analyses (albeit with different clustering of municipalities depending on the migrant group considered) and avoids the exclusion of households due to small sample sizes in some municipalities.

For each migrant origin group, we estimate three logit models. *Model 1* investigates how changes in childcare availability within municipalities over time affect mothers' uptake of formal childcare and only includes (i) the fixed effects for the (clustered) municipalities, and (ii) local childcare coverage (quadratic specification). Local childcare coverage is a time-varying variable and reflects in each year the number of formal childcare places per 100 children aged 0–3 in each municipality. A quadratic specification is used to allow that the impact of changes in childcare availability varies by the level of childcare coverage. For the municipality dummies, we use effect coding instead of dummy coding, which allows us to calculate predicted probabilities of uptake averaged across municipalities.¹⁹ *Model 2* additionally introduces (i) mothers' origin group

¹⁸ The clustering of municipalities by mothers' origin group is available upon request.

¹⁹ By using effect coding, the constant of our model is equal to the grand mean (instead of referring to the mean of the reference group, as is the case with dummy coding) and the coefficients indicate the difference between the mean of the identified group and the grand mean (Hardy, 1993).

(natives are used as reference category), and (ii) the interaction between mothers' origin group and the municipality fixed effects to allow local variation in the migrant-native gap in childcare uptake. Finally, *Model 3* addresses whether the impact of increasing local childcare availability on the uptake of formal childcare varies by mothers' origin group by including the interaction between mothers' origin group and local childcare coverage (quadratic specification) in addition to Model 2. To visualise the effect of increasing local childcare availability on mothers' formal childcare uptake, we estimate for each origin group predicted probabilities and average marginal effects at different childcare coverage levels using the margins command in Stata/MP 17.

Results

Descriptive results

During the observation period 2010–2014, Belgium exhibits substantial variation in the local availability of formal childcare between municipalities, as well as variation within municipalities over time. Figure 1a shows the childcare coverage level for each Belgian municipality in 2010 and indicates that childcare coverage levels range from 5 up to 56%. In general, Flanders exhibits a higher availability of formal childcare than Wallonia and Brussels, but there is also considerable variation between municipalities within each region. Figure 1b displays for each municipality the change in childcare coverage between 2010 and 2014 and indicates that the majority of municipalities witness an increasing childcare coverage level during the observation period of this study. Again, we find considerable variation between municipalities. Childcare coverage increases by 0–5 percentage points in 42% of the municipalities, by 5–10 percentage points in 18% of the municipalities and the increase exceeds 10 percentage points in 9% of the municipalities (Fig. 2). In contrast, the availability of formal childcare also decreases between 2010 and 2014 in 30% of the Belgian municipalities. This decrease ranges from 0 to 5 percentage points in 25% of the municipalities, while exceeding 5 percentage points in 5% of the municipalities.

Figure 3 shows the average uptake of formal childcare in 2010–2014 by mothers' origin group and indicates that native mothers are more likely to use formal childcare than second generation migrant mothers. The uptake gap with native mothers is particularly large for second generation mothers of Maghreb and Turkish origin. Whereas on average 70% of native mothers used formal childcare in 2010–2014, this amounts on average to 45% for Southern European origin mothers, to 29% for Maghreb origin mothers and only to 20% for Turkish origin mothers.

Multivariate models of changes in childcare coverage and uptake

Figure 4a shows mothers' probability of using formal childcare at different childcare coverage levels and indicates that mothers are more likely to use formal childcare when there are more childcare places available within their municipality. While mothers' probability of using formal childcare amounts on average to 50% at a coverage level of 5%, it increases up to 75% at a coverage level of 40%. As the impact of increasing local childcare availability on mothers' uptake of formal childcare may differ depending on the starting level, Fig. 4b visualises the average change in mothers' probability of using formal childcare associated with a percentage point increase in childcare coverage within

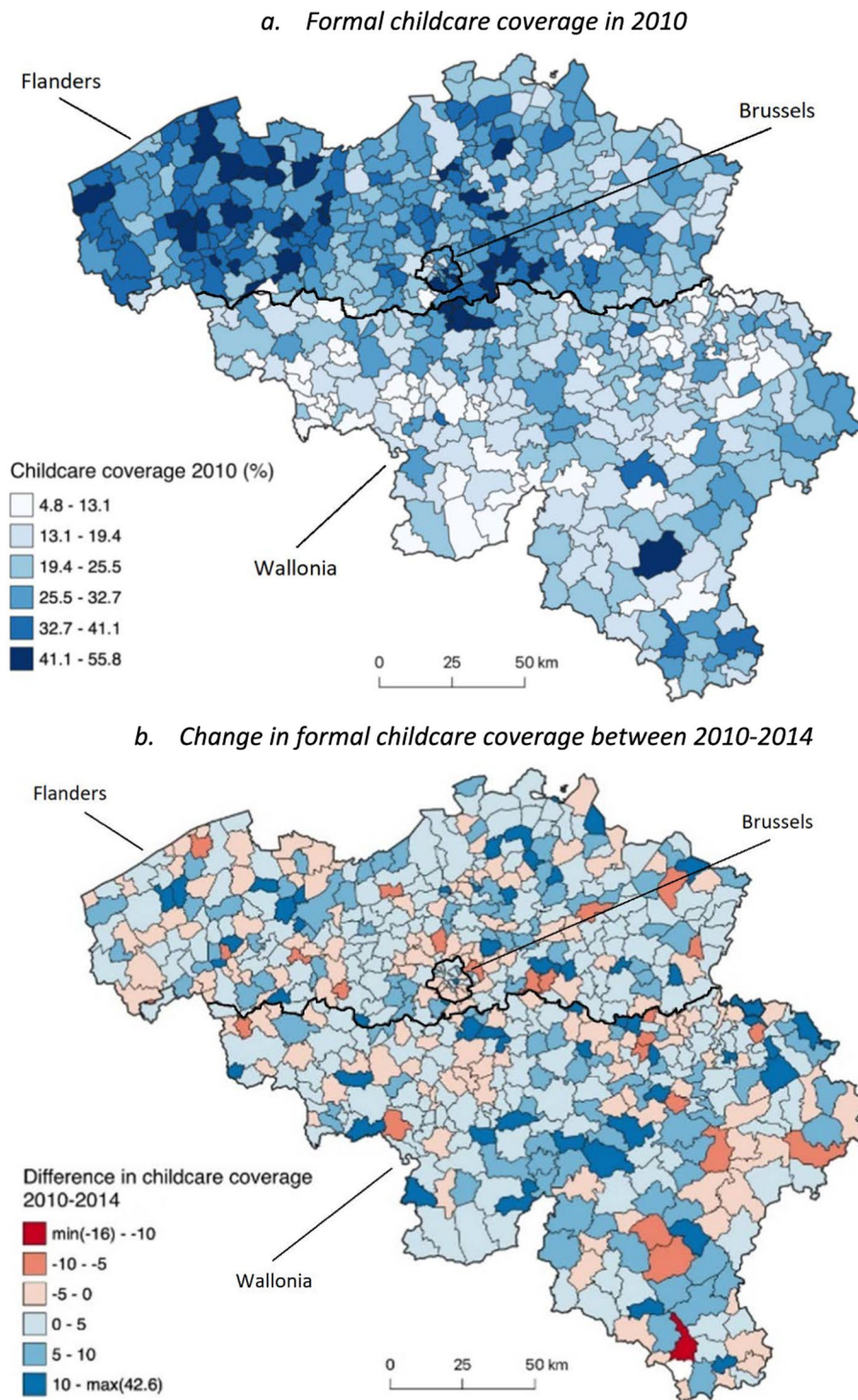


Fig. 1 **a** Formal childcare coverage in 2010 and **b** change in formal childcare coverage between 2010 and 2014 in Belgian municipalities. Childcare coverage reflects the number of formal childcare places per 100 children aged 0–3 in each municipality. The maps show (changes in) childcare coverage for all municipalities separately (Source: K&G and ONE, calculations by authors)

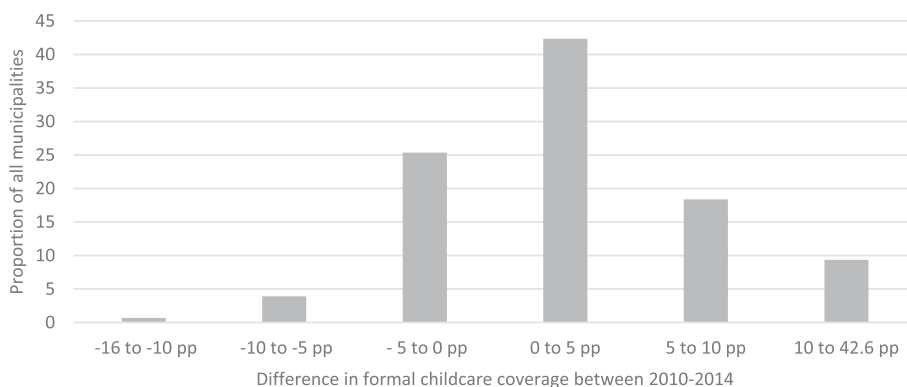


Fig. 2 Distribution of changes in formal childcare coverage between 2010 and 2014 within Belgian municipalities. Childcare coverage reflects the number of formal childcare places per 100 children aged 0–3 in each municipality (Source: K&G and ONE, calculations by authors)

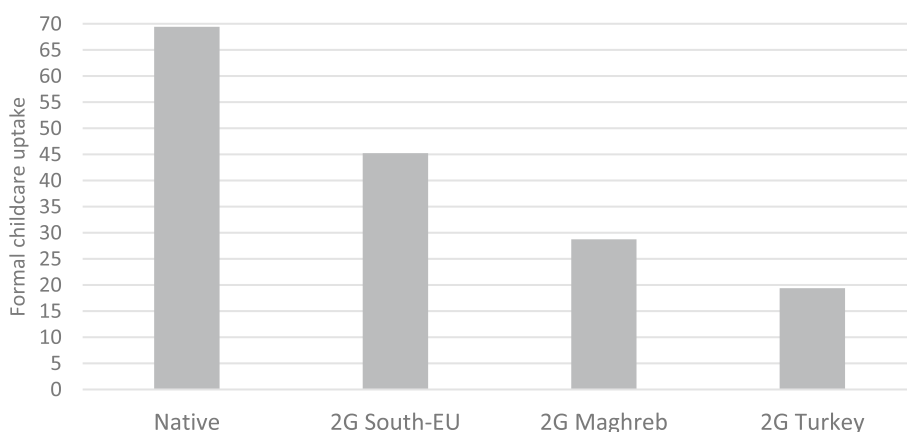


Fig. 3 Formal childcare uptake by mothers' origin group among two-parent households with one child aged 0-2.5 years (Source: Belgian Census 2011 linked to longitudinal register data, longitudinal tax return data on childcare expenses and municipality-level data on childcare coverage from K&G and ONE. Calculations by authors)

a municipality for different start levels of childcare coverage (model results available in [Appendix](#)). Our results show a positive effect of increasing local childcare availability, which is largest at low coverage levels and becomes increasingly smaller at higher coverage levels. Whereas mothers' probability of using formal childcare increases on average by 1 percentage points if childcare coverage increases by 1 percentage point at a coverage level of 4%, it only increases by 0.3 percentage points at a coverage level of 40%.

Subsequently, we examine whether and to what extent the impact of increasing local childcare availability on uptake probabilities varies by mothers' migration background. In line with Fig. 3, Fig. 5 shows that the probability of using formal childcare is consistently higher among native mothers than is the case among second generation migrant mothers. Considering the effect of childcare expansion on uptake, we find that mothers with a migration background are also more likely to use formal childcare when local coverage levels increase. With respect to native mothers, their probability of using formal childcare increases from an average of 55 to 75% when coverage levels increase from 5%

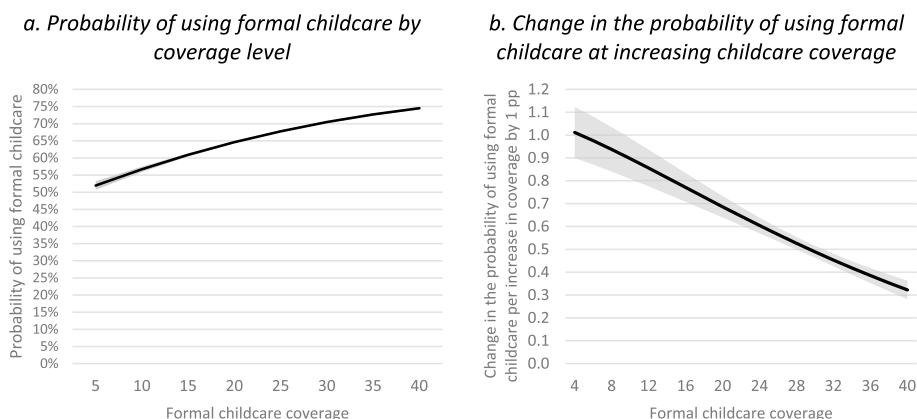


Fig. 4 **a** Probability of using formal childcare at different levels of childcare coverage and **b** change in the probability of using formal childcare for a 1 percentage point increase in childcare coverage at different levels of childcare coverage (with 95% conf. interval). **a** Predicted probabilities and **b** average marginal effects based on Model 1 including municipality fixed effects and childcare coverage (quadratic specification) (Source: Belgian Census 2011 linked to longitudinal register data, longitudinal tax return data on childcare expenses and municipality-level data on childcare coverage from K&G and ONE. Calculations by authors)

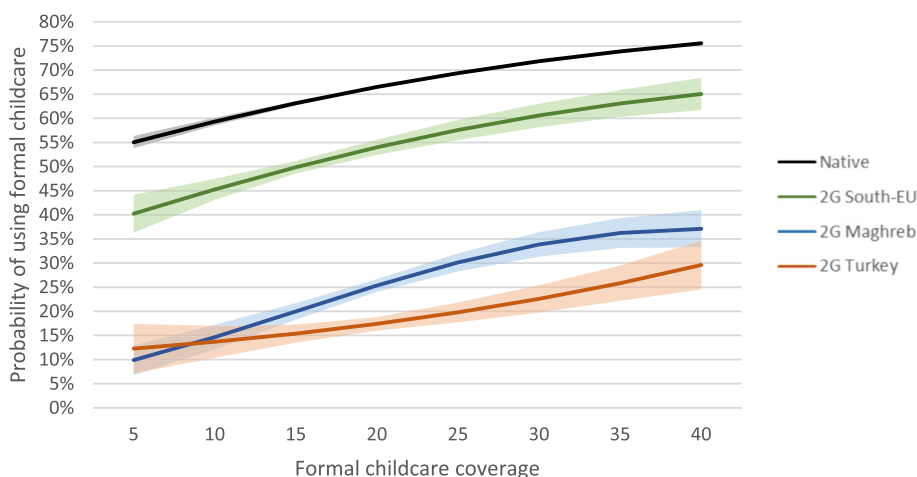


Fig. 5 Probability of using formal childcare at different levels of childcare coverage (with 95% conf. interval), by mothers' origin group. Predicted probabilities based on Model 3 including municipality fixed effects, coverage (quadratic specification), origin, origin * municipality and origin * coverage (quadratic specification) (Source: Belgian Census 2011 linked to longitudinal register data, longitudinal tax return data on childcare expenses and municipality-level data on childcare coverage from K&G and ONE. Calculations by authors)

to 40%. Considering the same coverage levels, the probability of using formal childcare increases from 40% to 65% among Southern European origin mothers on average, while the increase is limited from an average probability of 10 to 37% among Maghreb origin mothers. Regarding second generation Turkish mothers, we find that their probability of using formal childcare remains largely stable around 15% between coverage levels of 5% and 15%, while the probability of uptake subsequently increases to 30% at a coverage level of 40%.

Considering the effect of childcare expansions at different coverage levels, Fig. 6 indicates—in line with the overall effect of increasing local childcare availability

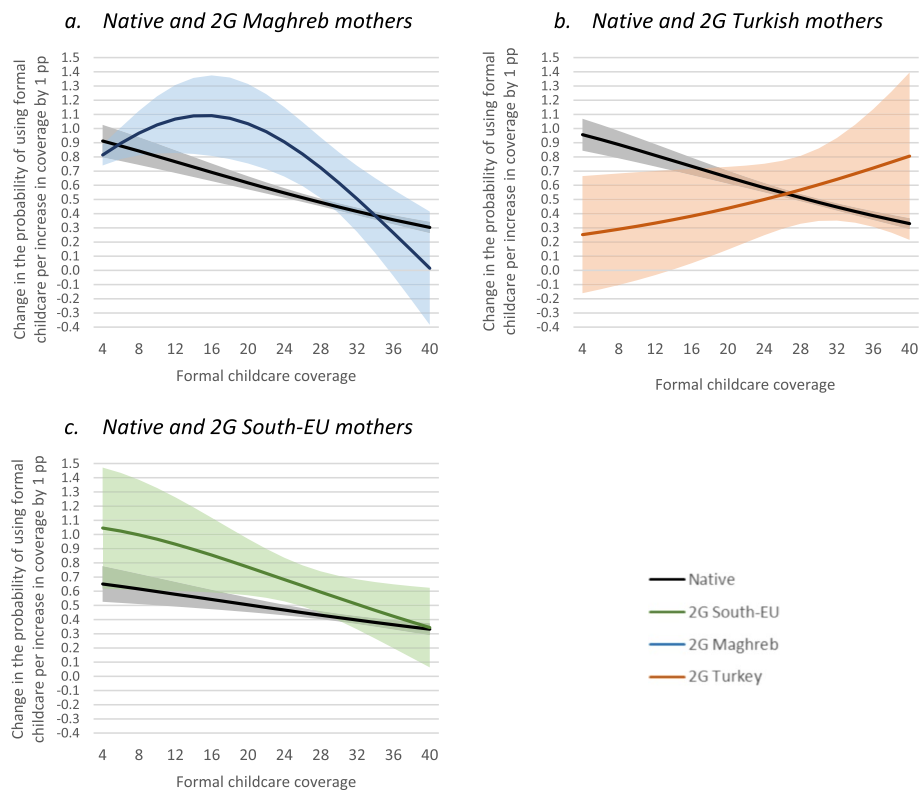


Fig. 6 Change in the probability of using formal childcare for a 1 percentage point increase in childcare coverage at different levels of childcare coverage (with 95% conf. interval), by mother’s origin group. Average Marginal Effects based on Model 3 including municipality fixed effects, coverage (quadratic specification), origin, origin * municipality and origin * coverage (quadratic specification). (Source: Belgian Census 2011 linked to longitudinal register data, longitudinal tax return data on childcare expenses and municipality-level data on childcare coverage from K&G and ONE. Calculations by authors)

(Fig. 4b)—that there is a positive effect of increasing coverage on native mothers’ formal childcare uptake, which becomes smaller at higher coverage levels. Whereas for native mothers an increase in childcare coverage within municipalities by 1 percentage point is on average associated with an increase of 0.9 percentage points in their probability of using formal childcare at a coverage level of 4%, it diminishes to an increase of 0.3 percentage points at a coverage level of 40%. A Likelihood Ratio test comparing models 2 and 3 indicates that the impact of increasing local childcare coverage differs significantly between native and second generation Maghreb mothers (Δ -2LL: 13.50; Δ df: 2; p : 0.001). Figure 6a shows that a 1 percentage point increase in childcare coverage within a municipality has a stronger positive effect on Maghreb origin mothers’ formal childcare use between coverage levels of 8–32%. For instance, at coverage levels of 16%, the increase in the probability of using formal childcare amounts on average to 0.7 percentage point for native mothers, whereas it amounts to 1 percentage point for Maghreb origin mothers. As a result, the gap in childcare uptake between Maghreb and native mothers becomes slightly smaller when the local availability of formal childcare increases. However, as this is only a slightly stronger positive effect, Fig. 5 shows that a considerable uptake gap persists.

Figure 6b indicates that increasing local childcare coverage has almost no effect on the childcare uptake of Turkish origin mothers at coverage levels between 4% and 20%. Turkish origin mothers' probability of using formal childcare increases at these coverage levels on average by 0.2 to 0.4 percentage points if childcare coverage increases by 1 percentage point within municipalities, which is a weaker effect compared to native mothers. The positive effect of increasing local childcare coverage among Turkish origin mothers becomes larger at higher coverage levels. At coverage levels of 40%, an increase in childcare coverage within municipalities by 1 percentage point is associated with an increase in the probability of using formal childcare of Turkish origin mothers around 0.8 percentage points (compared to 0.3 for native mothers). However, a Likelihood Ratio test indicates no significantly different effect of increasing local childcare coverage between native and second generation Turkish mothers (comparing models 2 and 3: Δ -2LL: 3.26; Δ df: 2; p : 0.196). Hence, although Turkish origin mothers become more likely to use formal childcare when childcare places become more widely available within their municipalities, the uptake gap with native mothers persists.

Finally, considering Southern European origin mothers, Fig. 6c shows that the increase in the probability of using formal childcare associated with a 1 percentage point increase in coverage ranges from an average of 1 percentage point at a coverage level of 4% to an increase by 0.3 percentage points at a coverage level of 40%. Although Fig. 6c suggests some variation in the effect of increasing coverage on uptake between native and Southern European mothers, a Likelihood Ratio test indicates that including the interaction between childcare coverage and origin in model 3 yields no significant improvement compared to model 2 (Δ -2LL: 3.80; Δ df: 2; p : 0.149). Hence, although Southern European origin women become more likely to use formal childcare in case of local childcare expansions, the uptake gap with native mothers persists for this origin group as well.

Finally, to control for the potentially different composition of native and migrant origin parents, we take the main socio-demographic characteristics into account that have been identified in the literature to affect the uptake of formal childcare. As such, we control for composition in terms of (i) mothers' highest educational level in 2011 (distinguishing low, medium, high and unknown), (ii) mother's age at first childbirth, (iii) the age of the first child at the end of the year, and (iv) fathers' migration background (distinguishing native, first generation migrant, second generation migrant and unknown origin). Table 2 in Appendix provides an overview of the distribution of the covariates by mothers' origin group. The results indicate that although migrant-native differentials in the uptake of formal childcare diminish to some extent after controlling for socio-demographic characteristics (Fig. 7 in Appendix) (Biegel et al., 2021b), the conclusions regarding the (differential) effect of local childcare expansions on uptake remain virtually unaltered (Fig. 8 in Appendix). Hence, while increasing childcare availability within municipalities has no differential effect on the uptake of formal childcare among Southern European and Turkish origin mothers compared to native mothers, it has a slightly stronger positive effect on the uptake of formal childcare among Maghreb origin mothers compared to native mothers, in turn slightly reducing uptake gaps.

Discussion

Research indicates that the uptake of formal childcare is lower among migrant origin parents compared to parents without a migration background (i.e., native parents) in most European countries, and that these differentials extend to the second generation (Biegel et al., 2021b; Driessen, 2004; Schober & Spiess, 2013; Teppers et al., 2019). Despite considerable investments in formal childcare availability in many European countries, it remains unclear whether expanding local childcare availability can effectively diminish migrant-native uptake differentials due to the lack of longitudinal research. Given this gap in the literature, this study explored for Belgium to what extent expansions in childcare availability within municipalities in the period 2010–2014 increase the uptake of formal childcare for children under age 3 among households where the mother has a second generation Southern European, Maghreb or Turkish background, versus no migration background.

Our results indicate that all origin groups are more likely to use formal childcare at higher coverage levels and that the impact of an increase in childcare coverage within municipalities by 1 percentage point on mothers' childcare uptake varies by migration background. For native mothers, increasing local childcare coverage has a positive effect on their childcare uptake, which is strongest at lower childcare coverage levels. The same overall pattern can be found among Maghreb origin mothers, but the positive effect is slightly stronger compared to native mothers, thus slightly reducing migrant-native uptake gaps, although considerable uptake gaps remain. With respect to Turkish origin mothers, we find that increasing local childcare availability has no significantly different impact on their childcare uptake compared to native mothers. Hence, the uptake gap with native mothers does not decrease when childcare places become more widely available within their municipalities. Our finding that Turkish and Maghreb origin mothers display very distinct patterns highlights the importance of distinguishing non-European origin groups, which has often not been possible due to data limitations. Furthermore, our results show that although Southern European mothers become more likely to use formal childcare when local childcare availability increases, the uptake gap with native mothers remains unchanged, since there is no differential effect of increasing local childcare coverage. Hence, large uptake gaps between native and second generation mothers persist, which are most pronounced among Maghreb and particularly Turkish origin mothers. This is unfortunate, since research indicates that early experiences of socialisation in formal settings entails considerable and long-lasting benefits for children's cognitive, linguistic and socio-emotional development, highlighting that the quality of formal childcare is crucial in this respect (Burger, 2010; Camilli et al., 2010; Lazzari & Vandenberg, 2012). These developmental benefits in turn contribute to enhancing children's educational and labour market careers, even in the case of Belgium, where pre-primary education is universal and free for all children from age 2.5 onwards.

Our finding that the uptake gap with native mothers is only slightly reduced or remained unchanged when childcare becomes more widely available may be related to the fact that supply is still not sufficiently large despite recent increases in coverage. In this respect, prior studies suggest that a strong expansion in formal childcare and universal coverage are necessary to reduce inequalities, as additional childcare places will not benefit vulnerable groups first when supply is insufficient (Sainsbury, 2019; Van

Lancker, 2018). Hence, it is likely that early local childcare expansions do not yet reduce migrant-native uptake gaps due to the persistent unmet demand of native parents, but that increasing local childcare availability only improves access for migrant origin parents when coverage levels become considerably higher. Since the analyses of this study have only considered coverage levels up to 40%, considering a longer and more recent time period would be very valuable to examine the impact of larger expansions on migrant-native uptake gaps.

This paper is, to our knowledge, the first longitudinal study addressing the relationship between local childcare availability and uptake differentials by migration background. While it is extremely valuable for policy makers to understand what would happen with the uptake of formal childcare among parents with different migration backgrounds in case the availability of childcare within their municipality increases, a number of limitations should be considered when interpreting these largely descriptive results. First, whether and the extent to which increasing local childcare availability reduces uptake gaps with native mothers for each migrant origin group may be moderated by the affordability and flexibility of the (additionally created) childcare places within their municipality. In Belgium, there are considerable differences between municipalities regarding the availability of and evolution in childcare places with income-related fees and research indicates that these places are not more available in less affluent municipalities (Van Lancker & Vandebroek, 2019; Vandebroek & Bauters, 2016). Particularly for migrant origin mothers with generally lower wages than native mothers, childcare without income-related fees may be unaffordable or entail limited net income gains from employment (Elloukmani & Ou-Salah, 2018; Vandebroek & Lazzari, 2014; Wall & José, 2004). In addition, the supply of childcare places with longer or non-standard opening hours, as well as their evolution in the period 2010–2014, varies considerably between municipalities. Since migrant origin women—especially of Turkish or Maghreb origin—are overrepresented in jobs with atypical working hours, this may be incompatible with the opening hours of most childcare services (Vandebroek & Lazzari, 2014; Wall & José, 2004). Hence, the degree to which increasing local availability affects migrant-native uptake gaps is likely to depend on the extent to which this entails more childcare places with income-related fees and flexible opening hours. Unfortunately, our data does not provide information on these characteristics of childcare provision.

Second, since childcare markets are geographically very small (Cleveland & Krashinsky, 2009), it is crucial that childcare places are located where parents with young children reside. It is likely that municipalities are still too large units to grasp the local availability of formal childcare. Native and migrant origin parents may still face differential access to formal childcare within municipalities due to potential differences in the distance from home to a childcare facility and the availability of means of transportation (e.g., car, public transport) (Vandebroek & Lazzari, 2014).

Third, due to data limitations, this study focussed on two-parent households with only one (first) child. On the one hand, capturing parents' first experience with formal childcare is very informative regarding the accessibility of formal childcare, especially since siblings of children who are already enrolled are given priority in Belgium (Vandebroek & Bauters, 2016; Vandebroek et al., 2008). As a result, parents who used formal childcare for their first child may also be more likely to enrol their later children

in formal childcare compared to parents who did not use formal childcare for their first child. On the other hand, prior research suggests that parents with multiple children may adopt different childcare strategies compared to parents with only one child due to additional financial or practical difficulties (Huston et al., 2002). Moreover, parents who have multiple children (at shorter intervals) may display more traditional gender role expectations for mothers. In addition, single mothers may need specific childcare strategies and excluding this group may have affected the results (Tekin, 2007). It would, therefore, be interesting to address in future research to what extent migrant-native uptake gaps and the impact of increasing local childcare coverage are related to household composition.

Fourth, we are aware that definitions of the second generation differ across studies and that our choices for identifying this group may bias the overarching conclusions regarding gradients in the uptake of formal childcare (Chimienti et al., 2021; Lessard-Phillips et al., 2017). In this study, we defined second generation women as women who are born in Belgium, but who have at least one parent with a nationality at birth that is not Belgian. As a result, our sample of second generation mothers consists of different parental constellations: (i) two foreign born parents, (ii) one foreign born parent and one Belgian parent, as well as (iii) one foreign born parent and one non-Belgian parent who is born in Belgium. Given that socio-economic and ideational contexts of second generation mothers are likely to vary depending on their parental constellation (de Valk, 2008; Huschek et al., 2011), potential differences in the uptake of formal childcare may exist within our sample of second generation mothers. The observed differences with natives among our sample of second generation Southern European, Turkish and Maghreb origin mothers may be related to compositional differences in this respect. However, further distinguishing these parental constellations would result in too small sample sizes and in turn affect the robustness of our estimates.

Despite these limitations, this study provides a first indication that increasing the availability of formal childcare within municipalities can narrow migrant-native uptake gaps, at least for some origin groups. Whereas these largely descriptive analyses are a necessary first step for our understanding of the relationship between local childcare availability and uptake differentials by migration background, more research is required to identify the possible mechanisms behind the varying effects of increasing local childcare coverage by migration background as well as the persisting and large migrant-native uptake gaps. As this requires a more in-depth and elaborate discussion that goes beyond the scope of one study, we identify three avenues for follow-up research and how these should (ideally) be further developed. First, given that supply shortages and priority criteria in practice disadvantage parents whose demand for care is more difficult to predict (Farfan-Portet et al., 2011; Vandebroek et al., 2008), such as parents with unstable employment trajectories and irregular working hours, accounting for mothers' labour market opportunities and attachment into the analyses is a crucial next step. However, since mothers' employment positions are endogenous with the uptake of formal childcare, we cannot consider their observed employment positions in the analyses (Biegel et al., 2021b). In addition, stratifying the analyses by women's observed employment position at an arbitrary moment before family formation is not an appropriate strategy to take mothers' labour market attachment into account given the intrinsic

instability of employment trajectories among migrant origin women (Maes et al., 2021). Stratifying the analysis by level of education is also fraught with difficulty as educational levels have been shown to translate into employment opportunities differently across migrant groups (Corluy, 2014). Hence, in line with recent research on the work–family trajectories of migrant origin women (Biegel et al., 2021b; Maes et al., 2021), we advocate that follow-up studies develop a robust time-varying indicator of women’s individual employment opportunities by estimating pre-birth employment probabilities of women who do not (yet) have children, but who otherwise have a similar socio-demographic profile. In addition, it would be worthwhile for studies of childcare uptake to include women’s (estimated) probabilities of being employed with atypical or irregular working hours.

Second, future research could consider the (differential) availability of grandparents as potential informal care providers among native and second generation mothers in more detail and assess to what extent this affects migrant-native differentials in the uptake of childcare, as well as differential effects of childcare expansion on uptake by migrant background. Given the generally low labour market participation of first generation women, especially of Turkish or Maghreb origin, the second generation may have more access to grandparents as informal care providers compared to native parents (Biegel et al., 2021b). As the availability of grandparents as informal care providers depends on multiple factors (e.g., age, residential proximity, employment position, competing care demands from siblings, etc.) (Biegel et al., 2021a), we need to enhance our understanding of how these factors are related to the uptake of formal childcare among different population subgroups (Biegel & Maes, 2022). If local childcare availability increases, migrant origin mothers may substitute informal childcare by formal childcare accordingly, in turn resulting in reduced migrant-native gaps in the uptake of formal childcare. However, even when formal childcare becomes more available, informal childcare may be a more flexible, affordable and/or more preferable option as primary care source than formal childcare for migrant origin mothers, which could moderate the impact of local childcare expansions on migrant-native gaps in uptake (Seibel & Hedegaard, 2017).

Third, although register data provides rich information, it does not allow us to consider parents’ work–family preferences. Considering their migration histories, second generation women—particularly of Turkish or Moroccan origin—may exhibit differential work–family attitudes and childcare preferences compared to native women, which may partly explain persisting migrant-native differences in the uptake of formal childcare (Güngör & Bornstein, 2009; Khoudja & Fleischmann, 2015; Seibel & Hedegaard, 2017; Wood, 2022). Previous research on the Belgian case has suggested that differential work–family preferences may be particularly relevant for explaining the lower uptake of formal childcare among Turkish origin mothers (Biegel et al., 2021b). To the extent that increasing local childcare availability induces more favourable preferences towards using formal childcare among migrant origin mothers and it becomes more acceptable to use formal childcare when local availability increases and more people in their social network use it (Neimanns, 2021; Vandenbroeck et al., 2008; Zoch & Schober, 2018), uptake gaps

with native mothers may become smaller. However, to the extent that differential socialisation contexts (de Valk, 2008; Grunow & Evertsson, 2016; Khoudja & Fleischmann, 2015) or limited labour market prospects (Elloukmani & Ou-Salah, 2018; Friedman et al., 1994) stimulate more traditional work–family attitudes among second generation women of Southern European, Maghreb or Turkish origin, they may be less likely than native women to outsource the care of young children, regardless of the local availability of formal childcare. To elaborate our understanding of the complex interaction between labour market opportunities, (endogenous) work–family preferences and childcare strategies, a longitudinal measurement of attitudes among native and migrant origin groups in combination with register-based panel data may be a promising avenue. In addition, additional mixed-method and qualitative research could provide valuable insights in this respect (Wood, 2022).

Appendix

See Tables 1, 2, 3, 4, 5 and Figs. 7, 8.

Table 1 Sample selection

	Native	2G South-EU	2G Maghreb	2G Turkey	Total
Households with one mother whose child is aged 9 months–2.5 years	608,811	41,467	34,239	14,415	698,932
Excluding households with more than 1 child	249,611	19,060	11,245	5238	285,154
Additionally excluding households in which mothers do not co-habit with the father (i.e., final selection)	220,542	15,246	9301	4629	249,718

Source: Belgian Census 2011 linked to longitudinal register data, longitudinal tax return data on childcare expenses and municipality-level data on childcare coverage from K&G and ONE. Calculations by authors

Table 2 Distribution of the covariates and sample sizes by mothers’ origin group among two-parent households with one child (in %)

	Native	2G South-EU	2G Maghreb	2G Turkey
Mothers’ educational level				
Low	7.7	13.4	21.3	23.2
Medium	34.2	40.6	53.4	57.0
High	57.0	44.3	23.5	18.1
Unknown	1.1	1.7	1.8	1.6
Mothers’ age at first childbirth				
Mean	28.7	28.6	26.9	26.0
Child’s age at end of the year				
Mean	1.7	1.7	1.6	1.7
Fathers’ migration background				
Native	87.1	51.5	10.7	5.6
First generation migrant	4.9	9.7	45.6	51.2
Second generation migrant	7.9	38.5	43.4	42.8
Unknown	0.2	0.3	0.3	0.4
<i>N</i>	220,542	15,246	9301	4629

Source: Belgian Census 2011 linked to longitudinal register data, longitudinal tax return data on childcare expenses and municipality-level data on childcare coverage from K&G and ONE. Calculations by authors

Table 3 Municipality-level fixed-effects logit models for the uptake of formal childcare, native and second generation Maghreb mothers

	Model 1		Model 2		Model 3		Model 4	
	OR	sig	OR	sig	OR	sig	OR	sig
Constant	0.79	***	1.26	***	1.28	***	0.45	***
Municipality fixed effects								
Effect coded dummies	Included		Included		Included		Included	
Childcare coverage								
Coverage (linear)	1.04	***	1.04	***	1.04	***	1.03	***
Coverage (quadratic)	1.00	***	1.00	***	1.00	***	1.00	***
Origin (ref. native)								
2G Maghreb			0.16	***	0.06	***	0.14	***
2G Maghreb * municipality			Included		Included		Included	
Coverage * origin								
Coverage (linear) * 2G Maghreb					1.07	***	1.05	*
Coverage (quadratic) * 2G Maghreb					1.00	**	1.00	*
Mothers' educational level (ref. high)								
Low							0.18	***
Medium							0.36	***
Unknown							0.30	***
Mothers' age at first childbirth							1.05	***
Child's age at end of the year							1.30	***
Origin father (ref. native)								
First generation migrant							0.66	***
Second generation migrant							0.80	***
Unknown							0.89	n.s
<i>N</i>	229,843		229,843		229,843		229,843	
<i>R</i> ²	0.0372		0.0563		0.0563		0.1341	
<i>df</i>	29		56		58		66	
Log likelihood	- 139,053		- 136,302		- 136,295		- 125,061	

Source: Belgian Census 2011 linked to longitudinal register data, longitudinal tax return data on childcare expenses and municipality-level data on childcare coverage from K&G and ONE. Calculations by authors

Significant levels: **p* < 0.05, ***p* < 0.01; ****p* < 0.001

Table 4 Municipality-level fixed-effects logit models for the uptake of formal childcare, native and second generation Turkish mothers

	Model 1		Model 2		Model 3		Model 4	
	OR	sig	OR	sig	OR	sig	OR	sig
Constant	0.74	***	1.01	n.s	1.01	n.s	0.39	***
Municipality fixed effects								
Effect coded dummies	Included		Included		Included		Included	
Childcare coverage								
Coverage (linear)	1.05	***	1.04	***	1.04	***	1.03	***
Coverage (quadratic)	1.00	***	1.00	***	1.00	***	1.00	***
Origin (ref. native)								
2G Turkey			0.11	***	0.13	***	0.28	***
2G Turkey* municipality			included		included		included	
Coverage*origin								
Coverage (linear)* 2G Turkey					0.98	n.s	0.97	n.s
Coverage (quadratic)* 2G Turkey					1.00	n.s	1.00	n.s
Mothers' educational level (ref. high)								
Low							0.18	***
Medium							0.36	***
Unknown							0.29	***
Mothers' age at first childbirth							1.05	***
Child's age at end of the year							1.29	***
Origin father (ref. native)								
First generation migrant							0.69	***
Second generation migrant							0.80	***
Unknown							1.0	n.s
<i>N</i>	225,171		225,171		225,171		225,171	
<i>R</i> ²	0.0354		0.051		0.051		0.1288	
<i>df</i>	20		38		40		48	
Log likelihood	- 135,493		- 133,293		- 133,292		- 122,373	

Source: Belgian Census 2011 linked to longitudinal register data, longitudinal tax return data on childcare expenses and municipality-level data on childcare coverage from K&G and ONE. Calculations by authors

Significant levels: **p* < 0.05, ***p* < 0.01; ****p* < 0.001

Table 5 Municipality-level fixed-effects logit models for the uptake of formal childcare, native and second generation Southern European mothers

	Model 1		Model 2		Model 3		Model 4	
	OR	sig	OR	sig	OR	sig	OR	sig
Constant	0.71	***	0.82	***	0.84	n.s	0.325	***
Municipality fixed effects								
Effect coded dummies	Included		Included		Included		Included	
Childcare coverage								
Coverage (linear)	1.03	***	1.03	***	1.03	***	1.02	***
Coverage (quadratic)	1.00	***	1.00	***	1.00	**	1.00	**
Origin (ref. native)								
2G South-EU			0.57	***	0.45	***	0.45	***
2G South-EU * municipality			included		included		included	
Coverage * origin								
Coverage (linear) * 2G South-EU					1.02	n.s	1.03	*
Coverage (quadratic) * 2G South-EU					0.9997	n.s	0.9997	n.s
Mothers' educational level (ref. high)								
Low							0.18	***
Medium							0.36	***
Unknown							0.30	***
Mothers' age at first childbirth							1.05	***
Child's age at end of the year							1.27	***
Origin father (ref. native)								
First generation migrant							0.71	***
Second generation migrant							0.77	***
Unknown							0.87	n.s
<i>N</i>	235,788		235,788		235,788		235,788	
<i>R</i> ²	0.0461		0.0494		0.0494		0.1266	
<i>df</i>	52		102		104		112	
Log likelihood	- 141,220		- 140,734		- 140,732		- 129,302	

Significant levels: **p* < 0.05, ***p* < 0.01; ****p* < 0.001

Source: Belgian Census 2011 linked to longitudinal register data, longitudinal tax return data on childcare expenses and municipality-level data on childcare coverage from K&G and ONE. Calculations by authors

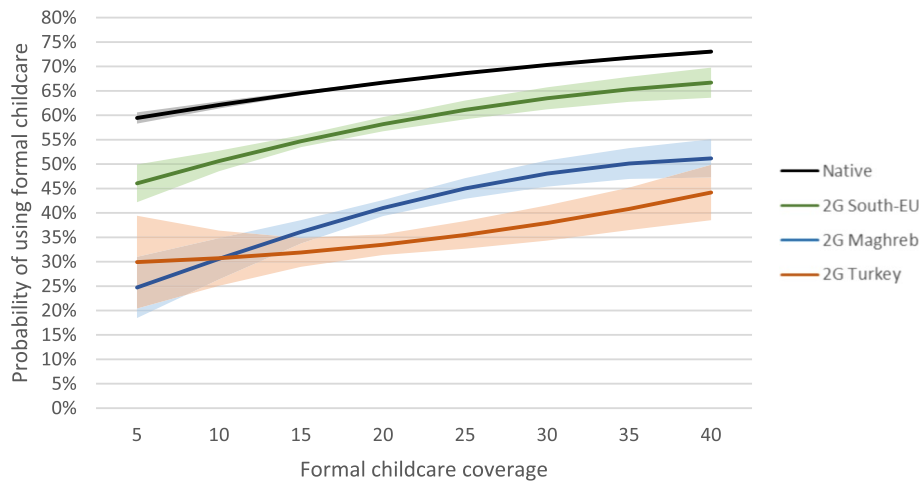


Fig. 7 Probability of using formal childcare at different levels of childcare coverage after controlling for socio-demographic characteristics (with 95% conf. interval), by mothers’ origin group. Predicted probabilities based on Model 4 including municipality fixed effects, coverage (quadratic specification), origin, origin * municipality, origin * coverage (quadratic specification), mothers’ educational level, mother’s age at first childbirth, the age of the first child at the end of the year, and the fathers’ migration background (Source: Belgian Census 2011 linked to longitudinal register data, longitudinal tax return data on childcare expenses and municipality-level data on childcare coverage from K&G and ONE. Calculations by authors)

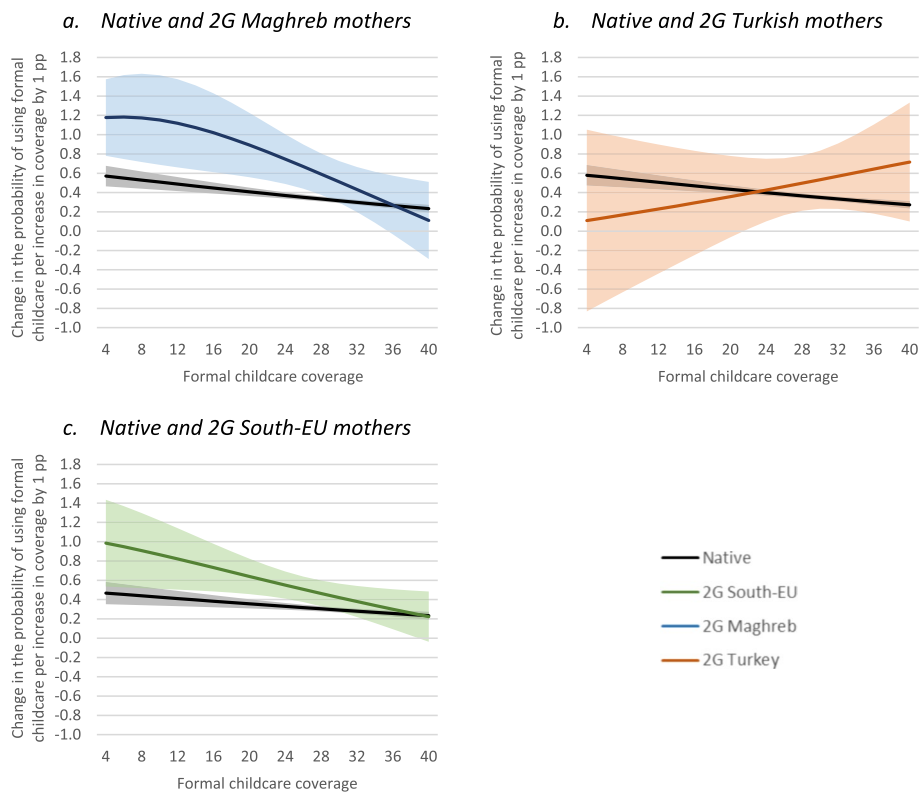


Fig. 8 Change in the probability of using formal childcare for a 1 percentage point increase in childcare coverage at different levels of childcare coverage after controlling for socio-demographic characteristics (with 95% conf. interval), by mother’s origin group. Average Marginal Effects based on Model 4 including municipality fixed effects, coverage (quadratic specification), origin, origin * municipality, origin * coverage (quadratic specification), mothers’ educational level, mother’s age at first childbirth, the age of the first child at the end of the year, and the fathers’ migration background. (Source: Belgian Census 2011 linked to longitudinal register data, longitudinal tax return data on childcare expenses and municipality-level data on childcare coverage from K&G and ONE. Calculations by authors)

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Author contributions

JM prepared the literature review, analysed the data and drafted, revised and finalised the manuscript. KN is responsible for data acquisition and the design of the municipality-level fixed-effects models, and helped with the interpretation of the results. NB helped with the literature review and the preparation of the data. JW contributed to the consistency of the introduction and theoretical framework, and to the presentation of the results. KN, NB and JW critically revised the paper. The authors read and approved the final manuscript.

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Availability of data and materials

The data that support the findings of this study are not publicly available.

Declarations

Competing interests

The authors declare that they have no conflicts of interest.

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