

Integrative Report (WP 1)

Lessons and Policy Implications

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CONTENT

ABBREVIATIONS	5
EXECUTIVE SUMMARY / ABSTRACT	6
1 INTRODUCTION	7
2 ROOTS AND DEVELOPMENT OF ACHIEVEMENT GAPS	8
2.1 Early roots of educational inequality and the transition into primary schooling	8
2.2 From school life to young adulthood	9
2.3 Integration of findings: from birth to young adulthood	10
3 THE ROLE OF EARLY CHILDHOOD EDUCATION AND CARE SYSTEMS.....	11
3.1 Overview: The role of ECEC for tackling inequalities.....	11
3.2 Inequality in ECEC participation in Europe	11
3.2.1 Pre-primary ECEC (age 3–5) versus early ECEC (age 0–2).....	11
3.2.2 Socioeconomic disparities in early ECEC utilization	12
3.2.3 Socioeconomic and ethnicity gaps in early ECEC utilization – a longitudinal perspective for the case of Germany	17
3.3 The potential of ECEC to reduce inequalities: a review	22
3.3.1 Theoretical and methodological considerations	22
3.3.2 Targeted programs	23
3.3.3 Universal programs	24
3.4 Concluding remarks	27
4 THE ROLE OF SCHOOL SYSTEMS.....	29
4.1 Overview	29
4.2 Input in educational systems: educational expenditures, class size, teaching hours, and teachers' education and salaries.	29
4.3 System features: age of tracking and vocational specificity.....	30
4.4 Conclusion	31
5 POLICY IMPLICATIONS AND RECOMMENDATIONS	33
6 REFERENCES	36

ABBREVIATIONS

ECEC	Early childhood education and care
EU-SILC	European Union Statistics on Income and Living Conditions
Eurostat	Statistical office of the European Union
NEPS	National Educational Panel Study (Germany)
PIAAC	Programme for the International Assessment of Adult Competencies
OECD	Organisation for Economic Cooperation and Development
PIRLS	Progress in International Reading and Literacy Study
PISA	Programme for International Student Assessment
SES	Socioeconomic status of the family
TIMSS	Trends in International Mathematics and Science Study

EXECUTIVE SUMMARY / ABSTRACT

This report summarizes and integrates all findings from ISOTIS Working Package 1 – Inequality at various stages of the educational career. Inequality in educational achievement by family socioeconomic status (SES) exist in most countries in the world and are particularly pronounced in Europe. SES gaps emerge early in life and are largely persistent throughout school. While SES-achievement inequality is largely persistent, migration-related achievement inequality depends on the national context and is frequently a timing issue as many migrant children catch up in school. Yet, educational policies must be informed by ethnic peculiarities in the specific national context.

Early investments in children before they go to school will pay off in terms of reducing inequality. Our analyses show that both targeted and universal ECEC interventions/policies help disadvantaged children to catch up and to alleviate early educational inequality, although, it remains unclear which approach is ultimately the most efficient policy strategy for reducing achievement inequality. Nonetheless, the contemporary landscape of European ECEC systems show room for improvement in terms of equal opportunities. There is a pronounced variation in ECEC utilization inequality by SES across European countries and that variation is largely independent of overall coverage levels. Thus, policy should aim at reducing access hurdles for socioeconomic disadvantaged families and minority group families. Moreover, ethnic minority groups and families with migration background are structurally more reluctant than majority/native families to enrol their children in early ECEC. Some but not all of these disparities are attributable to migrant families' lower socioeconomic resources. Thus, ECEC policies must be aware and sensitive to different values and cultural expectations of minority groups in relation to early childhood education and care.

When it comes to general educational policies and reforms in relation to educational systems, we found that those reforms and policy changes frequently do not seem to have the intended effects of reducing SES and migration-related educational inequalities. In fact, many reforms seem to have unintended side effects of increasing educational inequality. As we argue in the report, this points to problems with regard to the implementation of reforms. Thus, policies should implement measures to reduce negative side effects of reforms. Most importantly, 'targeted' efforts may ensure that disadvantaged groups are more effectively reached by policies. Moreover, standardization in rules and organisation of school systems may additionally offset negative side effects. Also, our findings point to occasional trade-off relationships between reducing socioeconomic and reducing migration-related educational inequality. Thus, policy makers should be aware of possible goal conflicts and the need to prioritize.

1 INTRODUCTION¹

ISOTIS Working Package 1 (WP1) studied how the formation and the evolution of achievement inequalities from infancy to young adulthood align along with two of the most critical dimensions of stratification in Western societies, namely family socioeconomic status (hereafter: SES) and migration (and ethnic) background. In addition to quantifying these inequalities, the working package identified key policies that might reduce or amplify inequalities.

The empirical work structured around two complementary and comparative research designs. The first design relied on national longitudinal assessment data, obtained from country specific cohort studies, that provided achievement data from infancy to the end of primary education for a selection of European countries: Germany, the Netherlands, the United Kingdom, Norway, and Italy (Passaretta and Skopek 2018a). This first design allowed us to study in-depth the early roots of socioeconomic and migration-related inequalities and to offer a genuinely longitudinal account of the inequality process at hand.

The second design integrated repeated cross-sectional data from international assessment studies (PISA, TIMSS, PIRLS, PIAAC), covering the end of primary education until young adulthood in more than 100 countries, including almost all European countries (Rözer and Van de Werfhorst, 2017; Rözer and Van de Werfhorst 2019). The resulting cross-national database was enriched by adding institutional and policy data on the country level, including educational policies related to the input (i.e. educational expenditure, class size, teacher salaries, teaching hours, teacher quality) and structure (i.e. coverage of pre-primary school enrolment, age of compulsory education, tracking age, and vocational specificity) of educational systems. We applied a variety of methods in which we look both at between country differences, within country changes over cohorts, and in which we follow cohorts over their life course.

The combination of those two research designs enabled us to provide the one of the most comprehensive and most recent portraits, currently available in the literature, of the evolution of social and migration-related disparities in educational achievement in Europe and the world.

The report is structured as follows. First, we briefly summarize and integrate our findings from previous reports on the roots and development of socioeconomic and migration-related achievement gaps across various stages of the educational career. In a second and larger section, we discuss the potential of early childhood education and care for reducing socioeconomic and migration-related inequality in education. For that, we present evidence on ECEC utilization as well as socioeconomic and migration/ethnicity related disparities in usage for European countries. Moreover, we evaluate the effectiveness of targeted and universal ECEC provision in terms of reducing educational inequality by socioeconomic status based on (quasi-)experimental evidence from reforms in European countries and other Western countries. In a third section we summarize and integrated findings from a cross-national analysis on how educational reforms and changes in educational policies in the past had been associated with reducing socioeconomic and migration-related gaps in student achievement. We conclude with several important implications and recommendations for policy making.

¹ Contributors: All authors.

2 ROOTS AND DEVELOPMENT OF ACHIEVEMENT GAPS²

This section will summarize and integrate central findings on roots and development of socioeconomic and migration/ethnicity related achievement gaps based on previous research of Working Packages 1. Detailed findings and analyses can be found in report deliverables D1.2 ('Inequalities in Educational Opportunities by Socioeconomic and Migration Background: A Comparative Assessment Across European Societies', Rözer & Van de Werfhorst 2017) and D1.3 ('Roots and Development of Achievement Gaps: A Longitudinal Assessment in Selected European Countries', Passaretta & Skopek 2018a).

2.1 Early roots of educational inequality and the transition into primary schooling

Our longitudinal study shows that socioeconomic and migration-related achievement gaps in school age are rooted substantially in the early years of life.

Children from high-income families and parents with a high level of education perform consistently better than children from less affluent families and whose parents have less educational resources. These gaps between different socioeconomic groups are already visible in the first two years of life, remain stable or even increase steadily over infancy, and are well-established even before children enter primary education. After the transition to formal schooling, socioeconomic disparities in achievement remain quite stable and increase only slightly throughout the years of primary and lower secondary school. Notwithstanding subtle differences across countries, we found considerable similarities in the evolution of socioeconomic gaps in achievement despite apparent institutional differences in national education systems and overall welfare-state arrangements. Besides, a significant part of socioeconomic achievement inequality accumulated over the early years is carried over to the years in (primary) schooling even though factors related to family socioeconomic status continue to shape educational achievement among school-aged children. Hence, preschool-age interventions that facilitate a more equalized start into school life hold the promise of reducing a large part of socioeconomic achievement inequality in the later school career.

There is more cross-country heterogeneity in the patterns of achievement inequality by children's migration and ethnic background. In general, children with migration or ethnic-minority background enter school with substantially lower skills compared to children without a migration background. Among others, children with a Turkish and Moroccan background are particularly disadvantaged. Socioeconomic disadvantages related to migration background account for those inequalities only in part. These findings varied between countries and target groups. In some countries, early disadvantages of migrant children vanish almost entirely over the school age, while in others those inequalities persist throughout primary and lower secondary education. Among the studied country cases, UK and Germany revealed the largest contrast. While the migrant-native gap closes quickly after the school entry in the UK, the migrant-native gap does not decrease over schooling in Germany. In the UK, Germany and the Netherlands we find that, although lagging behind at the school entry, children with a migration background enjoy over-proportional achievement gains over the school age: children of immigrants on average

² Contributors: All authors.

outperform children of natives in educational achievement when having started primary education at equal achievement levels. Hence, reducing migration-related inequality in preschool age could have the potential to eradicate migrants' penalties in school age entirely.

2.2 From school life to young adulthood

Findings obtained from the repeated cross-sectional design revealed that socioeconomic disparities in educational achievement are substantial in almost every country in the world. Home environments and parental cultural capital seem relevant sources of achievement disparities especially in Europe, where the number of books at home is a particularly good predictor of children's educational performances. We found that, overall, the last 10 years there has seen a slight increase in socioeconomic disparities.

Our study demonstrated that, in high income countries, socioeconomic gaps in achievement are already considerable in grade 4 of primary schooling (around age 10), which was the first point of observation in the study. Furthermore, the evidence suggests that SES inequality in achievement remains quite stable throughout the years of primary and lower secondary education. Inequality even seem to decrease slightly between grade 4 (age 10), grade 8 (age 14) and age 15. However, after age 15, a time at which many children leave the school system or go to very different types of schools such as upper vocational or academic education, socioeconomic disparities in achievement increase substantially. For example, we found that at around age 30, socioeconomic gaps in reading and math were approximately 50 percent larger than they had been at around age 10/11 in the 4th grade. This result suggests that not only much is to gain before primary education, but also after secondary education, while primary and secondary schools might function as equalizers in comparison to a situation in which children would not attend school.

The analyses suggest that migration-related achievement gaps are less pronounced and much more diffused than socioeconomic gaps. In several liberal countries and countries with selective immigration regimes, such as the United Kingdom, Australia and the Gulf region, children of immigrants outperform the majority population, even net of socioeconomic status. In contrast, migrant children's disadvantage in educational achievement were found to be larger in North-Western continental European countries such as Finland, Germany, Belgium, Austria, and the Netherlands. When there are gaps to the disadvantage of immigrant children, they are likely to shrink over generations. We found that achievement gaps among first-generation migrants and natives is often approximately halved by the second generation, irrespective whether they first performed worse or better than natives. First- and second-generation migrant children seem to catch up with natives over time, especially at grade 4 and 8.

On average, however, children of immigrants still perform academically worse than natives, especially when it comes to reading. In line with the longitudinal findings from the comparative cohort design, achievement gaps are substantial in grade 4 (age 10) but after that point children of immigrants catch up to children of natives in primary and secondary school. In those countries in which achievement gaps between natives and first-generation migrants increase in young adulthood (even up to age 33), achievement gaps between natives and second-generation migrants remain stable. Thus, second-generation migrants seem to approximate the performance levels of the native majority, especially in later life.

2.3 Integration of findings: from birth to young adulthood

All in all, results from the two research designs point towards the early roots of social and migration-related inequalities in educational achievement.

Socioeconomic inequalities in achievement exist in most countries in the world, are particularly pronounced in Europe, and also seem to be on the rise in the last 10 years. Those disparities have their roots early in life and become clearly visible at early ages (around age 2). They generally increase before children enter the formal education system. After school entry, social gaps remain mostly stable over primary and lower secondary schooling. However, gaps increase when adolescents move towards young adulthood after the age of 15. Importantly, socioeconomic disparities in early achievement observed in preschool age explain a large part of later socioeconomic disparities in school life achievement. All these findings suggest the potential of early intervention to abate social inequality in the educational achievements of adolescents and young adults.

Achievement inequality also aligns with children's migration background. Children of immigrants perform lower compared to children of natives in most developed countries, although migrant children's disadvantage has somewhat declined in the last decade. In the early years of life children of immigrants have a more difficult start in terms of achievement, but they do catch up to some extent. For many countries, we have observed migrant children's achievement levels catching up with native children's over primary and secondary schooling. Thus, based on our longitudinal evidence on migration-related inequality in educational achievement, it seems important to emphasize that migrant children's disadvantages in school is frequently a timing phenomenon. Furthermore, where a penalty persists in lower secondary education, gaps between natives and second-generation migrant children remain stable whereas gaps between natives and first-generation migrants increase towards young adulthood. However, when starting school life with the same achievement, migrants seem even to outperform natives in later educational stages, thus suggesting that reducing migration-related inequality in preschool age may eradicate educational penalties associated with migration background in school and even beyond.

3 THE ROLE OF EARLY CHILDHOOD EDUCATION AND CARE SYSTEMS³

3.1 Overview: The role of ECEC for tackling inequalities

Our findings on achievement gaps summarized above suggest that a large part of socio-economic inequality in educational achievement in school life is merely reflecting achievement inequality that pre-exists right at school start or before school life. This result stresses the relevance of policies that effectively level the playing field before children actually enter school. In this section we aim to link our findings on social and ethnic achievement gaps to evidence on Early Childhood Education and Care (ECEC) effectiveness.

We will start with an analysis on social and ethnicity related disparities in utilization of ECEC services and institutions. As we will see, systems of ECEC in Europe exhibit most differences when it comes to early ECEC catering children below age three. Thus, we will focus on that critical age period. International data from EU-SILC on ECEC uptake will be evaluated and complemented by a case study on socio-economic and ethnic difference in ECEC exposure and enrolment Germany exploiting detailed longitudinal data from the German National Educational Panel Study (NEPS). In a second step, ECEC reforms will be assessed and evaluated in relation to their effectiveness in reducing inequalities in achievement gaps. We will evaluate experimental and quasi-experimental evidence on targeted ECEC interventions but also on universal ECEC reforms in European and other Western countries. (Quasi-)Experimental evidence is chosen for it provides the most valid evidence for the effectiveness of ECEC programmes. The section will close with some conclusions and important policy lessons with respect to the role of ECEC systems for tackling inequalities.

3.2 Inequality in ECEC participation in Europe

An important aspect of the empirical reality of universal ECEC programmes is the way how families utilize ECEC services and how selective the uptake of ECEC services is among children in Europe. Growing demand for public provision of childcare flanked by numerous childcare bills over the last decades has produced an unprecedented expansion of childcare and early education sectors in many European countries. Indeed, as we will briefly show in the following, not all children have been affected equally from these developments.

3.2.1 Pre-primary ECEC (age 3–5) versus early ECEC (age 0–2)

First, in stark contrast to the context of the United States from where a large body of empirical evidence on ECEC programs originates, the European landscape of ECEC is characterised by nearly universal coverage in the older age groups of 3 to 5 years of age. In many European countries this can be explained by the existence of childcare institutions featuring long socio-cultural and historical roots such as the 'Kindergarten' in Germany, the 'Scuola Materna' in Italy, or the 'École Maternelle' in France.

Panel-II in Figure 1 provides an overview based on recent data on age-group specific utilization rates of ECEC services. In a large majority of countries, more than 80% of children in

³ Contributors: Skopek, J., van Huizen, T.

preschool age (3 to 5) attend ECEC institutions. In sharp contrast, Panel-I in Figure 1 reveals substantially lower ECEC attendance rates among the younger age group (0–2) and also more country heterogeneity – ranging from nearly no attendance in Slovakia, Czechia, Poland, or Greece up to more than 50% in Netherlands or even 70% in Denmark. Children’s experiences in institutions of ECEC also vary by intensity of usage. For example, whereas Norwegian and Dutch toddlers share about the same overall ECEC attendance rate (50%), among those who do attend, Norwegian children spent substantially more hours than their Dutch counterparts in ECEC institutions.

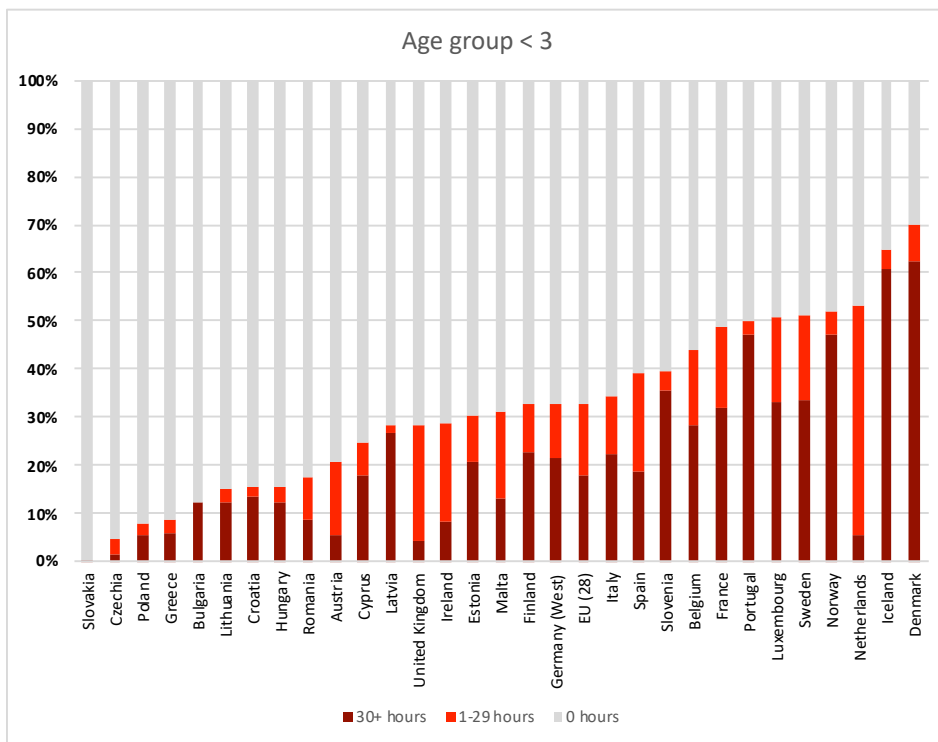
These basic figures on the demography of ECEC utilization signify the importance of institutional contexts, national social policies, and their cross-national heterogeneity in shaping early educational opportunities for children. Therefore, sociological and social policy perspectives on ECEC argue that families’ ECEC utilization behaviour determines the ‘who’ in a population of children will be able to reap the potential benefits of ECEC programmes (Kulic et al. 2019; Skopek et al. 2017). Patterns of utilization should thereby be understood as the joint outcomes of both mechanisms of demand (preferences, cultural norms and constraints of families making decisions upon childcare arrangements) and supply (availability and costs of childcare provision) (see Kulic et al. 2019; Pavolini and Van Lancker 2018).

3.2.2 Socioeconomic disparities in early ECEC utilization

Second, children’s ECEC uptake varies not only between countries but also within countries. As we will study in more detail now, this variation is marked along lines of socioeconomic status, migration background and ethnic minority status. In general, it was found that families with less socioeconomic resources in terms of social class, education, and income are more likely to keep their children in informal care rather than giving them to formal ECEC (e.g., Tang et al. 2012, Brilli et al. 2017; Pavolini and Van Lancker 2018). Other studies report lower level ECEC utilization for children with ethnic minority status or found evidence for social and ethnic disparities in quality characteristics of ECEC centres attended (e.g., Becker and Schober 2017; Zachrisson et al. 2013; Tang et al. 2012; Magnuson and Waldfogel 2005). Knowledge on utilization gaps is paramount to inform social policies on which social and ethnic groups needed to be particularly addressed to increase early educational opportunities for children from disadvantaged family backgrounds.

In the following, we will empirically illuminate issues of unequal participation at ECEC services for the youngest age group of children below age 3. We begin from a European-wide perspective by compiling evidence from statistical data that has been published by the OECD. Afterwards, we will take on a more in-depth look into the case of Germany by using detailed longitudinal data on early ECEC utilization.

I



II

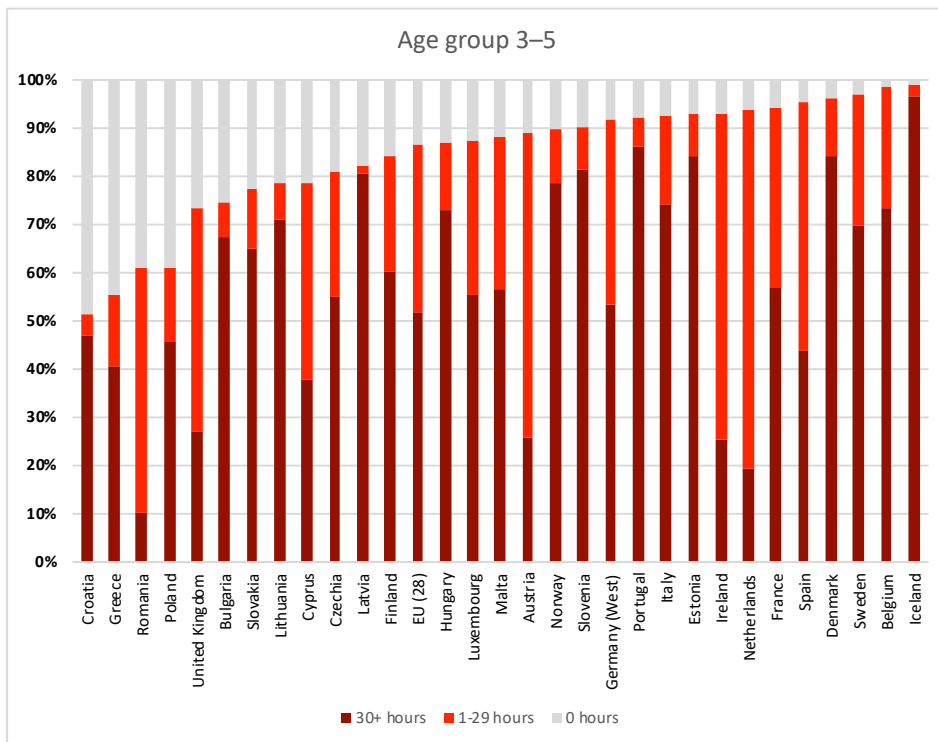


Figure 1: ECEC utilization rates in age groups 0–2 and 3–5 in Europe in 2016.

Source: Eurostat. Data from the EU-SILC Survey. Children in formal childcare or education by duration (weekly hours spend in childcare). Older age group defined from 3 years to minimum compulsory school age which is mostly age 5.

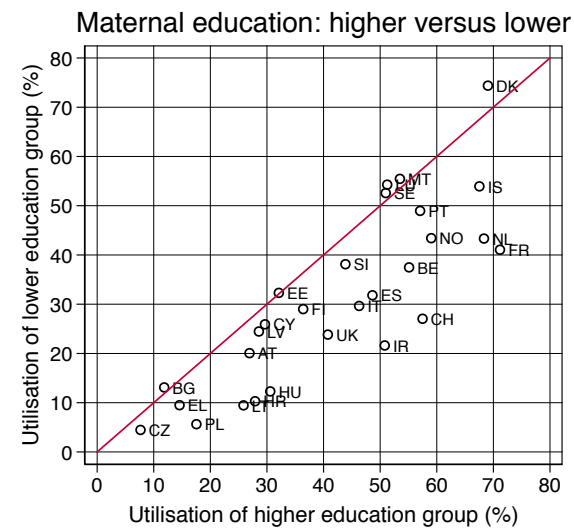
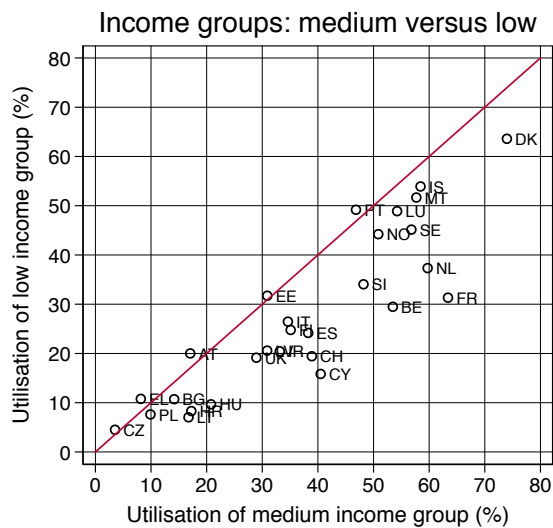
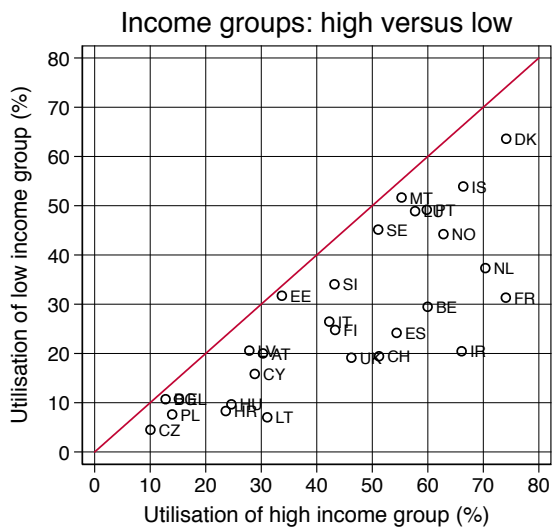
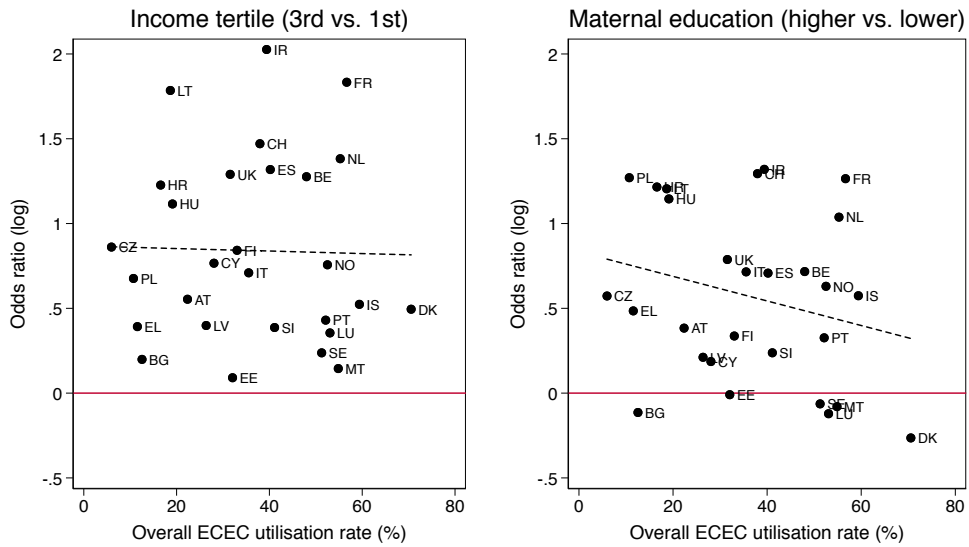


Figure 2. Rates of ECEC utilisation of socioeconomic groups in comparison.

Notes: N=28 countries. Red diagonal line indicates equal utilisation rate. Reference group on the horizontal axis, comparison group on the vertical axis. Data points below the redline indicate higher utilisation of reference over comparison group. Data from OECD estimates based on EU-SILC data. Own illustration.

(I) Utilisation inequality by overall utilisation rate



(II) Utilisation inequality by public spending per child

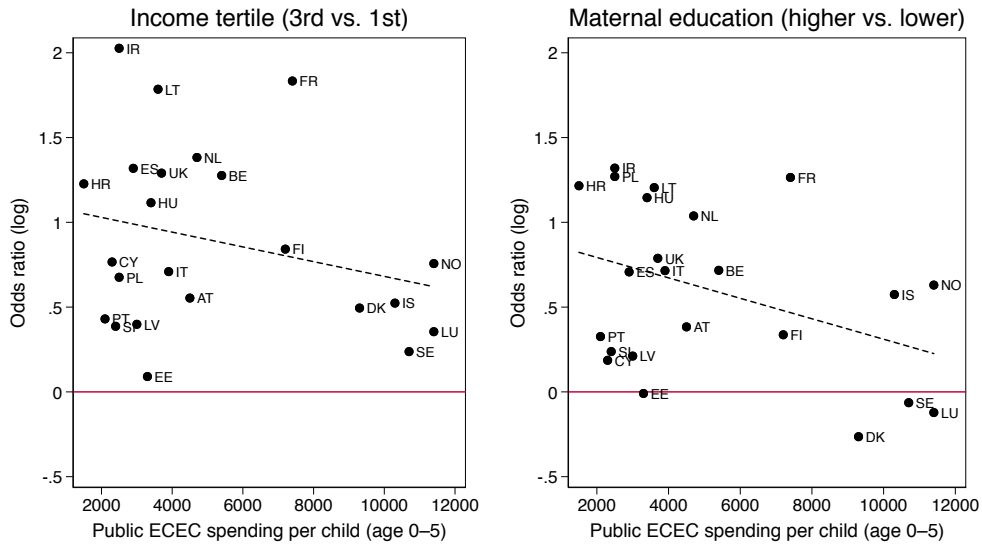


Figure 3 Correlates of socioeconomic inequality in early ECEC utilization across European countries.

Notes: N=28 countries of Panel I. N=23 countries for Panel II. Data from OECD estimates based on EU-SILC data. Own illustration.

How does socioeconomic inequality in early ECEC participation vary across Europe? And, does inequality vary by the relative size of early ECEC systems? It is tempting to presume that more universalized early ECEC systems, that is those with larger utilization in the population of children, exhibit also more social parity in participation. To explore these questions, we used estimates on 29 European countries provided by the OECD (based on EU-SILC data) that allow a breakdown of ECEC participation in Europe by maternal education (tertiary education attained or not) and tertile groups of equivalized disposable income. The data is valid for the year 2016. We compare first rates of ECEC utilisation rates across groups (Figure 2). Additionally, in Figure 3, we measured relative inequality among groups in ECEC participation by calculated the log of the ratio of odds of ECEC usage between higher socioeconomic groups versus lower socioeconomic groups (values larger than 0 indicate higher likelihood of ECEC usage for the high SES group, 0 indicates equal likelihood, and values below 0 indicate higher likelihood of the low SES group).⁴

Inspecting group-specific rates first, we find that in almost all countries children from lower income families and families with lower educated mothers have lower utilisation rates (see Figure 2). For example, for Ireland and France we find highest differences in utilisation rates of children from high- and low-income families. Estonia stands out by having nearly homogenous participation rates across all socioeconomic groups. Differences are small for countries such as Poland or Czechia, however, overall utilisation rates are very low too. In the next step, we are going to inspect findings based on our relative measures of inequality.

The scatterplots in Figure 3 show cross-national correlations between socioeconomic inequality in (below age 3) ECEC participation (log-odds ratio) and the overall (below age 3) ECEC utilization (Panel I, N=28 countries) and public ECEC expenditures per child (Panel II, N=23 countries).⁵ Also based on odds ratios, we observe a considerable variation in socioeconomic inequality of ECEC utilisation across European countries. The largest association between income groups and ECEC participation was found again for Ireland and France, the lowest in Estonia and Bulgaria. We also note substantial inequality by maternal education for many countries. Moreover, we do not find any meaningful cross-country correlation between the degree of ECEC universalization (the overall coverage) and our measure of inequality (Panel I) for income. We do see, however, a negative association between access inequality in terms of maternal education and ECEC coverage suggesting lower access inequality by maternal education in countries with higher overall enrolment rates. Finally, we repeated the exercise with

⁴ We calculated the odds ratio for its advantage of being a measure for the association of ECEC utilization and maternal education or income respectively that is in its calculation independent of the marginal rates of utilization. The odds ratio (OR) is defined as the ratio between group specific odds: O_{high} / O_{low} . Odds are defined as the fraction of children in ECEC (f_{ECEC}) versus the fraction of children not in ECEC, e.g. for the high SES group: $O_{high} = f_{ECEC, high} / (1 - f_{ECEC, high})$. The odds ratio is defined from 0 to infinity with a value of 1 being the equality point (if $OR = 1$ then groups have the same probability of ECEC usage). The odds ratio is a measure of a categorical association that is margin-free. The same categorical association can have different implications at different levels of the baseline fraction. For example, let the odds ratio O_{high} / O_{low} be 2 and the fraction of children attending ECEC be 50% among the low SES group. That implies that the fraction of children from high SES families that are attending ECEC is 66.7%. The percentage difference is 16.7 percentage points accordingly. Alternatively, preserve the odds ratio but set the baseline fraction of attending ECEC to 90% for the low SES group. Thus, the fraction for the high SES group is about 94.7% and the percentage difference only 4.7%. While the margin-free association between ECEC attendance and socioeconomic status group remains the same ($OR = 2$), the percentage difference varies depending on the baseline level of attendance. Furthermore, we took the logarithm of the odds ratio which yields a linear interpretation: values larger than 0 indicate that the more advantaged socioeconomic groups utilize ECEC more, values close to 0 indicate equality, and values lower than 0 indicate higher utilization by the socioeconomically disadvantaged group.

⁵ The expenditure measure was not available for all countries. We decided for the indicator of ECEC spending-per-child for age range 0–5 rather than 0–2 because the latter information was available only for a small subset of the data. However, when taking the spending indicator for age range 0–2 for the smaller subset of countries we found very similar trends.

another indicator, the amount of public spending per child. The figures reveal a negative cross-country relationship between per-child ECEC spending and inequality by household income and maternal education; higher public spending on ECEC goes apparently along with lower socioeconomic disparities in ECEC access – at least on the levels of countries.

The figures just presented suggest that there is socioeconomic inequality in early ECEC participation, however, the degree of that inequality varies considerable between countries. We also found no systematic cross-country relationship between a country's degree of ECEC participation inequality on the one hand and a country's overall ECEC coverage at the earliest age group on the other hand. Apparently, also in countries that have very high early ECEC coverage socio-economic disparity in access can be pronounced. As regards full universal systems there, explanations for unequal utilization rates must be sought in demand-related factors (such as individual families' preferences and choices) rather than aspects of rationing or supply factors. On the other hand, there are countries with modest or small coverage but comparably low socio-economic disparities in ECEC usage. That could result from institutional rules that give priority to children from low SES families in case of oversubscription while higher SES families evading to private alternatives (such as nannies or private services). Furthermore, one should note that low ECEC coverage particularly in Eastern European countries may be explained by their extensive maternity leave systems. Finally, although we found no consistent relationship between higher coverage and lower inequality in utilization, we saw a pattern that those countries that are spending more per child in the entire ECEC sector are also those countries that exhibit lower levels socioeconomic inequality in early ECEC participation.

Our exploration of cross-country differences provides an informative portrayal of correlates at the macro-level context of ECEC inequality, but it has important limits. In particular, we want to stress that such between-country correlations do not imply causality. Studies that are can link reforms in early childcare policies with detailed ECEC participation data would be needed to address the issues of causality. An example is a recent study by Sibley et al. (2015) who investigated the impact of policy reforms on unequal ECEC participation rates in Norway. They found that progressive introduction of universal childcare policies that increased both availability and affordability of ECEC use in fact lead to a mitigation of the utilisation gap with regard to parental education and family income.

3.2.3 Socioeconomic and ethnicity gaps in early ECEC utilization – a longitudinal perspective for the case of Germany

Finally, we present figures on socioeconomic and migration- and ethnicity related utilization gaps for Germany. The in-depth perspective allows us to inspect more nuanced facets of unequal ECEC participation such as the aspect of migration background and ethnicity or more dynamic aspects of utilization such as time-dependent exposure formal care in the early years.

For this purpose, we re-used longitudinal data from the preschool children cohort of the German National Educational Panel Study (NEPS – Starting Cohort 2) which has been analysed before in the report on roots and development of achievement gaps (Passaretta & Skopek 2018b). For the construction of measures on early ECEC utilization below age 3, we additionally exploited detailed data on children's childcare histories provided by the parent interviews and linked them to socioeconomic and ethnic groups. We evaluated group-based utilization outcomes by two measures: (I) types of non-parental care attended before age 3 and (II) the amount of time

children had been attending formal ECEC ('exposure') before age 3. Note that the *old Laender* (West Germany) and the *new Laender* (East Germany) of Germany differ in important ways in terms of ECEC uptake as well as the socioeconomic and ethnic composition of the population. Presenting an accurate empirical account requires preventing the results to be distorted by regional confounding. Therefore, we restrict the following analyses to West Germany only. The findings are representative for the early childhood experience of children who were born around 2006 and attended Kindergarten in 2011 in West Germany (average age of 5).

Figure 4 shows selected descriptive results on ECEC utilization in (West-Germany). Socioeconomic characteristics matter substantially for children's experience of early care. Children of high educated parents are not only more frequently cared for in formal settings of ECEC (67% as compared to 42% among children of low educated parents), they also experience more frequently other sorts of non-parental care such as care provided by relatives (mostly grandparents) and nannies. Exposure measures reveal substantial utilization gaps among children of higher and lower educated parents too. For example, by end of the third year of life (36 months of age), children from high educated parents had spent more than twice as much time (about 10 months or 28% of their lifetime) in centre based care compared to children from low educated parents (4 months or 11% of their lifetime). Even though these gaps were closing when children approached Kindergarten age, these numbers suggest a profound social stratification in early ECEC participation. The picture is essentially the same when inspecting income instead of education groups.

We do observe some differences for children with and without migration background too. However, gaps are pronounced only when comparing children with native parents and children with two immigrant parents – the difference between native children and children with only one immigrant parent are comparably small. Ethnic differences and differences by language spoken at home are important facets of unequal ECEC participation too. With respect to ethnicity, we could distinguish between Germans, the historically two largest ethnic groups in Germany – Russians and Turks – and a residual category other. Children from Turkish origins stand out by having the least experience of non-parental sorts of care and the lowest uptake of ECEC by age 3. Finally, we observe that children from non-German speaking homes have a substantially lower exposure to ECEC compared to children from German speaking homes.

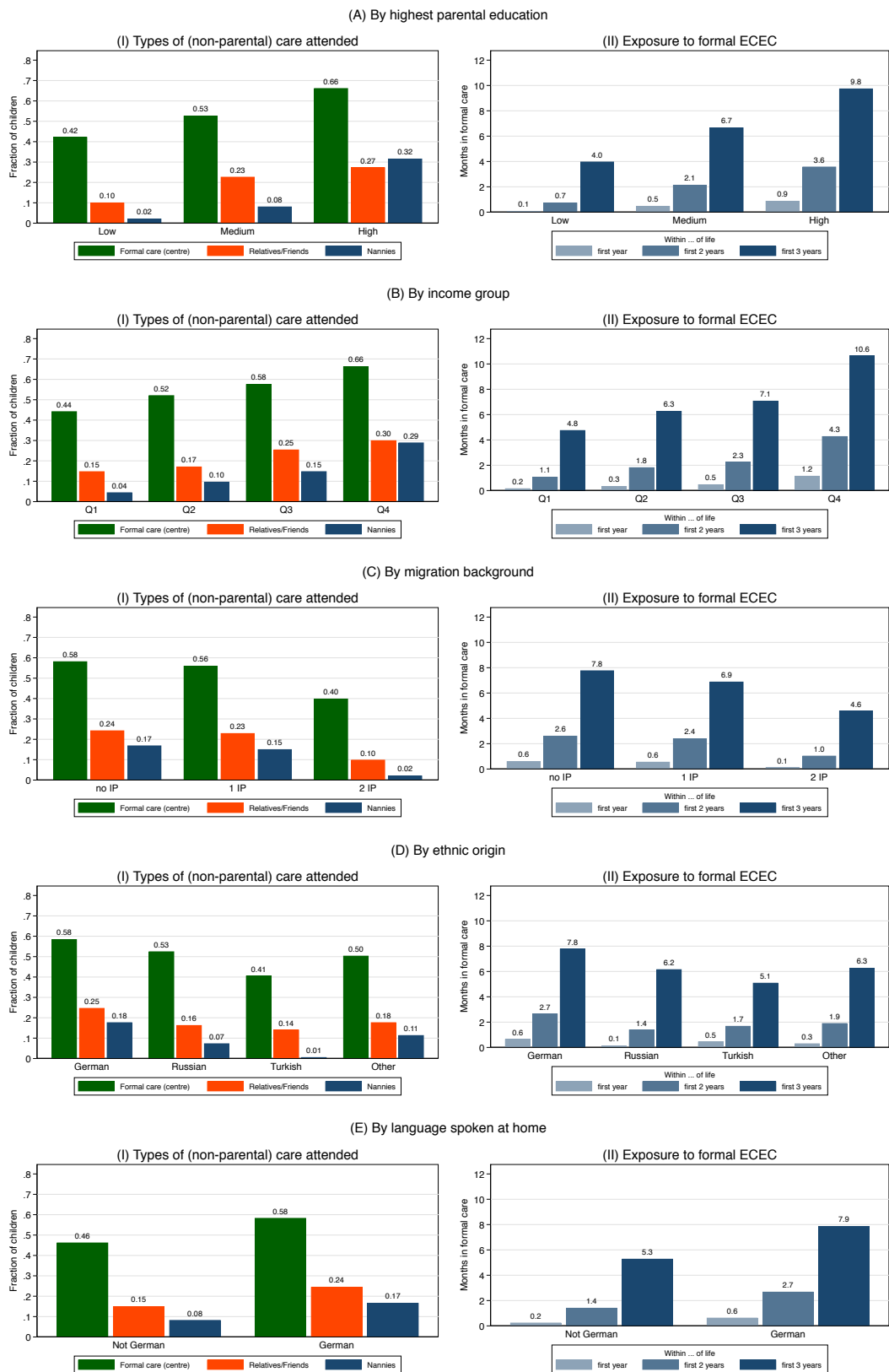


Figure 4. Non-parental care (Panel I) and exposure to formal ECEC (Panel II) by groups in West Germany.

Note: Data from NEPS Starting Cohort 2. West-Germany only. N=1715. Weighted.

To which extent are the previously found utilization gaps between native German children and ethnic minority children caused by group differences in socioeconomic resources? Figure 5 aims to address this question. Shown are the observed rates of ECEC exposure by end of the third year of life (when children reached 36 months of age) and rates that we would expect to see if minority groups had the exact same education and income situation of the majority group (shown by the green bars). Expectations (observed plus 'simulation' in the figures) have been calculated based on regression models that predict exposure based on the minority status variable, highest parental education, and income and exchange of distributions between groups.

Results of this exercise suggest that a fair part of the minority gaps in ECEC utilization are attributable to a corresponding gap in socioeconomic resources. For example, the German-Russian gap would disappear entirely and the German-Turkish gap to a large extent if the Russian and Turkish families had the German families' educational and monetary resources (see Panel A in Figure 5). Likewise, the gap between children of natives and children of immigrants as well as the gap between German and non-German speaking families would be substantially smaller, although it would not entirely disappear. Together, our evidence suggests that the relative underutilization of early ECEC by ethnic minority groups of is to a large extent rooted in their different socioeconomic realities. Yet, the findings also indicate some utilization gaps for minority groups that are not explained by socioeconomic resources. Those remaining gaps might be explained by factors which could relate to cultural differences and barriers. Research on immigrants' beliefs towards attitudes preschool participation documents the role of language and cultural differences may play in preventing immigrant parents and school administrations from working together to achieve educational goals (Tobin et al. 2013). Moreover, as Kulic et al. (2019) point out, particular disadvantages for minority groups might stem from a lack of integration policies in other spheres and domains such as the labour market, forcing them into specific childcare options which are many times informal care. As it is argued by Kulic et al. (2019), genuine minority related disadvantages in ECEC utilisation require special attention by social policy analysts which must be culturally informed and more holistic in scope by taking into account the broader situation of minority groups' societal integration.

Summing up, we would like to underline that prior research as well as our own analyses strongly suggest that children from disadvantaged family backgrounds who are most likely to benefit from ECEC participation are least likely to participate in the first place. Thus, for benefits to be reaped, policies should focus on providing accessible and affordable ECEC plans to all families. Moreover, ECEC quality matters for the gains and the participation. Thus, quantitative expansion of the ECEC infrastructure must not come at the expense of diminishing ECEC quality.

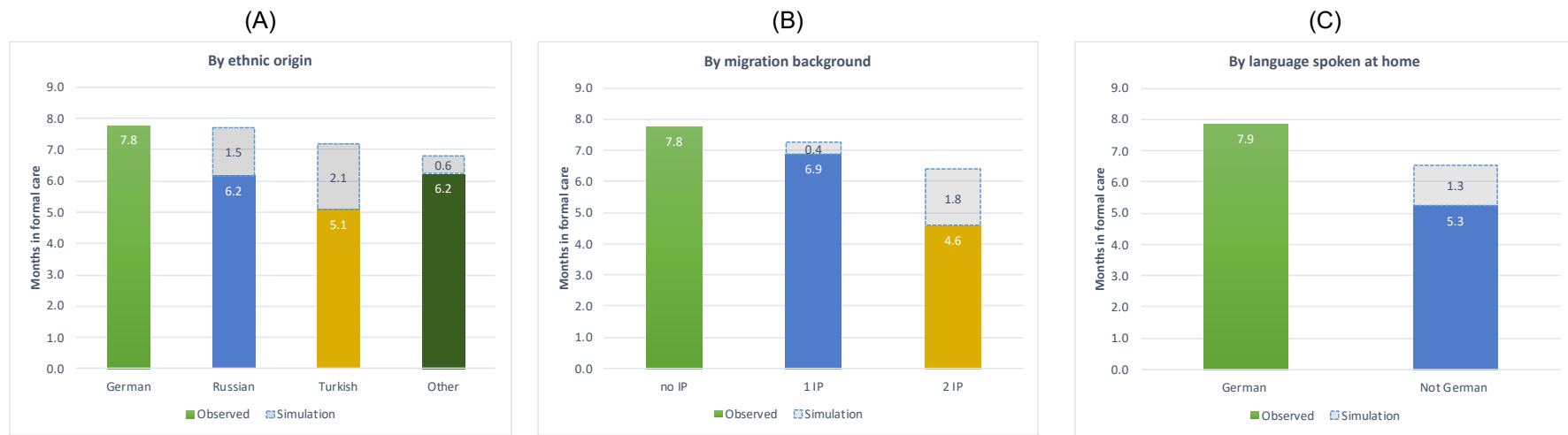


Figure 5. Observed exposure and expected/simulated ECEC exposure by age 3 if minority groups had the same socioeconomic composition as the majority group (green bar).

Note: Data from NEPS Starting Cohort 2. West-Germany only. N=1715. Weighted.

3.3 The potential of ECEC to reduce inequalities: a review

3.3.1 Theoretical and methodological considerations

There is a large and growing evidence base showing that experiences and environments in the first years of life are critical for the development of abilities and skills (Rowe and Goldin-Meadow, 2009; Cartmill et al., 2013; Currie and Rossin-Slater, 2015). As participation in ECEC implies that children spend a substantial part of their time outside the home environment (or the informal care environment), the use of ECEC changes these experiences and environments and thereby has the potential to have large implications for children's abilities and skills.

In this section, we discuss four key general issues that are important to understand the mechanisms generating effects on child development as well as the empirical evidence on ECEC effectiveness in general. First, the extent to which enrolment in ECEC is beneficial (or detrimental) for child development depends on the *features of the ECEC program*: 1) the *quality* of the provision: high-quality programs provide more stimulating learning environments and therefore may generate larger gains; 2) the *intensity* of the program: part-time programs may not have the same impact as full-time programs; 3) the *starting age*: the starting age determines the total exposure (duration) of ECEC use. Moreover, ECEC may be more effective in some periods than in others, for instance because child development is more sensitive to the learning environment during some phases rather than others (Doyle et al., 2009). These issues are directly related to inequalities in the use of ECEC: high SES families may be more likely to select higher quality services, use more ECEC hours and enrol their children at an earlier age.

Second, we should emphasize that the *counterfactual* mode of care crucially matters for determining the effectiveness of ECEC programs. Any claim about program effectiveness is a relative statement: compared to what is the program considered effective? For instance, do we compare the impact of a new program with the impact of a program already in place, or is the home environment the counterfactual environment? And what is the relevance of informal care? For example, an expansion of ECEC services may primarily crowd out informal care rather than parental care. Furthermore, variation in the counterfactual learning environment will lead to heterogeneous policy effects. This is particularly relevant for the understanding of the potential of ECEC to reduce socio-economic skills gaps. As family SES is positively related to the counterfactual (home) learning environment (Cascio and Schanzenbach, 2014; Heckman and Mosso, 2014), children from lower SES parents are more likely to benefit from ECEC attendance. Hence, it is theoretically ambiguous whether participation in ECEC generates benefits or costs in terms of child outcomes. Whether ECEC participation can be considered as an actual investment or disinvestment depends on the features of the ECEC provision (most notably the quality) and the quality of the counterfactual mode of care (typically the learning environment provided by the mother).

Third, we should take into account that effects may depend on the *type and timing* of child outcomes. For instance, participation in ECEC may boost language skills but have no effects on socio-emotional skills (or the other way around). Moreover, short-term program effectiveness may not guarantee program effectiveness in the long run. Program effectiveness does not necessarily decline monotonically as children age. For instance, the impact of a program may fade out in the medium run and show up again in the long run (' sleeper effects').

Fourth, claims about program effectiveness are causal claims, implying that one should be careful about the estimation *methodology*. In general, children (parents) selecting into ECEC are systematically different from those who do not, and unobservable characteristics are likely to be important. These endogeneity issues cannot be fully addressed by correlational studies, even when a large number of controls are included. This is a serious concern when deriving policy implications: correcting for the endogeneity bias may not only affect the size but also the sign of the estimate (e.g. a positive effect may turn out to be a negative effect; see Herbst (2013) for a relevant case). We therefore focus on studies that use exogenous variation to identify the effectiveness of ECEC, as these studies can make stronger causal claims. We distinguish between randomized control trials (RCTs; randomizing treatment by design) and natural experiments, exploiting ‘natural’ sources of exogenous variation (due to reforms or specific policy features). The latter studies apply difference-in-differences, instrumental variables or regression discontinuity designs. Here we provide a review of the recent evidence from such studies on targeted and universal ECEC programs. We focus on evidence from Western, developed countries (Europe, US, Canada, Australia).

3.3.2 Targeted programs

Targeted ECEC programs are eligible for children with a (risk of) disadvantage; this could be based on income, migration status, local area or other measure of disadvantage. Evidence on the effectiveness of targeted ECEC programs comes both from small-scale RCTs and programs implemented at scale. Most of the impact studies exploiting exogenous variation is from the US.

Concerning small scale RCTs (“demonstration programs”), the Perry Preschool Program (PPP) represents without doubt one of the most influential ECEC programs. This landmark study was implemented in the 1960’s in Ypsilanti (Michigan). Eligible families lived in deprived conditions and had an African American background (N=123). The program combined part-time, high-quality centre-based care with weekly home visits for children aged 3 and 4. PPP has now follow-up data through age 50, allowing to assess lifecycle and multi-generational effects of the program. PPP generated significant gains for the treated children on a wide range of dimensions. Early cognitive and non-cognitive (socio-emotional) outcomes improved. Although some of these effects fade out (partially), there are sizeable long-term gains in terms of school achievement, high school graduation, employment, health, crime rates and welfare take-up (Heckman et al., 2010a; Heckman et al. 2013). Cost-benefit analyses demonstrated that investments in a program such as the PPP can achieve considerable rates of return (Heckman et al., 2010b). Recent follow-up studies (participants are around age 50) show that there are important second-generation effects, i.e. there are gains for the children of the PPP participants (Heckman and Karapakula, 2019). Another demonstration programs with long-term follow-ups is the Carolina Abecedarian (ABC) program, implemented in the 1970’s and 1980’s. Compared to PPP, ABC started earlier (at birth) and has a more intensive ECEC component, both in terms of duration and hours per week. As for PPP, ABC generated positive short-term effects that persisted into adulthood (see Elango et al. (2015) for a review that also discusses the Infant Health and Development Program and the Early Training Project, two other RCTs with an important centre-based component).

In addition to the evidence on small scale programs, there is now a growing evidence base on the effects of large-scale programs. One of the most important sources of evidence

comes from Head Start, the largest and oldest (founded in 1965) ECEC program in the US (see Morris et al. (2018) for a more comprehensive review of Head Start impacts). Access to the program is means-tested and generally limited to families with an income below or at the poverty line. Children start at age 3 or 4 and care is primarily centre-based. The program has been evaluated through the Head Start Impact Study (HSIS), an RCT, as well as by several natural experiments. The HSIS is the largest RCT on ECEC in the US and includes around 5.000 children aged 3 and 4. Children applying for Head Start were randomly assigned to Head Start and control. Although the study has a strong design, an important limitation of the study is control contamination: many of the children in the control group used centre-based alternatives to Head Start (and around 15% actually Head Start). Initial evaluations that did not take into account this issue report rather modest positive effects, if any (Puma et al., 2012). However, more recent studies addressing the issue of control contamination and comparing the Head Start treatment with care provided at home by parents found sizeable short-term effects (Feller et al., 2016; Kline and Walters, 2016). In addition to the HSIS, which does not include a long-term follow-up, several natural experiments on Head Start report significant long-term benefits in terms of health, schooling and crime outcomes (Ludwig and Miller, 2007; Carneiro and Ginja, 2014). In general, the effects of Head Start appear somewhat weaker than the effects of the small-scale demonstration programs. This difference may be explained by the lower average quality of Head Start; moreover, the Head Start population is less disadvantaged than the children participating in the demonstration programs.

Evidence on the impact of targeted programs from Europe is scarce; this is also due to the fact that targeted programs are rather uncommon in Europe. An exception is the targeted ECEC program in the Netherlands for 2.5 to 4-year olds with a high risk to lag behind in school (generally children with low educated and/or migrant parents). Currently, there is only one study available that exploits exogenous variation to evaluate the effectiveness of the program. Akgündüz and Heijnen (2018) examine in a DID framework the impact of additional funding allocated to 37 Dutch municipalities on grade repetition in kindergarten (an indicator of school readiness). The results point out that grade repetition among boys dropped significantly due to the reform. However, it is unclear what exactly drives this effect (e.g. higher coverage, more intensive programs or higher quality of the provided programs). The finding that targeted programs significantly improve the outcomes of targeted children is consistent with the results from Leseman et al. (2017) who found that skill gaps between disadvantaged and non-disadvantaged children in ECEC narrowed in the early years.

3.3.3 Universal programs

In contrast to targeted ECEC programs, universal programs do not have eligibility criteria other than age. In practice this may mean that the program is free for all age-eligible children; however, there may also be income-dependent fees with significant fees for high income groups but limited or no fees for the lowest income groups to guarantee universal access ('progressive universalism'). It should also be stressed that universal access does not imply universal take-up: many European programs have universal ECEC programs, but participation rates remain well below 100 percent (see Section 3.2).

Whereas targeted programs have been assessed by RCTs, randomly restricting access

to universal programs to study the impact is practically infeasible and generally unethical. Nevertheless, in recent years the impact of universal programs on child development has been examined using natural experiments. Most of these studies exploit regional variation in the timing of the implementation of national ECEC reforms (e.g. Havnes and Mogstad, 2015; Felfe et al., 2015; Felfe and Lalive, 2018; Cornelissen et al., 2018). A recent meta-analysis by van Huizen and Plantenga (2018) synthesizes this recent literature. The study considers a wide range of children's outcomes, from (short-term) cognitive and socio-emotional outcomes to long-term outcomes observed in later childhood and adulthood (e.g. educational achievement, employment). Based on 250 estimates from 30 studies conducted between 2005 and 2017, the overall results are rather ambiguous as impact estimates are often statistically insignificant. However, several relevant patterns can be observed. First, the quality of the ECEC provision matters crucially: in general, high quality programs generate a positive impact. Second, the overall null results obtained in many studies mask important effect heterogeneity: the benefits of universal ECEC appear to be concentrated in children from lower SES families. The results indicate that it is unlikely that children from higher SES families benefit significantly from ECEC: there are cases where they do, but also cases where children from high SES families are significantly negatively affected. This finding points out the potential of universal ECEC to reduce SES skill gaps and to promote social mobility. Moreover, for cost-benefit analysis, this implies that the proportion of disadvantaged children enrolling in the universal ECEC program critically affects the rate of return of the investment (van Huizen et al., 2019)

To further assess the potential of universal ECEC to reduce inequalities, we calculated a 'SES gap reduction score' for the studies included in the meta-analysis, focusing on studies that provide separate estimates for low and high SES groups. Moreover, we updated the meta-analytical database for 2018-2019, using the same inclusion criteria as van Huizen and Plantenga (2018). The SES gap reduction score is calculated by comparing estimates for children from low versus children from high SES families. Most studies include multiple estimates, for instance on several child development domains (e.g. both language and numeracy scores) or several timings of assessment (i.e. different ages at which the outcome is measured). For each estimate (each outcome measure), we calculate a score which is 1 if there is a significantly positive effect for low SES children, but no significant positive effect for high SES: in that case, the evidence clearly shows that the program reduces inequality. If both groups significantly benefit (or are significantly harmed), the score is 0. Finally, the score of the estimate is -1 if high SES children gain significantly while there are no significant positive effects for low SES children. In the latter case, the program would widen SES gaps. We argue that this is a rather conservative approach to evaluate the potential of ECEC to reduce inequalities. For instance, if both low and high SES children benefit significantly from ECEC, but low SES children gain (significantly) more, the program may reduce gaps. Whether this actually reduces gaps in the population depends on the relative take-up intensity and therefore it is not clear a priori whether SES gaps are reduced. Hence, the score is 0 if both groups significantly benefit, as one cannot make a strong claim that the program reduces inequalities.

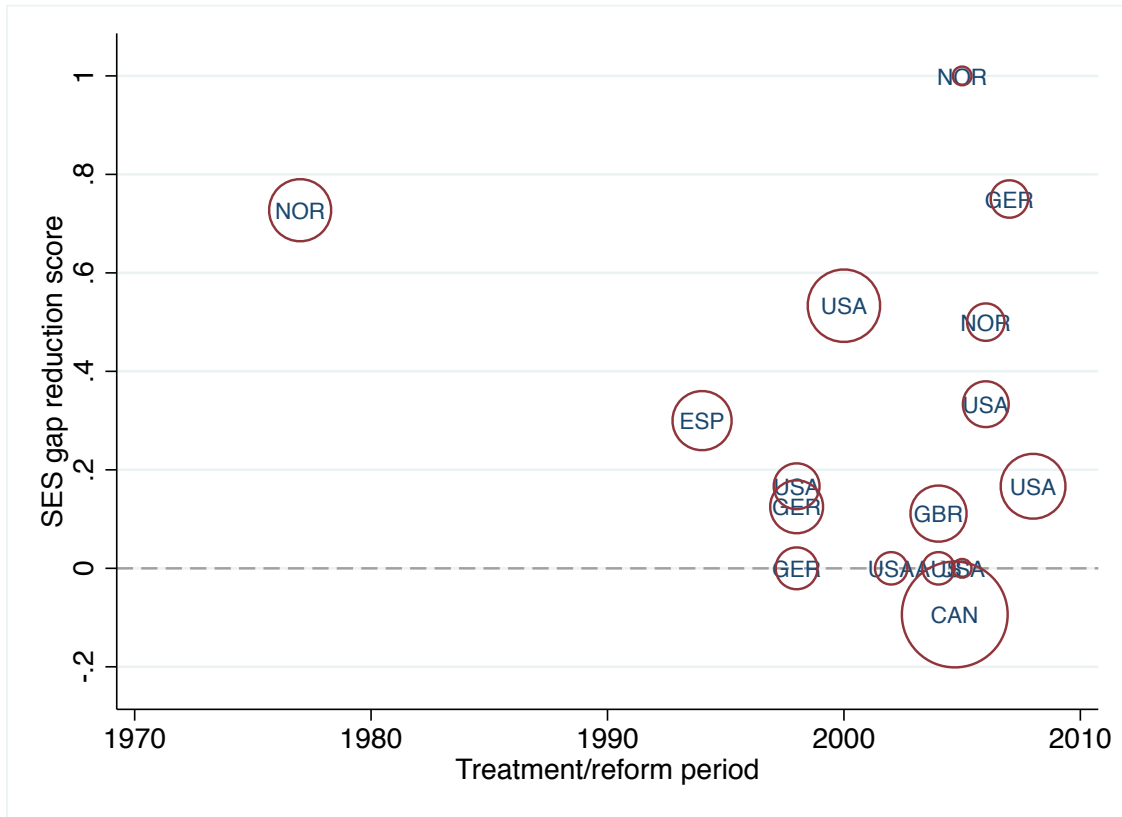


Figure 6: Universal ECEC and the reduction of SES gaps.

Notes: Results are based on an update of the meta-analytical database of van Huizen & Plantenga (2018). The size of the circles indicates the number of estimates used to calculate the SES gap reduction score.

The overall SES gap reduction scores, presented in Figure 6, are the study averages of these scores; the size of the circles indicates the number of estimates used to calculate the average score per study. The figure clearly shows that low SES children are more likely to gain from ECEC. In fact, a general pattern is that high SES do not benefit and low SES benefit in at least some of the child development domains or measurements included in the study. This explains why most of the scores are below 0 and 1.

Finally, it should be noted that most impact studies concern ECEC policies for children aged 3 onwards. As discussed in Section 3.2, coverage for these groups is nearly universal in many countries. Therefore, an important policy discussion is whether (universal) access ECEC should be extended to younger aged children. The evidence base for policies for infants and toddlers is still small. As argued by Drange and Havnes (2019: p.582): “The relative lack of plausible evidence is worrying for policymakers, because programs are often heavily subsidized, but it is also worrying for parents, who need to decide whether and when to enroll their children in childcare.”

To illustrate that the general finding on effect heterogeneity holds for younger aged children as well, we discuss here the main recent cases. First, Dearing et al. (2018) exploit a 2002 Norwegian reform, mandating municipalities to provide access to ECEC to all children, leading to a substantial expansion of ECEC slots for children aged 1 and 2. The results show that language scores of children from low income families improved significantly, while language scores of children from high income families were not significantly affected. Second, Drange and Havnes (2019) exploit random assignment to ECEC by the Oslo government when ECEC centres are

oversubscribed to estimate the causal effect of ECEC attendance. The effects for low SES children are generally stronger, pointing out that an early start in ECEC has the potential to reduce gaps. For instance, Drange and Havnes (2019) show that starting 4 months earlier in ECEC significantly increases language scores of children from low educated parents by 0.24 SDs. The effect is much smaller (0.11 SD) and statistically insignificant for children from high educated parents. Third, Felfe and Lalive (2018), relying on a recent German reform that led to a substantial expansion of childcare slots (for 0-2 aged children), report that ECEC helps especially disadvantaged children to catch up. Finally, the study of Fort et al. (2019) – while this study is not included in the analysis presented above as it focuses on a rather specific sample of the population – provides relevant evidence on the impact of ECEC for children below age 3. The study exploits admission thresholds in the Bologna day care system (a relatively high-quality program for children of 0-2 years of age). Given the design estimating the effect around a particular threshold, the effects are estimated for children of affluent parents: the average annual income of the parents of the children in the analytical sample is around twice the Italian annual gross household income. The findings demonstrate that one additional month in ECCE reduces IQ by 0.5 percent at age 8-14. Negative effects are also found in the non-cognitive domain. Overall, the findings concerning ECEC for 0-2 year olds are in line with the findings on effect heterogeneity discussed earlier: (high quality) ECEC generates positive effects for children in the lower part of the SES distribution, negligible effects in the middle and higher part of the SES distribution and potentially negative effects in the top of the SES distribution.

3.4 Concluding remarks

To conclude, we want to emphasise that available evidence demonstrates the potential of both approaches – targeted and universal programs – to reduce achievement gaps between children from advantaged and children from disadvantaged backgrounds. Hence, we can state that early ECEC interventions work towards decreasing inequality. As an open question remains, what is the more efficient approach in terms of reducing inequality. On the one hand, targeted programs may be more efficient policy option since high SES children generally do not benefit. But, targeting also comes at a price, for instance, means testing and resulting stigmatization effects. On the other hand, in most progressive universal programs, fees are income dependent which might alleviate concerns about efficiency. Moreover, we have seen that uptake and usage of ECEC programs are considerably stratified by socioeconomic and cultural characteristics of children's families. Thus, a potential side benefit of universal programs could be that they may be more accessible to lower SES families. Thus, are universal programs more effective than targeted programs in enrolling low SES children? And, do low SES children benefit more from universal than from targeted programs? We do not know the answers to these questions as of yet. Hence, we would conclude that further research is needed to clarify better these important policy questions.

One aspect, though, clearly emerges as a central strategy to policy makers who are concerned with levelling the playing field through early interventions: investments should be directed in a way to ensure that disadvantaged children receive high quality ECEC care, rather directing investments towards a quantitative expansion of a low-quality universal program. Finally, policy makers should seek leverage in 'early years' measures other than ECEC interventions as those might play an important role in reducing inequalities too. For instance, starting school at an

earlier age may reduce gaps (Leuven et al. 2010; Cornelissen and Dustmann, 2019); the same holds for investing in parenting and family support programs (Doyle, 2019; see also ISOTIS report from Cohen et al. 2018).

4 THE ROLE OF SCHOOL SYSTEMS⁶

4.1 Overview

This section summarizes and integrates central findings on the role of educational systems and reforms from Task 1.4 of Working Package 1. Detailed findings and analyses including a detailed literature review on the role of educational systems and reforms can be found in a separate report ('Achievement inequalities and the impact of educational institutions', Rözer & Van de Werfhorst 2019). Based on pooled and harmonized cross-national achievement data (PISA, TIMSS, PIRLS, and PIAAC) that have been linked with data on educational policies and reforms, we distinguished between such reforms or policy changes that affect inputs to educational systems (e.g., educational expenditures, class size, teacher education and salaries) and those reforms or policies that affect the structure of education systems (e.g., changes in tracking age, length of compulsory schooling, vocational specificity). Main results from these macro-level analyses will be briefly summarized in the following two consecutive sections. Finally, we draw some conclusions.

4.2 Input in educational systems: educational expenditures, class size, teaching hours, and teachers' education and salaries.

One of the most popular cries to improve educational systems is to increase the budget. More money can increase educational performances and decrease educational inequalities, for example because it can be used to support disadvantaged children and schools. However, an empirical question is whether this actually occurs, because advantaged parents can use their resources to affect policies that work in their interest. In this light, there is a debate in the literature on whether there is a positive relationship between educational expenditure and the quality of education and, if so, how strong this relationship is. In our study on the effects of educational systems on achievement gaps, we inspected how achievement inequality was associated with five central dimensions related to educational spending policies: (1) the sheer amount of educational expenditures as well as more specific fields of spending such as (2) teacher remuneration, (3) teacher quality, (4) class size, and (5) teaching hours.

Our findings from the repeated cross-sectional study show that there is hardly any association between socioeconomic and migration-related achievement gaps on the one hand and educational budget on the other. This might indicate that educational expenditures *per se* can do only little to decrease educational inequalities, probably because it matters a lot what the budget is used for.

Increasing the salaries of teachers may be one policy where the budget can be used for. Evidence, especially from the United States, shows that the lowest performing teachers work in schools that are disproportionately attended by disadvantaged children, and that the lower salaries in these schools may form one reason why the better performing teachers do not work in these schools. Yet, direct evidence on whether higher teacher remuneration in a country or larger region raises the performance of disadvantaged children remains limited. Exploiting variation on the country level, we found hardly any association between the salaries of teachers and achievement

⁶ Contributors: Rözer, J., van de Werfhorst, H. G.

gaps. This is perhaps because the budget is first used for the best performing schools or because in our set of highly developed countries, including almost all European countries, the differences between schools and the pay-gaps between schools are too small to pick up any effects.

Another aspect related to teachers is teachers' qualifications. Educational policies intending to raise teaching quality may decide to invest into teachers' experience, training, and education. One of the major limitations towards reducing inequalities through teacher quality is that, similar as with their salaries, high quality teachers often work in schools with the most advantaged and best performing students (teacher sorting). On top of this, it seems plausible that disadvantaged children would benefit from high qualified (and highly paid) teachers most. This may be the case because they know better what these children need, have more patience with them, are more highly committed, or have better pedagogical skills to train them. This reasoning is supported by a handful of studies. In our analyses, we also found some support that socioeconomic and migration-related achievement gaps are larger in countries that have more qualified teachers in terms of experience and education.

Reducing class sizes is another potential lever of educational policy aiming to reduce educational inequalities. Smaller classes could facilitate teachers giving certain students additional attention they need and may help students to socialize quicker to the school culture, all of which might be beneficially especially for disadvantaged children. However, evidence from research on the effect of class size on student performance is mixed at best. In general, effect sizes tend to be relatively small but disadvantaged groups seem to benefit most from smaller classes. Our results showed mixed evidence with respect to the country-level association of socioeconomic achievement gaps and average class size. However, we found evidence for a positive association between class sizes and migrant-native achievement gaps. In other words, in school systems that had smaller class sizes also migration-related inequality in educational achievement was smaller.

Finally, teaching hours in the curriculum could be another measure of educational policies that aim to mitigate inequality of educational opportunities. Both higher- and lower-performing students might particularly profit from additional teaching hours: higher-performing as they learn more efficiently, and lower-performing students as they need more time than better-performing students to process new learning content. Especially when the additional hours is used to teach new subjects, the school system may ask too much of the disadvantaged children and favor the performance of high-performing students. Hence, opposing arguments can be given whether additional time is beneficial for reducing inequalities. In line with these opposing arguments, previous research found mixed evidence whether additional instruction time benefits advantaged or disadvantaged children most. Also our results are mixed.

4.3 System features: age of tracking and vocational specificity

Less popular than an increase in input is to change the tracking age, because this will require drastic changes in the educational system. Yet, our findings are in line with the majority of the literature which shows that later tracking reduces socioeconomic gaps in student achievement. A reason why early tracking tends to reproduce educational inequalities is that it gives children from socioeconomically disadvantaged backgrounds less time to catch up with more advantaged before school track decisions are taken. Moreover, high SES parents are more often "far-sighted" in their choices by "pushing" their children earlier to more prestigious and academically more

demanding school tracks.

Closely related to the age of tracking is the vocational specificity of educational systems. Even early tracking systems differ in the percentage of students that enrol in upper vocational education. Vocational education disproportionately attracts low SES children and might both work as a safety net by offering education that fits the needs of these students, as well as a trap because job related skills are often learned at the costs of general skills such as literacy and mathematic skills. Still much remains unknown about the consequences of a vocational system, and also our results leave it in the middle whether it disperses or reduces SES inequalities.

Furthermore, migrants are argued to benefit from later tracking because this gives them time to catch up with natives and to get used to the host society. Previous research is inconclusive about its effects. Our research suggests that later tracking does not increase the gaps between migrants and natives, but it remains the question whether it declines them. It appears that a slightly more promising strategy is to reduce the size of vocational education, probably because migrants are more likely to go to vocational education than natives, while in vocational education vocational skills are often taught at the expensive of general skills such as language and mathematics.

4.4 Conclusion

In the detailed report (see Rözer & Van de Werfhorst 2019), we could demonstrate that resource expansion in educational systems, such as higher spending rates relative to GDP, lowering student/teacher ratios, raising teacher salary, or reducing teaching hours, often do not lead to decreasing educational inequalities. To the extent that these policies aimed at reducing inequalities, many of such policies were thus ineffective. As we found, inequalities sometimes even seem to have increased after spending-related policies were implemented. These observations are in line with sociological explanations that emphasize that, in actuality, many policy reforms may be equally or even more effective for advantaged children than for disadvantaged children. In particular, the thesis of Maximally Maintained Inequality (MMI) argues that middle class families will reap the benefits from policies aiming to improve education up to the level when they can no longer 'grow' in their attainment (Raftery and Hout 1993). Given that the middle classes benefit equally, or even more from policies than disadvantaged families, we conclude that policy makers should ensure that the spent resources arrive at groups whose rising attainment would reduce inequalities. More resources to the schooling system are only effective in reducing inequalities if those resources disproportionately go to schools who need them most.

From a policy perspective, these arguments may lead to a plea for targeting educational investments which could ensure that only the socioeconomically disadvantaged groups will benefit. By the same token, educational 'targetisation' would require means-testing to exactly identify social groups in need. However, welfare state literature more generally, and the literature on early childhood education and care more specifically, provides ample evidence that it is rather the generic policies addressed to everyone which help to reduce inequalities, and not the policies relying on means-testing. Apparently, that imposes a dilemma for well-intended social policy agendas. As we believe, one key issue for resolving this dilemma is standardization. Resource-spending policies, therefore, should be complemented with the introduction of standardized rules regulating and monitoring the quality of care to ensure that generic policies, such as general

availability of ECEC facilities, reduce inequalities. If generic policies are furnished with quality standards, it is possible that students who would need additional resources most, will also benefit most from them.

5 POLICY IMPLICATIONS AND RECOMMENDATIONS⁷

We are concluding the report with a summary of general policy implications and recommendations based on this integrated report and the work that has been done in Working Package 1. Policy implications and recommendations primarily refer to the national level, however, we also highlight the potential for overarching EU wide policy. In addition, find more specific recommendations in previous research reports of WP1 (Rözer & Werfhorst 2017; Passaretta & Skopek 2018a, Rözer & Werfhorst 2019).

- *Early investments in children before they go to school will pay off in terms of reducing inequality.* SES gaps emerge early in life and are largely persistent throughout school. That draws policy attention to early years and preschool. Securing high quality early investments in children from disadvantaged family backgrounds is likely to level the playing field in school considerably. National efforts in early childhood education and care could be combined with EU wide frameworks that elaborate overarching roadmaps and milestones, best practice models, implementation standards, as well as standards in quality assurance. Next to practice, EU wide frameworks should continue to facilitate collaborative research infrastructures elaborating data on early learning and childhood development in order to improve evidence-based policy making all across Europe. While we have ample cross-national data on learning in school (e.g., PISA, TIMSS, and PIRLS), internationally harmonized assessment studies targeting learning and well-being in early childhood just have begun to emerge.⁸
- *While SES-achievement inequality is largely persistent, migration-related achievement inequality depends on the national context and is frequently a timing issue as many migrant children catch up in school. Yet, educational policies must be informed by ethnic peculiarities in the specific national context.* Children of immigrants are behind at school start, but tend to catch up during school, gaps shrink – socioeconomic composition of migrant families play a role and some ethnic groups are penalized more than others. That draws policy attention to (a) ‘timing’ aspects when it comes to migrant children, (b) targeted policies that are informed by peculiarities of ethnic groups, and (c) the importance of the national context of immigration and integration. Thus, when it comes to enhancing educational opportunities of children of migrants and ethnic minorities the national rather than EU wide context is decisive.
- *Both targeted and universal ECEC interventions/policies help disadvantaged children to catch up and to alleviate early educational inequality. However, it remains unclear which policy approach is most efficient in reducing achievement inequality.* Evidence from *targeted interventions* have shown beneficial effects for disadvantaged children. Thus, by supporting children from disadvantaged families, targeted interventions have the potential to reduce the overall level of achievement inequality. Moreover, evidence on *universal ECEC interventions* have the potential to reduce SES related achievement inequality as gains tend to concentrate on disadvantaged children while advantaged children often do not benefit. Early childhood

⁷ Contributors: All authors.

⁸ An example is the *International Early Learning and Child Well-being Study* (IELS) conducted in England, USA, and Estonia for five-year olds (see OECD 2020).

policies should prioritize investments that ensure high quality ECEC for disadvantaged children rather than investments furthering an expansion of low-quality ECEC. Based on the available evidence, those implications apply to all across Europe. As suggested above, national ECEC programmes should be coordinated within common European wide frameworks.

- *More research is needed to better understand the trade-off between targeted and universal ECEC programs.* Policy should acknowledge that we do not know yet which policy approach – universal ECEC or target ECEC policies – would be ultimately more efficient in reducing socioeconomic achievement inequality in children. Policies should invest in further research to bolster the evidential base to more profoundly address these important questions. To progress in these questions, national and European wide research collaborations producing relevant and high quality data in particular experimental or quasi-experimental data are required.
- *Contemporary European ECEC systems show room for improvement. Policy should aim at reducing access hurdles for socioeconomic disadvantaged families and minority group families.* Although children from disadvantaged families might benefit most from ECEC participation, in contemporary ECEC systems, however, we see a considerable amount of socioeconomic and migration-related disparities in utilization. There is a pronounced variation in ECEC utilization inequality by SES (household income and parental education) across European countries. Inequality in access is not lower in countries with larger ECEC sectors, but lower in countries with higher ECEC spending per child. Thus national early childhood policies must ensure that access to good quality early education and care is available to low income families. Benchmarking within European-wide frameworks could assist national policy-making.
- *ECEC policies must be aware and sensitive to different values and cultural expectations of minority groups in relation to early childhood education and care.* Ethnic minority groups and families with migration background are structurally more reluctant than majority/native families to enrol their children in early ECEC. Some but not all of these disparities are attributable to migrant families lower socioeconomic resources. National and in particular local governance structures would be require to address the needs and preferences of specific minority groups to increase uptake. Findings from other ISOTIS Work Packages (Aguiar & Pastori 2019; Aguiar et al. 2020; Broekhuizen et al. 2019) provide viable cues on how concrete policies fostering more inclusive ECEC participation of immigrant and ethnic minority groups may look like. In particular, those findings highlight the potential of targeted interventions that go beyond sheer language support by actively incorporating multicultural policies in ECEC curricula and adequate and continuous professional development of ECEC staff.
- *Quantitative expansion of ECEC coverage does not necessarily imply lower socio-economic and socio-cultural inequality in uptake and usage of ECEC.* Our macro-analyses suggest that (in the past) higher enrolment rates at preschool were not associated with lower SES achievement inequality in school. A reason for that might be that it is the more advantaged

families in the first place that might take advantage of more and higher quality ECEC opportunities arising from a gradual expansions of the ECEC sector. However, we did find some evidence that higher public spending per child goes a long with lower inequality in ECEC participation.

- *What can we learn from past changes in educational systems and educational policy reforms at the national level?*
 - Policy should be aware that frequently general educational policies and institutional change are ineffective or do not have the intended effects of reducing inequality. A reason for that might be that advantaged families react strategically to educational reforms and may over-proportionally exploit additional opportunities as they arise.
 - That points to *implementation problems*. Policies should implement measures to reduce negative side effects of reforms.
 - For example, *'targeted' efforts* may ensure that disadvantaged groups are more effectively reached by policies. Effective local governance structures are needed to ensure proper implementation of targeted measures at the locality of interest (see also Barnes et al. 2019). Moreover, *standardization* in rules and organisation of school systems on the national (or federal level) may additionally offset negative side effects.
 - Our findings point to occasional *trade-off relationship* between reducing socioeconomic and reducing migration-related educational inequality. For example, we found that higher teacher qualification would alleviate migrant-specific disadvantages at the cost of larger disadvantages for children from socioeconomically more disadvantaged families.
 - In general, our findings suggested that *smaller class sizes* (by hiring more teachers) and *tracking at later ages* would help to reduce both SES and migration related inequality. National (or federal) equal opportunity policy should therefore evaluate student-teacher ratios on the regional and local school level. Changing the tracking age would require changing core elements of educational systems which may invoke political resistance. However, minor adjustment measures at the local level (such as probationary track attendance, bridging classes, or track-integrative schools) may alleviate inequality effects in school systems with early tracking (such as Dutch or German education systems).

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