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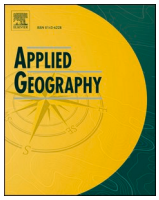

Variation in child care access across neighborhood types: A two-step floating catchment area (2SFCA) approach

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ABSTRACT

Finding safe and high-quality child care is critical to working parents. However, research suggests that formal child care—both family child care and center-based child care—is in short supply in the U.S. We hypothesize that compared to urban neighborhoods, child care access will be lower in outlying suburban neighborhoods with newer and less developed social infrastructure. Applying the 2SFCA method, we predict variation in the supply of child care relative to demand—a measure of child care access—across California neighborhoods that vary by geography as well as sociodemographic and employment characteristics. Similar to prior research, we find that percent Latinx of a neighborhood is associated with lower child care access. In terms of neighborhood type, as we predict, we find that child care access is lower in newly developed suburban areas compared to most other neighborhood types. This finding suggests the importance of incentives to create formal child care facilities in new suburbs, neighborhoods that house a quarter of all young children in the state.

1. Introduction

Child care is a lifeline for working parents whose labor market participation often is contingent on finding safe and high-quality care for their children (Breunig et al., 2011; Chevalier & Viitanen, 2002). The need for child care is particularly pressing for working mothers who shoulder disproportionate responsibility for the care of their children (Altintas & Sullivan, 2016; Boesch et al., 2021). However, a growing body of research suggests that formal child care—both family child care homes and child care centers—is in short supply (Anderson & Mikesell, 2019; Langford et al., 2019; Malik et al., 2018; Pilarz et al., 2022). The child care supply dwindled further during the COVID-19 pandemic when many child care centers closed their doors due to low enrollments, high costs, and staffing shortages (Lee & Parolin, 2021; Zhang et al., 2023).

Child care use varies by race/ethnicity and income. Specifically, lower-income households and households of color are less likely to use formal child care than higher-income and white households (Hirshberg et al., 2005; Kisker & Ross, 1997). For example, 65 percent of non-Hispanic white children who are not yet in kindergarten participate in center-based care, compared to 59 percent of Black and 57 percent of Hispanic children.[1] In part, these percentages can be explained by variation across population groups in preferences for informal care, defined as the use of friend and family caregivers (Kuhlthau & Mason, 1996). However, it is difficult to explain revealed behavior based only on demand, since many households experience supply constraints due to price, quality, and availability that limit their options (Davis & Connelly, 2005; Kisker & Ross, 1997; Meyers & Jordan, 2006) and consequently depress their use of formal care.

With respect to availability, studies show significant variation in the supply of formal child care across neighborhoods that vary by race/ethnicity and income (Fuller & Liang, 1993; Gordon & Chase-Lansdale, 2001; Malik et al., 2018; Queralt & Witte, 1998). Some of these studies touch on the role of geography, particularly differences between urban and rural areas (Anderson & Mikesell, 2019; Langford et al., 2019). However, they do not examine variation across neighborhood types, the focus of our analysis. We hypothesize that, compared to other neighborhoods, outlying suburban areas in California will have lower child care access, largely due to underdeveloped social infrastructure. To test this relationship, we draw on child care data from the California Department of Social Services (CDSS) and predict variation in child care access defined as child care capacity relative to potential demand.

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[1] Source: National Center for Education Statistics, 2019, https://nces.ed.gov/nhes/tables/childcare-2019.asp.

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Similar to other studies, we find less child care access in Latinx and rural neighborhoods across California. Additionally, as we predict, child care access is lower in the state's newly developed suburban areas, home to a quarter of all children under five. Our findings suggest the importance of incentives to create formal child care facilities in newly developed suburban neighborhoods to meet the growing demand for child care in outlying areas.

2. Neighborhoods and child care access

Numerous studies find an undersupply of child care relative to potential demand in the U.S. The lack of supply is particularly apparent for more expensive child care types, such as infant and toddler care (Sandstrom et al., 2018; Sandstrom & Chaudry, 2012; United States General Accounting Office, 1999) as well as for children with special needs (United States General Accounting Office, 1999). Moreover, a growing number of workers—largely low-wage workers and workers of color—work nonstandard and/or irregular hours (Enchautegui et al., 2015) when child care is not typically available (Kisker & Ross, 1997). The lack of non-standard-hour care may help to explain why workers with irregular shifts are less likely to use center-based care compared to workers with standard schedules (Kimmel & Powell, 2006; Queralt & Witte, 1998).

Child care supply varies across neighborhoods by income and race/ethnicity; the degree and character of this variation is shaped by type of care, location, household characteristics (e.g., education and family structure), and the policy environment. With respect to neighborhood income, research suggests that child care supply is nonlinear. Access to child care is best in higher-income neighborhoods where well-educated professionals live (Coley et al., 2014; Fuller & Liang, 1996, pp. 31–49; Sylva et al., 2007). Child care supply also is relatively robust in poor neighborhoods, where both residents and centers are more likely to receive public subsidies compared to other neighborhoods (Bassok et al., 2011; Davis et al., 2019; Fuller & Liang, 1996, pp. 31–49; Small & Stark, 2005). Still, many families in low-income neighborhoods experience unmet child care needs (Fuller & Liang, 1996, pp. 31–49; Sandstrom et al., 2018). Finally, child care tends to be least available in working-class and middle-income communities where public subsidies are less prevalent (Fuller & Liang, 1996, pp. 31–49).

The findings on variation in child care supply across neighborhoods by race/ethnicity are mixed. For example, Malik et al. (2018) find that 57 percent of the Latinx population lives in a child care desert—neighborhoods with a ratio of more than three young children for every licensed child care slot. In comparison, 44 percent of the Black population in the U.S. lives in a child care desert, a share lower than for all other major racial/ethnic groups (Malik et al., 2018). In contrast, Davis et al. (2019) find very little difference in the average adjusted supply of child care across communities by race/ethnicity. One explanation for this difference may be the application of different measures of child care access.

Finally, child care supply differs by geography, the focus of this analysis. Kim and Wang (2019) find that living in a larger city is a protective factor from experiencing a severe child care supply gap. Conversely, many studies show that families in rural areas have less access to formal child care than those who live in more urban areas (Beach, 1995; Katras et al., 2004; Malik et al., 2018; Paschall et al., 2020; Sipple et al., 2020). In rural areas, small family day care centers are more prevalent than larger child care centers (Anderson & Mikesell, 2019; Beach, 1995; Gordon & Chase-Lansdale, 2001). Potentially, the lack of supply in rural areas may be associated with the scarcity of center-based care (Gordon & Chase-Lansdale, 2001). Head Start programs—federally-funded early childhood education—provide center-based care in many rural areas (Malik & Schochet, 2018). However, these programs can be absent from areas with the greatest supply gaps (Kim & Wang, 2019). While the limited availability of child care in rural areas may indicate a supply problem, one study finds that it can be explained by the lower demand for formal care among rural families (Davis et al., 2019).

While many studies have examined differences in child care access between urban and rural areas, child care access also may be constrained in outlying neighborhoods within metropolitan areas. Markets may have difficulty responding to rapid changes in demand. Early on, suburbs were the domain of largely middle- and higher-income white households, in which men were the primary breadwinners and women cared for children (England, 1993; Spain, 2014). Over time, suburban women entered the workforce in growing numbers (England, 1993). More recently, lower-income families—in which women always have had relatively high labor force participation—and people of color have suburbanized (Howell & Timberlake, 2013; Kneebone, 2017). The combination of these trends likely elevated the need for child care in suburban neighborhoods.

However, suburbs were built and structured around an outdated division of labor that does not accommodate women's needs, including their need for "locally available, affordable, quality child care at convenient locations" (England, 1993, p. 28). At the same time, the automobile-oriented, low-density urban form in these neighborhoods can make it difficult for families—particularly those without automobiles—to travel to child care centers and, therefore, suppress demand for center-based care (redacted).

Finally, the child care market may have difficulty responding quickly to increased child care demand, particularly in newer, fast growing outlying areas. Local governments have played little role in addressing the need for child care. Outlying suburban neighborhoods grew at a time when local governments had reduced their spending on infrastructure, including social infrastructure (Lo et al., 2015).

Neighborhood variation in child care supply may be due to differences in the demand for formal care. For example, higher-income families, higher-wage workers, as well as families with older children are more likely to choose center-based care over other modes of care (Hofferth & Wissoker, 1992; Meyers & Jordan, 2006). However, studies find a relationship between improved child care access and child care use, suggesting that the market does not meet the existing demand for center-based care. For example, in a comparison of child care arrangements of otherwise similar low-income families across three states (California, Connecticut, and Florida) and across California zip codes, researchers show that lower-income families were less likely to use formal care if they live in communities with a more limited supply of formal care (Fuller et al., 2002). Hirshberg et al. (2005) and Matthews and Jang (2007) produce similar results among non-English speaking parents and immigrants. Indeed, costs are a significant deterrent to using formal care. There is a strong relationship between child care subsidies and increased demand for formal care (Ertas & Shields, 2012; Fuller & Liang, 1996, pp. 31–49; Greenberg, 2010).

3. Data and methodology

In this study, we explore access to child care for young children (ages 0–4) in California across neighborhoods that vary by neighborhood type, controlling for both demographic and employment characteristics. In this section, we describe our data and analytical approach.

3.1. Data on child care supply, demand, and neighborhood factors

We received data from the California Department of Social Services (CDSS) on child care facilities operating in the state from 2010 to 2020. The dataset includes child care type (day care center, family day care home, infant care center, school-age day care center, and ill center), license status, date of opening and (if applicable) closing, address, and capacity (i.e., the number of young children the center can serve).[2]

Data on the number of children under five years old (our estimate of demand) and sociodemographic characteristics of neighborhoods are from the 2015–2019 5-year American Community Survey (ACS). We chose the 2015–2019 5-year ACS to ensure consistency in the spatial boundaries (2010 administrative boundaries) across all of our datasets.

To align the child care and sociodemographic data, we narrowed the child care dataset to those facilities that: (1) were licensed and opened before 2019 *or* were licensed and opened before 2019 and closed after 2017; (2) were not a "school-age" day care center; and (3) were not closed due to a change in location or ownership" (as identified by the CDSS). After applying these parameters, we obtained a dataset of 40,055 child care facilities. Due to confidentiality protections, we located these child care facilities to the centroids of 2010 blocks and treated the centroids as proxies for the actual child care center locations.

We also used data from the origin-destination matrix from the 2019 LEHD Origin-Destination Employment Statistics (LODES), road network from ESRI StreetMap Premium, 2010 administrative boundaries from TIGER/Line shapefiles, Environmental Protection Agency 2014 Smart Location Database, and 2010 Decennial United States Census. Table 1 summarizes these data sources.

3.2. Child care access

To measure child care access, we use a 2-step floating catchment area (2SFCA) method (Luo & Wang, 2003). The 2SFCA approach considers all supply and demand equally within the floating catchment area and ignores centers and children located out of such areas. In reality, however, child care facilities that are nearby are more spatially accessible than those located farther away. Researchers have argued that the 2SFCA method does not consider such variation in accessibility and proposed a modified method which includes the travel time/distance within bordered areas (Fransen et al., 2015). We applied this modified 2SFCA to measure access to formal child care.

Table 1
Data sources.

Data sets	Source
Child care facilities	California Department of Social Services (2010–2020)
Sociodemographic information	2015–2019 5 years American Community Survey
Administrative boundaries	TIGER Shapefile 2010 boundaries
Road network dataset	ESRI StreetMap Premium - California (2020)
Origin-Destination matrix	LEHD Origin-Destination Employment Statistics (LODES) (2019)
Neighborhood types	Environmental Protection Agency Smart Location Database (2014) and Decennial United States Census (2010)

In step 1, we defined the floating catchment area and calculated the supply weighted by demand within the area. For each child care facility, we identified the locations of children within a threshold travel time from the child care facility; calculated the travel time between the child care facility and these children's locations; and computed the supply-over-demand ratio within the catchment area. The formula for the supply-over-demand ratio R_c is the following:

$$R_c = \frac{S_c}{\sum N_k \times t_{c,k}} \; with \; t_{c,k} \leq T_0 \qquad \text{Equation 1}$$

where S_c is the capacity of child care facility *(c)*; N_k is the number of children under five years old within the threshold travel time of child care facility *(c)*; $t_{c,k}$ is the travel time between the child care facility (*c*) and the child's residential location (*k*).

In step 2, we summarized the supply weighted by travel time within a floating catchment area centered on each child's residential location. For each child's location, we: identified all child care facilities that were within the threshold travel time from the child's location; calculated the travel time between the children's location and these child care facilities; and summed up the supply-over-demand ratio at the child's location. The formula for access to child care at each child's residential location A_k is as follows:

$$A_k = \sum t_{k,c} \times R_c with \; t_{k,c} \leq T_0 \qquad \text{Equation 2}$$

where $t_{k,c}$ is the travel time between the child's residential location (*k*) and the child care facility *(c)*; R_c is the supply-over-demand ratio at a child care facility (*c*). We set the threshold travel time T_0 at 10 min, the median child care trip travel time in California based on data from the 2017 National Household Travel Survey.[3] A larger A_k value means better access at this child's location. The child care facilities are located at the centroids of blocks, and the young children are located at the centroids of block groups.

Fig. 1 illustrates the floating catchment areas and the location of both the children's residences and the child care facilities. We then aggregated the average of the access A_k to the Census tract, a more reasonable proxy for a neighborhood—our interest in this paper—compared to blocks or block groups.

As an example, Fig. 2 shows the distribution of child care access in the Los Angeles-Long Beach-Anaheim, CA MSA. Over 50 percent of tracts in this region have a child care access value of less than 0.42, and these neighborhoods are located in both urban and rural areas. As the map shows, child care access is relatively low in urban areas located in Downtown Los Angeles, Downey, and Anaheim.

3.3. Neighborhood factors

Previous studies show an uneven spatial distribution of child care access by household income, race/ethnicity, parents' employment status, family status (single or married), the number of young children (0–5/6 year olds), and geography. Based on these studies, we constructed a regression model to predict neighborhood child care access. The model predicts the log of the child care access measure (since the measure is positively skewed) as a function of three groups of variables: demographic, employment, and location (see Fig. 3). As the log of child care access between 0 and 1 is negative, we add one to the access

[2] Data on the capacity of family day care homes that serve less than nine children are confidential. To maintain the confidentiality of these data, if a family day care home has a capacity of less than nine, CDSS assigns the center as having a capacity of eight, even if it serves less than eight children. Because of this, our analysis likely overestimates the capacity of family day care homes. (For unknown reasons, CDSS identifies some family day care homes as having a capacity for six children.) While the number of these small family child care centers is relatively large (32 percent of all centers), these centers are small and, therefore, account for only 10 percent of all child care spaces.

[3] There are statistically significant differences in median travel time across neighborhood types, likely explained by neighborhood variation in mode and traffic congestion. However, the actual differences in median travel times are quite small: 1–2 min. Research on household child care preferences find that most families prefer to send their children to centers located reasonably close to their homes (Van Ham & Mulder, 2005).

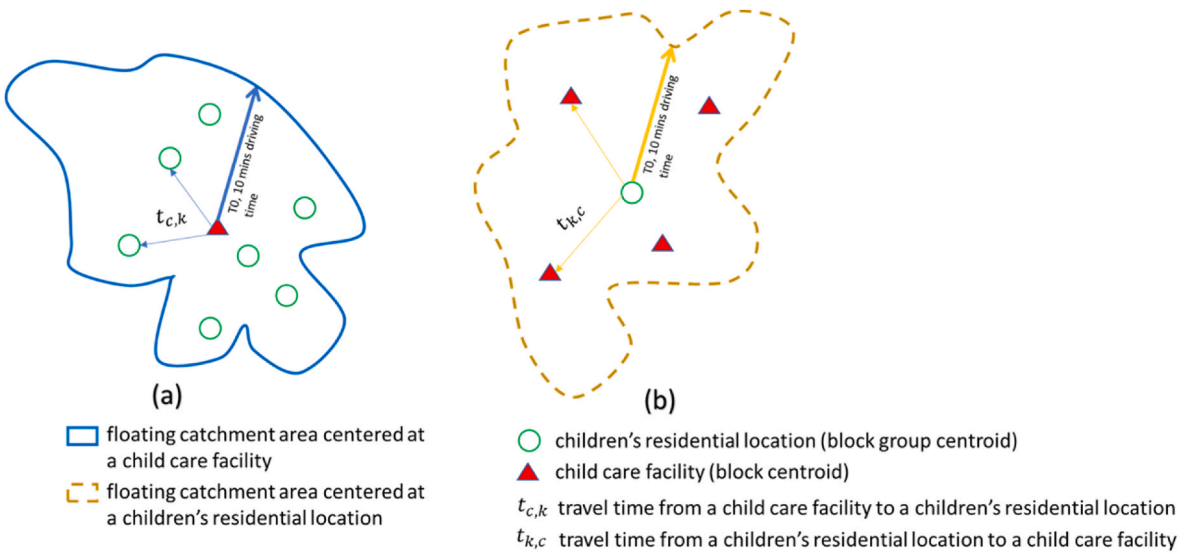

Fig. 1. Schematic illustrating steps in 2SFCA method of calculating child care access.

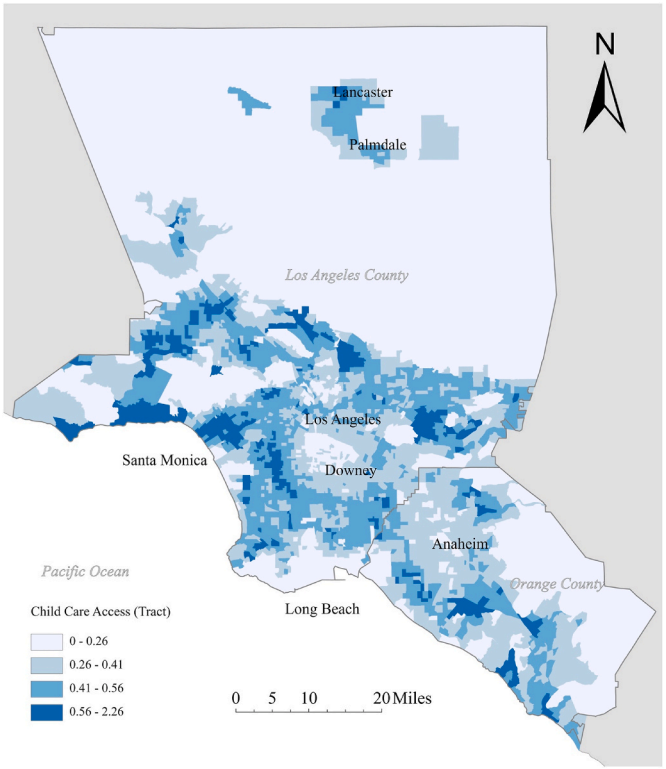

Fig. 2. Child care access at tract level in the Los Angeles-Long Beach-Anaheim, CA MSA (Classification method: Natural breaks).

measure before the logarithmization to make the result easier to explain.

Demographic Characteristics. We control for sex (the ratio of women to men), since a neighborhood with a high proportion of women may indicate relatively large numbers of mothers in need of child care. Similar to other studies (Ertas & Shields, 2012; Hofferth & Wissoker, 1992; Radey & Brewster, 2007), our model also includes measures of race/ethnicity: percent Black, percent Asian, and percent Latinx. Segregation (by race/ethnicity and immigrant status) may be associated with neighborhood-level social networks that increase residents' use of non-center-based care (e.g., care from trusted family and friends) (Ansari et al., 2020; Liu, 2015; Radey & Brewster, 2007). Moreover, the racial and ethnic composition of neighborhoods is strongly related to socioeconomic status. Many neighborhoods with substantial Black and Latinx residents have high poverty rates (e.g., Charles, 2003; Krivo et al., 2009). In California, the correlation between the percent Black and the neighborhood poverty rate is not high (0.19), likely because African Americans comprise a relatively small percentage of the California population. In contrast, the association between the percent Latinx and the poverty rate is high (0.68).[4] Given these correlations, we control for the percent Black, Asian, and Latinx. However, we exclude percent non-Hispanic white as it is highly and negatively associated with percent Latinx (−0.78).

Employment Characteristics. Our models include the proportion of young children (ages 0–5) with two working parents.[5] We hypothesize a positive relationship between the proportion of parents who both work and demand for and access to child care. Dual-working parent households potentially have less time to take care of young children compared to dual-parent households with only one working parent (Craig & Powell, 2012; Meyers & Jordan, 2006). Moreover, household median income is highly related to the number of working parents in the household and, therefore, with child care use (Abrassart & Bonoli, 2015; Ansari, 2017; Coley et al., 2014), since higher-income households are better able to afford child care compared to lower-income households.

We expect a negative relationship between the percent of workers who work from home and child care access. Parents who work at home may have more flexible schedules that may allow them to take care of children compared to parents who work outside the home and, therefore, have less demand for care. In contrast, workers with longer-distance commutes may have greater demand for child care, since they typically have an extended work day. To measure commute distance, we used 2019 LODES data to calculate Euclidean distance between workers' home and workplace Census block and then aggregated the data to the Census tract to be consistent with the other variables in our model.

Neighborhood Location. Finally, we examined the relationship between neighborhood and child care access. We tested whether child care

[4] While we present descriptive data on child care supply by poverty rate, we do not include poverty rate in our models since it is strongly correlated with both labor market participation and race/ethnicity.

[5] As we describe, child care demand is the number of children ages 0–4. However, the ACS only includes data on the proportion of young children ages 0–5 with two working parents.

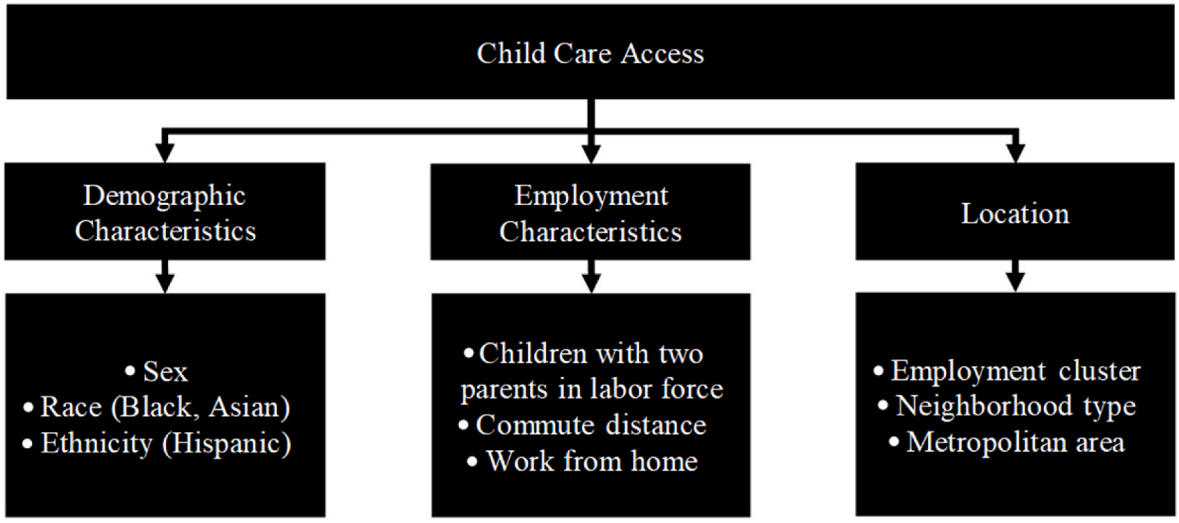

Fig. 3. Determinants of child care access.

access varies across different neighborhood types, hypothesizing that child care access will be lower in more recently developed outlying neighborhoods compared to older neighborhoods located closer to city centers. To test this hypothesis, we adopted the seven neighborhood types developed by Voulgaris et al. (2017) at the Census tract level. The neighborhood types include three urban neighborhoods (mixed use, old urban, and urban residential), three suburban neighborhoods (established suburb, patchwork, and new development), and rural. Urban neighborhoods tend to be older, with higher residential and employment densities and extensive infrastructure and services (e.g., transit and social services). In contrast, outlying neighborhoods are newer and have a more dispersed urban form. In these more outlying neighborhoods, the number of services and institutions have lagged behind the substantial growth in the suburban population (Allard & Roth, 2010; Lo et al., 2015).

Fig. 4 shows the distribution of young children (ages 0–4), population, workers, and Census tracts by neighborhood type. In California, rural areas comprise only 7.5 percent of all tracts and six percent of the California population. In contrast, new development accounts for 20 percent of all tracts and almost a quarter (24%) of both the total population and young children.

Additionally, our model includes two other geographic characteristics: location in an employment center and major metropolitan area. We hypothesize that child care access in employment centers will be higher than in other neighborhoods due to child care demand from both residents and workers. Using the LODES data, we applied the method innovated in Giuliano and Small (1991) and Giuliano et al. (2007) to construct an employment cluster dummy. We designated a tract as within an employment cluster if: (1) it was contiguous with others; (2) it had a minimum of ten employees per acre; and (3) when combined with other tracts in the cluster, it had at least 10,000 employees. We also include variables for the major metropolitan statistical areas (MSAs) in the state: Los Angeles, Sacramento, San Diego, San Francisco/Bay Area, and San Jose.[6] The metropolitan area variables respond to findings showing a positive relationship between population size and child care access (Kim & Wang, 2019).

There are a few important limitations to our data and methods. The largest is the lack of data on child care cost, which affects household child care decision making (Langford et al., 2019; Pennerstorfer & Pennerstorfer, 2019; Van Ham & Mulder, 2005). To help explore the relationship between cost and access, we developed three additional statistical models by income groups: lower, medium, and higher. In doing so we explore whether the relationship between child care access and independent variables remains stable, even in higher-income neighborhoods, where presumably residents face fewer cost-based barriers to child care.

Due to confidentiality restrictions in using the data, we use single points to represent the location of child care facilities and the residential location of children. This approach may introduce aggregation errors in our distance calculations since both children and child care centers are likely dispersed throughout a given neighborhood (Hewko, Smoyer-Tomic, and Hodgson, 2002).

We also note the mismatch in data years. The neighborhood types are based on analysis using data from the 2010 Decennial Census. We assume that neighborhood types have not changed fundamentally since 2010 but, of course, cannot be certain. Finally, as we note previously, we do not know the exact capacity of very small child care centers (those with the capacity to serve eight children or less). While a limitation, the overestimation of child care supply does not undermine our findings; rather they simply represent best-case outcomes.

4. Results & discussions

4.1. Descriptive analysis

Table 2 shows the results of our descriptive statistical analysis. We find that child care access across California Census tracts ranges from 0 to 14.27, with a median of 0.47. The data also highlight a few other important characteristics of the California population. The median percent Latinx is high (31%), relative to Blacks (2.6%) and Asians (8.1%). The median percentage of young children (0–5) with two working parents is also high at 38 percent. Finally, relatively few Census tracts are located in employment clusters.

In terms of the seven neighborhood types, urban residential, established suburb, and new development account for 67 percent of all Census tracts in California. As Fig. 5 shows, child care access differs across neighborhood types. Consistent with the broader literature, of the seven neighborhood types, families in rural neighborhoods have the least access (0.36) to child care. Child care access is also relatively low in new development neighborhoods (0.42). With one exception, child care access is similar across the other neighborhood types. Mixed use neighborhoods have the best child care access (0.58). However, as Fig. 4

[6] These are short-hand names for the following MSAs (respectively): Los Angeles-Long Beach-Anaheim, Sacramento-Roseville-Arden-Arcade, San Diego-Carlsbad, San Francisco-Oakland-Hayward, and San Jose-Sunnyvale-Santa Clara.

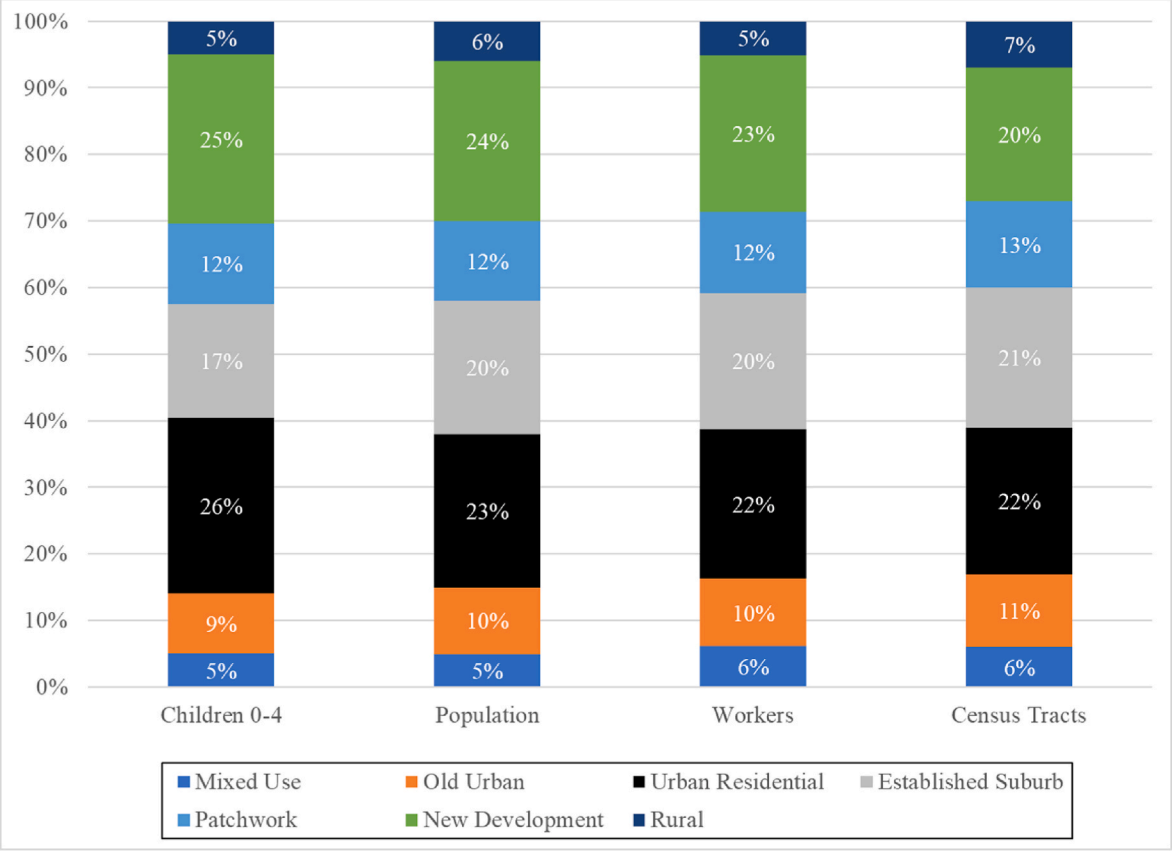

Fig. 4. Neighborhood type share of young children (ages 0–4), population, workers, and number of tracts.

Table 2
Descriptive statistics.

Variables	Min	Median	Max	Sd
Access to child care	0	0.47	14.27	0.27
Sociodemographic				
Ratio of female to male adults (18+)	0	1.04	3.64	0.18
White (%)	0	37.2%	100%	26.0%
Black (%)	0.0%	2.6%	84.7%	2.6%
Asian (%)	0.0%	8.1%	93.8%	8.1%
Latinx (%)	0.0%	30.9%	100.0%	30.9%
Poverty (%)	0.0%	27.7%	100.0%	18.4%
Household median income ($)	7461	73,483	249,651	38,339
Employment status				
Children <6 with both parents in the labor force (%)	0.0%	38.4%	100.0%	38.4%
Workers who work from home (%)	0.0%	5.0%	56.0%	5.0%
Median commute distance (miles)	1.39	12.25	188.15	13.38
Neighborhood types (%)				
Mixed-use	6.5%			
Old urban	11.5%			
Urban residential	23.4%			
Established suburb	23.0%			
Patchwork	13.5%			
New development	21.2%			
Rural	0.8%			
Employment cluster (%)				
Yes	7.7%			
No	92.3%			
Metropolitan areas (%)				
Los Angeles	35.9%			
Sacramento	5.6%			
San Diego	7.6%			
San Francisco/Bay Area	11.9%			
San Jose	4.5%			

Note: The descriptive statistics exclude records with null values for each variable. Total sample size is 8057 tracts before null values exclusion.

shows, mixed use neighborhoods include only five percent of all young children and less than six percent of all workers in the state.

To facilitate comparisons with existing studies, we also present variation in child care access by quartiles of neighborhood sociodemographic characteristics (see Fig. 6). We find that neighborhoods with a high percent Asian tend to have greater access to child care, while neighborhoods with a high percent Latinx tend to have less access. In contrast to other studies that show non-linear relationships between income and child care access (Dowsett et al., 2008; Farfan-Portet et al., 2011), in California there is a strong positive relationship between income and child care access. Child care access also tends to be positively associated with percent non-Hispanic white and work from home and is negatively associated with percent Black.

4.2. Factors associated with neighborhood access to child care

Table 3 includes the results of our multi-linear regression model. We find that some of the variables operate as we predicted. A higher ratio of adult women to men is associated with better access to child care, likely due to greater demand for child care among working women in a single parent family (Tekin, 2007). For similar reasons, the percentage of children with duo-working parents is also positively associated with child care access.

In terms of race/ethnicity, the percent Black is not statistically significant, a finding different than that in Fig. 6. This may be due to the difference in the two measures: percent Black in the model and quintiles by race in Fig. 6. However, more likely, the finding is associated with the other control variables in the model. Indeed, the percent Black in California is relatively small: approximately 86 percent of tracts in California have populations that are less than ten percent Black. The relationship between the percent Black and child care access, therefore, is likely moderated by the presence of other racial groups, particularly

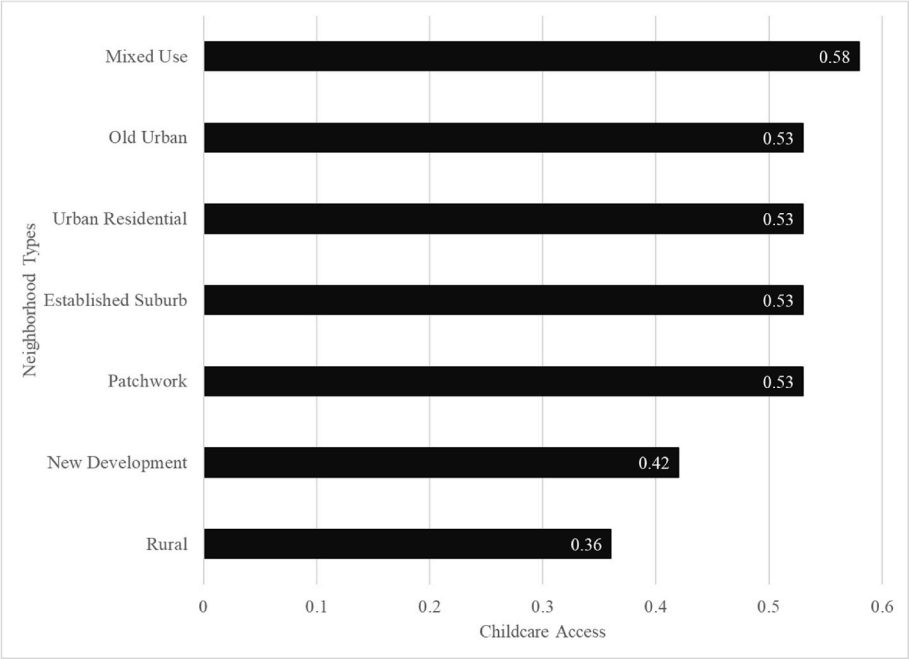

Fig. 5. Child care access by neighborhood type.

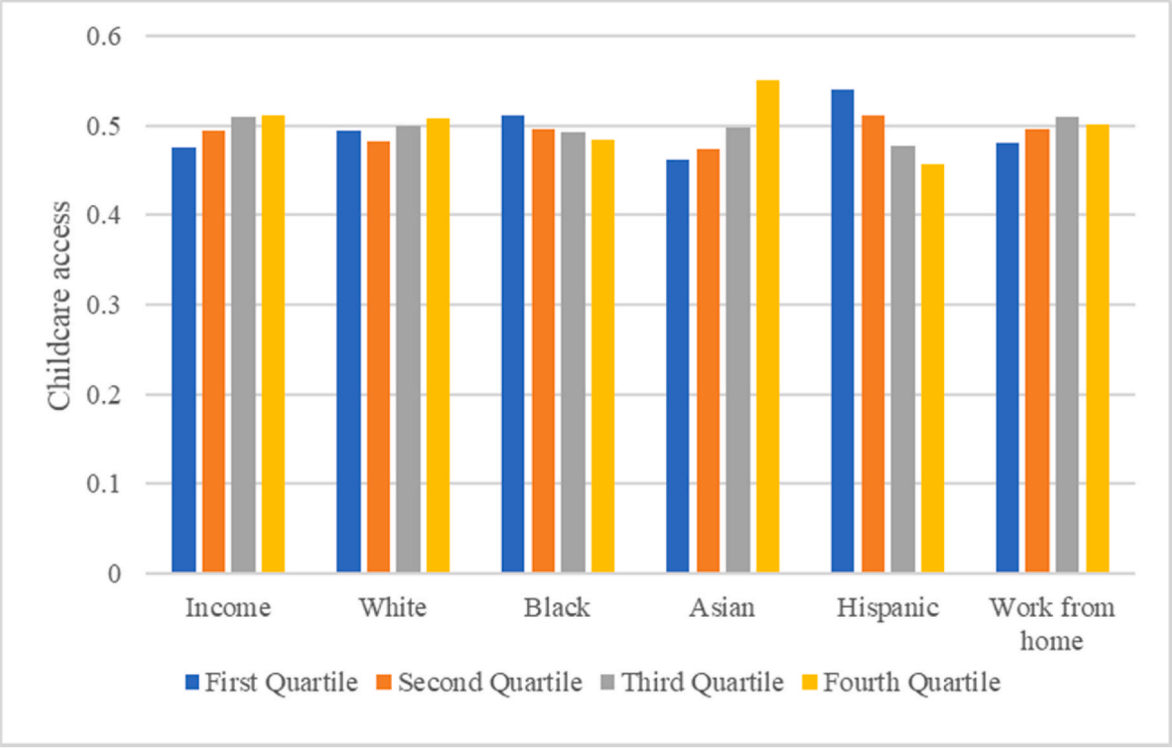

Fig. 6. Child care access by socioeconomic/demographic groups.

high percentages of Latinx residents, which as we discuss below is associated with lower child care access in our model.

Percent Asian is associated with greater child care access, while percent Latinx is associated with lower child care access. In neighborhoods with high proportions of Asians, this relationship may be explained by the high percentage of Asian adults with children in the labor force combined with their relatively high household incomes and earnings (see Table 4). Latinx adults with young children are slightly less likely to be in the labor force than Asian adults but have significantly lower household incomes and wages. Consequently, they may be priced out of the market for formal care. We do find, however, that federally-subsidized Head Start child care centers in California are disproportionately located in neighborhoods with high proportions of Latinx

Table 3
Model Results: Relationship between neighborhood characteristics and child care access.

Variables	Unstandardized Coefficient	Partially Standardized Coefficient	*P*-value	
Intercept	0.32	0.15	<0.00	***
Demographic				
Ratio of female to male adults (18+)	0.04	0.04	0.00	***
Black (%)	0.02	0.02	0.17	
Asian (%)	0.03	0.04	0.00	**
Latinx (%)	−0.03	−0.05	0.00	***
Employment status				
Children <6 with both parents in the labor force (%)	0.03	0.04	0.00	***
Workers who work from home (%)	0.01	0.00	0.74	
Median commute distance (miles)	−0.00	−0.05	0.00	***
Neighborhood types (%) (Reference: Established suburb)				
Mixed-use	0.02	0.13	0.01	*
Old urban	0.02	0.12	0.00	**
Urban residential	0.00	0.01	0.86	
Patchwork	0.00	0.02	0.53	
New development	−0.06	−0.46	0.00	***
Rural	−0.12	−0.90	0.00	***
Employment cluster (%) (Reference: non-cluster)				
Employment Cluster	0.02	0.16	0.00	***
Metropolitan Area (Reference: outside of these MSAs)				
Los Angeles	0.00	0.01	0.84	
Sacramento	0.03	0.19	0.00	***
San Diego	0.05	0.36	0.00	***
San Francisco/Bay Area	0.07	0.49	0.00	***
San Jose	0.07	0.54	0.00	***
Adjusted R-square	0.19	0.19		
N	7721	7721		

Note: Records with null values are removed from the regression.
Significance: ***p < 0.001, **p < 0.01, *p < 0.05.

Table 4
Characteristics of the adult population by race and ethnicity in California.

Race/ Ethnicity	% in the labor force		Median Household Income	Full-time Wage and Salary Income[a]
	All adults w/ young children (<5)	Adult women with young children (<5)		
White, non-Hispanic	80%	66%	$100,357	$66,178
Black	80%	72%	$67,822	$46,932
Asian	79%	66%	$108,939	$62,576
Latinx	76%	60%	$70,920	$35,000

Sample: California adults 18+.
Data: 2015–2019 American Community Survey Microdata Sample.
[a] Full-time work: 50–52 weeks per year, 35+ hours per week.
Source: Ruggles et al. (2022).

residents, suggesting a potential role for preference.[7]

Median commute distance is significantly and negatively associated with child care access. This relationship is likely associated with income, and specifically the fact that higher-income workers who live in outlying neighborhoods commute relatively long distances into downtown or other employment centers; in comparison, lower-income workers tend to commute short distances (Hu et al., 2017). Demand for child care may be elevated in higher-income neighborhoods where workers travel longer distances. As we hypothesized, neighborhoods in employment clusters are associated with greater child care access compared to those outside of employment centers. Child care supply in these neighborhoods appear to benefit from the demand of both residents and workers.

While many of these variables are statistically significant, their association with child care access is weak compared to the role of geographic characteristics. The model shows that controlling for demographic and employment characteristics, child care access varies substantially across neighborhood types. Compared with established suburbs, urban areas (both mixed use and old urban) are associated with greater child care access, while new development suburbs and rural areas are associated with less child care access.

We also tested the relationship between neighborhood type and income, since the model does not include neighborhood income due to multicollinearity. We classified Census tracts into three income groups by quartiles of household median annual income: lower income (first quartile, less than $52,815), middle income (second and third quartiles, $52,815-$101,475), and higher income (greater than $101,475). We then examined the relationship between neighborhood type and child care access for three income-based neighborhoods (see Table 5 in Supplementary Material). Indeed, we find that new development and rural neighborhoods remain associated with less child care access regardless of neighborhood income.

Variation in child care access across neighborhood types controlling for socioeconomic and employment characteristics of residents suggests spatial barriers to child care provision and use. Both supply- and demand-side issues are likely to blame. Compared to other neighborhoods, older urban neighborhoods tend to have more established institutions, having had more time to develop (Downs, 2010). Moreover, these neighborhoods tend to have relatively high employment and residential densities, providing residents with reasonable access to destinations within a relatively short travel time (Shen, 2001).

In contrast, outlying communities—particularly rural areas—may lack the infrastructure needed to attract and support local businesses, such as child care centers (W.K. Kellogg Foundation, 2004). Additionally, the child care demand in areas with lower and more dispersed populations may be a better match to small centers. However, the owners and managers of smaller centers can have more difficulty than those of larger centers managing their operational costs, including the costs associated with regulatory and licensing requirements (Henly & Adams, 2018). Operational costs only increased during the COVID-19 pandemic due to limits on class size as well as increased expenses on staff and sanitation (Workman & Jessen-Howard, 2020).

In outlying neighborhoods, transportation may pose a significant demand-side barrier to child care use. Given their dispersed urban form, rural and many suburban destinations are most easily accessed by automobile. Consequently, there tends to be limited investment in other transportation modes—public transit, bicycling, walking (Henning-Smith, 2017). Just over seven percent of California households do not own automobiles (Ruggles et al., 2022). While most of these households live in urban areas, about 130,000 live in lower-density neighborhoods and are potentially isolated without a car.[8] Lower-income car owners can face transportation access barriers to child care. Many drivers in these households must compete with other household members for the use of a single household vehicle (Blumenberg et al., 2020) or, due to income constraints, may have to contend with older and potentially unreliable vehicles (Fletcher et al., 2010; Klein, 2020).

[7] The average racial percent of Census tracts with Head Start Centers is six percent Black, ten percent Asian, 25 percent Non-Hispanic white, and 55 percent Latinx compared to all tracts—five percent Black, 14 percent Asian, 37 percent Non-Hispanic white, and 39 percent Latinx.

[8] These are California neighborhoods in the bottom quintile in PUMA density according to the 2015–2019 ACS 5-year sample (Ruggles et al., 2022).

5. Conclusions

Child care access varies across neighborhood types controlling for socioeconomic and employment characteristics, suggesting spatial barriers to child care provision and use. The supply- and demand-side issues suggest the importance of policies to better support both child care centers and low-income families, particularly in outlying neighborhoods.

The Child Care and Development Fund (CCDF) is the primary source of federal funding for subsidized child care. During the COVID-19 pandemic, President Biden signed into law a series of economic relief bills that provided the states with additional one-time child care funding of which California received more than $5 billion (Schumacher, 2022). These funds were used to increase the number of families who receive subsidized care (e.g., emergency child care for essential workers and subsidized spaces for low-income families) and to support providers (e.g., stipends and rate increases). California has allocated additional state revenue to child care (Office of Governor Gavin Newsom, 2021). While significant, these one-time federal and state allocations remain far short of the need (Schumacher, 2022).

Our research suggests the need for policies targeted to centers and families located in outlying areas. To address geographic variation in the costs of providing care, states should allocate child care subsidies based on the true costs of providing care rather than based on market rate surveys mandated by the Child Care and Development Block Grant Act of 2014. The prices that centers charge families are substantially lower than the true costs of providing quality child care that meets regulatory health and safety standards (Bipartisan Policy Center, 2021). Centers typically set their rates based on what families can afford to pay and the rates charged by nearby centers, finding other sources of revenue to cover their remaining costs (Bipartisan Policy Center, 2021). Research on child care centers in rural areas suggests that the costs to provide care in small family centers in outlying neighborhoods is likely higher than in larger urban child care centers due to the significant fixed costs of running a center and the inability to benefit from economies of scale as well as the need to provide transportation services (Henly & Adams, 2018).

Further, family child care centers—prevalent in outlying areas of the state—are small businesses that could benefit from enhanced assistance. This might include help with licensing requirements, professional development and training, and other business support (e.g., technical assistance and community lending) (Bipartisan Policy Center, 2021).

Child care centers, even those subsidized by the federal government, are not required to provide transportation (Carr et al., 2022). Studies show a relationship between transportation and a number of important outcomes, including service use (Arcury et al., 2005; Klein, 2020; Wolfe et al., 2020), underscoring the importance of enhancing transportation in outlying communities. These interventions might include: subsidized auto ownership and carsharing programs (Williams, 2020), approaches currently being tested outside of California urban areas (Turner & Colgan, 2021; Williams, 2020); the redeployment of vehicles across existing programs; and the expansion of new technology-based services such as ride-hailing for young children (Haller, 2019).

There are sound economic reasons for pursuing these policies. Increased child care funding combined with targeted programs to meet the needs of providers and families located outside of dense urban neighborhoods will improve child care access and address a major barrier to labor force participation and earnings growth, particularly among women with children. Additionally, more robust and equitable care infrastructure can enhance the U.S. economy, which currently faces a substantial labor shortage (Ferguson, 2023; Horrigan et al., 2022).

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.apgeog.2023.103054.

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