Brain Drain: Characteristics of Hawai‘i-Born Adults on the U.S. Mainland

research & economic analysis division

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Executive Summary

From 2017-2019, the population in Hawai‘i decreased, in large part due to a high rate of net domestic outmigration. Of primary concern with respect to economic growth, these outmigrants are more likely to be young, educated workers, a phenomenon often referred to as “brain drain”. Unlike the recent DBEDT report *Hawai‘i Migration Flows: 2013-2017*, which uses migration status over the past 12 months (whether in the past year, someone lived in the same house, moved within the state, moved between states, or moved from abroad) to look at people who have moved away from Hawai‘i, this report defines brain drain by birth place. A brain drain leaver from Hawai‘i is one who was born in Hawai‘i but now lives on the continental U.S. To assess possible reasons for and results of brain drain, this report compares socioeconomic characteristics and outcomes for Hawai‘i-born working-age individuals, and how these relate to whether one chooses to stay in Hawai‘i or move to other parts of the U.S.

According to data from 2014-2018, a little under 500,000 people born in Hawai‘i live on the mainland. People moving away from Hawai‘i primarily move to the western half of the U.S. (including Arizona and Colorado) and populous southern states (Texas, Florida, Georgia, and Virginia), with more educated leavers slightly more likely to move to New York and North Carolina. Hawai‘i-born people living on the mainland are more likely to be working-age with a bachelor’s degree or higher, female, and white compared to their counterparts who have remained in Hawai‘i. Comparing among those with a bachelor’s degree, those on the mainland are less likely to have business, health, or education degrees and more likely to have biology or arts degrees. The lower prevalence of health and education degrees translate to a lower percentage of Hawai‘i-born mainlanders working in health and education-related occupations and industries compared to those who stay in Hawai‘i.

With a low unemployment rate during the period of analysis, people born in Hawai‘i who stay in Hawai‘i have a higher labor force participation rate and a lower unemployment rate, and are more likely to work full time than their counterparts who move to the mainland. Median personal income and median hourly wage are comparable between Hawai‘i-born stayers and leavers (leavers earn about $2,000-$5,000 more per year), though more-educated Hawai‘i-born leavers make more money at the higher end of the income/wage distribution (about $15,000 more). Differences in earnings seem to be largely compositional; taking into account age, gender, race, education, and occupation, differences in personal income and hourly wage are much smaller, and not statistically significant. This suggests that it is not higher wages, per se, that are encouraging people to move to the mainland, but the types of jobs available on the mainland instead. For those earning STEM or NSF-defined science and engineering degrees, a higher percentage of Hawai‘i-borns living on the mainland are in STEM or science and engineering occupations, compared to Hawai‘i-borns who stay in Hawai‘i.

Household income is much higher for people born and living in Hawai‘i, likely due to household composition making up for the much higher housing costs in Hawai‘i compared to the mainland. In fact, household income relative to housing cost is higher for Hawai‘i-born stayers than for those who move to the mainland. In other words, it appears that the advantage to moving to the mainland for cheaper housing is only for those who are set on avoiding multigenerational households.

I. Introduction

From 2017-2019, the population in Hawai‘i decreased. While small decreases in fertility and small increases in death rates have led to a decline in the natural growth rate in the state, the population decline in the past three years have been primarily attributed to a high rate of net domestic outmigration. Even more so, the popular sentiment is that much of this outmigration is of young, educated workers, a phenomenon sometimes referred to as “brain drain”. A recent report from DBEDT, *Hawai‘i Migration Flows: 2013-2017*, confirms that relative to Hawai‘i residents, domestic outmigrants (as defined by migration status over the past 12 months) are younger adults (aged 18-34) and educated (have a bachelor’s degree or higher) using data from the American Community Survey (see Table 1). Migration status in the American Community Survey specifies whether, in the past year, someone lived in the same house, moved within the state, moved between states, or moved from abroad.

Table 1. Age Composition and Educational Attainment of Migrants

	Hawai‘i residents*	Domestic outmigrant*
Age		
Younger than 18	20.3%	20.1%
18-34 years old	21.9%	45.8%
35-44 years old	12.6%	11.7%
45-64 years old	27.2%	15.8%
Older than 64	18.0%	6.5%
Education (aged 18+, not in school)		
Less than HS diploma	9.0%	5.1%
HS diploma	30.6%	26.2%
Some college	30.1%	30.2%
Bachelor’s degree	20.4%	23.9%
Master’s degree or higher	9.8%	14.7%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS, from *Hawai‘i Migration Flows: 2013-2017*.
*Excludes military personnel and their families. “Some college” includes associate degree earners.

One concern about using migration status from one year ago, as in *Hawai‘i Migration Flows: 2013-2017*, for evaluating brain drain away from Hawai‘i is that any migration that occurred outside of the previous 12 months is not captured (the decennial census used to ask about migration status over the past 5 years, but that question was last asked in 2000). Accordingly, this report assesses brain drain from Hawai‘i based on the birth place of the individual, as used in a recent U.S. Congress Joint Economic Committee publication, *Losing Our Minds: Brain Drain across the United States*[1], with the understanding that there are two ways this could mismeasure brain drain: (1) non-Hawai‘i-born individuals who moved to Hawai‘i, particularly those who were educated in Hawai‘i and spent some time in Hawai‘i’s labor market as a (young) adult

[1] *Losing Our Minds* defines a “brain drain leaver” by education (top third in the national education distribution) and age (31-40 years of age) that do not align with how this report will assess brain drain from Hawai‘i. Available at https://www.jec.senate.gov/public/index.cfm/republicans/2019/4/losing-our-minds-brain-drain-across-the-united-states.

would not be counted as a brain drain leaver, and (2) Hawai‘i-born individuals who might have moved away from Hawai‘i at a young age and might not be considered a brain drain leaver by some people are counted. While there is no way to capture the former (outside of a very limited migration status variable), the latter can still be viewed within the lens of a decline of the population and loss of labor supply, even if they moved away from Hawai‘i at a young age.

The purpose of this report is to look at brain drain from Hawai‘i by comparing socioeconomic characteristics and outcomes for Hawai‘i-born working-age individuals, and how these relate to whether one chooses to stay in Hawai‘i or move to other parts of the U.S.[2] This is complemented by comparisons to mainland-born individuals living in Hawai‘i, who are similar to Hawai‘i-born individuals on the mainland in that people in both populations have decided to move halfway across the Pacific Ocean, possibly without family at the destination to help acclimate. The analysis begins with a look at where Hawai‘i-born working-age individuals are living on the mainland, followed by the characteristics and outcome comparisons. This comparison section starts by looking at demographic characteristics (gender and race) before focusing on education outcomes (educational attainment and field of degree) and economic outcomes (employment, income, and housing) that both affect and are affected by the decision to relocate. A more rigorous analysis of economic outcomes is performed to disentangle possible reasons for moving, and to evaluate whether any differences in these outcomes are due to composition effects (e.g., being in different occupations), or if holding all other things equal, Hawai‘i-born individuals living on the mainland have different outcomes from those who stay in Hawai‘i.

The data for this report comes from the American Community Survey (ACS), covering the years 2014-2018, taking advantage of a question in the ACS about birthplace of the respondent. While active military personnel and their spouses can contribute to the labor supply and economic growth, their migration decisions are not directly affected by factors associated with brain drain (though one could choose to join the military because of a lack of job opportunities). Thus, active military personnel and their families are excluded from the following analyses. For the purposes of this report, the U.S. “mainland” is defined as the 48 contiguous states and Alaska; Puerto Rico, Guam, and other territories are not included.

II. Defining “Brain Drain”

The coining of the term “brain drain” is generally credited to the British Royal Society, which used it to describe the phenomenon of British scientists moving to the US and elsewhere in the 1950s and 1960s.[3] More broadly, brain drain usually refers to the outflow of highly trained or intelligent people. Brain drain typically is used in the context of moving from one area of residence to another (geographical), but it can also apply to movement from one sector to another (industrial) or from one organization to another (organizational). Most geographical brain drain research looks at the flow of educated workers from less developed countries to more developed countries, but geographical units can be smaller, such as at the state or province level, or less well-defined, such as rural-to-urban brain drain.

[2] Migration out of the U.S. cannot be easily tracked, so Hawai‘i-born people living abroad are not in this report.
[3] Royal Society (1963), “Emigration of scientists from the United Kingdom: Report of a committee appointed by the Council of the Royal Society”, Royal Society: London.

Because there is concern for the general migration-related decline in the younger labor force in Hawai‘i, and how Hawai‘i’s economy will fare in the near future as a result of this decline, individuals between the ages of 18 and 34 are the focus of this report. For the sake of providing a historical context of brain drain away from Hawai‘i, older cohorts are briefly examined. Tables and figures for 18-34 year olds are in the main text, while supplemental tables and figures for older cohorts are in Appendix A. As much of the brain drain literature looks at higher educated migrants, with research on economic development pointing to growth positively correlated to education and training, this report will look more closely at individuals with more education, including some analysis on STEM degrees and occupations.

III. Where are People Moving to?

It is generally accepted that people moving away from Hawai‘i primarily move to the western half of the U.S. (including Arizona and Colorado), but what are other common destinations for brain drain leavers? Across the three age cohorts used in this report (18-34, 35-44, and 45-64), the top ten states that Hawai‘i-born individuals move to are the same: the West Coast (California, Washington, Oregon, and Nevada), populous western states (Arizona and Colorado), and populous southern states (Texas, Florida, Georgia, and Virginia). More-educated brain drain leavers generally follow this pattern, with New York and North Carolina being more popular destinations in some cases. Table 2 shows the top 10 destinations by age cohort.

Table 2. States that Hawai‘i-born People Move to, by Age and Education

18-34 years old	35-44 years old	45-64 years old
Total: 131,341	*Total: 75,282*	*Total: 138,226*
California (19.8%)	California (23.8%)	California (26.1%)
Washington (10.0%)	Washington (8.9%)	Washington (8.6%)
Nevada (7.6%)	Nevada (7.5%)	Texas (7.1%)
Texas (6.2%)	Texas (6.4%)	Nevada (5.8%)
Florida (5.2%)	Florida (4.1%)	Florida (4.7%)
Oregon (5.1%)	Oregon (4.0%)	Oregon (3.7%)
Virginia (4.1%)	Virginia (3.5%)	Virginia (3.4%)
Colorado (3.2%)	Arizona (3.4%)	Arizona (2.8%)
Arizona (2.9%)	Colorado (2.7%)	Colorado (2.8%)
Georgia (2.8%)	Georgia (2.5%)	Georgia (2.6%)
18-34 years old, Bachelor's or higher	**35-44 years old, Bachelor's or higher**	**45-64 years old, Bachelor's or higher**
Total: 40,832	*Total: 32,305*	*Total: 56,568*
California (25.3%)	California (28.6%)	California (27.5%)
Washington (9.7%)	Washington (8.3%)	Washington (8.8%)
Texas (5.3%)	Texas (5.5%)	Texas (7.0%)
Oregon (5.3%)	Nevada (4.7%)	Florida (4.2%)
Virginia (4.8%)	Virginia (3.6%)	Virginia (4.2%)
Florida (4.8%)	Oregon (3.6%)	Colorado (3.8%)
Nevada (3.7%)	Florida (3.6%)	Oregon (3.8%)
New York (3.4%)	New York (3.3%)	Nevada (2.7%)
Colorado (3.4%)	Colorado (2.9%)	Arizona (2.7%)
North Carolina (2.4%)	Georgia (2.9%)	North Carolina (2.3%)

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Percentage of movers in parentheses.

Several other interesting patterns emerge. The order of the top 10 destinations is nearly identical across the three age cohorts for all brain drain leavers, while only the top 3 destinations (and Virginia in 5th) are identical across the age cohorts for those with a bachelor's degree or higher. Older age cohorts and those with more education are more likely to move to California, usually at the expense of Nevada. Despite some sentiment of Nevada as a retirement destination, there is actually a smaller percentage of Hawai‘i-born individuals living there in the 45-64 years old age cohort compared to the two younger cohorts. Instead, an individual in the older cohort is more likely to live in Texas, by over 1.5 percentage points for those with a bachelor's degree or higher.

IV. Comparing Characteristics and Outcomes

A little under 500,000 people born in Hawai‘i now live on the mainland. For comparison, about 730,000 people were born and live in Hawai‘i, while just over 290,000 people were born on the mainland and live in Hawai‘i.[4] As noted earlier, people leaving Hawai‘i (regardless of birthplace) tend to be younger and more educated than Hawai‘i-born Hawai‘i residents. The age and educational attainment differences are apparent between Hawai‘i-born residents and

[4] There are actually more foreign-born (including those born in American territories) people living in Hawai‘i, 300,266, than there are mainlanders.

Hawai‘i-born individuals living on the mainland as well, particularly with regards to educational attainment (see Table 3). Importantly, for brain drain considerations, it is the case that those leaving for the mainland are both younger *and* more educated; almost 15% of Hawai‘i-born mainlanders are between the ages of 18 and 44 and have a bachelor’s degree or higher, compared to 7.7% of those remaining in Hawai‘i. In other words, the more optimistic scenario (with respect to economic growth) where educated leavers are close to retirement age is not the scenario that Hawai‘i is experiencing. Perhaps of most concern, not only are there these differences in percentages, but raw numbers show that there are more Hawai‘i-born people with a bachelor’s degree or higher living on the mainland than there are who stayed in Hawai‘i across all age cohorts.

Hawai‘i residents born on the mainland comprise a higher percentage of young adults and a higher percentage of educated people, which can make up for some of the workforce leaving Hawai‘i. However, much of these mainland-born Hawai‘i residents are older as well, and much of the educated mainland-born Hawai‘i residents are old – 9.5% of mainland-born Hawai‘i residents are older than 64 and have a bachelor’s degree or higher, compared to 4.3% for Hawai‘i-born residents and 5.1% for Hawai‘i-born leavers. With regards to raw numbers, more-educated mainland-born Hawai‘i residents only exceed Hawai‘i-born mainland residents in the older-than-64 cohort

Thus, brain drain of young, educated working-age adults appears to be non-trivial.

Table 3. Education by Age Breakdown, Percentage of Birthplace-by-Residence Category

	Hawai‘i born, Hawai‘i resident	Hawai‘i born, Mainland resident	Mainland born, Hawai‘i resident
Total	**733,745**	**490,088**	**290,669**
Less than 18 years			
All education levels	30.5%	15.6%	12.1%
Age 18-34			
HS degree or less	8.9%	7.8%	5.7%
Some college	8.1%	10.7%	9.1%
Bachelor’s degree	3.5%	6.2%	5.8%
Master’s or higher	1.0%	2.1%	1.9%
Age 35-44			
HS degree or less	3.5%	3.4%	2.5%
Some college	3.6%	5.3%	4.5%
Bachelor’s degree	2.3%	4.2%	4.1%
Master’s or higher	1.0%	2.4%	2.6%
Age 45-64			
HS degree or less	7.9%	7.1%	7.3%
Some college	6.9%	9.6%	11.3%
Bachelor’s degree	4.5%	7.1%	8.1%
Master’s or higher	1.9%	4.4%	5.9%
Age 65 and older			
HS degree or less	7.7%	4.7%	3.9%
Some college	4.5%	4.4%	5.9%
Bachelor’s degree	2.9%	2.9%	4.5%
Master’s or higher	1.5%	2.2%	5.0%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. “Some college” includes associate degree earners.

Demographic Characteristics

There were substantial gender and racial differences between Hawai‘i-born people who stayed in Hawai‘i compared to Hawai‘i-born people who moved to the mainland. Movers were more likely to be female and more likely to be white compared to stayers, a difference that was consistent across age cohorts and levels of education.

Gender

A higher percentage of Hawai‘i-born people moving to the mainland were females compared to the Hawai‘i-born-Hawai‘i-resident population, by around 4 percentage points overall (Table 4). The gap between Hawai‘i residents and mainland residents was a little smaller among those with a bachelor’s degree or higher, though the female population among Hawai‘i-born mainland residents was quite high (over 58%) for those aged 18-34 years old. Older Hawai‘i-born cohorts (living in Hawai‘i or living on the mainland) tend to have slightly higher percentage of females overall, but a lower percentage of females with a bachelor’s degree or higher, regardless of birthplace or residence (see Appendix A).

Table 4. Gender Composition, Age 18-34

	Hawai‘i born, Hawai‘i resident	Hawai‘i born, Mainland resident	Mainland born, Hawai‘i resident
Age 18-34			
Male	52.6%	48.1%	51.9%
Female	47.4%	51.9%	48.1%
Age 18-34, Bachelor's or higher			
Male	42.3%	41.8%	41.9%
Female	57.7%	58.2%	58.1%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Tables for 35-64 year olds in Appendix A.

Race

Table 5 shows that people who are born in Hawai‘i but move to the mainland are far more likely to be white, compared to the Hawai‘i-born people who live in Hawai‘i (people born on the mainland moving to Hawai‘i are even more likely to be white, unsurprisingly; the share of whites on the mainland is over 70%, but the share of whites age 18-34 is less than 60%). Racial differences between Hawai‘i-born stayers and leavers are more muted for those with bachelor's degrees or higher, for the most part. The racial breakdown for older cohorts was similar for Hawai‘i-born stayers, with a slightly higher percentage of Asian-alones and slightly lower percentage of two-or-more-races. For Hawai‘i-born leavers, older cohorts also had similar racial breakdowns, with older movers being slightly more white and slightly less multi-racial (see Appendix A).

Table 5. Race Composition, Age 18-34

	Hawai‘i born, Hawai‘i resident	Hawai‘i born, Mainland resident	Mainland born, Hawai‘i resident
Age 18-34			
White alone	8.0%	43.1%	61.1%
Asian alone	27.1%	14.5%	7.1%
NH/Other PI alone	14.7%	11.2%	2.9%
Other race alone	7.3%	10.6%	10.7%
Two or more races	42.8%	20.6%	18.2%
Age 18-34, Bachelor's or higher			
White alone	9.2%	42.4%	67.4%
Asian alone	40.8%	23.1%	9.0%
NH/Other PI alone	6.1%	4.8%	1.2%
Other race alone	9.5%	10.1%	9.9%
Two or more races	34.3%	19.7%	12.5%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Tables for 35-64 year olds in Appendix A.
"NH/Other PI alone" refers to Native Hawaiians or other Pacific Islanders alone.

Even though Native Hawaiians and Pacific Islanders made up less than 5% of movers aged 18-34 with a bachelor's degree or higher, the number of Native Hawaiians and Pacific Islanders with a bachelor's degree that were born in Hawai‘i and living on the mainland is effectively

equal to the number born and living in Hawai‘i - 49.4% of college-educated Native Hawaiians and Pacific Islanders move to the mainland (see Table 6). In contrast, nearly 6 times as many Hawai‘i-born whites aged 18-34 with a bachelor’s degree or higher are living on the mainland compared to those still living in Hawai‘i (85.2% of college-educated whites move to the mainland, compared to 14.8% who stay in Hawai‘i). In fact, more Hawai‘i-born whites aged 18-34 with a bachelor’s degree or higher are living on the mainland than there are whites aged 18-34 of any educational attainment that were born and living in Hawai‘i. Other-race-alone also had more people moving to the mainland than staying in Hawai‘i. For Asians-alone and two-or-more-races, more stayed in Hawai‘i than moved to the mainland.

Table 6. Percentage of Hawai‘i-borns who Move to Mainland, Age 18-34, by Race

	White alone	Asian alone	NH/other PI alone	Other race alone	Two or more races
All	81.7%	30.8%	38.8%	55.0%	28.6%
Bachelor’s or higher	85.2%	41.5%	49.4%	57.0%	41.8%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. “NH/Other PI alone” refers to Native Hawaiians or other Pacific Islanders alone.

Educational Characteristics

As shown in Table 3, working age adults born in Hawai‘i who move to the mainland tend to be younger and more educated than those who stay in Hawai‘i. However, Table 3 does not show what percentage of people within an age-by-education cohort move to the mainland. Furthermore, not all majors are created equal; some fields have higher earning potential or can lead to jobs in growing occupations or industries. Relevant to the brain drain discussion, some fields might not have many job opportunities in Hawai‘i, all but necessitating a move to the mainland where more opportunities might be available.

Educational Attainment

Table 7 highlights the brain drain concern: over half of those who earn a bachelor’s degree or higher to move to mainland (51.4% to 54.5% for bachelor’s degree earners, 59.2% to 62.8% for graduate degree earners), whereas around 40% of those born in Hawai‘i who have a high school degree or less move to the mainland. Among younger adults, over 55% of Hawai‘i-born people with a bachelor’s degree move away, a percentage surpassed by the 60% of those earning a master’s degree or higher.

Table 7. Percentage of Hawai‘i-borns who Move to Mainland, by Age Group and Educational Attainment

Age	Less than high school	High school degree	Some college	Associates degree	Bachelor’s degree	Master’s or higher
18-34	40.9%	35.9%	47.8%	44.6%	54.5%	59.2%
35-44	49.4%	39.0%	54.0%	41.6%	54.5%	62.8%
45-64	50.4%	35.7%	51.7%	41.6%	51.4%	60.6%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families.

Interestingly, those who earn an associates degree are more likely to remain in (or leave and move back to) Hawai‘i compared to those who have some college. Some of this might be due to

college attendance habits; one might be more likely to attend a mainland 4-year university as opposed to staying in Hawai‘i to attend community college. The similar percentages between the "some college" and "bachelor's degree" among the older cohorts is suggestive that moving away for school leads to staying on the mainland, regardless of whether a degree is earned or not. The difference between these two columns for the 18-34 cohort could partly be due to some young adults still completing school in Hawai‘i who have not looked at moving to the mainland for employment yet (though the gap is large enough that this explanation seems rather insufficient). More educated individuals in older cohorts move to the mainland at about the same rate as the 18-34 cohort; this could happen for a variety of reasons:

- The rate of moving to the mainland as a young adult (for school or for job opportunities early in the career) has remained relatively unchanged for the past few decades;
- Older cohorts moved to the mainland at a lower rate while as a young adult, but have recently been more likely to move to the mainland (such as for retirement); or
- Older cohorts moved to the mainland at a higher rate while as a young adult, but have recently returned to Hawai‘i (such as to take care of parents).

A quick look at the 2005-2009 ACS (the earliest ACS with a 5-year sample) and comparing the age 18-34 cohort and age 35-44 cohort for the 2005-2009 sample with the 35-44 cohort and age 45-64 cohort in the 2014-2018 sample, respectively, suggests that there are not stark differences in the decision to move, though some evidence points to older cohorts moving at slightly higher rates and then returning.[5] The age 18-34 cohort for the 2005-2009 sample had people moving to the mainland at slightly lower rates for those with less than an associates degree (37.4% to 53.2% compared to 39.0% to 54.0%) than the 35-44 cohort for the 2014-2018 sample and slightly higher rates for associates degree and bachelor's degree earners (42.0% and 57.0% compared to 41.6% and 54.5%). Comparing the age 35-44 cohort for the 2005-2009 sample with the 45-64 cohort in the 2014-2019 sample, those with less than an associates have similar moving rates, but the gap between those with an associates or bachelor's degree is even higher, by around 5 percentage points. The likelihood of moving to the mainland is considerably lower for the 45-64 cohort in the 2005-2009 sample compared to the same age cohort in the 2014-2019 sample for those without a high school degree (35.2%).

[5] The 18-34 cohort in 2005-2009 has an age range of 23-47 in 2014-2018, so around half (if not more) of this cohort falls into the 35-44 cohort in 2014-2018. The 35-44 cohort in 2005-2009 has an age range of 40-57 in 2014-2018, so a majority of this cohort falls into the 45-64 cohort in 2014-2018. Some of the 45-64 cohort in 2005-2009 will still be under 64 in 2014-2018, as well.

Table 8. Percentage of Hawai‘i-borns who Move to Mainland, by Age Group and Educational Attainment, 2005-2009

Age	Less than high school	High school degree	Some college	Associates degree	Bachelor's degree	Master's or higher
18-34 (23-47)[a]	45.3%	37.4%	53.2%	42.0%	57.0%	59.2%
35-44 (40-57)[a]	51.1%	38.8%	53.4%	46.0%	56.9%	60.2%
45-64 (50-77)[a]	35.2%	37.0%	46.8%	38.1%	47.5%	54.3%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2005-2009 5-year PUMS.
Note: Excludes military personnel and their families.
[a] Widest 2014-2018 age range in parentheses, e.g., assuming an 18-year old in 2009 is surveyed in 2014 and a 34-year old in 2005 is surveyed in 2018.

Field of Degree

Popular fields of degree are mostly consistent, regardless of residence or birthplace. Business is always the most popular field of degree, with health, education, psychology, and social sciences often in the top 5. Differences in the top fields can be for two reasons: (1) job opportunities for the field could be limited in Hawai‘i or (2) Hawai‘i's post-secondary education system might not be particularly strong in the field. A combination of the two could also lead to someone born in Hawai‘i moving to the mainland – the person moves to the mainland for school and stays on the mainland for work.

Table 9. Top 10 Fields of Degrees Earned, Age 18-34

Hawai‘i born, Hawai‘i resident	Hawai‘i born, Mainland resident	Mainland born, Hawai‘i resident
Business (20.6%)	Business (17.0%)	Business (18.6%)
Health (10.7%)	Biology (9.1%)	Social sciences (9.5%)
Education (8.6%)	Social sciences (7.8%)	Health (9.1%)
Psychology (7.8%)	Health (7.1%)	Biology (8.5%)
Social sciences (7.4%)	Psychology (6.6%)	Psychology (8.4%)
Engineering (7.1%)	Engineering (6.3%)	Education (6.3%)
Biology (6.6%)	Art (6.3%)	Art (5.1%)
Communications (4.6%)	Education (5.9%)	Communications (4.7%)
English/literature (3.0%)	Communications (5.6%)	Engineering (3.9%)
Art (2.7%)	English/literature (4.6%)	Criminal justice (3.2%)

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Percentage of degree-earners earning degree in the field is in parentheses. Graduates who did not respond with the field of degree earned are omitted from calculations. Tables for 35-64 year olds in Appendix A.

Hawai‘i-born people living on the mainland are less likely to have business, health, and education degrees, and more likely to have a degree in biology or art. One stereotype of getting a job after majoring in business is that networking and connections matter, which could mean that finding a job in Hawai‘i is easier for business majors in Hawai‘i compared to the mainland. Mainland-born Hawai‘i residents have slightly lower rates of majoring in business compared to Hawai‘i-born residents, perhaps reinforcing the notion that networking and connections matter in

business. Careers in health and education have similar constraints when finding jobs after graduating: certification/licensure can be different between jurisdictions, limiting job opportunities on and mobility to the mainland. However, while job options on the mainland for Hawai‘i teachers are limited because of licensure differences, there are numerous reciprocity agreements among states such that Hawai‘i teachers do not need to take additional coursework or training (though additional paperwork, such as evidence of teaching effectiveness, might still be a requirement).[6] There are numerous interstate compacts for physicians and nurses/nurse practitioners, but it does not appear that Hawai‘i is a part of any.[7] Despite this discrepancy in reciprocity, mainland-born Hawai‘i residents have a higher percentage of health-degree earners relative to education-degree earners. Mainland-born Hawai‘i residents are far less likely to have engineering degrees; this could also be licensure-related.

The decline in business and education degrees between Hawai‘i-born stayers and leavers is similar for older age cohorts. The decline in health degrees is similar, albeit slightly smaller, for the 35-44 cohort, but the percentage of health-degree earners among Hawai‘i-born people aged 45-64 is the same for those who live in Hawai‘i and those who live on the mainland. Biology and art degrees see a similar increase for Hawai‘i-born mainlanders in the older cohorts (see Appendix A).

Economic Outcomes

The state of Hawai‘i’s economy is somewhat of a mixed bag; even though Hawai‘i has a high labor force participation rate and a low unemployment rate, economic growth has been on the low end compared to other states. This contrast is reflected when comparing the labor market outcomes of people born and living in Hawai‘i to their Hawai‘i-born, mainland-living counterparts. Hawai‘i-born Hawai‘i residents are more likely to be working and tend to work more hours. However, personal income and hourly wages are higher for Hawai‘i-born mainland residents, particularly on the higher end of the income/wage distribution.[8] While occupational and industry break downs of workers are broadly similar for Hawai‘i-borns living in Hawai‘i and Hawai‘i-borns on the mainland, there are some occupations and industries that are more commonly found among Hawai‘i-born workers living on the mainland, which could account for some of the differences in personal income and wage. Household income is higher for Hawai‘i-born people who stay in Hawai‘i, but this might be due to differences in household composition in response to the high housing costs in Hawai‘i.

Labor Force Participation and Employment

Hawai‘i has generally had among the lowest unemployment rates among the states, and this shows up when comparing the unemployment rate between Hawai‘i-born stayers and leavers;

[6] For example, the National Association of State Directors of Teaching Education and Certification (NASDTEC) Interstate Agreement facilitates interstate agreements that outline which states’ educator certificates will be accepted in another jurisdiction. See http://ecs.force.com/mbdata/MBProfAllRTANW?Rep=TCL17STA for a list of states with reciprocity and the level of reciprocity the states have.

[7] Hawai‘i is not a part of the Interstate Medical Licensure Compact (https://imlcc.org/) or the Nurse Licensure Compact (https://www.ncsbn.org/nurse-licensure-compact.htm).

[8] “Personal income” follows the Census Bureau’s definition, and is found directly in the ACS data: see https://www.census.gov/glossary/#term_Income for the definition. Personal income include salary and wages, interest and rental income, Social Security benefits, and cash public assistance and welfare payments. “Hourly wage” is calculated by the author, using the ACS’s data on wage and usual hours worked.

among those aged 18-34, 5.0% of Hawai‘i-born people living in Hawai‘i are unemployed, compared to 5.9% of Hawai‘i-born people living on the mainland (Table 10).[9] However, a higher percentage of Hawai‘i-born mainland residents are employed, leading to a 2 percentage point higher labor force participation rate. Mainland-born Hawai‘i residents have an even higher labor force participation rate and employment rate. One possible interpretation of this is that moving halfway across the Pacific Ocean is costly, and moving without a job in hand is risky. One does not move from Hawai‘i to the mainland, or vice versa, without a job waiting at the destination; there is some selection bias among the movers.

Alas, the higher percentage of people not in the labor force for Hawai‘i-born residents is unique to the 18-34 cohort. In fact, the difference already disappears for this age cohort when focusing on people who have a bachelor's degree or higher. For those in the 18-34 year old cohort with a bachelor's degree or higher, and for older cohorts (regardless of education), the labor force participation rate is higher and the unemployment rate is lower among Hawai‘i-born Hawai‘i residents, compared to either Hawai‘i-born mainland residents or mainland-born Hawai‘i residents. Note that not participating in the labor force at older ages is not necessarily a bad outcome; one could have earned enough to retire early.

Table 10. Labor Force Participation and Employment, Age 18-34

	Hawai‘i born, Hawai‘i resident	Hawai‘i born, Mainland resident	Mainland born, Hawai‘i resident
Age 18-34			
Employed	75.7%	77.1%	78.7%
Unemployed	5.0%	5.9%	4.5%
Not in labor force	19.3%	17.1%	16.7%
Age 18-34, Bachelor's or higher			
Employed	88.0%	86.5%	86.5%
Unemployed	3.1%	3.5%	4.0%
Not in labor force	8.9%	9.9%	9.6%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Tables for 35-64 year olds in Appendix A.

When looking at the number of hours worked per week, the younger cohort of Hawai‘i-born Hawai‘i residents is again unique; while older cohorts of Hawai‘i-born Hawai‘i residents are more likely to work full-time compared to Hawai‘i-born mainland residents, the younger cohort of Hawai‘i-born people living in Hawai‘i is less likely to work full-time compared to their mainland counterparts, 76% compared to 80%, respectively (Table 11). Full-time is defined as 30 hours, according to federal definitions under the Affordable Care Act. Those with a bachelor's degree or higher are much more likely to work full-time among the younger cohort, by around 10 percentage points, likely due to school attendance within the broader 18-34 cohort (the gap is around 3 percentage points or less for older cohorts).

[9] The unemployment rate is actually computed based on those in the labor force, so the 19.3% (17.1%) of Hawai‘i-born stayers (leavers) who are not in the labor force need to be removed from calculations. Excluding those who are not in the labor force, the unemployment rate for Hawai‘i-born Hawai‘i residents is 6.2%, compared to the 7.1% for Hawai‘i-born mainland residents.

Table 11. Full-Time vs. Part-Time Work, Age 18-34

	Hawai‘i born, Hawai‘i resident	Hawai‘i born, Mainland resident	Mainland born, Hawai‘i resident
Age 18-34			
Full-time	76.0%	80.4%	81.0%
Part-time	24.0%	19.6%	19.0%
Age 18-34, Bachelor's or higher			
Full-time	85.3%	89.8%	85.6%
Part-time	14.7%	10.2%	14.4%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Full-time is defined as 30 hours, according to federal definitions under the Affordable Care Act. Tables for 35-64 year olds in Appendix A.

Hawai‘i-born people who move to the mainland are more likely to work in the private and non-profit sector, compared to Hawai‘i-born people who stay in Hawai‘i. For the 18-34 cohort, this difference is primarily due to wo government (local/state/federal) workers, with a small difference among rates of self-employment. Among older cohorts, the difference in private and non-profit employment is larger, but Hawai‘i-born stayers work in government at even higher rates, particularly in state government (Hawai‘i-born Hawai‘i residents who have a bachelor's degree are between 2 to 3 times more likely to work in state government than their mainland-resident counterparts) (see Appendix A). To make up for this increasing gap in government employment, Hawai‘i-born leavers are more likely to be self-employed. Mainland-born people living in Hawai‘i are also much more likely to work in government compared to Hawai‘i-born people living on the mainland; overall, the difference is mainly due to federal employment, but for those with a bachelor's degree or higher, the difference is split between higher state employment and federal employment.

Table 12. Class of Worker, Age 18-34

	Hawai‘i born, Hawai‘i resident	Hawai‘i born, Mainland resident	Mainland born, Hawai‘i resident
Age 18-34			
Private/non-profit	81.3%	84.0%	70.9%
Local/state/federal	14.9%	11.6%	22.6%
Self-employed	3.4%	4.1%	5.9%
Age 18-34, Bachelor's or higher			
Private/non-profit	67.0%	79.9%	65.9%
Local/state/federal	28.5%	16.1%	27.7%
Self-employed	4.3%	3.8%	5.7%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Columns do not sum to 100%, as family employment, which account for less than 1% of employment, has been excluded from each column. Tables for 35-64 year olds in Appendix A.

Occupation

Perhaps the clearest occupational differences between Hawai‘i-born people aged 18-34 who stayed in Hawai‘i versus those who moved to the mainland is in construction and extraction

occupations (see Table 13). In Hawai‘i, construction and extraction occupations made up 7.8% of responses; in contrast, only 2.9% of Hawai‘i-born mainlanders worked in construction and extraction occupations. Hawai‘i-born mainlanders were slightly less likely to be in sales and related occupations and food preparation and serving occupations; they were more likely to work in an office and administrative support occupation, management occupation, or production occupations compared to their counterparts who live in Hawai‘i. Mainland-born Hawai‘i residents are also less likely to be in construction and extraction occupations (3.8%) and more likely to work in a food preparation and serving occupation. Despite the differences in the percentage of people who majored in education or health among Hawai‘i-born stayers and leavers, a similar percentage of people work in education and training occupations and healthcare practitioner occupations. This is likely due to a lower percentage of Hawai‘i-born residents earning a bachelor’s degree or higher compared to those who move to the mainland.

Table 13. Top 10 Occupations, Age 18-34

Hawai‘i born, Hawai‘i resident	Hawai‘i born, Mainland resident	Mainland born, Hawai‘i resident
Sales & related (13.0%)	Office & admin. supp. (14.0%)	Food prep. & serving (14.2%)
Food prep. & serving (12.8%)	Sales & related (11.9%)	Sales & related (11.8%)
Office & admin. supp. (12.5%)	Food prep. & serving (11.5%)	Office & admin. supp. (9.1%)
Transportation (8.2%)	Transportation (7.4%)	Education & training (6.6%)
Construction & extraction (7.8%)	Management (6.4%)	Healthcare practitioners (6.6%)
Education & training (6.1%)	Education & training (5.6%)	Management (6.5%)
Management (4.8%)	Healthcare practitioners (5.3%)	Transportation (6.4%)
Healthcare practitioners (4.7%)	Production (4.0%)	Personal care and service (4.2%)
Personal care and service (3.8%)	Personal care and service (3.7%)	Installation, maint., repair (4.0%)
Bldng & grnds cleaning (3.6%)	Healthcare support (3.3%)	Construction & extraction (3.8%)

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Percentage of workers in occupation is in parentheses. Workers who did not respond with occupations are omitted from calculations. Tables for 35-64 year olds in Appendix A.

The occupation breakdown for people aged 18-34 with a bachelor’s degree or higher is rather different from the overall population (Table 14). A much smaller percentage of those with a bachelor’s degree or higher are in sales and related occupations, food preparation and serving occupations, and construction and extraction occupations. The differences in the percentage in education and health degrees/occupations between Hawai‘i-born stayers and leavers shows up here. Hawai‘i-born stayers are also slightly more likely to be in architecture and engineering occupations, by a little over 1 percentage point. Hawai‘i-born people living on the mainland are more likely to be in a management occupation; computer and mathematics occupation; business operations specialist occupation; financial specialist occupation; and arts, design, entertainment, sports, and media occupations.

Table 14. Top 10 Occupations, Age 18-34, Bachelor's Degree or Higher

Hawai'i born, Hawai'i resident	Hawai'i born, Mainland resident	Mainland born, Hawai'i resident
Education & training (14.7%)	Education & training (11.5%)	Healthcare practitioners (12.4%)
Healthcare practitioners (13.1%)	Management (11.5%)	Education & training (12.3%)
Office & admin. supp. (12.1%)	Office & admin. supp. (10.9%)	Sales & related (10.5%)
Management (9.4%)	Healthcare practitioners (9.7%)	Management (10.0%)
Sales & related (7.5%)	Sales & related (7.3%)	Office & admin. supp. (9.7%)
Arch. & engineering (5.0%)	Computer & mathematics (6.5%)	Food prep. & serving (6.7%)
Community & soc. service (4.0%)	Business op. specialists (6.2%)	Business op. specialists (4.4%)
Food prep. & serving (4.0%)	Arts, design, entertainment (5.4%)	Personal care and service (3.9%)
Business op. specialists (3.8%)	Financial specialists (5.0%)	Arts, design, entertainment (3.6%)
Financial specialists (3.5%)	Food prep. & serving (4.1%)	Community & soc. service (3.5%)

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Percentage of workers in occupation is in parentheses. Workers who did not respond with occupations are omitted from calculations. Tables for 35-64 year olds in Appendix A.

These occupational patterns are consistent for older cohorts; licensure limits the ease of being in education and training occupations and healthcare practitioner occupations for Hawai'i-born people living on the mainland, while there are a higher percentage in management occupations and arts, design, entertainment, sports, and media occupations. Differences in business operation specialists and financial specialists are mixed. Overall, people in older cohorts are less likely to be in food preparation and serving occupations and sales and related occupations (see Appendix A).

Industry

With the size of the tourism industry in Hawai'i, it is unsurprising that the top two industries that Hawai'i residents (Hawai'i-born or mainland-born) aged 18-34 work in are the arts, entertainment, and recreation, and accommodation and food services industry and the retail trade industry (Table 15). Construction is also a major industry among Hawai'i-born residents. The arts, entertainment, and recreation, and accommodation and food services industry and the retail trade industry are also common for Hawai'i-born mainland residents, but construction is not in the top 10 industries. More common industries to work in among Hawai'i-born mainland residents are the professional, scientific, and management, and administrative, and waste management services industry and the manufacturing industry. Mainland-born Hawai'i residents are much more likely to be in public administration, likely due to people moving to Hawai'i for federal jobs.

Table 15. Top 10 Industries, Age 18-34

Hawai‘i born, Hawai‘i resident	Hawai‘i born, Mainland resident	Mainland born, Hawai‘i resident
Arts, ent, accom, & food (21.4%)	Arts, ent, accom, & food (18.2%)	Arts, ent, accom, & food (21.9%)
Retail trade (15.2%)	Retail trade (15.4%)	Retail trade (13.0%)
Construction (9.1%)	Prof, sci, admin services (12.3%)	Public administration (12.7%)
Educational services (8.7%)	Health care (9.5%)	Prof, sci, admin services (8.2%)
Health care (8.6%)	Educational services (8.6%)	Health care (8.2%)
Prof, sci, admin services (8.3%)	Manufacturing (7.1%)	Educational services (8.0%)
Public administration (4.8%)	Fin. & insurance, real estate (4.9%)	Construction (4.9%)
Transportation & warehsing (4.6%)	Transportation & warehsing (4.1%)	Other services (4.1%)
Fin. & insurance, real estate (4.5%)	Other services (3.9%)	Fin. & insurance, real estate (4.1%)
Other services (4.0%)	Public administration (3.6%)	Transportation & warehsing (4.0%)

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Percentage of workers in industry is in parentheses. Workers who did not respond with industry are omitted from calculations. Tables for 35-64 year olds in Appendix A.

For 18-34 year olds with a bachelor’s degree or higher, work in the arts, entertainment, and recreation, and accommodation and food services industry; the retail trade industry; and the construction industry is less common. Instead, these more educated workers work in the educational services industry; health care industry; and professional, scientific, and management, and administrative, and waste management services industry. As noted several times previously, licensure differences could make working in education or health care less appealing for those moving to the mainland, so the professional, scientific, and management, and administrative, and waste management services industry is the top industry Hawai‘i-born mainlanders work in. Hawai‘i-born mainlanders also work more in manufacturing than Hawai‘i-born Hawai‘i residents. The gap between more educated Hawai‘i-born stayers and leavers shrinks for the construction industry and grows for public administration.

Table 16. Top 10 Industries, Age 18-34, Bachelor’s Degree or Higher

Hawai‘i born, Hawai‘i resident	Hawai‘i born, Mainland resident	Mainland born, Hawai‘i resident
Educational services (19.5%)	Prof, sci, admin services (19.3%)	Educational services (15.8%)
Health care (17.0%)	Educational services (15.8%)	Arts, ent, accom, & food (14.6%)
Prof, sci, admin services (10.7%)	Health care (12.6%)	Health care (13.9%)
Arts, ent, accom, & food (10.5%)	Arts, ent, accom, & food (9.6%)	Public administration (10.8%)
Retail trade (7.7%)	Manufacturing (7.7%)	Prof, sci, admin services (9.4%)
Public administration (7.6%)	Retail trade (7.7%)	Fin. & insurance, real estate (6.7%)
Fin. & insurance, real estate (7.2%)	Fin. & insurance, real estate (6.8%)	Retail trade (6.0%)
Construction (3.7%)	Public administration (4.8%)	Other services (4.3%)
Manufacturing (3.1%)	Information (3.7%)	Wholesale (3.3%)
Transportation & warehsing (3.1%)	Other services (3.6%)	Construction (3.2%)

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Percentage of workers in industry is in parentheses. Workers who did not respond with industry are omitted from calculations. Tables for 35-64 year olds in Appendix A.

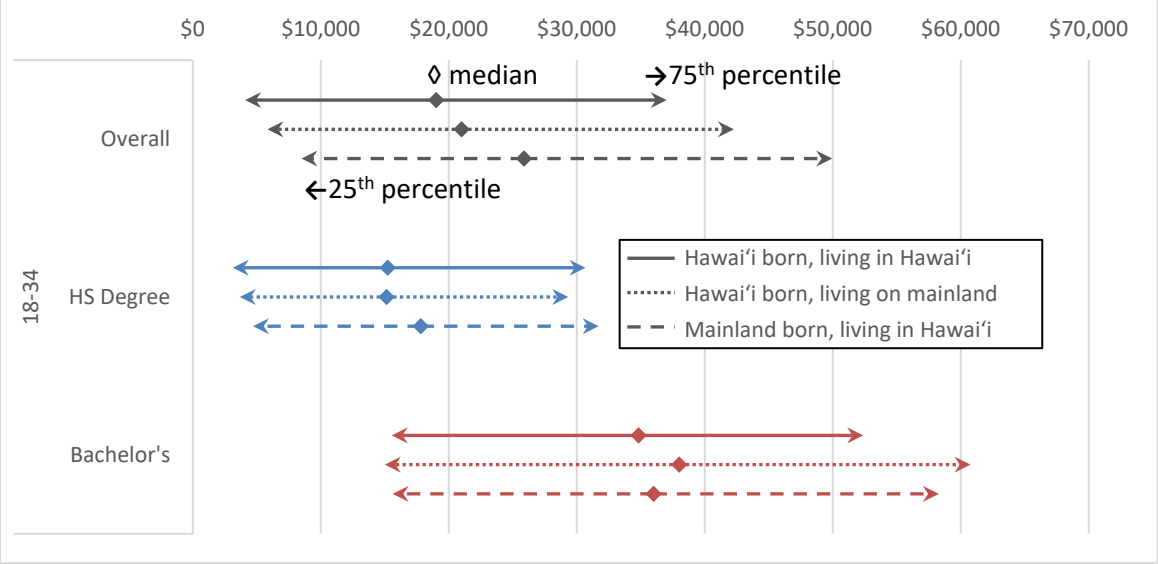
Educational services; professional, scientific, and management, and administrative and waste management services; and public administration become more popular industries to work in for

older cohorts. The percentage of people in public administration equalizes across the three populations for the older cohorts. For Hawai‘i residents (both Hawai‘i-born and mainland-born), retail trade decreases in popularity for 35-44 year olds before increasing for 45-64 year olds; retail trade might be an easier low-skill industry for older workers to participate in, compared to arts, entertainment, and recreation, and accommodation and food services or construction. With that being said, older Hawai‘i-born mainland residents are more likely to work in manufacturing than younger Hawai‘i-born mainlanders (see Appendix A).

Income and Wage

Overall, 18-34 year-olds born and living in Hawai‘i had lower personal incomes than 18-34 year-olds born in Hawai‘i and living on the mainland, who in turn had lower personal incomes than 18-34 year-olds born on the mainland and living in Hawai‘i (Figure 1). The median incomes for these populations were around $19,000, $21,000, and $26,000, respectively (in real terms, 2018 base year). The first and third quartiles showed a similar pattern. When looking at personal income by education, Hawai‘i-born people aged 18-34 with just a high school degree had similar personal incomes (a median just over $15,000), regardless of place of residence, compared to mainland-born Hawai‘i residents (a median slightly under $18,000). In contrast, Hawai‘i-born people aged 18-34 with a bachelor’s degree living in Hawai‘i had lower personal incomes ($35,000 median, $52,500 75th percentile) than Hawai‘i-born mainland residents of the same age and educational attainment ($38,000 median, $60,750 75th percentile), though the 25th percentile of personal income was similar.

Figure 1. Personal Income Quartiles, Age 18-34, by Education ($2018)



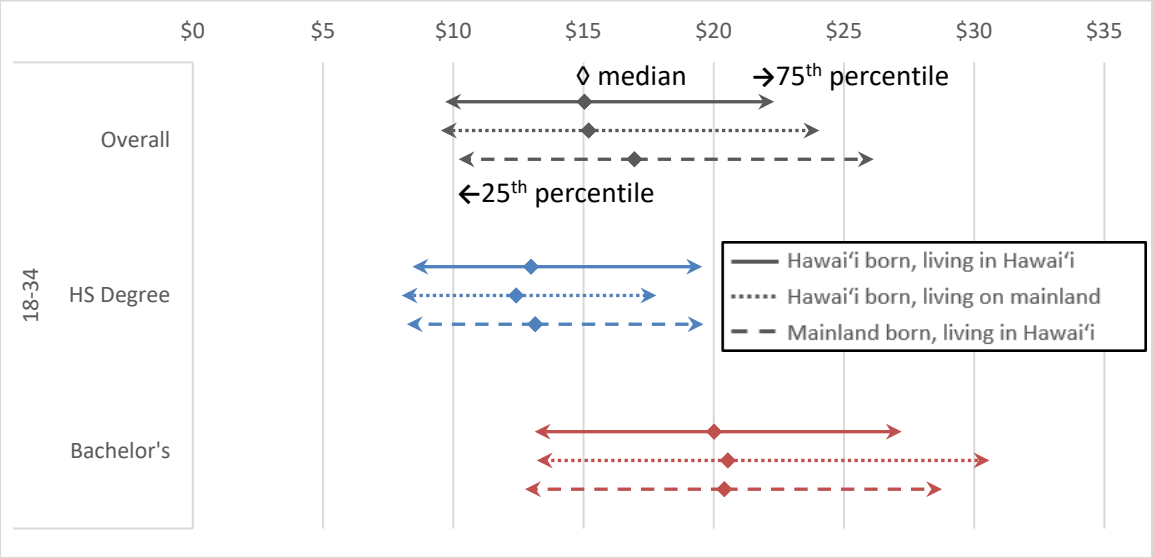
Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Income deflated to 2018 levels. Diamond in middle of line represents median amount; left arrow represents 25th percentile amount; right arrow represents 75th percentile amount. Figures for 35-64 year olds in Appendix A.

A similar pattern emerged for older cohorts: overall, median personal incomes were similar between Hawai‘i-born stayers and leavers, with a larger gap at the 75th percentile, while high school graduates who had no post-secondary education had a similar spread (though median income for stayers was slightly higher than for leavers). The income gap was more evident

among those with bachelor's degrees, particularly among higher earners. For those with a bachelor's degree, Hawai'i-born mainlanders earned $2,000-$5,000 more than Hawai'i-born locals at the median and around $15,000 more at the 75th percentile (see Appendix A).

To evaluate whether this difference in personal income is a function of higher (hourly) pay or a function of working longer hours, Figure 2 looks at the distribution (25th percentile, median, 75th percentile) of hourly wages for Hawai'i-born Hawai'i residents, Hawai'i-born mainland residents, and mainland-born Hawai'i residents overall and by educational attainment. For all age cohorts and all educational attainment, there are no major differences between income distributions and hourly wage distributions, so while there are differences between the percentage of workers in part/full time work when comparing Hawai'i-born stayers and leavers, differences in personal income are not completely driven by hours worked. Rather, overall, Hawai'i-born mainlanders get paid more, per hour, than their counterparts who stayed in Hawai'i, with slightly lower hourly wages for high school degree earners and slightly higher hourly wages for bachelor's degree earners when comparing Hawai'i-born stayers versus leavers.

Figure 2. Hourly Wage Quartiles, Age 18-34, by Education ($2018)

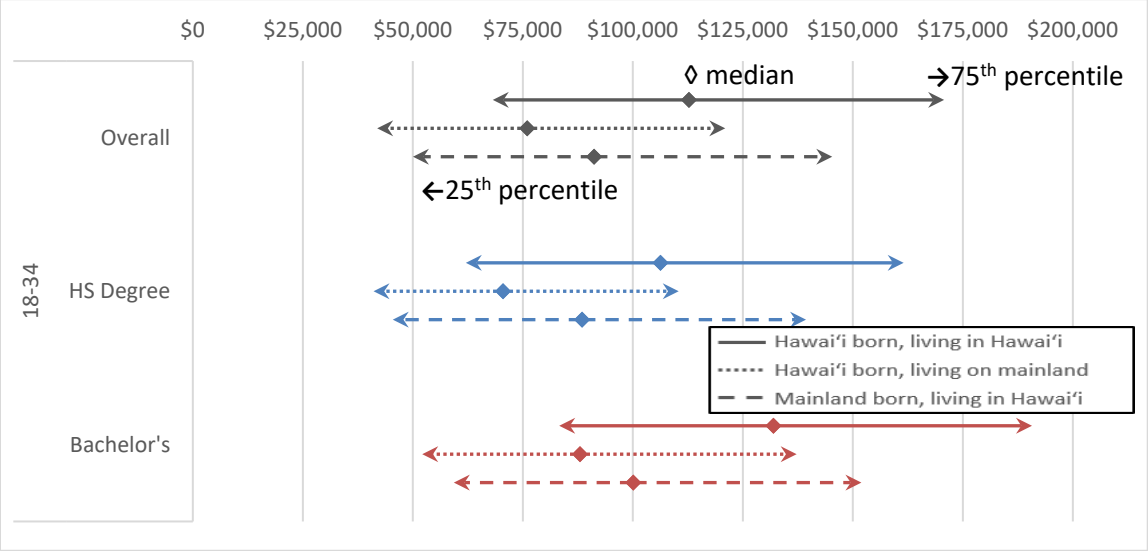


Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Income deflated to 2018 levels. Diamond in middle of line represents median amount; left arrow represents 25th percentile amount; right arrow represents 75th percentile amount. Figures for 35-64 year olds in Appendix A.

Household income tells a completely different story, likely due to differences in household composition (Figure 3). Household income for Hawai'i-born people who stay in Hawai'i is significantly higher than Hawai'i-born people who move to the mainland, by at least $15,000 overall and up to $45,000 when taking into account educational attainment. People who stay in Hawai'i could be staying with parents or other family members, contributing to household income in ways that a nuclear family moving to the mainland would not be able to take advantage of. In that sense, mainland-born people who move to Hawai'i might offer a more apt comparison, as these movers are also unlikely to take advantage of extended family adding to household income. However, even this comparison does not seem particularly helpful for those

moving to the mainland; mainland-born movers to Hawai‘i also have higher household income, though the magnitude of the difference is noticeably smaller.

Figure 3. Household Income Quartiles, Age 18-34, by Education ($2018)



Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Income deflated to 2018 levels. Diamond in middle of line represents median amount; left arrow represents 25th percentile amount; right arrow represents 75th percentile amount. Figures for 35-64 year olds in Appendix A.

Differences in median household income between Hawai‘i-born residents and their counterparts on the mainland persist among the older cohorts, though the gap narrows considerably, particularly among those with a bachelor’s degree. In fact, among the older cohorts, household income at the 75th percentile for bachelor’s-degree-earning Hawai‘i-born movers to the mainland is slightly higher than Hawai‘i-born people who stayed in Hawai‘i. This reinforces the idea that young adults might still be living with family members.

Housing

With different household compositions (and thus household incomes) come different home ownership rates. Even if housing costs are significantly cheaper on the mainland, this is insufficient to make up for lower household incomes, resulting in a homeownership gap of over 20 percentage points between Hawai‘i-born Hawai‘i residents and Hawai‘i-born mainland residents for the 18-34 age cohort. Again, mainland-born Hawai‘i residents might be a more apt comparison, and for this comparison, Hawai‘i-born mainland residents do relatively well; Hawai‘i-born mainland residents have a homeownership rate 10 percentage points higher than mainland-born Hawai‘i residents.

Table 17. Home Ownership, Age 18-34

	Hawai‘i born, Hawai‘i resident	Hawai‘i born, Mainland resident	Mainland born, Hawai‘i resident
Age 18-34			
Own home, mortgage	47.2%	35.4%	24.9%
Own free & clear	15.3%	6.8%	7.0%
Renting	37.5%	57.8%	68.1%
Age 18-34, Bachelor's or higher			
Own home, mortgage	55.3%	36.8%	28.0%
Own free & clear	18.9%	5.8%	7.8%
Renting	25.8%	57.4%	64.2%

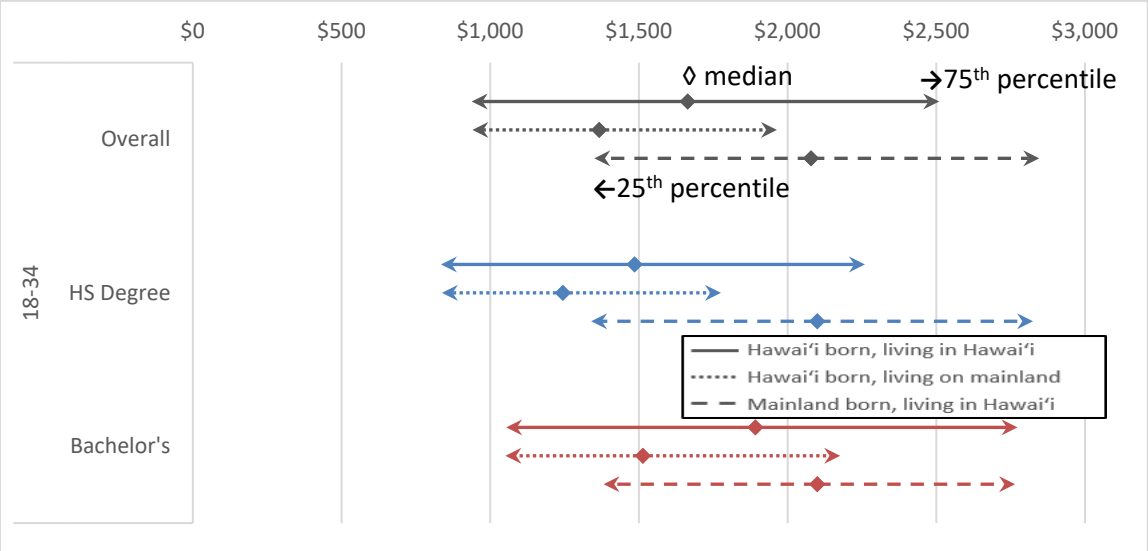
Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Tables for 35-64 year olds in Appendix A.

Differences in homeownership between Hawai‘i-born Hawai‘i residents and their counterparts living on the mainland all but disappear among the older cohorts; for some populations, the rates are nearly identical. With that being said, Hawai‘i-born residents are more likely to own their homes free and clear, without any mortgage left to pay. In contrast, mainland-born Hawai‘i residents continue to have lower homeownership rates, by around 10 percentage points.

As one might expect, housing costs are significantly less for those living on the mainland. Figure 4 compares the monthly housing costs for Hawai‘i-born young adults living in Hawai‘i, Hawai‘i-born young adults living on the mainland, and mainland-born young adults living in Hawai‘i, by quartile and by education. Renters (gross rent) and homeowners (mortgage and other ownership costs) are included in the figure below. Median monthly housing costs almost $300 higher for Hawai‘i-born young adults in Hawai‘i, compared to Hawai‘i-born young adults on the mainland. Median monthly housing costs are even higher for mainland-born adults in Hawai‘i, almost $400 higher than Hawai‘i residents who were born in Hawai‘i. The gap for higher-cost housing (the 75th percentile) is even larger when comparing Hawai‘i-born residents and Hawai‘i-born mainlanders, though not by much.

Differences in monthly housing costs are persistent, regardless of age or educational attainment, and rent and homeownership costs are similarly cheap on the mainland (see Appendix A for the supplemental monthly housing costs quartiles figure for 35-64 year olds, as well as the gross rent quartiles figure and the select monthly homeownership costs quartiles figure), with some small exceptions (e.g., the median gross rent for 35-44 year olds with a bachelor's degree is slightly higher for Hawai‘i-born mainlanders). Higher monthly homeownership costs are not necessarily due to Hawai‘i-born mainlanders having mortgages versus Hawai‘i-born residents living in free and clear homes, either. Across the board, mortgages are higher for Hawai‘i-born residents, and even higher for mainland-born people living in Hawai‘i (primarily for older adults with only a high school degree). Mortgage amount quartiles by age and education can also be found in Appendix A.

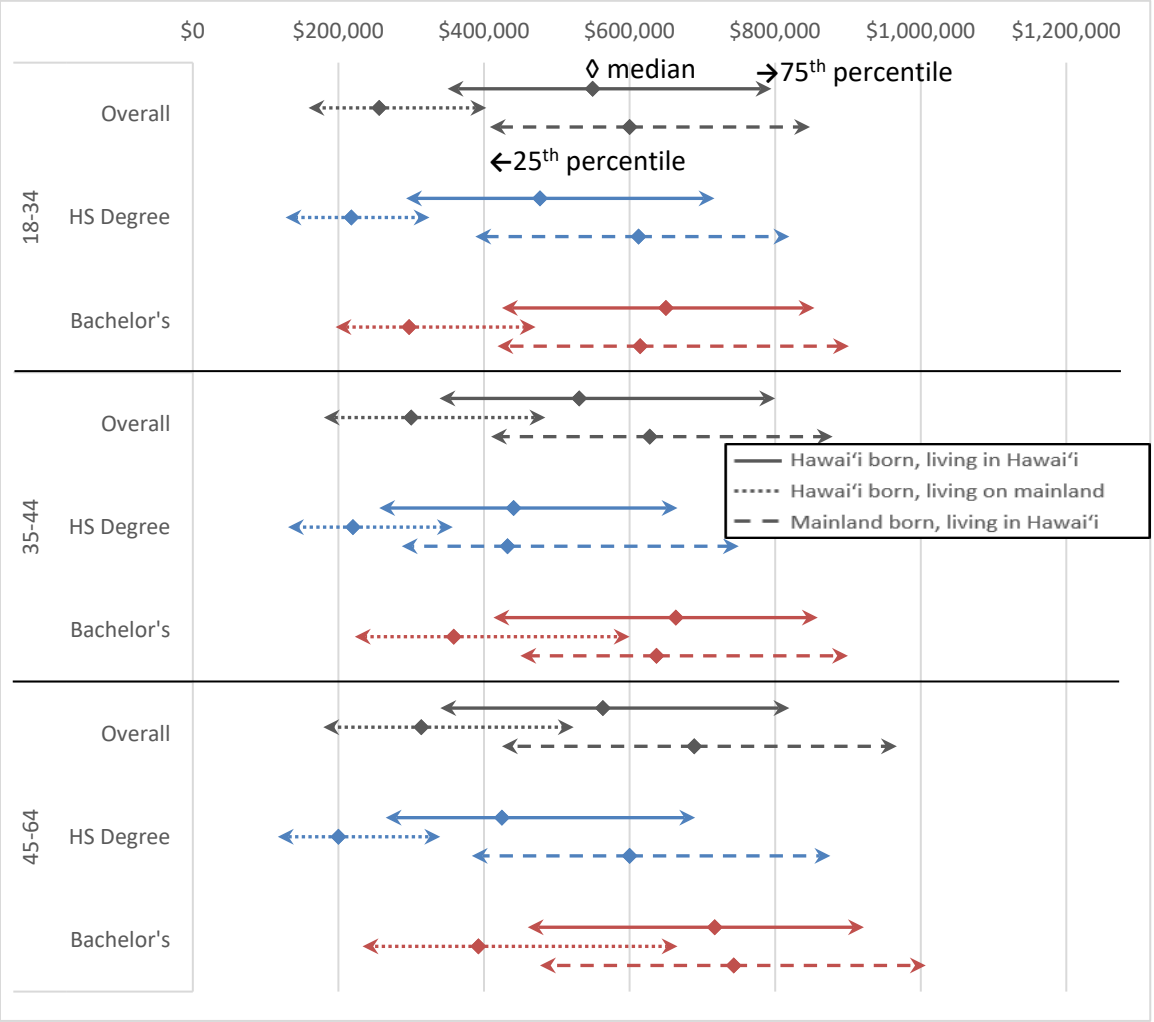
Figure 4. Monthly Housing Costs Quartiles, Age 18-34, by Education ($2018)



Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Income deflated to 2018 levels. Renters and homeowners included. Diamond in middle of line represents median amount; left arrow represents 25th percentile amount; right arrow represents 75th percentile amount. Figures for 35-64 year olds in Appendix A.

The really sharp contrast in housing between Hawai'i and the mainland is in house value (see Figure 5). The median house value for young adults born and living in Hawai'i is just under $550,000, compared to around $250,000 for young adults born in Hawai'i and living on the mainland (young adults born on the mainland and living in Hawai'i have a median house value of over $600,000). Across all age cohorts and levels of education, and across the different quartiles, house values in Hawai'i are approximately double that of the Hawai'i-born people living on the mainland. The 25th percentile house values for some populations of Hawai'i-born Hawai'i residents almost exceed the 75th percentile house values for their mainland-resident counterparts.

Figure 5. House Value Quartiles, by Age and Education ($2018)

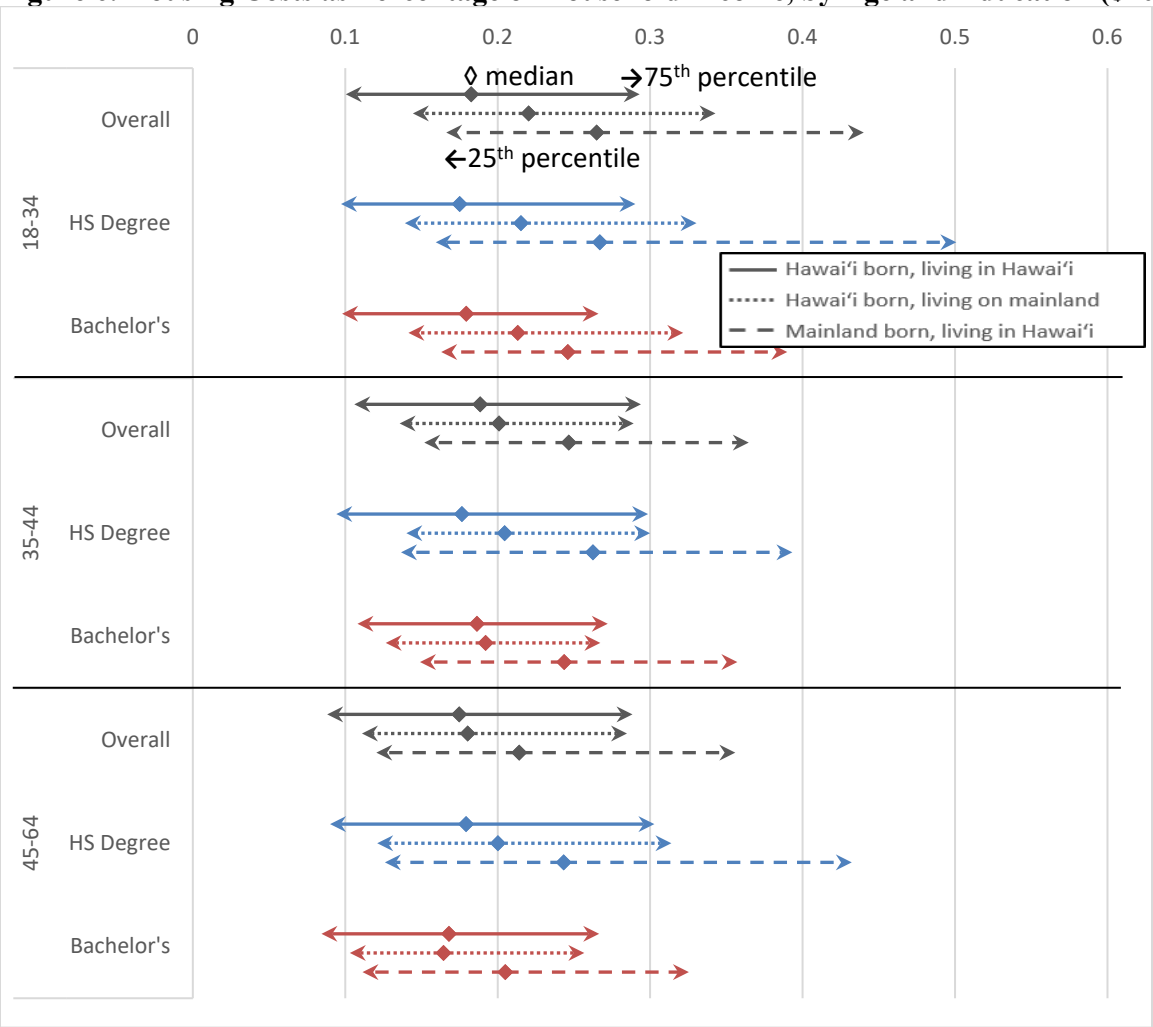


Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Income deflated to 2018 levels. Renters and homeowners included. Diamond in middle of line represents median amount; left arrow represents 25th percentile amount; right arrow represents 75th percentile amount.

V. Why Move to the Mainland? A Closer Analysis of Economic Outcomes

Personal income and hourly wage differences between Hawai'i-born stayers and leavers were small compared to the differences in housing costs. One might conclude that housing costs were the primary driver of moves. However, for those moving to the mainland, while housing costs are lower, household income is also lower; with more expensive housing in Hawai'i, household composition changes – multigenerational and extended family households are more prevalent, to increase household income. The question, then, for those who are considering moving to the mainland to more affordable housing, are housing costs low enough to offset the lower household income? Figure 6 suggests that this is unlikely, particularly for younger adults.

Figure 6. Housing Costs as Percentage of Household Income, by Age and Education ($2018)



Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Income deflated to 2018 levels. Renters and homeowners included. Diamond in middle of line represents median amount; left arrow represents 25th percentile amount; right arrow represents 75th percentile amount.

Figure 6 presents housing costs as a percentage of household income – monthly housing costs are scaled up to annual costs (multiplied by 12) and then divided by annual household income, as a measure of cost burden. Lower percentages indicate a lower cost burden. If lower housing costs on the mainland were more "affordable" even with lower household incomes, housing costs would be a lower percentage of household income. Instead, it looks like Hawai'i-born young adults living in Hawai'i have housing costs that make up a smaller percentage of household income compared to Hawai'i-born young adults who move to the mainland. Hawai'i-born older adults have a much smaller gap between living in Hawai'i and the mainland, and those with bachelor's degrees have effectively the same cost burden. For these older adults, cost burdens are relatively equal, so moving to the mainland for housing affordability is supported by the data. Note that the gap closes because the percentage decreases for Hawai'i-born mainlanders; the percentage is stable for Hawai'i-born residents. The stability of the household costs as a percentage of household income for Hawai'i-born residents lends credence to the idea that

households in Hawai‘i (particularly of those who are from Hawai‘i) are multigenerational; younger adults with lower earnings live with their higher-earning parents, and when these younger adults grow older, get paid more, and have their own families, their children stay with them even when the children become working aged. In other words, there is a regular rotation of lower-earning younger generations and higher-earning older generations in the household.

For younger adults, Figure 6 paints somewhat of an incomplete picture. One could be set on living in their own household, even if it is slightly costlier to do so. As the Hawai‘i-born, living in Hawai‘i distributions include the larger, multigenerational/extended family households, this might not be a relevant comparison group. Instead, mainland-born people living in Hawai‘i might be the more apt comparison – these people are unlikely to be moving with their extended families, so their household composition (spouse and own children only) is closer to those Hawai‘i-born people who want to move out of a multigenerational/extended family household. In this case, younger adults born in Hawai‘i and living on the mainland have a lower cost burden than young adults born on the mainland and living in Hawai‘i, by about 5 percentage points. Alternatively, households can be broken out into multigenerational and single generation households, and then cost burden can be compared. This is still imperfect, as it does not account for extended family households or roommates, but it does provide a closer comparison. For single generation households, Hawai‘i-born younger adults living in Hawai‘i still have a lower median housing cost relative to household income compared to Hawai‘i-born younger adults living on the mainland, though the difference is about 2.5 percentage points, compared to the 3.8 percentage points when multigenerational households were included.[10] Thus, it does not look like, strictly speaking, that housing costs are the reason for people born in Hawai‘i to move to the mainland. Note that this comparison does not take into context the size or amenities of the housing; Hawai‘i leavers could be spending slightly more than their counterparts who stay in Hawai‘i, but leavers could be getting substantially more house relative to the cost.

The Current Population Survey (CPS) asks about reasons for moving within the past year, and the responses confirm that housing costs are not the primary reason for leaving Hawai‘i for the mainland. Table 18 presents the breakdown of responses from the question about reasons for moving of outmigrants whose residence one year ago was in Hawai‘i. Employment is a major driver in the decision to move, even more so for 18-34 year olds. In particular, a majority of responses noted moving for a new job or job transfer as the reason for moving. Over 13% of movers moved for housing reasons, but “cheaper housing” was not a common response, even for those between the ages of 18-34 (though it had the fourth most responses). This is not to say that cheaper housing is not an impetus; one could want to move to the mainland for cheaper housing but will not do so unless there is a job to move to. The person is moving because of a new job, but this new job was found because of a desire to move to a more affordable location.

[10] One possibility for why housing cost as a percentage of household income might be lower in Hawai‘i for single generation households despite higher personal income on the mainland is that spouses have a harder time finding jobs on the mainland. So, even in a single generation household, household income is less in Hawai‘i.

Table 18. Reasons for Moving to the Mainland: 2013-2017

	Percentage, all movers	Percentage, 18-34 year olds
Family Reason		
Change in marital status	2.4%	4.8%
Other family reason	26.3%	14.4%
Job-related Reason		
New job or job transfer	43%	54.4%
To look for work or lost job	1.7%	1.2%
For easier commute	0.1%	-
Other job-related reason	3.6%	4.7%
Housing reason		
Wanted new or better housing	2.4%	-
Wanted better neighborhood	0.2%	-
For cheaper housing	1.8%	5.1%
Other housing reason	11.7%	11.4%
Attend/leave college	1.3%	3.5%
Other reasons	5.5%	0.6%

Source: Estimates based on U.S. Census Bureau, Current Population Survey Annual Social and Economic Supplement 2013-2017 5-year PUMS, using the IPUMS Online Data Analysis System (https://cps.ipums.org/cps/sda.shtml).

Is there any evidence to suggest that job opportunities were strictly the reason for people born in Hawai‘i to move to the mainland, regardless of housing costs? There are no gross differences in personal income and hourly wage except for older, educated higher end earners. The analysis of personal income, hourly wage, and labor force participation are suggestive that younger adults might not be moving to better job situations on the mainland. However, one problem with simply using quartiles to do such a comparison is that the characteristics of the Hawai‘i-born-living-in-Hawai‘i median earner might be different from the Hawai‘i-born-living-on-the-mainland median earner. Their ages could be different, their genders could be different, and their occupations could be different. To address this, a more robust comparison strategy, propensity score matching, is used. The idea behind propensity score matching is that (near) identical individuals, similar in all variables except that one is exposed to some form of treatment while the other is untreated, are compared, and any difference in the outcome is due to the treatment.

For this analysis, all Hawai‘i-born 18-64 year olds were pooled together, and age, gender, race, and education were matched, with the treatment being whether the person moved to the mainland. The results from this matching show that Hawai‘i-born mainlanders have a personal income $2,100 higher and an hourly wage $1.60 higher than their local counterparts, similar to the differences found above. Personal income and hourly wage were statistically significant at the 10% level (p value of 0.56 and 0.067, respectively).

Noting the differences in field of degrees, occupations, and industry, this basic matching seems incomplete. Incorporating occupation categories into the matching analysis revealed that some of the difference in personal income and hourly wage between Hawai‘i-born stayers and leavers was due to the types of jobs people had on the mainland; controlling for this, the gap in personal

income decreased to $1,350 and hourly wage decreased to $1.20, and both lost statistical significance. Thus, while moving to the mainland leads to a slightly higher wage, all things equal, it is the jobs that are available on the mainland that are inducing the decision to move.

To explore this idea more carefully, Table 19 compares whether people with science, technology, engineering, and math (STEM) degrees or National Science Foundation (NSF) defined science and engineering (and science and engineering related) degrees are going into STEM or science and engineering occupations. The latter NSF definition is used because STEM degree and occupation definitions can be somewhat diverse and imprecise; for the purposes of this analysis, the Department of Homeland Security's STEM Designated Degree Program was used for field of degree, while the U.S. Census Bureau's STEM, STEM-related, and non-STEM code list were used.[11] Table 19 presents the percentage of people with a STEM degree who are in a STEM (related) occupation and the percentage of people with an NSF-defined science and engineering (related) degree who are in science or engineering occupations.

Table 19. Percentage of STEM and Science and Engineering Degree Earners in STEM and Science and Engineering Occupations, by Age

	Hawai'i born, Hawai'i resident	Hawai'i born, Mainland resident	Mainland born, Hawai'i resident
STEM			
18-34	36.9%	40.5%	35.4%
35-44	32.9%	44.2%	39.1%
45-64	41.6%	41.4%	36.2%
Science and Engineering			
18-34	4.3%	10.3%	4.5%
35-44	4.4%	11.6%	5.8%
45-64	4.5%	9.3%	6.7%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families.

The percentage of Hawai'i-born mainlanders aged 18-34 who received a STEM degree and continued into a STEM occupation was 3.6 percentage points higher than the percentage of Hawai'i-born residents aged 18-34; the difference was even higher for 35-44 year olds, but the percentage was essentially the same for the 45-64 year-old cohort. For science and engineering degree-earners going into a science or engineering occupation, the gap between Hawai'i-born leavers and stayers was 6 percentage points for the 18-34 year-old cohort, 7.2 percentage points for the 35-44 year-old cohort, and 4.8 percentage points for the 45-64 year-old cohort. Mainland-born Hawai'i residents have similarly low percentage of people with STEM/science and engineering degrees going into a STEM/science and engineering occupation as Hawai'i-born Hawai'i residents. This points to limited job opportunities in STEM fields in Hawai'i.

[11] NSF's science and engineering (related) degrees are flagged in the ACS under the "SCIENGP" and "SCIENGRLP" variable. Background on NSF's studies on science and engineering degrees can be found in *Science and Engineering Degrees: 1966–2012*, NSF 15-326, available at http://www.nsf.gov/statistics/2015/nsf15326/. Information on the DHS's STEM Designated Degree Program list can be found here: https://studyinthestates.dhs.gov/eligible-cip-codes-for-the-stem-opt-extension. The Census Bureau's STEM code list can be found here: https://www.census.gov/topics/employment/industry-occupation/guidance/code-lists.html.

VI. Conclusion

According to 2014-2018 data, approximately half a million people born in Hawai‘i live on the mainland, of which 70% are working age (18-64 years old). Over a quarter of the Hawai‘i-born people living on the mainland are working-age adults with a bachelor’s degree or higher. Of concern for Hawai‘i’s economic growth, there are more Hawai‘i-born working-age adults with a bachelor’s degree or higher living on the mainland than there are living in Hawai‘i, and mainland-born movers to Hawai‘i do not come in enough numbers to make up for the loss in human capital.

Hawai‘i-born adults who move to the mainland are more likely to be female and white, compared to those who stay in Hawai‘i. They are more likely to have a degree in biology or art, and less likely to have a degree in education or health, probably due to occupational certification/licensure being a barrier to cross-state mobility for people in education and health occupations. These differences in obtaining education and health degrees shows up in occupation and industry, as Hawai‘i-born mainlanders are less likely to be in education or health occupations/industries, in addition to a smaller percentage working in construction, compared to Hawai‘i-born residents. Instead, Hawai‘i-born mainlanders are more likely to be in production, computer and mathematics, or arts and entertainment occupations, and are more likely to be in the manufacturing or professional services industry.

With a low unemployment rate, people born in Hawai‘i who stay in Hawai‘i have a higher labor force participation rate and a lower unemployment rate than their counterparts who move to the mainland. Hawai‘i-born stayers are also more likely to work full time. A higher percentage of Hawai‘i-born stayers work in government, by around 50% in most cases. There are small differences in median personal income and median hourly wage between Hawai‘i-born stayers and leavers, though more-educated Hawai‘i-born leavers make more money at the higher end of the income/wage distribution. Household income is much higher for people born and living in Hawai‘i, but that is likely due to household composition, to make up for the much higher housing costs in Hawai‘i compared to the mainland.

The decision to move to the mainland for Hawai‘i-born people looks to be a result of a combination of lower housing costs and more job opportunities. Gross rents and mortgages are much higher in Hawai‘i, and while multigenerational/extended family households earn more than enough to offset this – household costs as a percentage of household income is lower for Hawai‘i-born young adults living in Hawai‘i compared to Hawai‘i-born young adults living on the mainland – those who want to live by themselves (with just their spouse and own children) might not be able to afford doing so in Hawai‘i. Broadly speaking, jobs alone do not appear to be incentivizing moves. While Hawai‘i-born mainlanders earn slightly more than those who stay in Hawai‘i, by $2,000-$5,000, the difference seems to be largely compositional; taking into account age, gender, race, education, and occupation, differences in personal income and hourly wage are much smaller, and not statistically significant. Instead, it appears that the types of jobs that are available on the mainland are drawing Hawai‘i-borns away from Hawai‘i. For those earning STEM or NSF-defined science and engineering degrees, a higher percentage of Hawai‘i-borns living on the mainland are in STEM or science and engineering occupations, compared to Hawai‘i-borns who stay in Hawai‘i.

Appendix A. Supplementary Tables and Figures

Table A1. Gender Composition, Age 35-64

	Hawai'i born, Hawai'i resident	Hawai'i born, Mainland resident	Mainland born, Hawai'i resident
Age 35-44			
Male	51.8%	48.0%	54.2%
Female	48.2%	52.0%	45.8%
Age 35-44, college or more			
Male	44.4%	42.7%	48.3%
Female	55.6%	57.3%	51.7%
Age 45-64			
Male	50.2%	47.5%	54.2%
Female	49.8%	52.5%	45.8%
Age 45-64, college or more			
Male	44.9%	48.9%	51.9%
Female	55.1%	51.1%	48.1%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families.

Table A2. Race Composition, Age 35-64

	Hawai‘i born, Hawai‘i resident	Hawai‘i born, Mainland resident	Mainland born, Hawai‘i resident
Age 35-44			
White alone	7.2%	46.5%	67.6%
Asian alone	30.4%	15.8%	9.5%
NH/Other PI alone	15.9%	11.9%	1.3%
Other race alone	8.0%	7.4%	11.3%
Two or more races	38.5%	18.4%	15.6%
Age 35-44, Bachelor's or higher			
White alone	8.4%	48.5%	71.1%
Asian alone	41.6%	20.8%	11.2%
NH/Other PI alone	7.8%	5.7%	0.6%
Other race alone	9.7%	6.6%	6.7%
Two or more races	32.5%	18.4%	14.0%
Age 45-64			
White alone	8.0%	53.2%	74.6%
Asian alone	43.9%	17.0%	5.9%
NH/Other PI alone	14.0%	10.5%	1.9%
Other race alone	5.4%	5.9%	6.2%
Two or more races	28.8%	13.4%	11.4%
Age 45-64, Bachelor's or higher			
White alone	7.9%	54.6%	79.0%
Asian alone	61.4%	23.9%	7.4%
NH/Other PI alone	6.7%	5.3%	0.8%
Other race alone	6.6%	4.9%	4.8%
Two or more races	17.4%	11.3%	8.0%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families.

Table A3. Top 10 Fields of Degrees Earned, Age 35-64

35-44		
Hawai‘i born, Hawai‘i resident	**Hawai‘i born, Mainland resident**	**Mainland born, Hawai‘i resident**
Business (21.6%)	Business (18.2%)	Business (15.0%)
Education (10.2%)	Social sciences (9.8%)	Social sciences (9.9%)
Health (9.5%)	Health (7.8%)	Biology (8.2%)
Social sciences (8.2%)	Education (7.4%)	Psychology (7.1%)
Psychology (6.5%)	Engineering (7.3%)	Education (6.5%)
Engineering (5.0%)	Biology (6.3%)	Health (6.5%)
Biology (4.8%)	Psychology (6.0%)	Communications (5.8%)
Communications (4.4%)	Info. & comp. sci. (5.2%)	Art (5.3%)
English/literature (3.3%)	Art (4.6%)	Engineering (5.1%)
Art (3.0%)	English/literature (4.5%)	Physical sciences (3.1%)
45-64		
Hawai‘i born, Hawai‘i resident	**Hawai‘i born, Mainland resident**	**Mainland born, Hawai‘i resident**
Business (24.4%)	Business (22.0%)	Business (18.6%)
Education (14.1%)	Education (9.2%)	Education (9.8%)
Social sciences (10.4%)	Social sciences (9.0%)	Social sciences (9.1%)
Engineering (6.9%)	Engineering (7.9%)	Health (8.0%)
Health (6.5%)	Health (6.4%)	Biology (6.4%)
Psychology (5.0%)	Biology (5.3%)	Psychology (5.8%)
Art (4.2%)	Psychology (5.1%)	Art (5.6%)
Biology (3.9%)	Art (4.9%)	Engineering (5.3%)
Communications (3.6%)	Communications (4.2%)	Communications (4.4%)
Pub. admin. (2.1%)	Info. & comp. sci. (3.5%)	Physical sciences (3.2%)

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Percentage of degree-earners earning degree in the field is in parentheses. Graduates who did not respond with the field of degree earned are omitted from calculations.

Table A4. Labor Force Participation and Employment, Age 35-64

	Hawai'i born, Hawai'i resident	Hawai'i born, Mainland resident	Mainland born, Hawai'i resident
Age 35-44			
Employed	85.0%	82.1%	82.4%
Unemployed	3.8%	4.1%	3.1%
Not in labor force	11.5%	14.2%	14.5%
Age 35-44, Bachelor's or higher			
Employed	93.1%	87.8%	88.0%
Unemployed	1.1%	2.1%	2.8%
Not in labor force	6.0%	10.4%	9.2%
Age 45-64			
Employed	75.0%	71.4%	72.4%
Unemployed	1.8%	3.0%	2.8%
Not in labor force	23.2%	25.6%	24.8%
Age 45-64, Bachelor's or higher			
Employed	82.8%	79.0%	79.8%
Unemployed	0.9%	2.7%	1.9%
Not in labor force	16.3%	18.3%	18.4%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families.

Table A5. Full Time vs. Part Time Work, Age 35-64

	Hawai'i born, Hawai'i resident	Hawai'i born, Mainland resident	Mainland born, Hawai'i resident
Age 35-44			
Full time	91.5%	90.9%	87.0%
Part time	8.5%	9.1%	13.0%
Age 35-44, Bachelor's or higher			
Full time	94.7%	92.1%	90.1%
Part time	5.3%	7.9%	9.9%
Age 45-64			
Full time	90.4%	88.5%	86.5%
Part time	9.6%	11.5%	13.5%
Age 45-64, Bachelor's or higher			
Full time	91.4%	88.9%	88.2%
Part time	8.6%	11.1%	11.8%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families.

Table A6. Class of Worker, Age 35-64

	Hawai'i born, Hawai'i resident	Hawai'i born, Mainland resident	Mainland born, Hawai'i resident
Age 35-44			
Private/non-profit	69.1%	75.4%	63.9%
Local/state/federal	23.6%	16.4%	21.4%
Self-employed	7.0%	2.9%	14.7%
Age 35-44, Bachelor's or higher			
Private/non-profit	55.8%	70.9%	57.1%
Local/state/federal	37.7%	21.8%	28.2%
Self-employed	5.9%	7.2%	14.6%
Age 45-64			
Private/non-profit	62.0%	68.0%	54.8%
Local/state/federal	28.8%	20.1%	23.1%
Self-employed	9.1%	11.6%	21.6%
Age 45-64, Bachelor's or higher			
Private/non-profit	49.6%	61.8%	48.2%
Local/state/federal	39.9%	25.7%	31.9%
Self-employed	10.5%	12.3%	19.5%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Columns do not sum to 100%, as family employment, which account for less than 1% of employment, has been excluded from each column.

Table A7. Top 10 Occupations, Age 35-64

35-44		
Hawai'i born, Hawai'i resident	**Hawai'i born, mainland resident**	**Mainland born, Hawai'i resident**
Office & admin. supp. (15.1%)	Office & admin. supp. (13.3%)	Management (13.8%)
Management (9.8%)	Management (12.5%)	Education & training (8.5%)
Sales & related (9.1%)	Sales & related (8.2%)	Office & admin. supp. (8.5%)
Construction & extraction (8.5%)	Education & training (7.4%)	Healthcare practitioners (8.5%)
Education & training (7.4%)	Healthcare practitioners (7.3%)	Sales & related (7.1%)
Transportation (7.1%)	Transportation (6.4%)	Food prep. & serving (5.1%)
Healthcare practitioners (5.3%)	Computer & mathematics (4.8%)	Construction & extraction (5.0%)
Food prep. & serving (4.9%)	Production (4.7%)	Computer & mathematics (4.7%)
Protective services (4.9%)	Construction & extraction (4.0%)	Transportation (4.5%)
Installation, maint., repair (3.7%)	Food prep. & serving (3.7%)	Business op. specialists (3.9%)
35-44, Bachlor's or higher		
Hawai'i born, Hawai'i resident	**Hawai'i born, mainland resident**	**Mainland born, Hawai'i resident**
Education & training (16.3%)	Management (17.5%)	Management (15.4%)
Management (14.6%)	Education & training (12.8%)	Education & training (13.6%)
Healthcare practitioners (11.2%)	Healthcare practitioners (11.0%)	Healthcare practitioners (12.0%)
Military (9.5%)	Office & admin. supp. (8.9%)	Office & admin. supp. (6.3%)
Community & soc. service (5.9%)	Computer & mathematics (6.9%)	Sales & related (5.7%)
Financial specialists (5.1%)	Sales & related (6.1%)	Business op. specialists (4.9%)
Business op. specialists (4.4%)	Financial specialists (5.1%)	Computer & mathematics (4.6%)
Protective services (4.2%)	Arts, design, entertainment (4.8%)	Arts, design, entertainment (4.4%)
Sales & related (3.9%)	Business op. specialists (4.6%)	Arch. & engineering (4.3%)
Computer & mathematics (3.6%)	Arch. & engineering (3.4%)	Community & soc. service (4.7%)
45-64		
Hawai'i born, Hawai'i resident	**Hawai'i born, mainland resident**	**Mainland born, Hawai'i resident**
Office & admin. supp. (16.6%)	Office & admin. supp. (14.0%)	Management (14.8%)
Management (9.5%)	Management (13.3%)	Sales & related (10.9%)
Sales & related (8.9%)	Sales & related (9.6%)	Office & admin. supp. (10.4%)
Transportation (8.0%)	Education & training (7.3%)	Education & training (8.6%)
Construction & extraction (7.2%)	Transportation (6.1%)	Healthcare practitioners (7.0%)
Education & training (6.8%)	Healthcare practitioners (6.1%)	Construction & extraction (6.8%)
Bldng & grnds cleaning (5.0%)	Business op. specialists (4.2%)	Transportation (5.4%)
Installation, maint., repair (4.5%)	Production (4.2%)	Food prep. & serving (4.1%)
Healthcare practitioners (4.2%)	Construction & extraction (3.7%)	Business op. specialists (3.8%)
Food prep. & serving (4.0%)	Computer & mathematics (3.6%)	Arts, design, entertainment (3.1%)
45-64, Bachelor's or higher		
Hawai'i born, Hawai'i resident	**Hawai'i born, mainland resident**	**Mainland born, Hawai'i resident**
Education & training (15.1%)	Management (19.1%)	Management (19.0%)
Management (15.0%)	Education & training (13.0%)	Education & training (15.7%)
Office & admin. supp. (12.3%)	Healthcare practitioners (9.7%)	Healthcare practitioners (10.1%)
Healthcare practitioners (9.3%)	Sales & related (9.0%)	Sales & related (8.9%)
Sales & related (6.4%)	Office & admin. supp. (8.5%)	Office & admin. supp. (6.6%)
Financial specialists (5.8%)	Business op. specialists (5.9%)	Business op. specialists (5.3%)
Business op. specialists (5.7%)	Computer & mathematics (5.3%)	Community & soc. service (4.0%)
Arch. & engineering (4.2%)	Arch. & engineering (4.7%)	Computer & mathematics (3.9%)
Community & soc. service (3.8%)	Financial specialists (4.0%)	Arts, design, entertainment (3.4%)
Computer & mathematics (3.3%)	Arts, design, entertainment (3.2%)	Transportation (2.9%)

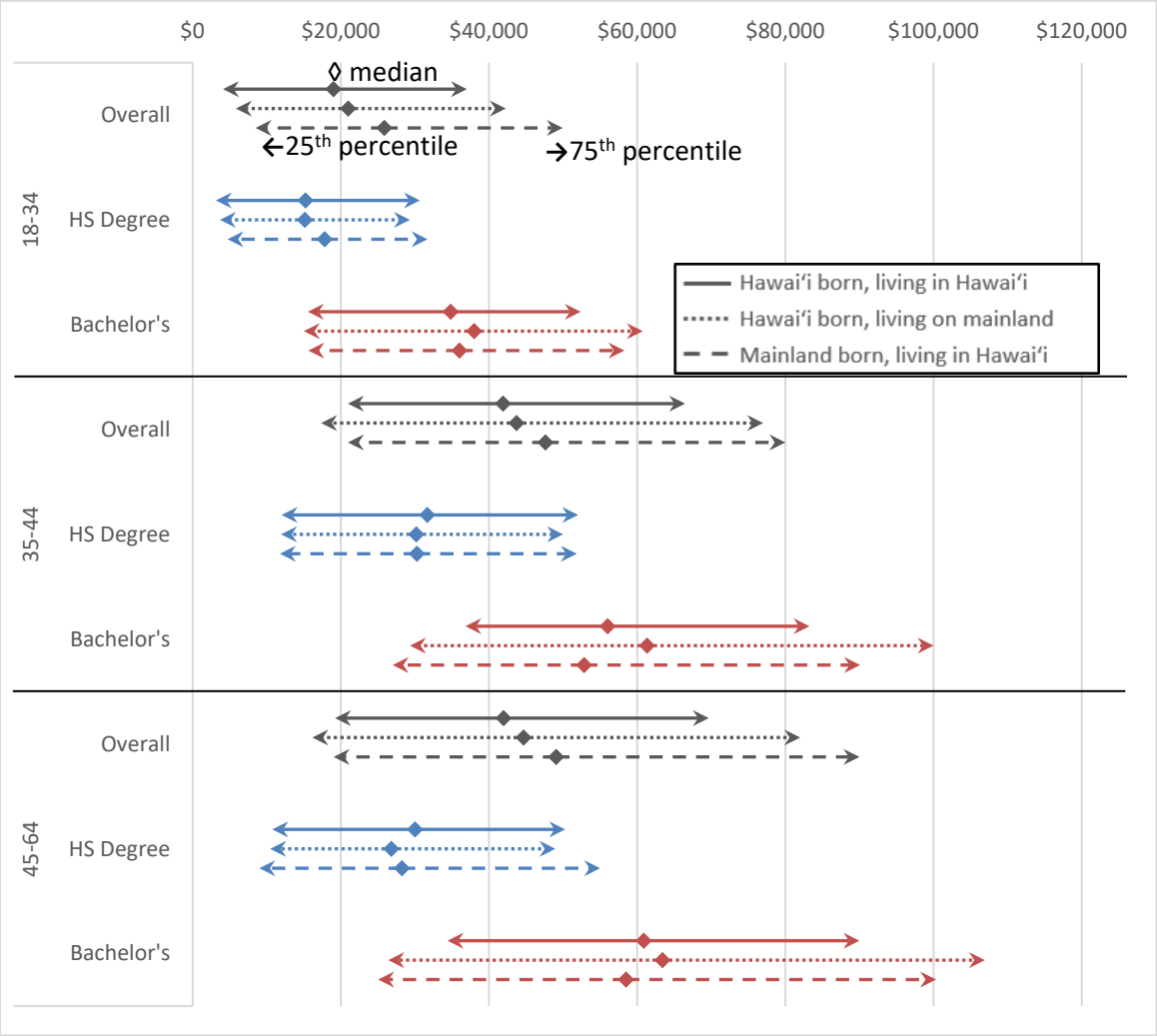
Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Percentage of workers in occupation is in parentheses. Workers who did not respond with occupations are omitted from calculations.

Table A8. Top 10 Industries, Age 35-64

35-44		
Hawai'i born, Hawai'i resident	**Hawai'i born, mainland resident**	**Mainland born, Hawai'i resident**
Educational services (10.9%)	Prof, sci, admin services (13.4%)	Prof, sci, admin services (15.4%)
Arts, ent, accom, & food (10.7%)	Health care (11.8%)	Arts, ent, accom, & food (12.3%)
Public administration (10.5%)	Educational services (10.4%)	Health care (11.7%)
Retail trade (10.4%)	Retail trade (10.0%)	Public administration (10.8%)
Construction (10.0%)	Arts, ent, accom, & food (9.7%)	Educational services (10.1%)
Prof, sci, admin services (9.8%)	Manufacturing (7.9%)	Construction (7.9%)
Health care (9.5%)	Fin. & insurance, real estate (7.6%)	Retail trade (6.6%)
Fin. & insurance, real estate (7.3%)	Public administration (6.1%)	Fin. & insurance, real estate (5.3%)
Transportation & warehsing (5.4%)	Construction (5.6%)	Other services (4.8%)
Other services (3.9%)	Transportation & warehsing (5.0%)	Transportation & warehsing (4.1%)
35-44, Bachlor's or higher		
Hawai'i born, Hawai'i resident	**Hawai'i born, mainland resident**	**Mainland born, Hawai'i resident**
Educational services (22.3%)	Educational services (18.0%)	Prof, sci, admin services (19.1%)
Public administration (15.5%)	Prof, sci, admin services (17.4%)	Educational services (16.8%)
Health care (14.9%)	Health care (12.5%)	Health care (15.5%)
Prof, sci, admin services (10.1%)	Fin. & insurance, real estate (8.2%)	Public administration (11.9%)
Fin. & insurance, real estate (8.3%)	Public administration (8.0%)	Arts, ent, accom, & food (6.9%)
Arts, ent, accom, & food (6.0%)	Arts, ent, accom, & food (6.9%)	Fin. & insurance, real estate (5.3%)
Construction (3.9%)	Manufacturing (6.2%)	Other services (5.3%)
Transportation & warehsing (3.6%)	Retail trade (5.7%)	Retail trade (4.1%)
Retail trade (3.6%)	Information (4.3%)	Construction (3.5%)
Social assistance (3.4%)	Other services (3.5%)	Social assistance (2.7%)
45-64		
Hawai'i born, Hawai'i resident	**Hawai'i born, mainland resident**	**Mainland born, Hawai'i resident**
Public administration (12.8%)	Prof, sci, admin services (13.3%)	Prof, sci, admin services (12.6%)
Educational services (11.0%)	Educational services (10.7%)	Educational services (10.6%)
Arts, ent, accom, & food (9.6%)	Health care (10.5%)	Public administration (10.6%)
Retail trade (9.4%)	Retail trade (9.2%)	Health care (9.9%)
Health care (8.8%)	Manufacturing (9.1%)	Arts, ent, accom, & food (9.7%)
Construction (8.6%)	Public administration (7.8%)	Construction (9.0%)
Prof, sci, admin services (8.5%)	Fin. & insurance, real estate (7.3%)	Retail trade (8.7%)
Fin. & insurance, real estate (8.2%)	Arts, ent, accom, & food (6.3%)	Fin. & insurance, real estate (8.3%)
Transportation & warehsing (6.9%)	Transportation & warehsing (5.7%)	Transportation & warehsing (4.6%)
Other services (4.4%)	Construction (5.5%)	Other services (4.6%)
45-64, Bachelor's or higher		
Hawai'i born, Hawai'i resident	**Hawai'i born, mainland resident**	**Mainland born, Hawai'i resident**
Educational services (21.2%)	Educational services (18.0%)	Educational services (17.7%)
Public administration (16.4%)	Prof, sci, admin services (17.0%)	Public administration (14.1%)
Health care (12.2%)	Health care (12.1%)	Health care (12.7%)
Prof, sci, admin services (10.5%)	Manufacturing (8.8%)	Prof, sci, admin services (12.7%)
Fin. & insurance, real estate (9.7%)	Public administration (8.6%)	Fin. & insurance, real estate (8.1%)
Retail trade (5.2%)	Fin. & insurance, real estate (7.8%)	Arts, ent, accom, & food (6.7%)
Arts, ent, accom, & food (4.8%)	Retail trade (5.2%)	Retail trade (5.4%)
Transportation & warehsing (3.4%)	Transportation & warehsing (3.8%)	Construction (4.0%)
Construction (3.1%)	Other services (3.8%)	Other services (3.5%)
Other services (2.7%)	Arts, ent, accom, & food (3.7%)	Transportation & warehsing (2.6%)

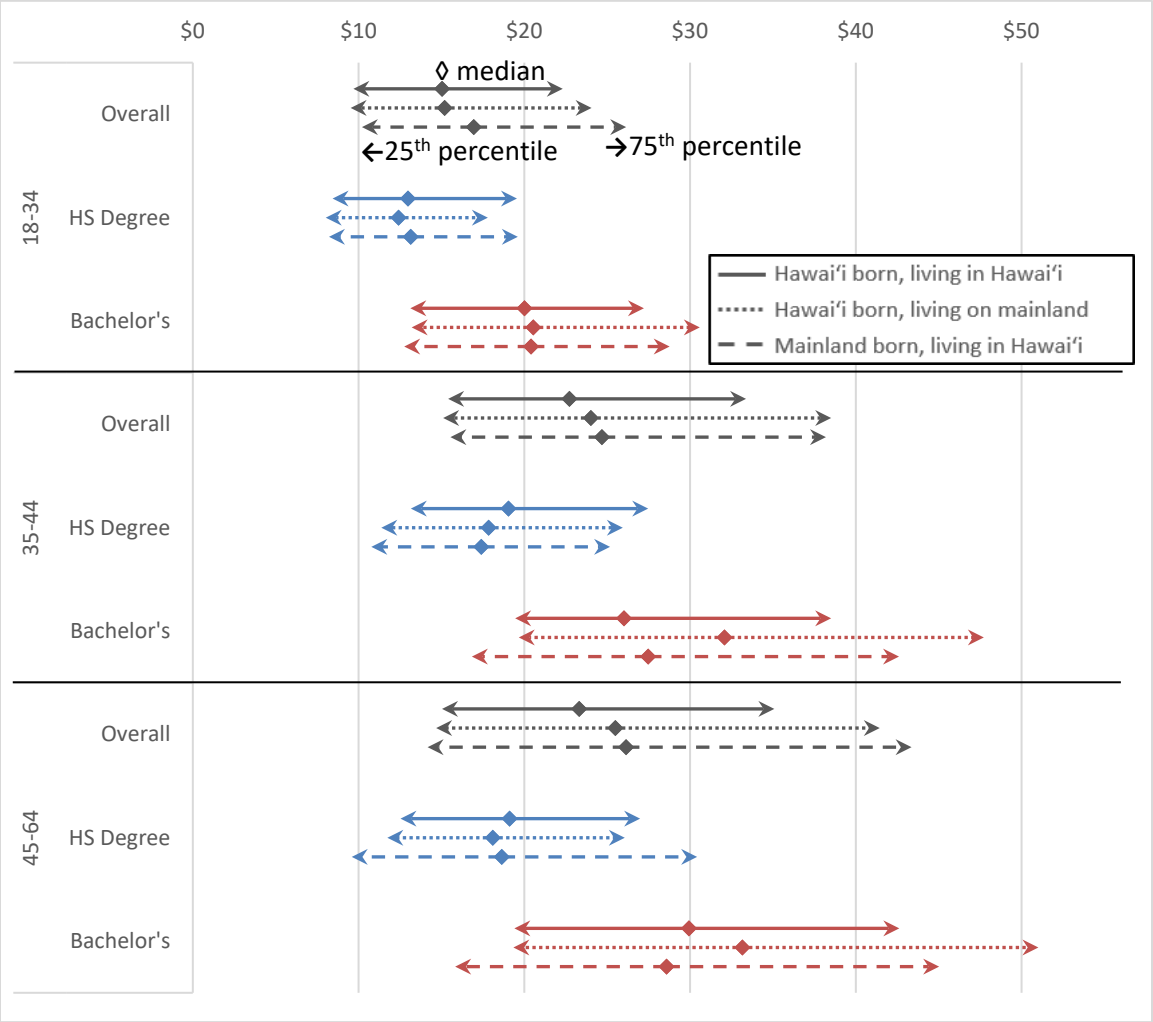
Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Percentage of workers in industry is in parentheses. Workers who did not respond with industry are omitted from calculations.

Figure A1. Personal Income Quartiles, Age 18-64, by Education ($2018)



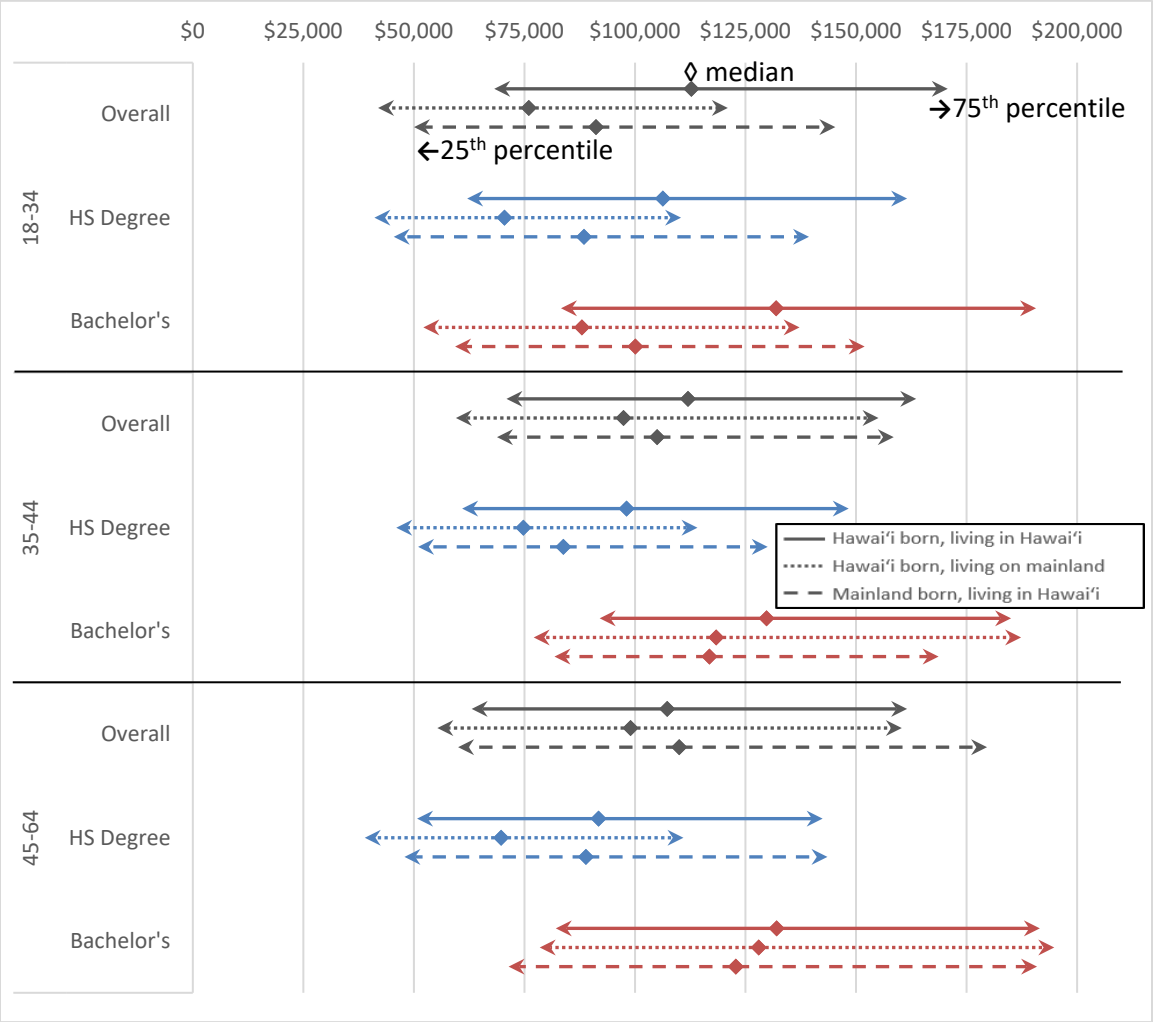
Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Income deflated to 2018 levels. Diamond in middle of line represents median amount; left arrow represents 25th percentile amount; right arrow represents 75th percentile amount.

Figure A2. Hourly Wage Quartiles, Age 18-64, by Education ($2018)



Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Income deflated to 2018 levels. Diamond in middle of line represents median amount; left arrow represents 25th percentile amount; right arrow represents 75th percentile amount.

Figure A3. Household Income Quartiles, Age 18-64, by Education ($2018)



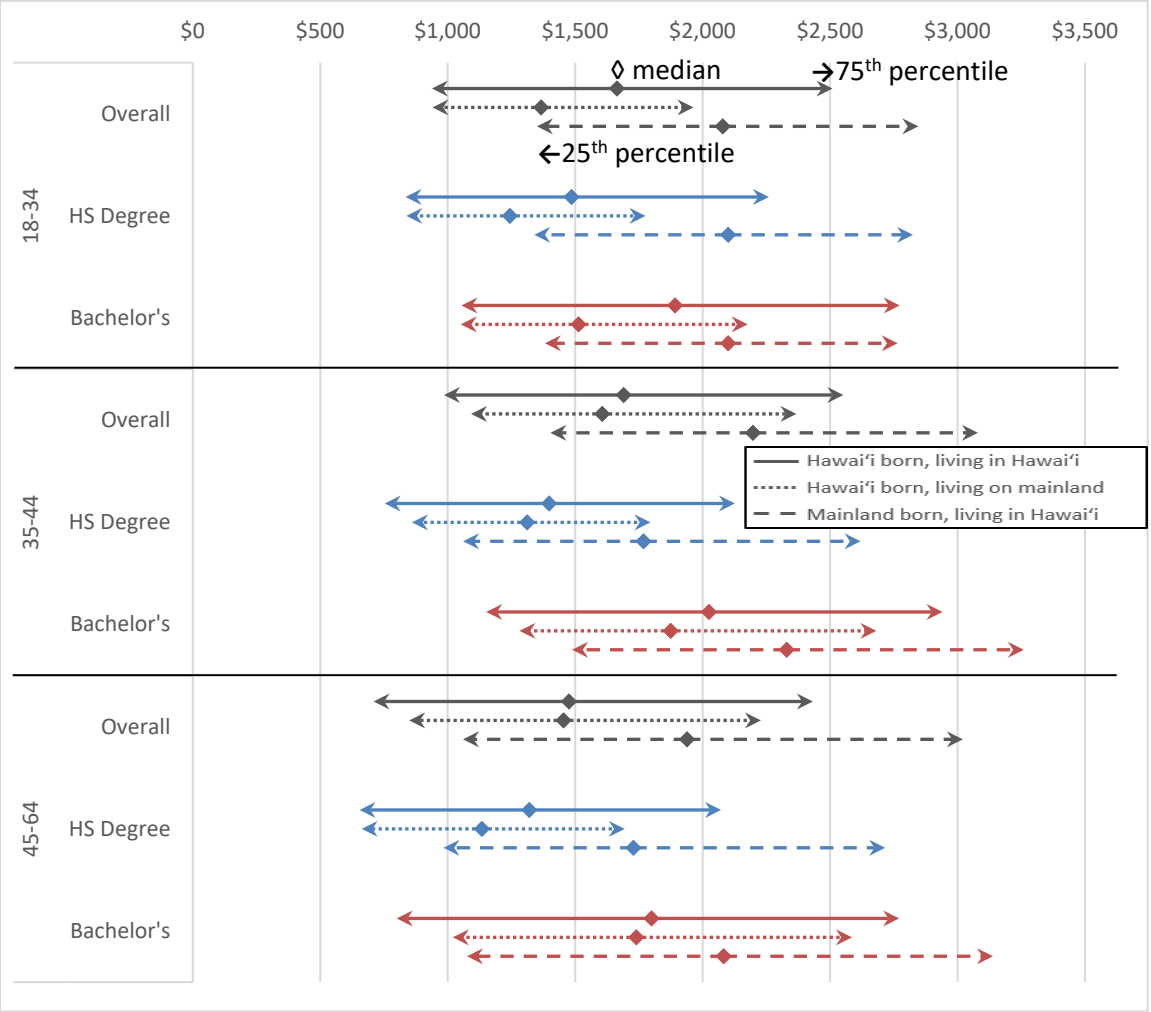
Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Income deflated to 2018 levels. Diamond in middle of line represents median amount; left arrow represents 25th percentile amount; right arrow represents 75th percentile amount.

Table A9. Home Ownership, Age 35-64

	Hawai‘i born, Hawai‘i resident	Hawai‘i born, Mainland resident	Mainland born, Hawai‘i resident
Age 35-44			
Own home, mortgage	51.5%	51.4%	37.8%
Own free & clear	13.1%	9.1%	8.1%
Renting	35.4%	39.5%	54.1%
Age 35-44, Bachelor's or higher			
Own home, mortgage	61.0%	61.9%	46.2%
Own free & clear	13.5%	7.3%	7.7%
Renting	25.4%	30.8%	46.1%
Age 45-64			
Own home, mortgage	53.2%	56.7%	51.0%
Own free & clear	22.1%	18.4%	16.6%
Renting	24.7%	24.9%	32.4%
Age 45-64, Bachelor's or higher			
Own home, mortgage	61.8%	65.7%	55.6%
Own free & clear	24.8%	18.5%	18.7%
Renting	13.4%	15.8%	25.8%

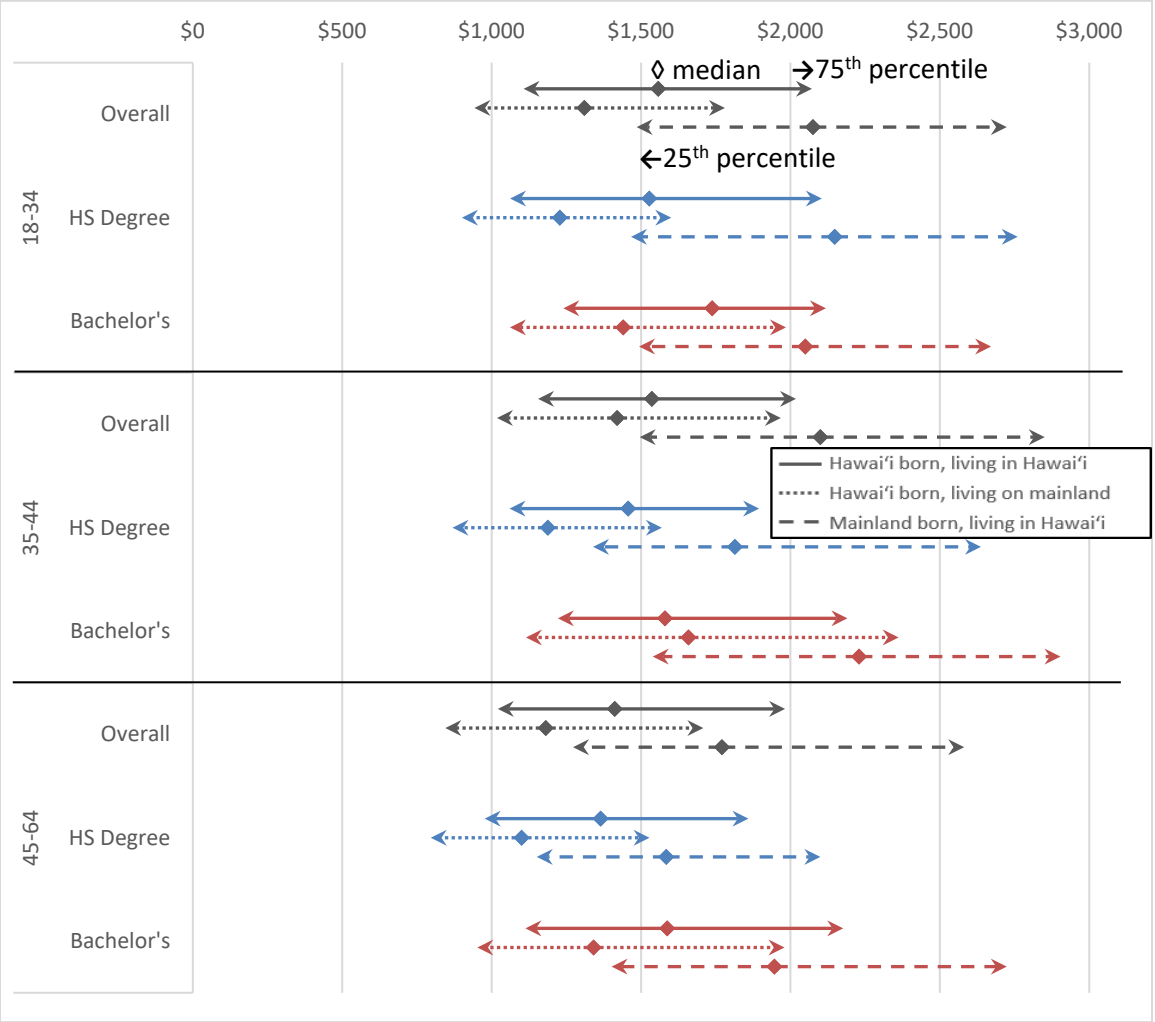
Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families.

Figure A4. Monthly Housing Costs Quartiles, Age 18-64, by Education ($2018)



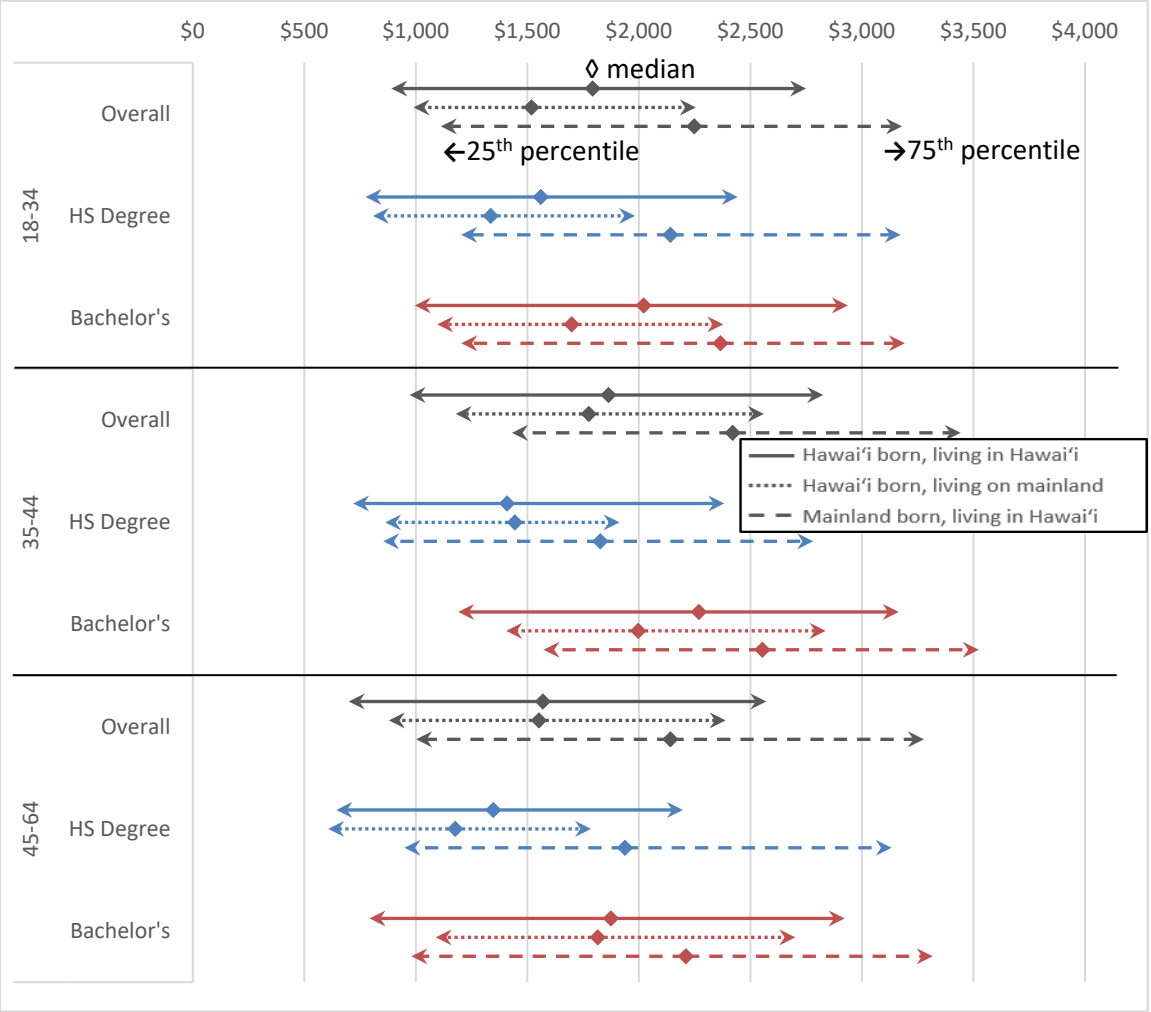
Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Income deflated to 2018 levels. Diamond in middle of line represents median amount; left arrow represents 25th percentile amount; right arrow represents 75th percentile amount.

Figure A5. Gross Rent Quartiles, Age 18-64, by Education ($2018)



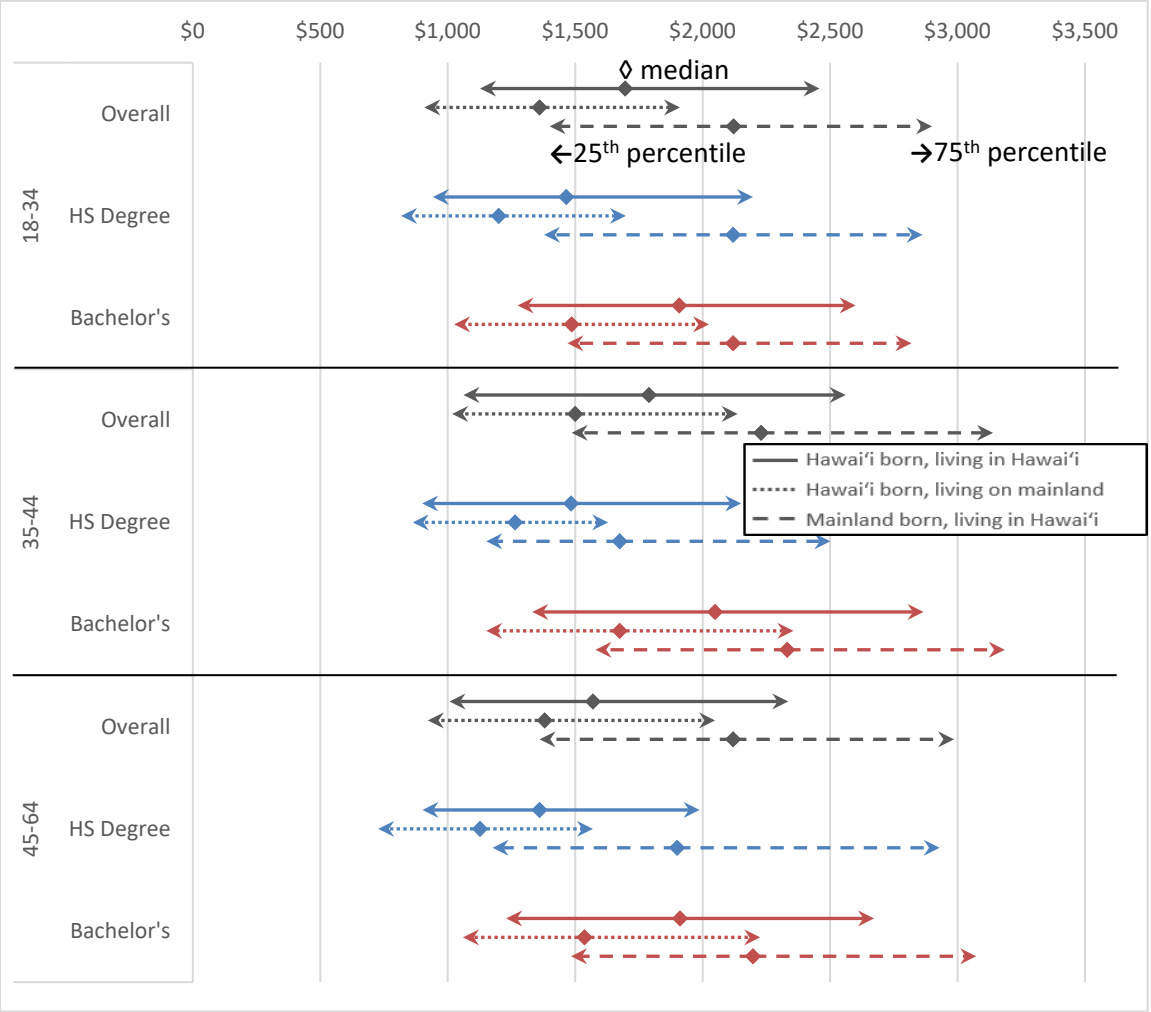
Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Income deflated to 2018 levels. Diamond in middle of line represents median amount; left arrow represents 25th percentile amount; right arrow represents 75th percentile amount.

Figure A6. Select Monthly Owner Costs Quartiles, Age 18-64, by Education ($2018)



Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Income deflated to 2018 levels. Diamond in middle of line represents median amount; left arrow represents 25th percentile amount; right arrow represents 75th percentile amount.

Figure A7. First Mortgage Amount Quartiles, Age 18-64, by Education ($2018)



Source: Estimates based on U.S. Census Bureau, American Community Survey 2014-2018 5-year PUMS.
Note: Excludes military personnel and their families. Income deflated to 2018 levels. Diamond in middle of line represents median amount; left arrow represents 25th percentile amount; right arrow represents 75th percentile amount.