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# The Importance of CalFresh and CalWORKs in the Lives of Young Children

## Technical Appendices

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# Appendix A. Data

## Data sources

Our data on CalFresh and CalWORKs participation come from the SNAP and TANF Longitudinal Data Bases (LDBs), which are produced by the California Department of Social Services (CDSS) from the Medi-Cal Eligibility Data System (MEDS).<sup>1</sup> MEDS is a Department of Health Care Services data hub for storing Medi-Cal, CalFresh, and CalWORKs eligibility histories. Throughout, we use data spanning 2005-2018. In this report, we use two components of each LDB:

1. The eligibility file, which contains individual-level records of program receipt by month. Each eligibility file is a statewide, month-by-month, individual-level record of SNAP or TANF receipt, and allows us to track children from the month of their birth up until the month they turn 6.
2. The case number file, which contains individual-level records of case numbers by time period. For CalFresh, the case number file provides records each month; for CalWORKs, case numbers provided reflect participation within the quarter. Case records link individuals to other members of cases, which we use to identify key case characteristics for the children in our analysis. These we discuss in more detail below.

In our analysis, we use several additional external data sources. In order to construct county-level population denominators, we use county/year live birth totals publicly available from the CDC WONDER Online Database, Single Year of Age County Population Estimates from the Surveillance, Epidemiology, and End Results Program (SEER), California Department of Finance (DOF) Annual Intercensal Population Estimates (2005-10) and P-3 State and County Projections (2010-18), and American Community Survey (ACS) microdata prepared by IPUMS-USA (Ruggles, et al. 2020). For the regression analyses, county-level unemployment data are drawn from unadjusted monthly unemployment rates produced by the California Employment Development Department (EDD).

**TABLE A1**  
Data sources

	Description
SNAP	California Department of Social Services SNAP Longitudinal Data Base (LDB), 2005-2018
TANF	California Department of Social Services TANF Longitudinal Data Base (LDB), 2005-2018
Population	CDC WONDER Online Database, public-use natality statistics
	American Community Survey (ACS)
	Surveillance, Epidemiology, and End Results Program (SEER)
	California Department of Finance (DOF) Annual Intercensal Population Estimates (2005-10) and P-3 State and County Projections (2010-18)
Economy	Employment Development Department (EDD) county unemployment rates

## Preparation of the analysis dataset

### Birth dates

Substantial overlap in participation between CalFresh and CalWORKs allows us to compare reported birth dates for many participants, and omit observations with conflicting dates. From a technical standpoint, differences likely arise because the SNAP and TANF LDBs are both updated regularly, but *separately*, using the most recent

<sup>1</sup> TANF indicates the Temporary Assistance for Needy Families program and SNAP indicates the Supplemental Nutrition Assistance Program. They are the federal names for CalWORKs and CalFresh, respectively.

data on participants from MEDS. For example, a birth date could potentially be saved differently across the two LDBs if a child participated in one program several years before beginning participation in the other, and a different birth date was reported for each program. In sum, each LDB reports only one birth date per individual, and there is no record of whether the birth date has been updated.

We also drop a small number of individuals flagged as participating in a program prior to their reported birth date, which are administrative errors either in birth date or records of participation.<sup>2</sup> For children born in 2012, for example, this translates to omitting 0.03% of all CalFresh recipients, and 0.06% of CalWORKs. Table A2 shows the results of birth-date cleaning for children born in 2005 and 2012.

**TABLE A2**

Results of data cleaning for cohorts of children born in 2005 and 2012

		2005	2012
CalFresh	Raw N	306,594	271,744
	N eligible before DOB	65	<30
	N with conflicting DOBs	327	63
	total N excluded	383	79
	% excluded	0.12%	0.03%
CalWORKs	Raw N	192,016	149,094
	N eligible before DOB	96	<30
	N with conflicting DOBs	368	75
	total N excluded	454	90
	% excluded	0.24%	0.06%

SOURCES: Authors' calculations from SNAP and TANF LDBs.

NOTES: "Eligible before DOB" describes children who are flagged as eligible in months preceding their recorded dates of birth. "Conflicting DOBs" describes children who participate in both CalFresh and CalWORKs, and whose dates of birth are recorded as different in the SNAP and TANF LDBs.

Finally, we drop from our analysis dataset observations for children whose most common cases include members whose birth dates appear in both SNAP and TANF LDBs with differences that make it impossible to determine whether they were children or adults at any point when the case was active. For the 2012 cohort, this results in dropping an additional 359 CalFresh participants, and 873 CalWORKs participants. Although dropping observations with conflicting birth dates improves the accuracy of our analysis sample, there could be other participants with errors in their birth dates.

## Race/ethnicity and language of case materials

MEDS data provide two pieces of demographic information: race/ethnicity reported by client or case worker, and language in which written communications from the state and county are provided. In our analysis, we regularly aggregate to simplified race/ethnic and language categories in order to protect individual privacy, and to simplify output. Throughout, we group together children with ethnicity "Latino," regardless of race.

As with birth dates, there are some children present in both SNAP and TANF LDBs whose responses for race/ethnicity differ. These differences could result from technical reasons, like differences in birth date responses, or from personal choices in the response process. There is no record of whether and/or if race/ethnicity responses have changed over time, and each LDB has only one response for race/ethnicity per participant. Again,

<sup>2</sup> While some children benefit from their mothers participating in CalFresh or CalWORKs during pregnancy, this is identifiable only by the mother's record, not the child's.

as with birth dates, seeing differences in race/ethnicity responses between the two LDBs suggests that some share of people who only ever show up in a single LDB have responses that would change, given more information.

We also note that the share of children with no response for race/ethnicity grew over our data window, particularly in rural counties, reaching a high of 5.8% of all children in the 2012 birth-year cohort. To avoid omitting these children, and to resolve discrepancies between the LDBs, we flag a single race/ethnicity response for each child in our universe using the following steps:

1. For children in both SNAP and TANF LDBs,
  - a. Update race/ethnicity if response is missing in one file and present in the other
  - b. Recode race/ethnicity as multiracial/other if response is present in both files but different
2. For children still missing a race/ethnicity response, including those present in one LDB only,
  - c. For children whose most common case includes other people,
    - i. Update race/ethnicity to match that of the oldest person with a race/ethnicity response on the child's most common case
3. Repeat step 1, providing updates for children who are present in both LDBs
4. Drop children still missing any response for race/ethnicity

This method results in dropping less than 1% of children from our universe (about 1,800, for the 2012 cohort). Table A3 shows the distribution of children born in in 2012 who participated in CalFresh and CalWORKs through age 5, across detailed and aggregated race/ethnic categories.

**TABLE A3**

Race/ethnic distribution of children born in 2012 who ever participated in CalFresh or CalWORKs through age 5

Aggregate category	Detailed category	CalFresh		CalWORKs	
Latino	Latino	162,952	58.5%	85,076	54.3%
White	White	46,029	15.9%	21,322	17.3%
Black	Black	27,176	9.5%	5,876	14.5%
Multiracial and other		16,983	6.4%	7,227	5.6%
	Multiracial and other	15,950	4.6%	6,727	4.3%
	Alaskan native/American Indian	1,033	0.4%	500	0.4%
Asian American/Pacific Islander		13,062	4.2%	5,139	3.1%
	Asian American/Pacific Islander, and Amerasian	3,367	1.2%	2,006	1.2%
	Vietnamese	2,712	1.0%	2,105	0.4%
	Filipino	2,112	0.8%	1,381	0.5%
	Chinese	1,797	0.7%	1,457	0.2%
	Cambodian	824	0.3%	397	0.3%
	Asian Indian	762	0.3%	504	0.2%
	Samoan	602	0.2%	210	0.3%
	Laotian	566	0.2%	294	0.2%
	Korean	380	0.1%	301	0.2%
	Hawaiian	348	0.1%	176	0.1%
	Guamanian	104	0.0%	54	0.1%
	Japanese	71	0.0%	41	0.1%

SOURCES: Authors' calculations from 2012–2018 SNAP and TANF LDBs.

NOTES: Table shows children in race/ethnic categories based on responses from each LDB, reconciled to differences between the two. Asian American/Pacific Islander describes a broad race/ethnic category, but is also a detailed response recorded in the SNAP and TANF LDBs that does not overlap with other detailed responses. In this table, we group Amerasian with the detailed Asian American/Pacific Islander response to protect privacy. Throughout the report, we use "multiracial and other" to describe children whose race/ethnic response is Alaskan Native/American Indian, other, or differs between SNAP and TANF LDBs. In this table, we show statistics for Alaskan

Native/American Indian children separately; we are unable to provide additional detail on the remaining children in the category. Overall groups shown ordered by size of CalFresh population, in descending order.

We do less cleaning of the language records; while children can and do have different responses in SNAP and TANF LDBs, the variable records an event as much as a demographic fact, and differences may be legitimate. Table 4 shows the distribution of children born in 2012 who participate in CalFresh or CalWORKs through age 5, by language in which their families receive case materials. Since 2005, the share of children in families receiving case materials in English has increased, from 63.2% for CalFresh and 71.4% for CalWORKs. In regression analyses shown in the report we collapse the language variation to English/non-English CalFresh case materials to capture potential language barriers that families may face.

**TABLE A4**

Families of more than 95% of children born in 2012 received CalFresh or CalWORKs case materials in English or Spanish

	CalFresh	CalWORKs
English	70.6%	79.5%
Spanish	26.2%	17.7%
Southeast Asian languages	1.1%	0.6%
Middle Eastern languages	0.8%	1.1%
East Asian languages	0.6%	0.2%
Sign language, Samoan, and other	0.5%	0.6%
European & Russian languages	0.3%	0.3%
Missing	0.03%	0.03%

SOURCES: Authors’ calculations from 2012–2018 SNAP and TANF LDBs.

NOTES: Table shows language in which children’s families received case materials. East Asian languages groups: Cantonese, Japanese, Korean, Mandarin, and Other Chinese. Southeast Asian languages groups: Cambodian, Hmong, Ilocano, Lao, Mien, Thai, and Vietnamese. Middle Eastern languages groups: Arabic, Armenian, Farsi, Hebrew, Turkish. European and Russian languages groups: French, Italian, Polish, Portuguese, and Russian. Sign languages, Samoan, and other groups: Samoan, Sign Languages, and Other non-English. Groups shown in order of size of CalFresh population, with missing responses last.

## Case characteristics

Cases can change over the course of children’s lives; families may move counties, meaning they will start a new case, family members may leave the household or be removed from a case, and children can move into new households themselves. When discussing the county in which a child participates in CalFresh or CalWORKs (see Table C7), or the number of siblings in their case, we refer to the modal, or most common, case that a child has through age 5.

The modal case is specific to the case number, unique person IDs, and adult/child status of each person on the case. In other words, a child’s modal case is the case number on which they spent the most months of early childhood with the same family members, when those family members were adults or children. If an aided family member turned 18 during a given spell, the child’s modal case would depend on whether they spent more months aided when the family member was over or under 18. Within each modal case, we then flag additional children as either older or younger siblings to the child in the analysis cohort (see Table A6 below).

Overall, less than one in four children have multiple cases for either CalFresh or CalWORKs (Table A5). Multiple cases occurred less often for Asian American/Pacific Islander children in the 2012 cohort (85 to 87% had a single case), and more often for African American children (69 to 75% had a single case).

**TABLE A5**

Share of children in each race/ethnic group in 2012 cohort with a single case through age 5

	CalFresh	CalWORKs
Overall	76.6%	81.1%
Latino	77.1%	82.8%
White	77.3%	79.1%
Black	68.5%	75.1%
Multiracial and other	76.7%	83.9%
Asian American/Pacific Islander	85.1%	86.8%

SOURCES: Authors' calculations from 2012–2018 SNAP and TANF LDBs.

NOTES: Groups shown ordered by size of CalFresh population, in descending order.

Tables A6 shows the share of children in the 2012 birth cohort with siblings on their modal case.

**TABLE A6**

Share of children in each race/ethnic group with siblings on their modal case (children born in 2012)

	CalFresh			CalWORKs		
	Any older siblings	Any younger siblings	Any siblings	Any older siblings	Any younger siblings	Any siblings
Overall	62.5%	21.7%	73.8%	59.8%	18.4%	69.0%
Latino	67.0%	22.0%	77.7%	65.0%	19.2%	73.8%
White	53.9%	20.6%	66.1%	50.7%	16.7%	60.9%
Black	54.8%	18.8%	65.1%	53.5%	15.5%	61.7%
Asian American/Pacific Islander	58.3%	21.8%	71.6%	57.0%	19.8%	67.2%
Other	58.1%	26.4%	71.9%	56.6%	21.4%	67.4%

SOURCES: Authors' calculations from 2012–2018 SNAP and TANF LDBs.

NOTES: Groups shown ordered by size of CalFresh population, in descending order.

When discussing whether children have any adults in their case, we switch to a longitudinal measure, differentiating between children who are in cases in which adults are also members, versus cases in which adults are never members. According to quality control sample data, which are monthly snapshots of the caseload, 24% of cases with children ages 0–5 have no adult on the case. The principal reason for a child-only case in the CalFresh program is due to adults' immigration status (22%, Figure A1).<sup>3</sup> The other main reason for no adult on the case is due to adults' SSI receipt, but this makes up only 2 percent of cases.<sup>4</sup> However, 9 percent of cases with young children are in households that have both aided adults *and* adult(s) who are ineligible due to immigration status. Thus the mixed immigration status flag we create has limitations both in the sense that it is over-inclusive to a small extent, but also in that it misses about 31 percent of CalFresh cases in households that include at least one unauthorized immigrant. Unfortunately, the LDBs lack information about household members who are not members of the CalFresh case, so

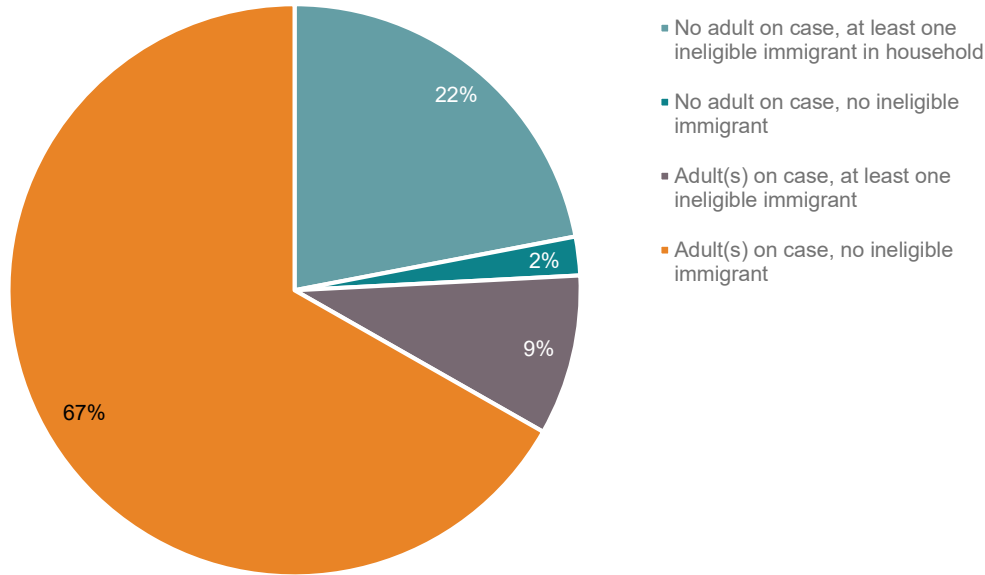
<sup>3</sup> In contrast, child-only CalWORKs cases are the result of several different CalWORKs program requirements, along with adults' immigration status. In particular, child-only cases occur when parents are sanctioned for non-compliance with work requirements and when they reach the lifetime time limit.

<sup>4</sup> The 2019 end of California's SSI cashout policy means that these child-only CalFresh cases should no longer occur.

we do not capture this subset of children who are living both with an unauthorized parent and with CalFresh-eligible adult(s).

**FIGURE A1**

Household composition of SNAP cases with at least one child age 0–5



SOURCES: Authors’ calculations from the FFY 2015–2018 SNAP RADEP.

**TABLE A7**

Share of children in each language group who are always in child-only cases (children born in 2012)

	CalFresh		CalWORKs	
	%	N	%	N
Overall	18.9	50,315	24.5	35,314
English	4.5	8,482	15.2	17,423
Spanish	58.6	41,017	68.6	17,475
Southeast Asian languages	20.9	349	14.9	41
Middle Eastern languages	9.5	282	18.9	163
East Asian languages	2.4	50	3.7	60
Sign languages, Samoan, and other	8.2	101	12.5	105
European & Russian languages	5.1	34	12.1	47

SOURCES: Authors’ calculations from 2012–2018 SNAP and TANF LDBs.

NOTES: Table omits <100 children missing responses for language of case materials. Left hand column shows the share of all children in the language group that are in child-only cases and the right hand column shows the number of children in the numerator of that ratio. Groups shown ordered by size of overall CalFresh population, in descending order

# Appendix B. Methodology

## Metrics

### Share of children who ever access CalFresh and CalWORKs

#### Children “ever in” California

One key goal of our research is to estimate the share of California children who participate in CalFresh and CalWORKs through age 5. We define the share of children in a birth year cohort who participate in a program through age 5 as the ratio between the total number of children born in a year with any months of benefit receipt before the month of their 6th birthday and the estimated number children born in that year who ever live in California before age 6.

Benefit receipt (the numerator) is well-defined: as discussed in Appendix A, it is drawn from the eligibility files of the California Department of Social Services longitudinal administrative records. However, developing the appropriate denominator is not straightforward. The total number of children receiving benefits before age 6 includes those who are born and live in California for the full 72 months prior to their 6th birthdays, as well as those who live in California for only part of those 72 months. Therefore, the denominator should include children who lived in California through age 5 for any period of time. If we instead use simply the number of children born in California, then we will overestimate the share of children who ever participated in these programs. The same is true if we use the number of children in California at age 5—because this represents the net number of children in California (e.g., after moves into and out of the state). Instead, we use a combination of data sources to provide our best estimate of the number of children who are “ever in” California between birth and turning age 6.

**“Ever in” population denominators for all children.** To avoid overestimating the share of children who participate in programs by using population denominators that exclude children not born in-state, we use the following method to estimate the total number of children born in a year who ever live in California through age 5 (“ever ins”):<sup>5</sup>

1. Start with total number of live births in California for each birth-year cohort, as reported in the Centers for Disease Control and Prevention (CDC) WONDER Online Database.
2. Estimate number of children in birth-year cohort living in California at age 5.
  - a. Calculate percent change in cohort population between ages 0 and 5, using Single Year of Age County Population Estimates from the Surveillance, Epidemiology, and End Results Program (SEER).
  - b. Adjust cohort size in year of birth by factor created in step 2a.
3. Estimate number of children in birth-year cohort living in California at age 5, who were born out of state.
  - a. Calculate percent of children in cohort at age 5 born out of state, using ACS microdata prepared by IPUMS-USA (Ruggles, et al. 2020).
  - b. Multiply estimated cohort population size at age 5 (step 2) by factor created in step 3a.
4. Add number of children born in California in cohort birth year (step 1) to estimated additional number in California at age 5 but born out of state (step 3).

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<sup>5</sup> Using American Community Survey (ACS) data, we estimate that about 10% of 5-year-olds in California were born elsewhere.



This approach has the benefit of being the simplest means of reaching an estimate close to what a more detailed method would generate. Table B1 below shows results of testing the sensitivity of our estimates of CalFresh participation to using different data sources and approaches to building overall population denominators.

Our preferred estimate is shown in the rightmost column (shaded cell), and relies as much as possible on administrative data sources. SEER estimates are based on inter- and post-censal population estimates from the National Center for Health Statistics and the US Census Bureau, and are an ideal complement to CDC natality data as they regularly used by the CDC to calculate birth and death rates. Across the rows of the final column of the table, this combination of data sources also produces the largest denominator and thus the most conservative estimate of children’s participation in CalFresh and CalWORKs.

**TABLE B1**  
Sensitivity analysis of statewide participation by children born in 2012, using different population denominators

Data sources			Estimates		
Birth-year cohort size (step 1)	Population trend (step 2a)	Born out-of-state adjustment (step 3a)	Birth cohort size at age 0 (step 1 only)	Cohort adjusted each age	Cohort adjusted at age 5 only
ACS	ACS	ACS	57.5%	51.7%	52.4%
SEER	SEER	ACS	54.2%	48.8%	49.4%
CDC	ACS	ACS	53.4%	48.0%	48.7%
CDC	SEER	ACS	53.4%	48.1%	48.7%

SOURCE: Authors’ analysis of IPUMS-ACS, SEER, and CDC data (2012-2018).

NOTE: The preferred estimate shown in the report is highlighted in grey.

The adjustments make a meaningful difference. Without adjusting for in-migration—in other words, using the cohort population in birth year as the denominator—we estimate more than half of children participating in CalFresh through age 5 (left hand column of estimates, 53.4% - 57.5%). Adjusting for in-migration using our preferred method (rightmost column) results in estimates of ever participation that are lower by about 5 percentage points (48.7% - 52.4%). We also show a more detailed method (middle column). This method repeats steps 2 through 4 above for each age from 0 to 5, summing the estimated number of children in California at each age but born elsewhere, and out of state in the previous year. However, this more detailed method generates estimates within a percentage point our preferred estimates, which adjusts for in-migration only at age 5.

**“Ever in” population denominators for children by race/ethnicity.** SEER data present racial/ethnic population estimates in bridged race categories, which rely on regression analysis to reassign multiracial and other children to the single-race category they would most likely report—but which do not match responses in the SNAP and TANF LDBs.<sup>6</sup>

To estimate program participation at the race/ethnic group level, we therefore add two additional ACS adjustment factors to our method above: estimated distribution of cohort population by race/ethnic group at age 0 and estimated distribution at age 5. Applying these at steps 1 and 2 allows us to complete step 3 and use ACS data to adjust for migration at the race/ethnic group level. Small single-age sample sizes in the ACS prevent us from adjusting for migration at age 5 alone, and so we replace step 3a with share of children in cohort at ages 0

<sup>6</sup> For more information, see [U.S. Census Populations with Bridged Race Categories](#) from the National Vital Statistics System.

through 5 born out of state. Table B2 shows the results of this process for CalFresh participation by children born in 2012, in the shaded cells.

Although we present in the report the estimates of participation by race/ethnicity using the data that are most consistent with our overall participation estimates, small ACS sample sizes raise the concern of the sensitivity of our estimates for race/ethnic groups with small populations. Therefore, Table B2 also shows estimates where we use the race/ethnic distribution of the cohort at ages 0 and 5 from California Department of Finance (DOF) population estimates instead of the ACS to generate adjustment factors. These estimates show the extent to which our preferred method is sensitive to differences in estimation of the race/ethnic distribution of the population.

The result is somewhat lower estimates of participation for Asian American/Pacific Islander, African American, and white children (by 3 to 6 percentage points), but larger estimates of participation for Latino (by 8 percentage points) and markedly larger estimates for multiracial or other race children (by 20 percentage points). Note that multiracial or other race children make up a relatively small share of the overall child population, so a relatively small change in the denominator translates to a large change in the estimate of participation. In particular, in Table B2 the 11,000 child change in the denominator translates into a 20 percentage point change in estimated participation (47% to 67%). For context, the denominator for Asian American/Pacific Islander children changes by close to the same amount (9,000) across the two data sources, but the estimate changes by only 3 percentage points (23% to 20%). African American children also make up a small share of the overall child population, but the population estimates are quite consistent across the two sources.

**TABLE B2**

CalFresh participation of children born in 2012, by race/ethnic group

	Estimate based on CDC/ACS data		Estimate based on DOF data	
	% participating	Estimated cohort size (denominator)	% participating	Estimated cohort size (denominator)
Asian American/Pacific Islander	23%	59,000	20%	68,000
African American	95%	29,000	92%	30,000
Latino	58%	282,000	66%	249,000
Multiracial and other	47%	36,000	67%	25,000
White	33%	140,000	27%	171,000

SOURCE: Authors' analysis of IPUMS-ACS, SEER, CDC, and DOF data (2012-2018).

NOTE: Shaded cells highlight estimates shown in [main report](#).

In Table B3, we show results of additional sensitivity analyses that explore two possible lowest bounds for our estimates of participation, by generating the largest possible population denominators for each race/ethnic group. The first set of columns show denominators drawn from SEER data, which (as noted above) inflate group populations by reassigning all multiracial children to mutually exclusive other groups. Here, we do not adjust for migration, since we cannot replicate the bridged-race regressions in ACS data. Instead, we use the largest population that each race/ethnic group had during the 2012 birth-year cohort's ages 0 to 5. These estimates are therefore likely conservative in that they do not account for all migration, but in general too large—if we thought that all multiracial children with African American background were reported as African American in the SNAP and TANF LDBs, we would estimate that 86% of African American children participated in SNAP through age five. Note that this change results from a change in the population denominator of just 2,000 children.

The second set of columns use CDC and ACS data as in our preferred method, but inflate group populations by creating non-exclusive race/ethnic categories that encompass all children reporting a race alone or in combination in the population. We omit the estimate for Latino children because this is the method we use to group Latino children in our preferred method, and it offers no additional information here. Because we both allow children to be counted in multiple groups and adjust the population estimates upward for migration, this method results in a true floor rather than a likely range for our participation estimates. In other words, if no children who were African American and another race were recorded as multiracial, and no Afro-Latino children were recorded as Latino, we would estimate that 55% of African American children participated in SNAP by age six. Though there may be errors in MEDS race records, and differences in when Afro-Latino participants report their race/ethnicity as either African American or Latino, it is unlikely that everyone with mixed racial/ethnic backgrounds reports the same single race. Again, the large change in the participation estimate for African American children is in part driven by the relatively small number of African American children in the overall population: an increase of about 20,000 children in the denominator nearly halves the participation estimate.

Estimates for white and multiracial and other race children are dramatically lowered by using this method, because most Latino Californians report their race as either white or other, and the majority of children in California are Latino. For the multiracial and other category in particular, this results in a large increase in the population denominator relative to the small number of participants—and while the exercise is useful in terms of setting bounds, the new range for multiracial and other children of between 12% and 67% participating in CalFresh through age five is not useful in terms of a precise estimate. For this reason, we recommend interpreting any estimates for multiracial and other race children cautiously.

Finally, where these explorations provide further information, they support use of our preferred method. With regard to Latino children, whose participation we would estimate at 66% using DOF data, testing SEER data suggests that our estimate the 58% participate in CalFresh is likely on the conservative side by at least 4 percentage points.

**TABLE B3**

Sensitivity analysis of CalFresh participation of children born in 2012 by race/ethnic group

	Estimate based on SEER data		Estimate based on single-race CDC/ACS data	
	% participating	Estimated cohort size (denominator)	% participating	Estimated cohort size (denominator)
Asian American/Pacific Islander	22%	62,000	15%	92,000
African American	86%	31,000	55%	50,000
Latino	62%	261,000	n/a	n/a
Multiracial and other	n/a	n/a	12%	145,000
White	32%	146,000	13%	348,000

SOURCE: Authors' analysis of IPUMS-ACS, SEER and CDC data (2012-2018).

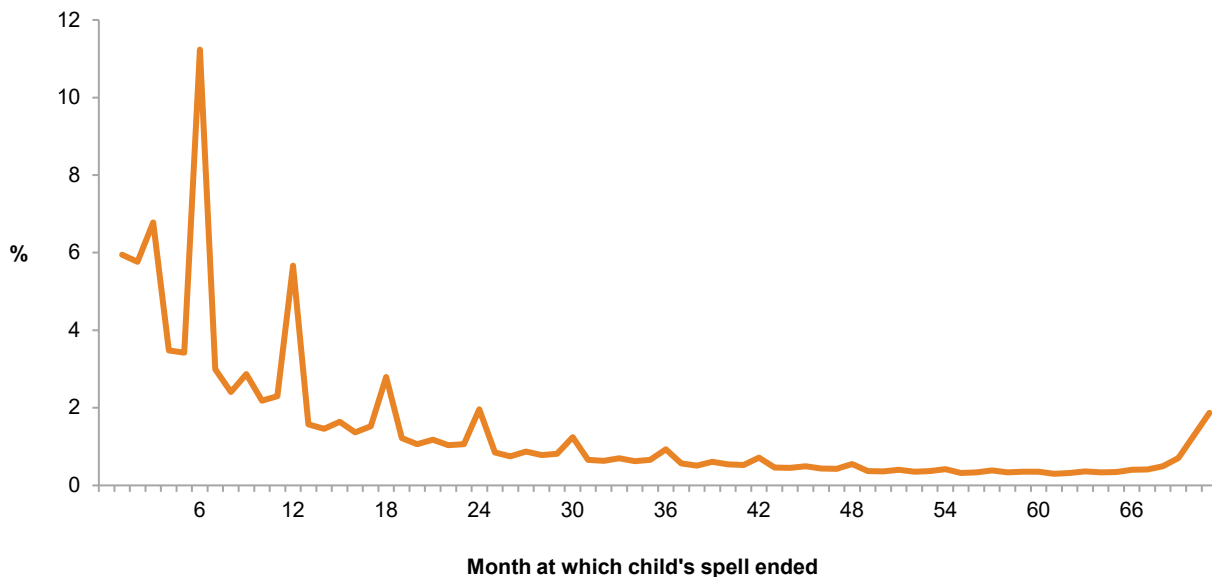
A final challenge is creating county- and race/ethnic group-level estimates for use in our regression analyses. For these, we turn to Annual Intercensal Population Estimates (2005-10) and P-3 State and County Projections (2010-18) from the DOF. In particular, in regression analyses that aggregate to birth-year-cohort/county/race-ethnic group cells (shown in Appendix C), we use as a denominator the maximum number of children in each county race/ethnic group by cohort because we are interested in inter-group differences rather than exact estimates of participation.

## Gaps in participation

Many children experience disruptions in program participation between spells of consecutive months of participation. Gaps in participation of 1 to 3 months can reflect administrative record errors, or real periods of non-participation, in which families are briefly ineligible for a program or experiencing delays at required reporting windows. In theory, we can distinguish between the latter two reasons for gaps by looking at whether they occur at reporting windows, or at other times. In practice, we look at participation from the child's perspective, and not all children join a case in its first month, when the timeline for reporting is established. The report therefore focuses on gaps that happen at any point in a child's young life. Since many children do experience spells of participation that end at likely reporting windows (Figure B1), we include regression models in Table C10 where the dependent variables distinguish between gaps that occur at possible reporting windows (+/- 1 month) and outside windows.

**FIGURE B1**

Children's spells on CalFresh are more likely to end at multiples of 6 months



SOURCE: Authors' analysis of SNAP LDB data, 2012-2018.

NOTE: Number of months of consecutive assistance assessed from the perspective of the child's first month participating in CalFresh, rather than the case's first month.

## Cumulative participation

We describe cumulative time spent participating in a program in terms of the total number of months or years for which children participate before the months of their sixth birthdays, after smoothing 1-month gaps. See Table C5 for detail on how cumulative years of participation has changed over time.

Smoothing 1-month gaps is consistent with other research and accounts for administrative error in reporting, and has little impact on the overall distribution of cumulative participation, and on our other key metrics of interest. We find that the median child born in 2012 who ever participated in both CalFresh and CalWORKs, for example, spent 47 months with CalFresh, with or without smoothing 1-month gaps in assistance. For children who just participated in CalFresh, smoothing 1-month gaps brings the median total number of months with CalFresh up from 20 to 21 months.

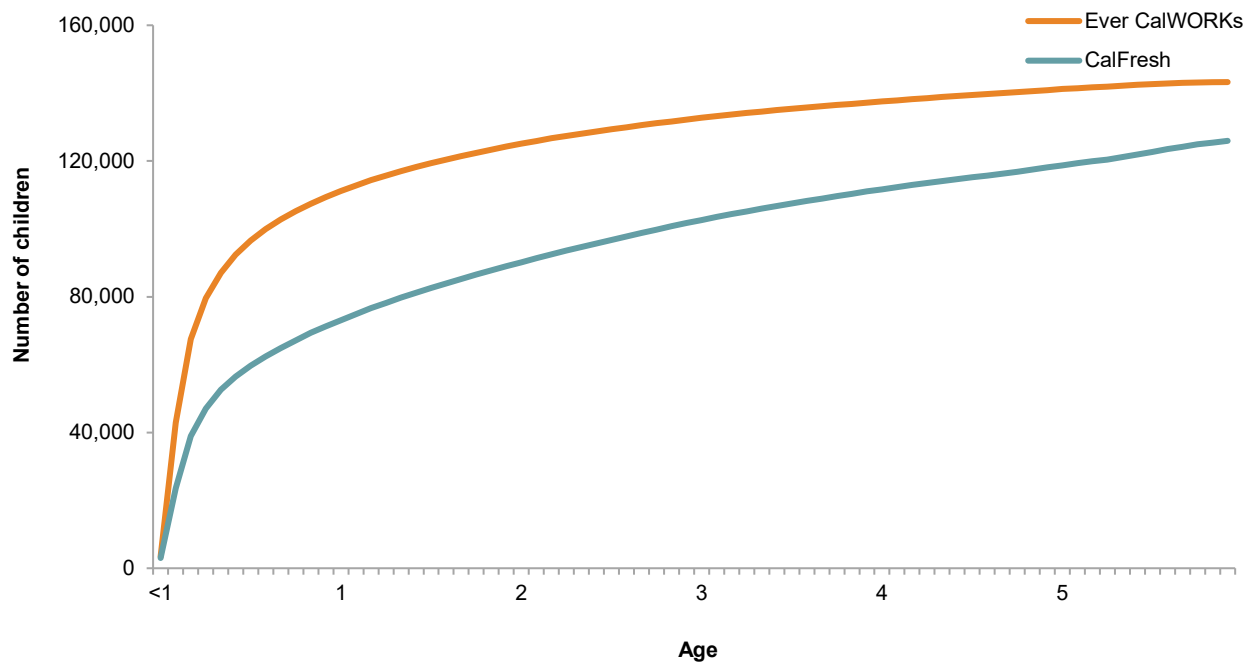
## Delayed participation

In our analysis, we refer to whether or not children first participate in CalFresh by age 5. Figure B1 shows the cumulative total of children born in 2012 who participate in programs by age 5 a greater share of children who only ever participated in CalFresh do so for the first time after their first year of life than children who participate in both CalFresh and CalWORKs through age 5. See Table C2 for additional detail.

Note that here, focusing on CalFresh participation, we omit about 3,000 children who are reported as only ever receiving CalWORKs. We continue with this practice throughout the report (see Table C1).

### FIGURE B2

Most children born in 2012 who participated in CalFresh by age 5 had already participated by age 1



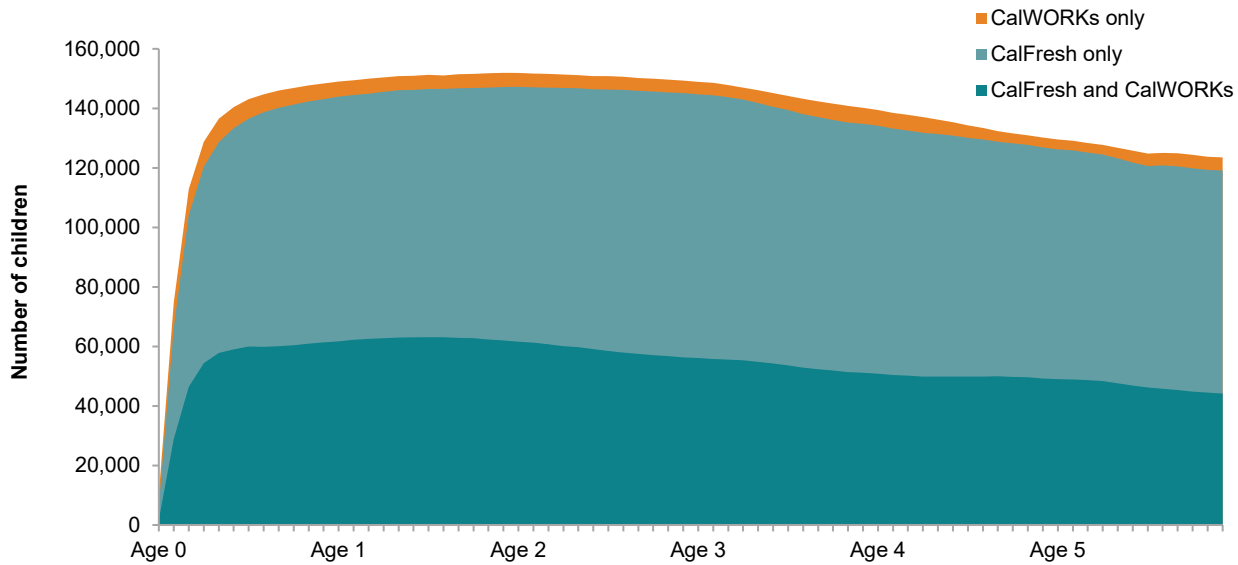
SOURCE: Authors' calculations from 2012-2018 SNAP and TANF LDBs.

NOTE: Chart shows cumulative number of children who ever accessed CalFresh, by age of first CalFresh participation. Some children who participated in CalWORKs did so for the first time before their first month of CalFresh participation.

These trends generally mirror overall monthly participation. Figure B2 shows monthly caseloads constructed from the 2012 birth cohort. In other words, this figure charts the ages at which participation is highest and lowest for children born in 2012 who ever participate in CalFresh or CalWORKs through age 5. As shown in Figure B2, the major change in participation happens early in life. Participation does trend downwards gradually from approximately age 2. After children's first several months of life, there is no particular month in which participation tends to peak – for example, at 12 months or 60 months, when WIC eligibility changes.

**FIGURE B3**

Monthly program participation for children born in 2012



SOURCE: Authors' analysis of SNAP LDB data, 2012-2018.

NOTE: While in most of our analysis "CalFresh and CalWORKs" indicates ever participating in CalWORKs, this figure shows simultaneous participation. Likewise, children shown here participating in CalFresh or CalWORKs alone may have participated in the other program at another point in young childhood.

## Unemployment rates

In regression models that include economic effects, we use one measure of depth of unemployment, and one of duration, both using county- and month-level data from the California Employment Development Department (EDD). To measure depth, we calculate the average county unemployment rate in the quarter of birth, where quarter is defined as birth month and the two months preceding. To measure duration, we calculate the number of months a child experienced a "high unemployment environment" based on their county and year and month of birth. We define the high unemployment environment using economist Claudia Sahn's indicator for defining recessionary periods, in which the 3-month moving average of the national unemployment rate rises 0.5 percentage points or more above its lowest point in the previous 12 months.<sup>7</sup> The period lasts for the longer of 12 months, or until the 3-month average unemployment rate falls to within 2 points of its pre-recession low. We apply this on a county level in our data; this approach finds the median child born in 2008 (e.g., at the start of the Great Recession) in California experienced 46 months of this high unemployment environment by age 6.

## Regression models

We employ two types of regression models. First, to summarize systematic differences across children and case characteristics, we use the 2012 cohort and several of the metrics described above as outcome variables. Covariates include race/ethnicity of child, modal case characteristics (whether any adults are on the case, the preferred language, and whether the case ever combined CalWORKs with CalFresh, and county) county of modal case, whether the case ever includes adults, preferred language, and whether the child ever participated in CalWORKs. Second, to assess changes over time during and after the last recession (the Great Recession of 2007–2009), we use 2005–2012 birth cohorts. These models are discussed in more detail in Appendix C.

<sup>7</sup> Sahn, Claudia. 2019. *Direct Stimulus Payments to Individuals*. The Brookings Institution.

## Appendix C. Detailed Tables

### Descriptive statistics

Tables C1 through C8 provide additional descriptive statistics that support Figures 1 and 4 through 9 and surrounding text in the [main report](#).

**TABLE C1**

Percent of children participating in programs ages 0–5, by year of sixth birthday

	All CalFresh	CalWORKs	CalFresh only
Turned 6 in	%	%	%
2011	40.0	18.4	21.6
2012	42.7	20.9	21.9
2013	46.0	23.4	22.6
2014	48.1	25.7	22.3
2015	50.0	27.9	22.2
2016	47.6	27.3	20.3
2017	48.8	26.9	21.9
2018	48.6	25.7	22.9

SOURCES: Author’s calculations from 2005–2018 SNAP LDB, 2005–2018 TANF LDB, 2005–2018 SEER Single Year of Age County Population Estimates, 2005–2012 CDC WONDER Natality Statistics, and 2005–2018 ACS data.

NOTES: Omits ~3,000 children in each cohort who are reported as participating in CalWORKs but not CalFresh, and ~1,000 in each cohort whose modal cases include invalid birth dates. See Appendix B for detailed methodology.

**TABLE C2**

Number of children born in 2005 and 2012 who participate in CalFresh ages 0–5, by age in months of first CalFresh or CalWORKs access

	CalFresh		CalWORKs	
	2005	2012	2005	2012
1 month	6,112 (2.6%)	6,459 (2.4%)	10,696 (7.1%)	5,258 (3.7%)
2 months	31,261 (13.1%)	59,992 (22.3%)	18,607 (12.3%)	31,485 (22.0%)
3 months	20,898 (8.8%)	40,031 (14.9%)	12,388 (8.2%)	19,176 (13.4%)
4-6 months	29,011 (12.2%)	42,365 (15.8%)	16,124 (10.7%)	20,333 (14.2%)
7-12 months	26,606 (11.2%)	31,812 (11.8%)	15,251 (10.1%)	15,891 (11.1%)
13-71 months	124,595 (52.2%)	87,999 (32.8%)	78,172 (51.7%)	50,754 (35.5%)

SOURCES: SNAP LDB 2005–2018, TANF LDB 2005–2018.

NOTES: CalFresh columns combine those who did and did not participate in CalWORKs before they turned 6. CalWORKs columns indicates age of first participation in that program (rather than age of first participation in CalFresh). Table omits ~3,000 children who participate only in CalWORKs by age 5.

**TABLE C3**

Typical spell lengths through age 5, 2005 and 2012 birth cohorts

	CalFresh		CalWORKs	
	2005	2012	2005	2012
Average spell length	20	21	17	18
Median spell length	12	12	10	11
90th percentile spell length	51	59	43	47

SOURCES: SNAP LDB 2005–2018, TANF LDB 2005–2018.

NOTES: Spell length calculated after smoothing 1-month gaps in participation.

**TABLE C4**

Number of CalFresh and CalWORKs spells through age 5

	CalFresh		CalWORKs	
	2005	2012	2005	2012
1 spell	147,111	152,013	94,286	90,287
2 spells	62,563	73,331	39,547	37,401
3 spells	22,426	30,529	15,719	13,580
4+ spells	7,902	13,332	7,513	4,960

SOURCES: SNAP LDB 2005–2018, TANF LDB 2005–2018.

NOTES: Number of spells ages 0–5 for cohorts born in 2005 and 2012, respectively. Number of spells of participation calculated after smoothing 1-month gaps in participation.

**TABLE C5**

Distribution of 2005 and 2012 birth-year cohorts, by years of participation by age 5

	CalFresh		CalWORKs	
	2005	2012	2005	2012
up to 1 year	29.1%	24.3%	33.5%	32.5%
1-2 years	18.4%	15.0%	19.3%	17.9%
2-3 years	14.5%	12.7%	14.8%	14.0%
3-4 years	11.6%	12.4%	12.0%	11.7%
4-5 years	10.8%	13.2%	9.3%	10.2%
5-6 years	15.8%	22.4%	11.1%	13.6%

SOURCES: SNAP LDB 2005–2018, TANF LDB 2005–2018.

NOTES: Years of participation calculated after smoothing 1-month gaps in participation.

**TABLE C6**

Geographic distribution of CalFresh and CalWORKs participation, for 2012 birth cohort

	CalFresh		CalWORKs	
	Number	% of total	Number	% of total
Alameda	7,442	2.8%	3,992	2.7%
Alpine	<30	*	<30	*
Amador	186	0.1%	107	0.1%
Butte	1,656	0.6%	922	0.6%



	CalFresh		CalWORKs	
	Number	% of total	Number	% of total
Calaveras	210	0.1%	112	0.1%
Colusa	138	0.1%	56	0.0%
Contra Costa	4,665	1.7%	2,474	1.7%
Del Norte	286	0.1%	206	0.1%
El Dorado	701	0.3%	331	0.2%
Fresno	13,731	5.1%	7,266	5.0%
Glenn	256	0.1%	144	0.1%
Humboldt	1,000	0.4%	479	0.3%
Imperial	2,358	0.9%	1,376	0.9%
Inyo	126	0.05%	42	0.03%
Kern	11,231	4.2%	6,629	4.6%
Kings	1,686	0.6%	962	0.7%
Lake	735	0.3%	365	0.3%
Lassen	195	0.1%	143	0.1%
Los Angeles	68,449	25.4%	41,001	28.2%
Madera	1,953	0.7%	1,048	0.7%
Marin	625	0.2%	219	0.2%
Mariposa	101	0.04%	63	0.04%
Mendocino	860	0.3%	433	0.3%
Merced	3,631	1.3%	2,441	1.7%
Modoc	67	0.02%	41	0.03%
Mono	53	0.0%	<30	*
Monterey	4,204	1.6%	2,124	1.5%
Napa	568	0.2%	198	0.1%
Nevada	446	0.2%	201	0.1%
Orange	16,076	6.0%	5,807	4.0%
Placer	1,133	0.4%	491	0.3%
Plumas	113	0.04%	62	0.04%
Riverside	17,778	6.6%	9,555	6.6%
Sacramento	12,961	4.8%	8,606	5.9%
San Benito	408	0.2%	181	0.1%
San Bernardino	21,428	8.0%	13,150	9.0%
San Diego	17,705	6.6%	7,713	5.3%
San Francisco	2,704	1.0%	1,151	0.8%
San Joaquin	7,392	2.7%	4,670	3.2%
San Luis Obispo	1,173	0.4%	583	0.4%
San Mateo	2,340	0.9%	572	0.4%
Santa Barbara	3,173	1.2%	1,392	1.0%
Santa Clara	7,160	2.7%	3,009	2.1%

	CalFresh		CalWORKs	
	Number	% of total	Number	% of total
Santa Cruz	1,552	0.6%	537	0.4%
Shasta	1,462	0.5%	859	0.6%
Sierra	<30	*	<30	*
Siskiyou	373	0.1%	253	0.2%
Solano	2,548	0.9%	1,428	1.0%
Sonoma	2,254	0.8%	782	0.5%
Stanislaus	5,696	2.1%	3,086	2.1%
Sutter	782	0.3%	463	0.3%
Tehama	640	0.2%	404	0.3%
Trinity	97	0.04%	45	0.03%
Tulare	7,641	2.8%	4,257	2.9%
Tuolumne	280	0.1%	170	0.1%
Ventura	4,868	1.8%	1,771	1.2%
Yolo	1,175	0.4%	534	0.4%
Yuba	713	0.3%	463	0.3%

SOURCES: SNAP LDB 2012–2018, TANF LDB 2012–2018.

NOTES: Table shows distribution of children born in 2012 who ever participated in CalFresh or CalWORKs by age 5, by county of modal case, and omits <1,000 children whose modal cases include invalid birth dates. See Appendix A for more details.

**TABLE C7**

Case characteristics of children born in 2012 who participated in CalFresh by age 5

	Adults on case				No adults on case			
	English case materials		Not English case materials		English case materials		Not English case materials	
	CalFresh only	Ever CalWORKs	CalFresh only	Ever CalWORKs	CalFresh only	Ever CalWORKs	CalFresh only	Ever CalWORKs
<b>% of race/ethnic group</b>								
Latino	23%	32%	10%	7%	2%	2%	16%	8%
White	40%	51%	2%	2%	1%	1%	2%	1%
Black	19%	77%	0.3%	1%	1%	3%	*	*
Multiracial and other	33%	45%	6%	12%	1%	1%	2%	1%
Asian American/Pacific Islander	36%	27%	21%	7%	2%	1%	5%	1%
<b>% of cohort</b>								
Latino	14%	20%	6%	4%	1%	1%	10%	5%
White	7%	9%	0.3%	0.4%	0.1%	0.2%	0.3%	0.2%
Black	2%	8%	0.03%	0.1%	0.1%	0.3%	*	*
Multiracial and other	2%	3%	0.4%	1%	0.1%	0.1%	0.1%	0.1%
Asian American/Pacific Islander	2%	1%	1%	0.4%	0.1%	0.1%	0.2%	0.04%

SOURCE: SNAP LDB 2012–2018, TANF LDB 2012–2018.

NOTE: Asterisks denote fewer than 30 people in cell. Table omits <1,000 children whose modal cases include invalid birth dates. See Appendix A for more details.

**TABLE C8**

Summary statistics on CalFresh participation for detailed race and ethnic groups, for children born in 2012

Detailed category	% always child-only	% with case materials not in English	% with CalWORKs	Avg. total years participating	Avg. age of first participation (mos)	% with any 1-3 mo. gaps	% not participating in first 3 months of life	% with prebirth case
							Of children who participate by age 1:	
Latino	27.7%	41.2%	49.0%	3.1	13	35.6%	41.3%	67.2%
White	4.6%	7.0%	55.6%	2.5	16	32.6%	38.6%	66.0%
Black	3.5%	1.0%	80.2%	3.3	12	35.8%	34.3%	70.6%
Multiracial and other	5.0%	20.5%	59.0%	2.7	18	31.4%	38.1%	69.0%
Multiracial and other	5.1%	21.6%	59.7%	2.7	6	31.2%	96.3%	38.0%
Alaskan native/American Indian	2.8%	1.5%	53.0%	2.8	8	35.0%	96.2%	39.1%
Asian American/Pacific Islander	8.9%	33.5%	35.8%	2.4	18	26.0%	37.9%	58.2%
Asian American/Pacific Islander, and Amerasian	8.4%	20.2%	42.1%	2.2	18	24.8%	34.7%	61.8%
Vietnamese	9.0%	67.3%	22.9%	2.7	19	22.7%	35.1%	60.9%
Filipino	6.8%	9.6%	36.4%	2.0	21	27.4%	45.1%	48.6%
Chinese	16.4%	75.2%	19.0%	2.5	19	24.6%	39.0%	46.9%
Cambodian	2.1%	14.4%	52.7%	3.1	12	25.8%	34.3%	69.0%
Asian Indian	5.5%	15.4%	35.0%	2.3	22	30.9%	41.5%	56.9%
Samoan	3.3%	1.8%	66.6%	2.7	15	35.7%	41.2%	62.1%
Laotian	1.1%	11.5%	49.2%	3.1	12	31.7%	30.4%	73.8%
Korean	24.2%	36.8%	21.1%	2.0	27	20.5%	51.9%	35.1%
Hawaiian	17.0%	18.4%	50.0%	2.4	14	26.4%	46.3%	55.0%
Guamanian	4.8%	6.7%	48.1%	2.2	20	33.7%	48.0%	50.0%
Japanese	12.7%	7.0%	42.3%	1.7	23	28.2%	40.0%	60.0%

SOURCES: Authors' analysis of SNAP and TANF LDBs, 2012–2018.

NOTES: See Table A3 for population totals. "Pre-birth case" defined as when child's first case number is active in any of the 3 months preceding their birth month. Asian American/Pacific Islander describes a broad race/ethnic category, but is also a detailed response recorded in the SNAP and TANF LDBs that does not overlap with other detailed responses. In this table, we group Amerasian with the detailed Asian American/Pacific Islander response to protect privacy. Throughout the report, we use "multiracial and other" to describe children whose race/ethnic response is Alaskan Native/American Indian, other, or differs between SNAP and TANF LDBs. In this table, we show statistics for Alaskan Native/American Indian children separately; we are unable to provide additional detail on the remaining children in the category. Overall groups shown ordered by size of CalFresh population, in descending order.

## 2012 cohort regression models

Tables C9 through C11 provide estimates from regression models using data from the 2012 cohort. They show correlations between participant children’s characteristics and three outcomes:

- Share of the 2012 cohort ever participating in CalFresh only or CalFresh and CalWORKs (aggregated at the county-level),
- Whether a child participated in their first 3 months, given participation in the first 12 months, and
- Whether a child had any 1-3 month gaps between spells of participation.

Columns 3 and 6 in Tables C10 and column 3 in Table C11 show our preferred estimates, which are discussed in the text and footnotes of the report. Estimates discussed in the report are translated into percentages by dividing coefficients by the mean of the dependent variable. Preferred estimates include county dummies and interactions between CalWORKs participation and individual and case characteristics. Columns 7 and 8 of Table C10 show estimates from a sensitivity analysis, where we focus on non-participation in the first month of life, and columns 4 and 5 of Table C11 show estimates for brief gaps that occur within a month of required semi-annual reporting versus gaps the occur farther from semi-annual reports.

**TABLE C9**

Share of 2012 birth cohort ever participating in CalFresh by age 6, given differences in county-level demographics

	(1)	(2)	(1)	(2)
	Participation in CalFresh only		Participation in CalFresh and CalWORKs	
Unemployment rate (avg)		-0.44*		0.78*
		(0.18)		(0.36)
Program Reach Index (avg)		0.51***		1.04***
		(0.14)		(0.23)
Child poverty rate (avg)		0.15**		0.25***
		(0.051)		(0.064)
Child pop % African American	-0.67**	-1.07***	1.34**	0.62**
	(0.22)	(0.18)	(0.43)	(0.21)
Child pop % Latino	0.27**	0.045	0.46**	-0.20*
	(0.087)	(0.053)	(0.16)	(0.076)
Child pop % Asian / Pacific Islander	-0.33***	-0.14	-0.68***	-0.14
	(0.080)	(0.084)	(0.19)	(0.12)
Child pop % Multiracial / other	1.41*	0.74*	2.10*	-0.12
	(0.55)	(0.36)	(1.03)	(0.57)
Constant	13.5*	9.11*	-2.12	-8.60
	(5.82)	(4.21)	(11.2)	(6.00)
Observations	58	58	58	58
R-Square	0.555	0.839	0.521	0.925
Mean percent participating	25.2	25.2	28.4	28.4

SOURCES: Author’s calculations from 2012–2018 SNAP LDB, 2012–2018 TANF LDB, 2012–2018 EDD county unemployment data, 2014–2018 CDSS Program Reach Index, and 2012–2018 DOF P-3 State and County Projections..

NOTES: \*\*\*p<.001, \*\* p<0.01, \* p<0.05. Robust standard errors in parentheses. Average unemployment rate refers to average during window in which birth-year cohort are ages 0-5 (2012–18). Denominator for percent ever on CalFresh is average size of cohort in county during window, based on DOF estimates. Demographic variables refer to average share of county population of children ages 0–5 in window that belongs to each group. Regressions weighted by average county population of children ages 0–5 in window.

**TABLE C10**

For children who first participate in CalFresh in first year of life, share with delays in participation at birth

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	No participation in first 3 months of life						No participation in first 1 month	
	Stratum: children with case active in 3 months before birth			Stratum: children with no case active in 3 months before birth			Active case	No active case
Any CalWORKs	-0.031*	-0.078***	-0.080***	-0.031**	-0.047**	-0.044**	0.007*	0.007
	(0.012)	(0.010)	(0.012)	(0.010)	(0.016)	(0.015)	(0.003)	(0.008)
Never adults on case	-0.012	-0.017	-0.019	-0.054***	-0.002	-0.005	0.005*	0.013*
	(0.008)	(0.018)	(0.016)	(0.006)	(0.008)	(0.008)	(0.002)	(0.005)
Case materials not in English	-0.006	0.003	-0.009	0.019***	0.032***	0.031***	0.003**	0.023***
	(0.011)	(0.015)	(0.011)	(0.004)	(0.005)	(0.004)	(0.001)	(0.004)
Any older siblings on case	0.046***	0.005	0.003	0.019**	-0.010	-0.011	-0.001	-0.006*
	(0.007)	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.002)	(0.003)
African American	-0.038***	0.044*	0.008	-0.086***	-0.095***	-0.102***	-0.006	-0.025
	(0.007)	(0.020)	(0.010)	(0.014)	(0.020)	(0.020)	(0.005)	(0.017)
Latino	0.024**	0.032	0.025*	-0.010	-0.019	-0.023	0.005	0.003
	(0.008)	(0.024)	(0.012)	(0.011)	(0.018)	(0.017)	(0.003)	(0.007)
Asian American/Pacific Islander	-0.043***	-0.050*	-0.053***	-0.049**	-0.065*	-0.061*	0.001	-0.027*
	(0.012)	(0.020)	(0.014)	(0.017)	(0.028)	(0.026)	(0.004)	(0.011)
Multiracial and other	-0.003	-0.004	-0.009	-0.013	-0.023	-0.013	0.003	-0.000
	(0.012)	(0.016)	(0.017)	(0.013)	(0.019)	(0.020)	(0.004)	(0.011)
Any CalWORKs, never adults on case		0.013	0.017		-0.120***	-0.117***	-0.008**	-0.081***
		(0.020)	(0.019)		(0.010)	(0.010)	(0.003)	(0.011)
Any CalWORKs, case materials not in English		0.010	0.008		-0.032***	-0.032***	-0.000	-0.005
		(0.008)	(0.008)		(0.008)	(0.007)	(0.002)	(0.010)
Any CalWORKs, any older siblings on case		0.056***	0.056***		0.061***	0.062***	0.006*	0.029***
		(0.008)	(0.007)		(0.008)	(0.008)	(0.002)	(0.003)
Any CalWORKs, African American		-0.049***	-0.050***		0.024	0.020	0.006	-0.015
		(0.011)	(0.011)		(0.017)	(0.018)	(0.006)	(0.016)

Any CalWORKs, Latino		0.007	-0.001		0.028	0.023	-0.007	-0.000
		(0.008)	(0.009)		(0.016)	(0.016)	(0.004)	(0.008)
Any CalWORKs, Asian American/Pacific Islander		0.027	0.019		0.036	0.031	-0.004	0.008
		(0.021)	(0.019)		(0.030)	(0.029)	(0.004)	(0.011)
Any CalWORKs, Multiracial and other		0.017	0.008		0.010	-0.001	-0.005	0.004
		(0.016)	(0.014)		(0.022)	(0.024)	(0.006)	(0.011)
Constant	0.329***	0.274***	0.366***	0.597***	0.578***	0.605***	0.960***	0.833***
	(0.013)	(0.017)	(0.015)	(0.014)	(0.015)	(0.019)	(0.004)	(0.009)
County fixed effects	x		x	x	x		x	x
Birth day and month fixed effects	x	x	x	x	x	x	x	x
Observations	117,763	117,763	117,763	57,785	57,785	57,785	117,763	57,785
R-squared	0.038	0.016	0.038	0.014	0.013	0.018	0.008	0.046
Mean of dependent variable	0.319	0.319	0.319	0.558	0.558	0.558	0.986	0.918

SOURCES: Author's calculations from 2012–2018 SNAP and TANF LDBs.

NOTES: Sample includes children born in 2012 who ever accessed CalFresh by age 1. County and older siblings refer to modal case. Robust standard errors in parentheses. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

**TABLE C11**

Share of 2012 birth cohort who ever experience short gaps in CalFresh participation, for children who ever participate in CalFresh through age 5

	(1)	(2)	(3)	(4)	(5)
	Any 1–3 month gaps			Any 1–3 month gap at reporting window	Any 1–3 month gap outside reporting window
Any CalWORKs	0.112*** (0.005)	0.144*** (0.009)	0.145*** (0.008)	0.084*** (0.006)	0.100*** (0.006)
Never adults on case	-0.046*** (0.006)	-0.029** (0.009)	-0.031** (0.009)	-0.013 (0.007)	-0.024*** (0.006)
Case materials not in English	0.002 (0.008)	0.018* (0.007)	0.023** (0.007)	0.016** (0.006)	0.015** (0.005)
African American	0.025* (0.010)	-0.006 (0.007)	0.014* (0.007)	0.009 (0.004)	0.015** (0.005)
Latino	0.064*** (0.008)	0.056*** (0.005)	0.070*** (0.006)	0.048*** (0.006)	0.040*** (0.004)
Asian American/Pacific Islander	-0.016 (0.011)	-0.026* (0.011)	-0.000 (0.009)	-0.003 (0.005)	0.001 (0.007)
Multiracial and other	0.007 (0.012)	-0.005 (0.009)	0.018* (0.007)	0.006 (0.004)	0.013* (0.006)
Any CalWORKs, never adults on case		-0.039* (0.018)	-0.041* (0.017)	0.160*** (0.004)	0.035*** (0.004)
Any CalWORKs, case materials not in English		-0.051*** (0.010)	-0.049*** (0.010)	-0.009*** (0.001)	-0.017*** (0.002)
Any CalWORKs, African American		0.004 (0.010)	0.005 (0.009)	0.016** (0.005)	0.027*** (0.004)
Any CalWORKs, Latino		-0.014 (0.009)	-0.013 (0.010)	0.046*** (0.001)	0.023*** (0.002)
Any CalWORKs, Asian American/Pacific Islander		-0.034** (0.010)	-0.035** (0.010)	-0.000 (0.001)	0.015*** (0.001)
Any CalWORKs, Multiracial and other		-0.016	-0.017	0.106***	0.114***

		(0.017)	(0.016)	(0.004)	(0.003)
Constant	0.245***	0.248***	0.226***	0.119***	0.131***
	(0.007)	(0.008)	(0.006)	(0.004)	(0.004)
County fixed effects	X		X	X	X
Observations	266,768	266,768	266,768	266,768	266,768
R-squared	0.025	0.019	0.026	0.013	0.018
Mean of dependent variable	0.343	0.343	0.343	0.195	0.205

SOURCES: Author's calculations from 2012-2018 SNAP and TANF LDBs.

NOTES: Sample includes children born in 2012 who ever participated in CalFresh by age 6. County refers to modal case. Robust standard errors in parentheses. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05



## Over-time regression models

These models isolate the change in the dependent variable associated with a change in the (county-level) unemployment rate. We consider two dependent variables:

1. The percent of children by race/ethnicity and county who ever participate in either program. In this model, data are aggregated to county/race/birth year observations.
2. The number of months in children's first 6 years participating in CalFresh or CalWORKs. In this model, the data are at the individual level, and models are stratified by combinations of programs used by age 6.

Tables C12A and C12B consider how the share of all children participating in CalFresh over their first 72 months changed with the economy over the years 2005 through 2012.

Tables C13A and C13B consider how the number of months of participation in CalFresh and CalWORKs changed over the course of the 2007-2009 Great Recession, using a sample of children born between 2005 and 2012. The dependent variable ranges between 1 and 72 months. The outcome variable is number of months of participation in CalFresh. For comparison purposes, in Table C14 we show number of months of participation in CalWORKs.

In all tables we use principally the county unemployment rate in the quarter of the child's birth to measure the state of the economy. Assuming ever participation and months of participation increase as the economy is weaker, we expect coefficients to be positive. Some models also include the number of months that a county experienced high unemployment over the course of the child's first 72 months (from birth up to age 6). Appendix B discusses the sources and creation of these metrics. All models include controls for race/ethnicity, county and child's birth year, implying that the coefficients on the metrics of the economy represent the change in months of participation for a within-county change in the unemployment rate.

Our preferred models are shown in column 3 of Tables 12A and 13A, and in columns 7 and 11 of Tables 12B and 13B. Earlier columns show the main effect of the unemployment rate before we introduce race/ethnic interactions with the unemployment rate. The final column adds county linear trends to control for, principally, differential trends in the county's CalFresh take-up rate. The introduction of linear trends generally does not change our main conclusions.

Coefficients on the unemployment rate in Tables 12A and 13A are insignificant, implying no change in overall participation and months of participation in CalFresh over children's early years associated with an increase in the unemployment rate. In Tables 12B and 13B we do see differences by whether a child also ever participated in CalWORKs. In the case of ever participation, the coefficients imply a decline in accessing CalFresh only but an offsetting increase in participation in both programs. Interactions with race/ethnicity are significant in the case of African American and Asian-American/Pacific Islander, and Multiracial/other children, but not for Latino children. They suggest amplified responsiveness of ever participation in CalWORKs and CalFresh as compared to CalFresh alone among African American children. We find no significant differences in responsiveness to the economy for Latino children as compared to white children.

Table 13B shows the results of regressions of months of participation on the unemployment rate. While there are significant declines in the number of months participating in CalFresh alone or in both programs associated with the unemployment rate for all groups of children except Latino children, the magnitude of the main effects and interactions are substantively small. Table C14 shows similarly small magnitudes for months of CalWORKs participation.

In the text of the report, to obtain the range of changes discussed in the text, we multiply unemployment rate coefficients by the increases forecasted by the Legislative Analyst’s Office in the 2020 unemployment rate (5.4 to 7.5 percentage points).

**TABLE C12A**

Percent of all children in 2005-2012 county birth-year cohorts who ever participated in CalFresh through age 5

	(1)	(2)	(3)	(4)
	<b>All CalFresh participants</b>			
Avg. unemployment rate in birth quarter	0.006 (0.005)	0.006 (0.005)	0.005 (0.006)	0.004 (0.012)
Number of months in period of high unemployment		0.000 (0.048)		
Birth q. unemp.*African American			-0.011*** (0.003)	-0.011*** (0.003)
Birth q. unemp.*Latino			0.001 (0.002)	0.001 (0.002)
Birth q. unemp.*API			-0.005 (0.003)	-0.005 (0.003)
Birth q. unemp.*Multiracial/other			0.002 (0.005)	0.002 (0.005)
Constant	17.900*** (5.171)	17.904*** (5.246)	18.341*** (5.490)	18.739 (10.262)
County fixed effects	x	x	x	x
Birth cohort fixed effects	x	x	x	x
Demographic indicators	x	x	x	x
County linear trends				x
Observations	2,185	2,185	2,185	2,185
R-squared	0.833	0.833	0.835	0.837
Mean of dependent variable	50.27	50.27	50.27	50.27

SOURCES: Author’s calculations from 2005–2018 SNAP LDB, 2005–2018 EDD county unemployment data, and 2005–2018 DOF Annual Intercensal Population Estimates (2005-10) and P-3 State and County Projections (2010-18).

NOTES: See Appendix B for full methodology for unemployment metrics. Demographic indicators include race/ethnicity. Regressions weighted by maximum county population of children in race/ethnic group in cohort. Robust standard errors in parentheses. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

**TABLE C12B**

Percent of all children in 2005-2012 county birth-year cohorts who ever participated in CalFresh through age 5

	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Stratum: participation in CalFresh, <u>no</u> CalWORKs				Stratum: participation in CalFresh and CalWORKs			
Avg. unemployment rate in birth quarter	-0.012***	-0.012***	-0.010**	0.001	0.017***	0.017***	0.014***	0.001
	(0.004)	(0.004)	(0.004)	(0.008)	(0.003)	(0.003)	(0.003)	(0.007)
Number of months in period of high unemployment		0.000				0.005		
		(0.028)				(0.031)		
Birth q. unemp.*African American			-0.019***	-0.019***			0.014***	0.013***
			(0.002)	(0.002)			(0.002)	(0.002)
Birth q. unemp.*Latino			-0.000	-0.000			0.002	0.002
			(0.001)	(0.001)			(0.001)	(0.001)
Birth q. unemp.*API			0.002	0.002			-0.007***	-0.007***
			(0.001)	(0.001)			(0.002)	(0.002)
Birth q. unemp.*Multiracial/other			0.003	0.003			0.011**	0.011**
			(0.003)	(0.003)			(0.003)	(0.003)
Constant	21.545***	21.547***	19.773***	10.473	-3.238	-3.194	-0.450	9.603
	(3.561)	(3.587)	(3.669)	(6.867)	(2.988)	(3.038)	(3.115)	(6.362)
County fixed effects	x	x	x	x	x	x	x	x
Birth cohort fixed effects	x	x	x	x	x	x	x	x
Demographic indicators	x	x	x	x	x	x	x	x
County linear trends				x				x
Observations	2,125	2,125	2,125	2,125	2,134	2,134	2,134	2,134
R-squared	0.676	0.676	0.694	0.703	0.852	0.852	0.860	0.863
Mean of dependent variable	24.10	24.10	24.10	24.10	26.83	26.83	26.83	26.83

**TABLE C13A**

Total months of participation through age 5, for children born 2005-2012

	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	All CalFresh participants, LHS: months CalFresh participation				CalWORKs participants, LHS: months CalWORKs participation			
Avg. unemployment rate in birth quarter	0.001	0.001	-0.000	-0.001	0.001	0.001	0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Number of months in period of high unemployment		-0.021				-0.004		
		(0.013)				(0.012)		
Birth q. unemp.*African American			-0.001	-0.001			-0.001	-0.001*
			(0.001)	(0.001)			(0.001)	(0.001)
Birth q. unemp.*Latino			0.001	0.001			0.001	0.000
			(0.001)	(0.001)			(0.001)	(0.001)
Birth q. unemp.*API			-0.002	-0.002			-0.003***	-0.003***
			(0.001)	(0.001)			(0.001)	(0.001)
Birth q. unemp.*Multiracial/other			-0.001	-0.000			-0.004***	-0.004***
			(0.001)	(0.001)			(0.001)	(0.001)
Constant	26.900***	26.816***	27.699***	27.103***	24.415***	24.398***	24.643***	23.665***
	(0.932)	(0.900)	(0.841)	(0.775)	(0.892)	(0.899)	(1.140)	(0.598)
County fixed effects	x	x	x	x	x	x	x	x
Birth cohort fixed effects	x	x	x	x	x	x	x	x
Demographic indicators	x	x	x	x	x	x	x	x
County linear trends				x				x
Observations	2,156,674	2,156,674	2,156,674	2,156,674	1,159,850	1,159,850	1,159,850	1,159,850
R-squared	0.043	0.043	0.043	0.044	0.040	0.040	0.040	0.042
Mean of dependent variable	35.04	35.04	35.04	35.04	31.69	31.69	31.69	31.69

SOURCES: Author’s calculations from 2005–2018 SNAP LDB and 2005–2018 EDD county unemployment data.

NOTES: See Appendix B for full methodology for unemployment metrics. Demographic indicators include: race/ethnicity, never adults on case, case materials not in English, any other children child case members. Robust standard errors in parentheses. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

**TABLE C13B**

Total months of CalFresh participation through age 5, for children born 2005–2012

	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Stratum: participation in CalFresh, <u>no</u> CalWORKs				Stratum: participation in CalFresh and CalWORKs			
Avg. unemployment rate in birth quarter	-0.000	0.000	-0.003**	-0.003***	-0.001	-0.001	-0.002*	-0.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Number of months in period of high unemployment		-0.042*				-0.001		
		(0.016)				(0.016)		
Birth q. unemp.*African American			-0.002*	-0.002***			-0.003***	-0.003***
			(0.001)	(0.001)			(0.000)	(0.000)
Birth q. unemp.*Latino			0.004***	0.003***			0.002**	0.002*
			(0.001)	(0.001)			(0.001)	(0.001)
Birth q. unemp.*API			0.000	-0.000			-0.001	-0.001
			(0.001)	(0.001)			(0.001)	(0.001)
Birth q. unemp.*Multiracial/other			0.001	0.001			0.000	0.000
			(0.002)	(0.002)			(0.001)	(0.001)
Constant	16.755***	16.595***	19.281***	18.519***	35.491***	35.486***	36.322***	35.453***
	(1.015)	(0.942)	(0.894)	(0.965)	(1.053)	(1.033)	(0.897)	(0.636)
County fixed effects	x	x	x	x	x	x	x	x
Birth cohort fixed effects	x	x	x	x	x	x	x	x
Demographic indicators	x	x	x	x	x	x	x	x
County linear trends				x				x
Observations	1,019,596	1,019,596	1,019,596	1,019,596	1,137,078	1,137,078	1,137,078	1,137,078
R-squared	0.087	0.087	0.088	0.090	0.050	0.050	0.051	0.053
Mean of dependent variable	23.97	23.97	23.97	23.97	44.97	44.97	44.97	44.97

SOURCES: Author's calculations from 2005–2018 SNAP LDB and 2005–2018 EDD county unemployment data.

NOTES: See Appendix B for full methodology for unemployment metrics. Demographic indicators include: race/ethnicity, never adults on case, case materials not in English, any other children child case members. Robust standard errors in parentheses. \*\*\* p&lt;0.001, \*\* p&lt;0.01, \* p&lt;0.05



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