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Persisting Income-Based Preschool Enrollment Gap in the U.S., 2000 to 2023

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Abstract

This study aims to understand whether access to early childhood education (ECE) has become more equitable over a period of substantial growth in public pre-K investment. This study describes and statistically tests the differential trends across income groups in center-based ECE enrollment among 3- and 4-year-olds. Across descriptive, regression, and decomposition analyses, the income-based disparities in ECE enrollment were remarkably persistent. For both age groups, the enrollment gap between the top and lower income quintiles has changed relatively little (converged for 4-year-olds by one to two percentage points per decade and widened for 3-year-olds by two to three percentage points per decade). Decomposition analyses show the stability in factors explaining the gaps, with compositional differences in maternal education across income groups remained the largest measured driver of the gap throughout, and this pattern held through both the Great Recession and the COVID-19 pandemic.

Keywords: Early childhood care and education, Unequal access to early learning, Income gap trends, Decomposition

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1 Introduction

Preschool enrollment in the United States has long reflected income-based disparities (Magnuson & Waldfogel, 2016), driven in large part by its high cost, alongside other barriers to accommodating families' needs (Meyers & Jordan, 2009). Among available care options, center-based early childhood education (ECE) is among the most expensive. In 2022, the average annual cost of full-day, center-based ECE for preschool-age children ranged from $7,155 in smaller counties to $12,849 in the largest counties (Poyatzis & Livingston, 2024), a substantial burden even at the lower end, given that the median annual earnings of workers were approximately $47,960 that year (Guzman & Kollar, 2023). With childcare prices remaining persistently high over time (Herbst, 2018), federal and state governments have implemented policy reforms in the past three decades aimed at expanding access for low- and moderate-income families.

In the 1980s, the income-based gap in preschool enrollment exceeded 30 percentage points between the top and bottom income quintiles, as documented in Magnuson and Waldfogel's (2016) analysis of enrollment trends from 1968 to 2013. Public spending on state preschool programs roughly doubled during the 1990s, from approximately $1.6 billion in 1991–92 to nearly $3.2 billion in 1998–99 (Schulman et al., 1999; figures adjusted to 2024 USD). This decade of progress in pre-K funding coincided with a narrowing of the income-based gap in preschool enrollment, driven by increases in enrollment among children from lower-income families (Magnuson & Waldfogel, 2016; Magnuson et al., 2007). This improved equitable access to early learning was especially notable given rising inequality from the 1960s through the 1990s in other domains of parental investment, including financial expenditures on children (Kornrich

& Furstenberg, 2013), time parents spent on developmentally enriching activities (Altintas, 2016), and children's academic achievement gaps (Duncan et al., 2017; Reardon, 2011).

Yet it remains an open question whether this narrowing trend has persisted over the past quarter of century. Magnuson and Waldfogel's (2016) analysis extends only through 2013, offering a partial view of this period that predates the most recent wave of state pre-K expansions and the COVID-19 pandemic. Sustained public investment in ECE since 2000 suggests further convergence was plausible: not only did ten states newly adopt pre-kindergarten (pre-K) programs (Cascio, 2021), but states also expanded investment in their existing pre-K programs (Moran et al., 2026), together producing a remarkable increase in the national share of 4-year-old children enrolled in public pre-K, from 14% in 2001–02 to 37% in 2023–24 (Friedman-Krauss et al., 2025). At the same time, however, the Great Recession (2007–2009) and the COVID-19 pandemic may have disrupted the gains from policy efforts, potentially stalling or reversing prior progress.

Recent trends in women's labor force participation further motivate a reassessment of preschool enrollment gaps. While women's employment rose steadily from the 1960s through the 1990s, it has largely plateaued since the early 2000s, especially among those with less education (Black et al., 2017). Although preschool participation is not necessarily contingent on maternal employment, weaker workforce attachment may reduce children's ECE participation. Conversely, lower maternal employment among lower-resource families may itself reflect limited access to ECE (Pilarz et al., 2019).

This study extends prior work by examining trends in the income-based ECE enrollment gap from 2000 to 2023, extending Magnuson and Waldfogel's (2016) analysis by a decade beyond its 2013 endpoint, using data from the American Community Survey, a nationally

representative, annually repeated cross-sectional dataset. Given that most early childhood policy initiatives over the past four decades have prioritized lower-income families, and that state pre-K expansions have primarily targeted 4-year-olds, this study separately examines enrollment disparities for 3- and 4-year-olds across income quintile groups to assess how targeted policy efforts have shaped age-specific ECE access across the income distribution.

To better understand the drivers of these disparities, this study uses decomposition methods to partition the enrollment gap into components attributable to observed compositional characteristics (e.g., maternal education, employment status) versus differential associations of these characteristics with enrollment. This approach enables a comparison between three distinct periods—(1) 2000–2009, (2) 2010–2019, and (3) 2020–2023—bracketing eras before and after the two trend-breaking events: the Great Recession and COVID-19. The analysis provides insights into whether the factors contributing to enrollment disparities have shifted, persisted, or changed in salience over time.

2 Background

Over the past several decades, non-parental childcare became a norm for preschool-age children in the United States. By 2023, 67% of preschool-aged children spent time in the care of someone other than a parent—including extended family members, neighbors, home-based childcare providers, and formal early education programs such as pre-kindergarten, preschools, and community-based centers (Hanson et al., 2024). Families frequently rely on multiple care arrangements to meet their caregiving and work needs (Morrissey, 2008; National Center for Education Statistics, 2021). Among these options, high-quality childcare can play a dual role: it supports children's early development while enabling parental labor force participation, especially among mothers.

Children's developmental needs vary by age and temperament, and no single arrangement is universally optimal. Nonetheless, research shows that center-based care, often broadly called as preschool or ECE, particularly at ages 3 and 4, offers developmental benefits. These settings provide structured learning environments that support early cognitive and language growth (Bassok et al., 2016; Gormley et al., 2005; Weiland & Yoshikawa, 2013), particularly benefiting academic readiness for kindergarten (Phillips et al., 2017; Jenkins & Whitaker, 2026) for children from disadvantaged backgrounds for their kindergarten preparedness (Duncan & Magnuson, 2013; Weiland & Yoshikawa, 2013).

Center-based care clearly remains among the most expensive forms of non-parental care. As a labor-intensive service requiring trained professionals, regulatory compliance, and substantial infrastructure, its cost is inherently high (Borowsky et al., 2022). These high costs render it inaccessible to many low- and moderate-income families, potentially making affordability a central driver of enrollment disparities. Public policy responses—including subsidies for low-income working parents and the expansion of state-funded pre-K—have aimed to improve access, with evidence linking increased public investment to higher enrollment rates among low-income children (Crosby et al., 2010; Magnuson et al., 2007; Pilarz, 2018, Pilarz & Walther, 2026; Washbrook et al., 2011).

However, income alone may not fully explain persistent gaps in center-based enrollment (Hermes et al., 2026). Income is closely tied to parental education, a key socioeconomic marker that influences early education decisions through multiple pathways (Crosnoe et al., 2016; Fuller et al., 1996; Greenberg, 2011). Parents with higher educational attainment may place greater value on formal education for their children (Lareau, 2003; Weininger et al., 2015), even controlling for income. They are also more likely to have access to information about child

development and the long-term benefits of preschool, along with information about the application process, whereas informational barriers may limit the decision-making of less-educated parents (Burns et al., 2025; Hermes et al., 2021). Furthermore, parents with lower educational attainment are more likely to hold jobs with nonstandard hours and inconsistent schedules (Hepburn, 2020), making participation in center-based care more difficult logistically and less compatible with their work demands.

Structural inequalities in access to employment and care availability can further shape these enrollment gaps. Employment characteristics—including job stability, schedule regularity, and flexibility—influence low-income families' ability to enroll in center-based programs (Coley et al., 2014; Kwon et al., 2026; Pilarz et al., 2019). Mothers with standard daytime schedules are more likely to use center-based care, while those with nonstandard hours face greater constraints (Han, 2004). Geographic variation in the supply of licensed providers also restricts access, especially in low-income or rural communities (Sipple et al., 2020).

Understanding how parental education, employment conditions, and geographic access contribute to the income-based preschool enrollment gap is essential for explaining persistent disparities or converging trends. Yet few studies have quantified the relative contributions of these sociodemographic and structural factors over time.

This study focuses on children ages 3 and 4—a developmental window when policy interventions have increasingly aimed to expand access. By examining both trends and explanatory factors across income groups, this study evaluates whether access to center-based early education has become more equitable and whether changes in maternal employment and structural constraints help explain the persistence—or narrowing—of enrollment disparities.

3 Data

This study uses data from Integrated Public Use Microdata Series (IPUMS) USA, American Community Survey (ACS) (Ruggles et al., 2025), a survey collected by the U.S. Census Bureau and fielded monthly and reported annually since 2000. It collects school enrollment information throughout a calendar year for household members aged three or older. It asks respondents "At any time in the last three months, has this person attended regular school or college?" Respondents are then instructed to specify the grade of school including a selection option of "nursery school and preschool." The survey further asks the type of school, differentiating between public and private educational institutions. Prior work has documented income-based gaps in preschool enrollment using the Current Population Survey (CPS) October Education Supplement, which enables researchers to track the enrollment trend back since 1968 (Bainbridge et al., 2005; Magnuson & Waldfogel, 2016). To extend the trend analysis into the 2010s and early 2020s, I use ACS whose large sample size allows precise annual estimation of enrollment rate. The ACS offers a continuous measure of family income, making it preferable to the CPS October Education Supplement, which reports income in categorical brackets. The analytic sample included 1,584,264 children aged 3 and 4 in the ACS surveys from 2000 to 2023, whose family income data and ECE enrollment data are available. I supplement the main descriptive analyses using the October CPS data (Flood et al., 2025) from IPUMS to see whether the characterization of the trend based on the ACS is consistent across independent surveys.[1]

Early Education Enrollment

Children's early education enrollment is measured as a binary indicator coded as one if the child attended school, defined as preschool or nursery care among children aged three to four in the ACS. To confirm the validity of the ACS in capturing center-based ECE enrollment, I

compare the 2019 ACS preschool enrollment estimate to those from more recent data sources, including the 2019 October CPS, the 2018 panel of the Survey of Income and Program Participation (SIPP), the 2019 National Household Education Survey (NHES), and the 2019 National Survey of Early Care and Education (NSECE).

In 2019, the preschool enrollment rate estimated using ACS is 48% among 3- and 4-year-olds. This estimate aligns closely with the 48% estimated in the October CPS (author's calculation), which similarly asks about school enrollment for all household members aged three and older and collects responses in October. It is slightly higher than the 44% estimated using the SIPP (Wimer et al., 2026), which asks parents about child care arrangements during a typical week in the fall when the parent was working, attending school, or otherwise unavailable. The SIPP includes center-based care, nursery school, preschool, and Head Start programs. The ACS estimate is slightly higher than the 42% estimated using the NSECE among children aged 3 to 5 not yet in kindergarten (Datta et al., 2023); the NSECE measures regular care arrangements of at least five hours per week and covers formal care types such as Head Start, prekindergarten, and community-based centers, based on data collected primarily between January and May. The NHES reported a higher enrollment rate of 61% among children aged 3 to 5 not yet in kindergarten compared to other datasets, based on surveys administered from January to August (Cui & Natzke, 2021). The NHES measures whether the child currently attends a day care center, preschool, or prekindergarten not located in a private home, including a broad array of center-based programs such as Head Start and other early childhood settings.

Taken together, these comparisons suggest that the ACS estimate lies within the expected range across national surveys and is broadly consistent with more detailed measures of center-based ECE enrollment. This indicates that respondents in the ACS are unlikely to systematically

misclassify informal or family child care as school enrollment, or fail to recognize formal early education programs as "school," lending credibility to the ACS as a data source for tracking trends in preschool participation.

Income

Family income is measured as a continuous measure of total family pre-tax cash income earned by all family members related to the head of household over the previous 12 months. To maintain comparability over time, I classified families into income groups based on their relative position in the annual income distribution—an approach consistent with prior work that used income quartiles or quintiles (Greenberg, 2010; Magnuson et al., 2007; Magnuson & Waldfogel, 2016). In this study, I divide the sample into income quintiles (lowest, low, middle, high, highest income), which ensures that each group includes approximately one-fifth of the sample. Through Figures S1-S2, I show that the descriptive findings by income quintiles are robust to alternative approach of dividing income groups in relative distribution (e.g., income tertile, quantile) or by poverty groups.

Because the income distribution shifted considerably over the study period, the family income cutoffs for each quintile also changed. In 2000, families in the bottom quintile reported incomes below $20,000, while in 2023 this threshold rose to $45,000. To contextualize these thresholds relative to the U.S. federal poverty guideline: the poverty line for a family of four was $17,050 in 2000 and $30,000 in 2023 (U.S. Department of Health and Human Services [HHS], Office of the Assistant Secretary for Planning and Evaluation, n.d.). It means that the lowest income quintile group lived under or near poverty (income below 120% to 150% of the poverty line) over the study period. The middle quintile ranged from $35,830 to $52,800 in 2000 and from $80,010 to $120,000 in 2023, which is equivalent to 200% to 400% of the poverty line.

Families in the top quintile earned more than $78,710 in 2000 and more than $184,080 in 2023, with these cutoffs ranging from approximately 460% to 600% of the poverty line over time.

Covariates

For the decomposition analysis, this study considers child- and household-level characteristics that prior research has found to influence families' childcare decisions and can potentially explain income-based preschool enrollment gaps (Coley et al., 2014; Crosnoe et al., 2016; Fuller et al., 1996; Greenberg, 2011; Joshi et al., 2025; Meyers & Jordan, 2006; Pilarz et al., 2019; Weber et al., 2018). At the child level, the covariates include the child's gender and race or ethnicity. At the household level, the model accounts for the number of children under age 13 in the household, which may shape the affordability and need for childcare services. It also includes the educational attainment of mother, categorized as high school or less, some college or associate's degree, and bachelor's degree or higher, as well as the parent's immigrant status, distinguishing between U.S.-born and foreign-born respondents. The parental partnership status is also included, coded as a binary variable indicating whether the parent resides with a spouse or partner in the household—regardless of whether the partner is a spouse or an unmarried partner, and regardless of gender.

To account for maternal labor supply, a three-category variable is constructed indicating whether the mother is not working (including those not in school or training), working part-time (fewer than 40 hours per week), or working full-time (40 or more hours per week). This categorization reflects the fact that ECE programs—often operating on limited schedules (e.g., 8 a.m. to 3 p.m. for full-day program and 8 a.m. to 12 p.m. for part-day) with inflexible drop-off and pick-up times—can be less accessible to full-time working mothers than to part-time workers, especially when compared to more flexible informal child care arrangements. Mothers

who report being out of the labor force due to attending school or training are grouped with the part-time work category, as ACS does not provide detailed information about hours spent in education or training programs.

In addition to child and household characteristics, the analysis includes a full set of state fixed effects (indicators for the 50 states and the District of Columbia) to account for unobserved, time-invariant differences across states that may influence the availability and demand for center-based ECE. Including state fixed effects enables the identification of within-state trends in income-based preschool enrollment disparities by controlling for state-specific baseline differences.

Table 1 describes the sociodemographic composition of families by income group and how that composition shifted across periods. Asterisks indicate that a group's change from the first period (2000s) differed significantly from the change among the highest income families. By this test, composition shifted differentially across income groups on nearly every characteristic except child gender.

Three unparallel compositional shifts stand out. First, maternal education became more unequally distributed across income quintiles. Bachelor's degree attainment rose in every income group but far faster at the top, from 64% to 77% among the highest-income mothers against 6% to 12% among the lowest, widening the gap from 58 to 65 percentage points. Second, maternal full-time employment diverged sharply. Full-time work rose from 46% to 62% in the highest quintile while slightly dropping from 28% to 25% in the lowest, doubling the gap from 18 to 37 percentage points and concentrating demand for full-day, schedule-reliable care among families already most likely to enroll. Third, racial and ethnic and immigrant status composition moved in the opposite direction, converging across income groups. The difference in the share of White

non-Hispanic children between the highest and lowest quintiles narrowed from 38 to 27 percentage points, and the difference in the share of children of an immigrant mother narrowed from 7 to 2 percentage points.

Differences across income groups in single motherhood, number of children under age 13 in the household, maternal immigrant status, and average income-to-needs changed comparatively little across periods. The stability of the income-to-needs gap is important for interpreting what follows. Because quintiles are defined by rank rather than by income level, a widening resource difference between them could produce a widening enrollment gap without any change in how families of given resources behave. That the groups' resources relative to need remained roughly constant means the comparisons in Figures 1 and 2 hold group position fixed in real terms.

4 Analytic Approach

To address the first research question—whether the income-based gap in preschool enrollment has narrowed since 2000—I begin by descriptively illustrating income-specific trends in the enrollment rate from 2000 to 2023. National annual ECE enrollment rates are estimated by income quintiles for 4-year-olds and 3-year-olds using individual-level weights. Trends in public and private ECE enrollment are analogously illustrated to understand how changing enrollment in specific type of ECE is driving the overall enrollment trends. I also plot the enrollment *gaps* across income groups among 4- and 3-year-olds. This plot shows the trends in the pairwise *difference* in the ECE enrollment rates expressed in percentage points (pp) between highest-lowest, highest-middle, and middle-lowest income quintiles. I follow Magnuson and Waldfogel (2016)'s approach: the difference is estimated using a regression model where ECE enrollment status is predicted by income quintile group dummies (omitting the top income quintile as the

reference group) in a specific year with individual-level weights. The estimated difference between income groups is then averaged across 3-year periods to make the descriptive analysis easier to interpret.

I then estimate simple linear probability models to formally examine differential enrollment trends across income groups. To guard against the possibility of disruption due to COVID-19, the regression analyses only include pre-pandemic years, from 2000 to 2019. The model is specified as follows:

$$Y_{ist} = \alpha + \beta_1 lowest_{it} + \beta_2 low_{it} + \beta_3 middle_{it} + \beta_4 high_{it} + \beta_5 year_t + \beta_6 lowest_{it} \times year_t + \beta_7 low_{it} \times year_t + \beta_8 middle_{it} \times year_t + \beta_9 high_{it} \times year_t + \epsilon_{ist} \quad (1)$$

In this equation, Y_{ist} is a binary indicator of whether child *i* in state *s* and year *t* is enrolled in early education. I run this regression model for each age group separately ($a \in$ {4-year-olds, 3-year-olds}). The variables $lowest_{it}$, low_{it}, $middle_{it}$, $high_{it}$ are dummy indicators for children in the first, second, third, and fourth quintiles of the income distribution, respectively, with the top quintile (highest-income) as the omitted reference group. Thus, β_1, β_2, β_3, and β_4 represent the unconditional enrollment gaps at the first study period (year 2000) between children in highest- and each lower-income quintile, respectively, likely negative values showing lower enrollment compared to the highest-income quintile.

The variable $year_t$ is a continuous measure ranging from 2000 to 2019 capturing the linear trend in ECE enrollment over time. Because this model includes trend × income quintile interaction terms ($lowest_{it} \times year_t$, $low_{it} \times year_t$, $middle_{it} \times year_t$, and $high_{it} \times year_t$), β_5 captures the linear time trend in enrollment among highest-income children. The coefficients of interest are β_6, β_7, β_8, and β_9, which represent whether enrollment among lowest-, low-, middle- and high-income children grew at a different rate than among their highest-income counterparts. I estimate all equations using ordinary least squares (OLS) for ease of interpretation and consistency with

the Oaxaca-Blinder decomposition framework that follows, which is also based on OLS. For all analyses, standard errors are clustered at state levels.

To address the second research question – what factors contributed to the income-based enrollment gap across different periods – I estimate Oaxaca-Blinder decomposition models (Blinder, 1973; Oaxaca, 1973) to examine the extent to which observed sociodemographic and work-related characteristics explain the income-based enrollment gap in the 2000s, 2010s, and early 2020s. Oaxaca-Blinder decomposition is a widely used accounting method in labor economics and, increasingly, in education research (e.g., Blau & Kahn, 2017; Fortin et al., 2011; Jessen et al., 2020; Pilarz et al., 2019) for partitioning a mean difference in an outcome between two groups into a portion attributable to differences in observed characteristics and a portion attributable to differences in how those characteristics relate to the outcome. Applied to income-based gaps in ECE enrollment, this method asks how much of the enrollment gap between lower- and higher-income children would close if lower-income children had the same average characteristics (e.g., maternal employment, education) as higher-income children, and how much would remain even if those characteristics were equalized.

Formally, I first estimate the following linear probability model separately for each income group ($j \in$ {lowest, middle, highest}) and time period ($k \in$ {2000–2009, 2010–2019, 2020–2023}):

$$Y_{ist}^{j,k} = \alpha^{j,k} + \beta^{j,k} X_{it}^{j,k} + \delta_s + \epsilon_{ist}^{j,k} \quad (2)$$

where Y_{ist} is a binary indicator for ECE enrollment, X_{it} is a vector of sociodemographic and work-related characteristics, and δ_s denotes state fixed effects. State fixed effects are included for decomposition, so that differences in state composition and state-specific coefficients between income groups also contribute to the explained and unexplained components.

I then use the group-specific coefficient estimates from Equation 2 to decompose the mean enrollment gap between the highest-income group and each lower-income group *j* (lowest or middle) within period *k*:

$$\bar{Y}^{H,k} - \bar{Y}^{j,k} = \left(X^{H,k} - X^{j,k}\right)\beta^{H,k} + X^{j,k}(\beta^{H,k} - \beta^{j,k}) \quad (3)$$

explained *unexplained*

The first term, the explained component, captures the portion of the enrollment gap attributable to differences in the average characteristics (X) of lower- and highest-income children, evaluated using the highest-income group's coefficients ($\beta^{H,k}$) as the reference structure. The estimate of explained component answers how much would the gap shrink if lower-income children had the same average characteristics as highest-income children, given how those characteristics translate into enrollment for highest-income children.

The second term, the unexplained component, captures the portion of the gap attributable to differences in the coefficients $\beta^{j,k}$ themselves (including the intercept $\alpha^{j,k}$), evaluated at lower-income children's own average characteristics $X^{j,k}$. It answers how much of the gap would remain if lower-income children kept their own actual characteristics, but those characteristics translated into enrollment the way they do for highest-income children. I interpret this unexplained component as reflecting contextual or preferential differences in enrollment behavior between income groups—that is, the portion of the gap that would persist even if lower-income families' characteristics were held at their own observed levels, but the relationship between those characteristics and enrollment matched that of highest-income families. This may capture differing viable child care and ECE options, cultural preferences, access barriers, or institutional constraints, which this study cannot differentiate.

Because enrollment is a binary outcome, this decomposition follows the standard OLS-based approach (linear probability model) to Oaxaca-Blinder decomposition, in which predicted values are interpreted as linear approximations to enrollment probabilities. I use the highest-income group's coefficient as the reference structure following the original Oaxaca (1973) convention. It is important to emphasize that the decomposition analysis is a descriptive, accounting exercise and not intended for causal inference.

5 Results

Descriptive Trends

I begin with descriptive trends in ECE enrollment by income group from 2000 to 2023. Figure 1 presents two panels for each age group. The bottom panel plots center-based ECE enrollment rates by income quintile; the top panel plots the national share of all 4- and 3-year-olds enrolled in state-funded pre-K, included as context for the scale of public investment against which the enrollment trends should be read. The two panels share a common year axis and are read vertically.

For 4-year-olds, state pre-K enrollment rose from about 14% to 35% of the age group over the period. In contrast, the trend in center-based ECE enrollment rates are close to flat. Children in the first and second income quintiles—labeled "Lowest" and "Low," which overlap almost completely throughout—remain near 50% across the 2000s and 2010s, with only a slight upward drift before the COVID-19 disruption. The third, fourth, and fifth quintiles sit clearly above them in a consistent ordering, and their levels are likewise stable throughout until the decline around 2020. The spacing between the lines, the income gradient, changes little across two decades in which public pre-K roughly doubled its reach.

For 3-year-olds, state pre-K has not expanded much, rising only from about 3% to 7% of the age group. Potentially correspondingly, center-based enrollment for 3-year-olds is lower at every income level and the gradient is wider than that for 4-year-olds. The highest-income quintile shows a modest upward trend in the early-to-mid 2000s while the other groups remain comparatively flat, so the distance between the top quintile and the rest appears to widen before the Great Recession. Enrollment rates then stabilize across all income groups through the 2010s.

Figure 2 plots these differences directly as pairwise gaps between the highest and lowest (Q5−Q1), highest and middle (Q5−Q3), and middle and lowest (Q3−Q1) quintiles, with a fitted linear trend over 2000–2019 in each panel. Among 4-year-olds, the Q5−Q1 gap fluctuates within a band of roughly 20 to 26 percentage points without sustained movement in either direction; the fitted trend is −0.13 percentage points per year, implying a change of about 2.6 points across the full pre-pandemic period. The Q5−Q3 gap follows a similar and more muted pattern (−0.09 percentage points per year). The Q3−Q1 gap remains small throughout, near 5 percentage points, indicating that low- and middle-income children track closely and that the income gradient among 4-year-olds is driven largely by the gap between the highest quintile and the lower quintiles.

Among 3-year-olds the fitted trends run in the opposite direction: the Q5−Q1 gap widens by 0.24 percentage points per year and the Q5−Q3 gap by 0.22 percentage points, rising from roughly 25 to 30 percentage points across the 2000s before stabilizing in the 2010s. Both age groups show an uptick in gaps after 2020, although the pandemic years fall outside the fitted window and rest on smaller samples.

These largely stable patterns are robust to alternative definitions of income groups, including tertiles, quartiles, and categories based on income relative to the federal poverty line

(Figures S1 and S2). Results are similar in the October CPS, an independent national survey with a different enrollment question and a series extending back to 1994. Figures S3 and S4 used 3-year running average to reduce the year-to-year variation due to the small sample size of the October CPS survey. Although the estimates are noisily estimated, income-based gaps in center-based ECE enrollment are large throughout the period and show no sustained convergence, and the gap between middle- and lowest-income families is flat in both surveys. Contrasts involving the highest-income quintile do trend downward in the CPS for both 4- and 3-year-olds (Figure S4), but this likely reflects a measurement limitation rather than convergence. The October CPS records family income in nominal brackets that are not updated annually, so the top category captures a progressively less selective share of families, mechanically lowering its measured enrollment rate. Consistent with that interpretation, both contrasts anchored on the top quintile decline while the contrast that does not involve it is flat. I therefore read the CPS as corroborating the magnitude and persistence of income-based gaps.

In summary, the ECE enrollment trends were remarkably persistent, so was the enrollment gap between income groups. Given the substantial public investments toward public pre-K, this result raises questions of whether there was some degree of substitution between public pre-K and other ECE options. To explore this possibility, Figure 3 disaggregates the overall ECE enrollment (Figure 1) and separately plots children's enrollment in public and private ECE. It is important to note that public ECE enrollment in the ACS captures a distinct, though overlapping, construct from public pre-K enrollment. In the ACS, public ECE is reported by a family member of the child and can include any early childhood education that is publicly subsidized (e.g., public pre-K, Head Start, or early intervention programs offered in public school setting). Since public pre-K can be operated through community-based private ECE

centers, the classification may be ambiguous for families whose child is enrolled in a publicly subsidized private ECE. These measurement gaps may help explain why the growth in ACS-reported public ECE enrollment in Figure 3 looks more modest than the growth in state pre-K enrollment shown in Figure 1. With these caveats in mind, over time, public ECE enrollment for 4-year-olds increased across all income groups, with a relatively clearer upward trend for higher-income groups. In contrast, private ECE enrollment gradually declined across the 2010s among higher-income groups, while the trend remained stable for lower income groups. That is, for 4-year-old children, some degree of substitution from private to public ECE programs was observed among higher-income families. Such substitution was not as clear among 3-year-olds. The analogous graph using the CPS October Survey is presented in Figure S5, which also demonstrates an upward trend in public ECE enrollment with a downward trend in private enrollment.

Further, Figure 3 provides additional insight into the role of public ECE in shaping income-based enrollment differences. Throughout the study period, public ECE participation almost perfectly offsets the income gradient in private participation between the lowest- and second-lowest-income quintiles, for both 4-year-olds and for 3-year-olds, pointing to the continued role of public programs in closing income-based gaps among relatively lower-income families. For 4-year-olds, private ECE enrollment (bottom left panel) exhibits a stark income gradient, with the Highest-income quintile enrolling at substantially higher rates than all other groups, followed by a clear step-down ordering from High to Middle to Low to Lowest. This gradient is nearly the inverse of what appears in the public ECE enrollment panel (top left), where lower income groups enroll at higher rates than higher income groups—a pattern that substantially offsets the private ECE disparity and, for the two lowest-income quintiles, almost

entirely closes the gap between them in overall enrollment. For 3-year-olds, however, public enrollment rates (top right) are uniformly low across all income groups, with less differentiation by income quintile, except for the difference between the first and second income quintiles, representing a less clear compensatory role public ECE plays for 4-year-olds. As a result, the overall ECE enrollment trends for 3-year-olds shown in Figure 1 largely reflect the private ECE patterns for this age group, and the more limited reach of public ECE for 3-year-olds helps explain why income-based gaps are both larger and widening for this age group than for 4-year-olds.

In further exploration of the trends in the different ECE enrollment types, Figure S6 shows the full-day and part-day program enrollment trends (3-year running average), for which data available in the CPS October Survey, but not in the ACS. It shows increases in the full-day program enrollment across all income groups for 4-year-olds, embarking on an upward trend since the 2010s, accompanied with a declining trend in part-day program enrollment.

OLS Regression

Table 2 reports linear probability models of center-based enrollment on income quintile, a linear year trend, and their interaction, which formally test the trends in income-based gap from 2000 to 2019. Models were estimated separately for 3- and 4-year-olds and weighted by ACS person weights. Because quintile and year are fully interacted, the quintile coefficients give the enrollment gap relative to the highest quintile in 2000, and the interaction terms give the annual change in that gap.

The cross-sectional gaps are large. Among 4-year-olds, children in the lowest quintile were 24.7 percentage points less likely to be enrolled in a center-based setting than their highest-income peers, and the gaps were 25.5 for Q2, 19.6 for Q3, and 12.0 for Q4 (all $p < .001$). The

corresponding gaps among 3-year-olds were larger at 26.1, 25.7, 21.5, and 13.5 percentage points.

The interaction terms show that these gaps barely moved. The Q1 × Year coefficient for 4-year-olds is 0.1 percentage points ($p < .05$), indicating little meaningful convergence between the bottom and the top of the income distribution across two decades (narrowing one percentage points per decade); the interaction terms for other quintiles are also small. The Q1 × Year coefficient for 3-year-olds were also small, -0.2 percentage points ($p < .01$), indicating small divergence (widening two percentage points per decade). These are the regression counterpart of the fitted lines in Figure 2, which trend at -0.1 percentage points per year for the Q5−Q1 gap among 4-year-olds and +0.2 among 3-year-olds.

Decomposition

Table 3 presents Oaxaca-Blinder decomposition results for the enrollment gap between children in the bottom and top quintiles, estimated separately for 4- and 3-year-olds and across three time periods: the 2000's, 2010's, and early 2020s. All results are based on Equation 3, which includes individual and family-level characteristics and state fixed effects as covariates. Tables S1 and S2 report the detailed contributions to the Q5−Q1 decomposition; Tables S3 and S4 report the same for Q5−Q3.

Differences in measured characteristics account for most of the gap between the top and the bottom of the income distribution. Among 4-year-olds, the Q5−Q1 gap was 24.1 percentage points in the 2000s, 22.6 in the 2010s, and 23.4 in the early 2020s, of which composition explains 17.5 (72%), 16.8 (75%), and 15.3 (65%) percentage points. Among 3-year-olds the gaps were larger – 27.2, 28.8, and 25.6 percentage points – and the explained share rose steadily across periods, from 16.8 (62%) to 19.2 (67%) to 19.7 (77%) percentage points.

The Q5−Q3 gaps are smaller, as expected: 19.0, 18.5, and 17.1 percentage points for 4-year-olds and 22.3, 24.5, and 21.0 for 3-year-olds. Composition explains only about half of them (48–53% and 46–48%, respectively). Middle-income families differ from high-income families far less in the characteristics the ACS measures than low-income families do (as shown in Table 1), yet their children's enrollment rates remain well below those of high-income children.

Maternal education dominates the explained component throughout. For 4-year-olds it accounts for 13.9, 14.0, and 12.6 percentage points of the Q5−Q1 gap across the three periods — roughly three-fifths of the total gap and about four-fifths of what composition explains. The pattern is nearly identical for 3-year-olds (14.2, 15.7, and 12.8 percentage points) and holds in the Q5−Q3 comparison as well, where education contributes 6.9–8.2 percentage points for 4-year-olds and 7.0–9.3 for 3-year-olds. No other measured characteristic comes close. Household composition contributes 1.5–2.9 percentage points to the Q5−Q1 gap, child demographics roughly 1 percentage point, and state of residence about 1 percentage point. Maternal employment contributes slightly *negatively* in most periods (−0.2 to −1.0 percentage points), meaning that differences in mothers' work status modestly narrow rather than widen the income gap in enrollment.

The unexplained component — 5.7 to 8.1 percentage points for 4-year-olds and 5.9 to 10.4 for 3-year-olds in the Q5−Q1 comparison, and 8.2 to 12.8 percentage points across the Q5−Q3 comparisons — is the portion of the gap that would persist if lower-income families had the same measured characteristics as the highest-income families. It reflects differences in how the same characteristics translate into enrollment rather than differences in the characteristics themselves. I read it as an accounting residual, of which magnitude depends entirely on observable characteristics.

6 Discussion and Conclusion

This study examined national trends in income-based disparities in center-based early childhood education (ECE) enrollment from 2000 to 2023, a period of major public investment growth in state pre-K programs. It addressed two key questions: (1) whether the enrollment gap across income groups has narrowed over time, continuing the convergence observed in the 1990s (Magnuson & Waldfogel, 2016), and (2) what demographic and household factors account for these disparities in the 2000s, 2010s, and early 2020s.

The results highlight remarkable stability from 2000 to 2023, in both the enrollment gap and the factors that explain it. Among 4-year-olds, convergence was small between the highest quintiles and lower quintiles and roughly similar across quintiles: 0.1-0.2 percentage points per year on average, cumulating to a 1-2 percentage-point narrowing over a decade. For 3-year-old children, the pattern runs in the opposite direction but also show largely stable trend, with pairwise differences between the highest quintile and lower quintiles modestly widening by 0.2-0.3 percentage points per year.

Decomposition analyses point to what underlies this stability. The share of the gap explained by observable compositional differences remained large (i.e., approximately two thirds to three quarters) and stable over time, and maternal education consistently accounted for the largest portion of the income-based disparities in children's ECE enrollment. This finding yields two interpretations, which are not mutually exclusive. First, maternal education may proxy for resources that annual income quintile alone does not sufficiently measure, such as permanent income and financial stability. This interpretation corroborates the perspective that affordability barriers primarily drive the persistent income-based gap in ECE enrollment. Second, education may operate through channels genuinely distinct from affordability: more highly educated

parents tend to have better information about available programs, application processes, and long-term benefits, and are more likely to hold stable, standard-hours jobs compatible with ECE schedules.

This study contributes to the literature in three key ways: it extends the empirical record on income-based enrollment disparities through 2023 and shows that little progress has occurred; it shows that stability in the aggregate gap obscures a shift in how children are enrolled, from private to public and from part-day to full-day programs; and it shows that this stability persisted through both the Great Recession and the COVID-19 pandemic, descriptively suggesting public investment functioning as a buffer rather than an equalizer.

First, by updating the empirical record from 2000 through 2023 (Bainbridge et al., 2005; Magnuson & Waldfogel, 2016), this study reveals that the disparity in income-based preschool enrollment have not meaningfully narrowed during this period. Given prior evidence that public spending on ECE can raise overall access, particularly among children from lower-income families (Magnuson et al., 2007; Pilarz, 2018; Washbrook et al., 2011), this stability is somewhat striking. It is not, however, the first study to document a stalled ECE enrollment trend. Moran et al. (2026) found no difference in preschool enrollment rates for 4-year-olds between states with universal and targeted pre-K programs from 2005 to 2019, either among all 4-year-olds or among those from low-income families, despite states with universal designs enrolling a significantly higher share of children in state pre-K programs. Other correlational studies similarly suggest muted enrollment responses to public spending on ECE in the post-2000 period. For example, in examining the association between total ECE spending (combining child care subsidies, Head Start, and public pre-K) and center-based ECE enrollment among 3- and 4-year-old children from low-income families between 1997 and 2011, Pilarz and Walther (2026)

found a statistically significant but small association (1.3 percentage points, or a 5% enrollment gain, per $1,000 increase in ECE spending), which the authors note is considerably smaller than the gains reported in earlier studies. Cha et al. (2026) documented a similarly small association, finding effects of state pre-K spending on 4-year-olds preschool enrollment of approximately 1 percentage points gain per $1,000 funding increase in both the ACS and CPS. Read alongside recent evidence of persistent economic precarity among the early education and child care workforce over the past three decades (Sadowski, 2026), these findings suggest that structural challenges long identified on both the supply and demand sides of the U.S. child care market have not meaningfully improved in the past two and a half decades.

Second, exploration by specific ECE type reveals a partial shift from private to public, and from part-day to full-day, programs. Across all income groups, this study observes an upward trend in public and full-day program enrollment alongside a downward trend in private and part-day ECE enrollment; both shifts are more pronounced among 4-year-olds than 3-year-olds, and more pronounced among higher-income than lower-income families. These findings align with Moran et al.'s (2026) argument that public pre-K investment over the past two decades may have changed who pays for children's ECE enrollment and how intensive that enrollment is, rather than expanding whether children attend ECE at all. While the overall income-based ECE enrollment gap remained essentially unchanged over this period, higher-income families appear to be the primary group absorbing the growth in public ECE access, largely by shifting enrollment that would otherwise have gone toward privately paid care. Lower-income families' own mix of public and private enrollment, by contrast, remained relatively stable, so this pattern does not reflect displacement of lower-income children from public programs. Instead, it suggests that the marginal gain from two decades of public investment in pre-K accrued

disproportionately to a group whose overall ECE participation was already comparatively high, while lower-income families, whose participation has remained comparatively low throughout the study period, saw little corresponding gain.

Third, just as much as the income-based gap in ECE enrollment did not converge over the course of increased public investments, neither was it meaningfully disrupted by the Great Recession or COVID-19. Maternal education remained the most important explanatory factor underlying persistent disparities across all three distinct periods (i.e., before the Great Recession, between the Great Recession and COVID-19, and after COVID-19). This pattern may suggest that public investments in ECE in the post-2000 era primarily served as a buffer against potential the loss of ECE enrollment among lower-income children during economic downturns and heightened parental job loss, rather than as a lever for boosting their enrollment. The modest diverging trend in ECE enrollment among 3-year-olds, the age group that public pre-K investment has expanded less, is consistent with this interpretation, and may be suggestive of the secular trend that would have prevailed in the absence of public ECE investment.

Several limitations should be noted. First, this study's focus on the center-based ECE enrollment sheds light on only one aspect of equitable access to ECE, but it cannot assess whether other dimensions, such as the cost of care to families, hours of care, or program quality, have also changed in equity-enhancing ways without a visible change in enrollment rates. Second, although the decomposition indicates that a substantial portion of the between-group differences in the probability of enrollment is attributable to compositional differences in mothers' educational attainment, it cannot distinguish whether this reflects unmeasured affordability barriers or other information- or work-related barriers. Third, omitted variables may inflate the unexplained portion of the ECE enrollment gaps across income groups. In particular,

this study could not account for parental work schedules—which are known to affect ECE enrollment decisions (Han, 2004; Pilarz et al., 2019; Pilarz & Walther, 2026)—because of data limitations in the ACS. It also does not incorporate child care supply-side factors, which may explain some portion of the gap through differences in the availability of center-based ECE across income groups (e.g., Brown & Herbst, 2026). Fourth, the income quintile approach, while effective for tracking relative inequality over time, may mask variation within income groups as well as growing income disparities between high-, middle-, and low-income families over time.

Future research should continue to monitor post-pandemic trends in ECE access and inequality. Greater attention to the factors driving the stalled ECE enrollment growth and the modestly widening enrollment gap between low- and high-income 3-year-olds would be an important avenues forward. Moreover, future studies should assess how varied state strategies for investing in ECE (Moran et al., 2026) have shaped state-level gaps in access to ECE. Importantly, early child care arrangement for children aged zero to two are not measured annually in the U.S., hampering our ability to track income-based disparities in children's earliest years. National data collection on infant and toddler child care would enable assessment of both progress and setbacks in the effort to ensure equitable early learning and child care opportunities for young children. Finally, linking early enrollment patterns to short- and longer-term developmental outcomes would provide valuable insight into the broader implications of convergence or persistence in early education inequality.

Notes

1. From 1968 to 1993, the CPS October survey asked whether the child was enrolled in school, and if so, followed up with a question about the grade level. One of the response options was “nursery school,” which included both full-day and part-day enrollment. Starting in 1994, the CPS clarified the school enrollment question by adding a prompt that defined "regular school" to include nursery school, kindergarten, elementary school, and schooling that leads to a high school diploma. This was followed by a question on the specific grade level, which included a response category labeled “nursery (preschool, prekindergarten).” This change aimed to standardize how respondents understood and reported early school enrollment, likely improving the accuracy of preschool attendance measures over time. Considering this change in the measurement, this study limits the analysis to the trend in preschool enrollment from 1994 to 2023 when complementing ACS-based finding with the CPS October survey.

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Data Availability Statement

This paper used ACS and CPS public-use files and the analytic code will be deposited in the openICPSR repository.

Use of Artificial Intelligence

The author used Claude (Sonnet 5, Anthropic) to assist with editing manuscript drafts (clarity and internal consistency checks) and with development and debugging of analysis code. All analytic decisions, code, results, and interpretations were reviewed and are the sole responsibility of the author.

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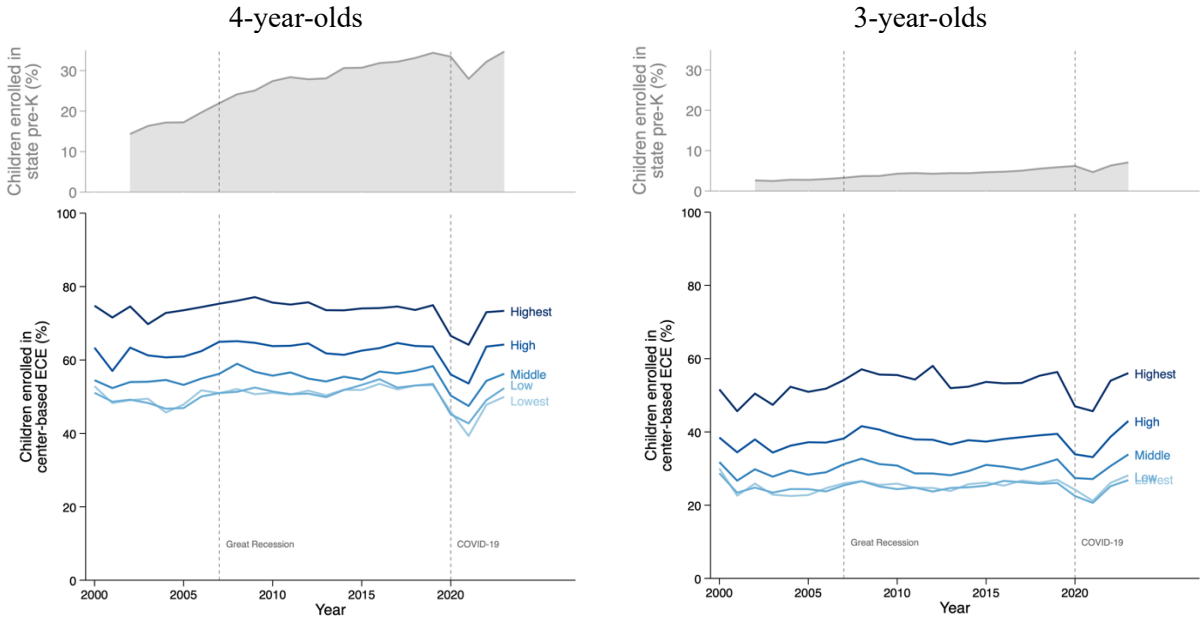
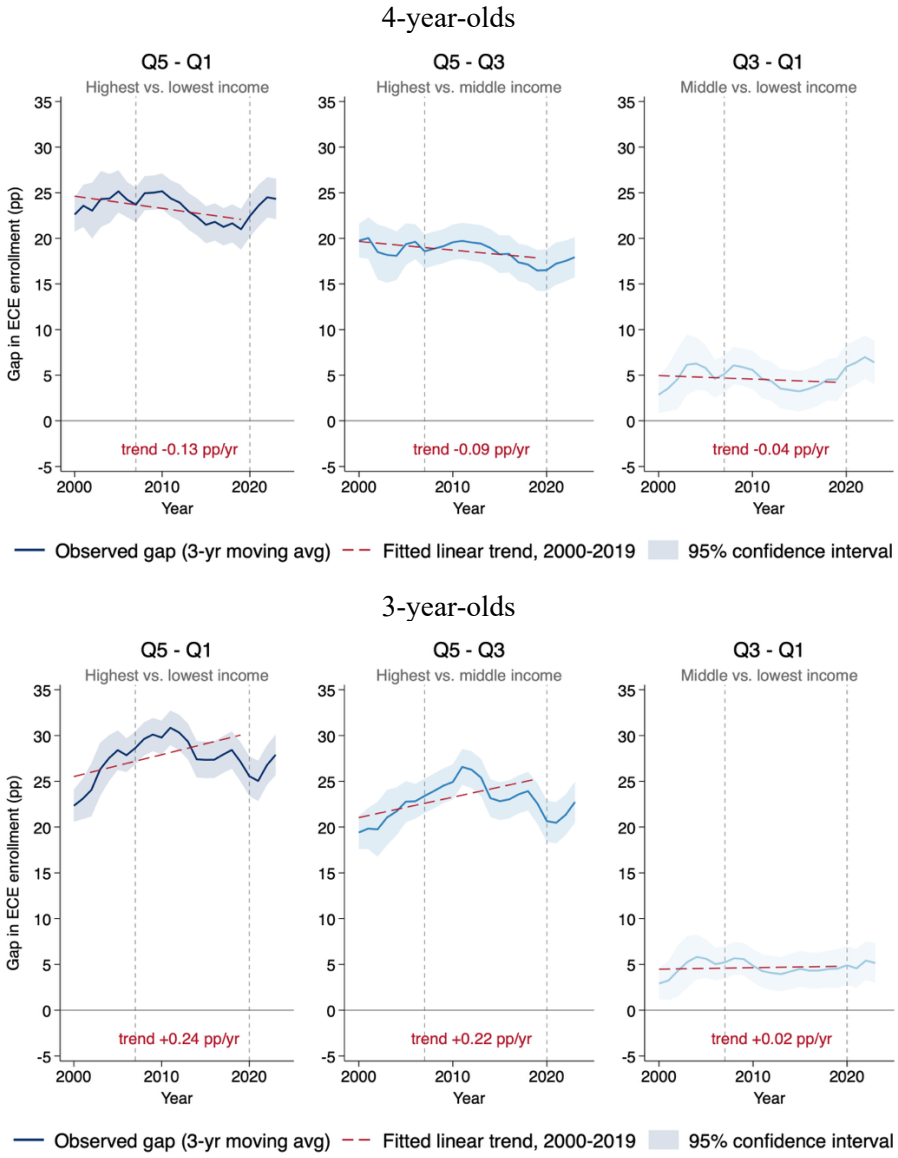
Figures

Figure 1. Center-based ECE enrollment rates by family income quintile, 2000-2023



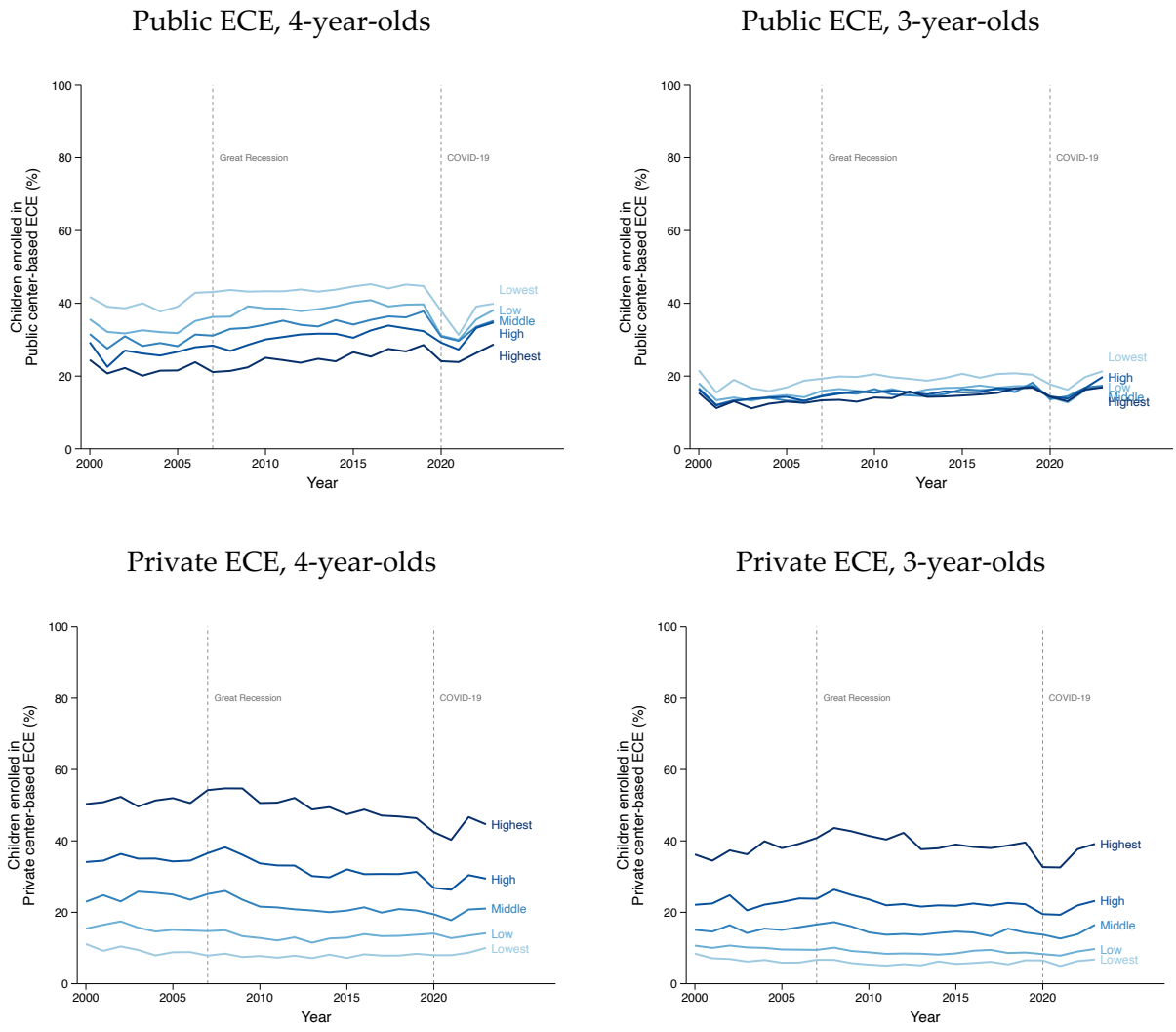
Source: Bottom panel: American Community Survey (ACS), 2000–2023. Top panel: NIEER *State of Preschool* Yearbooks, 2003–2023. **Note**: The top and bottom panels share a year axis and are read vertically. The bottom panel reports this study's estimates; top panel is contextual only. In the bottom panel, each line plots the weighted percentage of children in a given family-income quintile who were reported as enrolled in center-based early childhood education (ECE) in the survey year. Income quintiles are constructed separately in each survey year from total family income among families with a 3- or 4-year-old child. In the ACS, school enrollment for preschool-age children is worded as "nursery school and preschool," which encompasses both public and private programs and both part-day and full-day attendance. Dashed vertical lines mark 2007, the beginning of the Great Recession, and 2020, the first survey year affected by the COVID-19 pandemic. All estimates are weighted using ACS person weights. Sample sizes by period and quintile are reported in Table 1. The top panel plots the percentage of all 4- or 3-year-olds in the United States enrolled in a state-funded pre-K programs, shown to indicate the scale of public pre-K expansion against which the center-based ECE enrollment gaps below should be read. The top panel differs from the bottom in source and vertical scale: the top is reported by state ECE administrators and its axis runs 0–35 rather than 0–100. Children enrolled in state pre-K are a subset of those counted as enrolled in center-based ECE below, so the two series are not independent. NIEER reports enrollment by school year; values are plotted at the calendar year in which the school year end. No relationship between the two series is estimated or implied.

Figure 2. The income-based gap in center-based ECE enrollment, 4-year-olds (top row) and 3-year-olds (bottom row), 2000-2023



Source: American Community Survey (ACS), 2000–2023. **Note**: Each panel plots the pairwise difference in center-based ECE enrollment rates between two income quintiles, expressed in percentage points (pp) and in 3-year centered moving averages with 2-year averages at the endpoints; a larger value means a wider gap and zero means no gap. Q5−Q1 is the difference between the highest and lowest quintiles, Q5−Q3 between the highest and the middle, and Q3−Q1 between the middle and the lowest. Shaded bands are 95% confidence intervals. Income quintiles are constructed separately in each survey year from total family income among families with a 3- or 4-year-old child; Q1 denotes the lowest and Q5 the highest quintile. In the ACS, school enrollment for preschool-age children is worded as "nursery school and preschool," which encompasses both public and private programs and both part-day and full-day attendance. Dashed vertical lines mark 2007, the beginning of the Great Recession, and 2020, the first survey year affected by the COVID-19 pandemic. All estimates are weighted using ACS person weights.

Figure 3. Public (top row) and private (bottom row) center-based ECE enrollment by family income quintile, 2000-2023



Source: American Community Survey (ACS), 2000–2023. **Note**: Public and private enrollment are determined by the ACS follow-up item asking whether the school attended is public or private; the two panels for a given age sum to the overall enrollment rate plotted in Figure 1. It is important to note that public ECE enrollment reported in the ACS is not the same as public pre-K enrollment plotted in the top panels of Figure 1. Public ECE enrollment is reported by a family member and can broadly include public pre-K and other publicly funded programs, such as Head Start or early intervention programs operated in public schools. A family member reporting on behalf of a child who enrolled in a privately operated ECE program that is contracted and funded by the state or city might report that enrolling as private, even though it is functionally a publicly subsidized pre-K placement. Income quintiles are constructed separately in each survey year from total family income among families with a 3- or 4-year-old child; Q1 denotes the lowest and Q5 the highest quintile. In the ACS, school enrollment for preschool-age children is worded as "nursery school and preschool," which encompasses both public and private programs and both part-day and full-day attendance. Dashed vertical lines mark 2007, the beginning of the Great Recession, and 2020, the first survey year affected by the COVID-19 pandemic. All estimates are weighted using ACS person weights.

Tables

Table 1. Weighted characteristics of 3- and 4-year-old children and their families, by family income quintile and period

	2000-2009			2010-2019			2020-2023		
Income Quintiles	Q1	Q3	Q5	Q1	Q3	Q5	Q1	Q3	Q5
	M / %	*M* / %	*M* / %	*M* / %	*M* / %	*M* / %	*M* / %	*M* / %	*M* / %
Female child	49%	49%	49%	49%	49%	49%	49%	49%	49%
Child race and ethnicity									
White non-Hispanic	35%	63%	73%	31%*	55%	65%	31%*	51%*	58%
Black, non-Hispanic	26%	10%	6%	25%*	10%	5%	24%	10%	5%
Asian/Pacific Islander and other, non-Hispanic	7%	7%	11%	9%*	10%*	16%	12%*	13%*	21%
Hispanic/Latino	31%	20%	10%	35%*	25%*	13%	34%*	26%	15%
Number of children <age 13	2.29	2.17	2.16	2.28	2.18*	2.15	2.24*	2.17	2.15
Mother's education									
Highschool or less	68%	39%	13%	60%*	32%*	10%	55%*	28%*	9%
Some college	27%	37%	23%	33%*	38%*	17%	34%*	34%*	14%
Bachelor's degree or more	6%	23%	64%	7%*	29%*	73%	12%*	39%*	77%
Immigrant mother	25%	19%	18%	27%*	22%	21%	25%*	21%*	22%
Single mother	54%	10%	3%	55%*	12%*	3%	54%*	13%	5%
Mother's work status									
No work	44%	29%	28%	47%*	31%*	22%	48%*	31%*	20%
Part-time work (<40 h)	28%	29%	25%	30%*	27%*	22%	27%*	24%*	19%
Full-time work (>=40h)	28%	42%	46%	23%*	42%*	56%	25%*	45%*	62%
Income-to-needs (%)	70.08	269.41	487.07	63.32*	258.69*	488.39	78.65	304.26*	495.30
Observation	160,139	164,209	166,820	126,861	129,535	132,163	46,943	47,593	47,361

Source: American Community Survey (ACS), 2000–2023. Note: Cells report weighted means (M) for continuous measures and weighted percentages (%) for categorical measures, among children ages 3 and 4. Income quintiles are constructed separately in each survey year from total family income among families with a 3- or 4-year-old child; Q1 denotes the lowest, Q1 the middle, and Q5 the highest quintile. Q2 and Q4 are omitted for space and are available from the author. Family income is nominal (not inflation-adjusted), so the across-period increases reflect price growth as well as real income growth. An asterisk marks a characteristic for which the change from the 2000s differs significantly ($p < .05$) for Q1 or Q3 relative to the change for Q5; that is, asterisks test whether the composition of lower-income groups moved differently over time than the composition of the highest-income group, not whether the groups differ from one another in levels. All estimates are weighted using ACS person weights.

Table 2. Linear probability models of center-based ECE enrollment on income quintile, a linear year trend, and their interaction, 2000–2019

	4-year-olds		3-year-olds	
	β $(S.E.)$	*Implied change in gap per decade*	β $(S.E.)$	*Implied change in gap per decade*
Enrollment gap at baseline (*ref.* = Q5, highest)				
Q1 (lowest)	-0.247***	–	-0.261***	
	(0.008)		(0.013)	
Q2	-0.255***	–	-0.257***	
	(0.007)		(0.009)	
Q3	-0.196***	–	-0.215***	
	(0.006)		(0.008)	
Q4	-0.120***	–	-0.135***	
	(0.008)		(0.008)	
Annual change in the gap (quintile × year)				
Q1	0.001*	1.0 pp narrower	-0.002**	2.0 pp wider
	(0.001)		(0.001)	
Q2	0.002***	2.0 pp narrower	-0.003***	3.0 pp wider
	(0.000)		(0.000)	
Q3	0.001	1.0 pp narrower	-0.002***	2.0 pp wider
	(0.001)		(0.000)	
Q4	0.001+	1.0 pp narrower	-0.002***	2.0 pp wider
	(0.000)		(0.000)	
Year trend (Q5, highest)	0.001	–	0.003***	
	(0.000)		(0.000)	
Intercept	0.738***	–	0.505***	
	(0.008)		(0.009)	
Observation	726,955		737,307	

Source: American Community Survey (ACS), 2000–2019, weighted using ACS person weights. **Note**: Each column is a weighted linear probability model regressing an indicator for center-based ECE enrollment on income-quintile indicators, a linear year trend centered at 2000, and their interactions. Pandemic years (2020–2023) are excluded so that the estimated trend describes the pre-pandemic period. Standard errors, clustered at the state level, are in parentheses. The "implied change in gap per decade" column is a transformation of the interaction coefficient ($\beta \times 10 \times 100$), not a separate estimate, and is reported to make the substantive size of the trend legible. The quintile coefficients give the enrollment gap relative to the highest quintile at the start of the period. The interaction terms give the annual change in that gap. Because the quintile coefficients are negative, a positive interaction means the gap is closing and a negative interaction means it is widening. + p < .10, * p < .05, ** p < .01, *** p < .001.

Table 3. Oaxaca-Blinder decomposition of the income-based gap in center-based ECE enrollment, highest (Q5) versus lowest (Q1) income quintile

	2000–2009	2010–2019	2020–2023
Panel A. 4-year-olds			
Enrollment rate, Q5 (highest)	74.2 [72.6, 75.8]	74.6 [72.8, 76.5]	69.3 [67.2, 71.5]
Enrollment rate, Q1 (lowest)	50.1 [48.2, 52.0]	52.1 [49.7, 54.5]	46.0 [43.6, 48.3]
Gap, Q5-Q1	**24.1 [22.8, 25.4]**	**22.6 [20.9, 24.2]**	**23.4 [21.8, 24.9]**
Explained by composition	17.5 (72%)	16.8 (75%)	15.3 (65%)
o*f which: maternal education*	13.9 (58%)	14.0 (62%)	12.5 (53%)
Unexplained	6.7 (28%)	5.7 (25%)	8.1 (35%)
Observation	161,935	128,603	45,407
Panel B. 3-year-olds			
Enrollment rate, Q5 (highest)	52.0 [50.3, 53.8]	54.6 [52.7, 56.5]	50.7 [48.9, 52.6]
Enrollment rate, Q1 (lowest)	24.9 [22.7, 27.0]	25.8 [23.3, 28.2]	25.1 [22.7, 27.5]
Gap, Q5-Q1	**27.2 [24.9, 29.5]**	**28.8 [26.5, 31.1]**	**25.6 [23.9, 27.4]**
Explained by composition	16.8 (62%)	19.2 (67%)	19.7 (77%)
o*f which: maternal education*	14.2 (52%)	15.7 (55%)	12.8 (50%)
Unexplained	10.4 (38%)	9.6 (33%)	5.9 (23%)
Observation	165,024	130,421	45,502

Source: American Community Survey (ACS), 2000–2023, weighted using ACS person weights. **Note**: All quantities are in percentage points. Brackets contain 95% confidence intervals; parentheses give each component as a percentage of the total gap in that period. Every enrollment rate, gap, and explained and unexplained component in the table is distinguishable from zero at $p < .001$. The decomposition follows Equation 2 and adjusts for child sex, child race and ethnicity, number of children under age 13 in the household, mother's educational attainment, mother's immigrant status, mother's work status, and state indicators, using the highest-income group's coefficients as the reference structure. Standard errors are clustered at the state level. The maternal-education line sums the "high school or less" and "some college" components from Tables S1 and S2. Components may not sum to the total because of rounding. The gap is the difference in enrollment rates between the highest-income quintile and the comparison quintile. The explained component is the part of that gap attributable to differences in measured characteristics – how much of the gap would close if the lower-income group had the same average characteristics as the highest-income group, given how those characteristics predict enrollment for the highest-income group. The unexplained component is the remainder: the part that would persist if characteristics were equalized, reflecting differences in how the same characteristics translate into enrollment. Both are descriptive accounting quantities. This paper interprets the unexplained component as a measure of contextual or preference differences, but its size depends on which characteristics the model includes.

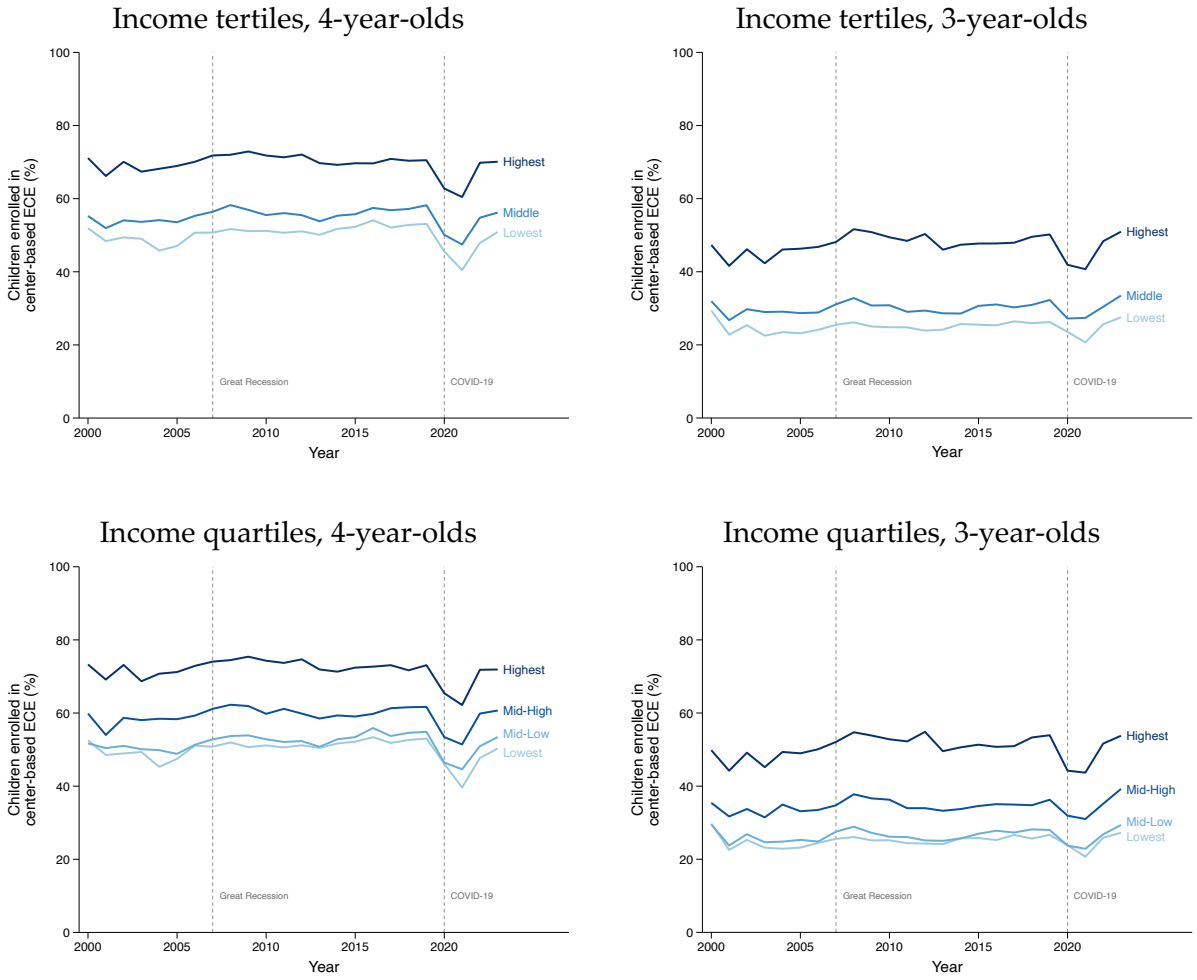
Table 4. Oaxaca-Blinder decomposition of the income-based gap in center-based ECE enrollment, highest (Q5) versus middle (Q3) income quintile

	2000–2009	2010–2019	2020–2023
Panel A. 4-year-olds			
Enrollment rate, Q5 (highest)	74.2 [72.6, 75.8]	74.6 [72.8, 76.5]	69.3 [67.2, 71.5]
Enrollment rate, Q3 (middle)	55.2 [53.1, 57.3]	56.2 [53.8, 58.6]	52.3 [49.7, 54.8]
Gap, Q5-Q3	**19.0 [18.1, 20.0]**	**18.5 [17.0, 19.9]**	**17.1 [15.9, 18.2]**
Explained by composition	9.9 (52%)	9.7 (53%)	8.2 (48%)
o*f which: maternal education*	8.1 (42%)	8.2 (44%)	6.9 (41%)
Unexplained	9.1 (48%)	8.7 (47%)	8.9 (52%)
Observation	165,656	130,634	46,478
Panel B. 3-year-olds			
Enrollment rate, Q5 (highest)	52.0 [50.3, 53.8]	54.6 [52.7, 56.5]	50.7 [48.9, 52.6]
Enrollment rate, Q3 (middle)	29.8 [27.9, 31.6]	30.1 [28.4, 31.8]	29.7 [28.0, 31.4]
Gap, Q5-Q3	**22.3 [20.6, 23.9]**	**24.5 [22.9, 26.0]**	**21.0 [19.7, 22.4]**
Explained by composition	10.2 (46%)	11.7 (48%)	10.1 (48%)
o*f which: maternal education*	8.4 (38%)	9.3 (38%)	7.0 (33%)
Unexplained	12.1 (54%)	12.8 (52%)	11.0 (52%)
Observation	165,373	131,064	46,355

Source: American Community Survey (ACS), 2000–2023. **Note**: See Table 3 for units, interval conventions, the covariate list, and guidance on interpreting the explained and unexplained components. All enrollment rates, gaps, and components are distinguishable from zero at $p < .001$.

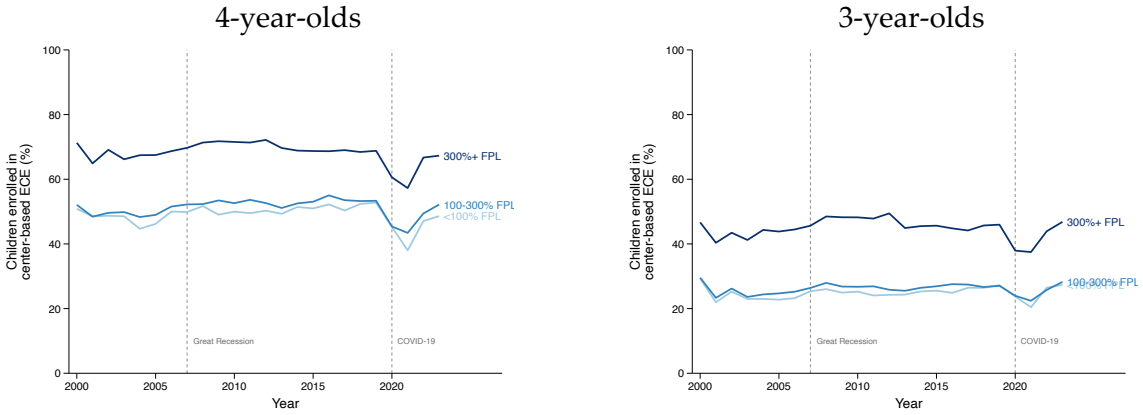
Appendix

Figure S1. Center-based ECE enrollment rate by income tertile (top row) and quartile (bottom row), 2000-2023



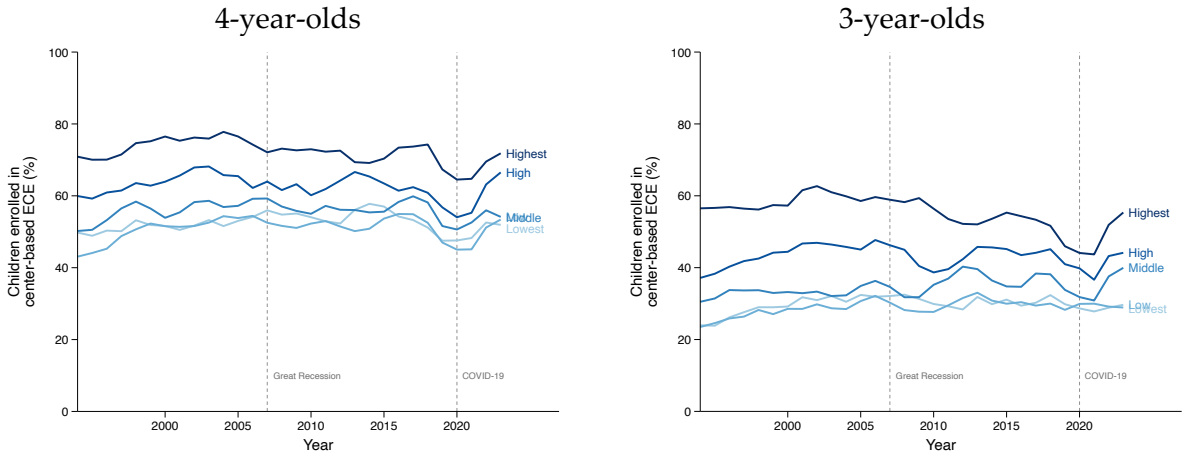
Source: American Community Survey (ACS), 2000–2023. **Note**: Tertiles and quartiles are constructed annually in the same way as the quintiles used in the main text. This figure is reported to show that the pattern in Figure 1 is not sensitive to the quintile cut points. In the ACS, school enrollment for preschool-age children is worded as "nursery school and preschool," which encompasses both public and private programs and both part-day and full-day attendance. Dashed vertical lines mark 2007, the beginning of the Great Recession, and 2020, the first survey year affected by the COVID-19 pandemic. All estimates are weighted using ACS person weights.

Figure S2. Center-based ECE enrollment rate by poverty groups, 2000–2023



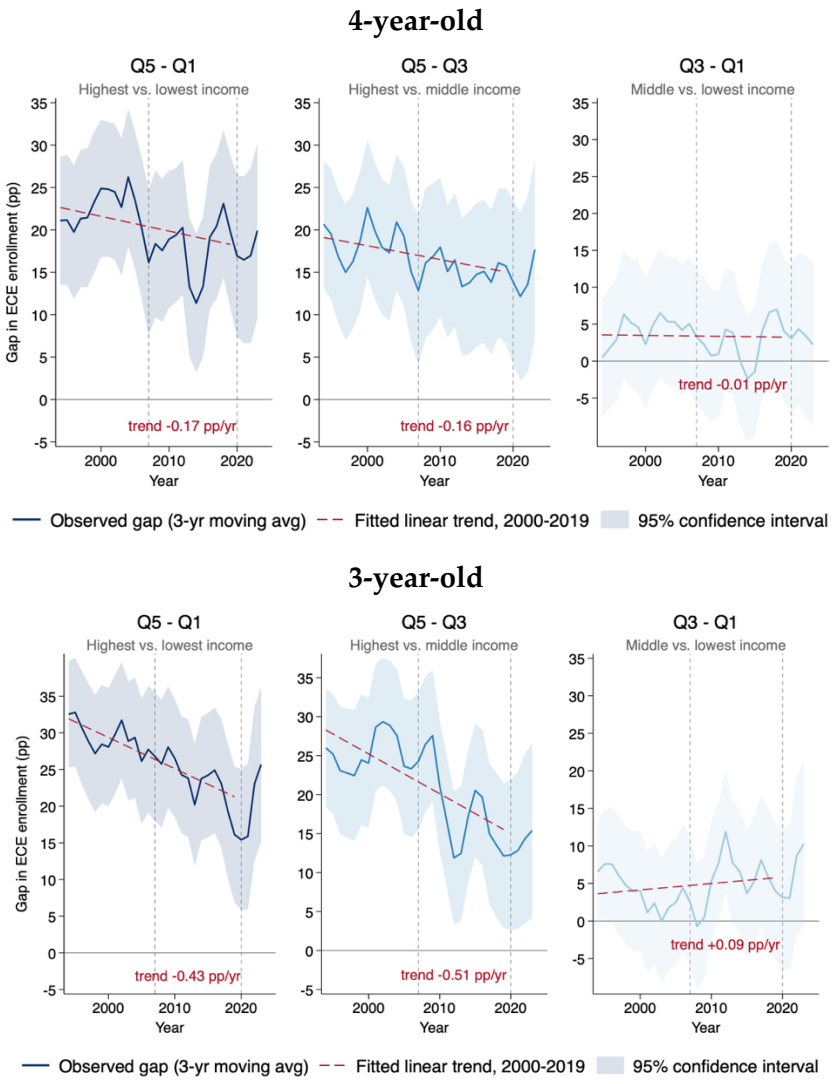
Source: American Community Survey (ACS), 2000–2023. **Note**: This figure is reported to show that the pattern in Figure 1 is not sensitive to grouping families by income relative to the federal poverty line. Families are grouped by total family income relative to the federal poverty line (FPL) for their family size. In the ACS, school enrollment for preschool-age children is worded as "nursery school and preschool," which encompasses both public and private programs and both part-day and full-day attendance. Dashed vertical lines mark 2007, the beginning of the Great Recession, and 2020, the first survey year affected by the COVID-19 pandemic. All estimates are weighted using ACS person weights.

Figure S3. Center-based ECE enrollment rate by income quintile, 3-year moving average, October CPS, 2000-2023



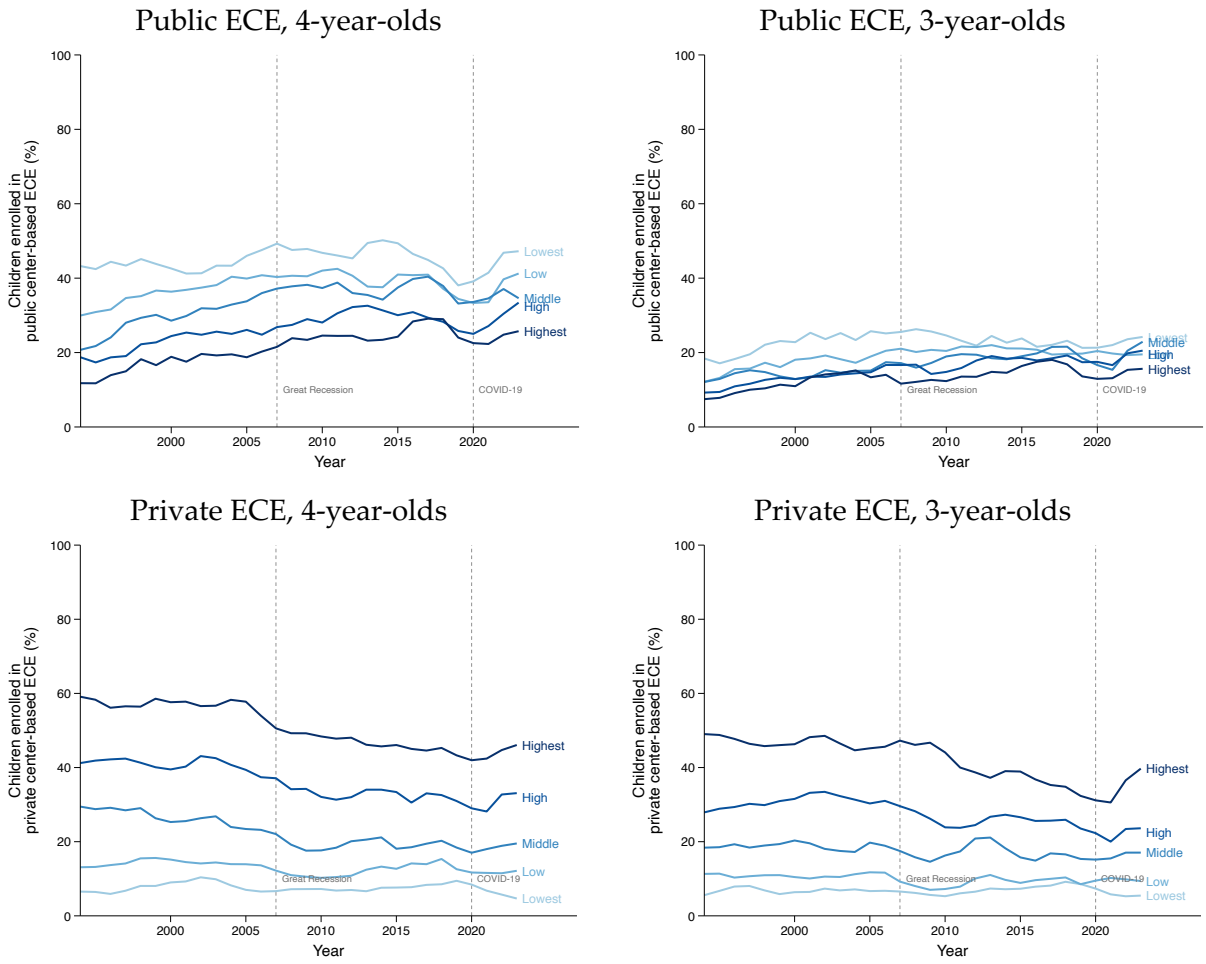
Source: October Current Population Survey (CPS), 1994–2023. **Note**: Each line plots center-based ECE enrollment, expressed in 3-year centered moving averages with 2-year averages at the endpoints. In the CPS, enrollment for preschool-age children is asked as "full-day (or part-day) nursery school (pre-kindergarten and preschool)." The CPS series begins in 1994 and so extends six years earlier than the ACS series in Figure 1. Income quintiles are constructed separately in each survey year from total family income categories among families with a 3- or 4-year-old child; Q1 denotes the lowest and Q5 the highest quintile. Dashed vertical lines mark 2007, the beginning of the Great Recession, and 2020, the first survey year affected by the COVID-19 pandemic. Estimates are weighted using CPS individual weights.

Figure S4. The income-based gap in center-based ECE enrollment, 3-year-moving average, October CPS, 1994–2023



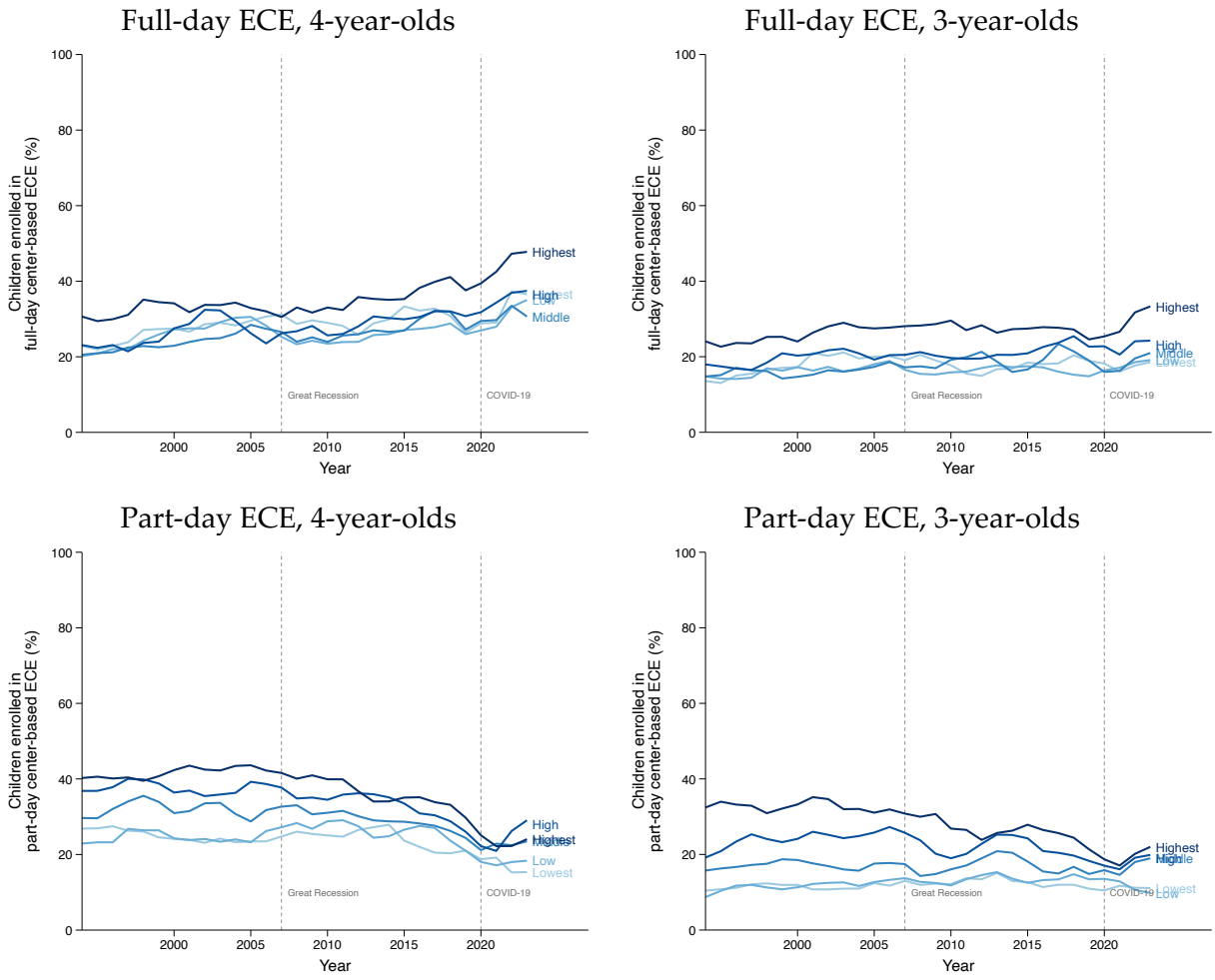
Source: October CPS, 1994–2023. **Note**: Each panel plots the difference in enrollment rates between two income quintiles in percentage points and in 3-year centered moving average with a 2-year average at the end points; a larger value means a wider gap. See Figure 2 for panel definitions and Figure S3 for the CPS enrollment wording. Dashed vertical lines mark 2007, the beginning of the Great Recession, and 2020, the first survey year affected by the COVID-19 pandemic. The CPS measures family income in categorical brackets that are not updated annually, so the highest-income quintile (Q5) becomes progressively less selective. The contrasts using Q5 as the reference group therefore trend downward for mechanical reasons, and their fitted slopes should not be read as evidence of convergence. The Q3−Q1 contrast does not involve the top bracket and is the appropriate comparison with Figure 2; it is flat in both age groups, consistent with the ACS. From 2010 the CPS also allocates missing family income at approximately a 20% rate. Estimates are imprecise throughout because of small annual sample sizes.

Figure S5. Public and private center-based ECE enrollment by income quintile, October CPS, 2000–2023



Source: October CPS, 1994–2023. **Note**: Each line is expressed in 3-year centered moving averages with 2-year averages at the endpoints. Public and private enrollment are determined by the CPS follow-up item asking whether the school attended is public or private. See Figure S3 for the CPS enrollment wording. Dashed vertical lines mark 2007, the beginning of the Great Recession, and 2020, the first survey year affected by the COVID-19 pandemic.

Figure S6. Full-day and part-day center-based ECE enrollment by income quintile, October CPS



Source: October CPS, 1994–2023. **Note**: Each line is expressed in 3-year centered moving averages with 2-year averages at the endpoints. Full-day and part-day enrollment are distinguished by the CPS items "full-day nursery school (pre-kindergarten or preschool)" and "part-day nursery school (pre-kindergarten or preschool)." The ACS does not distinguish attendance intensity, which is why the full-day/part-day results rest on the CPS alone. Dashed vertical lines mark 2007, the beginning of the Great Recession, and 2020, the first survey year affected by the COVID-19 pandemic.

Table S1. Detailed Oaxaca-Blinder decomposition of the Q5–Q1 income-based gap in center-based ECE enrollment, 4-year-olds

	2000–2009	2010–2019	2020–2023
Explained component			
Maternal education (ref. = bachelor's degree or more)			
High school or less	13.6 [12.4, 14.8]	12.1 [10.7, 13.4]	10.0 [8.5, 11.5]
Some college	0.4 [0.1, 0.7]	2.0 [1.5, 2.5]	2.6 [1.8, 3.4]
Maternal employment (ref. = full-time, ≥40 h)			
Not working	−0.5 [−0.8, −0.2]	−0.6 [−0.9, −0.3]	0.6 [0.0, 1.2]
Part-time (< 40 h)	−0.2 [−0.3, −0.1]	−0.4 [−0.5, −0.3]	−0.3 [−0.4, −0.1]
Household composition			
Number of children under 13	0.4 [0.2, 0.6]	0.2 [0.1, 0.3]	0.1 [0.0, 0.2]
Fewer than two parents	1.1 [−0.0, 2.2]	1.4 [0.4, 2.5]	0.9 [−1.2, 2.9]
Immigrant mother	0.3 [0.0, 0.5]	0.2 [0.0, 0.3]	0.2 [−0.0, 0.3]
Child demographics (race/ethnicity ref. = White, non-Hispanic)			
Child sex	−0.0 [−0.0, 0.0]	0.0 [−0.0, 0.0]	0.0 [−0.0, 0.0]
Black, non-Hispanic	0.1 [−0.3, 0.6]	0.0 [−0.6, 0.6]	0.3 [−0.5, 1.1]
Asian/other, non-Hispanic	−0.1 [−0.2, 0.0]	−0.0 [−0.1, 0.1]	−0.2 [−0.5, 0.1]
Hispanic	1.2 [0.5, 1.8]	1.0 [0.4, 1.7]	0.8 [0.2, 1.4]
Sum of state contributions	1.2	1.0	0.4
Total explained	**17.5 [15.3, 19.6]**	**16.8 [14.3, 19.3]**	**15.3 [11.6, 19.0]**
Unexplained component			
Maternal education (ref. = bachelor's degree or more)			
High school degree or less	−7.0 [−9.3, −4.8]	−5.4 [−7.1, −3.8]	−3.9 [−6.1, −1.7]
Some college degree	−1.2 [−2.2, −0.3]	−2.6 [−3.3, −1.9]	−2.3 [−3.8, −0.8]
Maternal employment (ref. = full-time, ≥40 h)			
Not working	3.2 [2.3, 4.0]	2.0 [1.1, 2.9]	1.1 [−0.2, 2.5]
Part-time (< 40 h)	0.7 [0.1, 1.3]	0.4 [−0.2, 0.9]	0.4 [−0.4, 1.2]
Household composition			
Number of children under 13	−3.9 [−5.5, −2.3]	−1.6 [−3.5, 0.2]	−3.7 [−7.1, −0.3]
Fewer than two parents	−2.2 [−3.8, −0.6]	−3.2 [−4.5, −1.9]	−2.4 [−4.8, −0.1]
Immigrant mother	−0.5 [−1.6, 0.7]	−1.3 [−2.2, −0.4]	−1.4 [−2.4, −0.3]
Child demographics (race/ethnicity ref. = White, non-Hispanic)			
Child sex	0.5 [−2.0, 3.0]	0.2 [−1.7, 2.0]	−2.3 [−5.3, 0.7]
Black, non-Hispanic	−2.7 [−4.0, −1.4]	−2.0 [−3.1, −1.0]	−1.6 [−2.9, −0.3]
Asian/other, non-Hispanic	−0.5 [−0.8, −0.3]	−0.2 [−0.4, 0.1]	−0.3 [−0.8, 0.1]
Hispanic	−1.4 [−2.3, −0.5]	−1.9 [−3.3, −0.5]	−1.0 [−2.3, 0.2]
Sum of state contributions	−8.2	−1.0	25.4
Total unexplained	**6.7 [4.1, 9.2]**	**5.7 [2.7, 8.8]**	**8.1 [4.0, 12.1]**
Observations	161,935	128,603	45,407

Source: American Community Survey (ACS), 2000–2023, weighted using ACS person weights. **Note**: All quantities are in percentage points; brackets contain 95% confidence intervals. Covariates are grouped by domain, with domains ordered by the size of their contribution. The 49 state indicators are reported as a single summed contribution, without a confidence interval, because the covariances among them are not recalculated here. A positive explained component means the characteristic is distributed in a way that widens the gap; a negative component means it narrows the gap. The decomposition follows Equation 2 and adjusts for child sex, child race and ethnicity, number of children under age 13 in the household, mother's educational attainment, mother's immigrant status, the number of parents, mother's work status, and state indicators, using the highest-income group's coefficients as the reference structure. Standard errors are clustered at the state level.

Table S2. Detailed Oaxaca-Blinder decomposition of the Q5–Q1 income-based gap in center-based ECE enrollment, 3-year-olds

	2000–2009	2010–2019	2020–2023
Explained component			
Maternal education (ref. = bachelor's degree or more)			
High school or less	13.6 [12.5, 14.8]	13.2 [12.2, 14.1]	9.4 [7.5, 11.4]
Some college	0.5 [0.2, 0.9]	2.5 [2.0, 3.0]	3.3 [2.6, 4.1]
Maternal employment (ref. = full-time, ≥40 h)			
Not working	−0.4 [−0.7, −0.1]	−0.1 [−0.6, 0.4]	1.4 [0.6, 2.1]
Part-time (< 40 h)	−0.1 [−0.2, −0.0]	−0.3 [−0.4, −0.2]	0.1 [−0.1, 0.3]
Household composition			
Number of children under 13	0.3 [0.1, 0.4]	0.2 [0.1, 0.3]	−0.1 [−0.3, 0.1]
Fewer than two parents	1.1 [−0.2, 2.4]	1.1 [−0.3, 2.4]	2.9 [1.0, 4.8]
Immigrant mother	0.2 [−0.0, 0.4]	0.0 [−0.1, 0.1]	0.1 [−0.0, 0.2]
Child demographics (race/ethnicity ref. = White, non-Hispanic)			
Child sex	−0.0 [−0.0, 0.0]	−0.0 [−0.0, 0.0]	0.0 [−0.0, 0.0]
Black, non-Hispanic	−0.4 [−1.0, 0.2]	0.5 [−0.2, 1.2]	0.8 [−0.0, 1.5]
Asian/other, non-Hispanic	−0.1 [−0.2, 0.0]	−0.1 [−0.3, 0.1]	−0.1 [−0.3, 0.1]
Hispanic	1.2 [0.5, 1.9]	1.2 [0.5, 1.9]	1.0 [0.3, 1.7]
Sum of state contributions	0.8	1.0	1.0
Total explained	**16.8 [14.6, 18.9]**	**19.2 [16.7, 21.7]**	**19.7 [16.7, 22.8]**
Unexplained component			
Maternal education (ref. = bachelor's degree or more)			
High school degree or less	−6.9 [−9.4, −4.4]	−7.1 [−8.3, −5.8]	−5.0 [−7.7, −2.2]
Some college degree	−1.8 [−2.5, −1.0]	−2.9 [−3.6, −2.2]	−3.7 [−5.3, −2.2]
Maternal employment (ref. = full-time, ≥40 h)			
Not working	3.0 [2.0, 4.0]	2.1 [1.0, 3.1]	0.2 [−1.6, 2.0]
Part-time (< 40 h)	0.6 [0.1, 1.1]	0.8 [0.2, 1.4]	−0.3 [−1.1, 0.5]
Household composition			
Number of children under 13	−2.5 [−3.7, −1.2]	−2.8 [−4.3, −1.3]	0.5 [−3.5, 4.5]
Fewer than two parents	−3.8 [−5.3, −2.3]	−2.9 [−4.6, −1.2]	−5.6 [−7.8, −3.5]
Immigrant mother	0.1 [−0.5, 0.8]	0.4 [−0.3, 1.1]	−0.7 [−1.4, −0.1]
Child demographics (race/ethnicity ref. = White, non-Hispanic)			
Child sex	1.0 [−0.9, 2.9]	0.2 [−1.3, 1.7]	1.3 [−2.6, 5.1]
Black, non-Hispanic	−1.6 [−2.3, −0.8]	−2.3 [−3.3, −1.3]	−1.6 [−2.8, −0.5]
Asian/other, non-Hispanic	−0.5 [−0.8, −0.2]	−0.4 [−0.6, −0.1]	−0.1 [−0.4, 0.2]
Hispanic	−1.4 [−2.4, −0.4]	−1.7 [−2.7, −0.7]	−1.2 [−2.2, −0.2]
Sum of state contributions	1.1	−2.4	−9.7
Total unexplained	**10.4 [7.6, 13.2]**	**9.6 [6.4, 12.9]**	**5.9 [2.5, 9.3]**
Observations	165,024	130,421	45,502

Source: American Community Survey (ACS), 2000–2023, weighted using ACS person weights. **Note**: All quantities are in percentage points; brackets contain 95% confidence intervals. Covariates are grouped by domain, with domains ordered by the size of their contribution. The 49 state indicators are reported as a single summed contribution, without a confidence interval, because the covariances among them are not recalculated here. A positive explained component means the characteristic is distributed in a way that widens the gap; a negative component means it narrows the gap. The decomposition follows Equation 2 and adjusts for child sex, child race and ethnicity, number of children under age 13 in the household, mother's educational attainment, mother's immigrant status, the number of parents, mother's work status, and state indicators, using the highest-income group's coefficients as the reference structure. Standard errors are clustered at the state level.

Table S3. Detailed Oaxaca-Blinder decomposition of the Q5–Q3 income-based gap in center-based ECE enrollment, 4-year-olds

	2000–2009	2010–2019	2020–2023
Explained component			
Maternal education (ref. = bachelor's degree or more)			
High school or less	6.6 [5.9, 7.2]	5.5 [4.7, 6.3]	4.2 [3.5, 5.0]
Some college	1.5 [1.2, 1.8]	2.7 [2.2, 3.1]	2.7 [1.9, 3.5]
Maternal employment (ref. = full-time, ≥40 h)			
Not working	−0.0 [−0.1, 0.1]	−0.2 [−0.3, −0.1]	0.2 [0.0, 0.4]
Part-time (< 40 h)	−0.2 [−0.2, −0.1]	−0.2 [−0.3, −0.2]	−0.2 [−0.3, −0.1]
Household composition			
Number of children under 13	0.0 . [−01, 0.1]	0.0 [−0.0, 0.1]	0.0 [−0.0, 0.1]
Fewer than two parents	0.2 [−0.0, 0.3]	0.2 [0.1, 0.4]	0.1 [−0.2, 0.4]
Immigrant mother	0.0 [−0.0, 0.1]	0.0 [−0.0, 0.1]	−0.1 [−0.2, 0.0]
Child demographics (race/ethnicity ref. = White, non-Hispanic)			
Child sex	−0.0 [−0.0, 0.0]	0.0 [−0.0, 0.0]	−0.0 [−0.0, 0.0]
Black, non-Hispanic	0.0 [−0.1, 0.1]	0.0 [−0.2, 0.2]	0.1 [−0.1, 0.3]
Asian/other, non-Hispanic	−0.1 [−0.2, −0.0]	−0.0 [−0.1, 0.1]	−0.2 [−0.4, 0.1]
Hispanic	0.6 [0.2, 0.9]	0.5 [0.1, 0.9]	0.4 [0.1, 0.8]
Sum of state contributions	1.3	1.2	0.8
Total explained	**9.9 [8.9, 11.0]**	**9.7 [8.4, 11.1]**	**8.2 [6.4, 10.0]**
Unexplained component			
Maternal education (ref. = bachelor's degree or more)			
High school degree or less	−3.0 [−4.0, −2.1]	−2.2 [−3.1, −1.4]	−1.9 [−2.9, −0.9]
Some college degree	−1.3 [−2.0, −0.6]	−1.7 [−2.3, −1.0]	−1.5 [−3.0, −0.1]
Maternal employment (ref. = full-time, ≥40 h)			
Not working	1.7 [1.1, 2.2]	1.7 [1.1, 2.3]	0.9 [0.2, 1.6]
Part-time (< 40 h)	0.6 [0.1, 1.1]	0.6 [0.1, 1.1]	0.4 [−0.3, 1.1]
Household composition			
Number of children under 13	1.0 [−0.6, 2.5]	1.5 [−0.2, 3.2]	0.0 [−2.7, 2.8]
Fewer than two parents	−0.5 [−0.8, −0.3]	−0.6 [−0.9, −0.2]	−0.2 [−0.7, 0.3]
Immigrant mother	−0.1 [−0.7, 0.6]	−0.6 [−1.2, −0.0]	−0.4 [−1.2, 0.4]
Child demographics (race/ethnicity ref. = White, non-Hispanic)			
Child sex	1.1 [−1.5, 3.6]	0.2 [−1.5, 1.9]	−1.0 [−3.8, 1.8]
Black, non-Hispanic	−0.6 [−1.0, −0.3]	−0.7 [−1.1, −0.4]	−0.4 [−0.9, 0.1]
Asian/other, non-Hispanic	−0.1 [−0.3, 0.2]	−0.1 [−0.3, 0.1]	−0.3 [−0.9, 0.2]
Hispanic	−0.6 [−1.2, 0.1]	−0.3 [−1.2, 0.6]	−0.3 [−1.2, 0.6]
Sum of state contributions	−7.1	−1.3	6.6
Total unexplained	**9.1 [7.8, 10.4]**	**8.7 [7.1, 10.3]**	**8.9 [6.8, 10.9]**
Observations	165,656	130,634	46,478

Source: American Community Survey (ACS), 2000–2023, weighted using ACS person weights. **Note**: All quantities are in percentage points; brackets contain 95% confidence intervals. Covariates are grouped by domain, with domains ordered by the size of their contribution. The 49 state indicators are reported as a single summed contribution, without a confidence interval, because the covariances among them are not recalculated here. A positive explained component means the characteristic is distributed in a way that widens the gap; a negative component means it narrows the gap. The decomposition follows Equation 2 and adjusts for child sex, child race and ethnicity, number of children under age 13 in the household, mother's educational attainment, mother's immigrant status, the number of parents, mother's work status, and state indicators, using the highest-income group's coefficients as the reference structure. Standard errors are clustered at the state level.

Table S4. Detailed Oaxaca-Blinder decomposition of the Q5–Q3 income-based gap in center-based ECE enrollment, 3-year-olds

	2000–2009	2010–2019	2020–2023
Explained component			
Maternal education (ref. = bachelor's degree or more)			
High school or less	6.5 [5.7, 7.2]	5.9 [5.2, 6.5]	3.8 [2.9, 4.7]
Some college	1.9 [1.6, 2.3]	3.5 [3.0, 3.9]	3.2 [2.5, 3.9]
Maternal employment (ref. = full-time, ≥40 h)			
Not working	−0.0 [−0.1, 0.0]	−0.0 [−0.2, 0.1]	0.5 [0.2, 0.8]
Part-time (< 40 h)	−0.1 [−0.2, −0.1]	−0.2 [−0.3, −0.1]	0.1 [−0.0, 0.2]
Household composition			
Number of children under 13	0.0 [−0.0, 0.1]	0.0 [−0.0, 0.1]	−0.0 [−0.1, 0.0]
Fewer than two parents	0.1 [−0.0, 0.3]	0.2 [−0.0, 0.4]	0.3 [0.1, 0.6]
Immigrant mother	0.0 [−0.0, 0.1]	0.0 [−0.0, 0.0]	−0.1 [−0.1, 0.0]
Child demographics (race/ethnicity ref. = White, non-Hispanic)			
Child sex	−0.0 [−0.0, 0.0]	−0.0 [−0.0, 0.0]	0.0 [−0.0, 0.0]
Black, non-Hispanic	−0.1 [−0.2, 0.0]	0.1 [−0.0, 0.3]	0.2 [−0.0, 0.3]
Asian/other, non-Hispanic	−0.1 [−0.2, −0.0]	−0.1 [−0.3, 0.1]	−0.1 [−0.3, 0.1]
Hispanic	0.6 [0.2, 0.9]	0.7 [0.3, 1.1]	0.5 [0.1, 1.0]
Sum of state contributions	1.4	1.6	1.6
Total explained	**10.2 [9.0, 11.4]**	**11.7 [10.4, 13.0]**	**10.1 [8.6, 11.5]**
Unexplained component			
Maternal education (ref. = bachelor's degree or more)			
High school degree or less	−3.5 [−4.4, −2.6]	−3.5 [−4.2, −2.7]	−1.8 [−2.9, −0.6]
Some college degree	−1.9 [−2.5, −1.3]	−2.6 [−3.2, −1.9]	−2.3 [−3.4, −1.2]
Maternal employment (ref. = full-time, ≥40 h)			
Not working	1.6 [1.0, 2.3]	1.5 [1.0, 2.0]	0.2 [−0.8, 1.2]
Part-time (< 40 h)	0.5 [−0.1, 1.0]	0.6 [0.1, 1.1]	−0.4 [−1.1, 0.2]
Household composition			
Number of children under 13	1.3 [−0.7, 3.3]	0.2 [−1.4, 1.8]	0.8 [−2.1, 3.8]
Fewer than two parents	−0.7 [−1.0, −0.3]	−0.7 [−1.1, −0.4]	−1.0 [−1.5, −0.5]
Immigrant mother	−0.0 [−0.6, 0.6]	0.0 [−0.6, 0.6]	−0.3 [−0.8, 0.3]
Child demographics (race/ethnicity ref. = White, non-Hispanic)			
Child sex	0.1 [−1.8, 2.1]	1.5 [−0.1, 3.0]	3.1 [−0.0, 6.2]
Black, non-Hispanic	−0.6 [−0.9, −0.2]	−0.8 [−1.2, −0.4]	−0.6 [−1.1, −0.2]
Asian/other, non-Hispanic	−0.2 [−0.4, 0.1]	−0.1 [−0.3, 0.1]	−0.1 [−0.5, 0.2]
Hispanic	−0.2 [−0.6, 0.2]	−0.2 [−0.9, 0.5]	−0.6 [−1.5, 0.3]
Sum of state contributions	0.7	1.9	−2.0
Total unexplained	**12.1 [10.7, 13.4]**	**12.8 [11.2, 14.4]**	**11.0 [9.4, 12.5]**
Observations	165,373	131,064	46,355

Source: American Community Survey (ACS), 2000–2023, weighted using ACS person weights. **Note**: All quantities are in percentage points; brackets contain 95% confidence intervals. Covariates are grouped by domain, with domains ordered by the size of their contribution. The 49 state indicators are reported as a single summed contribution, without a confidence interval, because the covariances among them are not recalculated here. A positive explained component means the characteristic is distributed in a way that widens the gap; a negative component means it narrows the gap. The decomposition follows Equation 2 and adjusts for child sex, child race and ethnicity, number of children under age 13 in the household, mother's educational attainment, mother's immigrant status, the number of parents, mother's work status, and state indicators, using the highest-income group's coefficients as the reference structure. Standard errors are clustered at the state level.