Inequalities in pre-school learning contexts by immigrant background

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Will be expanded

Introduction

In many Western countries, children with foreign-born parents are lagging behind children with native-born parents in school performance (see OECD 2023; and for Sweden: Jonsson & Mood 2023). This disadvantage appears to arise early in life (Højen et al 2021), and in the political debate, much hope is placed on the potential of pre-schools to remedy this. By providing a high-quality learning and language environment, it is hoped, pre-schools may compensate for the disadvantages of children of immigrant background. For the compensatory potential of pre-schools to be realized, immigrant-background children must not only go to pre-schools, but the pre-schools they go to must give them a better learning environment than they would otherwise have. Pre-schools should provide an environment conducive to language learning and to a positive cognitive, social and emotional development. Several mechanisms can counteract an equal or compensatory distribution of quality across pre-schools. Competition over educated staff, preferences of staff to work close to home combined with residential segregation, and perceived or real higher demands in a multi-lingual environment can lead to an uneven distribution of teachers who are more educated or experienced, and of teachers who are native speakers of the host country language.

Sweden has faced a particularly challenging situation in this regard, due to a lack of educated pre-school teachers (SOU 2020:67; Skolverket 2021) combined with a growing and more diverse student body. From 2002 to 2022, the number of pre-school aged children (ages 0–5) in Sweden increased by 26%. Only a minor part, less than 7 000 of an increase of 143 000, consisted of children to two Swedish-born parents. Consequently, the proportion of this age group with two Swedish-born parents has decreased from 74% to 60%, and an increasing proportion of children grow up with limited exposure to the Swedish language. The immigrant population is also highly diverse, coming from many different language backgrounds.

It is known that immigrant background children go to pre-school to a lower extent, that enrolment is particularly low among foreign-born children (Skolverket 2023), and that the proportion educated teachers are lower in pre-schools with a higher proportion of foreign-born children (SOU 2020:67). This has raised concerns that these children may suffer in terms of school readiness. Consequently, the hope is that policies that

promote pre-school enrolment in immigrant families – especially for foreign born children – and policies that equalize pre-school quality between immigrant background and Swedish background children will equalize later educational outcomes.

The aim of this article is to assess the potential for reducing educational inequalities between children of immigrants and children of Swedish-born parents through equalization of pre-school attendance and pre-school characteristics. We will expand the knowledge base in three ways. **First,** we ask whether groups who are known to have larger challenges in education attend pre-school to a lower extent. **Second,** we ask whether, among those who attend pre-schools, there are disadvantages for immigrant-background children in terms of different potential quality indicators (teacher-to-child ratio, teacher qualifications, teacher turnover, teacher sickness absence, and teacher sex composition), and in terms of the origin composition of the peer and teacher groups (approximating the quality of the Swedish language environment). **Third**, we ask to which extent disadvantages attenuate with time since immigration, and whether immigrant-background disadvantages in pre-school environments can be accounted for by their socioeconomic disadvantages.

Pre-school and child development

Historically, the demand for organized care and education for small children went hand in hand with women's increasing labour market participation. Yet the pedagogical component has always been an important part of the argument for pre-schools. Already in the 1930's, famous Swedish reformers Gunnar and Alva Myrdal promoted pre-schools as a better learning environment than the home, and as a liberating and equalizing force (1934: 298–309). The view that early child development is crucial for later outcomes has become widely accepted the last couple of decades, with research and advocacy of James Heckman and colleagues (Knudsen et al 2006; Heckman 2006) playing a central role. In this perspective, neuroplasticity of the developing brain and skills-beget-skills mechanisms makes the learning context in early childhood critically important. Pre-schools, it is suggested, can compensate those with a less stimulating home environment and hence be particularly helpful for children of disadvantaged backgrounds (Duncan & Magnuson 2013; Heckman 2006).

Our focus here is on universal pre-school programs – not targeted pre-school programs specifically designed for certain groups. There is a wealth of studies that seek to assess the effects of universal programmes, and a challenge is to distinguish causal effects from selection on unobserved family or child characteristics. Recently it has become more common to use more sophisticated causal identification strategies, exploiting exogenous variation in attendance from, e.g., reforms or enrolment lotteries. Huizen & Plantenga (2018) review 250 estimates from such natural experiments and find mixed results, with around half of estimates suggesting no effect, a third suggesting positive effects, and

almost a fifth suggesting negative effects. This is not surprising, as effects are likely to vary depending on design factors such as identification strategies and which outcomes are studied and when, and contextual factors such as baseline attendance, organization of pre-schools, composition of the target population and the counterfactual mode of care. They find some systematic patterns, such as negative effects pertaining primarily to behavioural outcomes, and positive effects being more common for public (rather than private) provision of pre-schools and in settings with higher pre-school quality.

To our knowledge, there are no Swedish studies that employ natural experiments to identify effects of pre-school on later outcomes – something which is likely due to a lack of data. Jonsson (2004), using data from the Level of Living Survey with extensive controls for potential confounders, found no meaningful effects – neither on average nor in more disadvantaged subgroups. In Norway, a context similar to the Swedish one, studies using credible identification strategies consistently show positive effects of pre-school on cognitive outcomes, at least for disadvantaged subgroups. Drange & Havnes (2019) – using exogenous variation from assignment lotteries – find that pre-school enrolment at ages 1–2 has substantial effects on language and mathematics test scores at age 6–7. The effects are stronger for children from socioeconomically disadvantaged families. Studies of the expansion of early pre-school (ages 1–2) also find stronger effects for socioeconomically disadvantaged students on language skills at age 3 (Dearing et al. 2018) and test scores at age 10 (Zachrisson et al. 2023). Using an intervention providing free childcare, Drange & Telle (2015) find that pre-school enrolment of immigrant-background children at ages 4–5 had positive effects on their later test scores.

Positive effects of pre-schools are presumed to rest on qualities of the pre-school environment such as supervised learning by trained staff and everyday practice in language, communication and social interaction. Pre-schools are however not all alike, and they may differ in terms of *structural quality* aspects, such as the number and education of staff and the size and quality of the indoor and outdoor environment, and in terms of *processual quality* aspects, such as the warmth and competence of teachers, and the pedagogical content that the child is exposed to. Because the second category is hard to measure systematically and on a large scale, available evidence on the effect of pre-school quality concerns structural quality aspects (that may or may not be correlated to processual quality). From a long list of structural indicators, Drange & Rønning (2020) found that only the proportion male staff and the frequency of sick leave among staff predicted children's later language test scores (but not math test scores). Surprisingly, teacher qualifications, teacher density and the proportion of teachers with immigrant background had no effect on later test scores. Another aspect of pre-schools that can potentially affect children's development is the composition of the peer group (Neidell & Waldfogel 2010). For children

with immigrant parents, having peers with Swedish-born parents may be particularly important for the development of Swedish-language skills.

Studies from different countries consistently find that enrolment in pre-school tends to be lower in groups that are socioeconomically disadvantaged, including among those of immigrant background (Drange & Telle 2020; Van Lancker & Pavolini 2023). However, the lower enrolment among children in immigrant families appears to be only partly due to their less favourable socioeconomic situation (Van Lancker & Pavolini 2023). Jessen (2020) found that barriers to pre-school access in Germany reduced inequality in enrolment by parental education but not inequality by migrant background. These results suggest that explanations for the lower enrolment of children in immigrant families need to be sought, at least partly, among factors beyond their socioeconomic disadvantage.

The Swedish setting

Sweden has a population of 10.5 million, whereof almost 700 000 are below 5 years of age. The Swedish population has in a few decades become highly diverse. Up until the 1960's immigration was relatively low, but the 1960's and 1970's saw large waves of labour immigration from Finland, Southern Europe and Turkey. Since the 1970's, refugee immigration has increased steadily, with large groups coming from the Middle East, former Yugoslavia, South America, and Africa. In addition, labour migration from Eastern Europe has grown with the enlargement of the European Union. The proportion foreign-born of the Swedish population has increased from a few percent in the 1960's to over a fifth in the 2020's, and an increasing proportion of the Sweden-born population have immigrant parents. The age distribution of the immigrant-background population is skewed, with few in the older age groups and many among children, youth and adults up to around 40 years of age.

Dual-earner households have long been the norm in Sweden. The female employment rate is high, standing at 76% in 2023 while the OECD average is 63% (OECD 2023a), and it is common for both mothers and fathers to work full time or close to full time. Employees are entitled to 18 months leave after the birth of a child, and to parental benefits for 480 days whereof 390 days are income-based and 90 days are flat rate. Most children in Sweden start pre-school before their second birthday. Children normally go to pre-school up until autumn the year they turn 6, when they start a compulsory kindergarten class preparing for the start of comprehensive school in autumn the year that they turn 7. From one year of age, children who live in Sweden have the right to pre-school to the extent needed for parents' work or studies. Children to parents who are unemployed or on parental leave have the right to pre-school for at least 3 hours a day or 15 hours per week. Fees depend on parents' income and are heavily subsidized, and from the autumn the year the child turns three, he/she has a right to 525 hours per year free of charge.

There are around 9 300 pre-schools in Sweden, with 500 000 children and just over 100 000 staff. Pre-school is a school form with its own curriculum, and tertiary educated pre-school teachers are responsible for the pedagogical content. Around 40% of the staff in pre-schools have a tertiary teaching degree and slightly less than 20% have an upper secondary degree in childcare work, meaning that around 40% of staff lack a degree in education or childcare (Skolverket 2023). Around 70% of pre-schools are municipal and 30% are run by private providers, including for-profit companies, non-profit organizations and cooperatives. The same fee structure and subsidies apply regardless of provider. Pre-schools of private providers are on average smaller, so around 20% of children go to such a pre-school (Skolverket 2023). They are most common in and close to the big cities (Skolverket 2023), and more popular among upper- and middle-class families than among working class families (Forsberg, Waddling & Alm Fjellborg 2023). Staff-to-child ratios are similar in municipal and private pre-schools, but private pre-schools have a much lower percentage of tertiary educated pre-school teachers (30 vs 43%) (Skolverket 2023).

Most children go to a pre-school close to where they live, meaning that pre-school composition inevitably reflects residential segregation. Ethnic residential segregation in Sweden increased during the 1990's (Nordström Skans & Åslund 2009; Biterman 2010), but with increasing immigration the dispersion of immigrants across neighbourhoods increased and although some neighbourhoods have a very high concentration of foreign-born residents, segregation has remained roughly stable (Malmberg & Clark 2021). Empirical findings confirm that the segregation of pre-schools by foreign background largely mirrors neighbourhood segregation (Alm & Fjellborg 2023). Fjellborg & Forsberg (2020), however, find that some strategic commuting also takes place. For example, they found children to foreign-born parents with higher education to be more likely to go to pre-schools other than the one closest to where they live.

Immigrant-background children in Sweden have lower pre-school attendance than Swedish-background children, in line with findings from other European countries (Van Lancker & Pavolini 2023). In Sweden in 2022, 86% of Swedish-background children aged 1–5 were registered in a pre-school, compared to 82% of children born in Sweden to foreign-born parents (generation 2) and 73% of children born abroad (generation 1). The gap is particularly large at young ages – at age 2, 93% of Swedish-background children are in pre-school, compared to only 64% of children in generation 1 (all numbers from Skolverket 2023). So far, knowledge is lacking on whether there are average quality differences between pre-schools of immigrant- and Swedish-background children, but numbers commissioned by the governmental commission SOU 2020:67 suggest that the proportion of staff with a teacher education is lower in pre-schools with high proportions of immigrant-background children (SOU 2020:67, Table 10.2).

Data and variables

The pre-school register is a rather recent addition to the Swedish school registers, covering all children enrolled at a given date. It is still too early to study links between pre-school enrolment or pre-school characteristics and later outcomes, but we can study the magnitude of differences in early learning contexts that are often held forward as important for children's development.

We use individual level data from population registers and the pre-school register 2014-2022, including all children born between 2014 and 2021 who were registered in the Swedish population and enrolled in a pre-school in October 15 in each given year. Each pre-school reports all children enrolled at that date, including their date of enrolment.[1] Thus, for those enrolled at that date we have information about the ongoing spell since its starting date, but we lack information about any spells that do not overlap October 15. For instance, if a child is enrolled in one pre-school during January to September, and then starts in another pre-school, we do not observe the first enrolment. Since our focus is not on enrolment levels per se but on differences between background groups, this is unlikely to have any major impact on our estimates of interest.

For the longitudinal analyses we include all children born between 2014 and 2021 who are in Sweden at any time point between their first birthday and August the year they turn 6. The cross-sectional analyses use data from 2022, including all children born between 2017 and 2021 who are in Sweden in October 2022.

Children are matched to information about parents, pre-schools, and pre-school staff.
On the parental level, we use information on country/region of origin, time of arrival in Sweden, refugee status, highest education achieved at the birth of the child, employment status and disposable family income. In our analysis, we select the maximum parental value for achieved education and it is categorized in the groups *Primary*, *Secondary* and *Tertiary* education and those with missing values are also included as a separate category. We follow a similar strategy for calculating parental time in Sweden, where the maximum duration is selected. Employment status is categorized into four categories: *Only Mother, Only Father, Both*, and *Neither* and it is based on the employment status in November the relevant year. For income, we use the mean disposable family income of both parents and we include zero values. We also use information on the child's birth order. Children are categorized as having Swedish background if at least one parent is born in Sweden (this includes children born abroad to Swedish parents and children adopted from a second country by at least one Swedish-born parent). Children are

[1] A small number of children, around 3,000 to 4,000 in a given year (Skolverket 2023), are enrolled in a pre-school despite not being registered in the Swedish population. These children cannot be matched with other data and are not included in our analysis.

classified as ‘generation 2’ if both parents are born abroad, and as ‘generation 1’ if they and their parents are born abroad.

We further classify children by their country/region of origin using 22 categories (see Table 1) and by refugee status. We define the region of origin as Swedish if any parent is Swedish born, otherwise it is the region of birth of the parents, with the mother's region of birth taking precedence. We create the regional grouping based on the largest historical immigrant groups in Sweden who may have children in pre-school. For the largest groups, children's background is categorized into single countries. For the other groups, children's background is categorized into regions.

Children are classified as having a refugee background if any parent or the child has had refugee status in Sweden. This also includes those who arrived in Sweden for family reunification with a refugee. Age of the child is measured in months since birth, and for the cross-sectional analyses age is measured on October 15 each year.

For staff-related indicators, we use staff full-time equivalents (FTE) as many pre-school employees work part-time. We calculate the number teacher FTE per child, [2] the number of teacher FTE with tertiary teaching degrees per child, the percentage of teacher FTE with a tertiary teaching degree, the percentage of staff FTE that are sick-leave days and the percentage of staff FTE that is composed of foreign-born staff. We also calculate the staff turnover rate as:

(1)

To capture peer composition, we measure the percentage of children with foreign-born parents in each pre-school.

[2] Children’s time spent in the pre-school also vary, but this information is not available and hence we cannot make similar FTE adjustments for children. There are however no strong reasons to believe that there are large differences by background in time spent in pre-school.

Table 1. *Background, region of origin and refugee status across the two different analysis samples. Percentages may not total 100 due to rounding.*

	Analysis sample	
	Cross-section (N=575,035)	Longitudinal (N=992,483)
Background		
Swedish	424,102 (73.8%)	722,697 (72.8%)
Generation 2	132,410 (23.0%)	221,716 (22.3%)
Generation 1	18,523 (3.2%)	48,070 (4.8%)
Region of origin		
Sweden	424,102 (73.8%)	722,697 (72.8%)
Finland	821 (0.1%)	1,750 (0.2%)
Scandinavia	2,259 (0.4%)	5,216 (0.5%)
Western Europe	4,398 (0.8%)	8,639 (0.9%)
Eastern Europe	14,026 (2.4%)	25,901 (2.6%)
Former Yugoslavia	14,999 (2.6%)	26,127 (2.6%)
Southern Europe	2,394 (0.4%)	4,570 (0.5%)
North America & Australasia	1,040 (0.2%)	2,198 (0.2%)
Southern and Middle America	3,036 (0.5%)	5,607 (0.6%)
Northern Africa	4,435 (0.8%)	7,879 (0.8%)
Eritrea & Ethiopia	10,471 (1.8%)	15,901 (1.6%)
Else Sub-Saharan Africa	7,804 (1.4%)	12,908 (1.3%)
Somalia & Djibouti	11,628 (2.0%)	22,384 (2.3%)
Syria	21,116 (3.7%)	35,158 (3.5%)
Iran	4,137 (0.7%)	7,288 (0.7%)
Iraq	13,706 (2.4%)	25,685 (2.6%)
Turkey	3,744 (0.7%)	7,402 (0.7%)
Else Middle East	6,430 (1.1%)	12,399 (1.2%)
East Asia	2,378 (0.4%)	4,763 (0.5%)
Else Asia	6,134 (1.1%)	10,811 (1.1%)
South Asia	10,419 (1.8%)	18,170 (1.8%)
Afghanistan	5,558 (1.0%)	9,030 (0.9%)
Migrant category		
Swedish	424,102 (73.8%)	722,697 (72.8%)
Non-refugee	62,198 (10.8%)	113,255 (11.4%)
Refugee	88,735 (15.4%)	156,531 (15.8%)

Methods

To estimate enrolment rates over time we perform an event-history analysis. Time at risk starts either when the child is 11 months old or the month they first immigrate to Sweden, whichever occurs last. The time at risk ends at the month of pre-school enrolment, emigration, death, or August the year the individual turns 6 years old. Children born between 2017 and 2021 are right censored in October 2022 as this is our last date with register information.

As emigration is not uncommon and prevents the enrolment into pre-school, right-censoring at the time of emigration could potentially bias the enrolment rates upward. Therefore, we model enrolment with a non-parametric competing risk model (Gaynor et al., 1993), where both emigration and death are treated as competing risks to pre-school enrolment. We estimate the cumulative incidence function (CIF) of enrolment (with the function:

(2)

Where is the number of enrolments at time , the number of children at risk and the Kaplan-Meier estimator for the overall survival function considering events of any type ():

(3)

This event-history model is also able to deal with right-censoring due to the lack of data beyond 2022.

In the final analysis where we want to control for socioeconomic factors, we use a Fine-Gray competing risk model which follows a similar logic as above (Fine & Gray 1999). This technique is semi-parametric and allows for the inclusion of covariates, similarly to a Cox proportional hazards model.

Results

Pre-school attendance

A commonly expressed concern is that groups who tend to have larger challenges in education, and who would presumably gain most from attending pre-school, are least likely to attend it. We know that immigrant background children have, on average, lower school grades than Swedish background children (Jonsson and Mood 2023, Skolverket 2023), and there is a clear gradient within the immigrant background group, with generation 2 faring better than generation 1. For the latter, the disadvantage increases starkly for those who immigrated after around 8 years of age. This group has a particularly challenging situation, yet are

of course not possible to target with attention to the pre-school environment. Apart from variation in school outcomes by migration generation, there is heterogeneity by origin region: Those with background in non-European lower-GDP countries tend to have larger school difficulties (Jonsson and Mood 2023).

Do the groups with larger challenges in education less often go to pre-school? **Table 2** shows that this seems to be the case when we look at aggregate generational categories. In all age groups, children in generation 1 are dramatically less likely to attend pre-school. The difference to other groups is particularly stark at young ages and decreases gradually, but a substantial difference still exists among those aged 5. It is important to note, however, that migration is uncommon among families with small children, so the group of pre-school age in generation 1 is small (see Table 1). There is also a risk that the numbers for generation 1 are deflated if many in a given age group are recent immigrants, because some lag between immigration and enrolment is to be expected. Generation 2 is enrolled in pre-school to a somewhat lower extent – a few percentage points – than children with Swedish-born parents.

The lower part of Table 2, however, demonstrates that children with background in several non-European lower-GDP countries have high enrolment rates, while children with background in several high-GDP origin countries have low enrolment rates. Thus, it is not the case that the origin groups with the largest challenges in education have systematically lower pre-school enrolment.

While Table 2 gives a cross-sectional picture, **Figure 1** instead follows the same children over time, and documents their cumulative enrolment in pre-school over months at risk (defined as either months since the first birthday or months since migration). This longitudinal analysis confirms the pattern of an overall low enrolment rate and later starting age among first generation children. Children in generation 2 tend to start pre-school at slightly higher ages than those of Swedish background, but differences are negligible when children reach around two years of age.

***Table 2**. Enrolment in pre-school at October 15 2022 by generation, region and age. Cohorts born 2017-2021. Origin regions sorted by enrolment rates at age 5. Cross-sectional study population.*

	Age					
	1	**2**	**3**	**4**	**5**	**Total**
	%	%	%	%	%	%
Background						
Swedish (n=424,102)	64.3	94.9	96.8	97.2	97.0	89.8
Generation 2 (n=132,410)	63.5	86.3	90.7	92.4	92.5	85.0
Generation 1 (n=18,523)	42.9	61.8	72.7	77.6	78.8	71.0
Total (n=575,035)	63.8	92.0	94.6	95.3	95.1	88.1
Region of origin						
Sweden (n=424,102)	64.3	94.9	96.8	97.2	97.0	89.8
Former Yugoslavia (n=14,999)	65.5	88.4	92.1	94.2	94.9	84.4
Eritrea & Ethiopia (n=10,471)	79.9	93.8	95.2	95.3	94.6	82.2
Finland (n=821)	56.0	87.8	92.9	95.9	94.0	76.5
Syria (n=21,116)	60.7	83.7	90.3	92.6	93.3	81.4
Afghanistan (n=5,558)	59.8	86.2	90.2	91.0	92.2	87.2
Iran (n=4,137)	62.7	89.3	92.7	92.8	91.8	82.3
Iraq (n=13,706)	63.4	86.8	90.5	92.5	91.6	72.4
Southern and Middle America (n=3,036)	66.7	85.7	90.0	90.0	91.2	85.0
Turkey (n=3,744)	54.5	83.1	89.3	90.9	90.8	77.3
Else Asia (n=6,134)	64.8	85.5	87.4	89.6	90.8	91.8
Eastern Europe (n=14,026)	54.8	82.7	87.0	89.4	89.9	85.5
Else Middle East (n=6,430)	58.4	78.5	86.0	88.1	89.2	82.2
Southern Europe (n=2,394)	67.7	84.8	84.7	84.7	89.1	84.4
Else Sub-Saharan Africa (n=7,804)	74.7	86.3	89.2	88.6	88.4	86.3
Scandinavia (n=2,259)	63.2	81.9	86.0	88.6	88.1	85.4
Somalia & Djibouti (n=11,628)	63.1	81.5	86.5	87.6	87.9	82.4
Northern Africa (n=4,435)	53.7	76.2	82.3	85.8	85.2	80.6
South Asia (n=10,419)	47.0	70.8	81.6	83.7	83.1	82.6
East Asia (n=2,378)	68.6	86.2	87.0	87.0	82.4	83.9
Western Europe (n=4,398)	58.9	80.6	81.3	84.0	77.0	72.9
North America & Australasia (n=1,040)	57.9	72.3	77.8	77.4	73.7	84.0
Total (n=575,035)	63.8	92.0	94.6	95.3	95.1	88.1

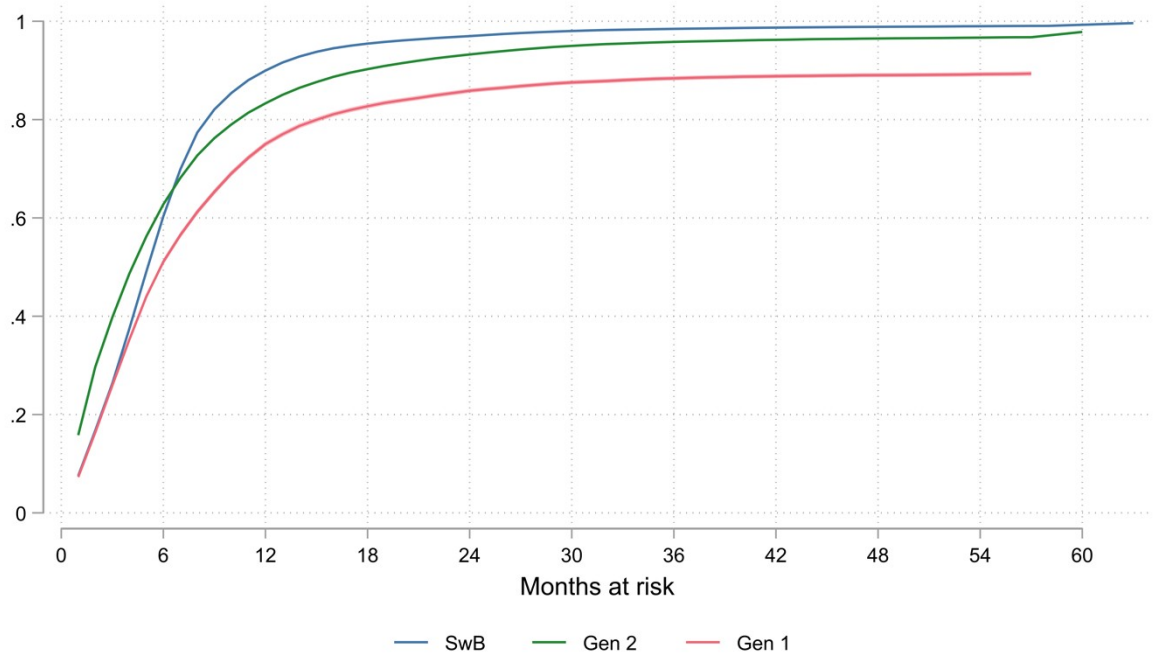

Figure 1. *Pre-school enrolment over observation months at risk, by generation. Cohorts born 2014-2021. Longitudinal study population.*

Pre-school attendance and time since migration

Time-related explanations for the lower or later enrolment of immigrant background children spring readily to mind. Many immigrants need time to find work, which may make pre-school enrolment for their children less urgent. Finding a place to settle in may take some time, and time may also be necessary to not only get but also to digest information about the pre-school system and available places. Time may also be a matter of cultural integration, with acceptance of Swedish family norms and institutions increasing with time spent in the country.

Figure 2 looks at enrolment among generation 1 children, divided into groups based on the age at migration. Not surprisingly, there is a steep increase in enrolment with time spent in Sweden during the first year since migration, but after two years rates flatten out and further time spent in Sweden does not matter much. Looking at the levels of enrolment at the end of the pre-school period (which naturally occurs after different time spans for the different age groups) it is clear that those who immigrate when they are very young (0–1 years of age) are an atypical group who, at all ages, have much lower enrolment than those who immigrate at higher pre-school ages.

For second generation children, we look at enrolment over age by parent's time in Sweden (**Figure 3**). Here time in Sweden is top coded for each child, so that we take the number of years of either the mother or father, depending on who has been in Sweden the longest. We see virtually no differences in enrolment between second generation children with regards to how long their parents have been in Sweden.

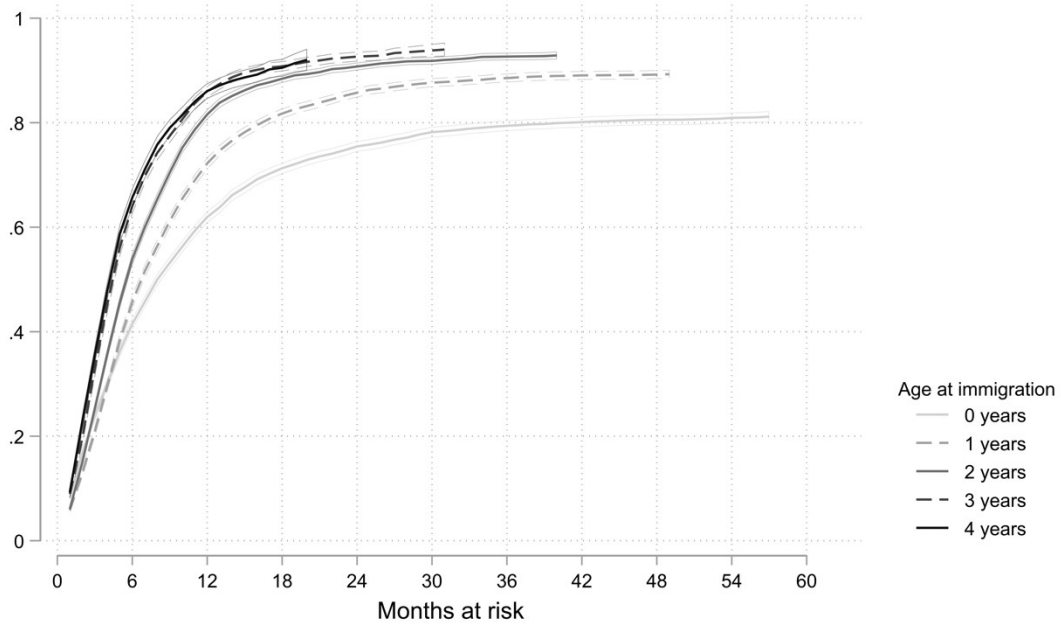

***Figure 2**. Pre-school enrolment over time since migration (in months), by age of migration. Children born abroad with immigrant parents (generation 1). Cohorts 2014-20121, longitudinal study population.*

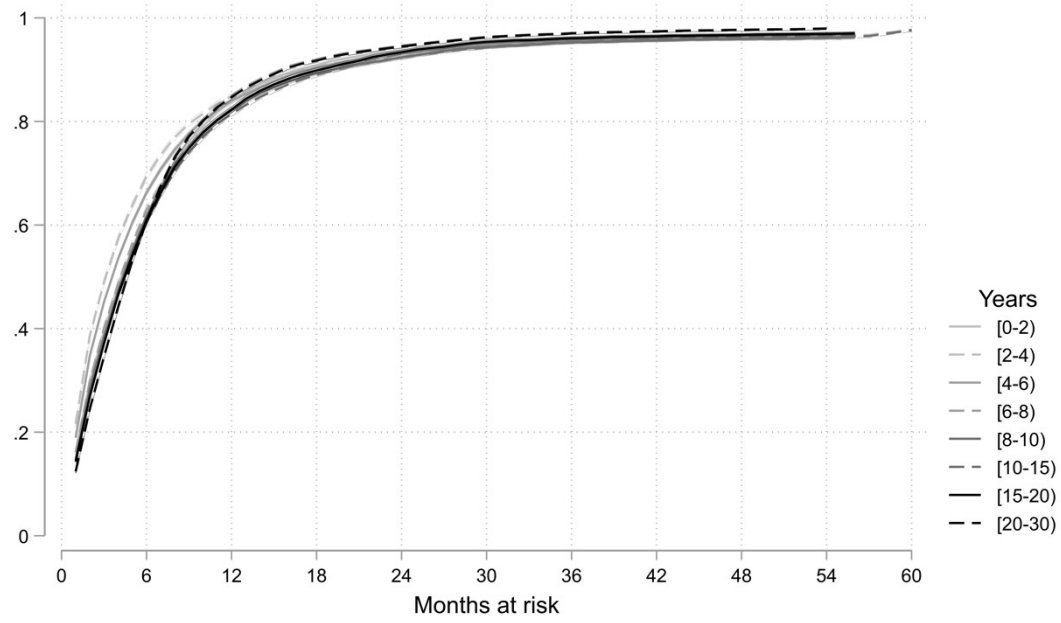

***Figure 3.** Pre-school enrolment over age (in months), by parental time in Sweden (measured in years before entering risk of pre-school enrolment and top-coded). Children born in Sweden with immigrant parents (generation 2). Cohorts 2014-2021, longitudinal study population.*

Attendance by refugee status

So far, we face two somewhat surprising findings. First, enrolment among children of immigrant background is low among those whose parents come from advantaged origin regions. Second, beyond the first year after arrival, time in the country matters little for enrolment. This means that the explanation for lower enrolment of immigrant background children is unlikely to be a simple matter of low socioeconomic integration or cultural distance. Delving further into the heterogeneity among immigrant background children, **Figure 4** shows that children in refugee families (dashed lines) have higher enrolment rates than children in non-refugee families (solid lines). This holds for generation 2 as well as generation 1, but while the difference is small in generation 2 it is very large in generation 1.

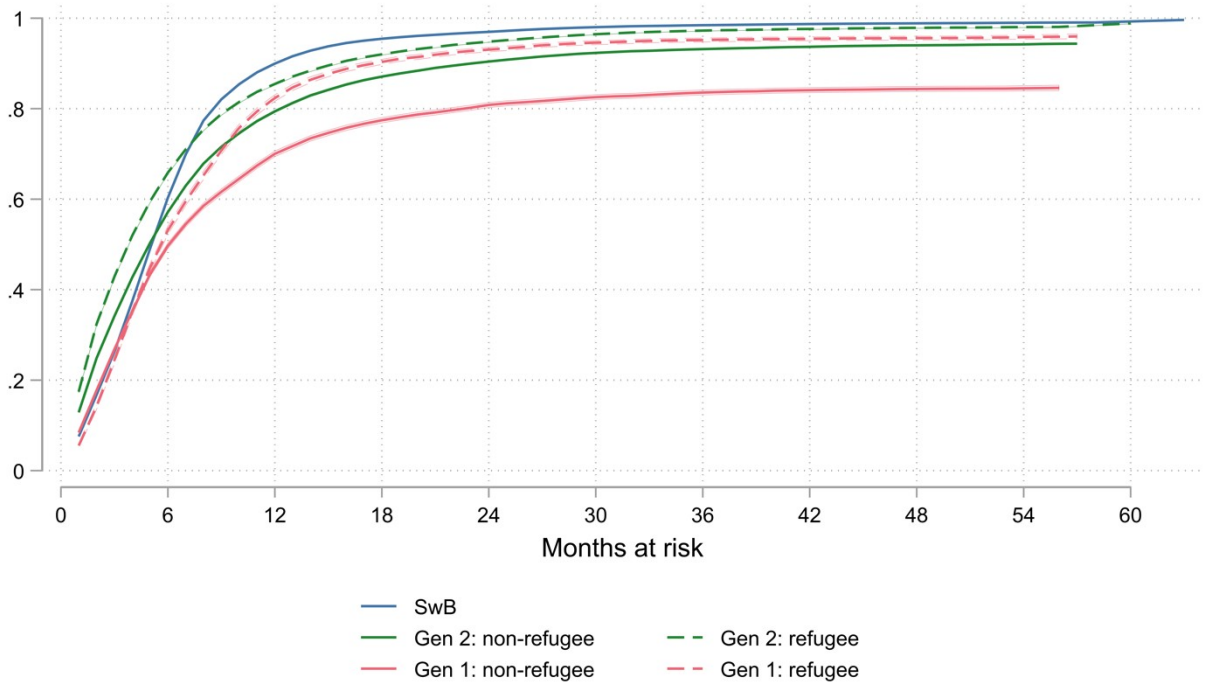

Figure 4. *Pre-school enrolment over months, by generation and refugee status. Cohorts 2014-2021, longitudinal study population.*

Why do we see so low enrolment among non-refugees? A possible explanation is that families immigrating on work permits may plan to stay only a limited time in Sweden, and therefore do not see the need to integrate their children to the Swedish pre-school system. Using the competing risk model, we can model the cumulative incidence of emigration from our data. In **Figure 5** we show the cumulative incidence of enrolment (solid line) and *either* enrolment *or emigration* (dashed line) among non-refugee children. By the end of the observation period, almost all of these children have either enrolled or emigrated. Hence, the overall lower pre-school enrolment among immigrant-background children is

largely generated by the very low enrolment of children in families who do not stay permanently in Sweden. At the end of the time at risk, the remaining difference between children of non-refugee background and Swedish background children is 3 percentage points for generation 1 and less than 1 percentage point for generation 2.

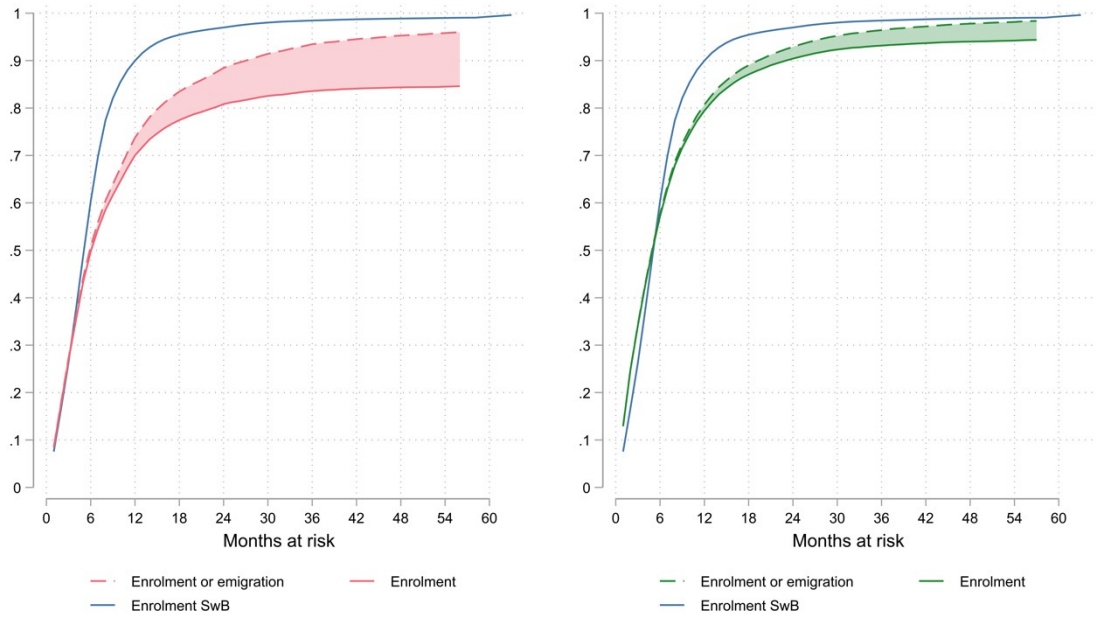

Figure 5. *Incidence of enrolment (solid line) and incidence of enrolment or emigration (dashed line) over observation months. Children born abroad with non-refugee immigrant parents (generation 1) in the left panel and children born in Sweden with non-refugee immigrant parents (generation 2) in the right panel. Blue solid line is the enrolment CIF for Swedish background children. Cohorts 2014-2021, longitudinal study population.*

A further way to understand if immigrant-background children face an enrolment disadvantage is by looking at those that enrol in compulsory pre-school class at age 6. In the left panel of **Figure 6**, we see that the distribution of the number of months spent in pre-school is very similar for Swedish-background children and children in generation 2. Generation 1 children who attend pre-school class have on average spent less time in pre-school, which is a pattern we would expect as they often immigrate later than age 1. In the right panel we show the proportional time of enrolment, that is how many months children have been enrolled divided by the number of possible months. Again, we see a similar pattern for Swedish-background children and generation 2 children, where take up of pre-school generally ranges from 80-100% of the possible time. For generation 1 children, we see a bimodal distribution where most children spend 60-100% of the available time in pre-school, but around 10-15% are enrolled for a maximum of 10% of the available time. This holds for children of both refugee and non-refugee background.

Breaking down the pattern for generation 1 children by age of immigration in **Figure 7**, we see that there is a strong age gradient. Children who arrive later and then attend pre-school class generally have a shorter relative (and absolute) enrolment time than children who arrive when they are younger. It is worth noting that due to data restrictions, the current analysis is only performed for the birth cohorts 2014-2016 who are enrolled in compulsory pre-school class in the fall semesters of 2020-2022. Given that a large share of this time is during the COVID-19 pandemic, these patterns may not generalize to other time periods if there is a changed selection on which migrants stayed or left Sweden during the pandemic.

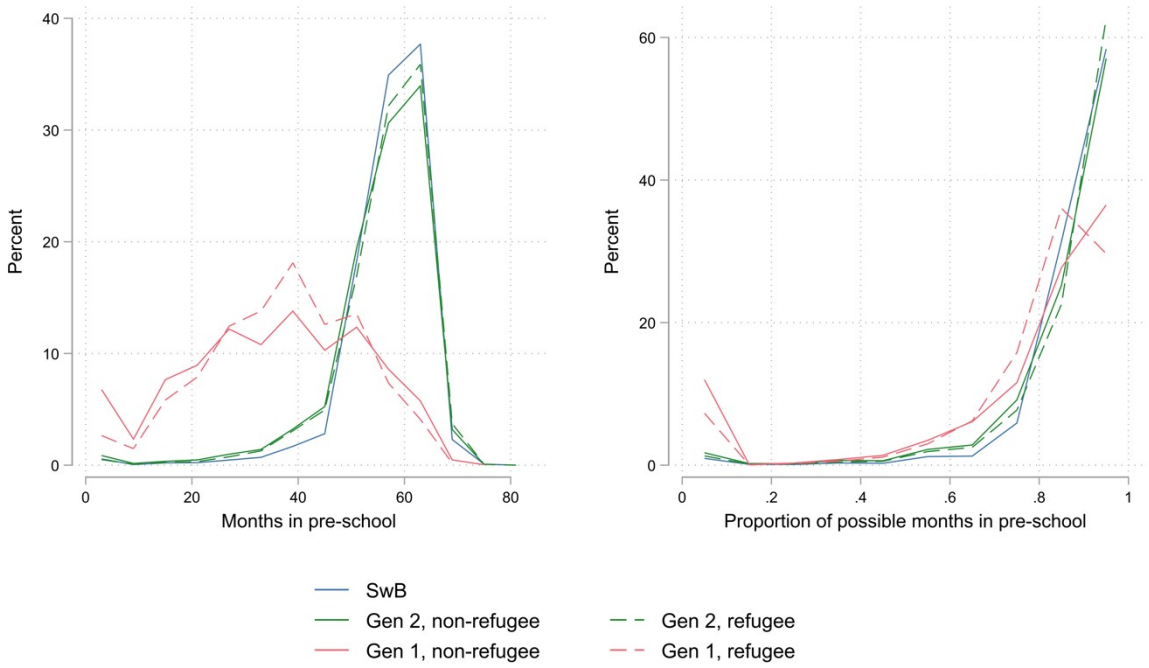

Figure 6*. Frequency polygons of enrolment time in pre-school among children attending pre-school class (compulsory at age 6). The left panel shows the number of months attended (binned into 6-month categories) and the right panel shows the number of months attended divided by possible months to attend (binned into 0.1 categories). Cohorts born in 2014-2016 and attending pre-school class in 2020-2022. Subset of longitudinal study population.*

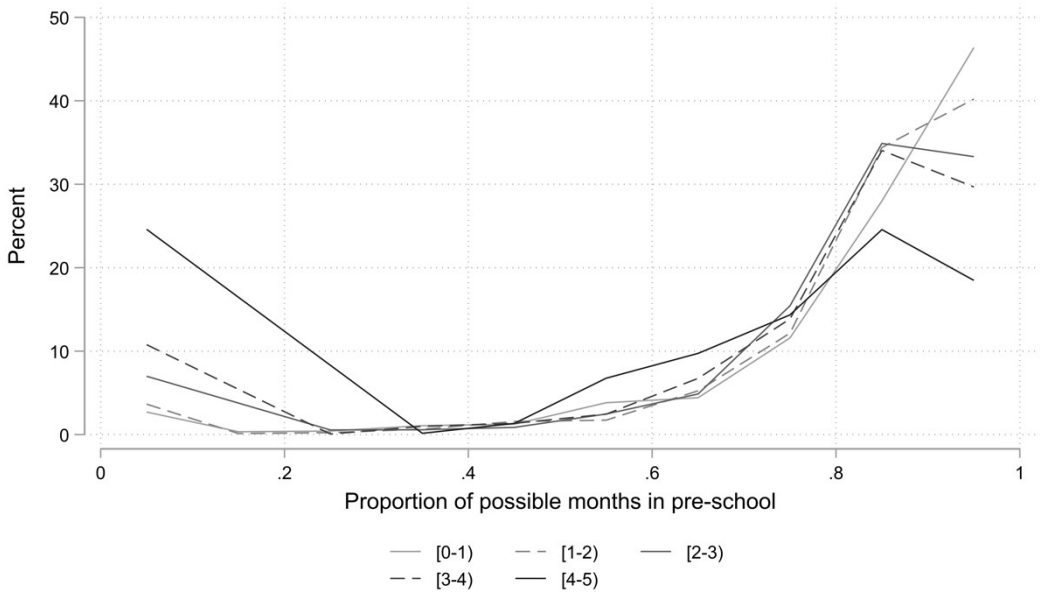

Figure 7*. Frequency polygons of enrolment time (the number of months attended divided by possible months to attend) in pre-school among Generation 1 children attending pre-school class. The lines show age at immigration. Cohorts born in 2014-2016 and attending pre-school class in 2020-2022. Subset of longitudinal study population.*

Pre-school environment

Foremost in the discussion about pre-school quality and equality is the issue of teachers: How many are they and are they educated for their task? Although not as salient an issue as for schools, composition of the peer group may also matter in terms of, e.g., the number of children with Swedish as a first language. Against the backdrop of high migration, the Swedish debate has put a lot of emphasis on the importance for children of immigrant background of exposure to the Swedish language. Concerns have been expressed that children may go to pre-schools were many teachers and children do not speak Swedish as a first language.

So far, there are no systematic studies of inequality in pre-school quality by migrant background in Sweden. To our knowledge, the only estimation on this issue is in SOU 2020:67, which showed that children of immigrant background on average went to pre-schools where a lower proportion of staff had a teacher education. This measure may however penalize a higher teacher density. If two pre-schools have a similar number of educated teachers but one of them also has more non-educated teachers, the proportion of teachers who are educated is lower in this pre-school, while it actually provides more structural resources. To provide a clearer picture, we therefore show two measures: (1) the number of educated teachers per child, and (2) the total number of staff per child.

Teacher education and teacher density

Figure 8 shows differences in the (a) number of teachers per child and (b) tertiary-educated teachers per child (both expressed in terms of teacher full time equivalents) across generation categories. The differences are small, with all generation categories having on average 0.2 teachers per child, and 0.08 to 0.09 tertiary educated pre-school teachers per child. However, the small differences that exist are to the advantage of immigrant background children in the first case (more teachers per child), but to the disadvantage in the second case (fewer tertiary educated teachers per child). Differences across different origin regions do however not suggest any systematic pattern, and the fear that the most vulnerable groups are more disadvantaged in this regard is not borne out (Appendix **Figures A1 and A2**).

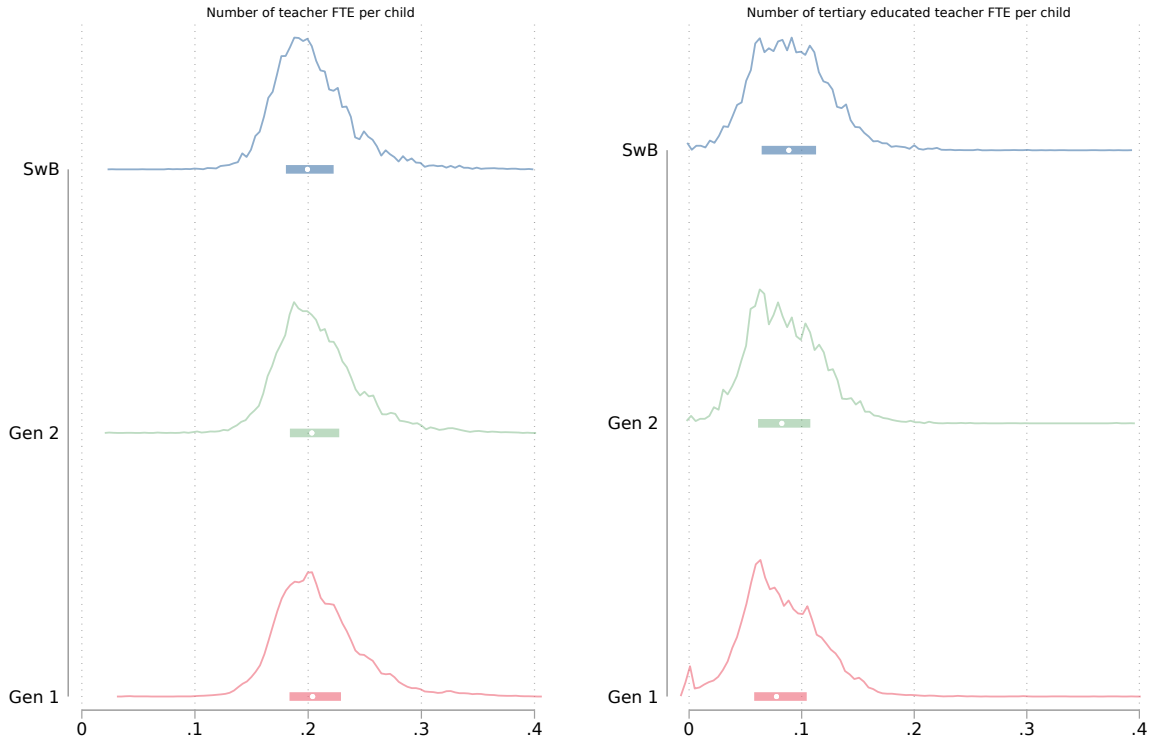

Figure 8. *Number of teacher full-time equivalents (FTE) and tertiary educated teacher FTE per child among children enrolled in October 2022, by generation. Cohorts born 2017-2021. The lines show the estimated kernel density, the box the interquartile range, and the dot indicates the median value.*

Teacher origin and sex

The density of Swedish background teachers is not per se a quality indicator, but it is likely to correlate with the quality of the Swedish language environment. In this domain there are large differences between Swedish and immigrant background children – Swedish-background children have on average 18% foreign-born teachers, while the corresponding number for immigrant-background children is 33–36% (**Table 3**). Surprisingly, children of Swedish background stand out against all regional categories, and within the immigrant-background group the variation does not indicate any systematic regional pattern.

Just as for teacher origin, teacher sex is not in itself a quality factor, but previous research from Norway (Drange & Rønning 2020) and Denmark (Gørtz, Johansen & Simonsen 2018) has reported it to have positive effects on later student achievement). The mechanisms behind this correlation are not obvious, and it is possible that it reflects that pre-schools who hire or get more male teachers have some other beneficial characteristics. Table 2, however, shows that there are no inequalities in

access to male teachers between children of Swedish and foreign background.

Table 3. *Average (over children) percentage foreign-born pre-school teachers and male teachers, by background. Children enrolled in pre-schools 2022.*

	Foreign born teachers	**Male teachers**
	%	**%**
Background		
Swedish	18	4
Generation 2	33	4
Generation 1	36	5
Region of origin		
Sweden	18	4
Finland	33	5
Scandinavia	34	5
Western Europe	28	5
Eastern Europe	29	4
Former Yugoslavia	30	4
Southern Europe	34	5
North America & Australasia	34	6
Southern and Middle America	35	5
Northern Africa	40	4
Eritrea & Ethiopia	30	4
Else Sub-Saharan Africa	35	4
Somalia & Djibouti	40	4
Syria	28	4
Iran	33	5
Iraq	36	4
Turkey	35	4
Else Middle East	34	4
East Asia	36	6
Else Asia	35	4
South Asia	45	5
Afghanistan	33	5

Teacher turnover and sickness absence

Figure 9 shows that there is a large variation in annual turnover rates across pre-schools, with the median being around 18%. The differences between background groups are however small, with only a 1-percentage point disadvantage for generation 1 children compared to Swedish-background children. In **Figure 9**, we also see that around 3% of all teacher FTEs during a year constitutes sick leave. The differences across generation categories are small, but children in immigrant families suffer a 0.2-0.5 percentage point disadvantage.

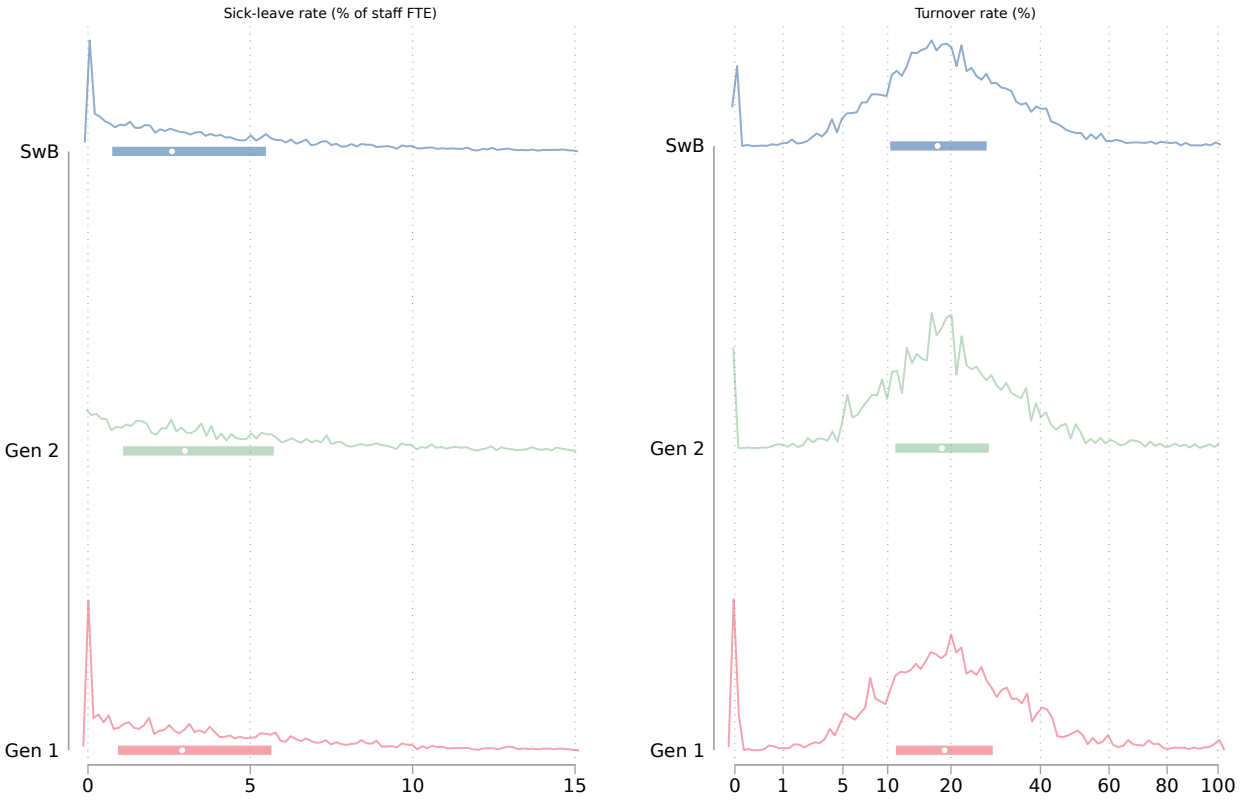

Figure 9. *Sick leave and turnover rate of teachers to children enrolled in October 2022, by generation. Cohorts born 2017-2021.*

Pre-school peer group composition

Against the backdrop of strong residential segregation, it is not surprising to see in **Figure 10** that children in immigrant families go to pre-schools with higher proportions of immigrant-background children. The differences are however dramatic, with Swedish background children going to pre-schools where a tenth of children have immigrant background, as compared to 40–50% for children of immigrant background.[3] To illustrate this from another angle, **Figure 11** shows the strength of the concentration of immigrant-background and Swedish-background children in Lorenz curves. Strikingly, around 50% of foreign-born students go to only 15% of all pre-schools.

[3] **Figure A3** in Appendix shows pre-school composition by origin region, and again we see that the main dividing line is between children with Swedish background and others. There are also other variations between origin categories, which is most likely a result of differential residential segregation for different origin groups.

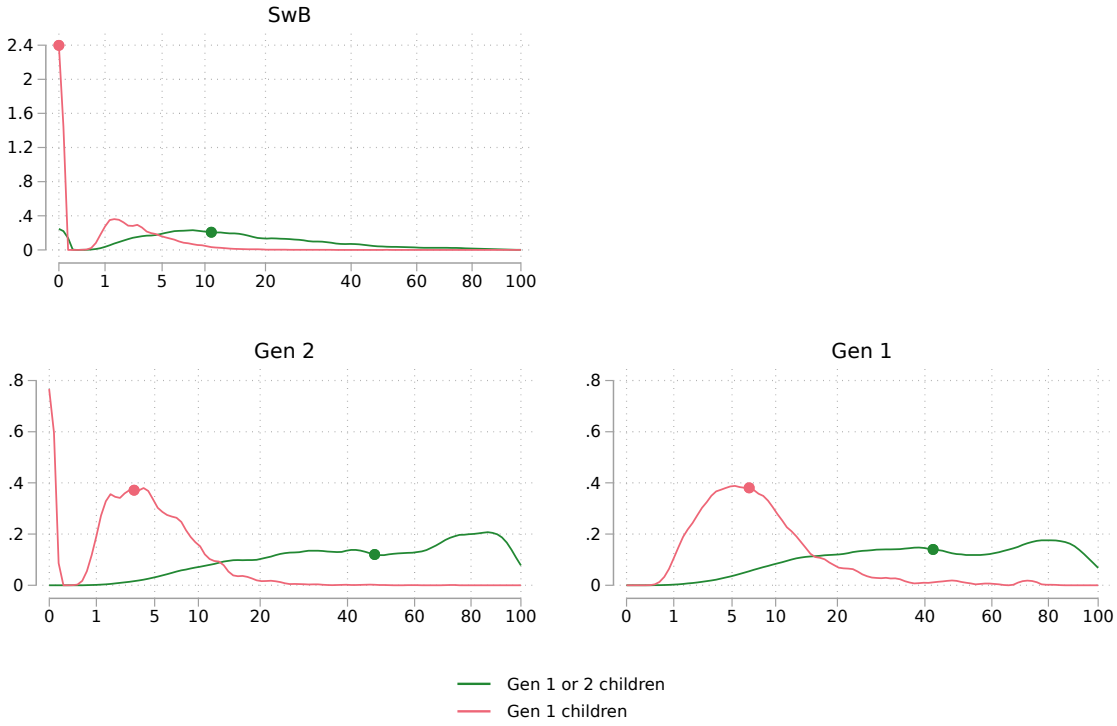

Figure 10. *Representation of children from immigrant families in children's pre-schools, by generation. The lines show the estimated kernel densities and the dots indicate the median value. Children enrolled in October 2022, by generation. Cohorts born 2017–2021.*

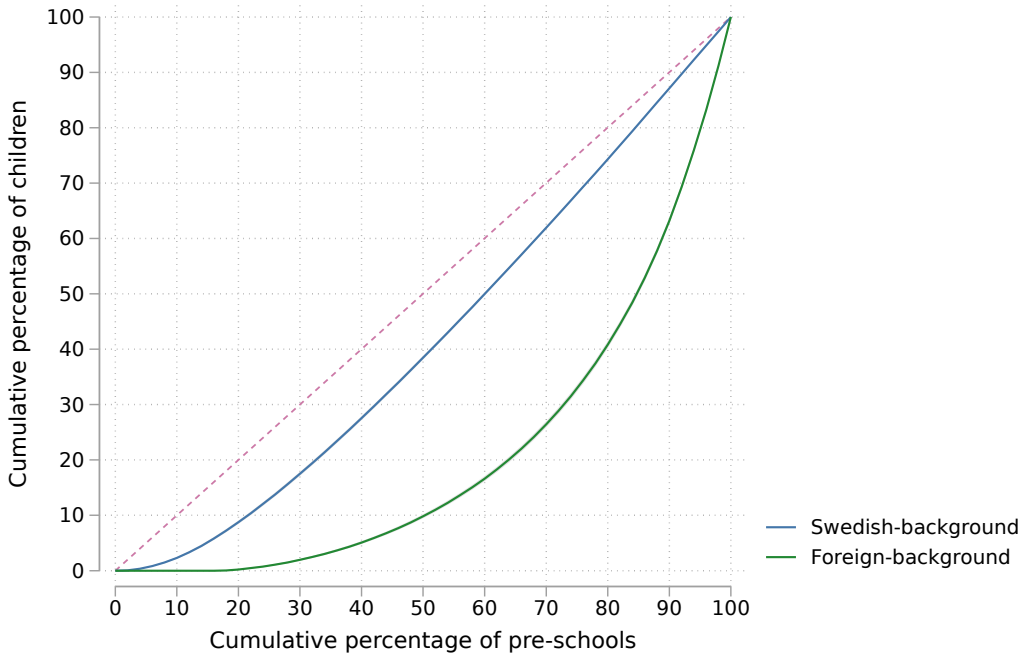

Figure 11. *Normalized Lorenz curves showing the cumulative percentage of Swedish-background and foreign-background children over pre-schools. Children enrolled in October 2022. Cohorts born 2017–2021.*

Pre-school environment and time since migration

We have shown that beyond the first year, time in Sweden does not matter much for differences in *enrolment in pre-school*. But does time matter for differences in the *pre-school environment?* Is there any evidence for integration in the sense that any disadvantages that immigrant-background children face are smaller for families who have been longer in Sweden? To answer these questions, we performed OLS regressions on all our pre-school environment outcomes with an interaction between parental time in Sweden and refugee status as our main explanatory variable, with Swedish-background children as reference category. We controlled for region of origin to eliminate compositional effects of different migration waves. The analysis was conducted jointly for generation 1 and generation 2 children. Regressions were conducted both with and without DeSo area fixed effects to assess the importance of sorting into geographical areas. We show the results from the regressions on percentage of foreign-background children and foreign-born teachers as these were the outcomes where we found a meaningful association with parental years in Sweden either for children with refugee or non-refugee background.

In **Figure 12,** the leftmost graphs show that among children with non-refugee background, the percentage pre-school peers of immigrant background decreases with parental time in Sweden. Parity with Swedish background children is however not reached even for families with a long history in Sweden. For children with a refugee background, we instead see an inverse U-pattern where children in families with a few years in Sweden have the highest percentage of immigrant-background pre-school peers. When accounting for neighbourhood sorting using fixed effects, as seen in the lower panel, this pattern disappears. This indicates that the increased share of immigrant-background children in pre-schools over time in Sweden for refugee-background children is explained by their gradual mobility into neighbourhoods with a higher share of immigrant-background children.

The rightmost graphs in Figure 12 shows that the percentage foreign born teachers is stable at a high level for non-refugee background children. For refugee background children, we see similarly high levels after 10 years in Sweden, but a dramatically lower level before that. Once again, the lower panel with neighbourhood fixed effects shows that this is due to sorting into neighbourhoods as we observe both a smaller absolute effect as well as very little change due to parental time in Sweden. Taken together, these results suggest an integration process only for peer group composition, and only for families with a rather long (15+ years) history in Sweden. For refugee migrants, those who have been longer in Sweden do in fact have a higher percentage foreign born teachers, which reflects sorting from less to more segregated neighbourhoods over time.

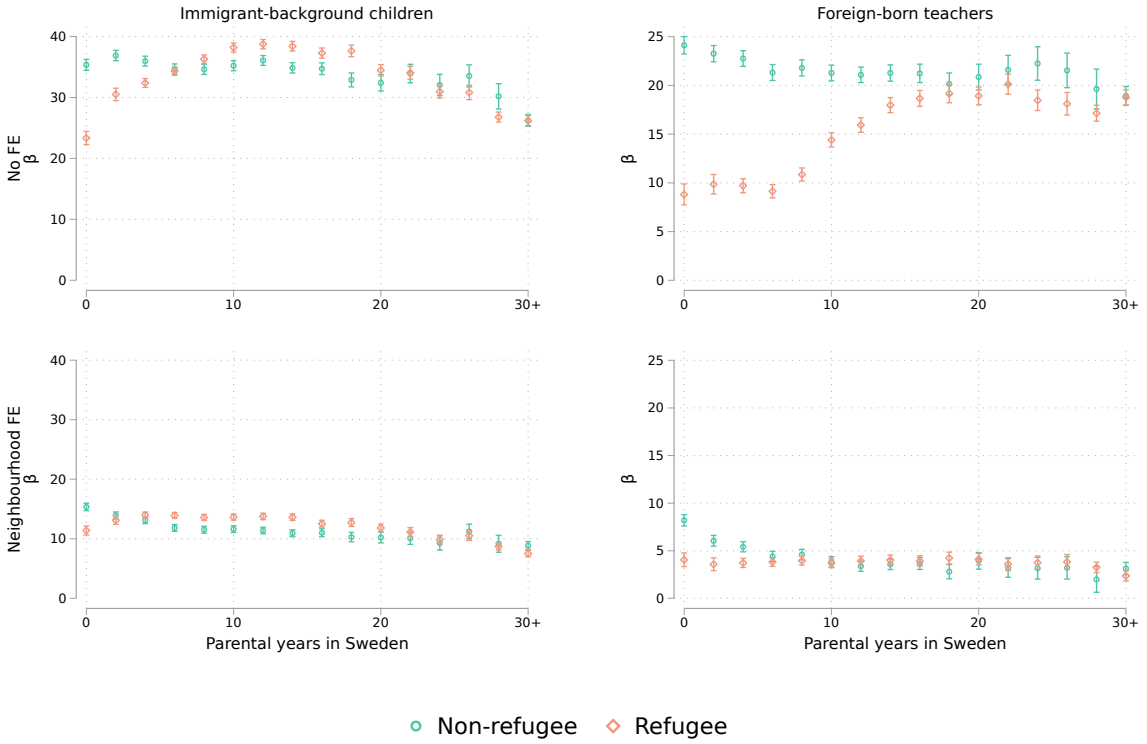

Figure 12. *Coefficient plots from regressing two different pre-school environment indicators on parental years in Sweden and migrant background category, Swedish-background children are used as reference category. The plotted coefficients show the difference in the dependent variable between Swedish-background children and children to immigrants with a given number of years in Sweden. The top row displays the results from regressions without DeSo area fixed effects and the bottom row display results using DeSo area fixed effects. Children enrolled in October 2019; cohorts born 2014–2018.*

The role of socioeconomic factors

We might expect that some of the differences in enrolment are due to differences in socioeconomic factors for children of different backgrounds. In **Table 4** we show descriptive statistics on income, parental education, parental activity status, which parents are in Sweden and the birth order of the child. Children with Swedish background have on average the most highly educated parents and the highest disposable family income, and dual-earner parents are the norm. Among foreign-background children, the general pattern is that generation 2 have higher socioeconomic status than generation 1, and that children with a non-refugee background have higher SES than children with a refugee background.

Table 4*. Socioeconomic status by background and refugee status the year the child is able to enroll in pre-school. Children born 2014-2021.*

	Background					
	SwB (N=722,697)	Gen2, non-refugee (N=81,400)	Gen2, refugee (N=140,316)	Gen1, non-refugee (N=31,855)	Gen1, refugee (N=16,215)	Total (N=992,483)
Disposable family income	5784.7 (13298.3)	4293.6 (4090.5)	3561.1 (2365.3)	2768.5 (4646.1)	1885.1 (1494.0)	5187.5 (11520.9)
Birth order	1.8 (0.9)	1.9 (1.0)	2.4 (1.5)	1.6 (0.8)	2.5 (1.6)	1.9 (1.1)
Highest parental education						
Missing	0.1%	4.1%	1.7%	35.8%	16.0%	2.0%
Primary	2.0%	7.6%	21.5%	4.5%	32.2%	5.8%
Secondary	38.4%	28.9%	41.1%	12.5%	24.6%	36.9%
Tertiary	59.5%	59.4%	35.8%	47.1%	27.2%	55.2%
Parents working						
Neither working	3.3%	13.6%	29.0%	29.1%	77.8%	9.8%
Mother working	5.1%	8.0%	6.2%	8.4%	1.7%	5.6%
Father working	14.4%	39.9%	39.2%	52.1%	19.2%	21.3%
Both working	77.2%	38.5%	25.6%	10.4%	1.3%	63.3%
Parents in Sweden						
Mother in Swe	1.9%	6.1%	7.7%	8.6%	16.2%	3.5%
Father in Swe	0.2%	1.0%	0.8%	3.5%	2.6%	0.5%
Both in Swe	97.9%	92.9%	91.5%	87.9%	81.2%	96.0%
Parents live together						
Parents not cohabiting	9.4%	13.6%	22.0%	13.7%	22.2%	11.9%
Parents cohabiting	90.6%	86.4%	78.0%	86.3%	77.8%	88.1%

The above socioeconomic factors are largely associated with enrolment in expected directions (Appendix **Figure A4**). The general pattern is that enrolment is high among most groups but with lower enrolment rates in families where neither parent is working, where the disposable income is below the 25th percentile, and where only one parent is in Sweden. Children where we do not have information on parental education have low enrolment rates, which probably reflects that this group is mostly composed of generation 1 children.

To understand whether socioeconomic factors can account for group differences in enrolment, we performed a Fine-Gray competing-risk regression. In **Figure 13**, we see the predicted cumulative incidence of enrolment across different child backgrounds when holding socioeconomic characteristics fixed (for the prediction, we fix values as follows: Both parents are in Sweden and working, their highest educational attainment is upper-secondary school, and the child is a first

born in a family with mean disposable family income). Holding these values constant, we see that both generation 1 and generation 2 children with a refugee background have a slightly higher enrolment rate than the other three groups. So, for children with similar socioeconomic and family background, the enrolment rate is highest among refugee background children, although the differences are small. The higher predicted rate of enrolment for refugees that we observe after controlling for socioeconomic factors implies that due to their worse socioeconomic situation, we would expect them to have *lower* gross enrolment than others. The fact that this is not so means that they have higher enrolment *than expected*, which is seen as an increase in their adjusted enrolment.

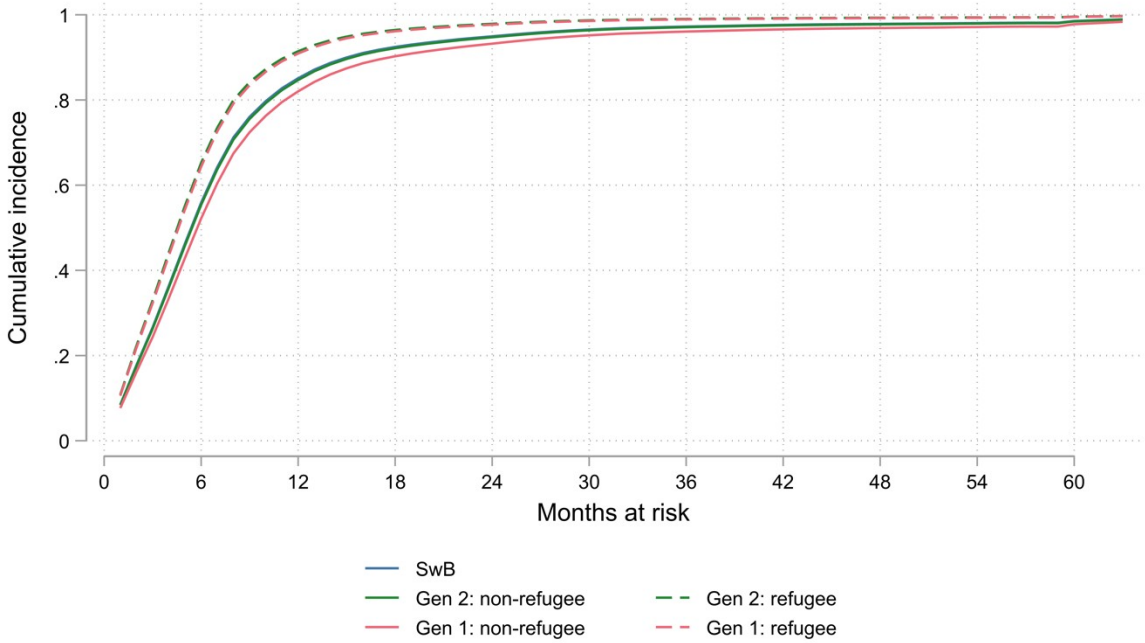

Figure 13. *Predicted pre-school enrolment over month by generation and refugee status, controlling for parental education, activity status, disposable family income, birth order and if parents are living in Sweden. Cohorts born 2014-2021.*

Conclusions

From the observation that enrolment in pre-school is less common among children in immigrant families, it has been a natural next step to draw the conclusions that (1) the children who would need pre-school the most, in terms of improving their later school outcomes, miss out on it; (2) that this is likely due to a lack of information and cultural differences, and (3) that a higher enrolment of these children is important for their future outcomes (see e.g., SOU 2020:67 for all these arguments in the Swedish case). As it turns out, these conclusions are unwarranted in the Swedish case. The lower enrolment of children in immigrant families is almost entirely driven by non-refugee families, and in particular by those who leave Sweden after a few years. This is not a particularly vulnerable

group, and a higher enrolment among them would leave little imprint on inequalities in later educational outcomes.

Our results show the importance of making sure to establish the facts before rushing ahead to build theories and make policies. In the words of Merton (1987: 3–4) “the basic role of empirical research designed to ‘establish the phenomenon’ is at times downgraded as ‘mere empiricism’. Yet we know that pseudo-facts have a way of inducing pseudo-problems, which cannot be solved because matters are not as they purport to be."

If increased enrolment is not the key, what about equalization of the structural quality of pre-schools? Although such equalization may be positive in several ways, there is nothing to suggest that it would equalize later outcomes of children in immigrant and native families – the differences between them in the structural pre-school quality that they face are simply too small. Where we see dramatic differences between children of immigrant and native parents is in the composition of staff and peers: Children in immigrant families go to pre-schools where a much higher proportion of staff and children are of immigrant background. This is not surprising given the strong residential segregation, but the difference is large and most of it persists even for children whose parents have spent decades in Sweden. Of course, having more foreign-background peers and staff is not per se a disadvantage, but is likely to affect language development. Policy-wise, a de-segregation of pre-schools is difficult as it is so closely tied to residential segregation. De-segregating staff, though also difficult and likely controversial, would seem more doable.

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Appendix

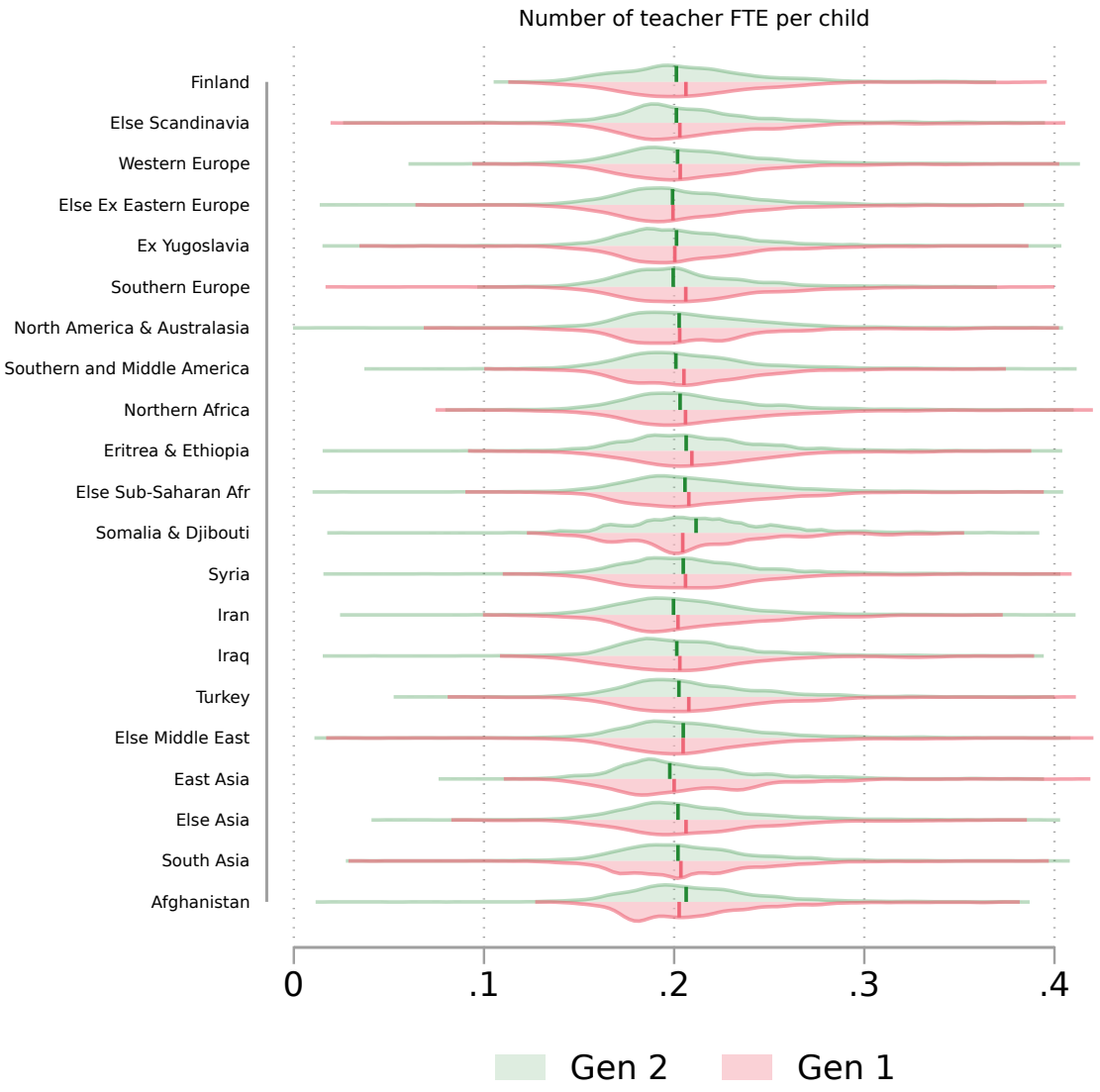

Figure A1*. Teacher FTE to child ratio by origin region. All children enrolled in pre-school in 2022.*

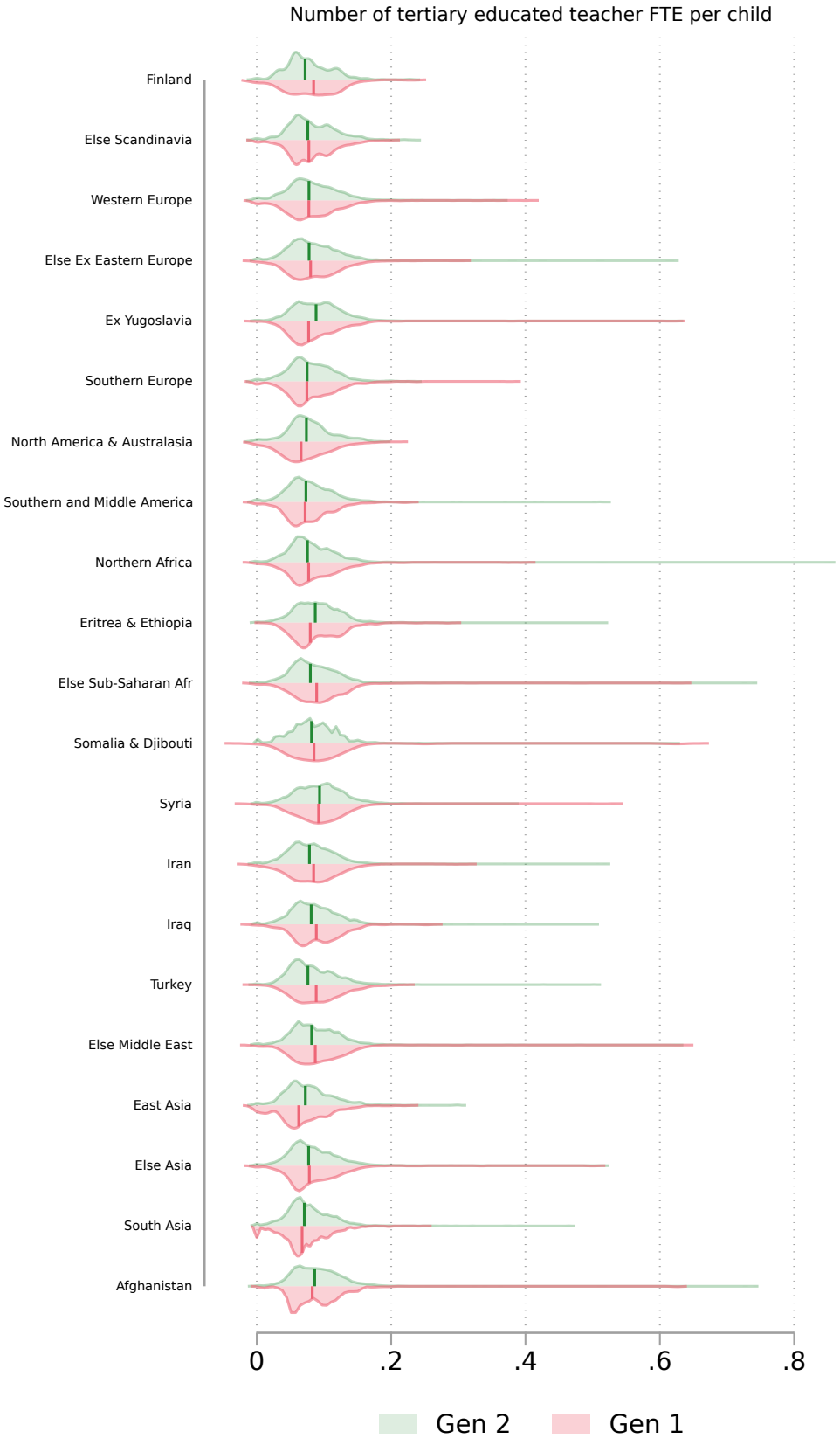

Figure A2. *Number of tertiary educated pre-school teacher FTE per child, by origin region. All children enrolled in pre-school in 2022.*

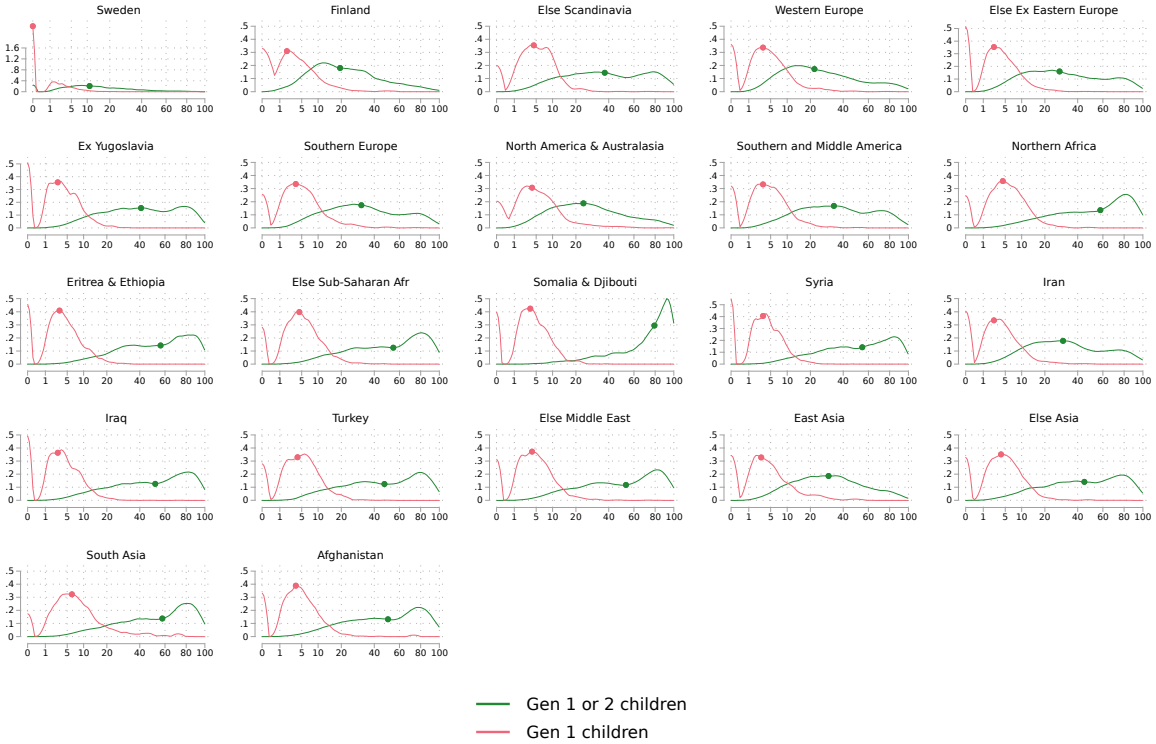

Figure A3. *Distribution of proportion pre-school peers of foreign background (generation 1 or 2, and generation 1 only), by origin region. All children enrolled in pre-school in 2022.*

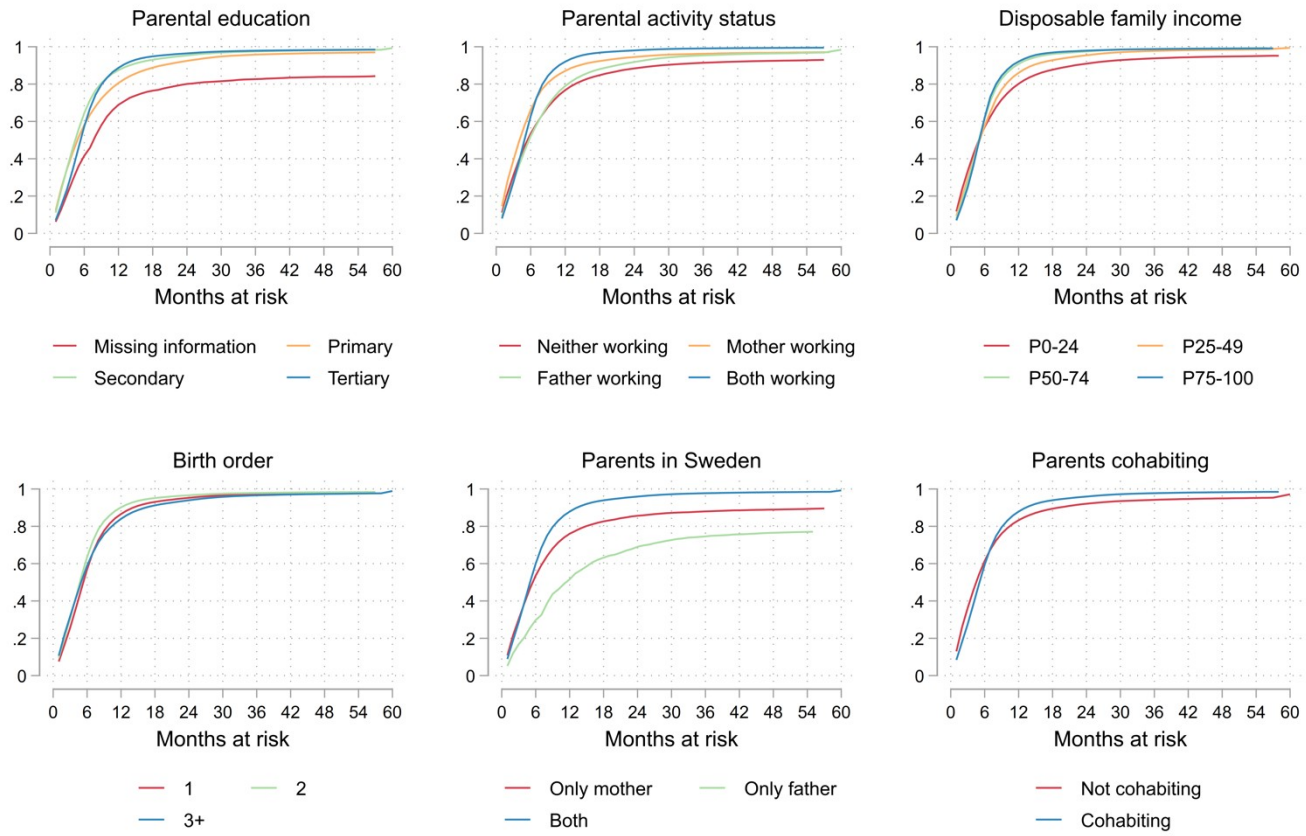

Figure A4. *Pre-school enrolment over months, by parental education, activity status, and income percentiles. Cohorts born 2014-2016.*