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Wellbeing and Housing Report Supplement

by

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This draft is written to be read in concert with "Drivers of well-being in Hawaii: Quantifying individual and community impacts" (Love and Garboden 2019). Please reference that document for findings related to individual level factors, and a description of our well-being measures.

1 Introduction

Housing is theoretically linked to well-being at both the individual and the community level.

When housing is too expensive, families experience economic stress and are forced to sacrifice other expenditures that promote economic mobility and child enrichment (Becker, 1991; Newman and Holupka, 2014, 2015). As housing burdens mount, residential stability is jeopardized. This results in frequent involuntary moves with a host of long term deleterious consequences (Desmond, Gershenson, and Kiviat, 2015; Garboden, Leventhal, and Newman, 2017; Schwartz, Stiefel, and Cordes, 2017; Ziol-Guest and McKenna, 2014). In some cases, families who cannot afford housing are pushed into homelessness (Mulroy and Lane, 1992; Rohe, 2017). For working families, high housing costs can keep otherwise credit-worthy households out of homeownership, jeopardizing their ability to build wealth (McCabe, 2016; Shapiro et al., 2004).

At the community level, individuals who are otherwise protected from the immediate stresses of rising housing costs can be impacted indirectly through increased levels of stress, the disruptions of social and political networks, and what researchers have termed "cultural displacement" – the exodus of amenities catering to a particular lifestyle (Brown-Saracino, 2010; Hyra, 2017; Pattillo, 2010).

Rising housing costs are not, however, wholly negative. For the vast majority of Americans, home equity represents the sole mechanism of wealth creation (Turner and Luea, 2009). When housing values rise, households are able to leverage their home equity (either via sale or refinance) for economic upward mobility and retirement security. At the neighborhood level, falling housing values are associated with other forms of community disinvestment and have traditionally resulted in an exodus of retail and cultural amenities as well as increased levels of housing speculation (Mallach, 2006; Wilson, 2012). For families whose well-being does not require local support networks, increasing property values are a harbinger of improved quality of life, lower crime rates, and improved civic infrastructure. Each of these may improve well-being.

The goal of this report is to summarize how neighborhood housing price appreciation can impact quality of life beyond individual level impacts (see Love and Garboden 2019). We first discuss how housing market indicators, particularly appreciation, can be measured and summarize different patterns across Hawaii. In answer to our our main question, we find few statistically significant associations between these measures and well-being. Data limitations, however, restrict our ability to assert a null effect. We conclude with next steps for research.

2 Housing Market Indicators

Our first step was to develop plausibly unbiased housing measures, specifically price appreciation and sales volume curves for each area in the state (see Love Garboden (2019) for detailed description of hybrid area construction).

To do this, we used the ZTRAX database provided by Zillow that includes all sales in the state of Hawaii since 1995. For the descriptive analysis we use data from 2000 due to data quality limitations. For the analytic portion, we use 2008-2017 to align with the Gallup data. Our data includes both condominium and single family home sales but is restricted to sales between $50,000 and $200,000,000 to eliminate irregularly high or low sales prices.

As with all administrative data, extensive cleaning was conducted to ensure accurate information, remove outliers, and resolve duplicates. To account for inflation, all prices were adjusted to 2017 dollars using the Consumer Price Index's "All items less shelter" series for the Hawaii metropolitan area.

Once the data was properly cleaned, we used it to develop neighborhood level price appreciation curves (changes in sales price per standardized unit of housing). As described in detail in Appendix A below, we used a repeat sales approach. This process identified properties that sold more than once and looked at the change in price between those two sales. The process then used these differences to calculate an appreciation rate for a particular area for a particular time period.

As shown in Figure 1, the curve for the state of Hawaii since 2000 shows fairly steady increases in sales price over the last few decades with a brief decline during the great recession.

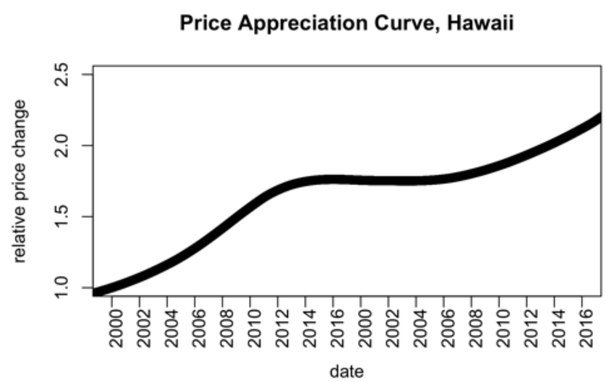

Figure 1: Housing Price Appreciation in Hawaii

Similar curves for each hybrid area are available in Appendix C: Figure 7.

Using these curves, we created two variables for each community: the average sales price and the rate of appreciation. In theory, we believe these variables will operate differently. The average sales price will more or less proxy the wealth of the neighborhood, impacting well-being in the expected way. Price appreciation, however, will represent neighborhood change with plausibly positive or negative impacts for residents.

We also created two other housing market measures. The first, total number of sales (both raw and relative to the number of properties) is designed to represent market turnover in a particular community. While usually associated with rising prices, turnover may have an independent impact on wellbeing as it represents demographic change.

Sales curves for each community can be found in Appendix C: Figure 9

Finally, we used data from the American Community Survey to examine changes in the ratio of homeowners to renters in a particular tract. We included this analysis for two reasons. First, large shifts in “tenure” represent a more precise proxy for demographic change; homeowners are almost invariably more wealthy and older than renters. Second, as noted in the introduction, we expect homeowners and renters to respond to value appreciation in different ways.

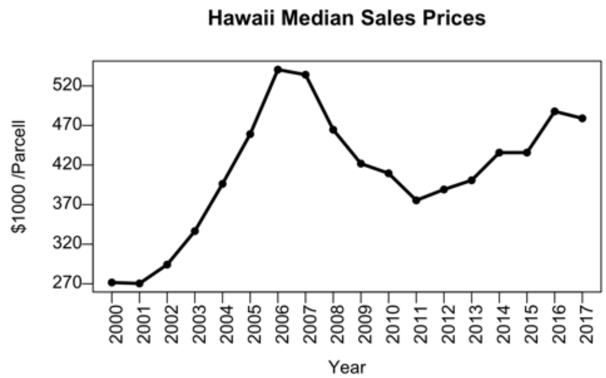

Figure 2: Median Sales Price, State of Hawaii

3 Housing Price and Appreciation Patterns Across the State

Table 1: Hawaii Home Sales - Median Price and Total Volume

Year	Total Sales Volume	Median Sales Price
2000	25,768	271,581
2001	25,177	270,394
2002	29,303	294,211
2003	35,844	336,531
2004	37,757	396,209
2005	41,265	459,074
2006	29,632	540,514
2007	24,316	534,067
2008	19,081	464,590
2009	16,196	421,799
2010	19,937	409,520
2011	17,504	375,394
2012	16,034	389,091
2013	16,608	400,737
2014	19,998	435,670
2015	18,334	435,752
2016	18,765	487,774
2017	17,413	479,000

As shown in Figure 1 above, the story of housing in Hawaii, at least over the

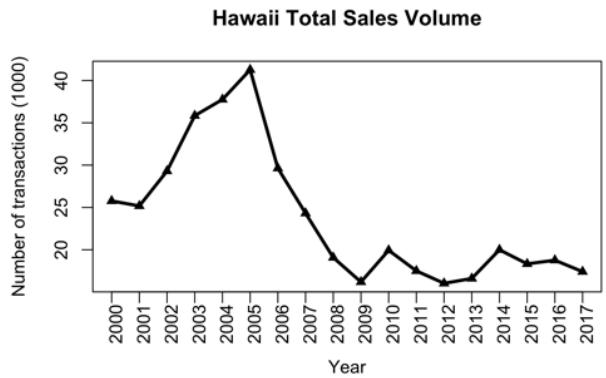

Figure 3: Annual Sales Volume, State of Hawaii

last two decades, has been one of rising prices. This pattern was interrupted briefly during the recessionary period of the late 2000s. In Figure 3 and Table 1, we see the dramatic spike in home sales prior to that period. Interestingly, as indicated by Figures 1 and 2 and Table 1, prices have increased steadily since the downturn (nearly approaching the previous peak), but without a corresponding increase in the volume of sales.

It is important to differentiate our appreciation curve from standard reports of Median Sales Prices, as reproduced in Figure 2 (note that all values are inflation adjusted, a step generally overlooked in median accounts of sales prices). As described in detail in Appendix A, the set of properties that sells is not random and changes overtime. By looking only at repeat sales, we are able to examine how the value of particular properties change, which includes value added by renovation. Because both median sale and repeat sale measures have meaning, we have included information from both in our models below.

There is substantial variation in the rate of price appreciation across the state. As shown in Figure 1, the average appreciation since 2008 (the time in which we have Gallup data) was approximately 20 percent (approximately 2 percent per year above inflation). Of course this is just the average appreciation over the time period; in 2008, prices were still falling and did not begin rising again until around 2012. They have risen more rapidly since.

However, this rate was not consistent across areas. Some show little or no appreciation, while others rose much faster than the state as a whole. This variability is summarized in Figure 4 and presented individually in Appendix C: Figure 7 and Table 8. During the 2008-2017 window only Waikiki showed appreciation over 100% (2.03). Ala Moana, Makiki, the North Shore, and Nu-

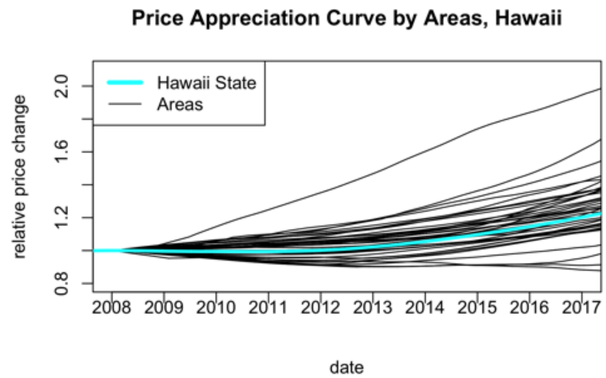

Figure 4: Housing Price Appreciation in Hawaii by Hybrid Area

uanu also showed sharp price increases. Although no areas have declined in value since 2000, several have since 2008, specifically Kau, Molokai, and Pahoa. Detailed maps are provided in Appendix C.

This pattern clarifies at the county level, illustrated in Figure 5 and Table 2. Appreciation rates are substantially higher on Oahu, with Hawaii and Maui both showing much more gradual appreciation. Kauai largely reflects the statewide average although the rate of appreciation has slowed down in recent years.

Table 2: Hawaii Home Sales - Median Sales Price (MSP) and Appreciation Rate (AR) by County, Inflation Adjusted 2017$

County Name	MSP 2000	MSP 2008	MSP 2017	AR 00-17	AR 08-17
HAWAII	202585	323448	300000	2.20	1.13
HONOLULU	286261	470412	531900	2.18	1.33
KAUAI	264241	558684	468500	2.36	1.22
MAUI	300941	582207	535000	2.05	1.15

In terms of changes in homeownership, the situation has been much more static. As shown in Appendix C: Table 9 and in Figure 6, the majority of areas showed no meaningful change in the ratio of homeowners to renters in particular areas over the last 20 years. Ala Moana and Waikiki rose (from 35 to 40, and 39 to 43 percent respectively), likely due to condo construction and conversions. Oahu's North Shore and Upcountry/Hana on Maui also gained. Of the few that fell in percent homeowner, Mililani and Kapolei stand out, both of which have seen their high homeowneship rates shrink slightly over the last decade. Despite these handful of neighborhoods, which gained or lost modest ground,

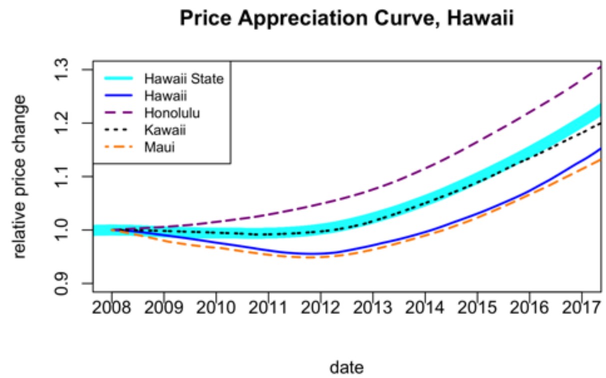

Figure 5: Housing Price Appreciation in Hawaii by County

the story in the state is one of stability rather than change. Homeownership neighborhoods remain as such, and vice versa.

4 Association of Housing Price Appreciation, Sales Volume, and Tenure on Well-Being

The next step is to see whether the variation in housing price appreciation, sales volume, or tenure changes are independently associated with well-being net of individual characteristics. As described above, we use six variables: 1) the average sales price in the area; 2) the appreciation rate over our data period; 3) the change in homeowner households; 4) the percent change in homeowner households; 5) the number of home sales; and 6) the ratio of home sales to total housing units.

These are modeled in two separate ways (described in detail in Appendix B). The key to both models is that they represent the impact of housing at the community level net of individual factors. People may be unhappy because they are unemployed, for example, and those people may live in neighborhoods with appreciating or depreciating housing values. But unless the change in housing values is associated with well-being above and beyond the tendency of unemployed people to be living in those areas, we would not expect a statistically significant effect.

Our findings are presenting in Tables 3 to 6. We ran multiple models to ensure that no particular set of assumptions fundamentally changes the results. The first four columns of each table do not adjust for individual income, the second four do. An asterisk next to a number implies that it is statistically significant.

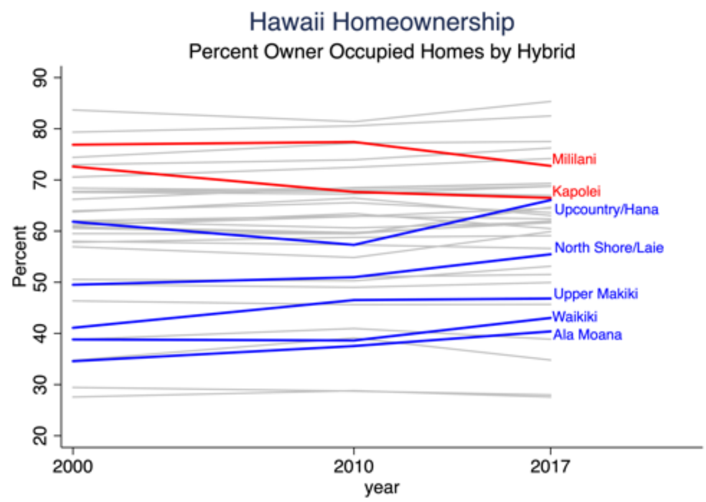

Figure 6: Change in Percent of Homeowners in Hawaii Neighborhoods

The line labeled "Constant" can be profitably ignored.

The average sales price for an area is significantly associated with well-being but only if we do not control for the survey respondent's income. In other words, areas with high housing prices contain happier people, but only because those people are more wealthy.

The appreciation rate is not significantly associated with well being, but the point estimates are consistently negative. Given the very small sample, this suggests that there may be a negative association between increasing housing prices and well-being, but our data is not able to detect it.

Homeownership does not appear to be significantly associated with well-being beyond its correlation with individual characteristics.

For the volume of home sales, our two primary models tell different stories. In one case, the relative volume of sales is positively associated with well-being, but this is not the case in the other model. In neither case, however, is the association statistically significant.

5 Conclusions and Next Steps

The analyses described above identified a high level of variation in price appreciation across this state. While nearly every part of the islands is experiencing rising housing costs, the rate of that increase varies substantially and in policy

Table 3: Area-Level Regressions, Residual Approach

	(1) WBIni	(2) WBIni	(3) WBIni	(4) WBIni	(5) WBIi	(6) WBIi	(7) WBIi	(8) WBIi
Sales Price	0.113*	0.148**	0.127**	0.125*	0.0394	0.0766	0.0527	0.0511
	(0.0643)	(0.0692)	(0.0642)	(0.0644)	(0.0625)	(0.0680)	(0.0626)	(0.0627)
Appreciation Rate	-1.107	-1.779	-1.290	-1.455	-1.190	-1.833	-1.380	-1.486
	(1.321)	(1.196)	(1.477)	(1.399)	(1.299)	(1.174)	(1.432)	(1.353)
Changes, Ownership	-0.163	-0.0843			-0.158	-0.0869		
	(0.118)	(0.0824)			(0.112)	(0.0811)		
Percent Ownership			0.0264	0.0277			0.0269	0.0281
			(0.0294)	(0.0278)			(0.0275)	(0.0255)
Homes Sales		0.0544		0.0471		0.0311		0.0245
		(0.108)		(0.113)		(0.106)		(0.111)
Percent Homes Sales	0.0458		0.0419		0.0490		0.0423	
	(0.240)		(0.235)		(0.245)		(0.244)	
Constant	-1.448*	-1.922**	-1.628*	-1.614*	-0.460	-0.956	-0.639	-0.618
	(0.845)	(0.917)	(0.851)	(0.853)	(0.821)	(0.896)	(0.829)	(0.827)
Observations	208	240	208	208	208	240	208	208
R^2	0.033	0.030	0.022	0.023	0.023	0.016	0.013	0.013

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Area-Level Regressions, Residual Approach

	(1) WBIni	(2) WBIni	(3) WBIni	(4) WBIni	(5) WBIi	(6) WBIi	(7) WBIi	(8) WBIi
Sales Price	0.148***				0.0834			
	(0.0557)				(0.0546)			
Appreciation Rate		0.270				-0.0518		
		(0.883)				(0.858)		
Changes, Ownership			-0.164				-0.156	
			(0.125)				(0.116)	
Percent Ownership			0.0190				0.0220	
			(0.0268)				(0.0249)	
Homes Sales				0.103				0.0705
				(0.116)				(0.112)
Percent Homes Sales				-0.0720				-0.0344
				(0.223)				(0.224)
Constant	-1.968***	-0.00489	0.0388	-0.0132	-1.107	0.00576	0.0416	-0.00458
	(0.743)	(0.0336)	(0.0312)	(0.0620)	(0.729)	(0.0328)	(0.0307)	(0.0614)
Observations	343	343	208	243	343	343	208	243
R^2	0.025	0.000	0.023	0.004	0.008	0.000	0.024	0.002

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Area-Level Regressions, Fixed Effects Approach

	(1) WBIni	(2) WBIni	(3) WBIni	(4) WBIni	(5) WBIi	(6) WBIi	(7) WBIi	(8) WBIi
Sales Price	0.151**	0.165**	0.158**	0.148**	0.0616	0.0734	0.0666	0.0534
	(0.0657)	(0.0678)	(0.0668)	(0.0666)	(0.0597)	(0.0630)	(0.0611)	(0.0608)
Appreciation Rate	0.227	-0.747	0.242	-0.156	0.236	-0.816	0.278	-0.259
	(1.375)	(1.328)	(1.203)	(1.126)	(1.290)	(1.245)		
Changes, Ownership	-0.158	-0.0530			-0.137	-0.0456		
	(0.103)	(0.0741)			(0.0965)	(0.0723)		
Percent Ownership			0.00727	0.0152			0.00357	0.0138
			(0.0234)	(0.0225)			(0.0208)	(0.0196)
Homes Sales		0.0826		0.0461		0.0973		0.0686
		(0.107)		(0.112)		(0.103)		(0.106)
Percent Homes Sales	0.249		0.287*		0.329**		0.369**	
	(0.157)		(0.161)		(0.152)		(0.155)	
Constant	-2.016**	-2.186**	-2.123**	-1.945**	-0.840	-0.972	-0.922	-0.696
	(0.866)	(0.900)	(0.885)	(0.882)	(0.784)	(0.830)	(0.805)	(0.800)
Observations	208	240	208	208	208	240	208	208
R^2	0.055	0.036	0.038	0.029	0.039	0.012	0.024	0.007

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Area-Level Regressions, Fixed Effects Approach

	(1) WBIni	(2) WBIni	(3) WBIni	(4) WBIni	(5) WBIi	(6) WBIi	(7) WBIi	(8) WBIi
Sales Price	0.169***				0.0868*			
	(0.0540)				(0.0507)			
Appreciation Rate		0.448				-0.0363		
		(0.906)				(0.859)		
Changes, Ownership			-0.176				-0.157	
			(0.107)				(0.0964)	
Percent Ownership			0.00728				0.00933	
			(0.0215)				(0.0189)	
Homes Sales				0.126				0.123
				(0.116)				(0.108)
Percent Homes Sales				0.0725				0.176
				(0.159)				(0.150)
Constant	-2.244***	-0.00600	0.0414	-0.0416	-1.150*	0.00868	0.0426	-0.0560
	(0.722)	(0.0323)	(0.0305)	(0.0593)	(0.676)	(0.0304)	(0.0290)	(0.0555)
Observations	343	343	208	243	343	343	208	243
R^2	0.034	0.001	0.023	0.006	0.010	0.000	0.022	0.011

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

meaningful ways.

There does not, however, appear to be a substantial association between neighborhood housing measures and subjective well-being after controlling for individual characteristics. As explained in the main report, this is not particularly surprising given that the area fixed effects only explain a small portion of the variation in individual well-being. It remains somewhat surprising, however, given that mental health and neighborhood satisfaction have been causally linked to neighborhood characteristics in random control trials (Leventhal and Brooks-Gunn, 2003).

There are a number of plausible explanations for our lack of findings. First, is that the mechanism by which housing acts on individuals is exclusively through individual level characteristics. In other words, the primary link is not housing costs within a community but an individual's personal costs relative to their personal income. While we do not have housing expenditures in the Gallup data, it is likely that the combination of income and other factors correlated with housing costs account for these individual effects.

It is also likely that the scale on which housing impacts well-being is far smaller than the geographical areas available to us. In other words, an individual's housing induced anxieties (or optimisms) may operate on their block or micro-neighborhood but not at higher units of aggregation.

Finally, the evidence we have of a link between neighborhoods and well-being comes from cities with levels of economic and racial segregation very different from Hawaii's. While price appreciation may matter in Los Angeles, Chicago, or Baltimore, it may not do so on an island with incredible ethnic heterogeneity.

On the first two points, we are limited by our data. On the third, we have some potential for further analysis. The University of Hawaii is currently in the process of applying for national Zillow data, a request we expect to be completed this summer. We are also in the process of expanding the Gallup analysis nationally. Put together, these two data sources will provide a powerful tool to assess whether or not Hawaii is a special or typical case.

In discussions with Ulupono, we understand that they will be fielding a data collection effort in 2020. We welcome the opportunity to advise this effort and are compiling a set of recommendations based on this analysis.

6 Appendix A: Trend Adjusted Repeat Sale Measure

Traditional housing value trends are based on the median sales price with specific quarters. These trends are generally upwardly biased because the properties that sell are not representative of all properties in an area and, indeed, the latent value of a property is strongly correlated with whether or not that property will appear in the set of sales.

A typical resolution of this issue is to replace the median price with an appreciation figure calculated from repeat sales (the same property selling more than once). This means that if property (i) sold at time points ($t_1, t_2, t_3, ...$), that property's price appreciation is calculated as the natural logarithm of a property (i) sold at time (t_{r+1}) less the natural logarithm of its most recent prior sale at time (t_r): $\ln(P_{i,r+1}) - \ln(P_{i,r}) = \ln(P_{i,r+1}/P_{i,r})$.

While this measure reduces biases associated with unmeasured time-invariant controls, it is complicated by the fact that the different in sales price of property (i) depends not only on the length of time between the sales ($t_{r+1} - t_r$) but also the relative appreciation of real estate values between those time periods between those periods: $f(t_{r+1})/f(t_r)$ where $f(t)$ represents the inflation adjusted median sales price at time t.

Here again the standard approach has some limitations. A crude yet frequently employed solution is to include control variables in a model for the length of time between sales and/or dummy variables of the year of each sale. In a linear model this means that the estimated coefficients on these two dummy variables are equivalent to the mean log sales price in each year.

This approach is functionally equivalent to approaches that calculate $f(t)$ as the average sales price each month (or log thereof), with some form of smoothing of these binned means by a temporal lag. This approach is only valid if the set of properties that sell in any given month does not meaningfully differ. In other words, if properties in one neighborhood sells in one year, and those in a different neighborhood the next, the relative prices of these properties, even when matched on observables will not necessarily represent the market trend. Given the high levels of volatility in Hawaii's market, a new approach is required to estimate $f(t)$.

Rather than averaging sales prices, our approach first estimates the first derivative of $f(t)$ by averaging the log ratios of all repeat-sale pairs that span a particular time point (t):

$$f'(t) = \frac{1}{\mathcal{N}}(t) \sum_{i \in H} \sum_{(t_r, t_{r+1}) \in S_i} \ln\left(P_{i,r+1}/P_{i,r}\right) \frac{1(t_r \leq t < t_{r+1})}{t_{r+1} - t_r} \tag{1}$$

Where H represents the set of all properties in the city, and S_i the list of all ordered pairs of sales of property (i): $(t_0, t_1), (t_1, t_2)$, and so forth. the denominator in the average is the number of sale date pairs that spanned t_k.

$$\mathcal{N}(t) = \sum_{i \in H} \sum_{(t_r, t_{r+1}) \in S_i} 1(t_r \leq t < t_{r+1}) \tag{2}$$

From this curve, estimated daily from the data, we can trivially calculate $f(t)$ as:

$$f(t) = \int_0^\tau f'(t)dt \tag{3}$$

I can apply this approach within any geographic area with sufficient number of repeat sales to produce a robust price appreciation function. For the entire city, I denote this $f_c(t)$ while each individual neighborhood (j) can have its own function $f_j(t)$.

Table 7: Fixed Effect Explanation

Person	Community	Height	Well-being
1	A	T	8
2	A	T	8
3	A	T	8
4	A	S	5
5	B	T	9
6	B	S	6
7	B	S	6
8	B	S	6

7 Appendix B: Modeling Community Level Effects

The analysis used to identify an association between housing price appreciation and well-being is similar to that conducted for the other area controls described in the core report.

We first estimate a standard area fixed effects model as follows:

$$W_{ict} = \alpha + \beta X_{ict} + \upsilon_c + d_t + \epsilon_{ict}$$

where W_{ict} represents the well being of person i in neighborhood c in year t. X is a vector of individual level variables, d_t is a year fixed effect designed to account for yearly changes in well-being across the state, ϵ_{ict} is the standard individual error term, and υ_c is the area fixed effect for area c.

The idea of a fixed effect, described in detail in the main report, here represents the average impact on well-being of living in a particular community over and above the individual characteristic of the resident him or herself.

Take, for example, the following toy example. Let us assume two communities. Community A includes three tall people and one short person. Community B includes three short people and one tall person. Their well-being scores are shown in Table 7.

For the sake of simplicity, let's assume that everything about a person can be explained by their neighborhood and height (in other words there is no individual level error term and no ommitted variables). On average, Neighborhood A is happier (7.25 v. 6.75), but it also has more tall people who appear much happier than short people (8.25 v. 5.75). Our modeling allows us to separate these two effects and determine the impact of both neighborhood and height simultaneously.

In this case, living in Neighborhood B actually adds +1 on a person's happiness, while being tall adds +3. A short person in Neighborhood A (such as 4) will have a happiness of 5, while a tall person in Neighborhood B will have a happiness of 9 (5+3+1).

In this case the neighborhood fixed effect is .5 for Neighborhood B and -.5 for Neighborhood B.

As described in detail in the main report, once individual characteristics are accounted for, we do not see substantial well-being differences between areas in Hawaii. Nevertheless, we can assess which area factors contribute to differences by estimating the association of housing price appreciation with the estimated fixed effects of each neighborhood (or, in the presence of heteroskedasticity, with the fixed effect plus the mean residual):

$$\beta Z_c + e_c = \begin{cases} \hat{\upsilon_c} \\ \hat{\upsilon_c} + \bar{\hat{\epsilon_c}} \end{cases} \tag{4}$$

If the estimated coefficient β is statistically different from zero, we can be reasonable confident that the area level variable Z is associated with well-being at the community level.

8 Appendix C: Supplemental Figures

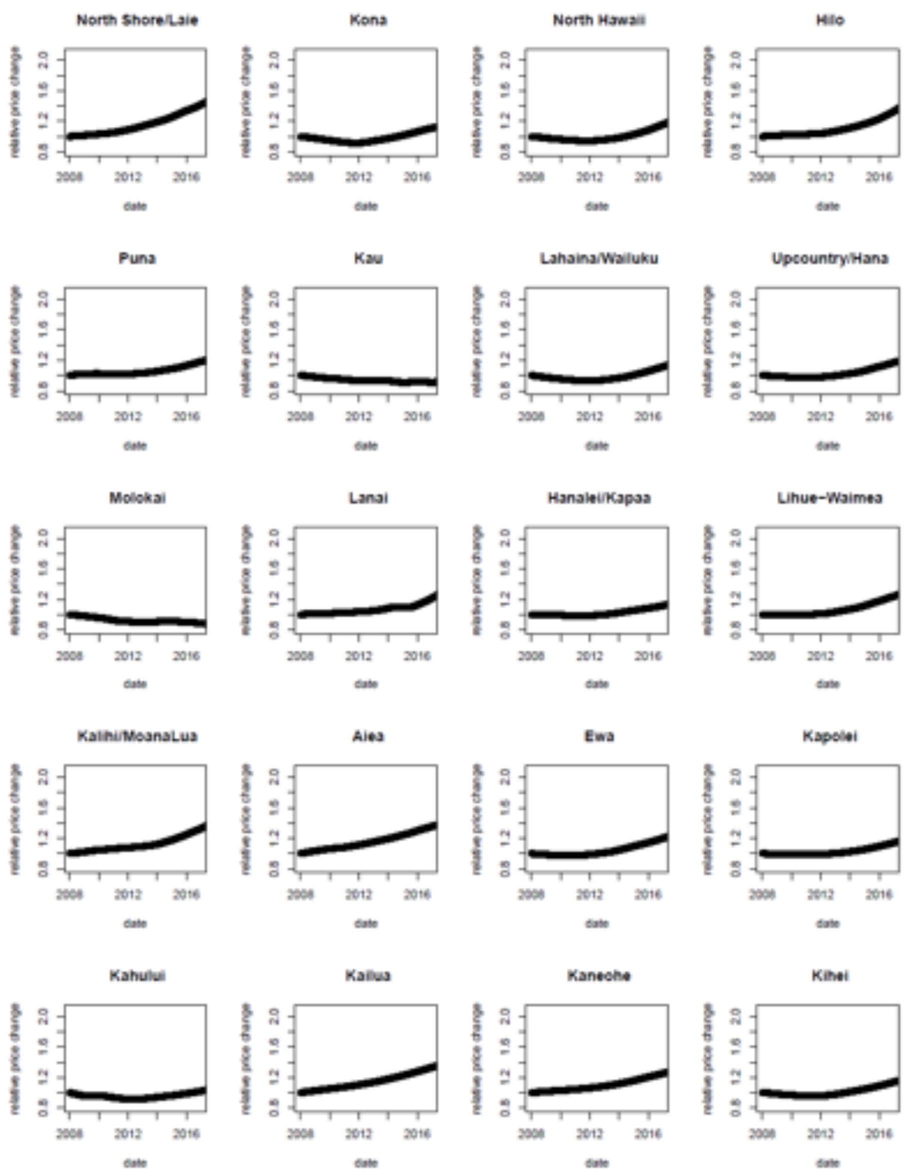

Figure 7: Housing Price Appreciation by Area in Hawaii

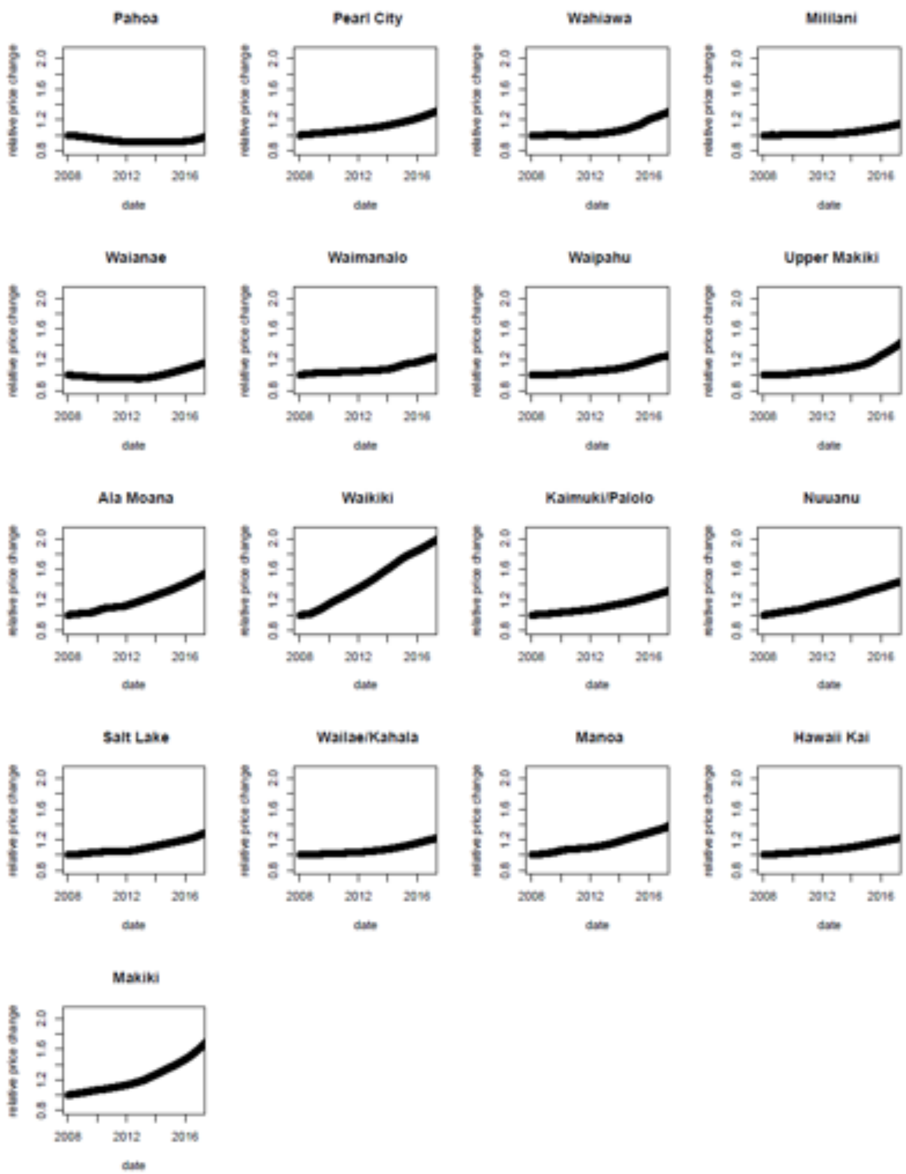

Figure 8: Housing Price Appreciation by Area in Hawaii cont.

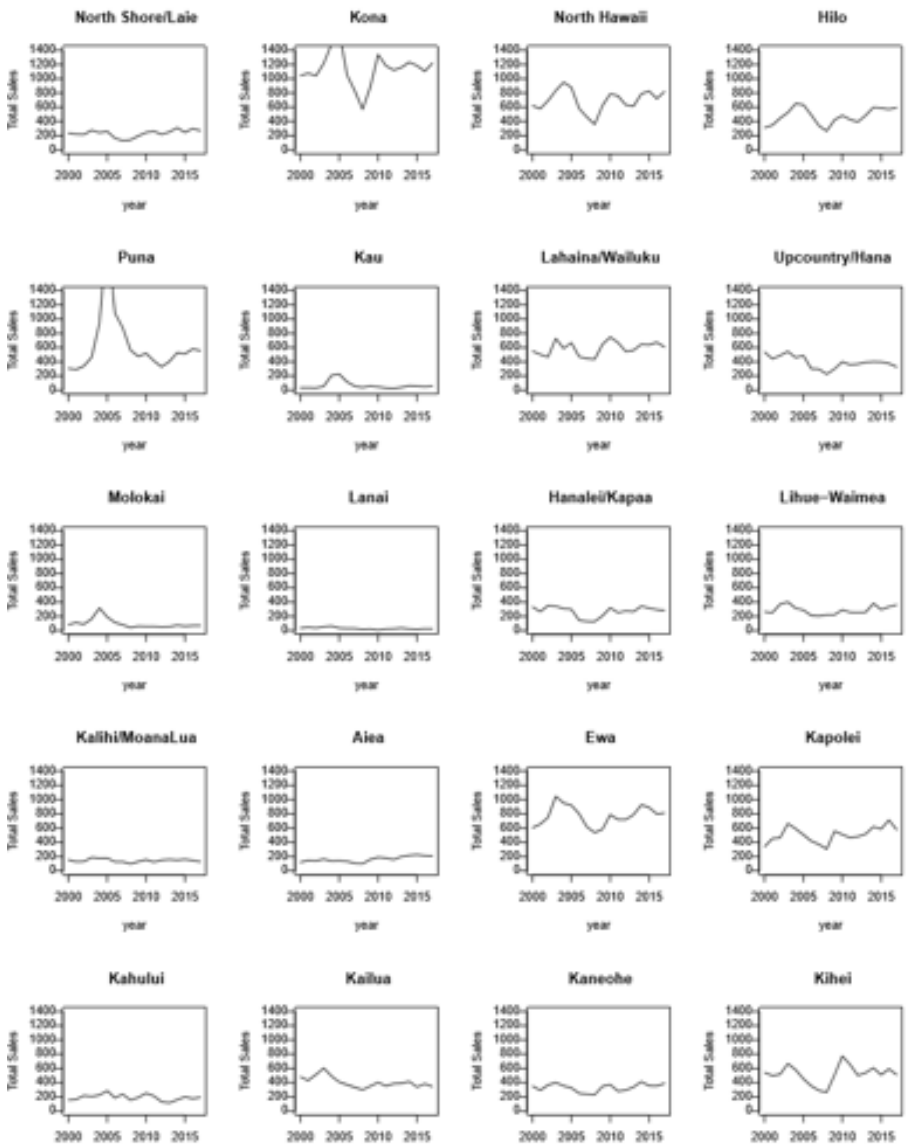

Figure 9: Housing Sales Volume by Area in Hawaii

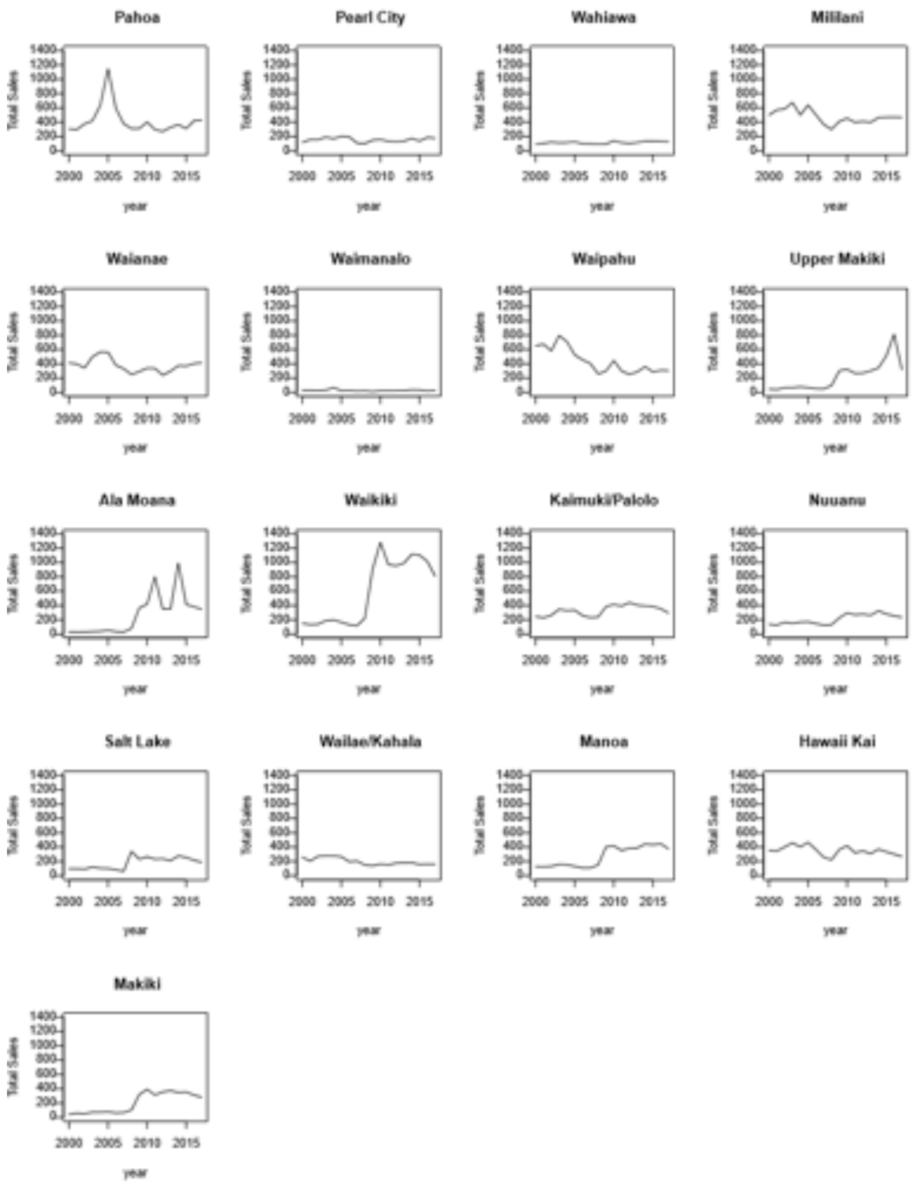

Figure 10: Housing Sales Volume by Area in Hawaii, cont.

Table 8: Hawaii Home Sales - Median Sales Price (MSP) and Appreciation Rate (AR) by Hybrid

Hybrid Name	MSP 2000	MSP 2008	MSP 2017	AR 00-17	AR 08-17
Aiea	521,142	792,155	459,250	2.210	1.400
Ala Moana	669,411	414,602	562,500	2.170	1.580
Ewa	300,941	588,088	627,967	2.010	1.250
Hanalei/Kapaa	308,281	646,897	642,750	2.130	1.160
Hawaii Kai	587,202	868,018	866,500	1.950	1.240
Hilo	168,821	328,212	249,450	2.550	1.400
Kahului	256,901	576,326	565,000	2.290	1.050
Kailua	532,152	846,847	969,000	2.380	1.380
Kaimuki/Palolo	600,414	797,300	929,000	2.080	1.350
Kalihi/MoanaLua	386,306	764,515	765,000	2.460	1.370
Kaneohe	422,786	740,991	739,900	2.250	1.290
Kapolei	364,065	675,302	598,856	2.000	1.200
Kau	173,959	125,616	223,000	2.080	0.923
Kihei	374,341	646,897	612,150	2.060	1.170
Kona	272,315	421,228	396,000	2.010	1.160
Lahaina/Wailuku	349,385	558,684	478,500	1.980	1.170
Lanai	234,881	529,279	421,250	3.170	1.380
Lihue-Waimea	217,999	471,294	425,000	2.600	1.270
Makiki	194,511	341,091	416,500	2.940	1.790
Manoa	589,404	575,150	372,598	2.090	1.430
Mililani	422,052	681,594	455,000	1.810	1.180
Molokai	234,881	341,091	269,000	1.620	0.868
North Hawaii	264,241	529,279	531,500	2.390	1.220
North Shore/Laie	330,301	717,467	663,000	2.730	1.480
Nuuanu	422,096	690,886	600,000	2.210	1.420
Pahoa	102,760	188,188	169,000	1.850	0.939
Pearl City	355,991	627,902	604,700	2.320	1.340
Puna	124,780	204,655	222,500	2.740	1.190
Salt Lake	403,702	408,839	385,000	2.260	1.330
Upcountry/Hana	380,507	709,822	668,000	2.080	1.200
Upper Makiki	367,001	629,254	580,000	2.210	1.510
Wahiawa	274,517	488,113	560,000	2.580	1.480
Waianae	180,565	452,828	400,000	1.990	1.180
Waikiki	440,402	130,686	419,500	3.350	2.030
Wailae/Kahala	778,043	1,282,032	1,380,000	1.950	1.270
Waimanalo	190,841	479,292	539,000	2.500	1.250
Waipahu	344,981	635,135	620,000	2.040	1.250

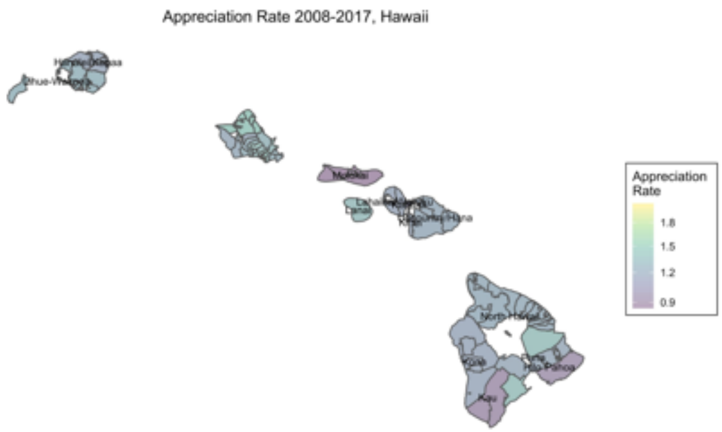

Figure 11: State Appreciation Rate, 2008-2017

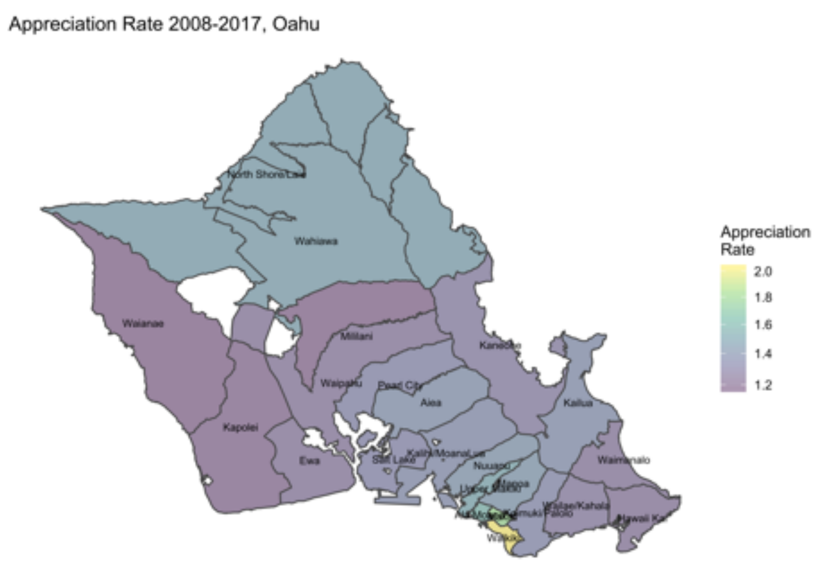

Figure 12: Oahu Appreciation Rate, 2008-2017

Table 9: Hawaii Homeownership - Owner-occupied Housing Units (OHU) and Percent (OHP) by Hybrid

	Number of Units			Percent of Units		
Hybrid Name	2000	2010	2017	2000	2010	2017
Makiki	4,119	4,271	4,059	27.6	28.8	27.6
Wahiawa	3,310	3,401	3,524	29.4	28.7	28.0
Salt Lake	5,799	6,354	6,324	34.7	39.1	34.8
Nuuanu	7,180	7,838	7,553	38.8	41.0	38.9
Ala Moana	2,572	3,658	4,104	34.6	37.5	40.4
Waikiki	5,696	6,331	5,792	38.8	38.6	43.0
Kalihi/MoanaLua	5,300	5,385	5,544	46.4	45.6	45.7
Upper Makiki	3,678	4,598	4,676	41.1	46.5	46.8
Manoa	9,151	8,976	9,232	49.6	49.0	50.0
Lanai	574	591	642	49.6	51.0	51.5
Kihei	4,395	5,476	5,739	50.5	50.3	53.1
North Shore/Laie	4,280	4,538	4,728	49.5	51.0	55.5
Lahaina/Wailuku	7,706	9,797	10,050	58.0	57.3	56.6
Waianae	6,104	6,904	6,882	57.8	58.8	59.1
Kahului	3,288	3,833	4,457	56.9	54.8	59.9
Kailua	9,866	9,970	9,654	61.2	63.4	60.5
Kaimuki/Palolo	10,668	10,583	10,723	60.8	59.7	61.6
Lihue-Waimea	7,285	7,795	8,099	62.0	60.6	61.8
Kona	8,165	10,516	11,201	59.5	59.5	62.0
Hilo	9,828	10,559	10,804	62.0	63.0	62.4
Aiea	8,698	8,990	8,246	63.7	66.5	63.0
Waipahu	11,117	12,652	12,064	64.0	65.6	63.6
Molokai	1,478	1,623	1,548	61.1	62.9	64.5
Hanalei/Kapaa	5,097	6,173	6,114	60.6	59.5	64.7
Upcountry/Hana	7,597	8,736	9,737	61.8	57.3	66.1
Kapolei	5,225	7,613	8,569	72.6	67.7	66.5
Pearl City	7,517	7,972	7,659	67.8	67.8	67.0
Waimanalo	1,591	1,622	1,667	67.6	67.2	68.7
Ewa	8,055	11,773	13,064	68.4	67.9	68.8
Pahoa	2,583	3,745	3,847	67.8	68.4	69.3
North Hawaii	7,033	9,048	8,593	66.2	68.5	69.3
Mililani	11,452	14,033	12,924	76.9	77.4	72.7
Kaneohe	11,927	12,427	12,139	70.5	72.5	74.2
Puna	5,389	8,395	8,649	73.0	73.9	76.2
Kau	1,177	2,008	1,848	74.4	77.2	77.5
Hawaii Kai	7,669	8,814	8,638	79.3	80.6	82.5
Wailae/Kahala	5,313	5,684	5,477	83.7	81.4	85.3

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