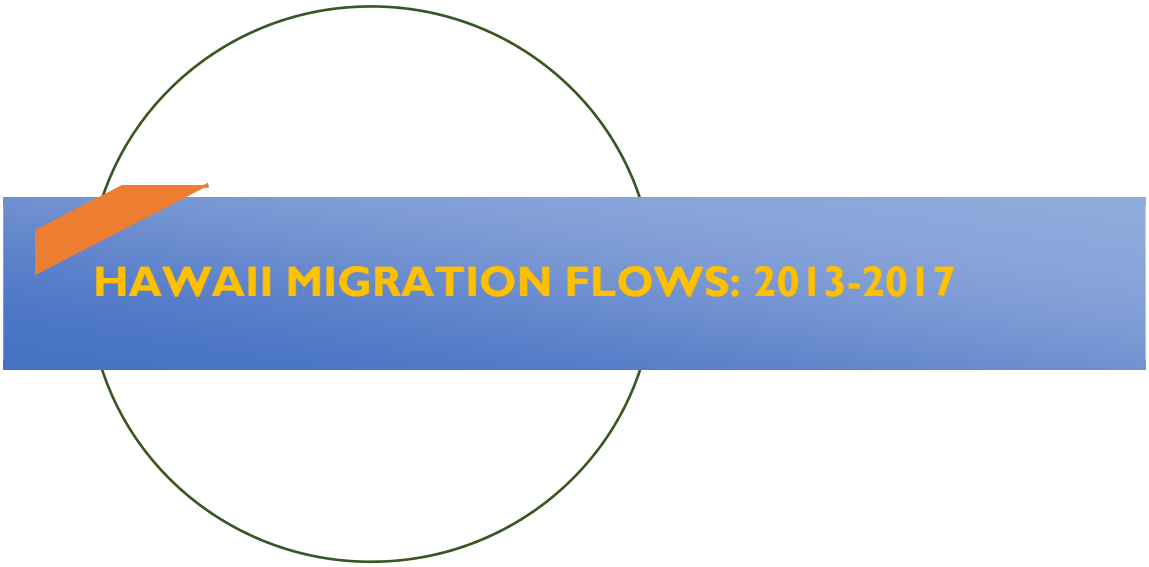

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Research and Economic Analysis Division

Department of Business, Economic Development and Tourism

STATE OF HAWAII

This report was produced by the Research and Economic Analysis Division (READ) of the Department of Business, Economic Development & Tourism (DBEDT) under the guidance of Dr. Eugene Tian, Division Head. The report was authored by Dr. Yang-Seon Kim, Research and Statistics Officer.

Executive Summary

This report provides a broad assessment of migrations that Hawaii experienced in the past several years based on the 2013-2017 American Community Survey data. Overall moving behaviors of Hawaii residents during the period and the characteristics of three types of migrants; domestic in-migrants, domestic out-migrants, and international in-migrants were analyzed.

Migrants Among Hawaii Residents

During the 2013-2017 period, on average 5 percent of Hawaii residents over 1-year old (about 69,600 persons) were migrants who moved from out-of-state in the past 12 months; 3.9 percent from the U.S. mainland and another 1.1 percent from abroad. These rates were higher than the U.S. average of 2.3 percent and 0.7 percent. The mobility which was greater than the U.S. average attributes partially to the large military population in Hawaii who subjected more frequent relocation of residency.

While the in-migration rate, the percentage of those who moved to Hawaii in the past 12 months among Hawaii residents, was not significantly different by gender, it exhibited clear differences when compared by age, educational attainment, and employment status. About one in ten 18-34 aged persons in Hawaii migrated in the past 12 months either from the U.S. mainland or from abroad. The in-migration rate was not particularly high among the elderly population (1.4 percent) indicating that retirement migration was not occurring at any significant scale in Hawaii.

More educated group included more migrants within them. Among people aged 25 and over in Hawaii, 5.1 percent of those with some college education or a Bachelor's degree were new comers to the state in that year while the percentage was only 2.4 percent for those with a high school diploma or less education.

Origin and Destination of Migrants

Sending and receiving more than 20 percent of domestic migrants to and from Hawaii, California was both the top origin of in-migrants to Hawaii and top destination of out-migrants from Hawaii. Many domestic out-migrants headed to states with geographic proximity, similar climate, metro areas with possibly more job opportunities, or states with a large military base.

Of the estimated 15,500 annual international in-migrants to Hawaii during the 2013-2017 period, 61.5 percent came from Asia. By country, Japan and Philippines were two main countries of origin for the international in-migrants to Hawaii. Philippines was the top origin of civilian families while Japan was where many of both civilian and military families came from.

Characteristics of Migrants

Migrants had an age structure much younger than overall Hawaii residents, which was true for both in- and out- migrants and true for both domestic and international migrants.

The young adult and prime-working age population in ages 18-34 was the largest age group among migrants making up nearly half of domestic in and out migrants. The proportion among migrants was twice as high as the proportion of overall Hawaii residents.

Since military personnel and their families move more frequently than other civilian families, migrants included military related population much bigger than overall Hawaii residents. Active duty military personnel composed 15.2 percent of domestic in-migrants, 9.8 percent of international in-migrants, and 8.6 percent of domestic out-migrants. By comparison, they composed less than 3 percent of the total Hawaii resident population aged 1 year and over.

Somehow, domestic in-migrants included more military related population than domestic out-migrants did during the 2013-2017 period. While 32.6 percent of domestic in-migrants were active duty military personnel or their families, the corresponding share for domestic out-migrants was 19.4 percent. This asymmetry implied that the size of net domestic outflow was bigger than commonly known if our interest was in the civilian family population only.

White-alone population made up 62.9 percent of domestic in-migrants reflecting the dominance of White-alone population in the mainland. Interestingly, White-alone was the dominant race of domestic out-migrants as well, composing 56.2 percent of total domestic out-migrants. Even after excluding military personnel and their families who contained more White-alone population, the race composed more than half of each domestic in- and out- migrants.

Similarly, a significant number of domestic out-migrants were born on the mainland. About 2 in 3 domestic out-migrants during the 2013-2017 period were mainland-born. Among those, 35 percent moved back to the state where they were born.

The age distribution of domestic out-migrants varied significantly by birthplace. About two third of Hawaii-born out-migrants to the U.S. mainland were aged 24 or under. On the other hand, this age group made up one third of the mainland-born, and one fifth of the foreign-born.

Compared to Hawaii residents, domestic migrants were more educated in general. Migrants from abroad showed a different pattern that included more of each end of the education spectrum: both the least-educated people and the most-educated people.

Compared to overall Hawaii residents, domestic migrants showed higher labor force participation rates. However, their unemployment rate was also high especially among domestic out-migrants. This is partially because the unemployed were more likely to move looking for a job and partially because moving left the migrant unemployed temporarily after the moving.

Being measured in the number of weeks worked in the past 12 months, employment stability was much lower among migrants. While more than 85 percent of Hawaii employed worked for at least 48 weeks in the past 12 months, this percentage was 7-20 percentage points lower for migrants. Among the three migrant groups, international in-migrants showed the lowest stability in employment.

There were more people living in poverty among the migrants who moved to and from Hawaii in the past 12 months. The poverty rate was especially high among the migrants who moved to Hawaii from foreign countries. Nearly 20 percent of international migrants in Hawaii were living in poverty in their first year of migration.

Propensity to Migrate Out Domestically

Propensity of Hawaii residents to migrate out domestically was examined to see how differences in demographic, social and economic characteristics of individuals affected the propensity.

For the population aged 18 and over, the propensity to migrate out domestically decreased with age. The propensity picked among the 18-24 age group showing that 9.2 percent of the 18-24 aged Hawaii residents moved out domestically every year during the 2013-2017 period. With 7.9 percent out-migration rate, the 25-34 age group showed the second highest propensity.

Nearly 10 percent of White-alone population in Hawaii moved to the U.S. mainland every year during the period. This was about 5 times higher than the propensity of Asian-alone or Native Hawaiian and other Pacific Islander-alone population to move out to the U.S. mainland.

The propensity of Hawaii residents to migrate out increased with education. With only 1.8 percent of them moving out annually, the persons with education less than a high school diploma were the least mobile. The propensity to move out increased with education showing 5.4 percent out-migration rate for the individuals with a Master degree or higher education.

Compared to the persons who worked in the past 12 months, the persons who were in the labor forces but didn't work in the past 12 months showed a much higher propensity to move out. By occupation, a distinctively higher out-migration rate was observed for workers in Computer, Engineering, and Science (CES) occupations.

Multivariate regression analysis was conducted to separate the indirect effects from the direct effects by examining the impact of each characteristic with all other characteristics being held constant. The regression results show that most key patterns in the propensity of Hawaii residents to migrate out that we found from the descriptive analysis were still valid.

Multiple studies have shown that migration rates declined during the recession. The period analyzed in this report was an expanding period for the whole U.S. economy including Hawaii. In order to find out whether the findings from this report were specific to the period, future studies may examine the differences between the period of recession and the period of economic expansion in migration patterns.

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1. Introduction

The population in Hawaii was estimated to have declined in two consecutive years in 2017 and 2018 according to the most recent population estimates by the U.S. Census Bureau released in 2018. Although the accuracy of these estimates will be verified when the results of the next decennial census become available after 2020, it raised concerns about the causes and impacts of the population decline on Hawaii economy and other areas. Negative population growth was reported for Hawaii only for a few years since it joined the United States as the 50th state in 1959. As the natural increase has been always positive, the negative total population growth was due to the states' having lost population to other areas through migration. For the past several years, a relatively large negative net domestic migration was the main cause of the low or negative population growth estimated for the years.

With the role of natural growth declining in population growth, population in Hawaii will be increasingly relaying on migration for its growth in the future. However, migration flows are very volatile and difficult to predict. The net migration in Hawaii has been very volatile in the past years mostly due to the volatile domestic net migrations. One factor behind the severe volatility of domestic net migration is that gross inflows and outflows of domestic migration in Hawaii have been much larger, often more than 10 times larger, than net flows. Thus, a relatively small percentage change in either gross inflow or outflow of migration sometimes resulted in a large percentage change in net flow of domestic migration.

Migration flows are difficult to predict because there are numerous reasons behind people's moving decision. Nationwide statistics show that job-related reasons explained about half of domestic interstate migrations in the U.S., which was roughly true for Hawaii. This makes economic conditions especially labor market conditions important in understanding the migration flows. However, there are many other reasons behind each moving decision. People would move to pursue advanced education, for family-related reasons, or for the reason related to cost of living. For international migration, the list of possible reasons could be much longer. Migration flows are difficult to predict also because migration is determined by both pull factors and push factors. Push factors are the conditions in Hawaii that force people to move out while pull factors are the conditions in the destination that attract them. Migration flows are complex as migration decisions are made based on comparisons between the relative opportunities and conditions of two places.

This report aims to provide a broad assessment of migrations that Hawaii experienced in the past several years. Although the size of net migration is important as it determines population growth in the area, examining the patterns and characteristics associated with the migrants in each gross flow separately would allow us to better understand the nature of issues and questions we have encountered about migration.

This report starts with discussing the role of migration in Hawaii population growth and its trend since 2010, followed by an overview of moving behaviors of Hawaii residents. It continues with the origin and destination, and various characteristics of migrants are analyzed in detail for three types of migrants; domestic in-migrants, domestic out-migrants, and international in-migrants. Next, we examine the propensity of Hawaii residents to move out to the U.S. mainland by various characteristics using descriptive statistics and logistic regression method. The report concludes with some observations and recommendation for future works.

Data Source

This report examined the size and the characteristics of migrants based on the Public Use Microdata Sample (PUMS) data from the American Community Survey (ACS), an annual survey by the U.S. Census Bureau. ACS includes two questions related to the migration history of the respondent. One is whether the respondent has moved since a year ago from the time of the survey and the other is where the previous residence was a year ago. Therefore, not only the size of the migration but the origin and destination, and the characteristics of the migrants can be analyzed using the demographic, social and economic profiles of the migrants included in the survey. This report analyzes migrations using information included in the 2013-2017 ACS. The surveys were taken in the period of 2013-2017 reflecting the migrations taken place from 2012 to 2017.

Since ACS is a sample survey, all estimates based on ACS reported in this report subject to sampling errors as well as non-sampling errors.

Limitation of Data

Some aspects of migrants such as duration of migration and return migration can be analyzed only by a longitudinal data where same individuals were observed multiple times over a period of time. Although some questions in ACS reference the 12- month period prior to the interview, it is a cross-sectional survey where each individual was surveyed only at one point in time to provide a snapshot of the individual. Therefore, full history of migration could not be analyzed.

The reason for the move is not included in the ACS. The Current Population survey (CPS), another survey by the U.S. Census Bureau, asks a similar 1-year migration question in its Annual Social and Economic Supplement (ASEC). CPS has an advantage over ACS in that it also asks the reason for migration. However, the sample size of ASEC CPS is too small to produce statistically meaningful information for in- and out- migrants to and from Hawaii. Also, unlike ACS, the population who live in group quarter facilities such as college dormitories and military barracks were not included in CPS.

This report analyzes both domestic and international migration. However, it couldn't analyze international out-migrants who moved out of the U.S. as ACS is a survey of people who are currently living in the U.S.

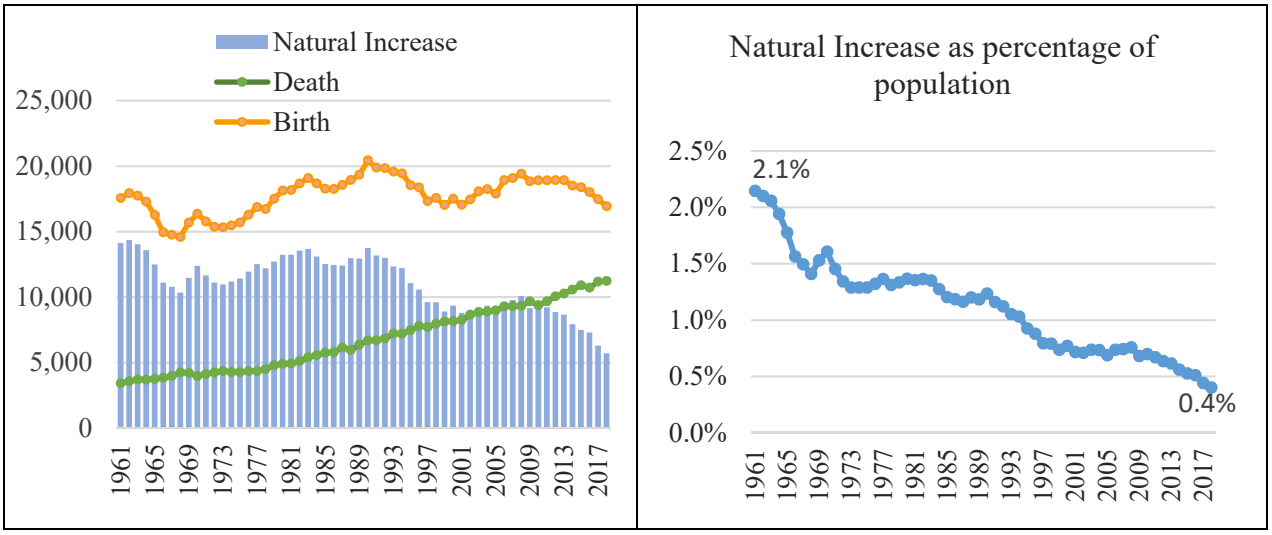
2. Migration and Population Growth

Migration as a Driver of Population Growth

Migration is an important element of population growth as population growth is determined by the natural increase and migration. The importance of migration as a driver of population growth has been increasing over time. With the long-term trend of aging population and the recent decrease in fertility rates both in Hawaii and the U.S., natural increase has been decreasing both in total number and as percentage of population making the role of migration in population growth of further importance.[1]

The left chart in Figure 1 presents birth, death, and natural increase as their difference in total number. Total number of deaths in Hawaii has gradually increased over time as population grew and as the influence of population aging dominated the influence of decreasing mortality. Total number of births, on the other hand, showed ups-and-downs having been influenced by economic and social conditions and as the size of population at child-bearing age varied with the aging of the baby boomers. With total births fluctuating, total number of natural increases has shown ups and downs as well. However, natural increase has been declining sharply when it was measured as the percentage of population because the population of Hawaii has been growing. Even after the baby boom period was over in the early 1960s, Hawaii's population was able to grow about 1 to 1.5 percent until the mid-1990s solely depending on the natural increase. The maximum population growth Hawaii could achieve based on natural increase without any inflow through migration was 0.4 percent in 2018, however.

Figure 1. Trends of natural increase in Hawaii: total number and as percentage of population

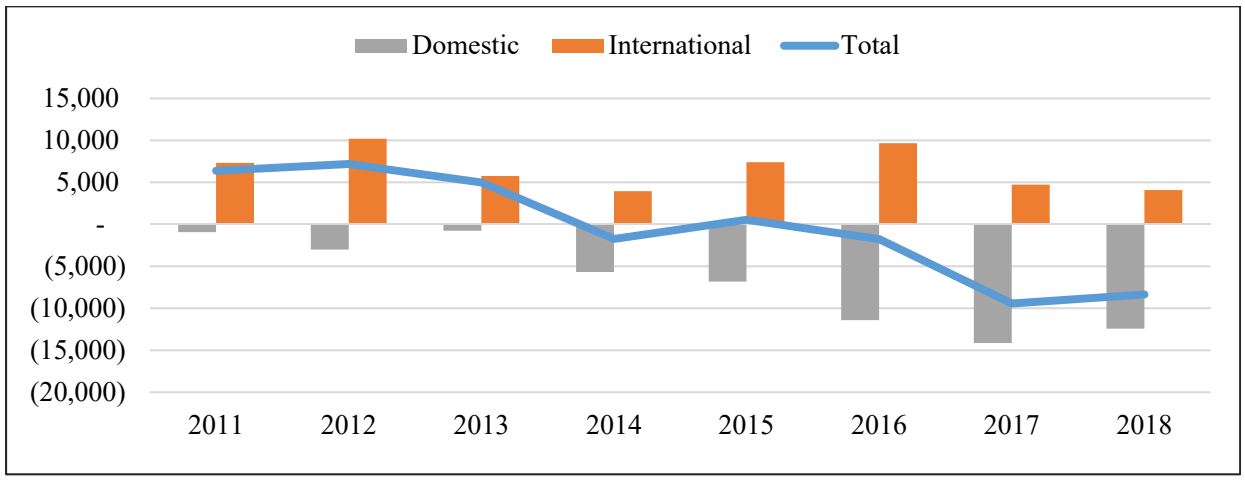


[1] See pp14-17 of "Population and Economic Projections for the State of Hawaii to 2045" (June 2018, DBEDT) for further discussion on decreasing fertility rate in Hawaii and the U.S.

Negative Net Migration in Recent Years

According to the 2018 annual population estimates by the U.S. Census Bureau, the average annual population growth in Hawaii for 2010-2018 period was 0.5 percent, much lower than 0.9 percent for the 1990-2000 period and 1.2 percent for the 2000-2010 period. The slower population growth in the years after 2010 was mainly due to a small positive or negative net migration. International migration to Hawaii showed a steady positive net migration in all past years. Domestic migration, on the other hand, showed a great year-by-year fluctuations in the past years. For the years after 2010, Hawaii lost people to other states in the U.S. for all the years while it continued to gain people through international migration. The size of net negative domestic migration was especially big during 2017-2018, which resulted in negative total net migration and negative population growth in 2017 and 2018.

Figure 2. Migration trend in Hawaii since 2010



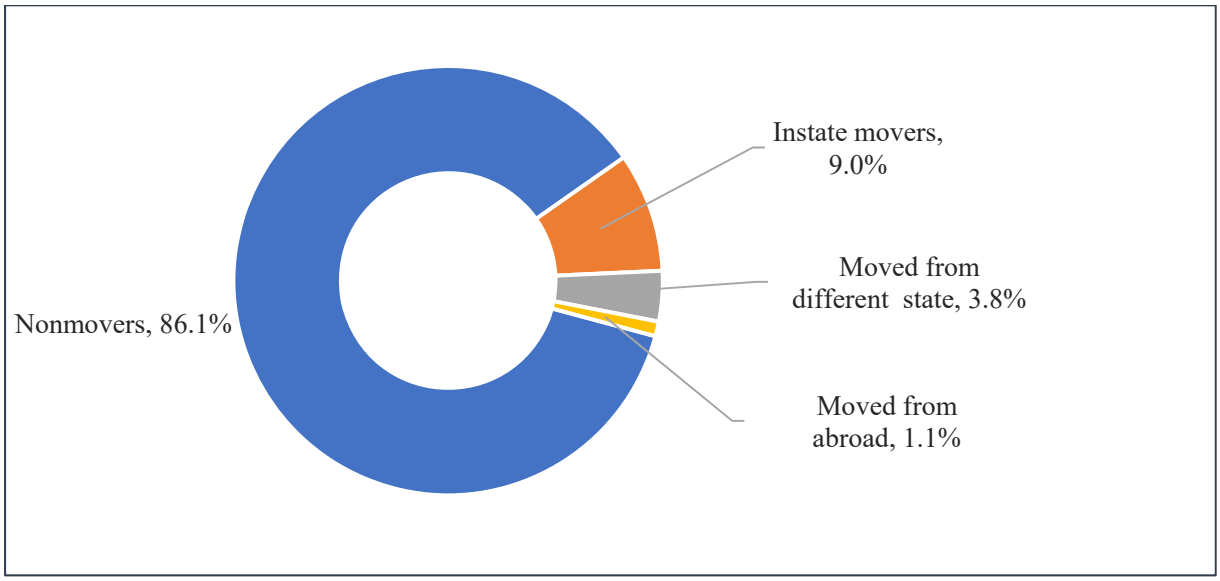
Source: U.S. Census Bureau, 2018 Annual Population Estimates

This report investigated migration patterns and characteristics based on the 2017 5-year ACS data. Surveys for this dataset were conducted during the period of 2013-2017. Since the survey asks about moving within 1 year from the time of the survey, the survey covers migration taken place in 2012-2017, which roughly matches the period Hawaii experienced a small positive or negative net migration. The estimate of migration based on ACS does not always match the estimates of migration from the Census Bureau's population estimates program because the former is based on a sample survey while the latter is based on the administrative records data. The 2018 population estimates reported negative 6,979 average net annual domestic migration and positive 6,946 average net annual international migration during the 2012-2017 period. According to 2017 5-year ACS data, net annual domestic migration was negative 7,600 people on average during the period, which is roughly in line with the estimates from the annual population estimates. As stated in Limitation of Data, net international migration could not be estimated based on ACS as international out-migrants were not included in ACS.

3. Moving Patterns of Hawaii Residents

During the 2013-2017 period, on average 86.1 percent of total resident population aged 1 year and over in Hawaii were non-movers, e.g. stayed in the same house as in the prior year. That means that 13.9 percent of Hawaii residents moved their residency in the past 12 months. Of the 13.9 percent, 9 percent were movers within the state, while the other 4.9 percent moved either from other states in the U.S. or from abroad in the past 12 months. [2]

Figure 3. Moving rates of Hawaii residents

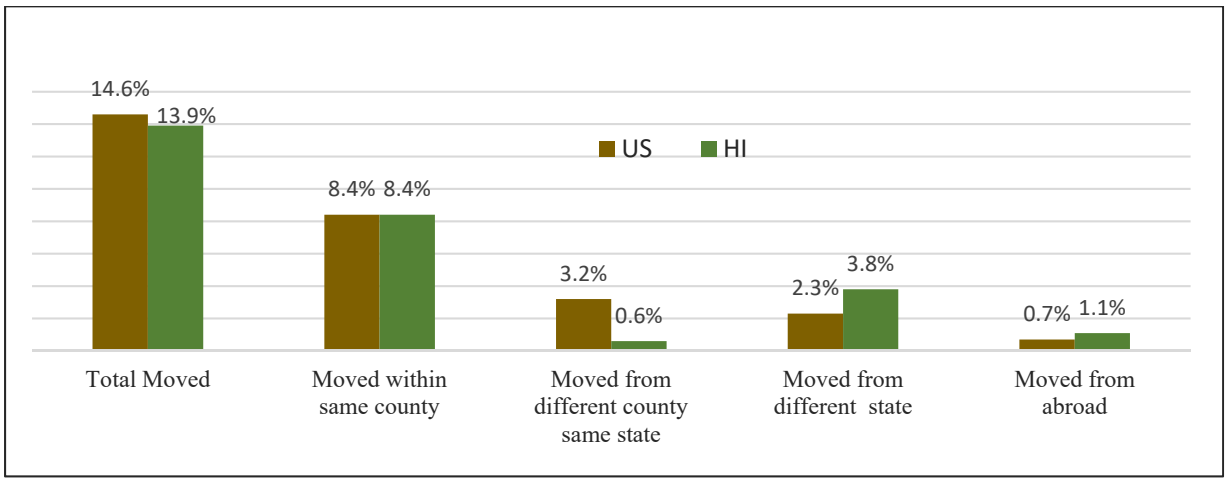


Source: U.S. Census Bureau, American Community Survey 2013-2017 5-year estimate table, B07007

Compared with the U.S. average, the overall moving rate was lower in Hawaii mostly because moving between counties were less frequent in Hawaii. Only 0.6 percent of Hawaii residents have moved to a different county in Hawaii in a typical year during the 2013-2017 period, while the corresponding figure for national average was 3.2 percent. However, interstates and international moving rates were higher in Hawaii. Of the total resident population in Hawaii during the 2013-2017 period, 3.8 percent were movers from the U.S. mainland while another 1.1 percent were movers from abroad, higher than the U.S. average of 2.3 percent and 0.7 percent. It may be attributed to the fact that Hawaii's population includes a large military population who subject to frequent relocation of residency. According to the 2013-2017 ACS data, active duty military personnel accounted for 15.2 percent of those who moved from the U.S mainland, and 9.8 percent of those who moved from abroad. By comparison, they accounted for less than 3 percent of the total Hawaii resident population aged 1 year and over.

[2] Note that moving rates in this section doesn't include the moving of out-migrants, who moved out of Hawaii and are no longer residents of Hawaii.

Figure 4. Movers as percentage of total residents, U.S. vs. Hawaii

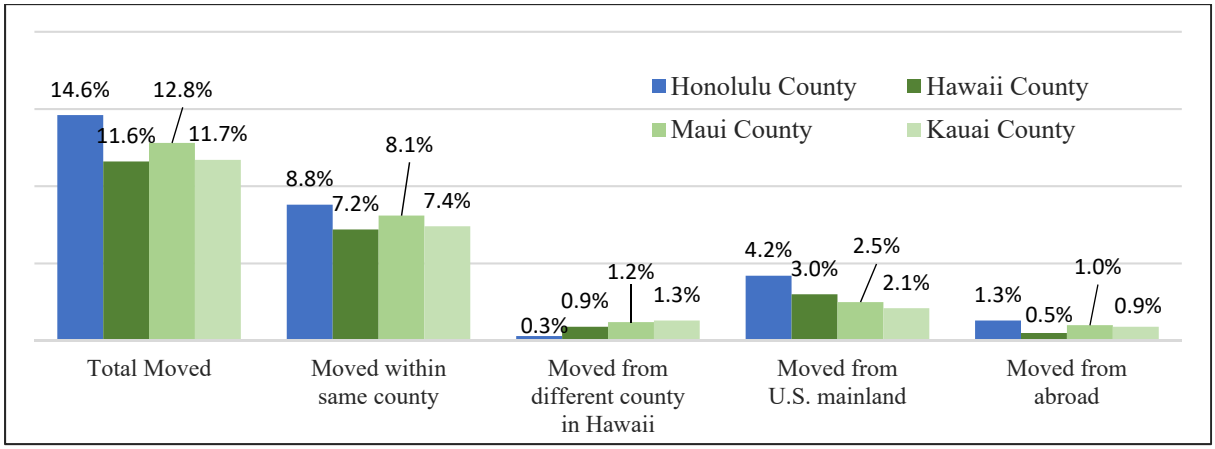


Source: U.S. Census Bureau, American Community Survey 2013-2017 5-year estimate table, B01007

Higher Moving Rates for Honolulu County

Looking at moving rates by county, people in Honolulu County moved more frequently than those in other counties. It was true for all moving categories except for the intercounty moving within the state. More frequent within-county moving observed in Honolulu County might be related to its relatively lower home ownership. The percentage of renter-occupied units was the highest in Honolulu County (44.4%) during the 2013-2017 period, followed by Maui County (40.7%), Kauai County (37.0%), and Hawaii County (33.0%). As for the moves from the U.S. mainland and abroad, there may be multiple factors explaining the higher moving rate for Honolulu county. Besides more college level education and job opportunities available in Honolulu, the high concentration of military population in Honolulu County also explains the higher interstate and international moving rate reported for Honolulu. In fact, over 95 percent of active duty military personnel in Hawaii and therefore their families live on Oahu.

Figure 5. Movers as percentage of total residents in Hawaii, by county



Source: U.S. Census Bureau, American Community Survey 2013-2017 5-year estimate table, B01007

4. Interstate and International Migrants in Hawaii

Although moves that were made locally within a county or within a state have its own policy implications, the long-distance moves crossing the state border have drawn more interest among policy makers and researchers due to their impact on population growth, labor market and the whole economy of the state. In this and following sections of the report, discussions will be made mainly based on the long-distance movers who moved across the state border in the past 12 months, and the term of *migrants* is used to denote them.

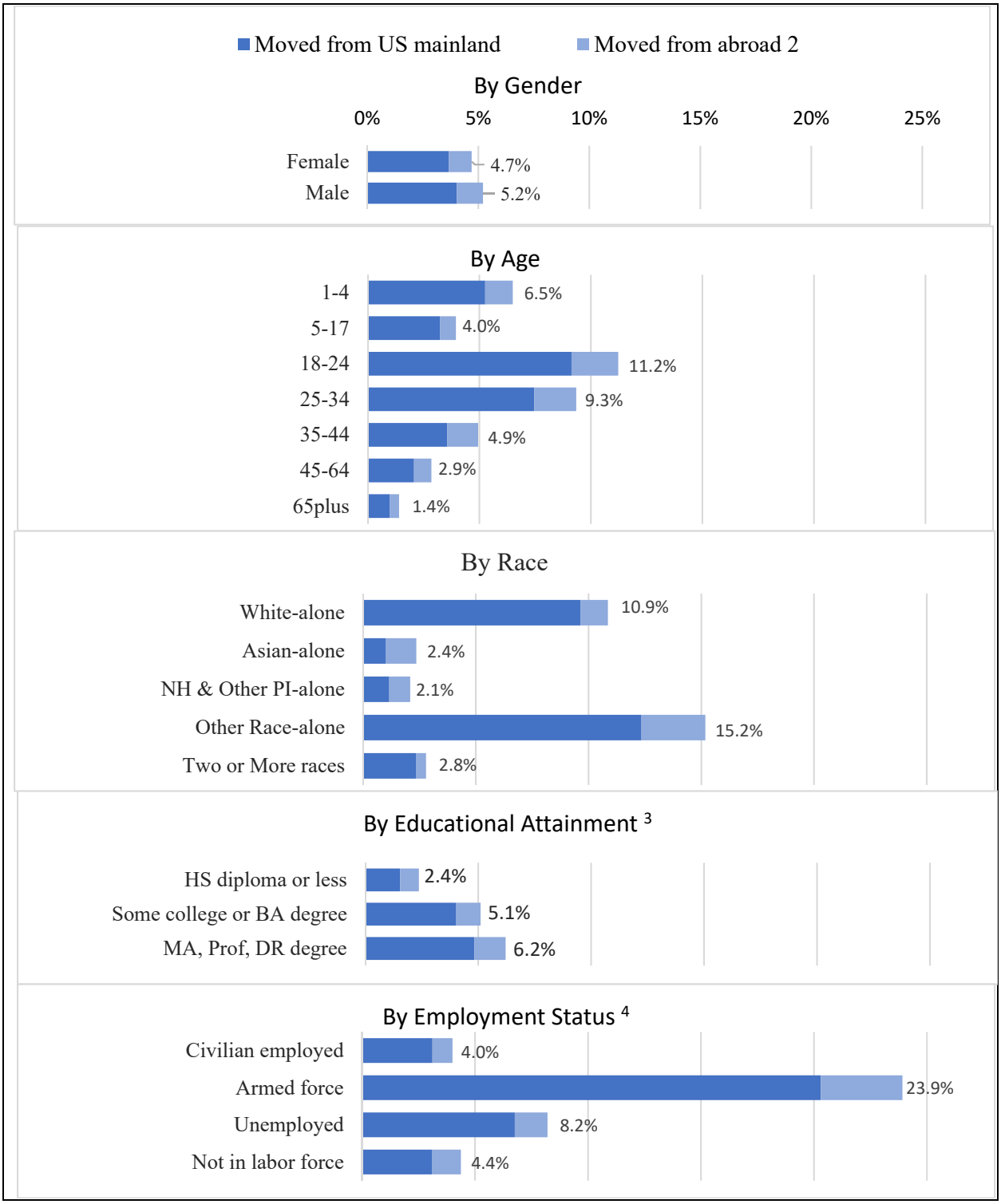
Counting the migrants both from the U.S. mainland and from abroad, about 69,600 Hawaii residents on average during the 2013-2017 period were a migrant in the sense that they moved to Hawaii less than a year ago. Among them, 78 percent (about 54,100 persons) were from the U.S. mainland while the other 22 percent (about 15,500 persons) were from abroad. [3] However, moving behavior were not even across the population groups with different characteristics. Some segments of population moved more frequently than others while some segments of population rarely moved. [4]

Figure 6 presents how in-migration rate varied by characteristics when in-migration rate measures the size of migrants as its percentage of Hawaii residents. While in-migration rate was not significantly different by gender, it exhibited clear differences when compared by age, educational attainment, and employment status. The characteristic group that was distinctively mobile compared to other population segments in Hawaii was military personnel. Nearly one out of four active duty military personnel in Hawaii moved to the state within one year prior to the survey either from the U.S. mainland or from abroad. As far as moving is concerned, their families behave similarly as all members in a family usually move together. Therefore, the percentage of migrants was much lower at 3.6 percent if military personnel and their families were excluded from the consideration. Aside from military status, the in-migration rates varied by unemployment status. The unemployed included twice more migrants than the employed. This may be partially because the unemployed were more likely to move and partially because it took time to find a job when people moved to a new place without a prearranged job.

Another characteristic that showed a very distinctive in-migration pattern was age. As commonly observed in the existing migration studies, migration peaked among the young-age population. Hawaii residents in ages 18-34 included much more migrants among them than other age groups did. About one in ten 18-34 aged persons in Hawaii migrated to the state in the past 12 months either from the U.S. mainland or from abroad. Another age group that showed a high in-migration rate was the 1-4 age group that must be attached to young married parents in 25-34 age.

[3] Migrants from Puerto Rico and other U.S. territories were included in "migrants from abroad" in this report.
[4] Since this section shows the share of migrants among Hawaii residents, only the characteristics of in-migrants were reflected here.

Figure 6. Interstate and international migrants[1] as percentage of Hawaii residents



1. People who moved to Hawaii from out-of-state in the past 12 months
2. Include migrants from Puerto Rico and other U.S. territories
3. Among Hawaii residents aged 25 years and over
4. Among Hawaii residents aged 16 years and over

Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

Interestingly, the in-migration rate was not particularly high among the elderly population in Hawaii. Only 1.4 percent of the total elderly population aged 65 and over in Hawaii have moved to Hawaii from outside in the past 12 months. It is very typical that the elderly population shows low mobility. Some may suggest that Hawaii would attract many retirement migrants as its warm climate is favorable to the elderly population. However, the data didn't show any evidence of retirement migration occurring at a significant scale in Hawaii.

Educational attainment also affected the in-migration rates. More educated group included more migrants within them supporting the widely known pattern of migration that highly educated people were more mobile. Among people aged 25 and over in Hawaii, 5.1 percent of those with some college education or a Bachelor's degree were new comers to the state in that year while the percentage was only 2.4 percent for those with a high school diploma or less education. The share of migrants was even higher among the people with a graduate or a professional degree. If a sizable number of Hawaii's young adults had left to the mainland to attend a college and came back home after completing the education, this post-college return migration may have made some contribution to the higher percentage of migrants among the college educated in Hawaii.

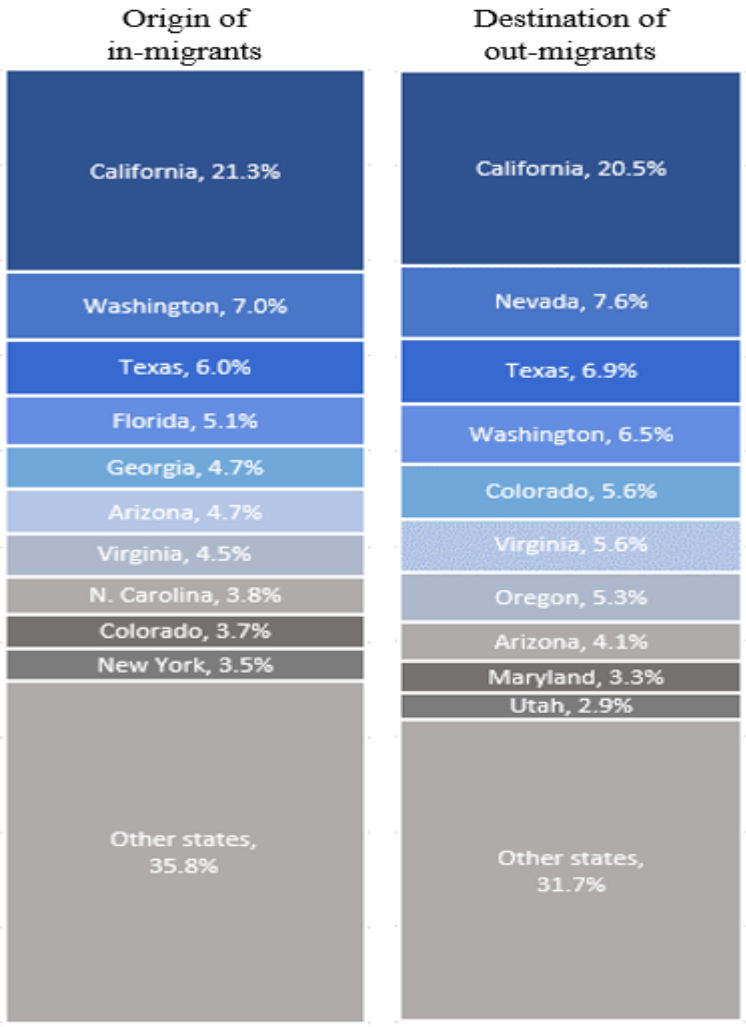
Race was another characteristic that demonstrated very different migration patterns across the characteristic groups. In comparison to Asian-alone or Native Hawaiian and Other Pacific Island-alone, Other Race-alone and White-alone population showed much higher in-migration rates. Of total White-alone and Other Race-alone population living in Hawaii during the 2013-2017 period, 10.9 percent and 15.2 percent of them were migrants who moved to Hawaii in the past 12 months. In contrast, a little over 2 percent of Asian-alone, and Native Hawaiian and Other Pacific Islander-alone have moved to Hawaii from outside in the past 12 months. Two or More races included a similar percentage of migrants, but the rate was a little higher at 2.8 percent.

5. Origin and Destination of Migrants

Origin and Destination of Domestic Migrants

Figure 7 presents where domestic in-migrants to Hawaii came from and where domestic out-migrants from Hawaii headed during the 2013-2017 period. Receiving and sending more than 20 percent of domestic migrants from and to Hawaii, California was the top destination of out-migrants from Hawaii as well as top origin of in-migrants to Hawaii. Washington and Texas were the two other states that have been both sender and recipient of migrants to and from Hawaii. Many states on the top of the list have either geographic proximity such as California and Washington, similar climate such as Florida, metro areas with a large population and possibly more job opportunities, or states with a large military base.

Figure 7. Origin and destination of domestic migrants



Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

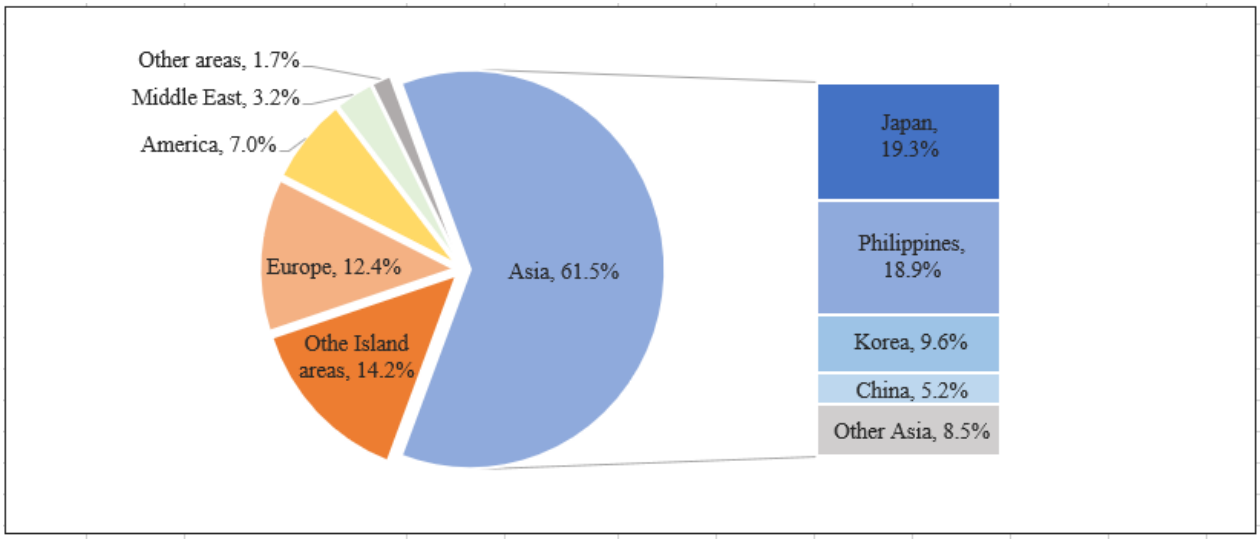
A pattern worth mentioning here is the similarity between origins and destinations of in- and out-migrants, possibly hinting the presence of return migration at a large scale. In fact, 35 percent of U.S. mainland-born domestic out-migrants moved to their home state where they were born. Excluding active duty military personnel and their families, the percentage was higher at 41.1 percent.

Origin of International In-migrants

Although the size was not as big as the migration from the U.S. mainland, Hawaii has been receiving steady inflows from foreign countries. During the 2013-2017 period, on average 15,500 people moved to Hawaii annually from foreign counties. Unlike domestic migration, ACS provides information on international migration for in-migrants only because people who moved out of the U.S. were not covered in the survey. An indirect way to assess the size of international out-migration is comparing the estimate of international in-migration from ACS with the estimate of net international migration from the U.S. Census Bureau's annual population estimates. Although making a comparison of two estimates from different data sources is not advised, it would give us some idea on the size of international out-migration from Hawaii. The 2018 vintage population estimates from the U.S. Census Bureau estimated the net international migration to Hawaii during the period of our consideration at about 7,000 per year. Comparing this estimate with the estimate of annual international in-migrants from ACS suggests that the size of international out-migration from Hawaii was a little over a half- size of international in-migration to Hawaii during the period.

Figure 8 presents where the international in-migrants to Hawaii came from. Of the estimated 15,500 annual international in-migrants to Hawaii, 61.5 percent came from Asia. By country, Japan and Philippines were two main countries of origin for the international in-migrants to Hawaii during the 2013-2017 period. Philippines was the top origin of civilian families while Japan was where many of the civilian and military families came from. Excluding active duty military personnel and their families, 22.1 percent of international in-migrants to Hawaii were from Philippines. Japan's share was somewhat lower at 17.2 percent when active duty military personnel and their families were excluded.

Figure 8. Origin of international in-migrants to Hawaii



Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

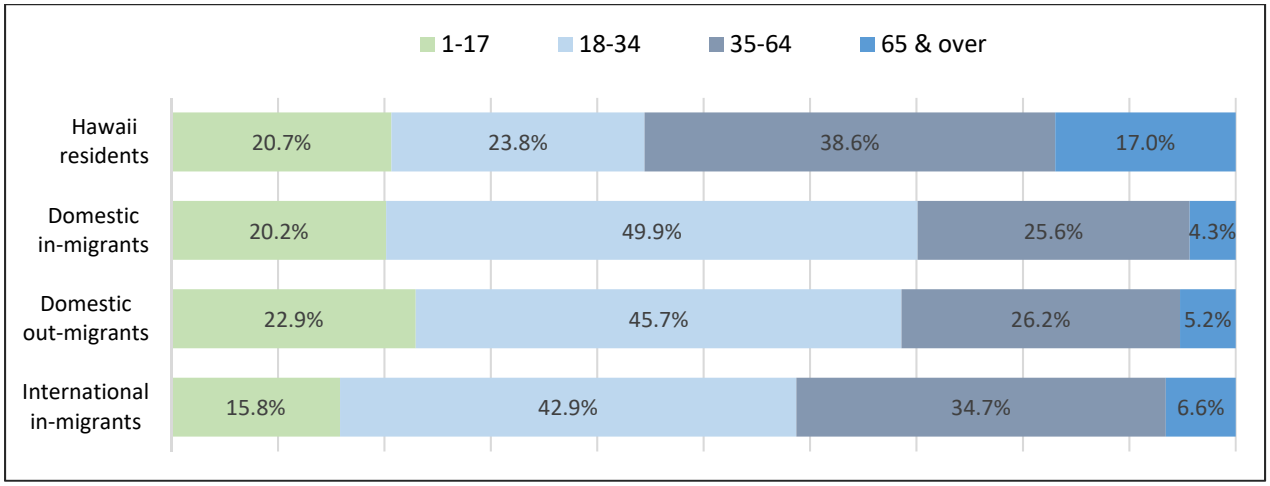
6. Characteristics of Migrants

Section 4 showed that the percentage of migrants among Hawaii residents varied widely by key characteristics. That was because the migrants who moved to Hawaii from outside had characteristics different from the average characteristics of Hawaii residents. In this section, we will discuss the characteristics of migrants, not only the migrants who were living in Hawaii but also the migrants who moved out from Hawaii and were living in the U.S. mainland. Again, the characteristics of international out-migrants who moved out of the U.S. could not be analyzed as they were not included in ACS, a survey of U.S. residents.

Age Composition

The most common characteristics of migrants at any geographic level, domestic and international alike, was its concentration in young age population. Hawaii was not an exception. Age structure of migrants was much younger than that of total population, and it was true for both migrants who moved to Hawaii and who moved out of Hawaii. It was also true for both domestic and international migrants. The largest age group among migrants was the young adult and prime working age population in ages 18-34. This demographic segment, where most college students and first-time job seeker would fall in, showed the highest proportion for domestic in-migrants at 49.9 percent. It was more than twice as high as its proportion of overall Hawaii residents.

Figure 9. Age composition of migrants



Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

Although a little lower compared to domestic in-migrants, this 18-34 age group accounted for 43-46 percent of domestic out-migrants and international in-migrants as well. On the other hand, the percentages of the older working age group in ages 45-64, and the elderly population aged 65 and over were much lower among migrants.

Table 1, Age composition of migrants

Age	Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l inmigrant	Excluding military personnel and their families			
					Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l inmigrant
All aged 1 and over	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1-17	20.7%	20.2%	22.9%	15.8%	20.3%	16.4%	20.1%	14.6%
18-24	9.2%	21.8%	19.3%	17.8%	8.3%	18.0%	20.6%	18.8%
25-34	14.6%	28.2%	26.3%	25.1%	13.6%	27.4%	25.2%	22.5%
35-44	12.7%	11.8%	11.7%	15.9%	12.6%	12.8%	11.7%	14.3%
45-64	25.9%	13.8%	14.4%	18.8%	27.2%	19.0%	15.8%	21.7%
65 and over	17.0%	4.3%	5.2%	6.6%	18.0%	6.4%	6.5%	7.9%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

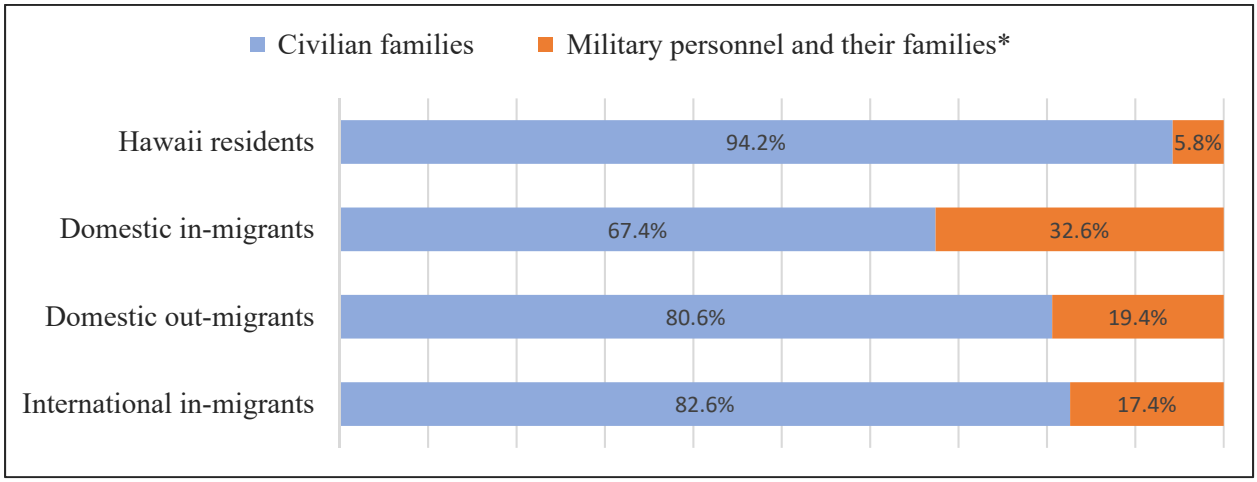
Military Personnel and their Families among Migrants

Military personnel move much more frequently than the civilian population. As far as migration is concerned, their families behave quite similarly. Not only military personnel themselves but also their dependents move for the reasons and patterns that are very different from the people in civilian families. They move by relocation orders that are rarely related to the economic and other conditions in Hawaii. They move more frequently than population in civilian families. According to a study, the average military family moves every 3 years and nine times over a 20-year career, not including deployments (Berg, 2008). Their moves are mostly across the state boundary. For these reasons, migrants included much more military personnel and their families than overall Hawaii residents did.

In this study, we defined the military families as people who live with an active duty military personnel in the same house. To exclude the unrelated people living with the military personnel in the same house, we included the household member only if she/he had a military insurance.[5] Defined as mentioned, 32.6 percent of migrants to Hawaii from the U.S. mainland were active duty military personnel or their families during the 2013-2017 period. Somehow, domestic in-migrants included more military related population than domestic out-migrants did during the time period. Since we didn't observe a significant change in the number of active duty military personnel in Hawaii during the period, one possibility is that many military personnel and their families moved out to foreign countries rather than moving out to the U.S. mainland during the period, which we couldn't verify with data.

[5] Note that the definition of military family in this report may differ from the definition used in other military statistics.

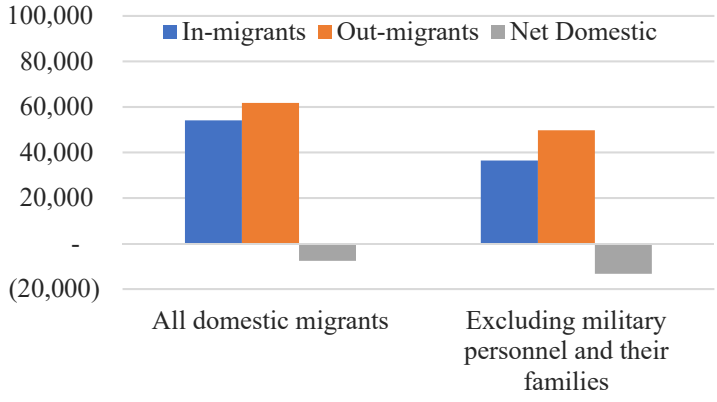
Figure 10. Military personnel and their families among migrants



*Military family was defined as those who live with an active duty military personnel in the same house and have a military insurance.
Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

When it comes to migration issue, we are often interested in the civilian family population only because military personnel and their families move for reasons that are not much related to the economic conditions in Hawaii that we have concerns about. More military-related population in domestic in-migrants than in domestic out-migrants suggests an important implication for the migration of civilian families during the period. The asymmetric sizes imply that the size of net domestic outflow was bigger than commonly known if our interest was in the civilian family population only. The figure and table below show the size of net domestic migration with and without military-related population included. Including active duty military personnel and their families, Hawaii showed a net loss of on average 7,600 people annually to other states in the U.S. during the 2013-2017 period. If we count the civilian family population only, the size of annual net loss was much bigger at 13,200 people.

Figure 11. Domestic migration with and without military population

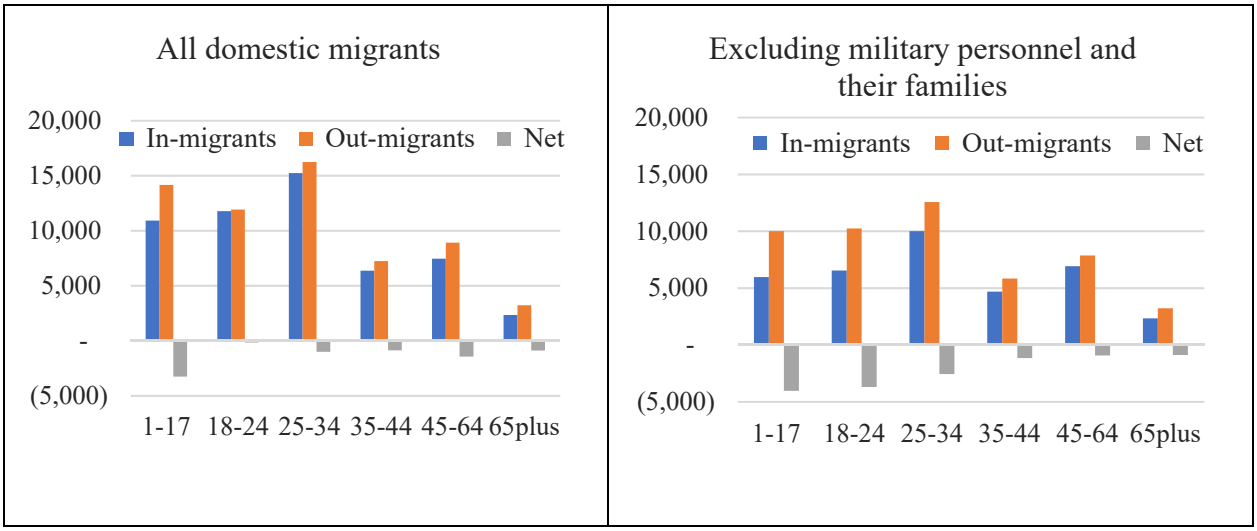


All domestic migrants	
In-migrants	54,100
Out-migrants	61,700
Net	(7,600)
Excluding military personnel and their families	
In-migrants	36,500
Out-migrants	49,700
Net	(13,200)

Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

Domestic net migration was also examined by age group with and without including military related population. Including active duty military personnel and their families, the net domestic out migration, presented as gray bars in Figure 12, was either not observed at all or very small in size for the young age population in ages 18-34. However, the chart on the right shows that Hawaii had been losing a significant number of the young age population to other states in both the 18-24 and 25-34 age categories if we don't count the net inflow of military population to Hawaii in these two age categories.

Figure 12. Net domestic migrants by age group



Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

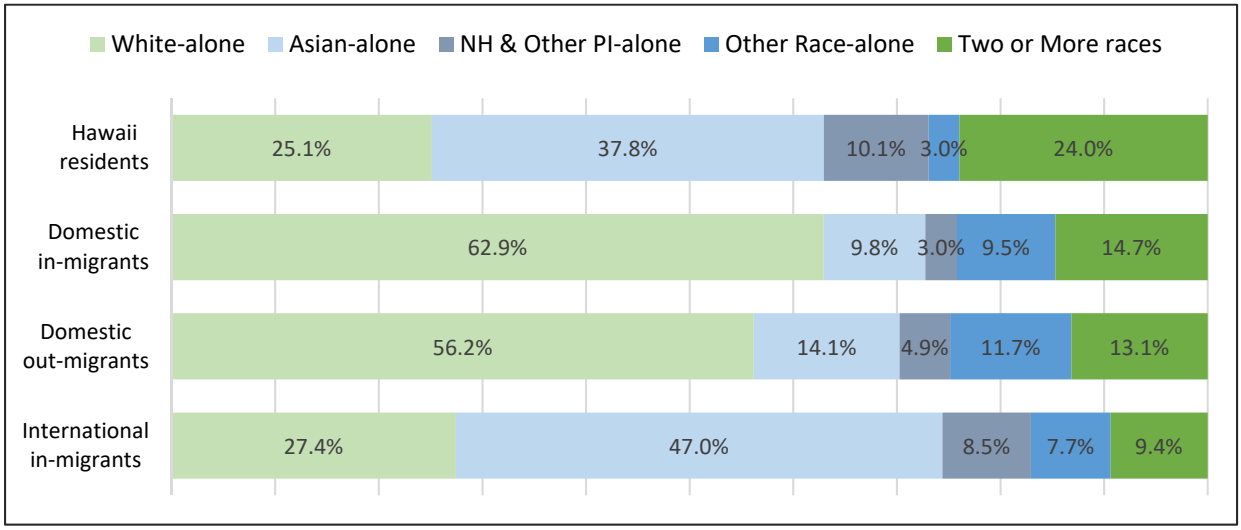
Race Composition

Another characteristic that showed substantial differences between migrants and overall Hawaii residents was race. Accounting for over half of each domestic in- and out-migrants, White-alone was the major race group among domestic migrants. The race's proportion of domestic in- and out-migrants was more than twice as high as its proportion of overall Hawaii residents. The higher proportion of White-alone population in domestic in-migrants seems natural as 73 percent of the U.S. mainland population were White-alone, three times higher than 25 percent in Hawaii population. However, it is interesting to see the proportion of White-alone population very high among domestic out-migrants as well. During the 2013-2017, 56.2 percent of domestic out-migrants from Hawaii were White-alone. Military personnel and their families in Hawaii include more White-alone population than overall Hawaii residents do. For that reason, the dominance of White-alone population decreased when military personnel and their families were excluded, but not much. The race still composed more than half of domestic out-migrants from Hawaii.

In contrast, domestic migrants included much less Asian-alone and Native Hawaiian and Pacific Islander-alone population. Asian-alone makes up about 40 percent of total Hawaii population. However, only 14.1 percent of domestic out-migrants during the 2013-2017 period were Asian-

alone. Although not as significantly as in Asian-alone population, a similar pattern was observed for Native Hawaiian and Pacific Islander-alone. While they accounted for about 10 percent of total Hawaii population, their share of domestic out-migrants during that period was 4.9 percent.

Figure 13. Race composition of migrants



Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

Table 2, Race composition of migrants

Race	Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l inmigrant	Excluding military personnel and their families			
					Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l inmigrant
All races (aged 1 and over)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
White-alone	25.1%	62.9%	56.2%	27.4%	22.7%	59.4%	53.1%	21.7%
Asian-alone	37.8%	9.8%	14.1%	47.0%	39.8%	12.6%	15.4%	52.5%
NH/Other PI-alone	10.1%	3.0%	4.9%	8.5%	10.6%	3.8%	5.6%	10.2%
Other Race-alone	3.0%	9.5%	11.7%	7.7%	2.3%	7.6%	11.2%	7.4%
Two or More races	24.0%	14.7%	13.1%	9.4%	24.7%	16.5%	14.7%	8.2%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

Birthplace and Return Migration

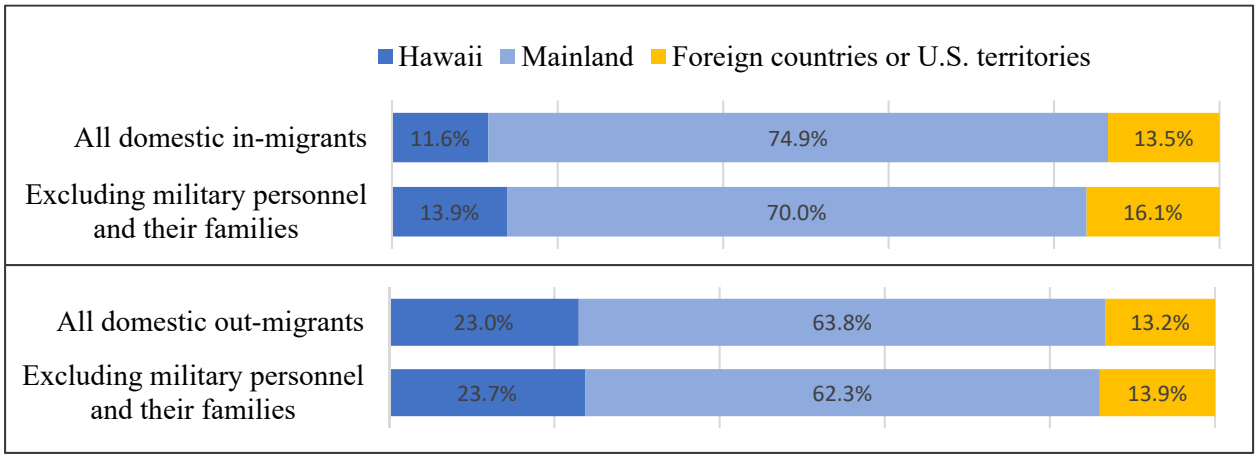
The high percentage of White-alone population among domestic out-migrants hints the possibility of a sizeable return migration. The migration decisions would be made for different reasons and influenced by numerous factors. If a move was made only for higher education, the individual may have planned, even before the initial move, to come back home after she/he

finishes the education. If a move was made for a better job opportunity, it is likely that the return migration is determined by the job market situation in both the origin and the destination.

ACS doesn't ask about the moving activity of the respondent for the time more than one year ago, nor the reasons for the move. Therefore, the survey does not provide answers to the question of how many of the observed migrations were return migrations. The only information available from the survey that can hint on the possibility of return migration is birthplace of the respondent.

About 75 percent of domestic in-migrants were born on the mainland, which seems very natural. Similar to what observed in the race composition, however, a significant number of domestic out-migrants were also mainland-born. About 2 in 3 people who moved from Hawaii to the U.S. mainland during the 2013-2017 period were born on the mainland, which means that the person moved to Hawaii from the mainland sometime since her/his birth. They may have moved to Hawaii in their childhood and moved back to the mainland for an education or a job. Or, they may have come to Hawaii for an education or a job as a young-adult and returned to their home states or other states in the mainland either as planned or as they found it difficult to manage living in Hawaii.

Figure 14. Birthplaces of domestic migrants



Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

The age distribution of domestic out-migrants varied significantly by birthplace. The first three columns in Table 3 show the age distribution of domestic out-migrants by birthplace. In this table, we excluded military personnel and their families to focus on the migration patterns of the population not related to military. The Hawaii-born domestic out-migrants showed the youngest age structure. About two third of Hawaii-born out-migrants to the U.S. mainland were aged 24 or under. On the other hand, this age group made up about one third of the mainland-born, and one fifth of the foreign-born out-migrants to the U.S. mainland.

These figures are for all people who moved, including both householders and non-householders. Although the move could be initiated by any member in the household, householders are more likely to be the lead of the move either as the decision maker or cause provider. For that reason, we also looked at the age distribution of migrants excluding non-householders. As presented in the right three columns in Table 3, many Hawaii-born householders left Hawaii when they were in the age of 18-24. Among the Hawaii-born out-migrants to the U.S. mainland, 60 percent of the householders, of any types of households including living alone or living in a group quarter such as college dormitory, were in ages 18-24. The Hawaii-born out-migrants in this age range might have moved to the mainland to attend a college or for their first job in the mainland after college graduation in Hawaii. In contrast, only 15 or lower percent of householders were in this young adult population group for the mainland- and foreign-born out-migrants. In fact, more than half of the householders among the mainland-born and foreign-born out-migrants fell in the 25-44 age range, suggesting that they likely have moved to the mainland for a job or some other reasons rather than education.

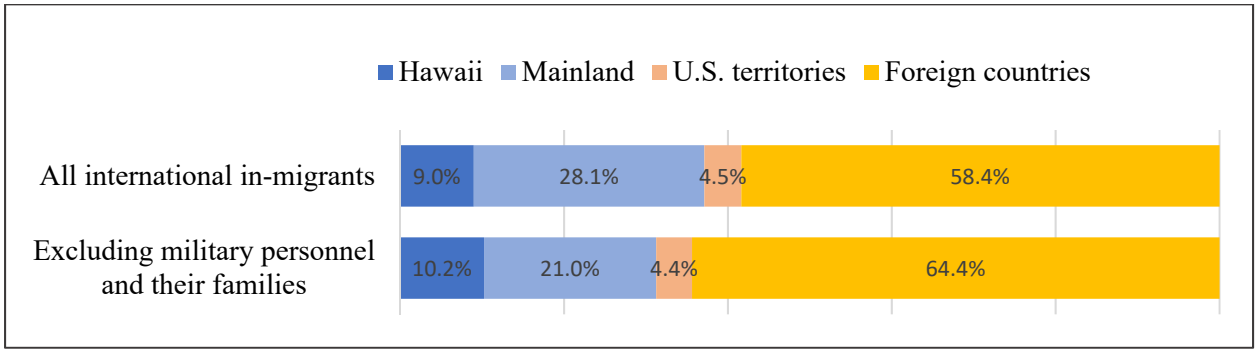
Table 3. Age distribution of domestic out-migrants by birthplace

Age	Domestic out-migrants excluding military personnel and their families					
	All persons in the households			Householders only [1]		
	Hawaii-born	Mainland-born	Other U.S. territory or Foreign born	Hawaii-born	Mainland-born	Other U.S. territory or Foreign born
All aged 1&over	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1-17	29.4%	19.1%	8.6%	1.8%	0.2%	0.0%
18-24	37.2%	16.4%	11.1%	60.1%	12.5%	15.1%
25-34	11.1%	28.4%	35.3%	14.0%	37.6%	34.6%
35-44	6.1%	13.0%	15.6%	6.7%	17.4%	20.3%
45-64	10.1%	17.1%	19.6%	14.9%	24.6%	18.8%
65 & over	6.0%	6.0%	9.8%	2.6%	7.7%	11.2%

[1] include living alone householders and individuals living in group quarters such as college dormitory
Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

Birthplace information is useful as well in making a guess on the size of returning U.S. residents among international in-migrants to Hawaii. More than one third of international in-migrants to Hawaii during the 2013-2017 period were actually born in the U.S., 9.0 percent in Hawaii and 28.1 percent in the U.S. mainland. Military personnel and their families are more likely to be a U.S.-born. However, with 31 percent of them born in the U.S. international in-migrants to Hawaii included a significant number of returning U.S. residents even after excluding military personnel and their families.

Figure 15. Birthplaces of international in-migrants



Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

Gender and Marital Status

Table 4 compares the three migrant groups with overall Hawaii residents for gender composition. The migrants during the 2013-2017 period included slightly more males than overall Hawaii residents. This is likely due to there being more military personnel, a very male dominant group, among migrants than among overall Hawaii residents during the period. Therefore, the slight male dominance disappeared when male dominant active duty military personnel and slightly female dominant their families were excluded in the comparison.

Table 4. Gender distribution of migrants

Gender	Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l inmigrant	Excluding military personnel and their families			
					Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l Inmigrant
All aged 1 & over	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Female	49.8%	47.4%	48.3%	46.4%	50.5%	50.0%	49.8%	48.4%
Male	50.2%	52.6%	51.7%	53.6%	49.5%	50.0%	50.2%	51.6%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

Table 5 compares migrants with overall Hawaii residents by marital status for those who aged 18 and over. As in the gender composition, marital status of migrants was not much different from that of overall Hawaii residents. Compared with overall Hawaii residents and domestic migrants, migrants who moved to Hawaii from abroad had slightly more married persons while domestic migrants to and from Hawaii included more persons never married. Given the younger age structure of domestic migrants, the higher proportion of persons never married was expected.

Table 5. Marital status of migrants

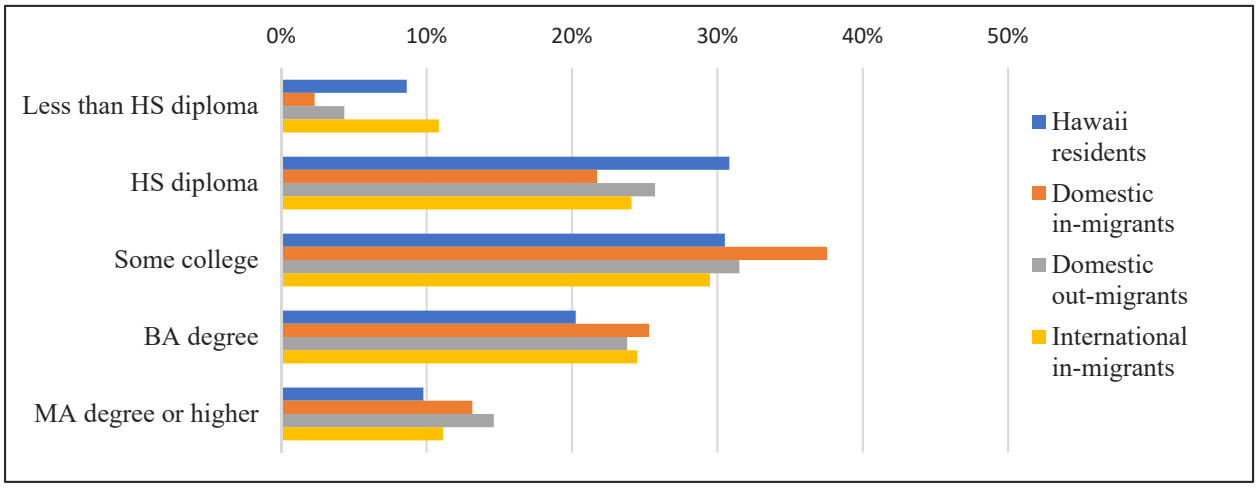
Marital Status	Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l inmigrant	Excluding military personnel and their families			
					Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l inmigrant
All aged 18 & over	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Married	52.0%	52.7%	48.9%	56.3%	51.2%	45.0%	43.3%	52.9%
Widowed/divorced /separated	17.5%	9.6%	12.6%	9.1%	18.3%	12.2%	14.5%	9.9%
Never married	30.5%	37.7%	38.6%	34.6%	30.5%	42.7%	42.3%	37.2%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

Educational Attainment

It was shown in many studies that mobility increased with education. College-educated were more likely to migrate than those without a college education (Kodrzycki 2001). College graduates were two to five times more likely than less educated workers to reside in a state with high labor demand at the time they entered the market (Wozniak, 2006). This tendency is well reflected in the distribution of educational attainment of migrants. Compared to overall Hawaii residents, both domestic in- and out-migrants were more educated in general. Among Hawaii residents aged 18 and over and not attending a school for the last three months before the time of the survey, 39.4 percent had a high school diploma or less education. This education group accounted for only 24.0 percent of domestic in-migrants and 30.0 percent of domestic out-migrants during the 2013-2017 period. On the other hand, the proportion of individuals with some college education, a Bachelor's degree (BA), and a Master degree (MA) or higher education was all higher among domestic migrants than among Hawaii residents.

Figure 16. Educational attainment of migrants aged 18 and over and not in school



Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

Migrants from abroad showed quite different patterns. It cannot be said that international in-migrants were less educated or more educated in general because they included more of each end of the spectrum: both least-educated people and most-educated people. Compared to overall Hawaii residents, international in-migrants during the 2013-2017 period included more people with less than high school education (10.8%). That was 2.2 percentage point higher than its proportion among Hawaii residents. However, the proportion of those with a Bachelor's degree or higher education was also higher among international in-migrants (30.1% for Hawaii residents vs. 35.6% for international in-migrants).

Table 6. Educational attainment of migrants aged 18 and over and not in school

Educational Attainment	Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l inmigrant	Excluding military personnel and their families			
					Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l inmigrant
Aged 18+, not in school	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Less than HS diploma	8.6%	2.3%	4.3%	10.8%	9.0%	2.5%	5.1%	12.6%
HS diploma	30.8%	21.7%	25.7%	24.1%	30.6%	18.2%	26.2%	24.1%
Some college	30.5%	37.5%	31.5%	29.8%	30.1%	36.2%	30.2%	28.4%
BA degree	20.3%	25.3%	23.8%	24.5%	20.4%	28.2%	23.9%	24.8%
MA degree or higher	9.8%	13.1%	14.6%	11.1%	9.8%	14.9%	14.7%	10.2%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

Employment Status and Occupation

Employment status of migrants is compared to overall Hawaii residents in Table 7 for the working-age population aged 16 and over. Migrants included three to five times more military personnel among them as they moved more frequently than the civilian population.

Compared with overall Hawaii residents, domestic migrants showed a higher labor force participation rate. The higher labor force participation rate must be due to the fact that domestic migrants had an age structure younger than overall Hawaii residents. Although more people participated in the labor force, the unemployment rate was high among domestic migrants. While the high unemployment rate was observed in both in- and out-migrants, the unemployment rate was especially high among domestic out-migrants. The percentage of the unemployed among domestic out-migrants was 6.9 percent of those aged 16 and over and 9.9 percent of the total labor force. Lack of employment opportunities is one of the key causes of migration. Many previous studies showed that the unemployed were more likely to migrate. Unlike many other characteristics that don't change over time, however, the employment status could have changed as a result of moving. Therefore, migrants included more people unemployed partially because the unemployed were more likely to move looking for a job and partially because moving left the migrant unemployed temporarily right after the moving.

International in-migrants showed a labor force participation rate lower than overall Hawaii residents although they also had an age structure younger than overall Hawaii residents. We may find the reason in the fact that international in-migrants included many foreign-born. As shown in page 22, about 60 percent of international in-migrants to Hawaii were a foreign-born. The labor force participation rate of foreign-born population in Hawaii is not meaningfully different from that of the natives in general. However, the foreign-born migrants could be discouraged to join the labor force in the first year of moving due to language barriers and cultural differences. It's interesting to see that the unemployment rate of international in-migrants was lower than domestic migrants, who must have had less challenges in finding a job than international in-migrants. Putting this together with a lower labor force participation rate of international in-migrants, one possible explanation could be that international in-migrants tended to wait to join the labor force until they saw a better chance of being hired.

Table 7. Employment status of migrants aged 16 and over

Employment Status*	Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l inmigrant	Excluding military personnel and their families			
					Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l inmigrant
All aged 16 & over	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Civilian employed	58.6%	47.6%	51.4%	46.1%	61.2%	62.7%	59.2%	54.2%
Armed force	3.6%	19.0%	11.1%	11.6%	0.0%	0.0%	0.0%	0.0%
Unemployed	2.8%	5.0%	6.9%	3.6%	2.9%	5.4%	7.6%	4.3%
Not in labor force	35.0%	28.4%	30.7%	38.7%	35.9%	31.9%	33.2%	41.6%

*For the week prior to the survey
Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

Table 8 shows how the stability of employment was associated with migration. Unstable employment status might have forced them to move out from the place they couldn't find a stable job. At the same time, migration might have left them temporarily unemployed as discussed. The employment stability was measured in Table 8 as the number of weeks worked in the past 12 months for those who were employed.

While the data doesn't allow us to tell the causality relation of unstable employment and migration, Table 8 clearly shows that many migrants experienced unstable employment in the year of migration. Over 85 percent of employed Hawaii residents indicated that they worked for at least 48 weeks (roughly 11 months) in the past 12 months. However, the percentage associated with the three migrant groups was up to 27 percentage point lower.

Among the three migrant groups, international in-migrants showed the lowest stability in employment. In general, military personnel tend to maintain a stable employment status regardless of moving. Hence, the employment stability indicators all got worse when military personnel were excluded. Excluding active duty military personnel, 25.7 percent of international

in-migrants who were employed at the time of the survey indicated that they worked only for 26 weeks or less in the past 12 months. Employment stability of domestic migrants was lower than overall Hawaii residents, but was better compared with international in-migrants.

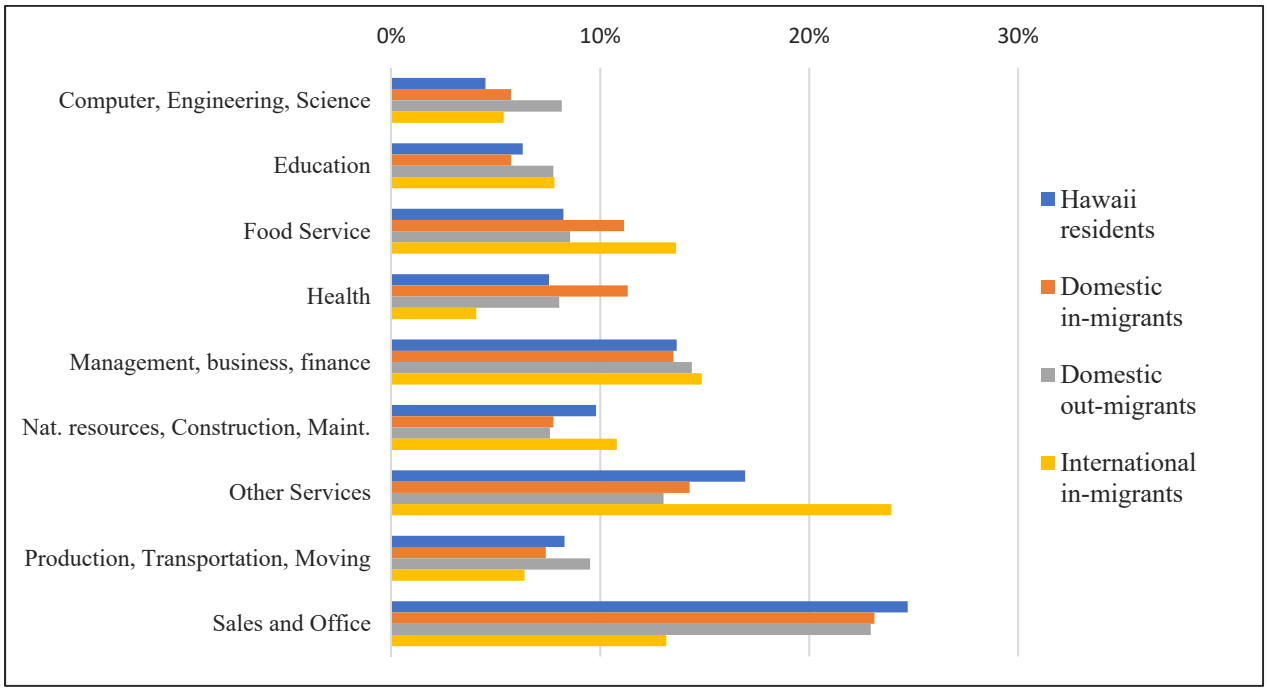
Table 8. The number of weeks worked in the past 12 months

Number of weeks worked in the past 12 months	Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l inmigrant	Excluding military personnel			
					Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l inmigrant
All employed	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
48-52 weeks	86.2%	79.5%	74.6%	66.0%	85.5%	73.6%	70.4%	58.2%
40-47 weeks	4.2%	6.6%	5.2%	4.8%	4.4%	8.3%	5.9%	6.0%
27-39 weeks	3.7%	7.0%	8.2%	8.2%	3.9%	9.0%	9.8%	10.1%
26 weeks or less	5.9%	6.8%	11.9%	21.0%	6.2%	9.1%	13.9%	25.7%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

Figure 17 shows the occupations of the civilian employed in the three migrant groups and overall Hawaii residents. Compared with overall Hawaii residents, both the domestic and international in-migrants showed a higher proportion in Food Service. Other than Food Service, domestic in-migrants included more people with Health occupations while international in-migrants included significantly more people with Other Service occupations.

Figure 17. Occupations of migrants, civilian employed



Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

Meanwhile, domestic out-migrants showed a noticeably higher proportion for Computer, Engineering, and Science occupations, and slightly higher proportion for the occupation of Education.

Compared with overall Hawaii residents, Construction and Other Service were the occupations that were less common among domestic migrants. On the other hand, Health, and Sales and Office occupations were much less commonly observed among international in-migrants.

Income and Poverty

Table 9 presents income distribution of the three migrant groups compared with overall Hawaii residents. In general, migrants included more of very low-income earners who made $10,000 or less per year. Among the employed Hawaii residents, those who made $10,000 or less per year made up less than 10 percent during the 2013-2017 period. This proportion was 2-5 percentage point higher for domestic migrants and 16 percentage point higher for international in-migrants. In fact, about one in four (one in three if active duty military personnel and their families were excluded) international in-migrants during the 2013-2017 period made $10,000 or less in their first year of moving.

There are two possible reasons for the low annual income; worked for a low-paid job or worked less. While many characteristics such as gender, race, birthplace, education, and occupation wouldn't change immediately with migration, migration may have affected employment status and income, especially in the year of migration. If a person moved without prearrangement of jobs, it is likely that the person stayed unemployed until he/she started a new job and was left with income lower than usual. As presented in Table 8, about a fifth (or a quarter excluding military personnel) of international in-migrants who were employed at the time of the survey indicated that they worked for 26 weeks or less in the past 12 months, which partially explains the high proportion of low-income earners among international in-migrants.

Table 9. Income distribution of migrants

Income in the past 12 months	Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l inmigrant	Excluding military personnel and their families			
					Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l Inmigrant
All employed	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
$10K or less	9.5%	11.1%	14.8%	25.2%	9.7%	12.1%	16.8%	31.8%
$10K-$25K	19.6%	23.3%	24.8%	20.9%	19.4%	23.2%	25.8%	22.7%
$25K-$50K	33.5%	30.8%	28.5%	26.0%	33.4%	29.9%	28.4%	23.1%
$50K-$75K	18.6%	16.8%	13.8%	15.4%	18.6%	15.5%	11.8%	13.7%
$75K & over	18.8%	17.9%	18.1%	12.5%	18.8%	19.4%	17.1%	8.6%

Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

As for the high-income category of making $75,000 or more per year, the pattern differed between domestic and international migrants. The proportion of this high-income group in domestic migrants was not much different from overall Hawaii residents. However, the percentage of this high- income earners were significantly lower for international in-migrants. The percentage of this high-income earner of total employed international in-migrants was 6.3 percentage point (10.2 percentage point excluding military personnel and their families) lower than overall Hawaii residents.

Table 10 tells us similar stories in a different measure, poverty status.[6] Poverty threshold is determined by size and type of the family. Similar to the analysis based on income, there were more people living in poverty among migrants who moved to and from Hawaii in the past 12 months, especially among the migrants who moved to Hawaii from abroad. The poverty rate, the percentage of people living in poverty, of international in-migrants was twice as high as that of overall Hawaii residents. Although it was not as high as for international in-migrants, domestic migrants also had significantly more people living in poverty than overall Hawaii residents did.

Table 10. Migrants by poverty status

Percentage of poverty threshold	Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l inmigrant	Excluding military personnel and their families			
					Hawaii residents	Dom. inmigrant	Dom. outmigrant	Int'l inmigrant
All aged 1& over who poverty can be defined for*	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Below 100%	10.4%	11.8%	13.5%	19.2%	10.8%	15.5%	15.2%	23.3%
100-200%	13.4%	16.7%	17.0%	15.9%	13.0%	14.6%	16.7%	13.2%
200-300%	15.3%	18.6%	16.8%	19.2%	15.0%	14.9%	14.7%	21.0%
300% or over	60.9%	52.9%	52.6%	45.7%	61.1%	55.1%	53.5%	42.4%

*Poverty status cannot be determined for people in group quarters and for unrelated individuals under age 15.
Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

[6] Poverty thresholds are the dollar amounts set to determine poverty status. The U.S. Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the family's threshold, then that family and every individual in it is considered in poverty. The official poverty thresholds do not vary geographically, but they are updated for inflation using the Consumer Price Index. (U.S. Census Bureau, https://www.census.gov/topics/income-poverty/poverty/guidance/poverty-measures.html)

7. Propensity to Migrate of Domestic Out-Migrants

This section examines how differences in demographic, social and economic characteristics affected the propensity of Hawaii residents to migrate to the U.S. mainland. The propensity of a characteristic group to migrate out was measured approximately by dividing the number of those who moved out from each characteristics group by the number of total Hawaii residents in the characteristic group during the period.

The charts in the left column of Figure 18 presents the propensity to migrate out by 6 key characteristics for overall Hawaii residents. It shows that the propensity to migrate out domestically decreased with age, and increased with education. People in the labor force but didn't work in the past 12 months (proxy for the unemployed at the time of migration) showed much higher propensity to move out than those who worked. The propensities were calculated similarly for a subgroup of the population excluding military personnel and their families (right column). The propensities were smaller in general when military related population, who move more frequently, were excluded. However, the 18-24 age group and the Other Race-alone group exhibited a propensity slightly higher without military related population, indicating strong migration movement among civilian family population with these characteristics.

Age

The domestic out-migration rate of Hawaii residents varied significantly by age. For the population aged 18 and over, the propensity to migrate decreased with age.[7] The propensity to migrate was the highest among the 18-24 age group at 9.2 percent, which means that 9.2 percent of Hawaii residents in ages 18-24 moved out to the U.S. mainland annually during the 2013-2017 period. The age group that showed the second highest domestic out-migration rate was the 25-34 age group. On average 7.9 percent of the 25-34 aged Hawaii residents moved out annually to head to the U.S. mainland. The age group with the lowest domestic out-migration rate was the population aged 65 and older. Merely 1.4 percent of Hawaii residents in this age segment moved out annually to the U.S. mainland.

Race and Birthplace

An average of about 10 percent of White-alone population in Hawaii moved to the U.S. mainland annually during the 2013-2017 period. This was about 5 times higher than the propensity of Asian-alone or Native Hawaiian and other Pacific Islander-alone population in Hawaii to move out to the U.S. mainland. A race that showed a propensity higher than the propensity of White-alone was Other Race-alone, which included Black-alone population.

Migration patterns by the place of birth were quite similar to the patterns by race. Every year during 2013-2017, about 11 percent of Hawaii residents who were born on the U.S. mainland

[7] Migration of persons in ages 1 to 17 is likely to be dependent on the migration decision of older persons in the household.

moved back to the mainland. Domestic out-migration rates of the Hawaii-born and foreign-born population were much lower. Averagely, 1.9 percent of the Hawaii-born and 2.4 percent of the foreign-born population moved out to other U.S. states annually during the 2013-2017 period. Persons who were born in other U.S. territories such as Puerto Rico, Guam, the U.S. Virgin Islands, or the Northern Marianas, moved out more frequently than the Hawaii-born or foreign-born population although it was not comparable to the propensity of the mainland-born.

Educational Attainment

The propensity of Hawaii residents to migrate to other U.S. states increased with education. The chart in Figure 18 shows the migration rates by educational attainment for the population aged 18 and over. To examine how final education affected the propensity to move out, those who were attending a school at the time of the survey such as those who migrated to attend college after high school graduation were excluded from the consideration. The demographic group with less than a high school diploma was the least mobile showing only 1.8 percent of them moved out to the U.S. mainland annually. The migration rate increased monotonically with education level. The persons with a Master degree or higher education showed the highest propensity to migrate indicating 5.4 percent of Hawaii residents in this education category moved out to the U.S. mainland annually during the period.

Employment Status

As discussed earlier, employment status may have changed due to migration. Our interest in this section is in learning how the employment status of the individual before or at the time of migration affected the migration rate. Thus, instead of using the current employment status, we used the employment status the individual had a year ago, which was before the migration. Compared to the persons who worked in the past 12 months, the persons who were in the labor forces but didn't work at all in the past 12 months showed a much higher propensity to migrate. Among the persons who were in the labor force at the time of the survey but never worked in the past 12 months, 7.1 percent moved out to head to other U.S. states. The corresponding rate for the persons who have worked even temporarily in the past 12 months was much lower at 4.4 percent.

Occupation

The last two charts in Figure 18 demonstrates how the propensity of Hawaii workers to migrate to other U.S. States differed by occupation. While workers in Construction related or Sales and Office occupations showed relatively a lower propensity to migrate, workers in Computer, Engineering, and Science occupations, and workers in Education showed relatively a high propensity to migrate. Especially, the distinctively higher out-migration rate of workers in Computer, Engineering, and Science (CES) occupations would raise concerns as those are the areas bringing innovation to the economy and the areas where the state has been putting effort to enhance high-quality employment opportunities in Hawaii. During the 2013-2017 period, 7.1 percent of workers in the CES occupations moved out to head to other U.S. states annually, 2.9 percentage point higher than domestic out- migration rate of workers in all occupations.

Figure 18. Propensity of Hawaii residents to migrate out domestically, by characteristics

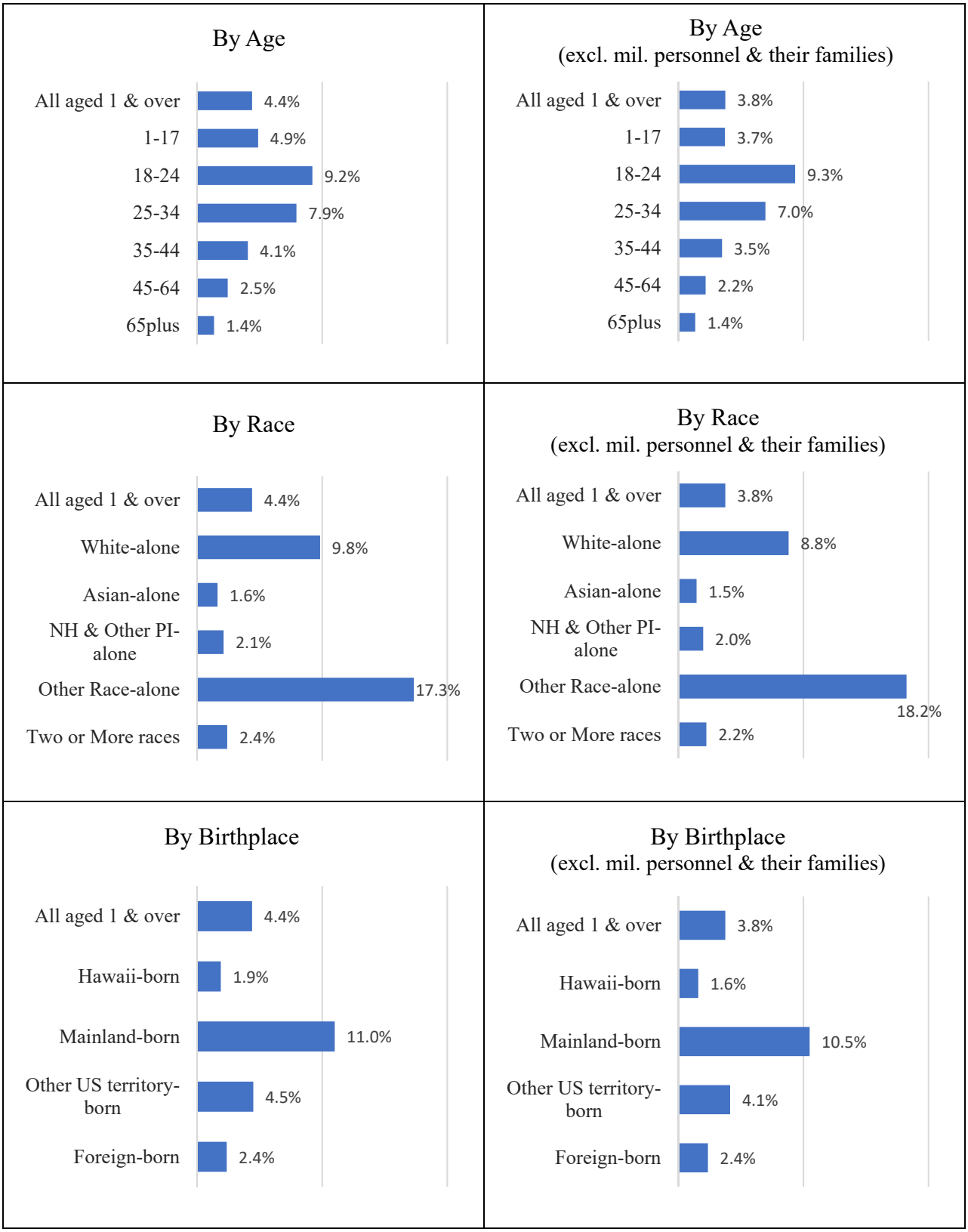
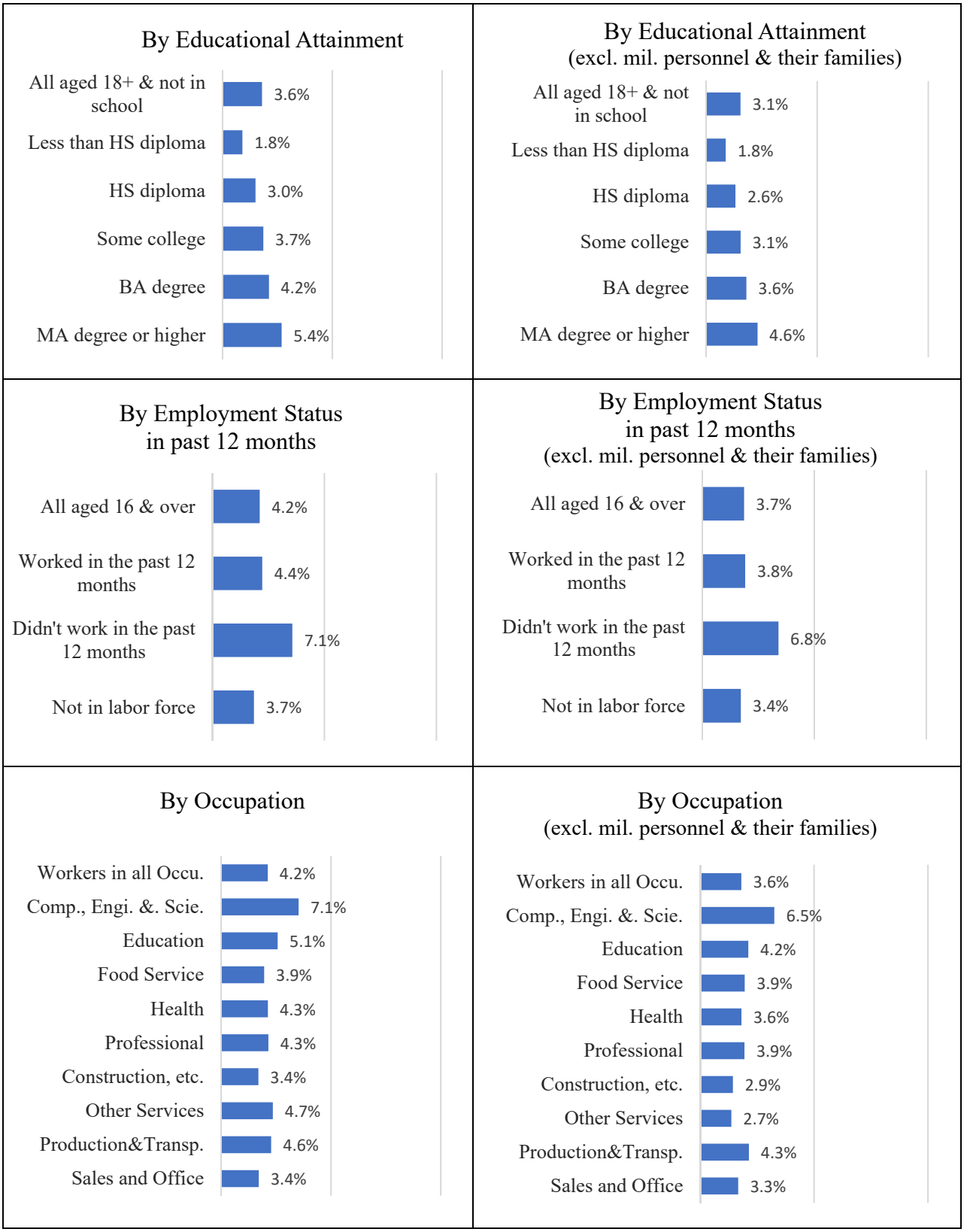


Figure 18. continued



Source: Estimates based on U.S. Census Bureau, American Community Survey 2013-2017 5-year PUMS

8.Concluding Observations

This report examined the overall moving behaviors of Hawaii residents and the characteristics of three types of migrants; domestic in-migrants, domestic out-migrants, and international in-migrants based on the American Community Survey covering the 2013-2017 period. Many patterns were commonly observed in all three migrant groups; Migrants were all highly concentrated in the young-age population. Compared to overall Hawaii residents, they included more people with a college or higher education, more unemployed and more low-income earners.

Military personnel and their families were the significant part of all three migrant groups. For some reasons, their size was much bigger among domestic in-migrants than domestic out-migrants suggesting that Hawaii's loss to other states in the past several years was larger than commonly known if only the population in civilian families were considered. For domestic migration, not only in-migrants but also out-migrants were dominated by White-alone and mainland-born population hinting possibly a large number of return migration among domestic out-migrants.

The report also showed that the propensity of Hawaii residents to migrate out to the U.S. mainland varied by characteristics. Both descriptive and regression analysis showed that the young-age population and the more educated people had a higher propensity to move out, which is in line with numerous previous migration studies. In addition to that, Hawaii's out-migration patterns were dominantly affected by race and birthplace of the individual. The unemployed were more likely to migrate than the employed. Also, the people in Computer, Engineering, and Science occupations showed a higher propensity to migrate than people in other occupations.

Multiple studies have shown that people tend to stay home during the recession. Levy, at all (2017) showed evidence that overall migration rates declined during the recession, despite large regional differences in unemployment and growth rates. The period analyzed in this report was an expanding period for the whole U.S. economy including Hawaii. In order to find out whether the findings from this report were specific to the period, future studies may examine the differences between the period of recession and the period of economic expansion in migration patterns.

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Appendix

Propensity to Migrate of Domestic Out-Migrants

: Logistic Regression Analysis

The descriptive statistics introduced in Section 7 illustrated how the propensity to migrate out domestically was associated with the specific characteristic under examination. The relationship between the characteristic and the propensity reflects not only the direct relation between the two but also the indirect relation that the characteristic had through another characteristic related to the propensity. For example, it would be possible that White-alone showed a higher propensity to migrate because many of them were born on the mainland. Or, the individuals with a college education showed a higher propensity to migrate out possibly because domestic out-migrants included many mainland-born college graduates who came to Hawaii for a college education and returned home after completing the education.

Multivariate regression analysis allows us to separate the indirect effects from the direct effects by examining the impact of each characteristic with all other characteristics being held constant (ceteris paribus). This appendix employs the binary logistic model to estimate the impact of each characteristic variable on the propensity of Hawaii residents to migrate out domestically after controlling for other factors.

When p is the probability of migration, the logistic model assumes a linear relationship between the log-odds of the probability and the explanatory variables (X_1,……., X_n).

$$\text{logit}(p)=\log\left(\frac{p}{1-p}\right)= \alpha + \beta_1 X_1 + \text{-------+ } \beta_n X_n$$

The following ten categorical variables were examined as explanatory variables for the propensity of Hawaii residents to migrate out domestically.

- Gender (reference group: male)
- Age (reference group: 55 and over)
- Marital Status (reference group: married)
- Children in the household (reference group: no child)
- Race (reference group: White-alone)
- Birthplace (reference group: Hawaii-born)
- Educational attainment: (reference group: high school diploma or less)
- School attendance (reference group: not in school)
- Employment status (reference group: worked in the past 12 months)
- Computer, Engineering and Science (CES) occupation (reference group: not in CES occupation)

Table A-1 summarizes the regression results when we applied the model to explain out-migration patterns of Hawaii residents aged 18 and over in civilian families excluding military

personnel and their families. The odds ratio in Table A-1 is the exponentiated version of the logistic regression coefficient. When X_i is a categorical variable with two categories, A (reference group) and B, the odds ratio of B is the odds of B's domestically out-migrating divided by the odds of A's domestically out-migrating.

Overall, the regression results were consistent with what we found in the descriptive analysis presented in Section 7. However, the differences in the propensity among the categories were estimated at smaller scales. That's because the multivariate regression model estimates the partial effect of the characteristic when all other characteristics are controlled to be constant.

As in the descriptive analysis, the propensity to move out was not affected by gender while the age of the individual was one of the most significant factors explaining the propensity to migrate. Even after controlling all other characteristics, the odds of domestically moving out for the age 18-24 group was more than 9 times as high as the odds for the reference age group, 55 years and over. The odds for the persons in the age 25-34 were lower but still more than five times as high than the odds for the reference group.

Two other characteristics that had very strong explanatory power were race and birthplace. After controlling all other factors, the odds for White-alone's moving out was about 2.5 times higher than the odds for Asian-alone or Two or More race-mixed and 2 times higher than the odds for Native Hawaiian and Pacific Islander-alone. By birthplace, the odds of the mainland-born's moving out was almost 4 times higher than the odds of Hawaii-born's moving out. The odds for those who were born in other U.S. territories or in foreign countries were also about 2 times higher than the odds for the Hawaii-born.

Regression results also showed that the employment status and occupation affected a person's propensity to move out even after controlling for other factors. Controlling for all other characteristics, the odds of moving out for those who didn't work at all in the past 12 months was nearly two times higher than the odds for those who have worked in the past 12 months. The model also tested whether the persons in Computer, Engineering, and Science (CES) occupations were associated with a higher propensity to move out after controlling for other factors. The result showed that the odds of moving out for the persons in CES occupations was 1.5 times as high as the odds for the persons in non-CES occupations.

The propensity to move out domestically increased with education with all other factors, including school attendance, controlled, but the higher mobility was statistically significant only for the persons with a Master degree or higher education.

A characteristic that exhibited a propensity pattern that was different from the descriptive analysis was marital status. When the propensity was calculated as in Section 7, excluding military personnel and their families, the propensity of those who never married to move out domestically was 5.2 percent, distinctively higher than the propensity of those who married (3.2 percent) and those who were widowed/ divorced/ separated (3.0 percent). This was possibly because the young age population had a very high propensity to move out and many of them were not married yet. The regression result showed that, controlling age and all other

characteristics of the individual, the odds of moving out was actually 26 percent lower for those who never married and 28 percent higher for those who were widowed/ divorced/ separated than the odds for those who were married.

Table A-1. Logistic regression results
(Dependent variable=1 if the individual moved out to the mainland, 0 if stayed in Hawaii)

Explanatory variables	Odds ratio
Gender (reference group: Male)	
Female	1.04
Age (reference group: 55 and over)	
Age: 18-24	9.53**
Age: 25-34	5.63**
Age: 35-44	2.65**
Age: 45-54	1.50**
Marital status (reference group: married)	
Widowed/divorced/separated	1.28*
Never married	0.74**
Children (reference group: no children in household)	
With children	0.72**
Race (reference group: White-alone)	
Race: Asian-alone	0.38**
Race: Native Hawaiian and Pacific Islander-alone	0.50**
Race: Other Race-alone	1.77**
Race: Two or More races	0.40**
Birthplace (reference group: Hawaii-born)	
Birthplace: mainland-born	3.83**
Birthplace: Other U.S. territories-born	2.59**
Birthplace: Foreign-born	1.79**
Education (reference group: less than a HS diploma)	
Education: HS diploma	1.27
Education: Some college	1.17
Education: BA degree	1.31
Education: MA degree or higher	1.62**
School attendance (reference group: not in school)	
In school	1.77**
Employment (reference group: worked in past 12 months)	
Employment: Didn't work in past 12 months	1.81**
Employment: Not in labor force	1.19
Occupation (reference group: not in C/E/S occupations)	
Occupation: Computer, Engineering, or Science	1.46**
Number of observations	53,445

** : significant at the 0.01 level, * : significant at the 0.05 level