Economic Mobility for Low-Income Families in Colorado:

The Need for Increased Targeted Public Investment

by

Dr. Anita Alves Pena
Professor of Economics
Colorado State University

John Singleton
MA Candidate in Economics
Colorado State University

This research was made possible through a grant from the Rudy & Alice Ramsey Foundation

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Life Is Not a Zero-Sum Game

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Executive Summary

Over the past two decades, the Colorado economy has continued to grow, but for too many families, that growth has not translated into increased economic mobility. This is especially true for low-income families in Colorado. Wages and salaries have failed to keep up with inflation, the economic value of higher education has decreased at a time when more Coloradans are receiving degrees, and financial costs borne by families (e.g., child care and housing) have dramatically increased.

Public investment has the potential to offset some inequities seen within a growing economy. Unfortunately, when adjusted for population and inflation, these investments in Colorado have not kept pace with observed growth and some investments have not been appropriately targeted toward the areas that can produce the greatest economic mobility for low-income families in Colorado.

Even with the limited funds distributed by the state legislature, these patterns suggest a lack of specifically targeted funding programs to support the upward economic mobility of state residents and suggest opportunities for where to direct increased public investment. Though some categories of funding show a positive benefit to the potential future of Coloradans, our study suggests simply pumping more money into the system alone will not achieve a goal of overall poverty reduction and increased upward mobility.

We match Colorado's "Big Six" public expenditure categories (health care, K-12 education, higher education, human services, corrections, and judicial) to representative survey data of Coloradans from the American Community Survey to examine relationships between public investment and economic mobility of low-income state residents and their families. We find education expenditure is particularly associated with minimizing the probability of being below established poverty thresholds (though this pattern breaks down for some Coloradans as higher education isn't considered "free"). We also find correctional spending does not operate as a poverty reducer and results across several public expenditure categories are sensitive to race and ethnicity. Our research, therefore, suggests public spending does not impact everyone in the state equally, providing empirical evidence supporting the need for increases in targeted public investment.

In order to understand potential mobility changes based on funding increases, we studied a thought experiment based on increased funding in each Big Six category and changes of the probabilities of being low-income and of achieving homeownership. We used homeownership as a stand in for mobility, as it is a traditionally accepted mechanism for wealth building among low-to-middle income households. While student educational funding is a primary concern, we also find if funding is increased in K-12 education and higher education categories, they would have a statistically significant impact on reducing poverty and increasing access to wealth for the most vulnerable residents. Categories such as corrections and judicial, which mainly focus on legal obligations, would either make little difference or reduce the likelihood of owning a home. Other categories have fewer clear implications, but are not as specifically related to the income impact of expenditure categories. In our modeling, we adjusted for aggregate changes in Colorado over time (such as in the migration rate into the state and in the size of the economy measured by production values). These changes in and of themselves, however, may be of interest for continued study, especially given the growth rates of these variables being high relative to national averages.

The report is broken into two sections, with major findings provided below:

1. The State of Low-Income Families in Colorado

Trends among low-income families:

- The percentage of Coloradans at or below the official federal poverty threshold has remained relatively flat; however, the overall number of individuals and families has increased.
- An increasingly larger percentage of college-educated individuals in Colorado has experienced poverty over time, a pattern that we interpret as consistent with negative economic mobility.
- Coloradans of color experienced a small upward movement out of poverty on average.
- Women in Colorado have increasingly become heads of household, and this group has seen an increase in poverty.

Self-sufficiency vs. poverty:

- The federal poverty threshold is inadequate in describing the economic mobility potential of Coloradans due to significant local cost of living increases over time, among other critiques of this limited standard that are documented widely elsewhere.
- As costs in Colorado increase, especially for child care and housing, the average total family income for low-income Coloradans (below or at the poverty threshold) has decreased by 10 percent between 2005 and 2018 after accounting for inflation.
- Among Coloradans in poverty, there is an ever-increasing gap between income received and the amount of income needed to afford basic costs in Colorado.

2. Public Expenditure & the Economic Mobility of Low-Income Families

State budget:

Despite rapid increases over time in population and economic output, growth has not translated into increased public funding in Colorado. Adjusted for inflation and population increases, state expenditures have not kept up.

- General Fund expenditures in several categories have remained flat or have decreased per capita since the Great Recession of 2008, with the exception of health care.
- Health care spending increases are unique, with changes largely resulting from the adoption of the Affordable Care Act and the expansion of Medicaid, as opposed to being related to local decision making.
- Categories that are traditionally associated with increased economic opportunity, such as K-12 education and higher education, have either been flat or have seen a decrease in funding.

Impact of increased funding by category:

We performed an analysis of changes in the probability of being in poverty and the probability of homeownership based on an increased amount of funding in each of the Big Six state spending categories. We simultaneously considered differences in these impacts across those who self-identify as white and those who are part of a community of color.

Health care: An increase in health care funding is associated with a reduction in poverty for communities of color, though with a slight increase in poverty in the white population. This is likely due to differences in the likelihood of falling within health care eligibility requirements (e.g., by income) across demographic subgroups of the state's population.

- Changes in the probability of homeownership are flat for white Coloradans and positive for communities of color with increased health care funding, indicating a potential for a shift of cost burdens for families alongside public funding increases.

K-12 education: Decreases in poverty are seen across racial groups when there are increases in K-12 education funding in the short term.

- This category shows, unsurprisingly, the highest potential to increase homeownership with real and equal increases for both whites and communities of color.

Higher education: Higher education funding is associated with a small but significant increase in the potential of poverty for Coloradans of color; however, non-Hispanic whites see a decrease in potential poverty. We interpret the higher education spending category as being a prime example of a need for a targeted policy as the cost of postsecondary education remains highly dependent on intergenerational wealth and access to affordable capital.

- Further cementing the case for differential access to capital by race, increasing higher education funding provides very different outcomes for wealth building through homeownership between different racial categories.

Human services: This category of spending works with populations who are more vulnerable to poverty and subsequently generally decreases poverty and increases homeownership. Spending in this category includes programs for food assistance, mental health, rehabilitation, aging, and child welfare.

- Unfortunately, improvements are of a smaller magnitude than for education for equal size increases in funding and long-term impacts are less certain.

Corrections: Corrections spending is primarily the amount of funds used to incarcerate, with a small amount going to reentry programs. Unsurprisingly, increased funding for incarceration shows the greatest negative impact on communities of color. Spending in this category reveals significant variation in impacts on different races. Most of the costs in this part of the budget are driven by the number of individuals who are incarcerated and the associated maintenance and management costs of correctional facilities.

- While increased incarceration spending has been associated with a small decrease in poverty for the majority white population in Colorado, communities of color have experienced the opposite.
- The change in the probability of homeownership associated with corrections is almost the same for both racial categories in the direction of Coloradans being less likely to own homes.

Judicial: An unexpected finding was the overall positive case for increased judicial spending for the outcomes of Coloradans. Spending in this category concerns the administration of the state courts. This includes support services for individuals such as public legal representation the number of judges, probation, and resources available for processing cases.

- Not only does judicial spending have the potential to significantly close the racial poverty gap, but it also shows a positive association with the likelihood of owning a home.
- To fully understand the difference in impact will require a deeper dive into the specific programs funded within the appropriations budget for judicial services, as well as their efficacy. Increased funding in recent years has focused on making judicial services more efficient while less burdensome in time and money.

As prior literature and case studies would suggest, increased spending on health care, K-12 education, higher education, and possibly judicial services could create net positive benefits, especially if programs are targeted to address residents in specific areas of need. Categories of spending like corrections are unsurprisingly a suppressor of economic mobility. Given the long-run impact of the current COVID-19 pandemic remains largely unknown, policymakers will need to be attentive to how lost tax revenue will hit the state budgets (possibly harder than the Great Recession), leading to a decline in public investment that history shows may take decades to recover.

Part 1

The State of Low-Income Families in Colorado

Key Highlights

Profile of Low-Income Coloradans

- The percent of Coloradans in poverty has remained consistent and has not decreased for the last 18 years.
- The average age of low-income Coloradans is increasing as the overall age of Coloradans increases.
- Coloradans at or below poverty are more likely to be white, less likely to be Hispanic, and less likely to be immigrants than over the past decades.
- Low-income Coloradans are more likely to have gone to college than in the past, but employment for low-income Coloradans is lower than in previous periods.
- Families below the poverty threshold have experienced lower total family incomes and lower earned income from wage and salary work over the past two decades.
- Income from welfare and public assistance has decreased over the past two decades.

Family Self-Sufficiency in Colorado

- The gap between what low-income families earn and what is considered needed for self-sufficiency continues to grow.
- The primary drivers of the increased gap are housing costs, child care, and taxes (inclusive of local, state, and federal). In Colorado, low-income families pay more in taxes as a percentage of their income than do those in higher income categories. The regressivity of Colorado's tax code has a negative effect on family self-sufficiency.

Economic mobility is often defined by economists in terms of movement between income categories (e.g., low income to middle class), and is often described in terms of intergenerational changes (wealth accumulated over generations) as opposed to shorter run (what a family earns in their lifetime).

Academic research informs current thought on linkages between location (down to local neighborhood) and long-run impacts on inequality and opportunity (measured by changes in the probability of poverty).[1,2,3] Findings suggest significant historical dependence of location, which helps motivate the regional perspective and focus on Colorado in this research. Unlike studies that are long-run and intergenerational[4,5], our report looks at indicators of social mobility within a generation[6] and with particular attention to relationships between state spending and business cycles.[7]

Other related academic literature to this study examines relationships between inequality and social mobility and intersections with public expenditure.[9,10,11] Some authors have documented far-reaching impacts on mortality and health[12,13] in addition to economic outcomes.[14,15] We argue the implications of our study are wide-reaching especially to the discussion of the effectiveness of anti-poverty programs in Colorado.

Our analysis focuses on examining key changes in who is receiving benefits from changes in Colorado's budgetary spending, and how changing the amount spent in the largest state funding categories changes the lives of Coloradans in various income categories. We focus on how families of certain characteristics are more or less likely to be in certain income groups in some years than in others and how these patterns may move with public funding. It is thus important to first profile low-income families in Colorado.

Profile of Low-Income Coloradans

We define relevant subsamples of Colorado residents for our consideration of the factors surrounding economic mobility. We consider three income categories: those below or at the poverty threshold, those between poverty and middle class (and who are therefore vulnerable to either moving into poverty or into the middle class), and the middle class itself. We define the middle class using an income-based definition as in the Bell Policy Center's middle class report, previous literature, and similar reports.

"In poverty" (below/at poverty): This group includes those below or at their relevant federal poverty threshold for the individual's reported family income and family size for their year of observation. Official poverty thresholds are based on both the total number of family members and also whether these family members are adults or are children.[16] Using measures of official poverty status is relevant for our understanding of families since the differences in family sizes and compositions affect how far a dollar goes within the household and because these values coincide with several eligibility thresholds for federal-level (and sometimes state-level or local-level) public support. A caveat, however, is this kind of federal poverty standard misses nuances of the true circumstances of people in any particular state including in Colorado. This motivates us to also consider other groups.

"Vulnerable" (between poverty and middle class): We define this group as those between the relevant poverty threshold and two-thirds of the median income in the state in the specific year. This income grouping is the most at risk of moving into the poverty category. Some academic work associates being "at risk" of poverty with the inability to smooth consumption over time and save portions of their income.[17] This may be interrelated with the inability to save for emergencies or other purposes.

"Middle income" ("middle class"): This group includes those at two-thirds of the median income in the state in the specific year up to two times median income. This matches the functional definition of "middle class" in previous reports by the Bell Policy Center and others.[18] Cutoffs from median income are compared for 2005 and 2018 in Table 1 to provide an example as to how middle class income compares to our lower income categories of interest.

Colorado Income Category Illustrations (Real 2019 USD) *table 1*[A]

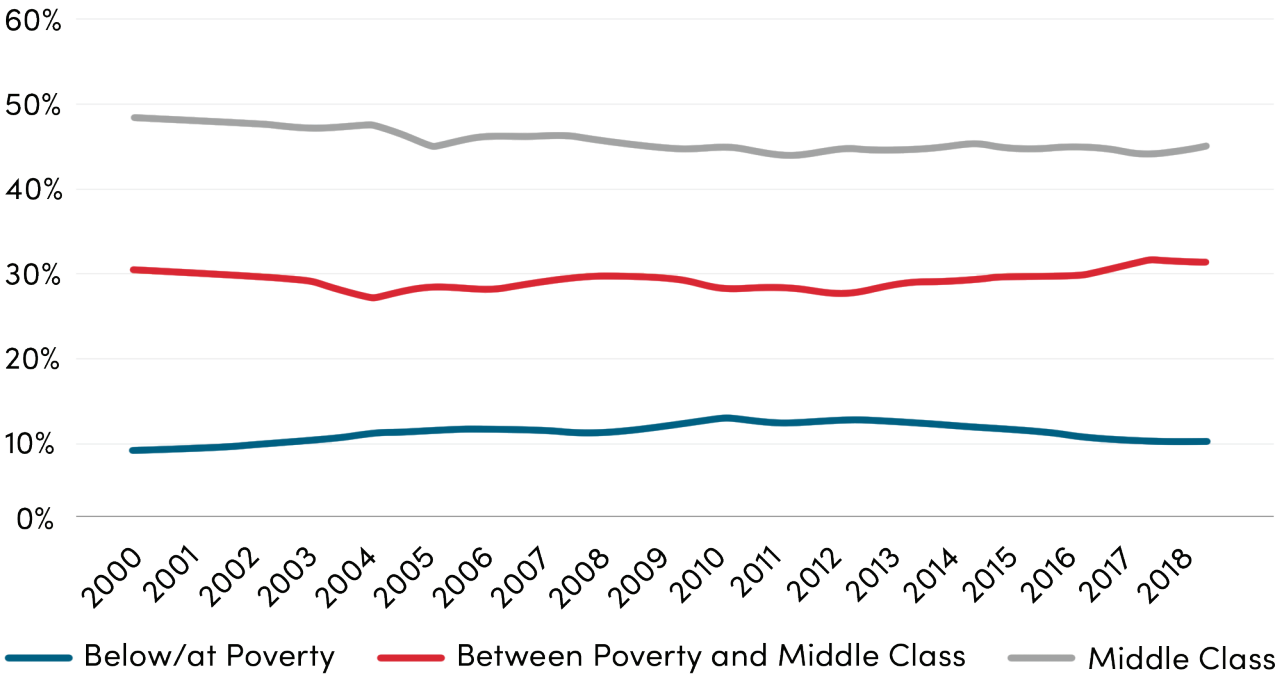
Year	**Poverty** *(Below/at relevant poverty threshold for family size)*	**Between Poverty & Middle Class** *(Above relevent poverty threshold but below two-thirds median income)*	**Middle Class** *(Between two-thirds and twice median icome)*
2005	1 Person: ≤$13,949 2 Persons: ≤$17,840 3 Persons: ≤$21,787 4 Persons: ≤$27,932	Personal Poverty Theshold to $49,139	$49,139 to $147,416
2018	1 Person: ≤$13,030 2 Persons: ≤$16,560 3 Persons: ≤$20,370 4 Persons: ≤$26,196	Personal Poverty Theshold to $53,001	$53,001 to $159,002

Source: *Author analysis of ACS data from IPUMS and of poverty thresholds from the U.S. Census Bureau*

The Percentage of Coloradans in Poverty Has Remained Fairly Consistent Over Time. The percentage of Coloradans in poverty has been fairly consistent over the years, but this means the overall number of individuals and families in poverty has increased given the increase in the state population. While there is some evidence of an increasing portion of the state population in poverty in the early 2000s, the percentage of households in our lowest income group returns to approximately 10 percent by the end of our study period (Figure 1). Meanwhile, the percentage of households between poverty and the middle class is relatively stable around 30 percent.

The percentage in middle class, however, has slowly declined. The proportion of Coloradans in the upper income category (equal to the remainder to sum to 100 percent) has increased over time, as has income inequality. Since we are particularly interested in who has and does not have potential for economic mobility in Colorado, we next consider socioeconomic characteristics associated with a family's position in the state's income distribution.

Percentages of Households by Income Group *figure 1*



Source: *Author analysis of ACS data from IPUMS*

Below are summary statistics of our three income groups of interest for 2018 in Table 2. There are higher percentages of female headed households and minority headed households in poverty in comparison to middle income. We further notice there are lower percentages of those with higher levels of education and lower percentages of household heads who are currently employed in the lowest income categories.

2018 Average Characteristics of Household Heads, by Income Category *table 2*[B]

	Below/at Poverty	Between Poverty and Middle Class	Middle Class
Age (years)	47.74	52.04	49.81
Female (%)	61.00	53.20	45.00
Non-Hispanic white (%)	61.50	70.00	76.80
Non-Hispanic Black (%)	6.01	5.26	3.04
Hispanic (%)	25.10	20.20	14.70
Immigrant (%)	16.30	13.70	11.30
Married (%)	20.10	27.30	63.30
Own family members in household (number)	2.069	1.786	2.595
Own children in the household (number)	0.699	0.371	0.777
Own children under age 5 in household (number)	0.157	0.0795	0.147
Less than high school (%)	13.70	6.76	2.91
High school (%)	35.30	34.30	22.20
Some college (%)	26.00	27.10	23.90
At least four years college (%)	23.10	30.90	50.50
Employed (%)	37.10	60.80	77.30
Observations (%)	216,667	679,616	978,383

Source: *Author analysis of ACS data from IPUMS*

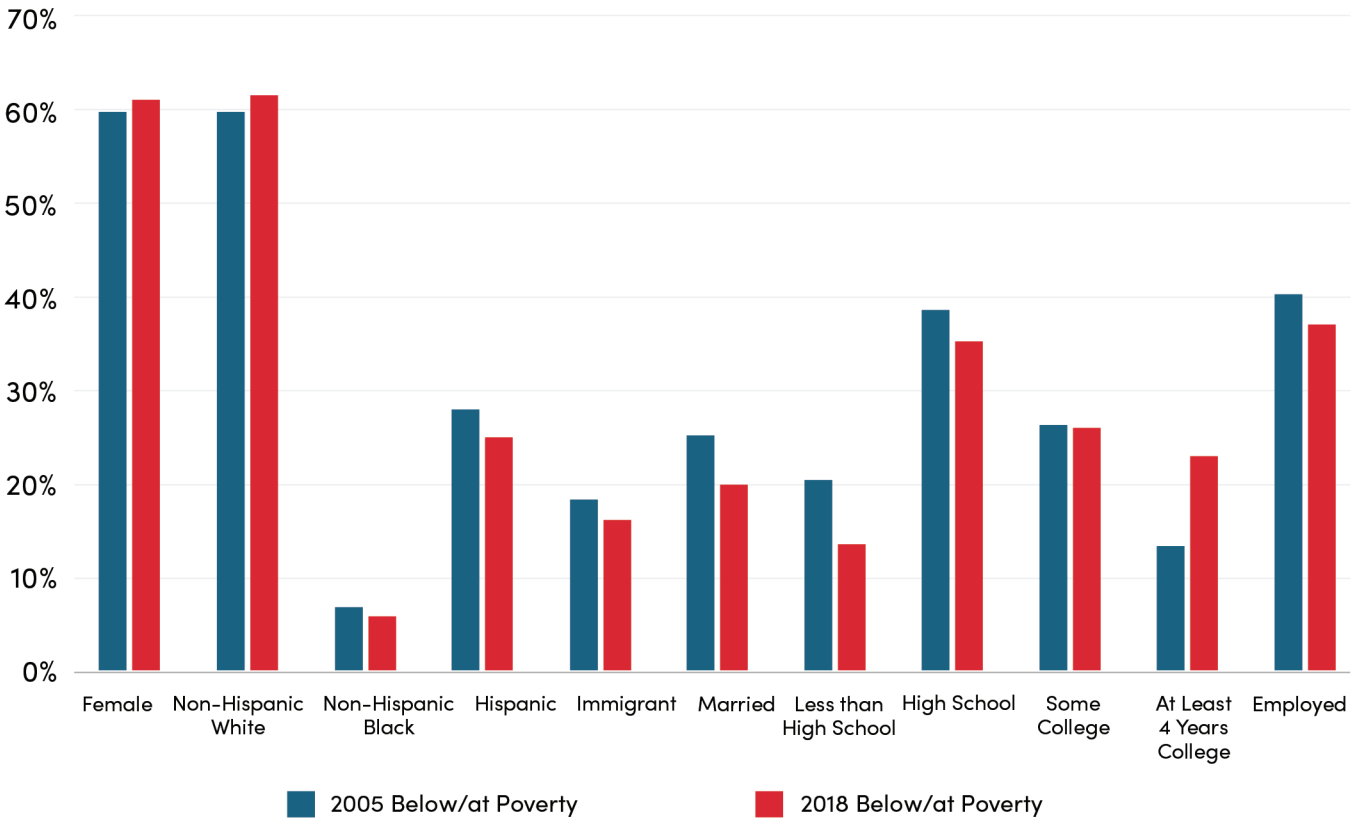
To expand on these patterns and how they have changed over time, Figure 2 shows several major socioeconomic characteristic categories to shine a light on who experienced either positive or negative mobility in Colorado between 2005 and 2018. There are several patterns of note. First, an increase in the number of women household heads in poverty alongside increases in the number of women as head of household over time is suggestive of growing vulnerabilities within this group (Figure 2a). Shifting family dynamics may be creating a spike in this percentage that will likely suggest further evaluation and policy action over time. Next, non-Hispanic white families comprise the largest racial group within the state and have seen an increase in poverty over our study frame. Finally, the significant increase from 13 percent to 23 percent of those in poverty with a four-year college education is a striking suggestion of failed policy to curb poverty.

Figures 2b and 2c show changes in average household head characteristics over time for those between poverty and middle class and for the middle, respectively, as an extension to this analysis. Specifically, these figures show major socioeconomic characteristic categories over time for those between poverty and the middle class and for the middle class to shine a light on who experienced either positive or negative mobility in Colorado between 2005 and 2018. Our major observations

include the woman percentage increased for those between poverty and the middle class much as it did for those in the lowest income category. As in the other income categories, this has implications for family well-being as the gender pay gap is unfortunately well established in Colorado and elsewhere. Most other categories remained relatively flat or increased slightly indicating greater stability in population socioeconomic characteristics with higher average income. Since the between-poverty-and-middle-class grouping represents those outside of poverty but still beneath the middle class, increases in this group come from both upward and downward economic mobility. Communities of color, on average, show a shift from below poverty to this still-vulnerable level of income.

Head of Household Characteristics for Coloradans Below or at Poverty Over Time (Percentages)

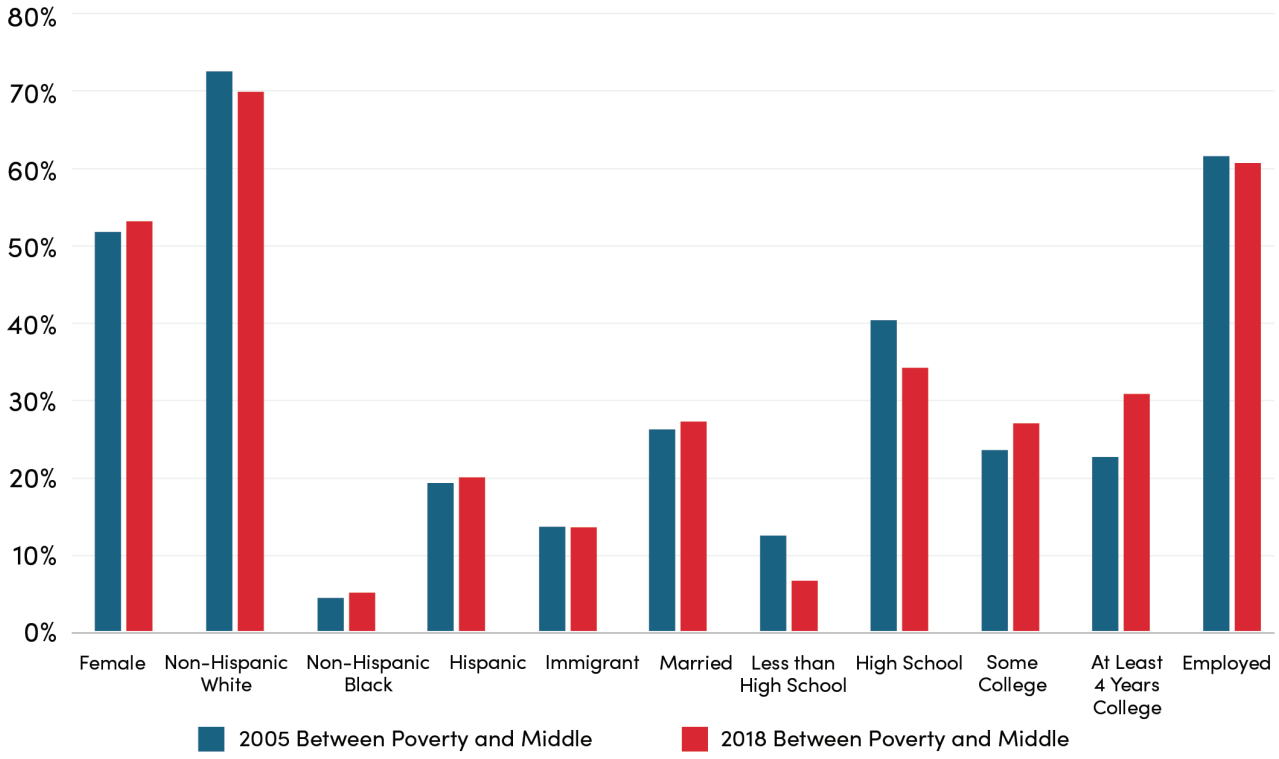
figure 2a



Source: *Author analysis of ACS data from IPUMS*

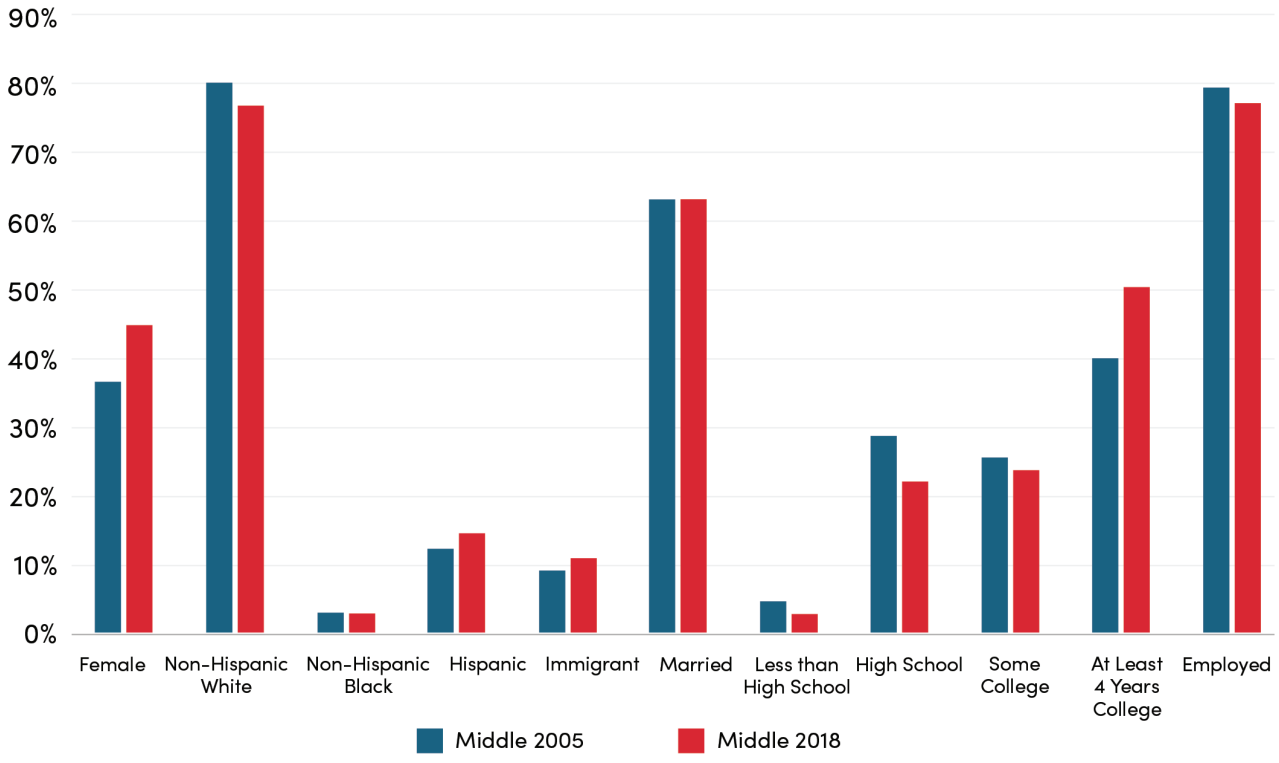
Head of Household Characteristics for Coloradans Between Poverty & Middle Class Over Time (Percentages)

figure 2b



Head of Household Characteristics for Coloradans in Middle Class Over Time (Percentages)

figure 2c



Source: *Author analysis of ACS data from IPUMS*

For the middle class, we note the woman percent share of the middle class also saw a large gain in this middle-income range. The increasing percentage of women in each income category infers a general shift in the head of household demographics. This has relevant policy implications that further strengthen the argument for holistic family policy planning such as parental shared leave. Another finding is the consistent increased share of four-year college educated Coloradans in each of the income categories we study. When all three category shifts are considered, the negative impact on those in poverty becomes more distinct. It is likely those in the lower income categories have less access to capital and at higher risk, creating a decreasing value of education for those with more vulnerability to potential poverty-inducing debt associated with a college degree.

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Colorado's Residents At or Below Poverty Are More Likely to Be White, Less Likely Hispanic, and Less Likely Immigrant Than in the Past. The Census Bureau defines "race" and "ethnicity" separately in the American Community Survey. We consider three main demographic race/ethnicity categories constructed from these data — non-Hispanic white, non-Hispanic Black, and Hispanic. We also consider the percentage of the population that is immigrant.

The change in the fraction of the population that is non-Hispanic white grew by 2.8 percent between 2005 and 2018 for those below the federally defined poverty level (Figure 2a). The increase in non-Hispanic white household heads in poverty may be interrelated with reductions in the vulnerable category between poverty and the middle class of 3.7 percent (Figure 2b) and a 4.4 percent reduction in the middle class (Figure 2c). The lowest income non-Hispanic Black, Hispanic, and immigrant groups have all shown decreases in poverty across these years, though it is important to note non-Hispanic Black and immigrant categories are very small portions of the population relative to the other two categories. The changes in poverty and vulnerability of poverty in some cases relate to immigrants and Hispanics moving into the middle class.

Colorado's Residents With the Lowest Incomes Are Getting Older. Another finding from our study of available data is the average age of Coloradans who are below the poverty threshold has increased from an average of approximately 43 years of age in 2005 to 48 years of age in 2018. Increases in average age are also noted for the other income categories in our investigation (from 49 to 52 years of age on average between 2005 and 2018 for those whose family incomes were between poverty and middle class, and from 46 to 50 years of age over this period for those whose income was classified as middle class). As each category has increasing age, this coincides with an increase in Colorado's overall population and growth.[19]

Since the average age of household heads and that of Coloradans in general has increased across income groups, targeted policy applications are likely to be focused on health care and retirement benefits. Household heads are also more likely to be women than in the past suggesting an increased role for inclusive human services. A long-term impact may be a shifting of priorities in the budget process to address issues more associated with an older population and with families more likely to be headed by women.

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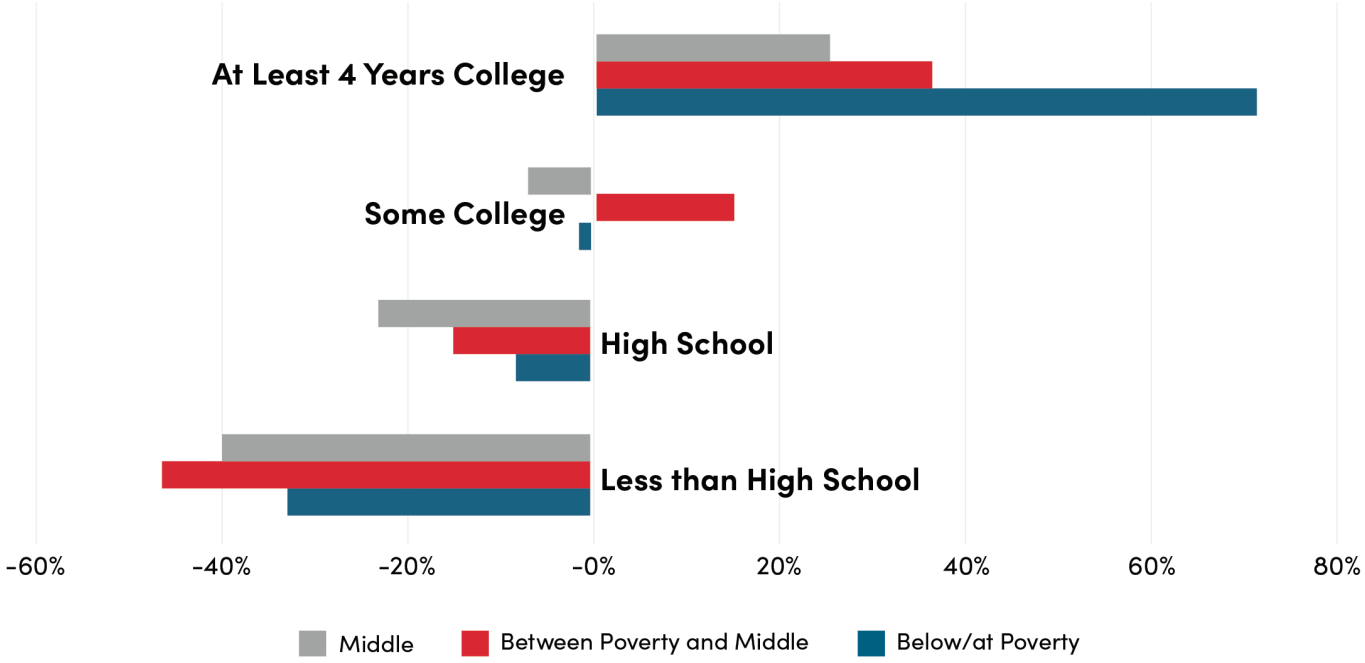
Colorado's Most Vulnerable Are More Likely to Have Gone to College Than in the Past.
The percentage of Colorado's low-income residents who indicate they have some college education decreased from 2005 to 2018 (from 26.4 percent to 26 percent). The percentage of Coloradans in the vulnerable to poverty category who indicate they have some college has increased from 2005 to 2018 (from 23.6 percent to 27.1 percent). The share of Colorado's lowest income individuals who indicate they have at least four years of college grew 71.1 percent this time period, from 13.5 percent to 23.1 percent. While this increase in percentage of individuals reporting at least four years of college has increased for all income groups studied, the percentage change is most dramatic for the most disadvantaged group, as seen in Figure 3.

The lack of state revenue assistance, the increasing cost of postsecondary education, and wage stagnation of post-school earners likely have each contributed to the rise of poverty of this group. As our findings in later sections of the report will demonstrate, an increase in funding prioritization for all categories of education could have the most significant impact on poverty reduction.

The increase in the percentage of low-income household heads with a four-year college education is significant for understanding the failure to significantly reduce poverty in Colorado. More than 50 percent of the household heads with the lowest incomes in 2018 indicated they had at least some college education, with the most dramatic increase surrounding the number of individuals with a four-year college education. This implies potential earnings in Colorado associated with college educations may be insufficient to offset the rising cost of this education. We will explore the budgetary proof of this later in this report and note further research on the "value" of a college education over time would cement the impact and benefit of postsecondary education under the current cost structure dynamics.

Changes Between 2005 & 2018 in Head of Households in Income Category Based on Education Level (Percentages)

figure 3



Source: *Author analysis of ACS data from IPUMS*

If more employers require a college education for employment, this number is likely to increase without policy offsets to the cost of education in Colorado.[20] There is evidence this is a cyclical process that ebbs and flows with market incentives. For example, the supply of new college graduates to the labor market rose at a rate not seen in several decades between 2004 and 2012. This influx of supply halted the college wage premium rise that could be an indicator of the educational increase in those experiencing poverty.[21]
A key observation for state budget funding consideration is the increase in education among those experiencing poverty and among those in both at risk and within middle class categories. While this overall increase in postsecondary education across several income categories highlights the perceived benefits of education, current funding mechanisms of cost sharing for postsecondary education reduce the probability of upward mobility.

Potential earnings with college educations are often insufficient to offset the cost of education. Specifically, state public funding has remained relatively steady while individual costs have increased. These patterns are devasting for the "value" of postsecondary education. While commonsense and data show an increase in wage and compensation based on postsecondary education degrees, those increases have not kept up with the cost of attaining those credentials (a feature we will highlight later in this report). Furthermore, if more employers require a college education for employment, the number of college-educated people is likely to increase even without policy offsets to the cost of education in Colorado. This influx of supply of new college-educated workers then may decrease the college wage premium and relate to the educational increase on average of those experiencing poverty.

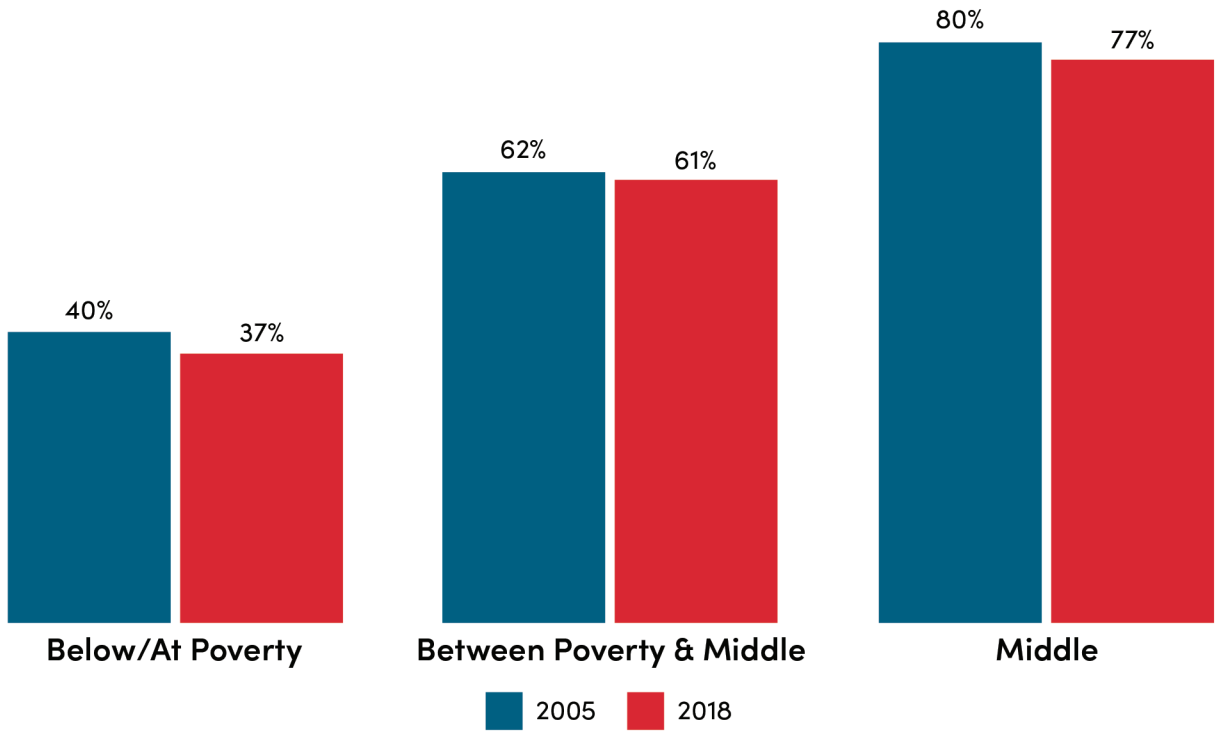
Coloradans With Low Incomes Face Increasing Challenges to Remain in Labor Force. When we diverge from more typical national measures of employment that are scaled relative to only those who are looking for a job to summarize across all Coloradans, we look at the larger group of all household heads and calculate who currently is employed (versus unemployed, engaged in home and care work, retired, and other possibilities including moving out of the labor force for any reason). With this, we see the percentage of Colorado's household heads with the lowest incomes who indicate they are currently holding a job has decreased from 40.1 percent to 37.1 percent from 2005 to 2018 (Figure 4).

The changes we note are significant since the overall employment changes in other income categories also decreased, indicating a general trend of fewer employment opportunities for those residents most in need of or wanting a job. However, even though the percent of employment in each category decreased when compared with the population growth, we see the total number of employed individuals in each income category increased. We also note with the aging of the population we would expect increases in the retired group over time. While the total number of people employed has increased over time, the lowest income categories experienced the highest reduction in employment likely due to the growing number of individuals in those categories, as well as the older population aging out of the workforce.

> ***While the total number of people employed has increased over time, the lowest income categories experienced the highest reduction in employment likely due to the growing number of individuals in those categories, as well as the older population aging out of the workforce.***

Households Employed in Each Income Category (Percentages)

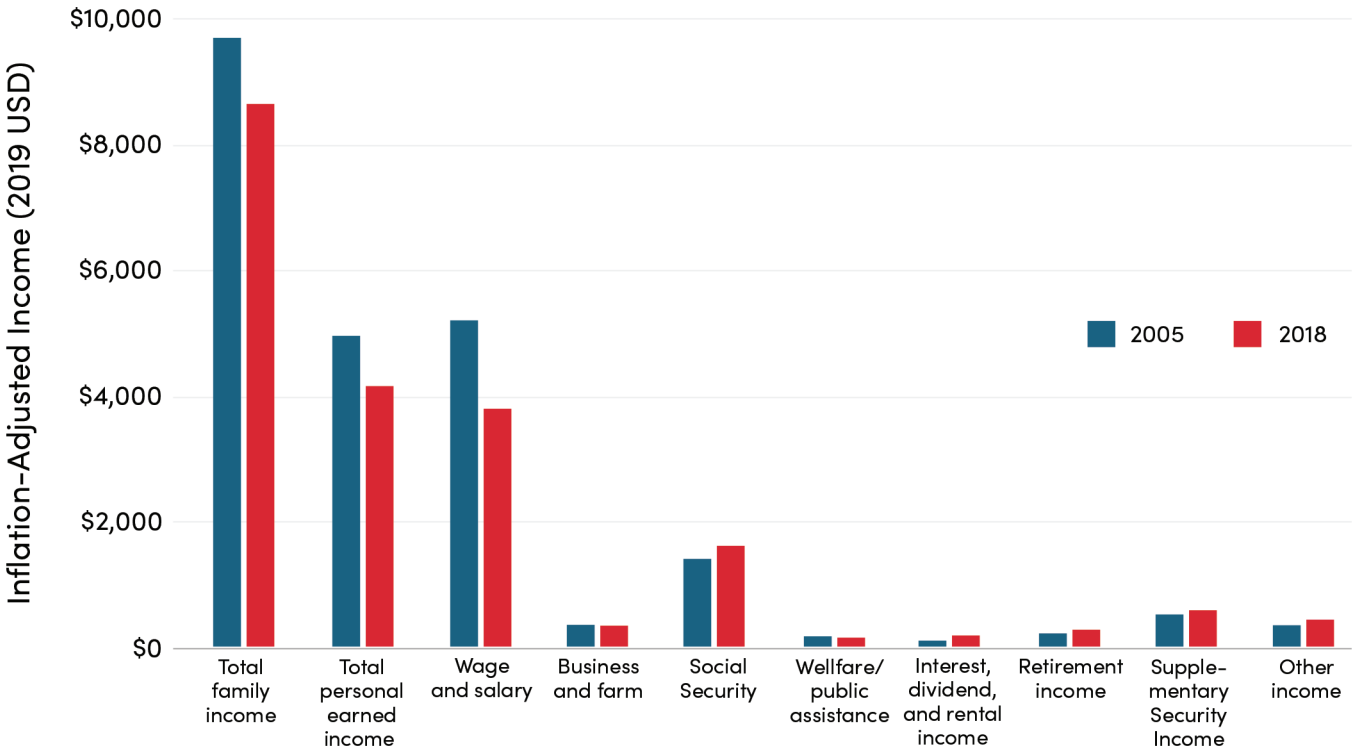
fig. 4



Source: *Author analysis of ACS data from IPUMS*

Public Aid Isn't Enough to Make a Meaningful Difference. The average total family income for families below the poverty threshold in Colorado have decreased by more than 10 percent between 2005 and 2018, a period in which average costs of living increased (Figure 5). The impact on the ability to afford everyday costs therefore is exacerbated and suggests Coloradans with the lowest incomes may be becoming particularly worse off over time.

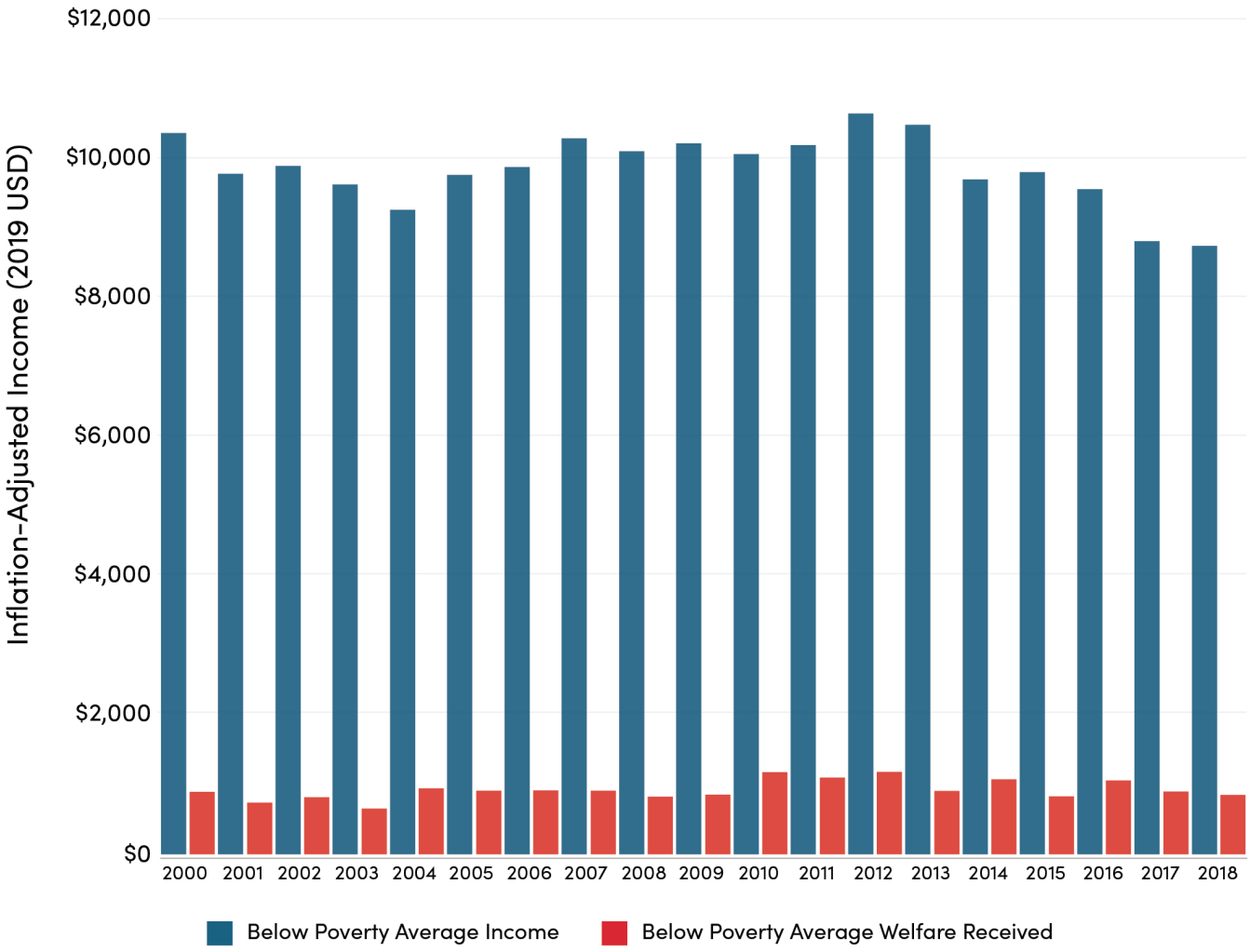
Income Sources for Families At or Below Poverty, 2005 & 2018 *figure 5*



Source: *Author analysis of ACS data from IPUMS*

Losses in general welfare assistance alongside stagnation and sometimes losses in overall total family income are consistent with the increase in the number of Coloradans in poverty (Figure 6). Even small gains in all other income categories were not enough to increase the total family income average. This paints a picture of Colorado's most vulnerable residents being left behind in three major indicators of mobility: income, public assistance, and cost of living.

Comparison of Income vs. Welfare for Those Below Poverty Threshold Over Time *figure 6*



Source: *Author analysis of ACS data from IPUMS*

Public aid is defined in our data as being income associated with public assistance programs (e.g., welfare). The data do not include any monies received from private charity. Though the highest support mirrors the time after the Great Recession, the overall pattern infers the total cost of living share paid by individual families, as opposed to being supplemented by federal subsidies, is likely to continue to increase over time. This is especially worrisome given, at the time of this writing, we are experiencing the early economic effects associated with the COVID-19 pandemic and resulting budgetary restrictions. It is an intuitive conclusion the reduction in total income, the reduction in public supports, and the current economic budget shortfalls will further reduce vulnerable Coloradans' economic mobility.

Family Self-Sufficiency in Colorado

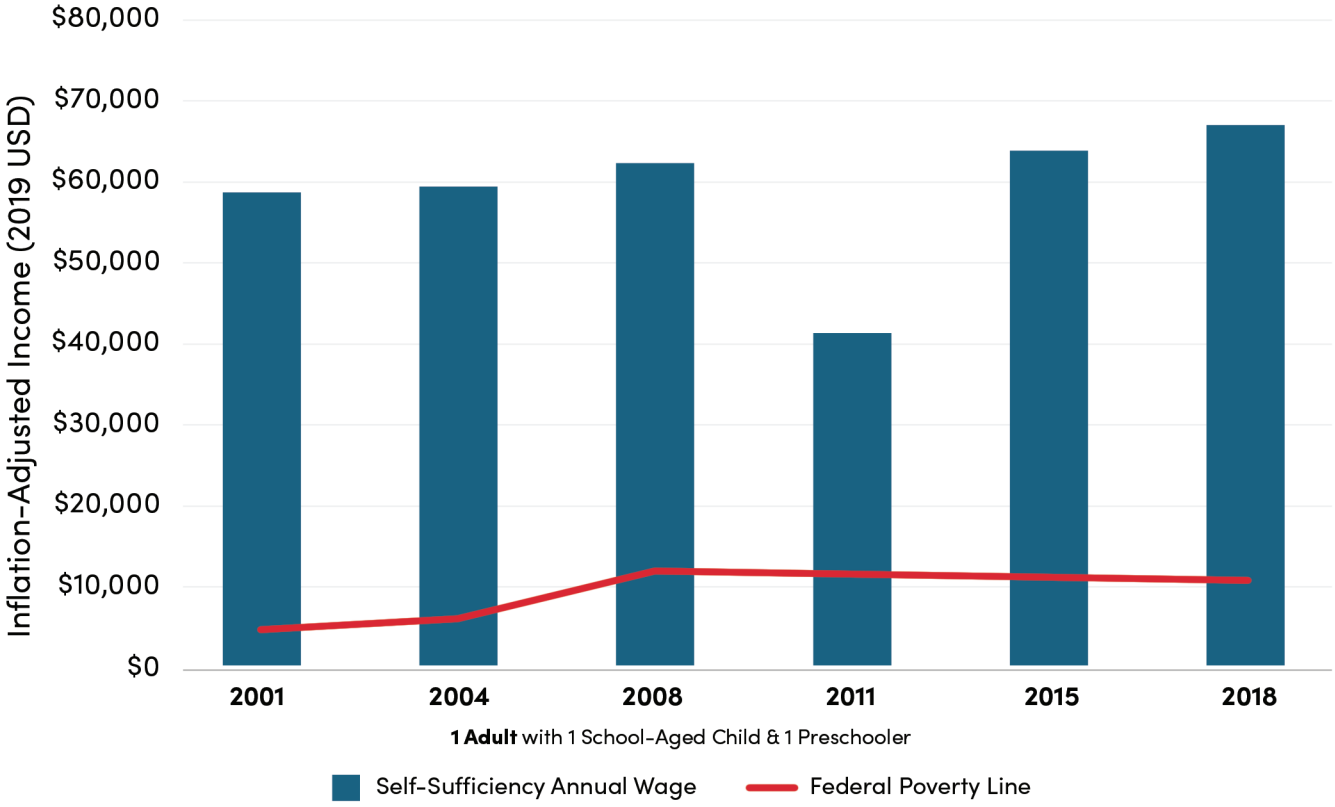
Another option for comparison is the self-sufficiency standard for Colorado that describes the income necessary to support a family of a given size without public assistance.[22] As shown below for the years between 2001 and 2018, there is a significant difference between the amount of income needed to live in Colorado due to rising costs in various cost of living indicators (e.g., housing, utilities, transportation, health care, groceries, etc.).[23]

As shown in the total income for households with two parents and two children with the lowest income in 2018, for example, was significantly less than the amount considered necessary for the same standard of living in Colorado based on the self-sufficiency standard ($10,089 compared with $73,613). This infers a significant amount of public (and/or private) assistance would be needed to make up the gap in minimum livable income.

Figure 7 illustrates the gap in what the federal government considers a livable poverty line compared with the actual cost of living requirements in Colorado to provide for oneself plus two children, or a parental unit (of two adults) with two children. We use the assumption one child is preschool age and one child is school age. As seen, the gap is significant, indicating the magnitude of funding of assistance programs required under federal standards to prevent a family from slipping into more impoverished conditions, especially in Colorado.

Difference Between Self-Sufficiency & the Federal Poverty Line, for a Family With 1 Adult & 2 Children

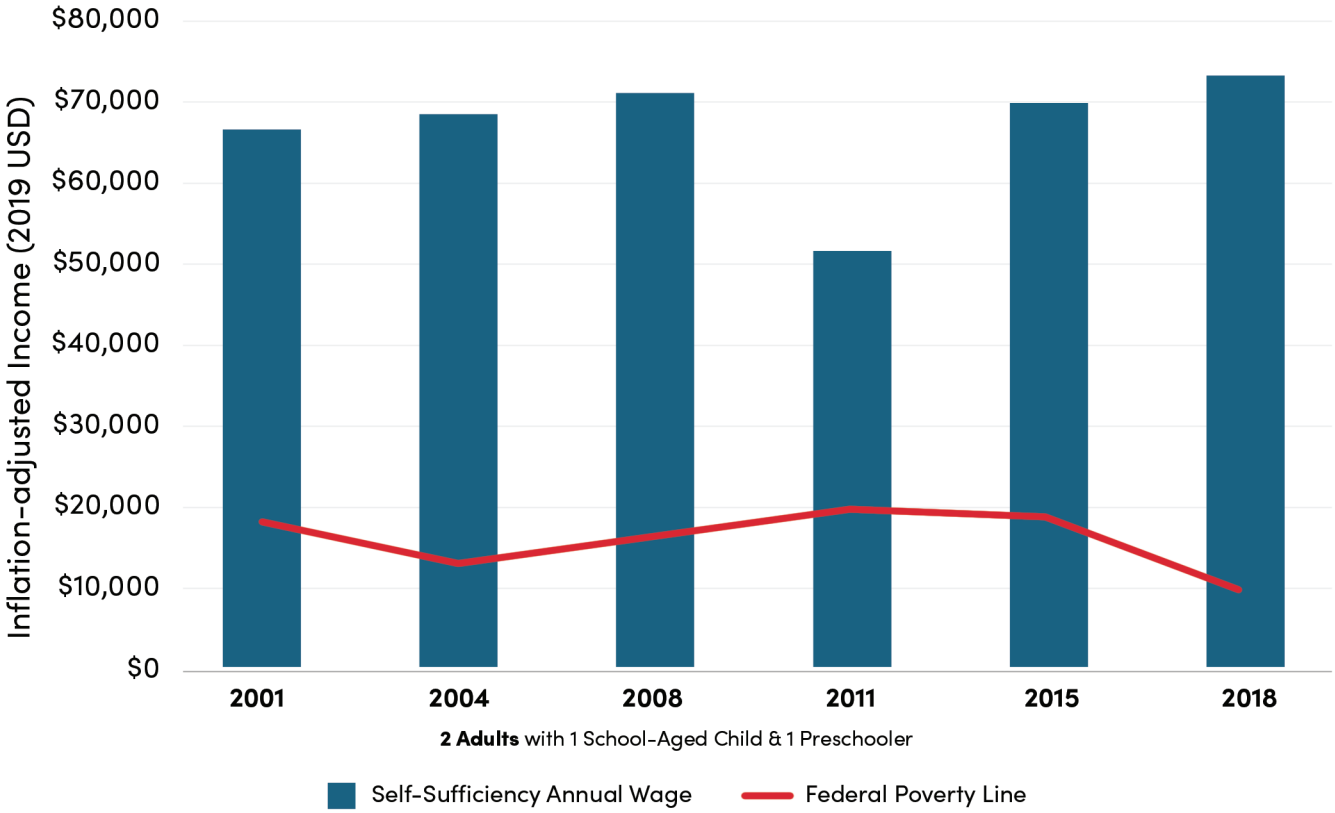
figure 7a



Source: *Author analysis of poverty thresholds from the U.S. Census Bureau and of the self-sufficiency standard for Colorado*

Difference Between Self-Sufficiency & the Federal Poverty Line, for a Family With 2 Adults & 2 Children

figure 7b



Source: *Author analysis of poverty thresholds from the U.S. Census Bureau and of the self-sufficiency standard for Colorado*

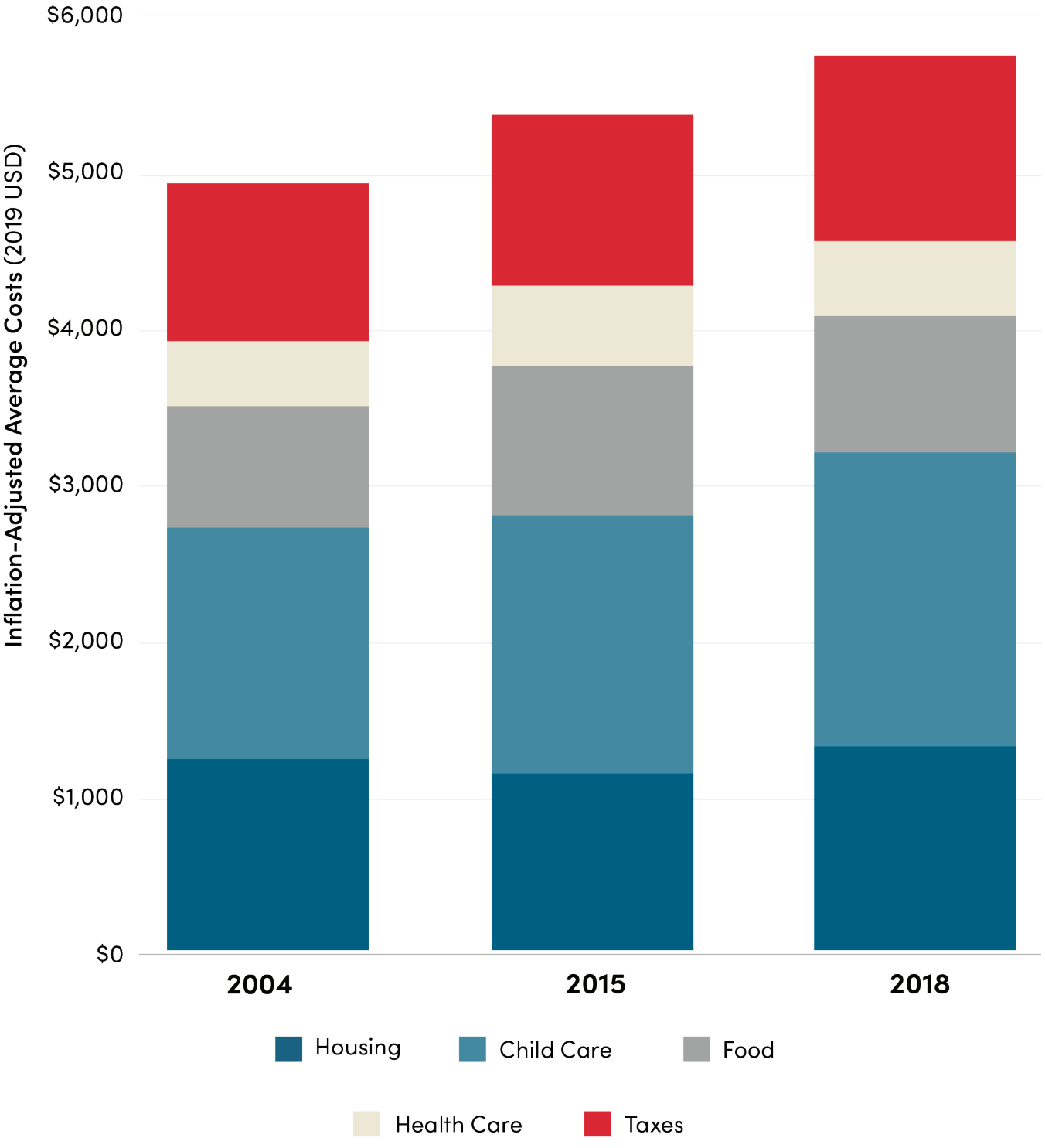
Growing Gap Between Income & Cost of Living Based on Self-Sufficiency Measures. While income has decreased in the lowest income households, costs for those living in Colorado have increased. The primary drivers of the increase in costs are housing, child care, and taxes (Figure 8). Furthermore, the primary driver of the gap in official poverty threshold income and self-sufficiency centers around the cost of living, specifically in Colorado where living costs are relatively high. As shown in Figure 8, with the exception of the period of years after the Great Recession, the costs associated with a family of two adults and two children have risen over $1,000 per month while total monthly income for the households with the lowest incomes has actually decreased by around $300.

> ***"The costs associated with a family of two adults and two children have risen over $1,000 per month while total monthly income for the households with the lowest incomes has actually decreased by around $300.***

Growing Cost of Living in Colorado

figure 8

Average Monthly Costs for Low-Income Families with 2 Adults & 1 School-Aged Child, 1 Preschooler



Source: *Author analysis of the self-sufficiency standard for Colorado*

Part 2

Public Expenditure & the Economic Mobility of Low-Income Families

Key Highlights

Public Expenditure in Colorado (Size & Statutes)

- When adjusted for population and inflation, Colorado's budget has not grown over the past two decades.
- The largest components of the state's budget are health care and primary and secondary levels of education.
- On a per-person basis, there have been significant decreases in spending on K-12 education and human services. K-12 education spending fell significantly with the 2008 recession and has yet to recover.
- Increases in health care spending correspond to the enactment of the Affordable Care Act that increased the number of enrolled participants in the health care system.
- General Fund spending for postsecondary education has remained relatively flat, while cash funding (fees and tuition) has steadily increased. This suggests an increasingly reduced return on investment in higher education when compared with wage stagnation over the same period.

Public Expenditure Effects on the Mobility of Colorado Families

- Analysis of Coloradans from 2005 through 2018 suggests Colorado's public expenditure, to the extent that a goal was to increase the quality of life of Colorado's residents, has become less effective over time despite increasing trends in some publicly financed categories.
- Impacts of higher education, and of judicial spending are associated with lower probabilities of poverty soon after expenditure as would be consistent with increasing the quality of life of Coloradans.
- Longer-run impacts are more variable across racial population subgroups.
- Targeted approaches are warranted as the changes impact different demographics in very different ways.

Public Expenditure Effects on Homeownership

- Without access to a fundamental wealth building asset, those in lower income categories are unable to access the middle class staple of economic mobility.
- Public expenditure in K-12 education, human services, and judicial are the most likely to lead to increased rates of homeownership for Coloradans below the middle class.
- The gap in homeownership between whites and members of communities of color decreases with increased investments in higher education.
- Increased spending in corrections is correlated with decreases in homeownership and judicial spending is associated with an increased homeownership gap between whites and communities of color.

Public Expenditure in Colorado (Size & Statutes)

We build off a baseline understanding of Colorado public spending to determine the economic mobility potential for effective policy. We start by defining what we mean by public expenditures and the "size" of government in Colorado. From the state operating budget in fiscal year 2019-2020, 19 percent (of $32.52 billion in total expenditures) went to K-12 education, 15 percent to higher education, 40.1 percent to human services and health care, with lesser amounts allocated to transportation (6.5 percent), corrections (1.6 percent), judicial (2.6 percent), general governmental expenditures (2.1 percent), and miscellaneous "other" expenses, including spending for agriculture, regulatory agencies, and public health and environment (11.7 percent).[24] The breakdown into these budget categories is relevant since we are particularly interested in the specific types of programs and policies that could increase mobility and self-sufficiency of Colorado families in the lower part of the income distribution.

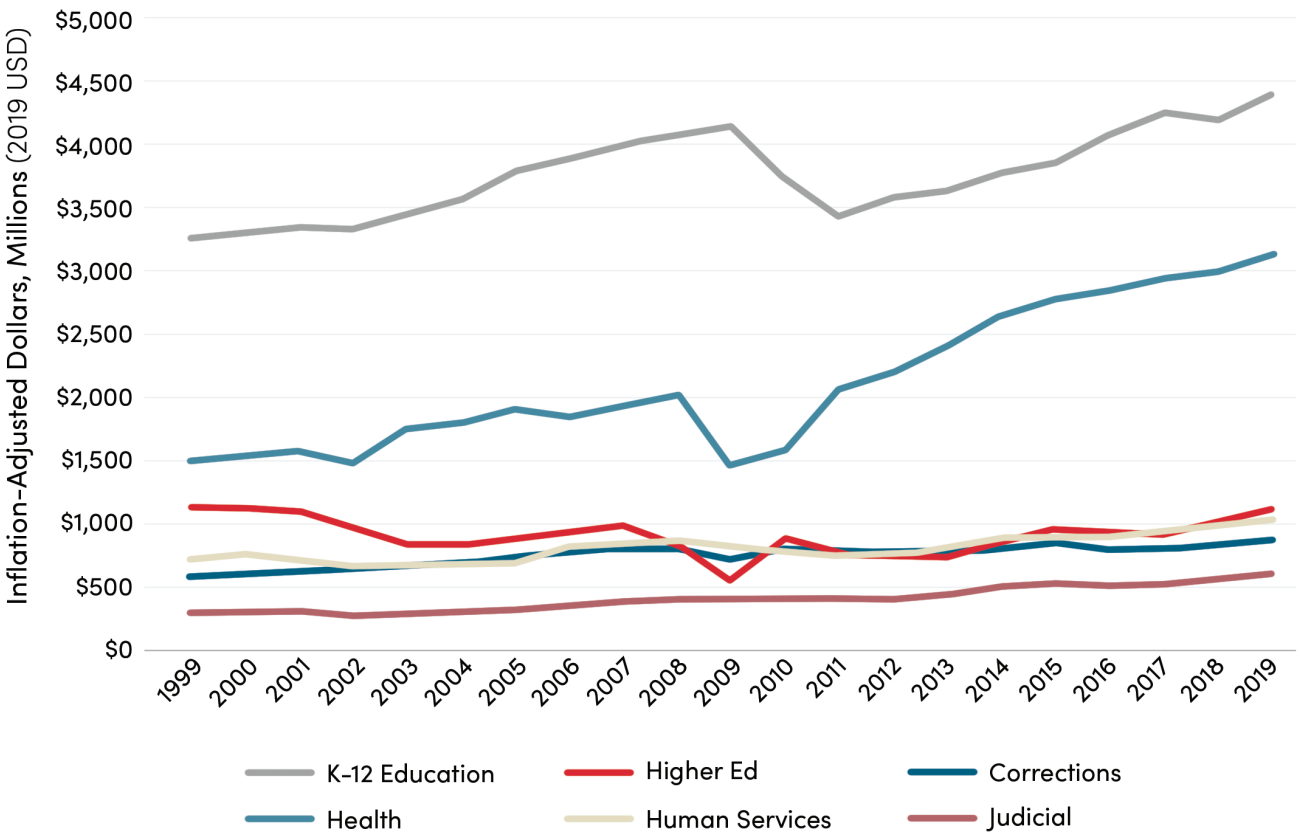
Colorado's population continues to grow quickly and is currently approximately 5.8 million, up almost 15 percent since the 2010 Census.[25] Considering Colorado is one of the fastest growing places to live in the country, we might reasonably expect similar growth in taxpayer-funded expenditures. We present budget numbers adjusted for price changes (inflation), for population, and for the size of the state economy for completeness. Overall, we see state spending has not kept up with population growth. In fact, on a per-person basis, there have been significant decreases in spending on K-12 education and human services. Positive changes in health care spending correspond to the enactment of the Affordable Care Act that increased the number of enrolled participants in the health care system as opposed to state-level decision making.

Aggregate state operating budget series can hide defunding of certain categories by state budgeting processes (e.g., when there is an influx of money from federal funds or from other intergovernmental transfers). Colorado's total state operating budget is comprised of the General Fund, cash funding, and federal funding. Generated mostly from income and sales tax, the General Fund is the main source of Colorado-controlled public funding.[26] As opposed to federally controlled funds and specifically allocated "cash" funds, the General Fund is debated and approved annually by the Colorado legislature, making it the most flexible and important funding source to economic mobility in Colorado. We base our analysis on this measure of public spending.

Figure 9 focuses on what the state General Assembly refers to as the Big Six: health care, K-12 education, higher education, human services, corrections, and judicial. These Big Six categories, which are under primary consideration in this report, not only represent the majority of General Fund spending (in 2019-2020, these six categories accounted for 92 percent General Fund spending),[27] but also presumably stand for the priorities of the legislature. As the dominate slice of the available budget, it is important to note the Big Six categories contain programs that can hurt or improve the quality of life of Coloradans with low incomes.

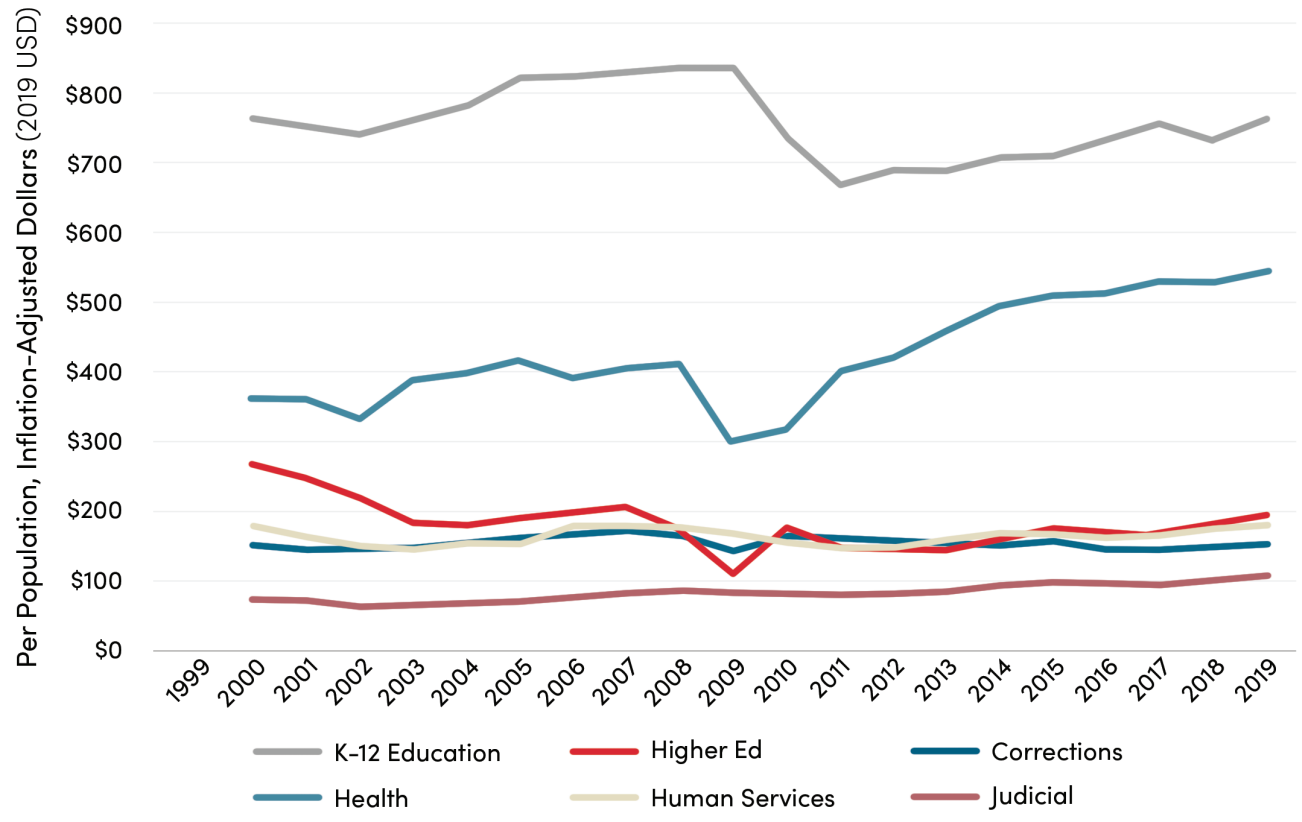
General Fund Trends, the Majority of Legislative-Controlled Budgeting

figure 9a

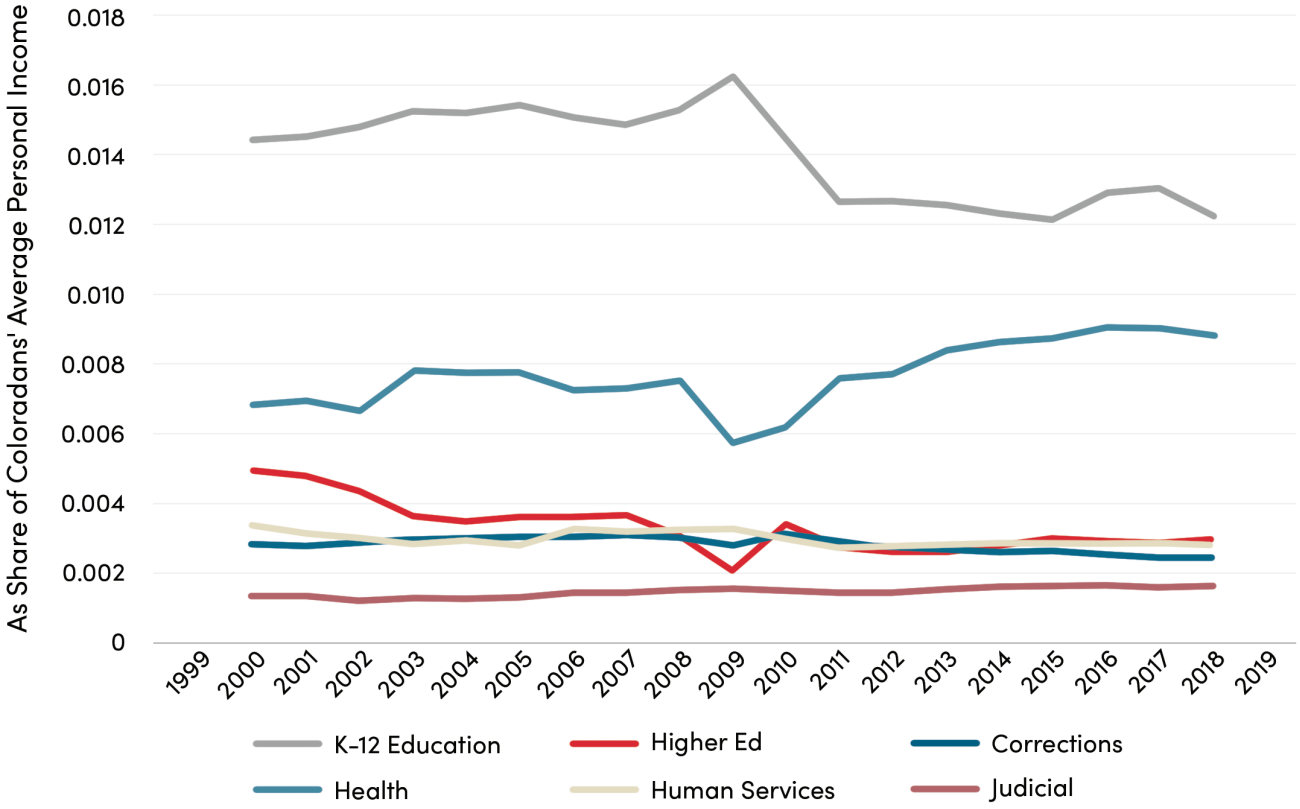


General Fund Trends, Adjusted for Population

figure 9b



General Fund Trends, Share of Average Personal Income *figure 9c*



Source: *Author analysis of General Fund data from the state of Colorado Joint Budget Committee*

The General Fund picture illustrates features of a nuanced budget story. While spending increases are evident for health care over our time period of interest, allocations per person to K-12 education and to higher education have significantly decreased.

Where Does This Money Go?

We consider each of the main budget categories in our review.

Health care: The vast majority of the state's General Fund spending on health care involves funding medical services for Medicaid and insurance premiums. The adoption of the Affordable Care Act is the primary driver of increased expenditure in this category, though it is important to note two-thirds of this increase went to older Coloradans, children, and people with disabilities. A smaller but relevant increase in spending in recent years was in indigent care and behavioral health programs that can provide beneficial public income supports for health services more widely to state residents.

K-12 education: This category is one of the most direct and specific funding mechanisms in the budget. Currently a formula based on need and the number of students is used to calculate necessary funding. Of note, there has been a significant shift in state aid over local taxation share over time.

Higher education: Increased enrollment is generally considered a cause of increased spending on higher education. Federal grants, contracts, and student aid are primary components of this state spending. However, the overall share of spending by the state on postsecondary education has plummeted over the last decade when viewed through the General Fund, with the cost of enrollment being absorbed by individual families and students.

Human services: This category includes General Fund spending on non-medical public assistance for all Coloradans, which includes a wide range of programs, from food assistance to child welfare services.

Corrections: This part of the budget focuses primarily on the Department of Corrections facilities across the state of Colorado. The majority of spending reflects the cost of operations and the increase in incarcerations.

Judicial: Essentially, funding consists of state and local court administrative costs. Notably, recent funding has increased the share of judicial funds that provide more holistic social welfare supports as a part of the probation process and as an alternative to prison.

Trends in Public Expenditures

The history of educational spending at both the K-12 and postsecondary education levels is an even more complicated issue. Changes such as the Taxpayer's Bill of Rights (TABOR), which limits state taxation; the 2008 Great Recession; and Colorado's 2012 marijuana excise tax, which is linked to school construction. All have contributed to variation in spending on K-12 and postsecondary education. For example, the 2008 recession severely limited Colorado's 2009 tax collection, leading to a decrease in K-12 educational funding that did not recover for a full decade,[28] and substitutions have occurred between the General Fund for higher education and the costs borne by students over this period.

As we enter a new period of financial constraint, the importance of this observation is heightened. A policy implication of this variance in funding is the overall economic health of the state greatly influences the spending on education which directly affects the economic health of the state. This cyclical influence infers the need to disconnect educational spending from specific income taxation, a feature which we return to in the conclusions of this report.

Public Expenditure Effects on the Mobility of Colorado Families

Graphical analysis of Colorado's income gap over time suggests Colorado's public expenditure, to the extent that its goal is to increase or maintain the quality of life of Colorado's residents, has become less effective despite increasing trends in some publicly financed categories. Therefore, we turn to determining if evidence from available data supports a link between changes in spending and any significant changes to a family's quality of life and well-being in the state. We are particularly interested in if and how changes in spending toward state public sector supports for economic mobility, like those for K-12 and higher education, have changed with changes in family characteristics over time.[29]

A primary difference between the empirical modeling in this section and what we observe from summary information earlier in this report is that we are calculating impacts on the probability of being low income. This exercise allows us to isolate correlations with economic mobility while holding constant the impacts of other important variables (e.g., demographic differences for families, macroeconomic differences over time, etc.).

Examining the Effects of Various Public Expenditures

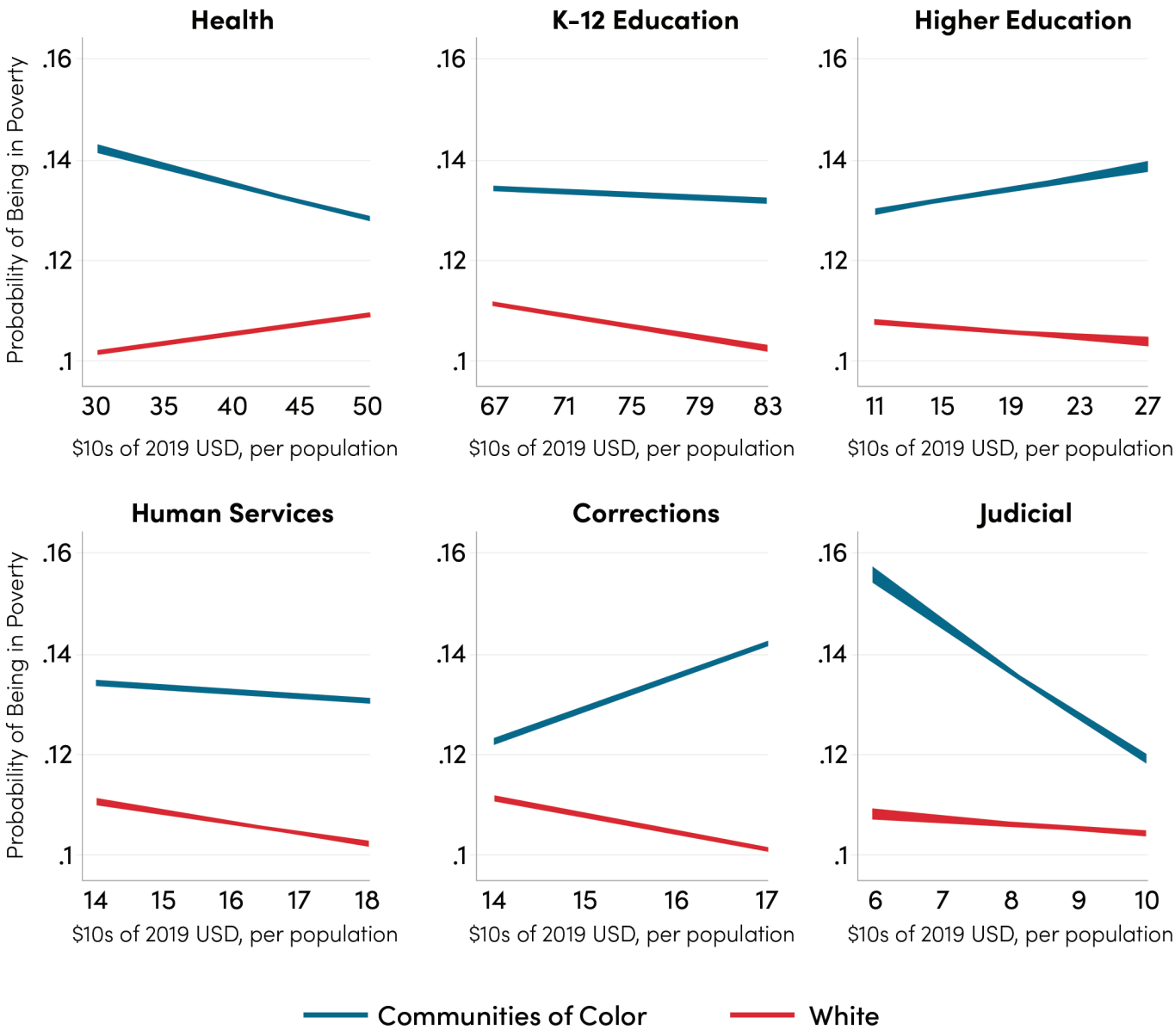
Our thought experiment is based on thinking through the implications of adding an extra $10 per capita to one of the six expenditure categories. In other words, what if we had an extra $10 per person (in constant year 2019 adjusted dollars) that we could allocate to a particular Big Six public spending category? What could policymakers do that might help family outcomes? In the context of this study, we ask what the associated change in probability would be of being in one of the low-income groups relative to being in the middle class. By thinking of public expenditures on a per-person basis, we are comparing constant increases in spending (i.e. the same amount of total spending directed at one budget category versus another). The exercise therefore can be thought of in terms of comparing and contrasting hypothetical budgets where one category is increased in isolation and with a fixed sum of money. This is, of course, different from considering per participant (e.g., per student in education, per patient in health care, per offender in corrections, etc.), though this type of scaling may be relevant for future, more detailed work on particular budget categories and their implications.

Our analysis consisted of estimating a formal statistical model designed to isolate the impact of our spending categories of interest as they relate to poverty outcomes in Colorado. Because we are ultimately interested in how spending affects Coloradans and since we are using data from several years over time, we adjust General Fund spending values by both inflation and by population. We follow past literature in making judgement calls regarding our modeling decisions.[30] We start by considering the "short-run" case, in which we isolate changes in the probability of poverty one year after General Fund expenditures.

We illustrate key impacts for our models that account for differences in demographics, time, and local geographies. In each case, we hold constant correlations between poverty and several household demographics: age of the household head in years; whether the household head is a woman or man; whether the household head is non-Hispanic white, non-Hispanic Black, Hispanic, or other; whether they have less than a high school education, high school, some college, or at least four years of college; whether they are an immigrant; whether they are married; and whether they are currently employed. We also hold constant differences in the number of family members in the household, the number of children in the household, and the number of children under age 5 in the household, as well as the year and place within the state of observation and macroeconomic variables corresponding to increases in the size of the economy measured by gross domestic product (GDP) of the state and to increases in population through the mechanism of migration into the state by year. Additional details about our estimated models appear in the Technical Appendix to this report.

Change in Probability of Poverty of Non-Hispanic White & Minority Households With a $10 Per-Capita Increase in General Fund Spending (After One Year), By Budget Category

figure 10



Source: *Author analysis of ACS data from IPUMS and General Fund data from the state of Colorado Joint Budget Committee*

Patterns illustrate how impacts of General Fund expenditure on Coloradans are not uniform across all parts of our population. We particularly look at how impacts compare within the non-Hispanic white population and communities of color. For our first analysis in Figure 10, we consider impacts at one-year lags (e.g., the impact of state funding one year in the past in each budget category separately on what we see today in terms of the probability of experiencing poverty).

Health care: We find the probability of being below the poverty threshold is decreasing for those communities of color but (marginally) increasing for the non-Hispanic white population. Health care is a large expenditure category with funding primarily targeting lower income individuals and families, which are disproportionately non-white, as shown in earlier summary statistics.

K-12 education: We find the probability of being below the poverty threshold is decreasing for white Coloradans and for communities of color alike for K-12 education. This suggests K-12 education funding is particularly meaningful when thinking about poverty mitigators for Colorado in the short term.

Higher education: We find the probability of poverty is decreasing for non-Hispanic whites alone for higher education. A primary difference between K-12 education and higher education is the presence of tuition in exchange for access. Constraints in terms of loan availability mean that not all Coloradans will find higher education affordable. As this is correlated with race, this suggests that some of the differential experience of non-Hispanic whites versus members of communities of color may relate to the feasibility of paying for postsecondary education in the first place. While universities and colleges already prioritize cost somewhat on need and access (e.g., offering in-state versus out-of-state rates, etc.), even these rate structures may reinforce barriers some Coloradans face. Education often is associated with the probability of finding high paying and stable employment. Our analysis therefore suggests a focus on reducing student debt, increasing per-student funding, and providing a better cost-benefit value for postsecondary education could provide a boost to earnings and subsequently reduce the percentage of Coloradans in poverty.

Human services: Like our findings for K-12 education, we find the probability of being below the poverty threshold is decreasing for non-Hispanic whites and for communities of color alike for the category of spending on human services. This means human services represent a promising category of spending to nudge poverty outcomes. One caveat, however, is human services expenditures generally support programs with stringent eligibility thresholds, meaning this type of spending is likely to reach a smaller group of beneficiaries than in the broader cases of K-12 and higher education spending. Still, this could be a particularly meaningful category given our earlier findings about changing demographic patterns toward more women as household heads, especially in low-income categories.

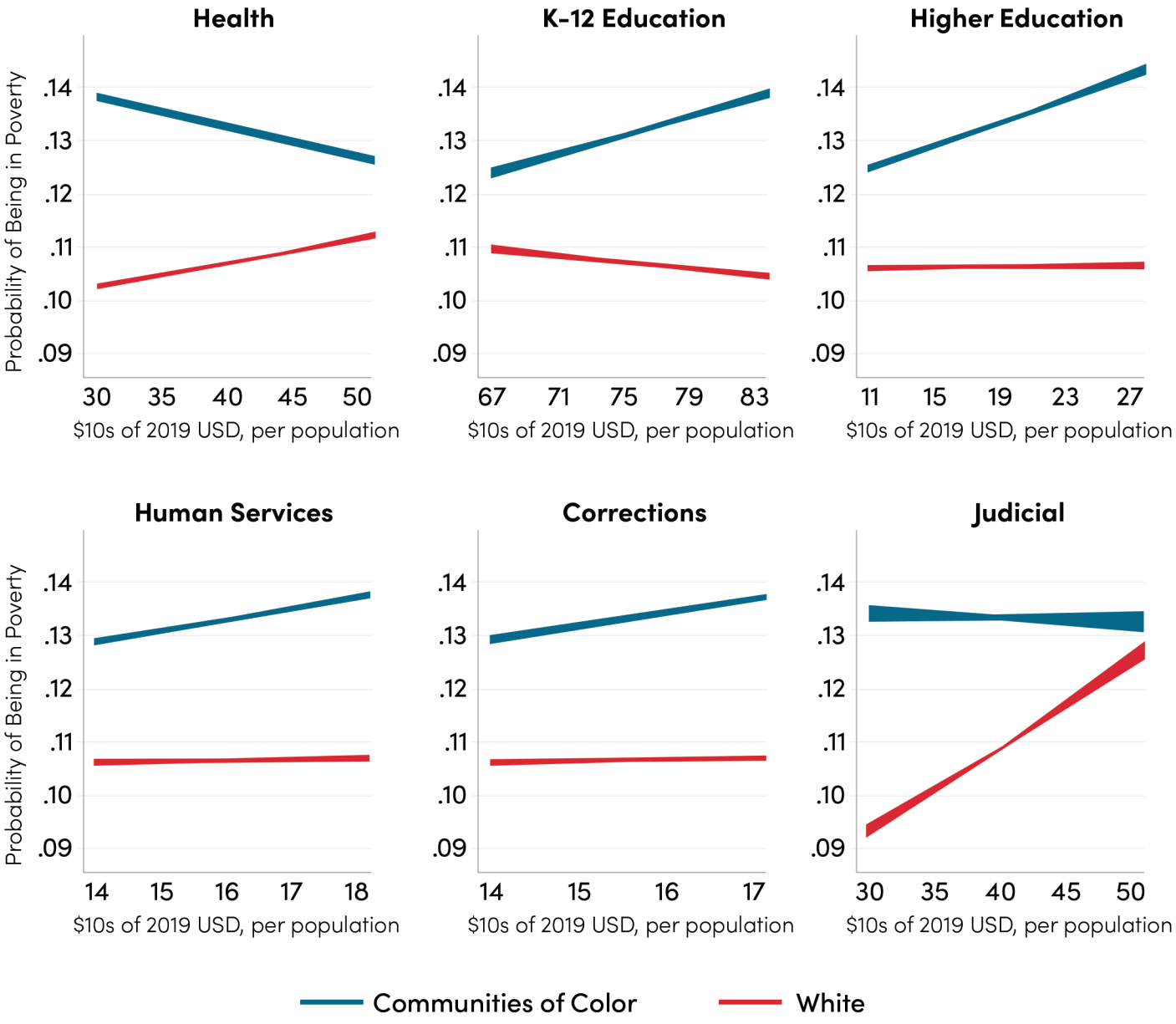
Corrections: We find the probability of poverty is decreasing for non-Hispanic whites alone for corrections, a finding likely interrelated with the extreme differences in the incarceration rate by race (and in differences in experience for subgroups of the population with the institutions surrounding incarceration).

Judicial: We find the probability of poverty is decreasing for both non-Hispanic whites and for communities of color for judicial spending, making this another meaningful category when it comes to poverty reduction, and this may be related to how fair systems and institutions can have positive impacts.

Figure 10 further illustrates how the racial poverty gap is decreasing with health care and with judicial expenditures, but there are divergences in this gap elsewhere. This finding has potential implications for inequality and is a worthwhile area for future continued research.[31]

Change in Probability of Poverty of Non-Hispanic White & Minority Households With a $10 Per-Capita Increase in General Fund Spending (after five years), By Budget Category

figure 11



Source: *Author analysis of ACS data from IPUMS and General Fund data from the state of Colorado Joint Budget Committee*

We expand our analysis to compare and contrast the "long-run" case where we examine changes in the probability of poverty five years after General Fund expenditures are incurred. We illustrate these findings in Figure 11. At a five-year lag, we find there is a decrease in poverty associated with K-12 education, but this is only clear for non-Hispanic whites. On one hand, this may relate to parents being able to pursue career advancement opportunities when kids are being taken care of better educationally. On the other hand, we note our analysis is limited in its ability to examine intergenerational impacts within families and, therefore, this long-run story is not complete. Although intergenerational links are not possible to explore with the data we use here (in which families are only observed at one point in time), this finding warrants more detailed future study with alternate data if it becomes available.

Empirical evidence is consistent with increasing poverty gaps across races associated with both main categories of education spending (lower and higher education) when impacts are measured five years post spending. This is another troubling pattern and is consistent with other literature[32], which suggests allocating funding without attention to programmatic and other needs alone is not enough, as needs may differ by race or other socioeconomic margins.

Other patterns in Figure 11 include heath care funding seems to minimize the racial poverty gap over time. These patterns again may be related to the Affordable Care Act in 2010 and Medicaid expansion in Colorado in 2013, both which represent shocks to health expenditure at the state level.

We see similar impacts for judicial spending. Judicial is an outlier category with decreases in poverty for communities of color, but the impact on the non-Hispanic white population shows the opposite. We note this category has the lowest budget share of the Big Six and there has been limited variation in this series over time. Still, we find the decreases in poverty associated with the judicial category for communities of color to be intuitive and encouraging.

While human services funding decreases poverty in the short term, the longer run is less certain. Again, we find this suggests targeted and adaptable funding is needed, especially for outcomes in communities of color. Correction is also not likely have the intended impacts if poverty reduction is the goal, as it's actually associated with more poverty for communities of color at the five-year mark after spending.

Overall, our results suggest it is not just how much spending that matters for poverty outcomes, but also where and how the money is being spent. Still, the results suggest some categories are more efficient at reducing poverty. Given prior research shows a myriad of ways increased funding on publicly provided services, such as education, can benefit an individual's quality of life, we find our results overall to be unsurprising and reassuring for public policy, as long as distributional considerations of impacts rise in their importance. Critically, we see there are differential impacts of public spending depending on one's race. As Colorado aims to reduce equity gaps, paying attention to the disparate ways some public spending reduces poverty among white Coloradans while other spending may reduce poverty among communities of color will be essential.

"Overall, our results suggest it is not just how much spending that matters for poverty outcomes, but also where and how the money is being spent.

Public Expenditure Effects on Homeownership

A key aspect of economic mobility is the ability and opportunity to build wealth. Traditionally in the United States, some definitions of economic mobility have centered around the increasing value of a family home. A growing housing market and increased equity are examples of mechanisms that allow for increased wealth building. Although there are other methods of measuring wealth accumulation, such as investment income, the ownership of a home often serves as a way to stave off negative economic mobility and act as a fundamental family need. As expected, homeownership rates are higher for those in the middle class relative to lower income groups of Coloradans.

Percentage of Households That Own a Home *figure 12*

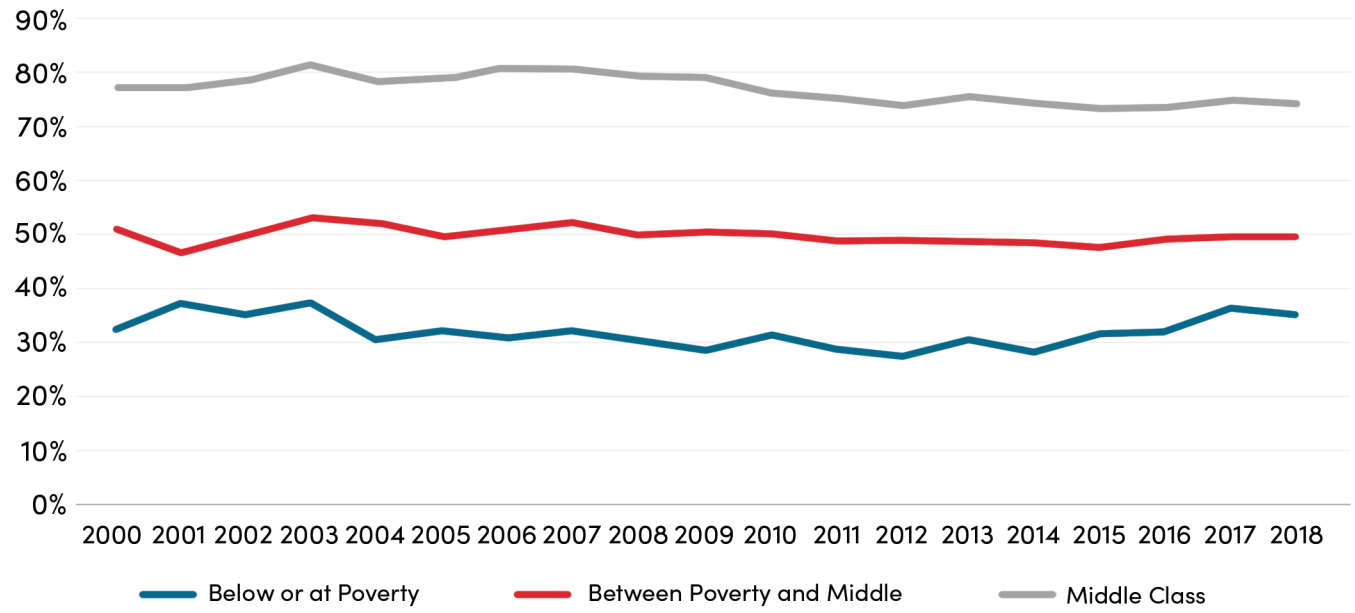
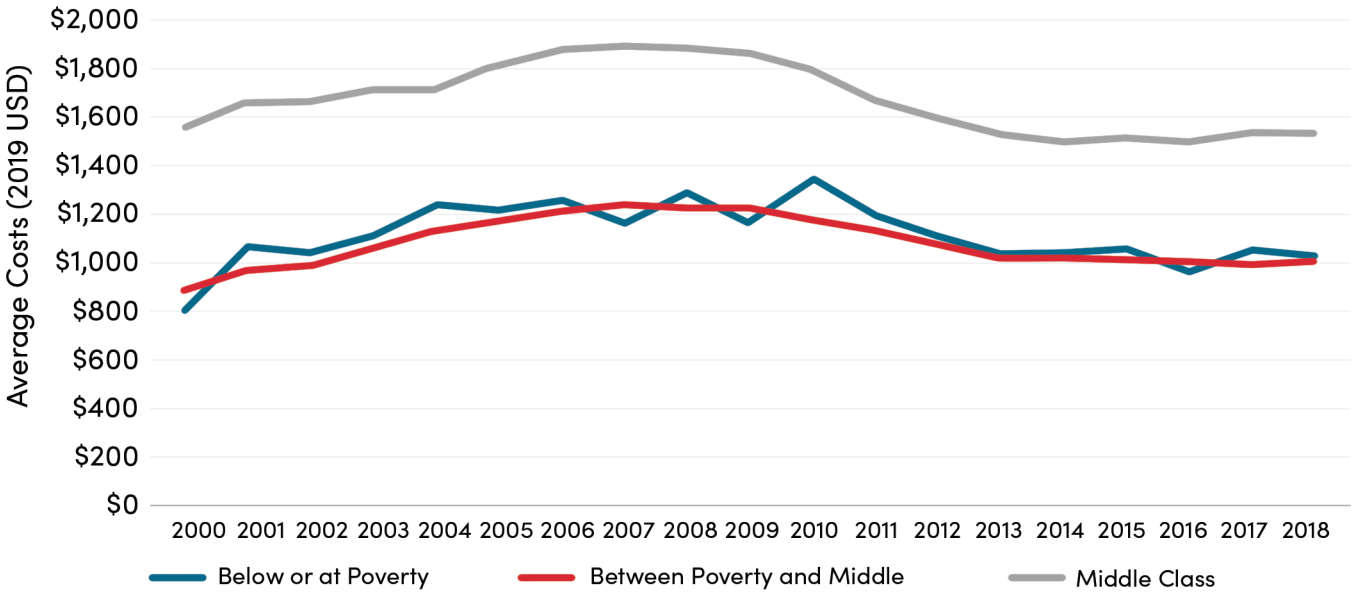


Figure 12 illustrates the percentage of Colorado families who own homes when separated by family income groups. In order to get a better sense about economic differences over time, we examine changes in the number of homeowners and their related costs versus the cost to rent in the state.[33]

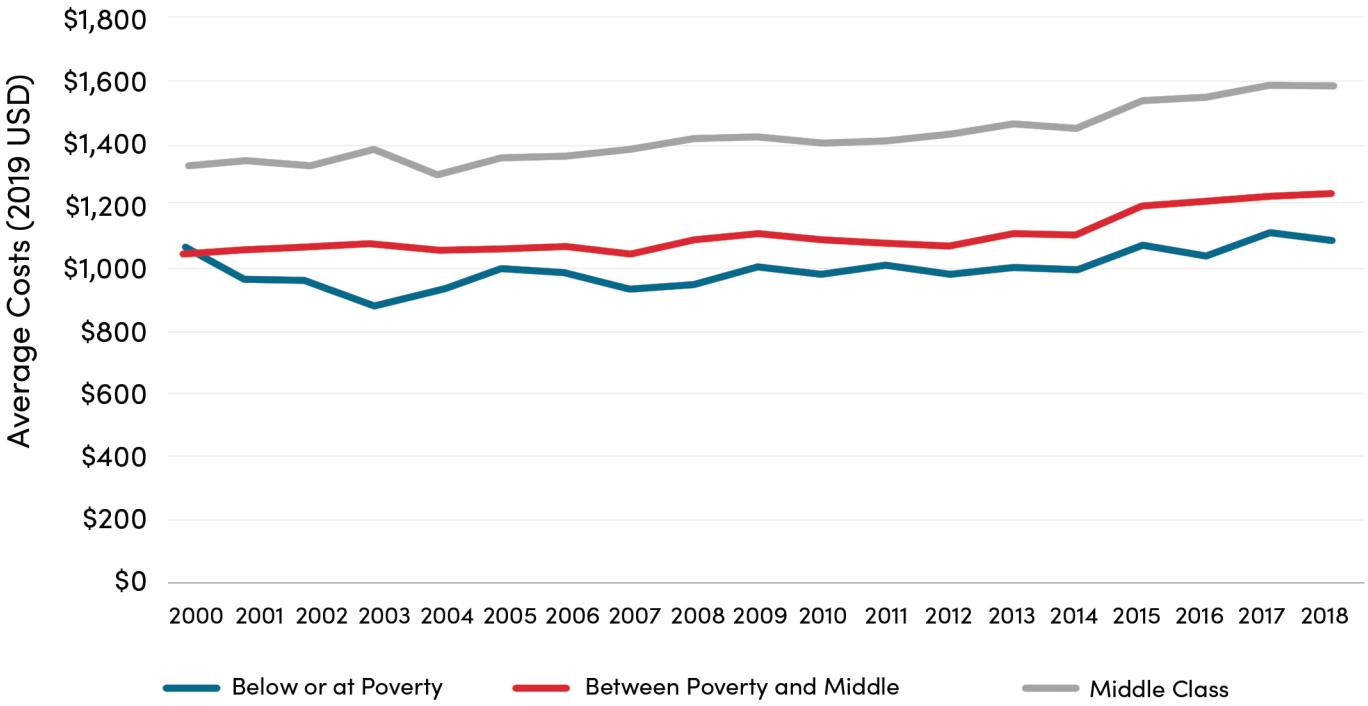
Home Ownership Costs Over Time for Coloradans *figure 13a*



Source: *Author analysis of ACS data from IPUMS*

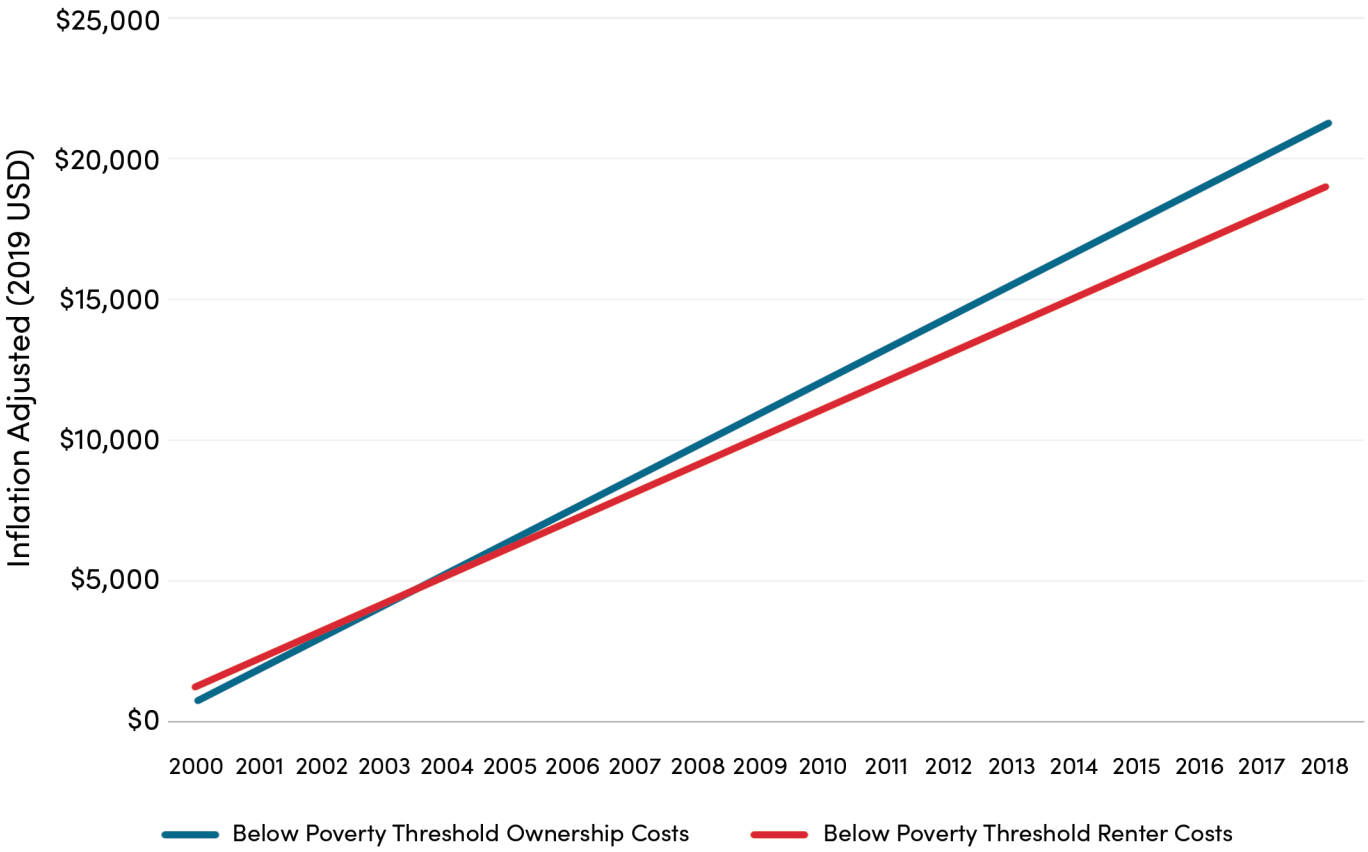
Rental Costs Over Time for Coloradans

figure 13b



Difference Between Cost of Homeownership & Rental Costs

figure 14



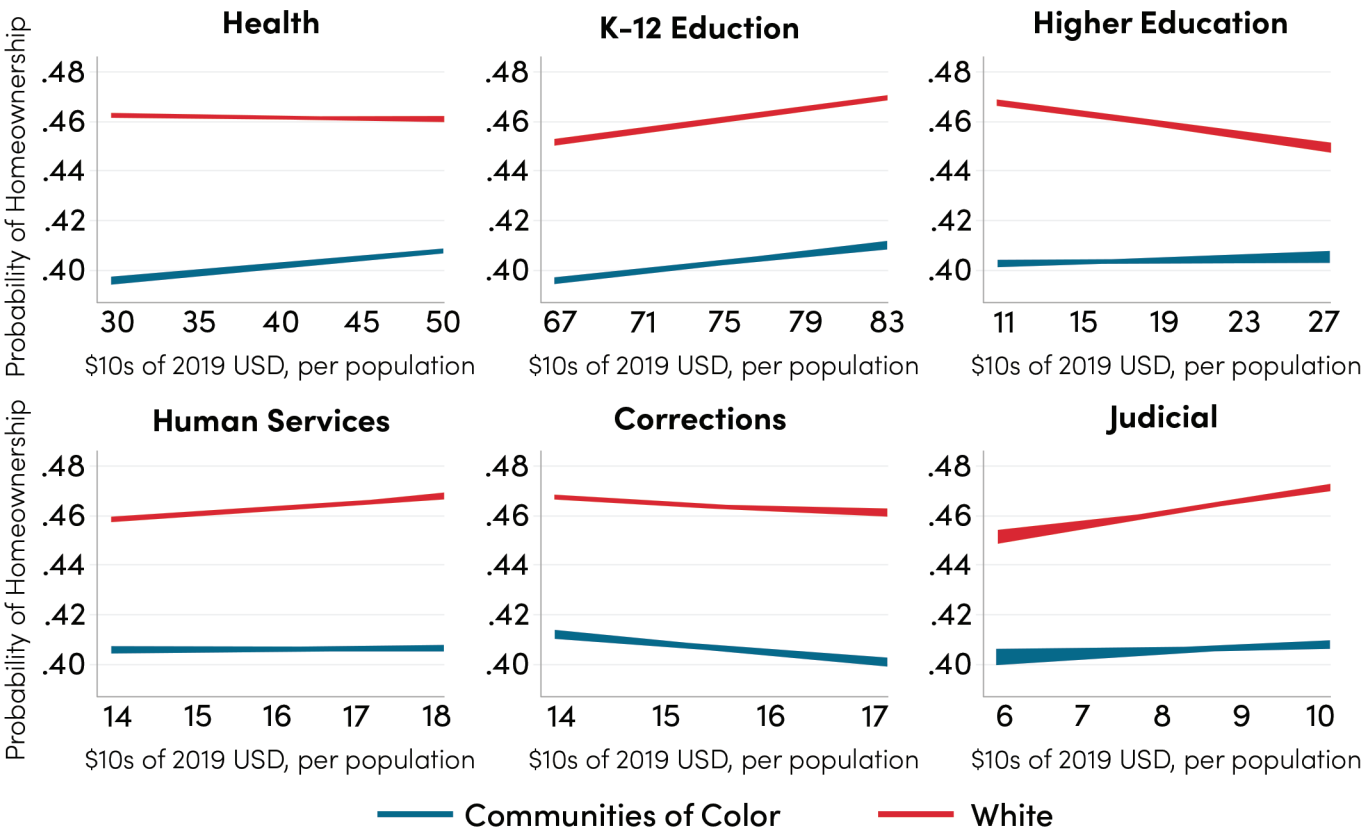
Source: *Author analysis of ACS data from IPUMS*

As expected, short-term costs suggest renting is less expensive, but when considering costs over multiple years, the costs versus benefits of owning a home become more evident. This is even more important when considering the implications of wealth building tied to home ownership and equity. Figures 13a and 13b illustrate average ownership costs and average rental costs over time in Colorado. We see ownership costs increased over the years of our study period, but then took a decreasing pattern while rental costs increased consistently.[34] When viewed together over an 18-year span, the cost of homeownership is about $2,200 higher than renting for those in the lowest income category. While this is not a small sum, it amounts to around $10 per month. When taken in context with wealth building, the extra $10 a month of homeownership represents thousands of dollars in earned wealth in the form of equity. (This magnitude is perhaps even more meaningful when we recall our thought experiment under which we saw significant changes in the probability of poverty for individual families was based on an additional $10 of spending per person per year.)

Without access to a fundamental wealth building asset, those in lower income categories are less likely to access the middle class mechanism of mobility. Unfortunately, homeownership and access to affordable housing is not one of the key components considered in Big Six General Fund legislation. As such, this traditional metric of mobility into the middle class is less likely to improve the lives of families with lower incomes under the current legislative process.

Change in Probability of Homeownership for Non-Hispanic White & Minority Households With a $10 Per-Capita Increase in General Fund Spending (After One Year), By Budget Category

figure 15



Source: *Author analysis of ACS data from IPUMS and General Fund data from the state of Colorado Joint Budget Committee*

Figure 15 illustrates similar logic to that of our earlier empirical modeling for poverty. Tying back to the role of public spending for low-income families, we consider changes in the probability of homeownership (and for the probability of holding investments respectively for comparison) as a function of state spending for Coloradans below middle class. Our modeling focus is on the population below the middle class, as those higher income individuals have reached a self-sustaining level of income that allows for avenues of investment beyond homeownership as a primary strategy for wealth building. We again show the impact by racial group of investment in the Big Six categories at the state level.

Our findings are both logical and illuminating in their explanatory power of the varied impact policy can have on different populations. Taken in turn, we find the categories with the most positive impact are K-12 education, human services, and judicial. The logic for K-12 education impacts on wealth building is described in literature on the subject, and is not a surprise, as higher spending will be correlated with better student outcomes and greater opportunities for economic mobility.

Interpretations of other categories are perhaps more nuanced. Judicial spending on the surface, for example, is easily misassociated with the prison system, which is instead encompassed by corrections (which does have the negative impact we would expect on homeownership probabilities). Digging deeper into actual expenditures in the judicial category highlights the attempt at reducing delays, inefficiencies, and legal financial obligations within the system that likely would have reduced positive impacts if left alone. Instead, the focus of the judicial category recently has been on positive changes to their system indicated an improved ability to esstentially "stay out of the way" of prosperity. We find the gap between non-Hispanic whites (who have higher rates of homeownership even when controlling for factors such as educational attainment and income) and communities of color decreases with an increase in higher education spending. This is notable as it suggests an equalization of opportunity as measured by homeownership, which is associated with access to higher education. The gap also seems to decrease with health spending, another expenditure category that is costly at the individual level when not provided publicly. The probability of homeownership, however, decreases in corrections spending for both groups, but increases with judicial spending. We argue this could be a function of different institutions and processes associated with, for example, Colorado's bail system and its link to homes as collateral.

Conclusion: The Need for Targeted Investments to Further Economic Mobility for Low-Income Coloradans

A focus on expenditure priorities in comparison to trends would in and of itself show Colorado's expenditures are out of step with the goal of reducing poverty and boosting upward economic mobility. Though the amount of money for state-funded programs has grown over time, the actual amount of money per person has shrunk or remained flat. Our study analyzes what this stagnant per-capita funding has done (or not done) to arguably two of the most important metrics of public expenditure success: economic mobility and reduced poverty. Both of these categories represent growth, efficiency, and can be equated, in at least some interpretations, with the promise of the American Dream.

The trend of declining investment per person has disproportionately impacted low-income families, creating potentially increasing inequalities across race, ethnicity, and class. In Colorado, households on the lower end of the economic scale have seen wage reductions in a time where the influx in population has contributed to rising costs in affordable living. Costs of child care and housing specifically have risen by enough that the assumed equivalent rise in public aid would have a difficult time compensating. Unfortunately, not only have wages stagnated and even decreased on average, but the public aid for low-income families has decreased as well. One of the traditional indicators of a mechanism for economic mobility that could combat the declining trends is postsecondary education. But here, we again see the dramatic diminishing prospects of Coloradans through the significant increase in the number of residents at or below the poverty line with four years of postsecondary education.

This study's findings show increased funding in vital categories such as K-12 education and higher education would improve the prospects of vulnerable families in Colorado, but that dumping money into topline funding categories without targeting mechanisms limits success and can increase inequities. While this may be conceptually obvious, our goal was to learn about how Big Six funding increases could potentially impact economic mobility and poverty by pinpointing specific relationships between Colorado's public taxpayer-funded expenditures and the income status of individual families. Toward this end, we keep in mind the importance of demographics and how impacts may vary across the white population and communities of color.

This heterogeneity suggests state investments that are well designed are all the more needed when we couple this finding with the realization that economic shocks and population-adjusted taxation maximums have resulted in a cycle of funding that has not recovered from the Great Recession, even as Colorado's population has exploded. Historically productive mechanisms of economic mobility, such as education, have stagnated in terms of spending, and in some cases, the lack of consistent and per-person funding have likely contributed to the increase in overall poverty and reduced mobility. A prime example is the lesser studied "cash fund," which is an additional component of the state operating budget beyond the General Fund, which we focus on in this report. The cash fund has been increasingly used as a way to provide direct funding of programs based on user fees, such as tuition for college and toll road taxes. While this has helped bypass TABOR rules, it has allowed for the General Fund to deprioritize spending on priorities like postsecondary education by shifting costs to individuals as institutional costs increase (e.g., new classroom technologies, increases to staff and their salaries and benefits, etc.)

A major takeaway from our analysis of the budget history for low-income families is the current economic shocks from COVID-19 could have a long-term devastating impact on the drivers of economic mobility. Coupling the COVID-19 impacts of reduced tax income for the state with the increased cost of health risk mitigation paints a picture of a decades-long recovery to return to original levels of funding per person, creating an even greater divergence in economic mobility for those currently beneath the middle class income level. The COVID-19 pandemic also suggests of the need for creative solutions. We, therefore, identified promising spending categories that can be considered when budgets are constrained.

In studying the effect of budgetary expenditures on poverty, it is important to note the federal poverty guidelines are woefully inadequate to address economic mobility. This study considers the ability to generate additional unused wealth or income as a determinant of economic mobility in an upward direction. Based on the self-sufficiency standard and our assessment of the income trends for Colorado specifically, even those significantly above the poverty line are unable to generate enough wealth or income to, on average, transition out of the lower income range. The bottom line is that for low-income brackets, Colorado has seen continually decreasing upward economic mobility, which is likely to become significantly worse given the current budget shortfalls and loss of low-wage jobs during COVID-19.

> ***"The bottom line is for low-income brackets, Colorado has seen continually decreasing upward economic mobility, which is likely to become significantly worse given current budget shortfalls and loss of low-wage jobs during COVID-19.***

We conclude by noting COVID-19 by itself is an important caveat to the work presented in this report. At the time of this writing, predicted relationships between public expenditure and poverty outcomes described in this report are based on trends and data drawn from a pre-COVID-19 state. Future studies would be prudent to consider possible structural changes to the economic and health conditions of families in our state.

The intent of this report is not to critique state legislative investment in Coloradans so much as it is to encourage a more data-driven view of how to make the biggest improvement for the largest number of individuals in order of need. Fundamentally, the legislative decision must balance potential impact versus cost in assessing appropriations and to do so requires a complete picture.

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14 Mayer, S. E., & Lopoo, L. M. (2008). Government spending and intergenerational mobility. Journal of Public Economics, 92(1-2), 139-158.

15 Ichino, A., Karabarbounis, L., & Moretti, E. (2011). The political economy of intergenerational income mobility. Economic Inquiry, 49(1), 47-69.

16 Poverty thresholds for various household sizes can be viewed from https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html.

17 Gallardo, M. (2018). Identifying vulnerability to poverty: A critical survey. Journal of Economic Surveys, 32(4), 1074-1105.

18 See the Bell Policy Center's 2018 Colorado's Middle Class Families report.

19 The Department of Housing and Urban Development put out a 2019 report on the Resident Population Estimates for the 100 Fastest-Growing U.S. Counties with 10,000 or more population in 2010 from April 1st, 2010 to July 1st, 2019. The estimates show that Weld, Broomfield, Douglas, and Denver counties all grew by at least 20% over that period. This is a market indicator of increased competition for housing that will drive up housing prices, increasing the overall cost of living.

20 The impact of COVID-19 on state educational institutions is likely to make it difficult to isolate the cost of higher education in the near future.

21 Autor, David H. (2014). Skills, education, and the rise of earnings inequality among the "other 99 percent." Department of Economics and National Bureau of Economic Research, MIT.

22 See endnote 3.

23 Bell Policy Center's Guide to Economic Mobility in Colorado.

24 State of Colorado Joint Budget Committee, Budget in Brief, Fiscal Year 2019-20 (available at https://leg.colorado.gov/sites/default/files/fy19-20bib.pdf).

25 https://www.census.gov/quickfacts/CO

26 Another possible source is the Annual Survey of State Government Finances from Census Bureau (publicly available at https://www.census.gov/programs-surveys/state/data.html) though these data include federal, state, and local sources in an aggregated format which does not capture the nuanced state-level decision dynamics as wanted for our purposes here. The Explore Budget section of the Colorado General Assembly page

broadly defines and summarizes the budget categories and totals which we do use: https://leg.colorado.gov/explorebudget/.

27 https://public.tableau.com/profile/explore.colorado.s.budget#!/vizhome/BudgetStory_15812725950890/BudgetStory

28 Colorado Fiscal Institute (2015). Shrinking Funding for Colorado's Schools A Timeline of School Finance Legislation and Consequences. https://www.coloradofiscal.org/wp-content/uploads/2015/05/school-finance-timeline-CFI.pdf.

29 We matched micro-data from the ACS by year to Colorado's General Fund data by spending category. We used General Fund values (as opposed to the state operating budget) because this spending is from Colorado to Colorado as it excludes additional grants in aid from the federal government and redistribution though this mechanism across states, which is external to Colorado state decision-making. We use the subsample of household heads to restrict most closely to the family level. Additional modeling information appears in the Technical Appendix.

30 E.g., Zwiers, M., & Koster, F. (2015). The local structure of the welfare state: Uneven effects of social spending on poverty within countries. Urban Studies, 52(1), 87-102.

31 Bell Policy Center: Racial Wealth Gap. https://www.bellpolicy.org/2019/12/03/racial-wealth-gap-homeownership-credit/#:~:text=In%20short%2C%20wealth%20can%20often%20determine%20your%20standing,historical%20policy%20decisions%20made%20at%20the%20national%20level.

32 Darity Jr, W., Hamilton, D., Paul, M., Aja, A., Price, A., Moore, A., & Chiopris, C. (2018). What we get wrong about closing the racial wealth gap. Samuel DuBois Cook Center on Social Equity and Insight Center for Community Economic Development.

33 Ownership costs are defined as the derived sum of costs associated with mortgages, deeds of trust, contracts to purchase, and similar property debts (e.g., first and second mortgages, home equity loans, other junior mortgages), real estate taxes, fire, hazard, and flood insurance payments, utilities (electricity, gas, and water and sewer), and fuels (e.g., oil, coal, kerosene, wood). This category also includes any monthly condominium fee or mobile home costs (e.g., installment loan payments, personal property taxes, site rent, registration fees, license fees). Rental costs are defined inclusive of rental cost of the housing unit (contract rent) and costs for utilities and fuels (parallel to those definitions in the ownership cost description).

34 Colorado rental costs have been shown to be unsustainable relative to the state minimum wage: https://www.cnbc.com/2020/07/14/minimum-wage-workers-cannot-afford-rent-in-any-us-state.html

A Methodology: We compare official federal poverty threshold cutoffs for example families with 1, 2, 3, or 4 persons. We report the average thresholds in this table (through actual poverty thresholds make additional minor adjustments for adults versus children in the family composition). We compare these cutoffs to incomes greater than poverty but less than middle class (defined by a lower bound cutoff of two-thirds median income) and to middle class (defined by a range between two-thirds median income and twice median income). Median income is calculated by year for Colorado specifically and averages over a wide variety of family sizes. We adjust all income cutoffs using the Denver-Aurora-Lakewood, CO Consumer Price Index (CPI) to report in 2019 real U.S. dollars in all cases, rounded to the nearest dollar.

B Methodology: These household-weighted sample means are based on the ACS 2018 1-year sample. More details and an expanded table of household head characteristics appears as Appendix Table A2, alongside comparison tables for the full population (Table A1) and for the spouses of household heads (Table A3).

Data Appendix & Notes on Methodology & Assumptions

We have two primary data sources.

Information on state-level public expenditure comes from Colorado General Assembly Budget (https://leg.colorado.gov/content/budget) and Explore the Colorado State Budget (https://leg.colorado.gov/explorebudget/)

Representative micro-level data on individuals in Colorado comes from the American Community Survey (ACS): Steven Ruggles, Sarah Flood, Ronald Goeken, Josiah Grover, Erin Meyer, Jose Pacas and Matthew Sobek. IPUMS USA: Version 10.0 [dataset]. Minneapolis, MN: IPUMS, 2020. https://doi.org/10.18128/D010.V10.0

Most of our analysis focuses on the General Fund series for Colorado's Big Six: health care, K-12 education, higher education, human services, corrections, and judicial. We also present some information on the state operating budget overall (which includes the General Fund) and on cash and federal funding, as relevant in the report's discussion.

ACS data are from federal survey data and therefore have sampling error. These data are from cross-sectional samples of the population, and each survey respondent is observed at only one point in time. We use the ACS one-year samples throughout the report.

The ACS from 2005 onward is a 1-in-100 weighted national random sample of the population. The smallest identifiable geography is the Public Use Microdata Areas (PUMA), which is defined to contain at least 100,000 people. The ACS from 2000 through 2004 are smaller samples (ranging from 1-in-750 to 1-in-232), and no geographies smaller than the state level are available for these samples. These and other changes in early sampling methodology (for example the exclusion of group quarters in the first samples) lead us to focus on years 2005 through 2018 in our main analysis. To operationalize, we restricted IPUMS USA data to Colorado via the state ICPSR code (ICPSR=62). We selected all cases for Colorado from ACS samples for each available year.

The Census Bureau defines families in relationship to a "household head." While some previous reports have made further adjustments for families based on household members who are not related yet live together, we follow the more common convention in our definition of households as this also matches available frequency weights (HHWT) to estimate up to Colorado population totals. We also employ person weights (PERWT) when examining all Coloradans instead of household units. We use a combination of an examination of official poverty status versus other divisions of the income distribution. Using measures of official poverty status as opposed to percentiles of the income distribution is relevant for our understanding of families since differences in family sizes and compositions affect how far a dollar goes within the household. Official poverty thresholds are based on both the total number of family members and whether these family members are adults or are children. Poverty thresholds for various household sizes can be viewed here: https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html.

It has been common in some past reports (as cited in the main manuscript) to consider the range of two-thirds of median income (within year) to two times median income as an operative definition of the "middle class," and we use this definition here. After excluding 23,828 observations with missing income information, our final sample is 765,025 unique observations.

To account for changes in the prices of goods and services over time for the budget series of interest, we use the Bureau of Labor Statistics' Consumer Price Index (CPI-U) for all items for all urban consumers. Since the Bureau of Labor Statistics does not offer a state-specific index, we use the specific CPI series for Denver-Aurora-Lakewood, Colorado area. We adjust all data into 2019 U.S. dollars. In addition to the state budget series, we also adjust individual and household-level income and cost data from the ACS to 2019 U.S. dollars for consistency. Annual data for the CPI come is from https://www.bls.gov/cpi/data.htm.

Similarly, to scale for changes in population that are relevant for interpreting the reach of budget categories, we use annual state-level population totals for Colorado over time from the Intercensal Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico as published by the Census Bureau (https://www.census.gov/data/tables/time-series/demo/popest/2010s-state-total.html and https://www.census.gov/data/tables/time-series/demo/popest/intercensal-2000-2010-state.html). When scaling by personal income, we use the state series as reported by the Bureau of Economic Analysis (https://www.bea.gov/data/by-place-states-territories).

Statistical Modeling

In addition to calculating summary statistics for demographic, work, income, and homeownership characteristics of Colorado residents, we also present results from a series of econometric statistical models. These models were based on matching microdata from the ACS by year to the data for Colorado's General Fund by spending category. As argued in the body of this report, the General Fund is most easily interpretable as spending from Colorado to Colorado, as it excludes additional grants in aid from the federal government and redistributions external to Colorado state decision making.

We estimate marginal effects from Probit regression models at the household head level for the probability of having family income below cutoff levels corresponding to that family's relevant poverty threshold. General Fund values are included as tens of dollars in 2019 constant values per person to match our thought experiment as outlined in the report. We run separate regressions for each of the Big Six expenditure categories.

In each case, we control for household head demographics: age in years; whether the household head is female or male; whether the household head is non-Hispanic white, non-Hispanic black, Hispanic, or other; whether they are immigrant; and whether they are married. We also include control variables for the number of family members in the household, the number of children in the household, and the number of children under age 5 in the household. We control for whether the household reports having less than a high school education, has high school, has some college, or has at least four years of college. We also control for whether the household is currently employed.

In addition to micro-level controls constructed from data from the ACS, we include two macro-level controls. First, we include lagged gross domestic product at the state level using data from the Bureau of Economic Analysis (https://www.bea.gov/data/by-place-states-territories). We adjust these values for inflation and for population and then include them as natural logs in order to allow for nonlinearities. We also include a macro variable for the lagged net migration rate using information on the numbers of new arrivals into the state from the Colorado Department of Local Affairs, State Demography Office (https://demography.dola.colorado.gov/births-deaths-migration/). We model time using a cubic time trend and we control for differences across lower levels of geography within Colorado using binary variables based on PUMAs, which are the lowest geography available in the public-use ACS from our source.

In extended analysis, we consider similar specifications for the probability of homeownership and for the probability of holding investments (interest, dividend, or rentals) for additional results beyond those for the probability of being in below or at the family's relevant poverty threshold. Since we are interested in differences in impacts by major subgroups in the state, we model an interaction terms for non-Hispanic white and state spending relative to impacts within communities of color. While we model the probability of poverty relative to the rest of Colorado's population (all income levels), we consider impacts of state spending on homeownership and on investments while restricting to households below the middle class.

Results via simple linear probability regression modeling instead of Probit (which allows for nonlinearities) are very similar.

A companion academic paper will be available upon request from the authors in fall 2020.

Table A1: Average Characteristics of All Coloradans, 2005 vs. 2018, by Family Income Group

	Below/at Poverty Threshold			Between Poverty & Middle Income			Middle Income		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	2005	2018	% Change	2005	2018	% Change	2005	2018	% Change
Age (years)	28.86	33.00	15.06	28.67	41.32	6.85	34.69	37.47	8.01
Female (%)	54.20	55.30	2.03	0.512	0.507	-0.98	0.49	0.49	0.00
Non-Hispanic white (%)	49.10	52.00	5.91	64.10	62.70	-2.18	75.20	69.30	-7.85
Non-Hispanic Black (%)	7.31	6.66	-8.89	4.25	5.44	28.00	3.01	3.16	4.98
Hispanic (%)	38.30	33.20	-13.32	27.60	26.20	-5.07	16.70	21.10	26.35
Immigrant (%)	18.60	13.80	-25.81	15.50	14.10	-9.03	9.51	10.70	12.51
Married (%)	20.60	16.20	-21.36	27.50	26.70	-2.91	49.40	48.00	-2.83
Own family members in household (number)	3.08	2.86	-7.08	2.35	2.32	-1.23	3.28	3.36	2.44
Own children in the household (number)	0.50	0.43	-15.08	0.35	0.31	-10.89	0.57	0.56	-1.40
Own children under age 5 in household (number)	0.18	0.10	-43.33	0.10	0.07	-28.82	0.14	0.11	-16.18
Less than high school (%)	35.50	31.00	-12.68	24.50	17.60	-28.16	23.60	21.30	-9.75
High school (%)	25.40	26.30	3.54	34.10	31.30	-8.21	25.20	22.10	-12.30
Some college (%)	16.50	19.10	15.76	18.30	21.60	18.03	18.30	18.40	0.55
At least 4 years college (%)	8.31	14.60	75.69	16.30	23.80	46.01	24.90	31.60	26.91
Employed (%)	27.00	25.50	-5.56	50.70	53.00	4.54	55.30	56.70	2.53
Observations	505,926	535,267		1,003,713	1,403,925		2,191,991	2,678,474	

Source: *American Community Survey and authors' calculations*

Methodology: Table A1 presents person-weighted sample mean estimations based on ACS data for year 2015 and 2018 separately and the percentage change in each characteristic over this time period in the Coloradoan subsamples defined by being (1) below or at the specific year's relevant poverty threshold for the individual's reported family income and family size, (2) between the relevant poverty threshold and two-thirds of the median income in the state in the specific year, and (3) at two-thirds of the median income in the state in the specific year up to two times median income.

Table A2: Average Characteristics of Colorado Household Heads, 2005 vs. 2018, by Family Income Group

	Below/at Poverty Threshold			Between Poverty & Middle Income			Middle Income		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	2005	2018	% Change	2005	2018	% Change	2005	2018	% Change
Age (years)	42.55	47.74	12.20	48.77	52.04	6.70	46.47	49.81	7.19
Female (%)	59.70	61.00	2.18	51.90	53.20	2.50	36.80	45.00	22.28
Non-Hispanic white (%)	59.80	61.50	2.84	72.70	70.00	-3.70	80.30	76.80	-4.36
Non-Hispanic Black (%)	6.90	6.01	-12.90	4.51	5.26	16.63	3.17	3.04	-4.10
Hispanic (%)	28.00	25.10	-10.36	19.40	20.20	4.12	12.50	14.70	17.60
Immigrant (%)	18.40	16.30	-11.41	13.70	13.70	0.00	9.33	11.30	21.11
Married (%)	25.20	20.10	-20.24	26.30	27.30	3.80	63.30	63.30	0.00
Own family members in household (number)	2.25	2.069	-8.04	1.764	1.786	1.25	2.546	2.595	1.92
Own children in the household (number)	0.81	0.699	-13.17	0.39	0.371	-4.87	0.769	0.777	1.04
Own children under age 5 in household (number)	0.28	0.157	-43.32	0.103	0.0795	-22.82	0.172	0.147	-14.53
Less than high school (%)	20.40	13.70	-32.84	12.60	6.76	-46.35	4.87	2.91	-40.25
High school (%)	38.60	35.30	-8.55	40.40	34.30	-15.10	28.90	22.20	-23.18
Some college (%)	26.40	26.00	-1.52	23.60	27.10	14.83	25.80	23.90	-7.36
At least 4 years college (%)	13.50	23.10	71.11	22.70	30.90	36.12	40.30	50.50	25.31
Employed (%)	40.10	37.10	-7.48	61.70	60.80	-1.46	79.50	77.30	-2.77
Observations	203,222	216,667		515,726	679,616		824,912	978,383	

Source: *American Community Survey and authors' calculations*

Methodology: Table A2 presents household-weighted sample mean estimations based on ACS data for year 2015 and 2018 separately and the percentage change in each characteristic over this time period in the Colorado household head subsamples defined by being (1) below or at the specific year's relevant poverty threshold for the individual's reported family income and family size, (2) between the relevant poverty threshold and two-thirds of the median income in the state in the specific year, and (3) at two-thirds of the median income in the state in the specific year up to two times median income.

Table A3: Average Characteristics of the Spouses/Partners of Colorado Household Heads, 2005 vs. 2018, by Family Income Group

	Below/at Poverty Threshold			Between Poverty & Middle Income			Middle Income		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	2005	2018	% Change	2005	2018	% Change	2005	2018	% Change
Age (years)	35.48	37.97	7.02	42.27	44.54	5.37	45.31	48.63	7.33
Female (%)	59.90	55.90	-6.68	55.20	50.90	-7.79	68.70	57.80	-15.87
Non-Hispanic white (%)	56.00	62.50	11.61	67.10	68.80	2.53	78.60	76.10	-3.18
Non-Hispanic Black (%)	3.26	4.10	25.77	2.25	4.75	111.11	2.58	2.51	-2.71
Hispanic (%)	34.90	26.20	-24.93	26.70	21.50	-19.48	13.90	16.00	15.11
Immigrant (%)	31.00	19.70	-36.45	20.50	19.50	-4.88	12.20	14.30	17.21
Married (%)	48.10	40.80	-15.18	58.10	55.60	-4.30	91.40	90.90	-0.55
Own family members in household (number)	2.62	2.40	-8.50	2.40	2.30	-3.92	2.99	3.02	0.80
Own children in the household (number)	0.86	0.71	-17.56	0.58	0.48	-16.12	0.93	0.94	0.54
Own children under age 5 in household (number)	0.34	0.19	-45.48	0.20	0.14	-28.50	0.23	0.21	-11.11
Less than high school (%)	24.10	11.60	-51.87	17.90	7.51	-58.04	6.37	4.28	-32.81
High school (%)	32.40	34.80	7.41	42.20	38.10	-9.72	36.00	28.30	-21.39
Some college (%)	28.50	31.10	9.12	22.00	24.60	11.82	24.60	24.60	0.00
At least 4 years college (%)	14.00	20.70	47.86	17.50	28.70	64.00	32.80	42.00	28.05
Employed (%)	38.50	35.50	-7.79	61.40	64.40	4.89	70.00	70.60	0.86
Observations	89,593	88,138		212,958	312,211		557,512	668,211	

Source: *American Community Survey and authors' calculations*

Methodology: Table A3 presents household-weighted sample mean estimations based on ACS data for year 2015 and 2018 separately and the percentage change in each characteristic over this time period in the Colorado spouse/partner of the household head subsamples defined by being (1) below or at the specific year's relevant poverty threshold for the individual's reported family income and family size, (2) between the relevant poverty threshold and two-thirds of the median income in the state in the specific year, and (3) at two-thirds of the median income in the state in the specific year up to two times median income.

Table A4: Average Family Income by Sources, 2005 vs. 2018, by Family Income Group & Subgroups (2019 constant USD) *(a) All Households*

	Below/at Poverty Threshold			Between Poverty & Middle Income			Middle Income		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	2005	2018	% Change	2005	2018	% Change	2005	2018	% Change
Total family income	9,700	8,694	-10.37	32,396	33,666	3.92	88,333	93,555	5.91
Total personal earned income	4,965	4,183	-15.75	19,937	18,999	-4.70	52,139	49,742	-4.60
Wage and salary	5,248	3,804	-27.52	18,853	17,839	-5.38	48,809	47,326	-3.04
Business and farm	370.6	378.2	2.05	1,415	1,160	-18.02	3,329	2,416	-27.43
Social Security	1,420	1,625	14.44	4,305	5,117	18.86	2,067	3,139	51.86
Welfare/public assistance	202.1	160.9	-20.39	59.44	41.91	-29.49	19.42	10.22	-47.37
Interest, dividend, and rental income	111.1	194.4	74.98	862.4	996	15.49	1,993	2,980	49.52
Retirement income	217.4	278.9	28.29	1,929	2,137	10.78	4,137	4,986	20.52
Supplementary Security Income	519.1	588.7	13.41	222.9	251.8	12.97	61.88	104.7	69.20
Other income	391.8	453.3	15.70	796.9	844.1	5.92	1,329	1,253	-5.72
Observations	203,222	216,667		515,726	679,616		824,912	978,383	

Table A4: Average Family Income by Sources, 2005 vs. 2018, by Family Income Group & Subgroups (2019 constant USD) *(b) Non-Hispanic whites*

	Below/at Poverty Threshold			Between Poverty & Middle Income			Middle Income		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	2005	2018	% Change	2005	2018	% Change	2005	2018	% Change
Total family income	8,450	7,955	-5.86	32,325	33,626	4.02	89,508	95,233	6.40
Total personal earned income	4,276	3,555	-16.86	19,015	17,561	-7.65	52,598	50,002	-4.94
Wage and salary	3,867	3,203	-17.17	17,981	16,284	-9.44	48,810	47,327	-3.04
Business and farm	409.4	351.8	-14.07	1,489	1,278	-14.17	3,788	2,675	-29.38
Social Security	1,687	1,766	4.68	5,080	6,148	21.02	2,278	3,615	58.69
Welfare/public assistance	190.3	102.7	-46.03	43.36	38.14	-12.04	20.74	8.345	-59.76
Interest, dividend, and rental income	171.1	303.1	77.15	1,132	1,316	16.25	2,339	3,556	52.03
Retirement income	226.1	326.7	44.49	2,139	2,473	6.64	4,574	5,660	23.74
Supplementary Security Income	408.3	513.8	25.84	237.6	250.3	5.35	71.08	110.8	55.88
Other income	343.8	427.2	24.26	805.7	925.6	14.88	1,325	1,270	-4.15
Observations	121,522	133,196		374,818	475,411		662,300	751,111	

Table A4: Average Family Income by Sources, 2005 vs. 2018, by Family Income Group & Subgroups (2019 constant USD) *(c) Minority (All Persons except for Non-Hispanic whites)*

	Below/at Poverty Threshold			Between Poverty & Middle Income			Middle Income		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	2005	2018	% Change	2005	2018	% Change	2005	2018	% Change
Total family income	11,561	9,874	-14.59	32,585	33,7610	3.61	83,551	88,011	5.34
Total personal earned income	5,990	5,185	-13.44	22,391	22,346	-0.20	50,268	48,883	-2.76
Wage and salary	7,304	4,764	-34.78	21,173	21,461	1.36	48,807	47,321	-3.04
Business and farm	312.8	420.4	34.40	1,218	884.9	-27.35	1,460	1,562	6.99
Social Security	1,023	1,401	36.95	2,245	2,717	21.02	1,207	1,567	29.83
Welfare/public assistance	219.7	254	15.61	102.2	50.67	-50.42	14.01	16.43	17.27
Interest, dividend, and rental income	21.86	20.97	-4.07	144.4	252.2	74.65	585.1	1,076	83.90
Retirement income	204.4	202.6	-0.88	894.6	1,354	51.35	2,356	2,758	17.06
Supplementary Security Income	684	708.2	3.54	184	255.2	38.70	24.38	84.75	247.62
Other income	463.1	495.1	6.91	773.5	654.5	-15.38	1,346	1,196	-11.14
Observations	81,700	83,471		140,908	204,205		162,612	227,271	

Table A4: Average Family Income by Sources, 2005 vs. 2018, by Family Income Group & Subgroups (2019 constant USD) *(d) Metro areas*

	Below/at Poverty Threshold			Between Poverty & Middle Income			Middle Income		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	2005	2018	% Change	2005	2018	% Change	2005	2018	% Change
Total family income	9,725	8,620	-11.36	32,563	33,578	3.12	88,756	93,794	5.68
Total personal earned income	5,095	4,491	-11.85	20,489	19,624	-4.22	53,449	50,870	-4.83
Wage and salary	5,549	4,078	-26.51	19,604	18,500	-5.63	50,467	48,801	-3.30
Business and farm	360.7	413	14.50	1,301	1,124	-13.60	2,982	2,069	-30.62
Social Security	1,323	1,479	11.79	4,164	4,867	16.88	2,019	3,015	49.33
Welfare/public assistance	193.6	169.2	-12.60	55.56	40.69	-26.76	21.87	7.902	-63.87
Interest, dividend, and rental income	107.9	190.7	76.74	790.4	899.6	13.82	1,712	2,660	55.37
Retirement income	226.4	241.6	6.71	1,920	2,053	6.93	4,238	4,845	14.32
Supplementary Security Income	528.5	525.2	-0.62	212.9	220.8	3.71	54.05	96.36	78.28
Other income	401.3	397.6	-0.92	853.1	902.6	5.80	1,346	1,241	-7.80
Observations	163,143	166,641		409,271	525,771		667,826	742,750	

Table A4: Average Family Income by Sources, 2005 vs. 2018, by Family Income Group & Subgroups (2019 constant USD) *(e) Non-metro areas*

	Below/at Poverty Threshold			Between Poverty & Middle Income			Middle Income		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	2005	2018	% Change	2005	2018	% Change	2005	2018	% Change
Total family income	9,599	8,942	-6.84	31,754	33,967	6.97	96,385	92,803	7.43
Total personal earned income	4,435	3,156	-28.84	17,817	16,862	-5.36	46,099	46,185	0.19
Wage and salary	4,024	2,894	-28.08	15,964	15,581	-2.40	41,171	42,673	3.65
Business and farm	410.6	262.4	-36.09	1,853	1,281	-30.87	4,928	3,512	-28.73
Social Security	1,815	2,113	16.42	4,851	5,973	23.13	2,290	3,530	54.15
Welfare/public assistance	236.5	133.3	-43.64	74.36	46.05	-38.07	8.125	17.54	115.88
Interest, dividend, and rental income	124	206.8	66.77	1,139	1,326	16.42	3,287	3,989	21.36
Retirement income	180.7	403.2	123.13	1,966	2,423	23.25	3,671	5,429	47.89
Supplementary Security Income	480.8	800.3	66.45	261.7	357.6	36.65	97.93	131.2	33.97
Other income	352.9	639.1	81.10	580.7	644.4	10.97	1,253	1,291	3.03
Observations	40,079	50,026		106,455	153,845		147,086	235,633	

Source: *American Community Survey and authors' calculations*

Methodology: Table A3 presents household-weighted sample mean estimations based on ACS data for year 2015 and 2018 separately and the percentage change in each characteristic over this time period in the Colorado spouse/partner of the household head subsamples defined by being (1) below or at the specific year's relevant poverty threshold for the individual's reported family income and family size, (2) between the relevant poverty threshold and two-thirds of the median income in the state in the specific year, and (3) at two-thirds of the median income in the state in the specific year up to two times median income.