

Economic Opportunity

Estimating the Economic Benefits of Hosting with Turo

SCIMA

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At the beginning of 2021 in Hawaii, Turo hosts listed 1,086 vehicles for sharing. The majority of available vehicles were in Honolulu County (54 percent), followed by Maui County (23 percent), Hawaii County (16 percent), and Kauai County (7 percent). The vehicles make up 0.1 percent of total privately owned vehicles in Hawaii. This study follows the 42,705¹ car sharing transactions that occurred from June to August in 2019; from September to November in 2020; and from February to April in 2021 to describe the economic benefits of hosting with Turo. Specifically, this study investigates the following:

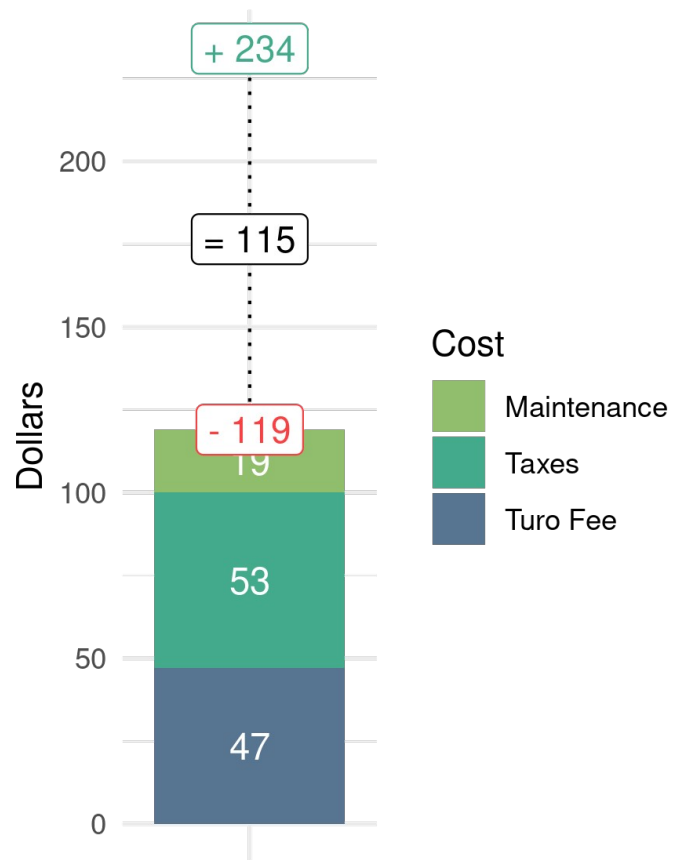
- The degree to which income generated for hosts exceeds the variable costs of putting additional mileage on a personal vehicle.
- The extent to which peer-to-peer car sharing helps individuals afford a vehicle.
- The effect of cash flow benefits on household income and mobility. In particular, the impact of benefits on low-income and economically disadvantaged communities in Hawaii.

The degree to which income generated for hosts exceeds the variables costs of putting additional mileage on a personal vehicle.

Within the sample time period,² the median number of days a vehicle was shared per transaction was *four*; while the median daily rate was \$59³ per day. This equates to median gross revenue of \$234 per transaction. The variable costs associated with each rental transaction are the Turo protection plan fee, federal and state taxes, and vehicle maintenance.⁴ Together these costs typically total \$119 per transaction. After taking into account the variables costs, **Turo hosts typically earn a profit of \$115 per transaction⁵** (see Figure 1).

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- 1 For this study, 357 observations were removed because the number of days shared exceeded the number of days in the month. While this does not represent an error in the original dataset; the data are excluded to facilitate the analysis of monthly revenue and expenses. The original dataset contained 43,062 observations.
 - 2 The data used for this study is a sample that includes observations over three-month time periods for years 2019, 2020, and 2021. While data analyzed for 2019 represent a comparatively “normal” year; data for 2020 and 2021 do not, as these data were collected during the Covid-19 pandemic. Rental activity in 2020 and 2021 was mostly lower than normal. Rental rates in 2020 were lower than normal and rental rates in 2021 were higher than normal. Inclusion of the 2020 and 2021 data do affect the magnitude of the results slightly, but not the direction. The conclusions made in this report are consistent using either set of data (i.e., with or without 2020 and 2021 data), in general. The biggest difference is in the third section of this report on cash flow benefits, where the exclusion of the 2020 and 2021 data would result in a 67 percent increase in additional annual income in the Honolulu scenario.
 - 3 Although data were collected during the 2019, 2020, and 2021 time periods, all dollars amounts (i.e., revenue and expenses) were adjusted to November 2021 dollars for comparability in the analysis.
 - 4 The dataset used for this analysis did not include miles driven, which is used to calculate maintenance costs. An assumption was made that daily miles driven is proportional to the size of the island on which the rental transaction was made.

Figure 1: Comparison of Revenue to Variable Costs



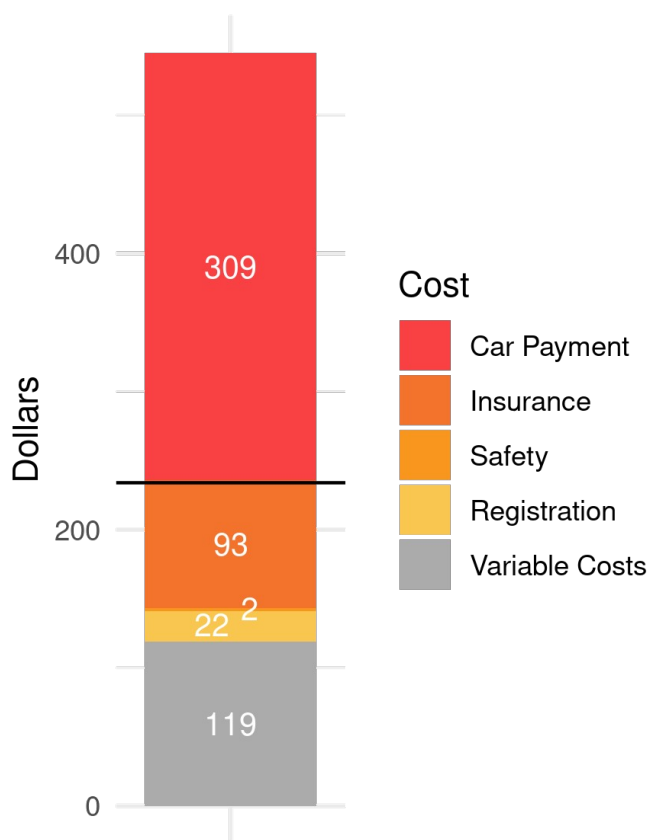
- 5 The median statistic is used because of extreme values for “days shared” and “average daily rate,” which skews the distribution of these data. Using the mean, a typical transaction would result in \$141 in net income (i.e., after subtracting variable costs).

The extent to which peer-to-peer car sharing helps individuals afford a vehicle.

The cost categories that are associated with car ownership are: vehicle registration, insurance, safety inspection, and monthly car payments.⁶ These are fixed costs that are incurred regardless of any activity through Turo.⁷ Among Turo hosts in the data, these costs typically amount to \$426 per month. Considering a typical transaction of four days, where net income is \$115, **one transaction per month covers all of the vehicle registration and insurance costs**—\$115 on a monthly basis (Figure 2).

Figure 2: Comparison of Revenue to Variable and Fixed Costs

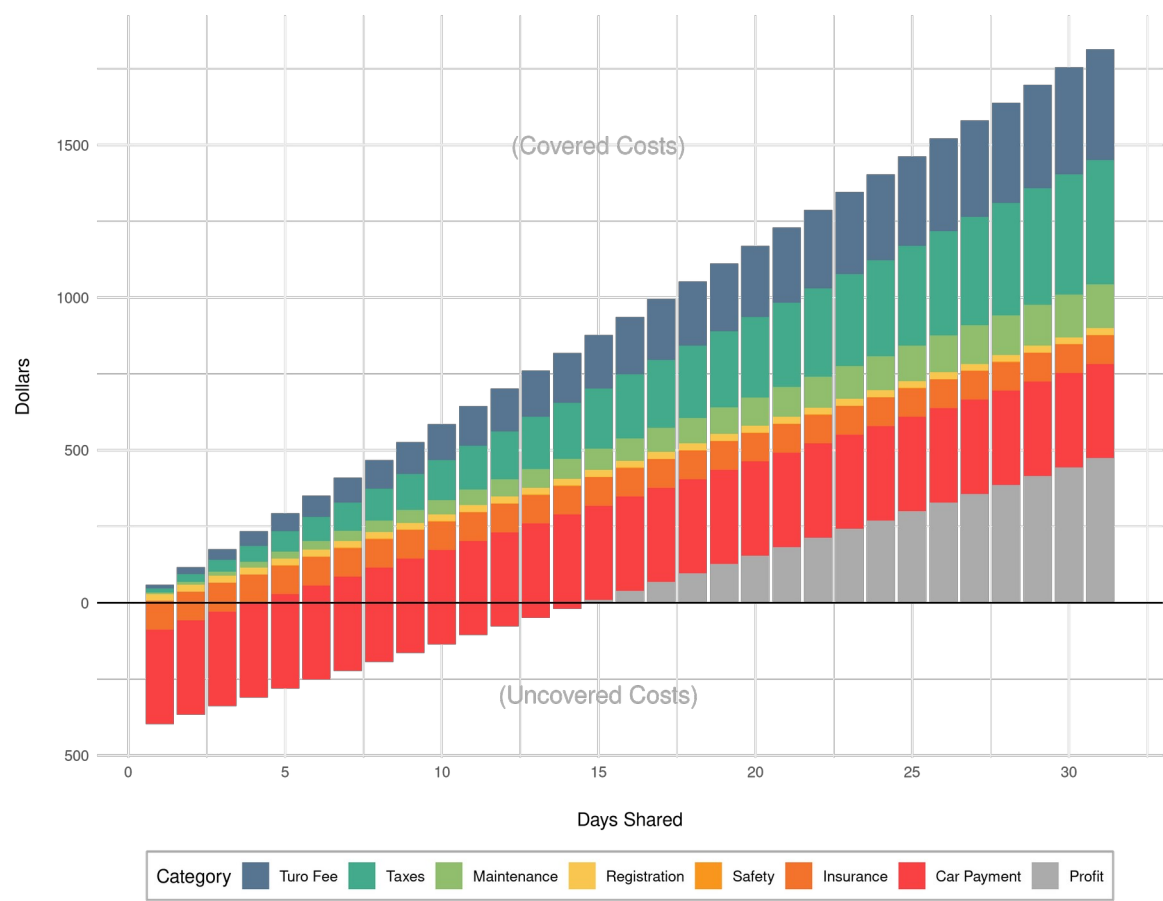
More car sharing activity results in greater net income. While four days of sharing (one typical transaction) covers all vehicle registration and insurance costs for the month; one week of sharing covers those costs and contributes about \$86 toward a car payment. **At about two weeks of vehicle sharing (15 days), the entire cost of the vehicle is covered,** including the monthly car payment (see Figure 3).



⁶ While it is assumed that many Turo hosts own their rental vehicle; this analysis determines the extent to which hosting income helps the host afford their vehicle, regardless of ownership status. Thus, a monthly car payment is taken into account for all hosts.

⁷ While traditional car rental companies may include some of these costs as part of their rental fees; these fixed costs are personal costs for Turo hosts. The costs are included in the analysis for the purpose of understanding how revenue earned through Turo vehicle sharing helps with hosts' personal costs of a vehicle.

Figure 3: Cost Coverage and Profit by Days Shared



Among Turo hosts without a car payment, all fixed costs (i.e., registration, safety, and insurance) are covered at five days of sharing and \$28 dollars in profit is made. At two weeks of sharing (14 days), hosts who own their vehicles typically earn \$289 in profit.

Reading Figure 3:

The chart shows the costs (variable and fixed) that are covered by gross revenue earned through vehicle sharing. Areas above the horizontal axis (zero line) are covered by gross revenue; while areas below the horizontal axis are not covered. Thus, the horizontal axis represents the cutoff point for vehicle cost coverage. The height of the bars, from the horizontal axis to the top of the stacked bars, represents gross revenue for each number of days shared. The gray area marked “Profit” shows net income after all variable and fixed costs are paid, assuming a car payment. For hosts without a car payment, one may view “Profit” as the height of the bar from the horizontal axis to the top of the red section of the stacked bars.

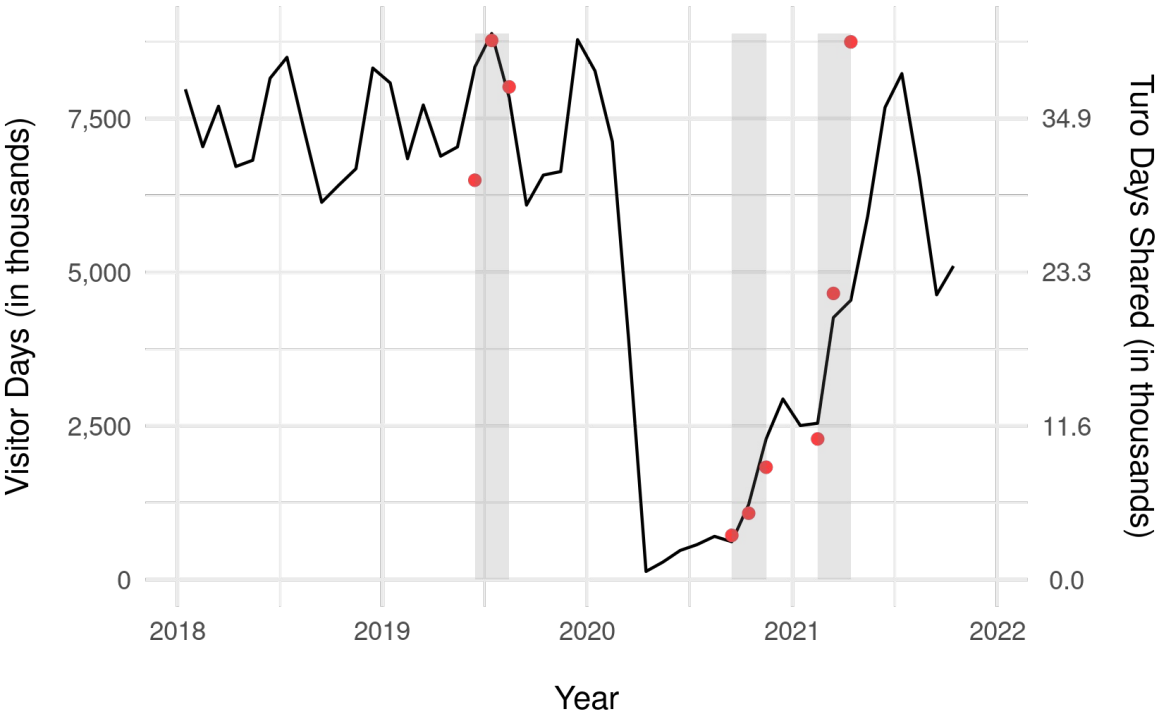
The effect of cash flow benefits on household income and mobility. In particular, the impact of benefits on low-income and economically disadvantaged communities in Hawaii.

In Hawaii, the car rental market is largely driven by tourism. For Turo hosts, in particular, there are three major factors that affect vehicle sharing: 1) the number of visitors, 2) proximity to visitors, and 3) the availability of a vehicle. These three factors help describe the population that is most likely to benefit economically from hosting through Turo.

Number of Visitors

Car sharing activity is correlated with tourist activity in the state. Figure 4 below shows the number of visitor days for each month from 2018 to the end of 2021 (black line). The total number of Turo host sharing days is superimposed on top of this chart (red dots) to show the relationship between the two measures. Near the end of 2020—after the start of the pandemic—tourist activity dropped precipitously along with Turo rental activity. At the beginning of 2021, both tourist and Turo rental activity began to recover at similar rates. It should be noted that additional examination is needed to determine any increase in Turo activity related to lifting of inter-island pandemic related restrictions and other additional travel trends of Hawaii residents before, during, and after the time periods of this study.

Figure 4: Comparison of Total Visitor Days (line) and Total Turo Rental Vehicle Days Shared (red dots)

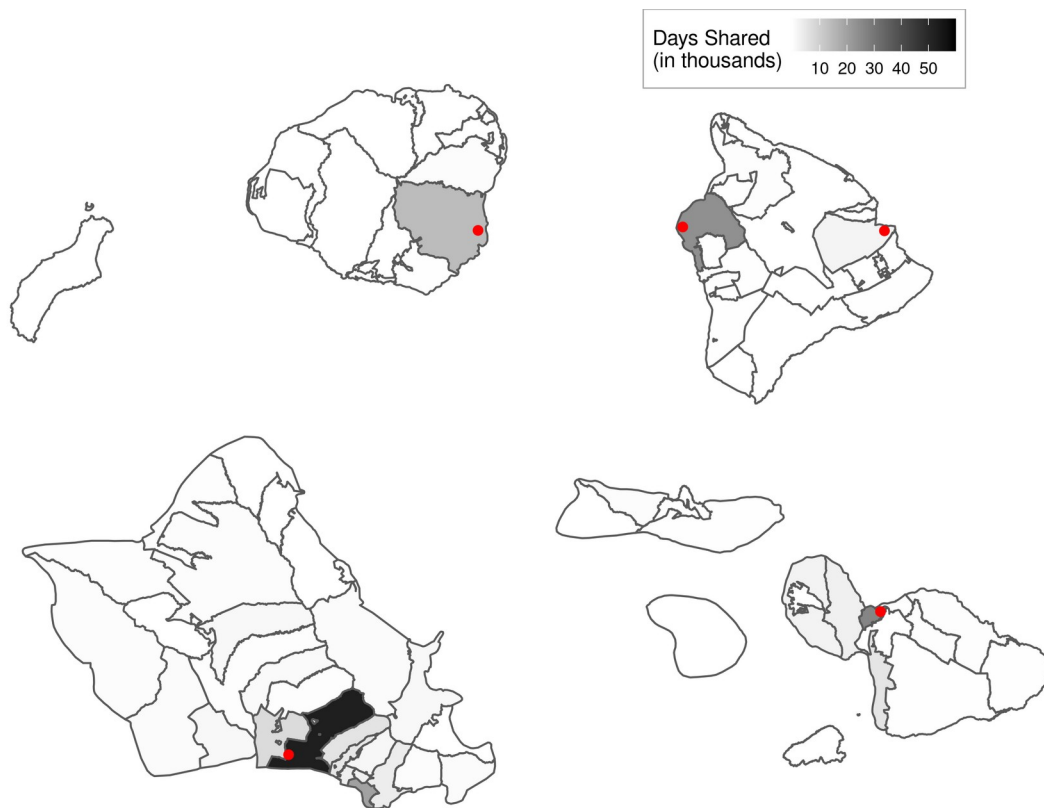


Proximity to Visitors

As tourism is a main driver of Turo rental activity, geographic areas near airports or major tourist destinations have more rental activity. The zip code encompassing Honolulu International Airport has the most activity—representing more than a quarter (27 percent) of total days shared in the study.

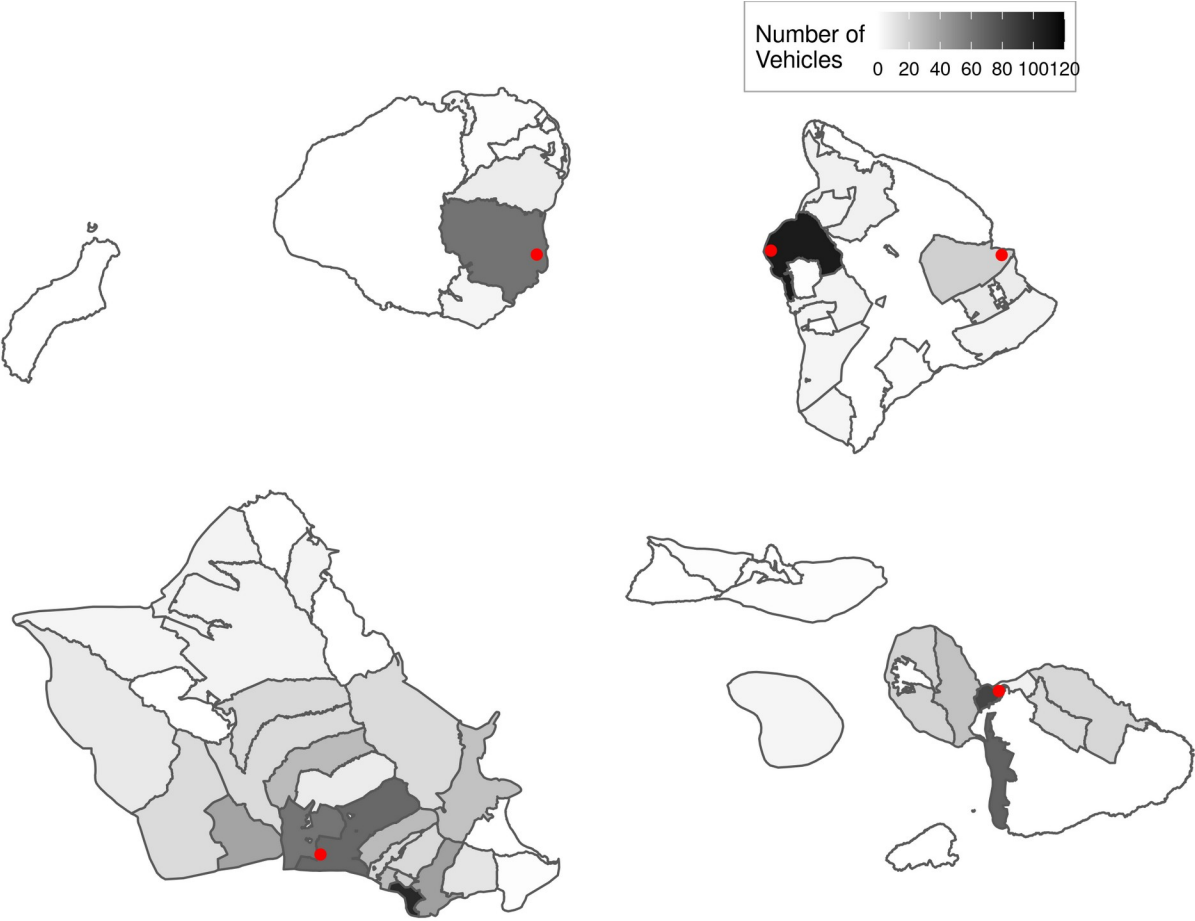
Other zip codes, including those encompassing Kahului Airport, Kona International Airport, Waikiki, and Lihue Airport have the next highest proportions of total days shared (13 percent, 12, percent, 10 percent, and 7 percent, respectively). Combined, these five areas make up more than two-thirds (69 percent) of total days shared (see Figure 5).

Figure 5: Total Turo Vehicle Rental Days (Days Shared) by Zip Code



Turo hosts also tend to live closer to areas with greater peer-to-peer car sharing activity. Figure 6 shows the zip codes where host vehicles are located. Turo host vehicle location is in close proximity to areas with high proportions of transaction activity (compare to Figure 6 to Figure 5).

Figure 6: Number of Turo Rental Vehicles Available by Zip Code



Availability of a Vehicle

Based on the results above, eight geographies⁸ are designated as high transaction areas (i.e., areas in close proximity to visitors). In Hawaii county, the North Kona area is the highest transaction activity area. The area contains 15,821 households, more than half of which (55 percent) have at least one extra car available for sharing (i.e., households having more vehicles than “more-than-half-time” workers). Maui county has four areas identified as high transaction activity areas: Kahului, Wailuku, Kihei, and Kula. Together, these four areas contain 29,948 households, about half of which (52 percent) have at least one extra car available for sharing. Honolulu is the highest transaction activity area in Honolulu county—containing both the Honolulu International Airport and Waikiki. The area of Honolulu consists of 146,529 households, about one-third (36 percent) of which have at least one car available for sharing. Lihue and the surrounding area Puhi-Hanamaulu have the highest transaction activity in Kauai county. The two areas consist of 4,889 households, more than half of which (56 percent) have at least one vehicle available to share (see Table 1).

Table 1: Select Characteristics of High Rental Activity Areas

Geography	County	Number of Households	Percentage with at least 1 available car	Number of Households with at least 1 available car
North Kona	Hawaii	15,821	55	8,702
Kahului	Maui	7,846	50	3,923
Kihei	Maui	9,248	53	4,901
Kula	Maui	5,172	63	3,258
Wailuku	Maui	7,682	44	3,380
Honolulu	Honolulu	146,529	36	52,750
Lihue	Kauai	2,175	57	1,240
Puhi-Hanamaulu	Kauai	2,714	56	1,520

⁸ The geographies in this analysis are part of the County Subdivision scheme developed by the US Census Bureau.

Cash Flow Benefits

The precise effect of cash flow benefits on an individual household's income and mobility in Hawaii cannot be determined due to Turo not collecting individual or household characteristic data.⁹ However, the available data may be used to estimate total gross revenue generated for specific geographic areas. This information is used to develop a scenario that then distributes the revenue among households. This scenario-based approach offers insight to help us understand the cash flow benefits of hosting with Turo.

The Honolulu area has the most transaction activity among all areas in Hawaii. Over the nine months observed in this study, this area generated nearly \$3 million in gross revenue. The surrounding area consists of 43,852 households that are eligible¹⁰ to host. Among these eligible households, 375 cars were listed for sharing on the Turo website at the beginning of 2021. After distributing the nearly \$3 million dollars of gross revenue among the 375 households' sharing cars,¹¹ each household receives \$866 in additional gross income per month. Using the model described in Figure 3 above, this means that each household receives approximately \$435 in additional net income (after variable costs) each month. This equates to \$5,220 on an annual basis.

Hawaii's high cost of living means that traditional measures of poverty and low income often underestimate financial need in the state. Other measures have been developed that attempt to better estimate financial need by taking into account all expenses necessary to live "comfortably." This study uses a unique definition of meeting this standard called *livable income*.¹² In 2019, approximately 60 percent of households had a livable income in Hawaii. Different communities in Hawaii have higher and lower proportions of households with a livable income; however, most communities are quite diverse and represent households across the entire spectrum of financial need. For the target area in this analysis (i.e., Honolulu in Table 2 below), 58.0 percent of households have a livable income. Among households with at least one vehicle available for sharing in the area, 56.0 percent have a livable income—a slightly smaller percentage than the area in general.

9 Turo does not collect data on individual or household characteristics such as earnings from regular employment, education, household size, etc.

10 Eligible households include those that live in close proximity to the high transaction activity area and have at least one vehicle available for sharing.

11 Distributing gross revenue among 375 households assumes that each household shares one vehicle each.

12 The Livable Income calculation method was developed by the researcher/author of this report. Previous work on this topic indicates that while poverty is defined as 100 percent of the poverty guideline for Hawaii and low income is defined as 185 percent of the poverty guideline for Hawaii, livable income may be defined as 300 percent of the poverty guideline. The "gap" group here is a term to describe those households that do not meet the requirements to receive financial assistance and do not earn enough to make a livable income.

A sample¹³ of households was taken to represent households that host with Turo. The distribution of income among this sample is similar to the population from which the sample was taken (compare rows two and three of Table 2). After adding the \$5,220 in net income to each household, the distribution of income has a slight upward shift (see row four of Table 2).

Table 2: Effect of Cash Flow Benefits on Household Income and Mobility—Scenario [Honolulu]

Category	Households (n)	Poverty (%)	Low Income (%)	Gap (%)	Livable Income (%)
Honolulu ¹⁴	138,680	11.9	12.5	17.6	58.0
w/Vehicle Available	43,852	13.4	12.9	17.6	56.0
Listed on Turo (Baseline)	375	13.4	13.0	17.6	56.1
Listed on Turo (Scenario)	375	10.3	12.0	17.9	59.8

Among the 375 households in the sample and after adding the cash benefits from Turo hosting, 59.8 percent of households have a livable income—a 3.7 percentage point increase compared with those same households before the cash benefits from Turo. In this same scenario, poverty decreased 3.1 percentage points from 13.4 percent (before cash benefits) to 10.3 percent (after cash benefits). In addition, the percentage of low income households decreased by one point and the percentage of households in the gap group increase by three-tenths of a point.

In a real-world setting, an additional \$5,000 annually does not just mean moving from one category to another; additional income can be the difference in buying enough food for the family, paying bills or loans, or being able to invest in the future.

13 The sampling method gives an equal probability of selection to all households regardless of income or other household characteristics. The population from which the sample was taken includes those eligible households described above.

14 This consists of only the areas surrounding the target area—from Pearl City to Waikiki.

Table 3: Percentage Point Difference in Income Categories Before and After Turo Cash Benefits, Among Households with a Vehicle Listed on Turo—Scenario

Geography	Households (n)	Poverty	Low Income	Gap	Livable Income
Honolulu	375	-3.1	-1.0	0.3	3.7
Kahului	181	-5.2	-0.8	0.7	5.2
Kona	108	-10.8	-0.4	3.4	7.7
Lihue	62	-6.4	-2.5	2.8	6.0

Households on Maui, Hawaii, and Kauai islands that host with Turo may realize even greater economic benefit than households on Oahu. Running the same scenario as described above these areas see greater upward shifts in the distribution of income, compared with households in Honolulu. For example, in Kona (Hawaii island) additional income earned through hosting with Turo increased the percentage of households with a livable income by 7.7 percentage points and decreased the percentage of households in poverty by 10.8 percentage points (Table 3). While these areas have lower levels of transaction activity, they often have higher daily booking rates due to their distance from the major population center of Honolulu. For those hosting with Turo in these areas, a greater proportion of total gross revenue is shared among participating households—resulting in greater household income and economic mobility.

Cost Models Methodology

The variable cost and fixed cost models were developed using Turo data on host vehicles, days shared, average daily rate, zip code, and trip year and month. Additional data from publicly available data sources were used to complete the cost models. This section describes the methods used for the cost models.

Net Income

Revenue

Turo host *revenue* is determined by the daily rate and number of days a vehicle is shared. “Extras” such as drop off fee, miles, and equipment are not considered.

The Turo “80 plan” is assumed to be the typical plan used among Turo hosts and is used for the model.

Taxes

Area Median Income is used to estimate *household income* among Turo hosts and to determine the tax bracket applicable for filing taxes.

Head of household and single filing statuses for federal and state taxes, respectively, along with Area Median Income are used to determine the marginal *tax bracket* for calculating income taxes applicable to Turo income.

Maintenance

It is assumed that *maintenance costs* incurred due to additional miles driven by users occur at the same rate as regular (i.e., host) miles driven. The costs do not change over time as 1) total odometer miles are unknown and 2) data are not longitudinal and cover a relatively short time period.

Daily miles driven by users is proportional to island size. For the purpose of this study, daily miles driven is the one-way distance across the island where the vehicle was used.

Costs¹⁵

Turo host costs are: 1) Turo fees, 2) federal and state taxes, 3) maintenance, 4) car registration, 5) safety inspection, 6) car insurance, and 7) car payment. Turo fees, federal and state taxes,

¹⁵ This study considers only monetary costs and benefits. Non-monetary costs and/or benefits are beyond the scope of this study, but are important considerations for any decision-making process.

and maintenance are variable costs incurred as a result of a rental transaction. Car registration, safety inspection, car insurance, and car payment are fixed cost that are a result of car ownership regardless of any peer-to-peer car sharing activity.

Other incidental costs such as possible damage to a vehicle, cleaning, host time, and depreciation are not included in this analysis.

Registration

Car registration costs are determined by multiplying the weight of the vehicle by the state and county tax rate for the relevant state and county weight tax.

Safety

Annual *safety inspection* cost is \$25.

Insurance

Insurance costs are the average cost of coverage in Hawaii for a premium plan and is a constant fee of \$1,081 per year for all vehicles. During a transaction, the host's personal insurance would not be affected. Coverage is provided by the liability insurance policy purchased by Turo.

Car Payment

The *vehicle market value* represents what a host might pay for their vehicle in a scenario where the host just recently purchased their vehicle.

The *loan term* for a recently purchased car varies by the year of the vehicle—the loan term for a newer car is longer than that of an older car.

The *annual percentage rate* (APR) of a car loan varies by the year of the vehicle—older vehicles have a higher APR than newer vehicles.

Down payments and GE tax are not included in the calculation of the purchase of a vehicle.

Other

For this study an assumption is made that *sample months and years* are representative of transactions that occur among hosts and users in general.

Formulas and Components

Net Income

$$Net\ Income = Revenue - Taxes - Maintenance$$

Revenue

$$Gross\ Revenue = Daily\ Rate_{average} \cdot Days\ Shared$$

$$Revenue = Gross\ Revenue \cdot Protection\ Plan_{Turo} ; \text{Protection Plan} = 0.8$$

Taxes

$$Taxes = Revenue \cdot Marginal\ Tax\ Rate$$

Note: The marginal tax rate is based off of Area Median Income minus the standard deduction for head of household (federal) and single filer (state).

Maintenance

$$Maintenance = Days\ Shared \cdot Daily\ Miles \cdot 0.0955$$

Note: Daily miles is an estimation of the average miles driven in a single day for a car rental.

Fixed Costs

$$Registration = \frac{Weight_{car} \cdot Tax\ Rate_{state} + Weight_{car} \cdot Tax\ Rate_{country}}{12}$$

$$Safety = \frac{25}{12}$$

$$Insurance = \frac{1081}{12}$$

$$Car\ Payment_{month} = P \frac{i(1+i)^n}{(1+i)^n - 1}$$

where, P=Market Value of Car; i=periodic interest rate; n=number of payments

Cash Flow Benefits Methodology

The cash benefits scenario was developed using Turo and publicly available data. While the data were collected directly from hosts and sampled from the population, the use of these data in combination are only appropriate as scenarios. This section describes the method used to develop the cash flow benefits scenarios.

Geographies

There are two Census geographic schemes used in the description of cash flow benefits. These are the county subdivision scheme (CCD) and the public-use microdata area scheme (PUMA). The CCD scheme is used to describe the characteristics of communities in more detail, as this scheme contains greater geographic resolution. The PUMA scheme is used to describe the characteristics of households. This scheme is part of the microdata file that contains individual level records for people and households (see Households below).

Households

Household characteristics were obtained from the 2015-2019 American Community Survey, Public-Use Microdata Sample (PUMS) file. Four variables are used from this file: 1) number of individuals in the household, 2) household income, 3) number of vehicles, and 4) number of usual hours worked in the past year. These variables were used to determine income categories (see Income Categories below) and availability of a vehicle.

The analysis only considers a subset of all households as *eligible* to host with Turo. The criteria for eligibility are: 1) close proximity to the high rental activity area and 2) have at least one vehicle available for sharing. Proximity is determined by a geospatial analysis of rental activity and vehicle location from the Turo datasets. Vehicle availability is defined as a household having more vehicles than more-than-half-time workers in the household (note: more-than-half-time is defined as working 20 or more hours per week).

Income Categories

The four income categories used in this analysis (i.e., poverty, low income, gap, and livable income) are used for various purposes in the state of Hawaii. Poverty and low income are often used for financial assistance programs and livable income is used to more accurately describe the extent of financial need in the state. Household income categorization is determined by the number of people in the household and household income. The thresholds

for each category are based off of official definitions and previous studies on financial need in Hawaii.

Scenarios

The scenarios described in the Cash Flow Benefits section are based off of PUMS data and include only those PUMA that are relevant to each geography. Starting with a subset of eligible households (as defined above), a random selection of size n —where n equals the number of vehicles listed on Turo in the area— is made to represent a hypothetical group of households that host with Turo. All eligible households in the subset have an equal probability of selection. Total gross revenue is calculated from the Turo dataset for each geography. The total gross revenue is then distributed among the selected households. The distribution of income before Turo cash benefits and after Turo cash benefits is then compared. The results shown in this report are the average of 1,000 iterations of this scenario.

Data Sources

Net Income

Revenue

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