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Toward a Childcare Inclusive Poverty Measure

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Toward a Childcare Inclusive Poverty Measure

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Abstract

Childcare is a major need for all families with children in the United States, yet the Census Bureau's Supplemental Poverty Measure (SPM) only accounts for parents' childcare needs by treating childcare expenses as a nondiscretionary expense for parents who work in the labor market. In reality, all families with children have a need for childcare. In this discussion paper, we attempt to create a "Childcare Inclusive" poverty measure, following recommendations put forward by a 2023 National Academies of Sciences report on improving the SPM. We identify a number of conceptual and empirical issues that would need to be overcome before instituting a fully childcare inclusive poverty measure. Our goal in the creation and evaluation of such a measure is to help inform the Census' eventual consideration of a childcare inclusive measure going forward. A childcare inclusive measure, if properly constructed, would better illuminate the role that childcare subsidies like childcare vouchers and Head Start play in reducing child and family poverty.

Keywords

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Data Availability
This work uses publicly available data from the 2019 Current Population Survey Annual Social and Economic Supplement (CPS ASEC), the 2019 Survey of Income and Program Participation (SIPP), and the National Database of Childcare Prices (NDCP) produced by the U.S. Department of Labor Women's Bureau. The CPS ASEC data are available from the U.S. Census Bureau at https://www.census.gov/data/datasets/time-series/demo/cps/cps-asec.html. The SIPP data are available from the U.S. Census Bureau at https://www.census.gov/programs-surveys/sipp/data/datasets.html. The NDCP data and documentation are available from the U.S. Department of Labor Women's Bureau at https://www.dol.gov/agencies/wb/topics/featured-childcare. The analysis also employs a county-to-metropolitan-area crosswalk generated using Geocorr 2022 maintained by the Missouri Census Data Center and is available at https://mcdc.missouri.edu/applications/geocorr2022.html.

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Toward a Childcare Inclusive Poverty Measure

1. Introduction

Childcare is a major expense faced by families with children in the United States. Yet the current approach for measuring poverty treats childcare needs and resources inadequately. Since 2011, the United States Census Bureau has been releasing the Supplemental Poverty Measure (SPM; (Short, 2011)), which provides an improved measure of poverty based on decades of scholarship on how to most appropriately calculate families' needs and resources (Citro & Michael, 1995). The SPM is a marked improvement over the official poverty measure (OPM) in several respects, but its treatment of childcare is notably limited. The SPM conceptualizes needs based on a basket of goods that includes food, clothing, shelter, and utilities, plus a multiplier for other necessities. On the resource side, the SPM improves upon the OPM by considering both cash and in-kind benefits, including tax credits. The consideration of childcare expenses is less straight forward: Childcare expenses are included only when considering families' resources, by subtracting out-of-pocket childcare expenses from income as a non-discretionary expense. Moreover, these expenses are treated simply as a work expense – they are included only if both parents are working (or a single parent is working) and are pooled with other work expenses and capped at the value of the lowest-earning parent's earnings.

There are several problems with this approach, which are described in the National Academy of Sciences' (NAS) recent report on improving the nation's measure of poverty (National Academies of Sciences, Engineering, and Medicine, 2023). The primary problem with the SPM's approach to childcare is that it views this care as a necessary expense only when parents work in the labor market, and accounts for this expense only if parents pay for care in the marketplace, which thereby reduces disposable income. In reality, all families with children have a need for childcare, whether they work or not and whether they pay for childcare in the marketplace or not. Additionally, the SPM's accounting for resources is incomplete with respect to childcare, because government programs that pay for care, partially or in full, are not included. These problems are analogous to the SPM's treatment of health care needs, where these needs are only accounted for by excluding medical out-of-pocket expenses from income, but not costs of insurance and resources from subsidized care. The NAS report recommended incorporating health care needs into the poverty threshold and also fully valuing health insurance subsidies as resources that can meet those

needs. This recommendation was based on over a decade of research on a "Health-Inclusive Poverty Measure (HIPM)" that takes health care needs more explicitly into account (see, e.g., Korenman & Remler, 2016).

Many of the arguments in favor of a HIPM apply to the case of childcare. But in the case of childcare, the research on a "childcare inclusive poverty measure (CCIPM)" is lacking. The NAS report thus recommended further research so that an improved SPM could more fully incorporate the need for childcare in the poverty threshold and incorporate the value of childcare subsidies and publicly provided care such as Head Start and pre-kindergarten (and the value of unpaid childcare) as resources that can be used to meet that need.

The goal of this paper is to help lay the intellectual and empirical groundwork for improving the measurement of childcare needs and resources in the SPM. Researchers at the United States Census Bureau (Census) have also been laying such groundwork since the publication of the 2023 NAS report (see DiTommaso, Landivar, and Silwal, 2025 for the Census' latest treatment of the subject). Our goal in the creation and evaluation of such a measure is to help inform the Census' eventual consideration of a childcare inclusive measure going forward, as it builds toward implementing the recommendations from the NAS report. We recognize that developing such a measure will take time, as the HIPM did, and we see our research as one of the first crucial steps in that process, alongside Census and other researchers. The NAS panel also recommended additional research and discussion among the wider research community in order to arrive at an eventual best approach. Such research and discussion are necessary given the complicated issues around household decisions regarding childcare. Before turning to our empirical approach, we lay out how the NAS panel thought about (a) childcare needs and (b) childcare resources available to meet those needs.

2. Conceptualizing Childcare Need

Young children need adult care and supervision. Childcare subsidies and tax credits implicitly recognize the need for such care by offsetting the costs of care for families with children under the age of 13. So too do child protection policies that view leaving children under the age of 13 unsupervised as a form of neglect (Waldfogel, 2006). Childcare can also help parents maintain employment and attachment to the labor force, which is often a goal pursued by policy makers.

For families who purchase childcare, it is a major and growing expense, representing 8.8 percent of a typical family's budget in recent data (Mattingly, Schaefer, & Carson, 2016). Moreover, one in four families with young children who paid for childcare were "burdened" by that cost, defined as paying more than 10 percent of gross income on childcare expenses. However, not all families purchase care to meet their childcare need. Many parents provide care themselves, and many others rely wholly or in part on unpaid care from family members, friends, or neighbors (Cui & Natzke, 2021).

In this respect, defining and measuring childcare need is not completely analogous to defining and measuring health care need, which nearly all families pay for at some point. Indeed, childcare need can be thought of as similar to defining and measuring housing need. Some families meet their housing need by renting or buying housing, but other families meet that need by living in a unit they own free and clear or by sharing with family members or friends. The implication of the analogy is that all families with children under the age of 13 should be assigned a childcare need in their poverty threshold, regardless of whether they use paid care, use only unpaid care, or use a mix of paid and unpaid care.

3. Conceptualizing Childcare Resources

Once we conceive of childcare as a need that should be embodied in the poverty threshold, a corollary is that resources must include the value of childcare that families receive in the SPM framework. Families have an array of resources available to help them meet their childcare needs, with many families using multiple types of resources. These include: parents' own time; care provided free of charge by other relatives, friends, or neighbors; publicly funded programs such as Head Start and pre-kindergartens; childcare subsidies; childcare tax credits; employer assistance; and assistance from other sources such as churches or local agencies. Each of these types/packages of assistance would need to be assigned a value in order to be included in the count of resources.

Assigning monetary value to these various resources is the most complex component of creating a CCIPM. One potential approach, which we explore, is to define the value in resources as equal to the value of the childcare need in the threshold minus the amount the family reports paying for childcare. For families who do not pay anything out of pocket, the value of childcare resources is equal to the value of childcare need. Thus, a family who uses no paid care would be implicitly assumed to have their childcare need met (i.e., the unpaid care their child

receives would be valued at the level of their childcare need). And a family who uses paid care but does not pay anything toward that care would also be assumed to have their childcare need met (i.e., the publicly provided or subsidized care their child receives would be valued at the level of their childcare need). But a family who uses paid care and receives partial or no assistance would have childcare needs that exceed their resources.

There are obvious disadvantages and limitations to such an approach, which we readily recognize. For families who consume very high-quality care, for whom its monetary value is in excess of the childcare needs added to the threshold, the value of childcare resources can simply be capped at the amount of childcare need. This is analogous to the capping of resources from health insurance at the cost of an adequate health insurance plan under the HIPM.

For families who spend little or no income on childcare, however, the simplistic approach may be problematic. Consider the case of a single parent who pays $100 a month to a neighbor to watch their child while they are at work. That parent may choose this care because they find it optimal, they trust their neighbor, the neighbor provides high quality care, and the arrangement allows for flexibility that aligns with their employment. In this case, we can reasonably say that the parent is receiving resources (minus that $100 per month) that meet their childcare need. If, however, that same parent is using that care arrangement because they have no other options, even though the care may not be very high quality but it is the only thing they can afford, then the approach outlined above may overstate the resources they are getting to meet their childcare need. These are very real issues that will take additional conceptual and empirical work to address. Our goal in this paper is more modest, which is first to operationalize childcare resources and needs according to the NAS recommendations, and then offer this as a foundation upon which future conceptual and empirical work can build.

In order to build this foundation on the resource side, we first need to know more about the types of childcare families use, how much they pay for them, and whether they receive any government subsidies to help cover their costs. The Current Population Survey's Annual Social and Economic Supplement (CPS- ASEC), the primary dataset used by the Census to produce poverty statistics, currently contains very little information on childcare, aside from certain families' out-of-pocket spending on childcare. To formally capture childcare resources, including from government childcare subsidies, publicly provided care, and other childcare assistance, the Census

will ultimately need to add new survey questions to the CPS-ASEC. Indeed, the Census has recently been exploring and testing such new questions.

The paper proceeds as follows: We first outline the methods and data available to define and measure childcare need in the poverty threshold; we next outline the same for measuring childcare resources against that need. We then describe the empirical approach we took to explore the creation of a CCIPM in the CPS-ASEC, and provide an initial analysis of an experimental CCIPM, including estimated effects of childcare subsidies on CCIPM poverty using our experimental approach. Recognizing that there are fundamental empirical and conceptual limitations to this exercise, we conclude by laying out key measurement issues that need to be overcome in order to properly compute a CCIPM that could be carried out by the Census.

4. Methods and Data for Defining and Measuring Childcare Need

In order to assign a childcare need to every family with young children under age 13, there are several empirical challenges. The first is to determine the relevant parameters along which childcare need varies. At the child level, clearly child age needs to be considered. Care for infants and toddlers (ages 0-2) is much more expensive than care for preschoolers (ages 3-5), and both of those are more expensive than after-school care and care during school vacations for school-age children (ages 6-12). There are also vast differences in price by geographic area, which must be considered.

In addition, the cost of childcare varies considerably by type. Children may be cared for by a parent or other relative, friend, neighbor, babysitter, nanny, family day care provider, day care center, nursery school, preschool or prekindergarten, or after-school program, and many children receive more than one type of care. Moreover, the quality of that care varies enormously. As in the case of health care and housing, it is essential to define a benchmark for type and quality of childcare and assign a cost accordingly.

One obvious source of cost data comes from childcare subsidy reimbursement rates. Each state sets reimbursement rates as part of their participation in the Childcare and Development Fund (CCDF), which is (primarily) a childcare subsidy program for families with low incomes. To do so, states conduct market rate surveys every three years, to determine what rates are charged to families who pay privately for care for children of different ages and in different types of care. States then set a subsidy reimbursement rate that is meant to be at a level that is

sufficient to allow families utilizing a childcare subsidy to access childcare on an equal footing with families who are paying for that care privately. In practice, this typically means that states set the childcare subsidy rate at 75% of the identified market rate, though there is variation across states in this percentage. There are several advantages of using childcare subsidy rates to set the amount of childcare need for the thresholds: these rates are readily available across the US, they vary by age, geographic area, and type, and they are updated every three years. One potential disadvantage is that these rates are thought to not fully reflect the true costs of childcare (see e.g. Bipartisan Policy Center, 2020). Another is that not all states use the 75% threshold, meaning that unless those alternative thresholds were chosen for defensible reasons, childcare needs based on these rates may vary too arbitrarily across geographic area.

Fortunately, the Women's Bureau at the US Department of Labor has created the National Database of Childcare Prices (NDCP). This database provides childcare price information by provider type and child age at the county-level.[1] Specifically, the NDCP provides median and 75th percentile county-level childcare prices by child age and childcare type, using data from the same Market Rate Surveys referenced above (for further information, see Landivar et al., 2023). Like the childcare subsidy reimbursement rates, the NDCP figures are available across the US, vary by child age and type, and in theory can be updated on a regular basis. An advantage of this dataset is that the percent cuts (i.e., median, 75th percentile) are uniform across geographic areas, making geographic variation less arbitrary.

One disadvantage is that counties may not be the ideal geographic unit and are often less identifiable in datasets like the Current Population Survey that serves as the basis for poverty statistics (because of Census disclosure rules). We can, however, map counties to metropolitan areas using established crosswalks and thus use the county-level data to produce metro- area estimates of childcare needs. DiTommaso et al. (2025) note that the only other comparable source for childcare price data is the Childcare Aware of America's reports on childcare prices, but these are only available at the state level. Thus, if the goal is to use harmonized data on childcare prices at the county- level, the NDCP is the most viable data source currently available. In the discussion section we discuss alternatives to price data for including childcare needs in the thresholds.

[1] Data are available at <https://www.dol.gov/agencies/wb/topics/featured-childcare>.

Appendix C provides detail the NDCP are used to construct childcare need estimates for the Childcare Inclusive Poverty Measure thresholds. The appendix describes the availability of county-level price data, the extent of missingness in the NDCP, the procedures used to address missing values, the transformation of prices into region- and age-specific estimates, and the subsequent mapping to these estimates to the CPS ASEC microdata.

5. Methods and Data for Defining and Measuring Childcare Resources

Having incorporated childcare need into the poverty thresholds, the next step is estimate family's childcare resources and whether they meet their childcare need. This section focuses on the resource side of the measure and introduces our preliminary approach for estimating subsidized and publicly provided care.

5.1. Data Sources for Measuring Childcare Resources

As discussed above, to assign an appropriate value of childcare resources to a given family, we would ideally know whether they receive any assistance with childcare and if so, what kind(s). This can be accomplished by asking parents directly 1) whether they pay for any childcare, 2) whether they receive any help paying for childcare and if so, what the sources of that help are, and 3) whether their child attends any publicly provided care such as Head Start or pre-kindergarten. We would ideally know this for every child in the family who is under age 13. Unfortunately, the CPS-ASEC, which is used to produce the nation's poverty rates, does not contain this information. Thus, we must rely on other datasets to provide evidence on subsidies, assistance, and publicly provided care. One exception is the Child and Dependent Care Tax Credit, which is modeled using Census tax calculators, though such income is not directly observed in the self-reported data.

The Urban Institute's TRIM3 model (Zedlewski & Giannarelli, 2015) simulates multiple types of benefit receipt and amounts into microdata using a combination of eligibility data from the CPS surveys and administrative data from various sources. They use this to estimate childcare subsidy receipt (Chien, 2022). But these data only capture subsidies provided through the Childcare Development Fund (CCDF) or other indistinguishable sources of subsidies families may receive and not publicly-provided care such as Head Start or state Early Childhood Education programs, for example.

We use data on childcare subsidy receipt that are collected directly in the Survey of Income and Program Participation (SIPP). Though less information on benefit receipt is available in the SIPP after its redesign in 2014, there is still information on childcare expenses and types of childcare used, as well as whether the government helps families pay for that childcare. We use these data to construct an imputation model to estimate subsidy receipt into the CPS, analogous to procedures we successfully used in creating a historical SPM (Fox et al., 2015). One disadvantage of the SIPP is it contains somewhat less granular geographic information than is available in the CPS. There are also concerns with the quality of the childcare data currently collected (Census Bureau, personal communication). Fully imputing childcare subsidies from any dataset, however, is not ideal, and ultimately the CPS ASEC will need to have the requisite information to fully calculate a childcare-inclusive poverty measure.

5.2. Challenges in Measuring Childcare Resources

Though the Census Bureau is testing new questions to add to the CPS-ASEC that will facilitate the estimation of childcare resources, we wanted to fully illustrate the method, as well as the complications that arise from the method, by imputing key childcare parameters into the CPS from the Survey of Income and Program Participation (SIPP). Though the SIPP does not have perfect information on childcare use, including some methodological concerns (U.S. Census Bureau, 2021) we wanted to carry out a complete preliminary version of a CCIPM to highlight conceptual and measurement issues in the NAS' recommended approach.

To estimate childcare resources, we would ideally want to know: (a) what childcare arrangements families use for their children; (b) what government subsidies families receive for their children to help pay for that care; and (c) what out-of-pocket expenses families incur themselves in paying for this care. Currently, the CPS-ASEC only contains sufficient information on out-of-pocket expenses.

Measuring what childcare arrangements families use is complex and challenging, especially to do comprehensively. First, arrangements may differ across children in the family, meaning that if families have multiple children under the age of 13, surveys would need to capture arrangements for each of these children. Second, for any individual child, they may encounter many different arrangements over time – certainly across the year (e.g., school-year versus summer arrangements for school-aged children) but often even month to month, week to week, or sometimes even day to day. A child might be in an after-school program, for example, 3 or 4 days a week, but may

be cared for by a parent or relative on other days. Third, receipt of childcare subsidies is likely difficult to measure. Receipt of subsidies like a government voucher or children's participation in Head Start may be fairly straightforward to ask parents about, but many parents may not know if programs like pre-kindergarten programs or after-school programs are government subsidized or not.

To deal with these challenges, surveys often have to sacrifice comprehensiveness in exchange for reducing respondent burden. Surveys may, for example, focus on only one child's arrangements in the family, often referred to as a "focal child." Or they may focus on childcare at a certain time of the year only, say a representative week in the fall of the calendar year. And finally, surveys often try to simplify response options to avoid asking caregivers about things they may not be fully aware of. For example, surveys may simply ask about whether a child was enrolled in a "pre-Kindergarten program" or a "before or after school program," where it becomes unclear whether the caregiver is receiving government subsidized care or not.

5.3. Imputation of Subsidy Receipt and Childcare Expenses

An advantage of the SIPP from an imputation standpoint is that it measures childcare arrangements at the child level, allowing us to impute for all children within a family who are under 13. Rather than model complex and overlapping care arrangements, we decided to impute just subsidy receipt and childcare out-of-pocket expenses from the SIPP to the ASEC given that our approach is intended to be illustrative. We use data from the 2019 SIPP, which covers calendar year 2018. In the SIPP, caregivers are asked about various childcare arrangements for each child, and then are asked whether they received assistance in paying for any of this care through "welfare or social services." To those who answer yes to this question, we add those who report using Head Start or related programs. This is our primary subsidized care measure (referred to as "subsidy version 1" below). To test the sensitivity of results, we create two more expansive measures of subsidy receipt. The first adds pre-Kindergarten or nursery care; the second adds to that participation in before or after-school programs. These latter two subsidy definitions are arguably too expansive, as some of this care may not be government subsidized, but they provide a relatively high range of subsidized care use for comparison.

While the CPS-ASEC does contain information on parents' direct reports of out-of-pocket spending, we chose to also impute a version of this from the SIPP. Given that expenses may vary directly with receipt of subsidies,

we wanted to mimic the relationship between subsidies and spending from the SIPP when carried over to the CPS-ASEC in order to preserve any interdependencies.

Our imputation proceeds as follows: We first estimate a series of probit models in the SIPP predicting each of our three definitions of receipt of subsidized care.[2] We then estimate equivalent models in the CPS-ASEC, computing the predicted probability for each child for subsidy receipt, rank these predicted probabilities into percentiles, and impute subsidy receipt constrained to the actual share of subsidy receipt observed in the SIPP. While this exercise may not correspond precisely to the observed childcare spending in the CPS-ASEC, the results are intended to demonstrate the informational value of including detailed subsidy receipt paired with out-of-pocket spending. Ultimately, the CPS-ASEC will need to add more direct questions on childcare use and subsidies to its survey in order to capture childcare resources available to families.

Table 1 shows the observed and imputed subsidy receipt by child age from the SIPP donor dataset and the CPS-ASEC recipient dataset. A few points are of note. First, our imputation procedure does fairly well at capturing the overall percentage of children receiving a subsidy, though it performs less well when split out by child age. This suggests a non-trivial amount of error in a basic approach to implementing a SIPP-based imputation. One might refine this approach by running models separately by child age, though given the low prevalence of receipt this may prove challenging. Second, the percent of children receiving a subsidy varies greatly across definitions of subsidies, doubling from 5.7% under our most restrictive definition to 11.4% when adding pre-Kindergarten and nursery care and nearly doubling again to 20.8% when we include before and after school programs. Deciding what exactly constitutes a subsidy thus is likely critical for capturing childcare resources under a CCIPM.

With these imputations in hand, we proceed to impute childcare expenses. To do this, we divide children in both datasets into bins that are broken out by childcare subsidy receipt, child age (0- 2, 3-4, and 5-12), whether the parent was employed (for single parent families) or both parents were employed (for dual-parent families), and income relative to the poverty threshold (under or over 200% of the federal poverty line). In total, we construct 24

[2] In these models we predict subsidy receipt from (1) child's age; (2) numbers of infants, toddlers, pre-school aged, and school- aged children in the family, respectively; (3) race/ethnicity of the householder; (4) whether there are one or two parents present; (5) whether a parent is employed full-time year round; (6) parents' highest level of education (i.e., less than high school, high school degree or equivalent, some college or associate's degree, bachelor's degree or higher); (7) a flag for living in a multigenerational family; (8) metro/non-metro status; (9) total family size; and (10) a logged transformation of families' income to needs.

bins cross-classifying these characteristics and collapsing cells where sample sizes are sparse. We then calculate deciles of out-of-pocket expenses within each bin in the SIPP, and randomly assign 1/10th of each CPS- ASEC bin one of the decile values derived from the SIPP. This method effectively mimics the observed values and distributions from the donor SIPP sample contingent on a set of basic factors relevant for childcare expenditures. Appendix Figure B.1 shows the results, suggesting that the approach does fairly well at mimicking the overall distribution observed in the SIPP when brought over to the CPS-ASEC. Appendix Table A.2. shows mean values by poverty status and subsidy receipt, again showing the approach approximates the expense distribution fairly well.

5.4 Valuing Childcare Resources

With all of this information now in one dataset, we can proceed to illustrate the full construction of a preliminary CCIPM. To do this, we first need to put a monetary value on childcare resources, which involves: (i) valuing childcare subsidies received; and (i) valuing any non-subsidized care – paid and unpaid – provided for children in the family. To create estimates of these values, we follow the preliminary approach outlined in the NAS report:

(1) take total SPM resources, and add back in the total value of capped work and childcare expenses that the SPM subtracts from resources;

(2) re-cap non childcare-related work expenses and subtract these from the resources estimated in step 1 (procedures for capping these expenses are outlined in Poverty Statistics Branch, Social Economic and Housing Statistics Division, 2023);

(3) calculate the value of government subsidies; this is defined as the difference between childcare need and childcare out-of-pocket expenses for those children imputed to have received a subsidy;

(4) calculate the value of paid, but unsubsidized care; this is defined as the difference between childcare need and childcare out-of-pocket expenses for children whose families pay for care for the child;

(5) calculate the value of unpaid care; this is defined as equal to the need embedded in the poverty threshold from the threshold process described earlier;

(6) add these values from steps 3-5 to SPM resources calculated in step 2;
re-calculate poverty by comparing these resources in step 6 to the CCIPM poverty thresholds that include childcare needs in the thresholds.

Note that there are a number of assumptions about adequacy of care for these steps. For steps 3-5, the method assumes that childcare need is fully met by the subsidized, paid, and unpaid care provided for the child. This is a strong assumption given what we know about the market for childcare in the United States, and imperfections therein. A subsidy, for example, may keep a family's costs low, but depending on where and how they can use the voucher, it is unclear that the obtained care is sufficient to meet that family's need. The same is true for childcare purchased only on the private market. Analogously, the method assumes those families not paying for care are receiving care that's equivalent to that embedded in childcare needs. In some cases this assumption is surely met, for example if a family is using parental or relative care that they prefer and is of sufficient quality to meet their needs.

If a family is using care arrangements that are suboptimal for their child, precisely because they lack the resources to afford optimal care, each of these valuations may overstate the childcare resources actually available to the family. We return to this point in the discussion but first present the results that obtain from the method outlined thus far.

6. Resulting Childcare Inclusive Poverty Rates

Using the estimated childcare need within the new thresholds and the imputed childcare resources available to families, we recalculate poverty under the CCIPM. Table 2 shows poverty rates for children under age 13 with our childcare inclusive poverty measure, with and without the inclusion of childcare subsidies. The table also shows the SPM poverty rate for the same population (13.8%). The CCIPM poverty rate for children under 13 is 2.5 percentage points higher using a CCIPM than under the SPM (16.3% or the "yes" columns).

In subsidy version 1, including those who self-report receipt of welfare or government services for care or who indicate participation in Head Start or related programs, poverty would be 4.1 points higher in absence of subsidies (20.4%). Notably, however, these poverty reductions vary by the inclusivity of the definition of a subsidy. With the most inclusive definition, subsidy version 3, the absolute poverty reduction increases to 6.4 percentage points. And the relative poverty reduction increases from 20.0 percent to 28.2 percent. Results are therefore sensitive to choices about what constitutes a subsidized childcare arrangement. Tables A.3-A.6 in the appendix show analogous results broken down by various demographic characteristics.

7. Discussion

This paper implements a preliminary version of a Childcare Inclusive Poverty Measure (CCIPM) in the 2019 CPS-ASEC, for calendar year 2018. It follows the recommendations of the recent National Academies of Sciences (NAS) report for including childcare in the Supplemental Poverty Measure (SPM). To do so, childcare needs must first be included in the poverty threshold. Childcare resources – which entail unpaid, paid, and subsidized care – must then be valued against that estimated need.

To estimate need, we use data on childcare prices from the Bureau of Labor Statistics, which is in turn based on childcare market surveys. These data have several limitations. Childcare market surveys are conducted by states every three years, so relying upon them to estimate childcare needs will entail temporal gaps that will need to be overcome if need is to be included in the poverty thresholds on a yearly basis. As we demonstrate, there is also a large degree of missingness in these data, hampering the estimation of local childcare prices. In addition, these costs are administratively determined, so going forward they may not be determined consistently across states and over time, despite the BLS' attempts to harmonize the data (Davis et al., 2017). The Census Bureau should consider alternative data sources for estimating childcare need that are consistent and replicable year-to-year. For example, childcare expenses could be estimated in the basket of needs constituting the existing SPM thresholds in the Consumer Expenditure Survey (CE) – alongside expenses on food, clothing, shelter, and utilities. The CE is not a large enough survey to estimate local variation in childcare expenses, but a national cost estimate could be adjusted regionally for cost differences, for example by adjusting the estimated need by childcare provider wages using the American Community Survey (ACS). Such a method would make childcare needs estimation consistent with other components of the SPM threshold and provide a standardized approach available year to year that doesn't rely on sporadic and administratively determined price data.

Estimating childcare resources is even more challenging. Childcare arrangements, including how they are paid for, may vary across children within families. Arrangements also may vary across the year, even sometimes week-to-week, and child-to-child. Measuring subsidy receipt is also very challenging given that many parents may not know whether a given care arrangement that they use is government subsidized or not (Johnson & Herbst, 2013). Capturing all of this complexity via household survey questions at all, let alone accurately, would be extremely laborious. Questions would have to be at the child level, and "within child" would have to capture arrangements across the year and whether those arrangements are subsidized or not by the government. Simplifying questions

could be accomplished with research on how care varies within the year, across families—but such research does not yet exist. Common approaches instead use concepts like a "usual care arrangement" or a "primary care arrangement," though these of course will lead to loss of potential information on important vectors of childcare need and resources.

These measurement challenges are compounded by conceptual challenges in estimating the value of care. Regardless of whether care is paid, unpaid, or subsidized, its value relative to any estimate of need must take into account quality. Without accounting for quality of care, any method for establishing its value risks overestimation. When families resort to care arrangements that don't meet their children's needs, precisely because they lack financial resources, it is not sufficient to value the care they resort to as meeting their needs. Similarly, valuing the provision of unpaid care as equal to the need in the poverty threshold is an obvious simplification that needs further study for the measure to be relevant for the segment of families who do not use paid care.

For a CCIPM to be valid and accurate, we would need stronger data on families' childcare utilization, preferences, receipt of subsidies, and satisfaction of needs. This would require new survey data, ideally merged with administrative data on childcare subsidy receipt – a major new endeavor. Despite these data, measurement, and conceptual challenges, ignoring childcare needs in the measurement of poverty is not an option. Raising children and providing for their care is as necessary as the provision of food or shelter. Better data and better methods for accounting for this need will be critical to estimating poverty going forward.

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Data Availability

This work uses publicly available data from the 2019 Current Population Survey Annual Social and Economic Supplement (CPS ASEC), the 2019 Survey of Income and Program Participation (SIPP), and the National Database of Childcare Prices (NDCP) produced by the U.S. Department of Labor Women's Bureau. The CPS ASEC data are available from the U.S. Census Bureau at https://www.census.gov/data/datasets/time-series/demo/cps/cps-asec.html. The SIPP data are available from the U.S. Census Bureau at https://www.census.gov/programs-surveys/sipp/data/datasets.html. The NDCP data and documentation are available from the U.S. Department of Labor Women's Bureau at https://www.dol.gov/agencies/wb/topics/featured-childcare. The analysis also employs a county-to-metropolitan-area crosswalk generated using Geocorr 2022 maintained by the Missouri Census Data Center and is available at https://mcdc.missouri.edu/applications/geocorr2022.html.

Tables

Table 1. Observed and Imputed Childcare Subsidy Receipt, SIPP and ACS-ASEC

	Subsidy Version 1		Subsidy Version 2		Subsidy Version 3	
	SIPP	ASEC (imputed)	SIPP	ASEC (imputed)	SIPP	ASEC (imputed)
Total	5.66%	7%	11.36%	12%	20.77%	22%
Age 0-2	0.94%	0.99%	1.52%	0.71%	1.52%	0.81%
Age 3-4	1.99%	4.07%	4.84%	9.39%	5.06%	9.6%
Age 5-12	2.73%	1.94%	5.01%	1.9%	14.19%	11.59%

Note: Data from 2019 Survey of Income and Program Participation and 2019 CPS-ASEC (reference year 2018). Sample restricted to children aged under 13 (N=5,070 in SIPP and N=33,344 in CPS-ASEC)

Table 2. Childcare Inclusive Poverty Rates (Children Under 13 Years of Age)

	Childcare Inclusive Poverty Measure						SPM Poverty
	Subsidy Version 1		Subsidy Version 2		Subsidy Version 3		
	No	Yes	No	Yes	No	Yes	
Poverty rate	20.4%	16.3%	21.3%	16.3%	22.7%	16.3%	13.8%
%p change	-4.1%p		-5.0%p		-6.4%p		
Percent change	-20.0%		-23.6%		-28.2%		

Note: Data are from the 2019 Current Population Survey Annual Social and Economic Supplement (CPS ASEC). Sample restricted to children under 13 (n=33,344) Childcare subsidies and expenses are imputed using data from the 2019 Survey of Income and Program Participation (SIPP). Subsidy Version 1 includes families who received assistance to pay for childcare through welfare or social services, as well as those who used Head Start or related programs. Subsidy Version 2 builds on Version 1 by also including families who used nursery care. Subsidy Version 3 expands on Version 2 by additionally including those who used before- and after-school programs. "%p difference" refers to the absolute difference in poverty rates with and without the childcare subsidy for each version. "Percent decrease" indicates the relative reduction in poverty rate, calculated from the rate without the childcare subsidy to the rate with the subsidy included.

Appendix A. Tables

Table A.1. Percent of Children Using Any Center-Based Care of Exclusively Non-Center-based Care by Age: SIPP 2018 Panel (2017-2019 Surveys)

Age	Center-Based Care	Non-Center-Based Care (Exclusively)
0-2 Years	25.4%	74.6%
3-4 Years	44.3%	55.7%
5-12 Years	24.9%	75.1%

Note: Each row sums to 100 percent. Data from the Survey of Income and Program Participation 2018 Panel (2017-2019 surveys). Center-based care includes childcare centers, nursery care, Head Start, and before/after-school programs. Non-center-based care includes family day care, care provided by parents, grandparents, relatives, non-relatives, siblings, or the children themselves. N=3,969 (ages 0-2), 2,989 (ages 3-4), and 12,835 (ages 5-12). Estimates are weighted using the SIPP person weight in December (wpfinwgt).

Table A.2. Observed and Imputed Childcare Expenses in the SIPP and CPS-ASEC, by poverty status and subsidy receipt

	SIPP (actual)				ASEC (imputed)			
	Non-poverty		Poverty		Non-poverty		Poverty	
	Yes subsidy	No subsidy	Yes subsidy	No subsidy	Yes subsidy	No subsidy	Yes subsidy	No subsidy
Subsidy version 1								
Age 0-2	277	272	159	107	345	326	150	140
Age 3-4	303	291	232	323	345	329	320	357
Age 5-12	206	212	172	169	261	230	202	210
Subsidy version 2								
Age 0-2	270	313	152	144	321	302	156	198
Age 3-4	279	316	237	276	327	358	306	327
Age 5-12	198	258	167	190	249	280	199	226
Subsidy version 3								
Age 0-2	270	313	152	144	318	301	160	189
Age 3-4	283	311	237	276	317	353	349	309
Age 5-12	173	245	172	171	214	289	209	213

Note: Data from 2019 Survey of Income and Program Participation and 2019 CPS-ASEC (reference year 2018). Sample restricted to children aged under 13 (N=5,070 in SIPP and N=33,344 in CPS-ASEC). Summaries include cases with zero expenses.

Table A.3. Childcare Inclusive Poverty Rates (Children under 13), by Race and Ethnicity

	Childcare Inclusive Poverty						SPM Poverty	N
	Subsidy version 1		Subsidy version 2		Subsidy version 3			
	Yes	No	Yes	No	Yes	No		
Amer.Ind.	19.0%	33.9%	19.0%	26.9%	21.0%	29.5%	15.6%	449
%p difference (% decrease)	*14.9%p*	*(44.0%)*	*7.9%p*	*(29.5%)*	*8.5%p*	*(28.8%)*		
Asian/Haw/Pac	11.7%	15.0%	11.7%	16.1%	11.9%	16.6%	11.4%	1,792
%p difference (% decrease)	*3.3%p*	*(22.0%)*	*4.3%p*	*(27.0%)*	*4.7%p*	*(28.2%)*		
Black	28.8%	40.8%	28.7%	40.6%	28.7%	42.5%	25.2%	3,326
%p difference (% decrease)	*12.0%p*	*(29.5%)*	*11.9%p*	*(29.4%)*	*13.8%p*	*(32.4%)*		
Latino	25.1%	28.1%	25.0%	29.3%	25.2%	31.9%	21.8%	7,804
%p difference (% decrease)	*3.0%p*	*(10.6%)*	*4.2%p*	*(14.5%)*	*6.7%p*	*(20.9%)*		
Multiple	14.5%	24.7%	14.5%	23.9%	14.5%	23.8%	12.1%	1,344
%p difference (% decrease)	*10.2%p*	*(41.2%)*	*9.4%p*	*(39.4%)*	*9.3%p*	*(38.9%)*		
White	8.8%	10.5%	8.8%	11.9%	8.7%	12.9%	6.8%	18,629
%p difference (% decrease)	*1.8%p*	*(16.7%)*	*3.1%p*	*(26.3%)*	*4.1%p*	*(32.0%)*		
Total	16.3%	20.4%	16.3%	21.3%	16.3%	22.7%	13.8%	33,344
%p difference (% decrease)	*4.1%p*	*(20.0%)*	*5.0%p*	*(23.6%)*	*6.4%p*	*(28.2%)*		

Table A.4. Childcare Inclusive Poverty Rates (Children under 13), by Child Age

	Childcare Inclusive Poverty						SPM Poverty	N
	Subsidy version 1		Subsidy version 2		Subsidy version 3			
	Yes	No	Yes	No	Yes	No		
Infant (age 0-1)	16.8%	19.3%	16.9%	21.1%	16.9%	21.0%	14.5%	4,106
%p difference (% decrease)	*2.5%p*	*(13.0%)*	*4.3%p*	*(20.2%)*	*4.1%p*	*(19.7%)*		
Toddler (age 2)	17.8%	24.5%	17.7%	25.5%	17.8%	26.1%	15.3%	2,405
%p difference (% decrease)	*6.8%p*	*(27.7%)*	*7.7%p*	*(30.4%)*	*8.3%p*	*(31.8%)*		
Preschool (age 3-4)	18.6%	27.5%	18.5%	31.1%	18.6%	30.7%	14.8%	5,121
%p difference (% decrease)	*8.9%p*	*(32.3%)*	*12.6%p*	*(40.4%)*	*12.1%p*	*(39.3%)*		
School (age 5-12)	15.4%	18.4%	15.4%	18.4%	15.5%	20.8%	13.3%	21,712
%p difference (% decrease)	*2.9%p*	*(16.0%)*	*3.0%p*	*(16.4%)*	*5.3%p*	*(25.6%)*		
Total	16.3%	20.4%	16.3%	21.3%	16.3%	22.7%	13.8%	33,344
%p difference (% decrease)	*4.1%p*	*(20.0%)*	*5.0%p*	*(23.6%)*	*6.4%p*	*(28.2%)*		

Table A.5. Childcare Inclusive Poverty Rates (Children under 13), by Metropolitan Status

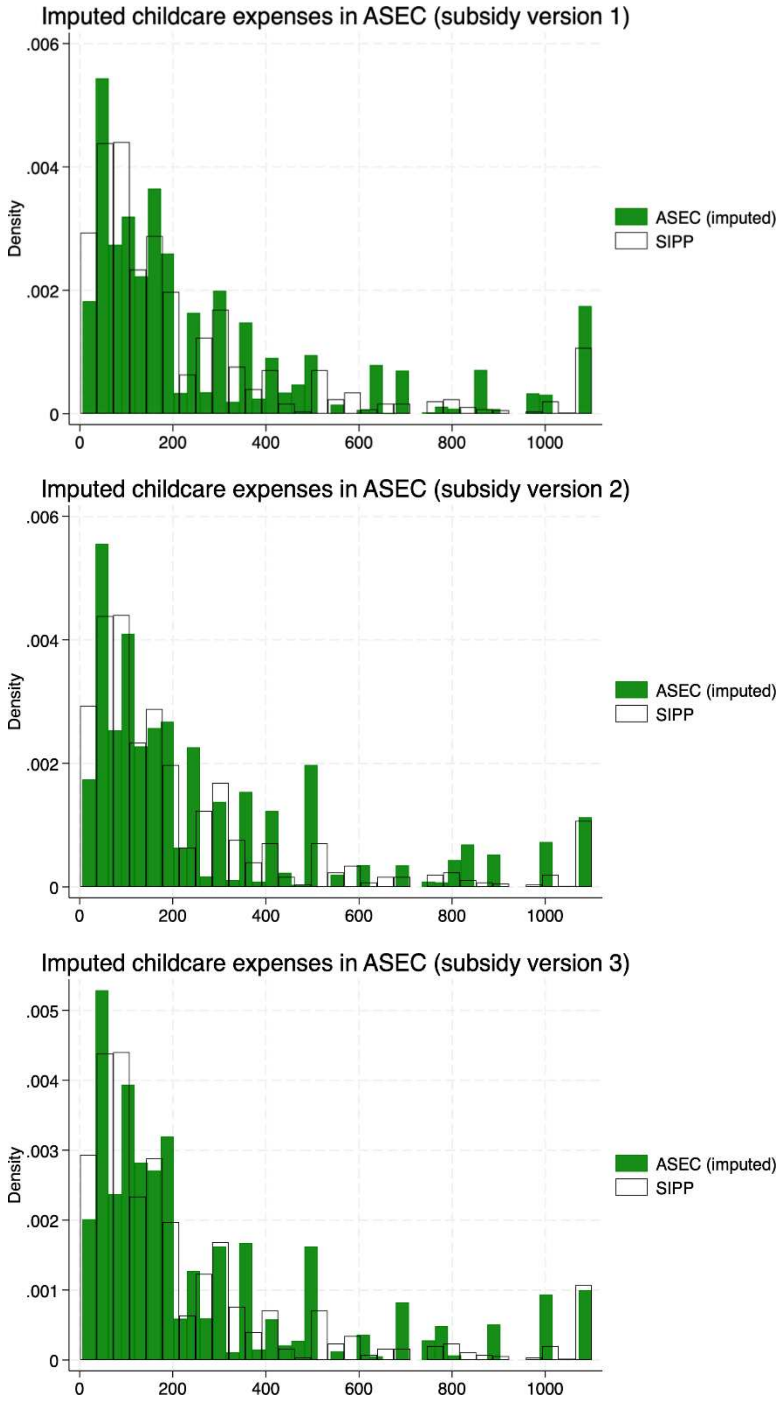
	Childcare Inclusive Poverty						SPM Poverty	N
	Subsidy version 1		Subsidy version 2		Subsidy version 3			
	Yes	No	Yes	No	Yes	No		
Non-metro or not identified	13.9%	19.3%	13.8%	19.7%	13.8%	19.2%	11.6%	8,457
%p difference (% decrease)	*5.4%p*	*(28.0%)*	*5.9%p*	*(30.1%)*	*5.3%p*	*(27.8%)*		
Metropolitan	16.8%	20.6%	16.8%	21.6%	16.8%	23.4%	14.3%	24,887
%p difference (% decrease)	*3.8%p*	*(18.5%)*	*4.8%p*	*(22.4%)*	*6.6%p*	*(28.3%)*		
Total	16.3%	20.4%	16.3%	21.3%	16.3%	22.7%	13.8%	33,344
%p difference (% decrease)	*4.1%p*	*(20.0%)*	*5.0%p*	*(23.6%)*	*6.4%p*	*(28.2%)*		

Table A.6. Childcare Inclusive Poverty Rates (Children under 13), by Household Type

	Childcare Inclusive Poverty						SPM Poverty	N
	Subsidy version 1		Subsidy version 2		Subsidy version 3			
	Yes	No	Yes	No	Yes	No		
Both parents present	10.7%	12.6%	10.6%	14.2%	10.7%	14.6%	8.8%	24,410
%p difference (% decrease)	*1.9%p*	*(15.3%)*	*3.6%p*	*(25.1%)*	*3.9%p*	*(26.5%)*		
Single parent/no parent	30.4%	39.9%	30.5%	39.2%	30.4%	43.3%	26.5%	8,934
%p difference (% decrease)	*9.5%p*	*(23.8%)*	*8.7%p*	*(22.3%)*	*12.9%p*	*(29.7%)*		
Total	16.3%	20.4%	16.3%	21.3%	16.3%	22.7%	13.8%	33,344
%p difference (% decrease)	*4.1%p*	*(20.0%)*	*5.0%p*	*(23.6%)*	*6.4%p*	*(28.2%)*		

Appendix B. Figures

Figure B.1. Distribution of Annual Childcare Expenses in 2018, SIPP and CPS-ASEC



Note: Data from 2019 Survey of Income and Program Participation and 2019 CPS-ASEC (reference year 2018). Sample restricted to children aged under 13 (N=5,070 in SIPP and N=33,344 in CPS-ASEC) whose families reported any out-of-pocket spending on childcare

Appendix C. Construction of Childcare Need Estimates

C.1. National Database of Childcare Prices

In this analysis, we follow the National Academy of Sciences (NAS) panel's recommendations (National Academies of Sciences, Engineering, and Medicine, 2023) to preliminarily estimate need using the National Database of Childcare Prices (NDCP). This database is produced by the Women's Bureau at the Department of Labor, who have created a harmonized dataset of weekly prices at the county level from 2008 to 2018 and at the state level from 2018 onward. Since this writing, the NDCP has been updated to include 2022 price data at the county level. These price data are also specified by age group and type of care (i.e., home-based versus center-based care).

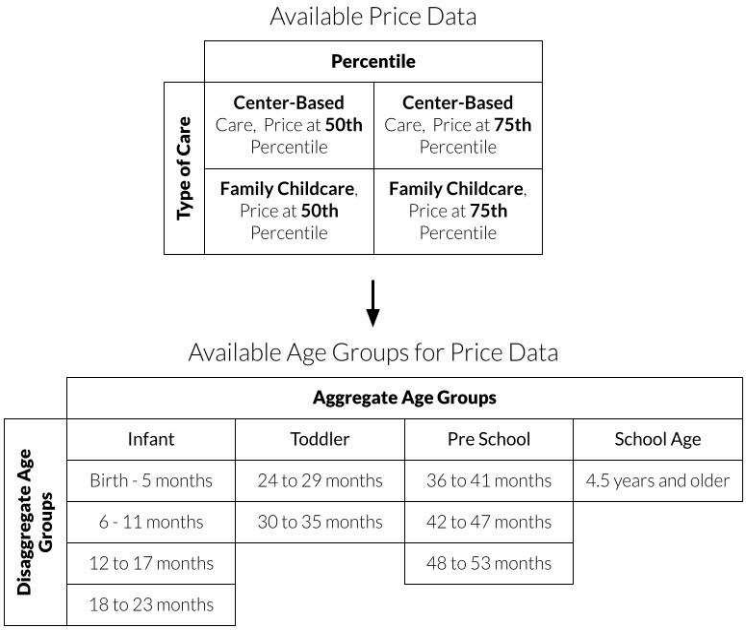
Given differences in state policies and reporting requirements, price data have been harmonized by the NDCP using a variety of imputation procedures. Nonetheless, a meaningful portion of counties are missing price data. To consistently estimate childcare need across the country, we augment the NDCP to ensure that all counties have price data in 2018. Our augmented 2018 dataset is used to estimate need following the NAS panel's suggestions. We outline our approach to constructing this augmented dataset here.

The NDCP has various degrees of missingness: 1) The county level data are only available up to 2018 and only state level data are available thereafter (prior to the update referenced above); (2) There are two states (NM and IN), with no data whatsoever; (3) Data availability varies across counties, even for those within the same state, for any given year. In Appendix C.2. we provide a brief overview characterizing missingness within the data.

The NDCP data are at the county-year level for all years between 2008 to 2022. Each record is associated with basic county demographics and 56 different price variables for different types of childcare across age groups. We use data for 2018, which was the latest data available at the time of the analysis. Since our analysis is illustrative of the new method, we do not repeat the analysis in later years. We note, however, that updates to the database are not yet annual, and the underlying data comes from surveys that are conducted generally every three years, so using this data in such a measure will inevitably result in interpolation of missing years. There will also be lag issues and a question of whether to re-estimate childcare needs when the next version of the data become available.

Figure C.1. presents a visual outline of the types of childcare variables within the NDCP. As shown in the first quadrant at the top, county level prices are collected or imputed at both the 50th or 75th percentile for center-based and family care. There are then fourteen variables associated with each combination of percentile and care type, capturing prices for four aggregate age groups and ten disaggregate age groups. These age groups are broken down in the second quadrant at the bottom of Appendix Figure B.1. For ease of exposition, unless otherwise specified, we focus the discussion on descriptions of county- level prices at the 75th percentile relative and to center-based care for school-aged children.

Figure C.1. Visual Outline of the Different Price Variables in the National Database of Childcare Prices (NDCP)



Note: Created by authors based on the documentation provided by the Women's Bureau on the National Database of Childcare Prices, available at https://www.dol.gov/sites/dolgov/files/WB/media/NationalDatabaseofChildcarePricesTechnicalGuideFinal.pdf.

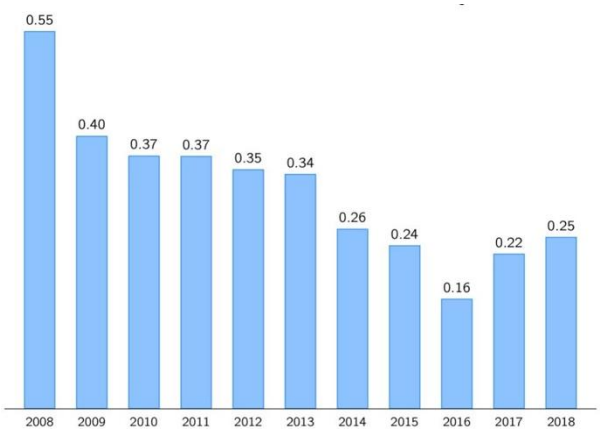
C.2. Missing County-Level Price Data

C.2.1. Missingness Over Time

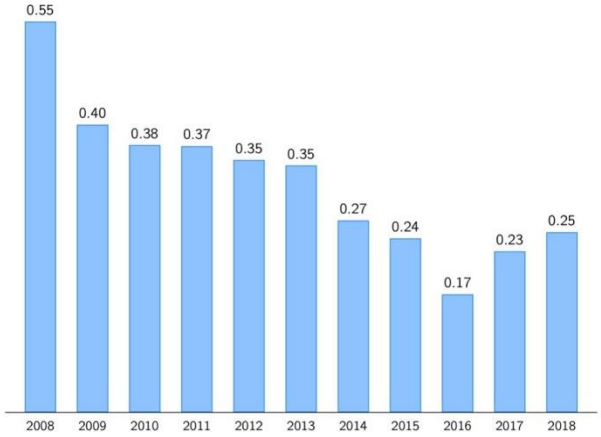
Figure C.2 presents an overview of the missingness of data by year and type of care among school-age children. Differences in the prevalence of missingness by type of childcare for any given year is minimal and at most one percent. Counties that report or have imputed information on one type of care usually have information on the other type of care.

Figure C.2. Percent of County-level Price Data Missing by Year

Panel A. Percent of County-Level Price Data on Center Based Care Missing by Year



Panel B. Percent of County-Level Price Data on Family Childcare Missing by Year



Source: National Database of Childcare Prices (NDCP), U.S. Department of Labor, Women's Bureau; https://www.dol.gov/agencies/wb/topics/featured-childcare.

While our work currently focuses on 2018, analyzing county-level response rates and data availability in previous years provides context for how pre-2018 data can be used to impute missing values for 2018. In 2008, at the start of the series, about half of counties across the country did not report or collect any type of price data on childcare. Over the course of the decade, the prevalence of missingness was halved. The lack of county-level data in earlier years will make harmonizing or augmenting price data relatively difficult if the proposed NAS methodology is retroactively applied back to 2009. Additional work is needed to determine the risks and feasibility of using the entire NDCP without introducing redundancies or interdependencies when imputing missing data throughout the series.

C.2.2. Missingness by Geography

By 2018, about 75 percent of all counties across the country had some kind of price data in the NDCP. As shown in Table C.1, county-level 2018 price data for center-based care for school-age children were missing in Alaska, Colorado, Florida, Georgia, Hawaii, Indiana, Iowa, Louisiana, Missouri, Montana, Nevada, New Mexico, North Carolina, Wisconsin, and the District of Columbia. Most of these states have absolutely no county-level 2018 price data, while most counties in Hawaii, Alaska, and Missouri are missing data. Less than five percent of counties are missing data in North Carolina and Wisconsin. One note on missingness by geography is that sometimes price data

are missing because there were no childcare providers in a given county (ICF, 2020) posing challenges unrelated to general missingness requiring imputation.

Table C.1. Percent of Counties Missing Price Data for Center-Based Care for School-age Children by State, 2018

State	Number of Counties Missing Data	Total Number of Counties	Percent of Counties with Missing Data
North Carolina	1	100	1%
Wisconsin	3	72	4%
Alaska	22	29	76%
Hawaii	4	5	80%
Missouri	100	115	87%
Colorado	64	64	100%
District of Columbia	1	1	100%
Florida	67	67	100%
Georgia	159	159	100%
Indiana	92	92	100%
Iowa	99	99	100%
Louisiana	64	64	100%
Montana	56	56	100%
Nevada	17	17	100%
New Mexico	33	33	100%

Source: National Database of Childcare Prices (NDCP), U.S. Department of Labor, Women's Bureau; https://www.dol.gov/agencies/wb/topics/featured-childcare.
Note: Table only includes states with any missing county-level data. Counties from all other states have 2018 price data in the NDCP.

When a county is missing 2018 price data, we adjust using pre-2018 data when available. Table C.2 shows the most recent year for which county-level data are available among states with any missing 2018 data. For example:

- In Alaska, 22 of the 29 counties are missing data on center-based care for school-age children in 2018. However, of these 22 counties, six have price data for 2015. The remaining 16 counties have no price data whatsoever between 2008 and 2018.

- In Florida, all 67 counties are missing 2018 price data but 65 have 2017 price data that can be transformed into 2018 dollars. The other two counties don't have price data until 2015.
- In Missouri, 94 of the 115 counties have no price data whatsoever.
- All counties in Indiana and New Mexico have no price data whatsoever.

As discussed in subsequent appendix sections, our proposed methodology for adjusting pre-2018 price data accounts for variation within this dimension of missingness in the data.

Table C.2. Data Availability or Counties Missing 2018 Price Data for Center-Based Care for School-age Children by State

State	Total Number of Counties	Number of Counties Missing Data	Latest Year Data Are Available					No Data Any Year
			2017	2016	2015	2014	2012	
North Carolina	100	1	0	0	1	0	0	0
Wisconsin	72	3	2	0	0	0	1	0
Hawaii	5	4	0	0	0	0	0	4
Alaska	29	22	0	0	6	0	0	16
Missouri	115	100	0	6	0	0	0	94
Colorado	64	64	0	0	64	0	0	0
District of Columbia	1	1	0	0	0	0	1	0
Florida	67	67	65	0	2	0	0	0
Georgia	159	159	0	159	0	0	0	0
Indiana	92	92	0	0	0	0	0	92
Iowa	99	99	99	0	0	0	0	0
Louisiana	64	64	0	64	0	0	0	0
Montana	56	56	0	56	0	0	0	0
Nevada	17	17	0	15	0	2	0	0
New Mexico	33	33	0	0	0	0	0	33

Source: National Database of Childcare Prices (NDCP), U.S. Department of Labor, Women's Bureau; https://www.dol.gov/agencies/wb/topics/featured-childcare.
Note: Table only includes states with any missing county-level data. Counties from all other states have 2018 price

data in the NDCP. Cells note the number of counties within each state that have data in an earlier year.

C.3. Imputing Missing Price Data

This section details how the NDCP was used to impute missing 2018 data for all childcare price variables. Our initial goal is to create a harmonized cross-sectional dataset so that all counties have either a reported or estimated price of childcare, regardless of type and across all age groups.

For each price variable, we first identify counties with price data for 2018. For those without 2018 data, we determine the most recent available year. Table C.2 compares the last year in which price information for center-based care (for school-aged children) is available for counties missing 2018 data. It's important to note that, although rare, the most recent year of data may vary across price variables, even for variables representing the same type of care. For example, hypothetical County A may be missing 2018 price data for center-based care for infants but report it for school-aged children. We subsequently identify the most recent data year for each price variable independently. Table C.2 presents price data for center-based care for school-aged children and, although largely representative of this dimension of missingness, may not reflect the exact situation for all variables across different age groups.

To best use all disaggregated county-level data available, we adjust pre-2018 price data to 2018 levels. We conduct this adjustment comparing two alternatives: either (A) inflation adjust the most recent year of data to 2018 USD using the Consumer Price Index (CPI) for tuition, school fees, and childcare produced by the Bureau of Labor Statistics (BLS, 2023), or (B) apply the average growth rate at either the state or national level. As discussed further later in Section 3.2, these methods largely yield similar price distributions.

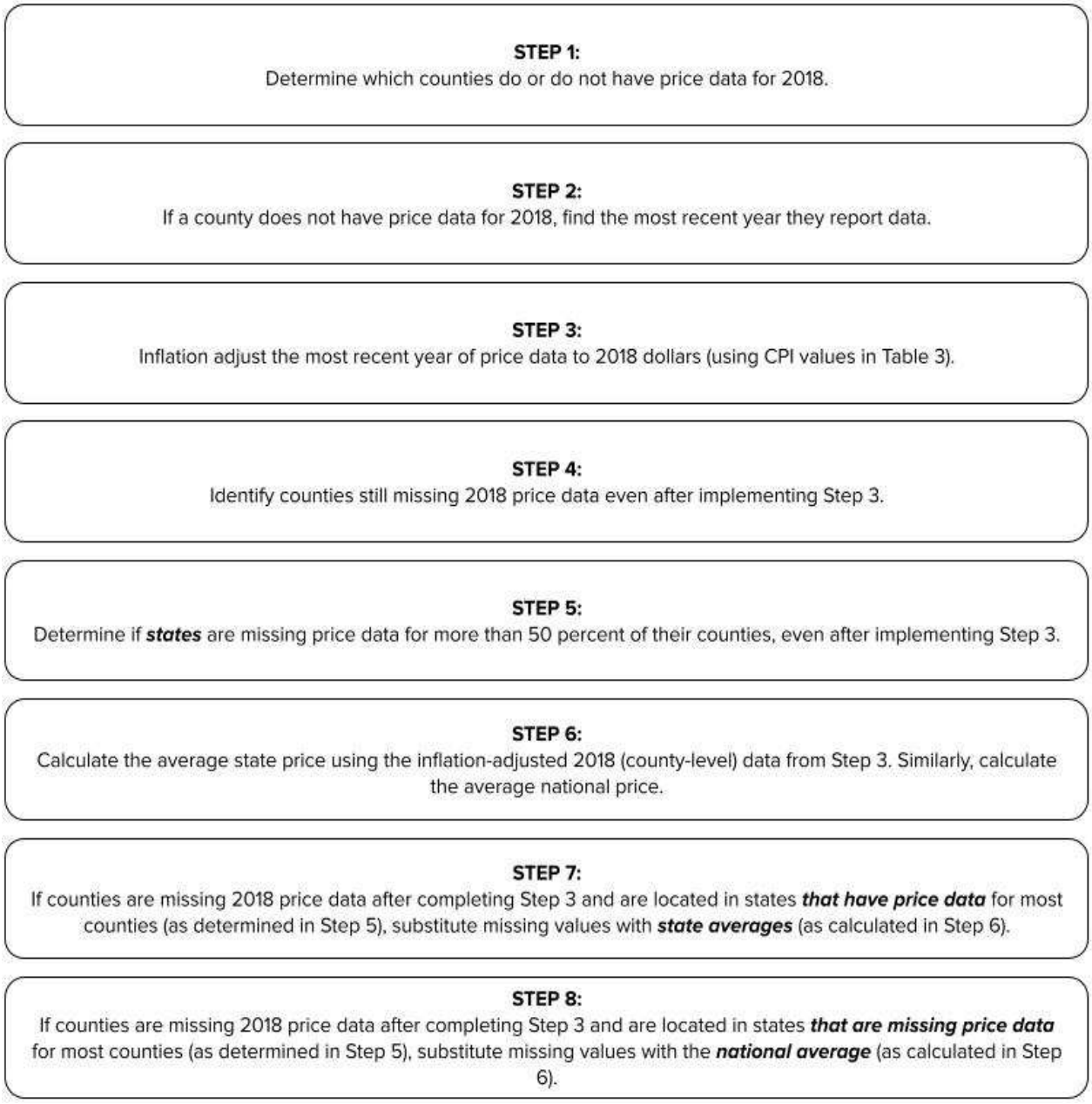
The Women's Bureau notes that even after the implementation of various imputation procedures, data remain missing for various reasons. Some states that publish or provide childcare prices specify reasons for missing data in certain counties, such as a limited sample of providers or an absence of providers altogether. However, to our knowledge, reasons for missing data are not systematically documented in the database, so we cannot identify specific counties affected. Nevertheless, we assign a price to these counties, assuming that if a provider were to operate there, prices would be consistent with the state's average market price.

C.3.1. Inflation Adjustment Procedure

Figure C.3 outlines the steps taken to adjust the NDCP price data for inflation (i.e., implement our inflation adjustment method) and create a complete set of 2018 prices with no missing information. These steps are independently applied to each variable due to missingness by combinations of care type and age group.

Table C.3 contains the CPI values used to inflation adjust pre-2018 price data. We first determine which counties do and do not have price data for 2018. If a county has price data for 2018, we use it (Figure C.3, Step 1). When, however, a county is missing price data for 2018, we find the most recent price they report (Figure C.3, Step 2), if any, and use its inflation adjusted value (Figure C.3, Step 3). This procedure is specific to each county as some counties, even within the same state, may report more frequently than others.

Figure C.3. Outline for Implementing the Inflation Adjustment Method



Note: Created by authors. Figure outlines the general steps taken to create a subset of 2018 childcare prices without any missing values using the proposed inflation adjustment method.

Table C.3. Consumer Price Index (CPI) for Tuition, School Fees and Childcare

Year	CPI	Year	CPI
2008	535.488	2014	674.253
2009	560.087	2015	698.556
2010	582.695	2016	716.684
2011	609.736	2017	732.399
2012	631.853	2018	752.155
2013	653.524		

Source: U.S. Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers: Tuition, Other School Fees, and Childcare in the U.S. City Average [CUSR0000SEEB], https://fred.stlouisfed.org/series/CUSR0000SEEB. Note: CPI values are associated with December of each year.

We then calculate the percent of counties within each state that are still missing price data after applying the inflation adjustment method (Figure C.3, Step 5). We also calculate state and national averages based on all available 2018 price data, including inflation-adjusted prices (Figure C.3, Step 6). If less than 50 percent of counties within a state are still missing price data, we substitute missing values with a state- specific average (Figure C.3, Step 7). However, if 50 percent or more of counties are still missing data, we instead use the national average (Figure C.3, Step 8). As shown in Table C.4, in each of the five states still missing price data for center-based care for school-age children—Hawaii, Alaska, Missouri, Indiana, and New Mexico—data are missing for more than 50 percent of counties. Therefore, all remaining missing values in these states are assigned the national average.

Price distributions, both nominal and real, are shown in Figure C.4. Pre-inflation adjustment distributions use only the counties with 2018 data, while post-inflation adjustment distributions use all counties. Overall, the distributions, regardless of childcare type, remain similar with little to no change in variance. The post-inflation adjusted distribution for center-based care is slightly more centered around the median of about $128, and the interquartile range decreases about 25 percent from $62.94 pre adjustment to $47.20 post adjustment. The post-inflation adjusted distribution for family-based care shifts upward by a few dollars, which translates into an annualized difference of about $36 per child.

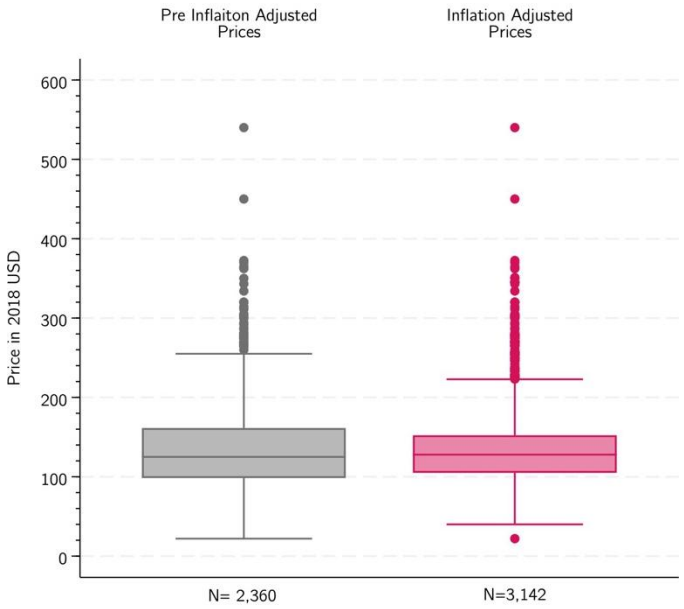
Table C.4. Percent of Counties Missing Price Data for Center-Based Care for School-age Children After Inflation Adjustment by State, 2018

State	Total Number of Counties in Each State	Missingness with No Adjustment		Missingness After Inflation Adjustment	
		Number of Counties Missing Data	Percent of Counties Missing Data	Number of Counties Missing Data	Percent of Counties Missing Data
North Carolina	100	1	1%	0	-
Wisconsin	72	3	4%	0	-
Hawaii	5	4	80%	4	80%
Alaska	28	22	76%	16	55%
Missouri	115	100	87%	94	82%
Colorado	64	64	100%	0	-
District of Columbia	1	1	100%	0	-
Florida	67	67	100%	0	-
Georgia	159	159	100%	0	-
Indiana	92	92	100%	92	100%
Iowa	99	99	100%	0	-
Louisiana	64	64	100%	0	-
Montana	56	56	100%	0	-
Nevada	17	17	100%	0	-
New Mexico	33	33	100%	33	100%

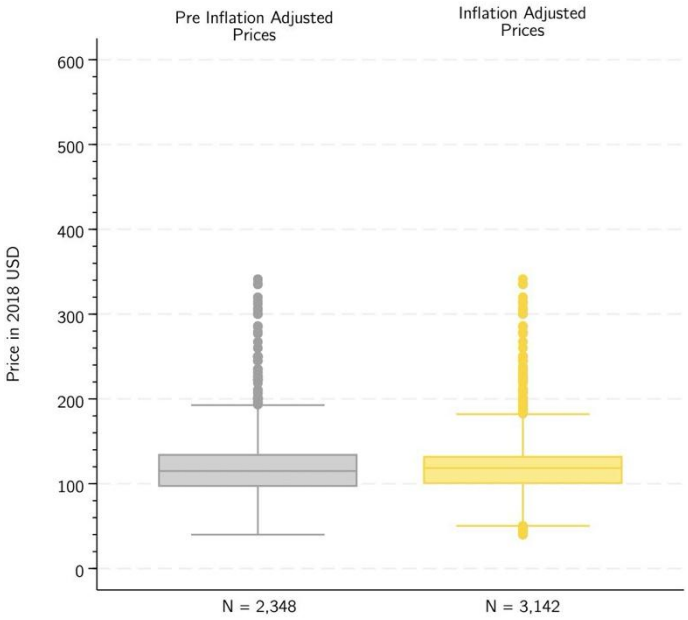
Source: National Database of Childcare Prices (NDCP), U.S. Department of Labor, Women's Bureau; https://www.dol.gov/agencies/wb/topics/featured-childcare.
Note: Table only includes states with any missing county-level data. Counties from all other states have 2018 price data in the NDCP. Cells note the number of counties within each state that have data in an earlier year.

Figure C.4. Distribution of Prices Pre-Inflation and Post-Inflation Adjustment

Panel A. Center-Based Care Prices



Panel B. Home-Based Care Prices



Source: National Database of Childcare Prices (NDCP), U.S. Department of Labor, Women's Bureau; https://www.dol.gov/agencies/wb/topics/featured-childcare.
Note: The distributions of inflation adjusted prices includes prices for all 3,142 counties in the sample after incorporating the method described in Section 3. See Appendix Table A1 for the descriptive statistics of each distribution illustrated in Panels A and B.

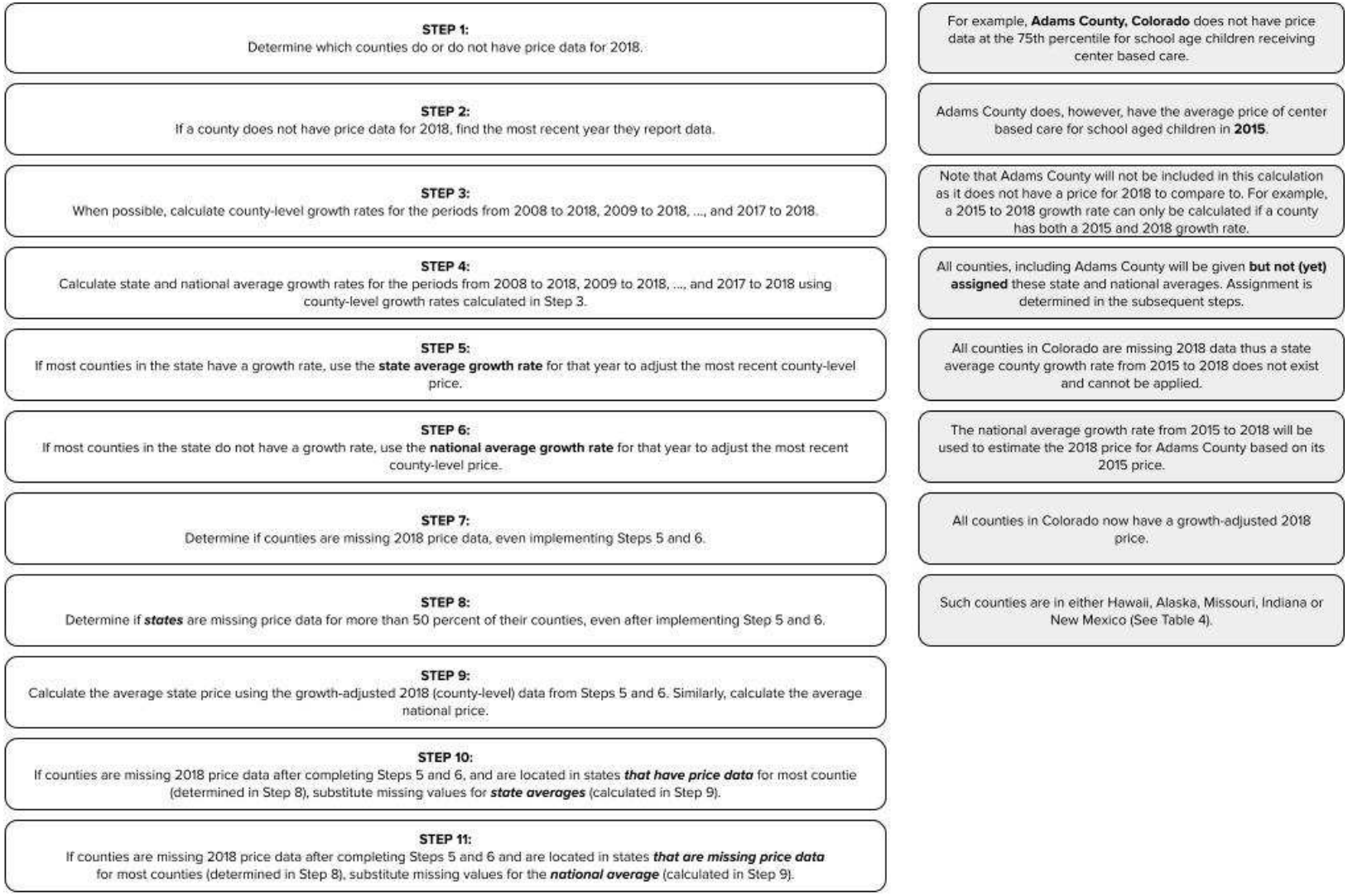
C.3.2. Average-Growth-Rate Adjustment Procedure

Figure C.5 outlines the steps taken to adjust the NDCP price data using year specific growth rates (i.e., implement our growth rate method) and create a complete set of 2018 prices with no missing information. As before, these steps are independently applied to each variable due to variation in the availability of different types of prices at the county level.

As before, we first determine which counties do and do not have price data for 2018. If a county has price data for 2018, we use it (Figure C.5, Step 1). When, however, a county is missing price data for 2018, we find the most recent price they report (Figure C.5, Step 2), if any, and use its adjusted value using the proposed growth rate method.

To apply the growth rate method, we calculate year-specific growth rates for all price variables in the NDCP. For example, for prices of center-based care for school-age children, we determine each county's growth rate for periods 2008 to 2018, 2009 to 2018, 2010 to 2018, and so on, up to 2017 to 2018 (Figure C.5, Step 3). Growth rates are calculated only when data exists for both years. For instance, if County A has data for 2017 but not 2018, the 2017 to 2018 growth rate cannot be calculated. After calculating county-level growth rates, we average them to obtain state and national growth rates (Figure C.5, Step 4). This results in ten separate year-specific average growth rates for each state and ten corresponding growth rates at the national level.

Figure C.5. Outline for Implementing the Growth Rate Adjustment Method



Note: Created by authors. Figure outlines the general steps taken to create a subset of 2018 childcare prices without any missing values using the proposed growth rate adjustment method

To adjust any pre-2018 prices using the growth rate method, we apply either the state or national year-specific average growth rate to counties missing 2018 data. If most counties in a state have a year- specific growth rate, we use the corresponding state average growth rate to adjust all pre-2018 prices (Figure C.5, Step 5). However, if most counties in a state lack this year-specific growth rate, we instead calculate and apply the national average growth rate (Figure C.5, Step 6).

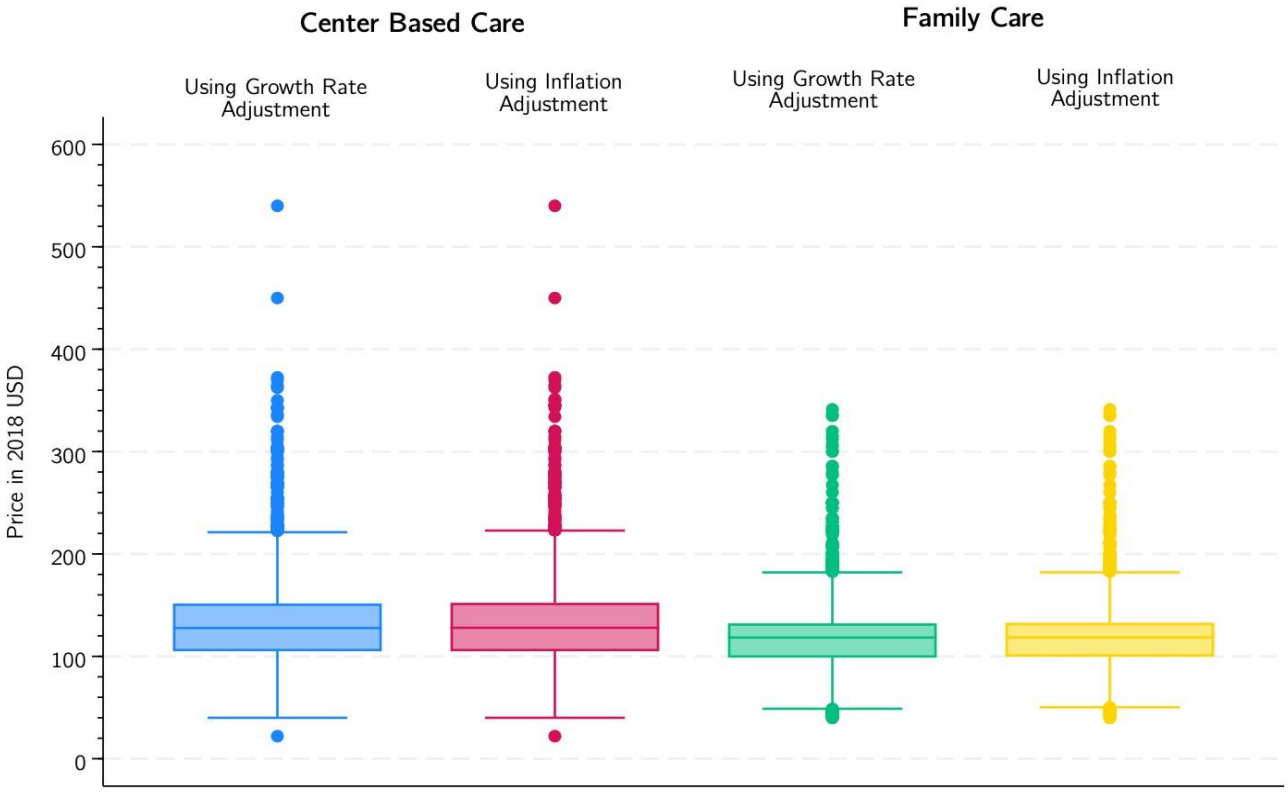
For example, Adam's County, Colorado, is missing 2018 data for center-based care for school-age children. The most recent year with price data for this county is 2015, so we apply the proposed growth rate adjustment to this price. Because unfortunately, 100 percent of counties in Colorado are missing 2018 data, a 2015 to 2018 state-specific average growth rate cannot be calculated. Instead, we apply the national average growth rate for 2015 to 2018 to estimate the 2018 price for Adam's County.

As before, for counties that never report any price data, neither the inflation or growth rate method can be used if there is no data to adjust (Figure C.5, Step 7). We calculate state and national averages based on all available 2018 price data, including inflation-adjusted prices. If less than half of counties within states are still missing 2018 data, even after implementing the growth rate adjustment, we assign them their state-specific average (Figure C.5, Steps 8-10). Otherwise, if a state is missing most of its county level data, we replace missing data with the national average (Figure C.5, Step 11).

C.3.3. Comparison of Adjustment Methods

Figure C.6. compares the resulting distributions from each price adjustment method used to address missing 2018 data on both center-based and family care for school-age children at the 75th percentile. Both methods produce very similar distributions across types of care for school-age children, as well as for other age groups (i.e., infant, toddler, and preschool-age children not shown in the figure below). This consistency suggests that the adjustments are insensitive to the method selected. For detailed descriptive statistics on center-based and family childcare prices for school-age children before and after each adjustment, refer to Table C.5.

Figure C.6. Comparing Distribution of 2018 Price Data for School-age Children by Type of Care and Adjustment Method (Prices at the 75th Percentile)



Source: National Database of Childcare Prices (NDCP), U.S. Department of Labor, Women's Bureau; https://www.dol.gov/agencies/wb/topics/featured-childcare.
Note: Distributions post growth rate or inflation adjustment using the average CPI values for tuition, school fees, and childcare in urban areas. County level prices are at the 75th percentile.

Table C.5. Descriptive Statistics of the County Level Distribution of 2018 Prices for School-age children by Type and Adjustment Method for Missing Data

	N Counties	Mean	SD	Min	Max	Percentile		
						25th	50th	75th
Monthly Center-Based Care Prices, 75th Percentile								
Pre Adjusted Prices	2,360	132.22	47.28	22.03	540.00	98.42	125.00	161.36
Post Inflation Adjusted Prices	3,142	133.12	44.70	22.03	540.00	105.00	127.85	152.20
Post Growth Rate Adjusted Prices	3,142	133.30	45.00	22.03	540.00	105.95	128.06	152.42
Monthly Family Care Prices, 75th Percentile								
Pre Adjusted Prices	2,348	119.29	35.79	39.95	341.22	96.30	115.00	135.00
Post Inflation Adjusted Prices	3,142	119.37	33.16	39.95	341.22	99.70	118.51	132.69
Post Growth Rate Adjusted Prices	3,142	119.22	33.32	39.95	341.22	99.04	119.18	132.16

C.4. Mapping Prices to CPS ASEC Microdata

C.4.1 Transforming Price Data into Needed Age Groups

As shown in Figure C.1, the NDCP provides prices for 14 different age groups. These disaggregated age groups are defined by age in months, while the Current Population Survey (CPS) identifies children by age in years. The NDCP prices for these disaggregated age groups are weighted based on the proportion of each year they cover. For example, the birth to five-month age group covers the first half of a child's first year, while the six to eleven-month age group covers the second half. Thus, the price for center-based childcare at the 75th percentile for a one-year-old would be the average of these two prices each covering a range of six months from birth to eleven months old.

In most cases, the data provided in the NDCP are consistent within monthly age groups across yearly age categories. This means that the cost of childcare for children aged zero to five months and for those aged six to

eleven months is often the same. Price variations between disaggregated age groups within a year are typically due to the application of one of the two adjustment methods used to impute missing 2018 price data. Regardless, these within-age-group cost differences tend to be minimal.

C.4.2. Crosswalking County Level Prices

The SPM adjusts poverty thresholds by metro area to account for variation in cost of living. To correspond with this approach, we subsequently translate county-level price data to the metro level using a crosswalk provided by the Missouri Census Data Center.1 County-level data are used to create 1) average metro-specific prices, 2) average state non-metro prices (for unidentified non-metro areas within a state), and average state metro prices (for unidentified metro areas within a state). The average metro-specific prices are weighted averages that reflect the proportion of county populations within the total metropolitan population. We currently use Geocorr 2022 to extract the 2020 county to metro crosswalk for all states.

C.4.3. No Information on Type of Childcare in the CPS ASEC

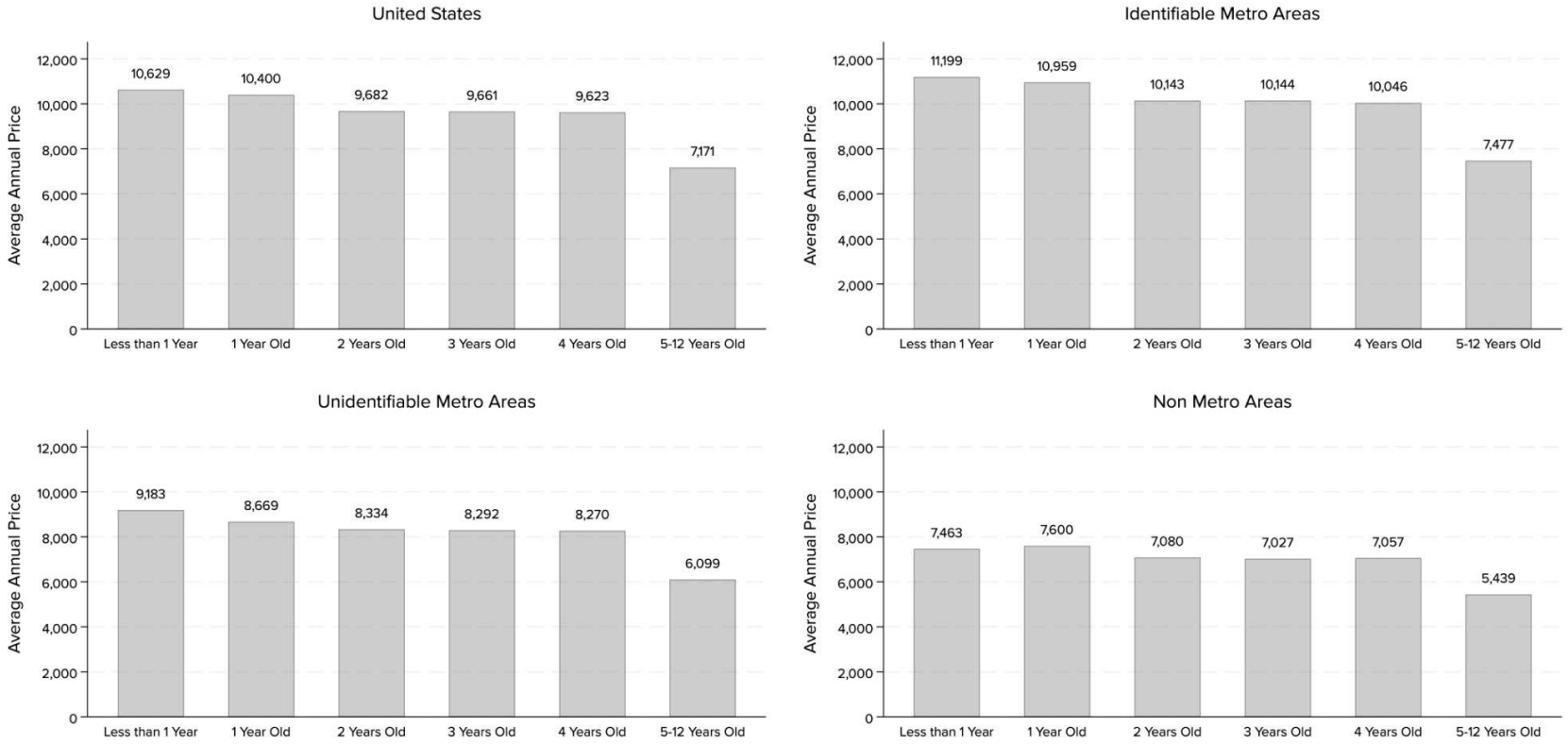
The CPS ASEC does not collect information on the type of childcare used by participating children. As a result, we cannot directly map our augmented dataset of childcare prices, which provides the 75th percentile price of childcare type and geography, to the CPS ASEC. Further, it is not clear that childcare need in the threshold should be determined by patterns of actual use at the family level. If using price data for the valuation of childcare need, we need an approach that aggregates prices across types of care. To do this, we use weighted averages of observed prices across families from the SIPP by age and geography.

Using these data, we estimate the distribution of children in each age group by type of care (see Table A.1). This distribution is then used to calculate a weighted average for children ages 0, 1, 2, 3, 4 and 5-12. For example, the weighted average of childcare for a one-year-old child in a specific geography, such as Santa Fe County, NM, would represent a mixture between the 25.4 percent of 0-to-2-year-olds using center-based care and the 74.6 percent using non-center-based care: weighted price = 0.254 × center-based price + 0.746 × non-center-based price.

Figure C.7 below shows the resulting average annual childcare prices by age across the United States, and within all metro and non-metro areas. Note that these averages are not weighted by population. Rather, these are the

averages calculated using our augmented data set of childcare prices by age group and geography after the SIPP weights are applied.

Figure C.7. A Picture of Annual Childcare Prices in 2018



Source: National Database of Childcare Prices (NDCP), U.S. Department of Labor, Women's Bureau; https://www.dol.gov/agencies/wb/topics/featured-childcare. Authors' calculations using data from the Survey of Income and Program Participation (SIPP).
Note: Figure presents average annual childcare prices in 2018 by child age and metropolitan status. County-level prices are adjusted using the inflation-adjustment method and aggregated across center-based and non-center-based care using the age-specific distribution of care arrangements observed in the SIPP. Estimates are not weighted by population.