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INTRODUCTION AND SUMMARY

In order to understand the *potential* market for secondary units, it is important to gain some insight into the functioning of the *existing* market for such dwellings. Examining this market in detail is made challenging, as compared to other residential submarkets, by the widespread lack of building and/or zoning permits for secondary units. Because of these informal characteristics, market information that is routinely published for other types of residential dwellings by third-party private entities, scholars, cities, the US Census and other sources is essentially non-existent for secondary units. We therefore must find ways to study what essentially amounts to a *black market* for secondary unit housing without relying on the data that is typically available for housing in general.

This working paper describes in detail the methods and findings from two separate techniques that we used to investigate the market for secondary unit housing. One is a survey of homeowners residing within the rail transit station areas of the study region. The other is an analysis of rental Internet advertisement data for units for lease throughout the study area. Each technique should be viewed as a separate approximation, or "cut" through the market for secondary unit housing in the East Bay. Each technique has a differing set of strengths and shortcomings. The summary of our findings from the two methods is presented below, while much lengthier descriptions of each method are given afterwards. Together, our two methods begin to paint a picture of the operation of a market that functions largely hidden in plain sight.

Summary of rental market analysis results

Reviewing the descriptive statistics and hedonic modeling results presented below, evidence for several important characteristics of secondary units as a rental submarket distinct from the overall, mainstream rental market emerges. The most notable results from the two analyses are as follows:

- *Approximately 16 percent% of single-family residential properties in the study area have at least one secondary unit.* This result provides evidence that secondary units, despite being frequently unpermitted, are not a marginal or aberrational phenomenon, but rather are widespread throughout East Bay station areas and almost certainly throughout the East Bay flatlands.
- *Secondary units most commonly take the physical form of a detached rear yard structure, a converted garage, or converted rooms in the main house.* A large majority were installed five or more years ago. The vast majority, though not all, are used as housing units.
- While not, on average, cheaper in terms of price per square foot, *secondary units are more likely to represent smaller, and therefore cheaper, housing packages than the typical rental unit in the East Bay.* This result suggests that secondary units are particularly important to small households of one to two people seeking affordable housing. Secondary units rented to strangers are at least 6 percent% cheaper than non-secondary units when their affordability is expressed in terms of a proportion of Area Median Income (AMI), as is common practice in the affordable housing industry.
- *Ownership and operation by amateurs is much more common (though far from ubiquitous) in secondary units than in the general rental market.* This has important consequences in the functioning of the secondary unit submarket. For instance, there is at least modest evidence that on-site secondary unit landlords appear to offer rents at a discount to their tenants vis-à-vis their absentee landlord peers. In addition, *secondary unit rents, controlled for amenities, appear to exhibit a wider degree of variation in rents than typical rental units*, suggesting the importance to secondary unit tenants of engaging in extensive searches to find an optimal housing package when navigating this idiosyncratic market if they do not happen to have a personal relationship with a secondary unit landlord in a desired location. Indeed, our results show that the most common methods by which secondary unit landlords find tenants are by already knowing the person, Craigslist, and personal referrals (in descending order of frequency). Finally, we observe that 26% of secondary units are occupied by the homeowning household itself, while an additional 29% are occupied by friends, family or acquaintances of the homeowner household, some of whom are living rent-free and others of whom are likely paying reduced rents.
- *Secondary units are much less likely to offer off-street parking than standard rental units.* Indeed, single-family residential (SFR) properties with secondary units do not appear to have significantly more off-street parking than those that lack secondary units. This suggests that, regardless of off-street parking requirements imposed by cities, secondary units are often offered to tenants who either do not have a car or else park their car(s) on the street. Furthermore, in the relatively infrequent cases in which secondary units do offer off-street parking, landlords very seldom charge for this amenity. This implies that off-street parking requirements, if followed, would often impose a cost on secondary unit landlords that they would not or could not pass on to tenants.
- *While most homeowners are aware of secondary units on their streets, and while most of these homeowners do not perceive there to be a negative impact from secondary units, those that do perceive a negative impact are by far most likely to cite increased pressure on on-street parking as the reason.* Indeed, our results suggest that SFR properties with one secondary

unit generate, on average, 0.9 more total cars and consume 0.7 more on-street parking spaces than SFR properties lacking secondary units. At the same time, SFR properties with secondary units exhibit wider variability in car generation than those that do not.

- *Secondary units appear to be much likelier than other types of rental units to offer substandard cooking facilities* (though it should be noted that the vast majority do appear to offer full kitchens). This is likely a consequence of both the amateur operation of secondary units and the widespread existence of unpermitted secondary units. Substandard cooking facilities are likely associated with other substandard conditions, although this cannot be directly gleaned from the data presented herein.
- While *we found no overwhelming demographic differences between households that have secondary units and those that do not*, the former have a somewhat smaller number of people, slightly lower incomes, and somewhat fewer white adults. Adults living in secondary units are considerably younger than adults in homeowner households, though relatively few are under 25, and very few are elderly. There are few children residing in secondary units.
- *Secondary units are much more likely to share utility costs with other units or to have them included in the rent.* This is likely associated with widespread non-professional management as well as a dearth of fully independent gas, electric, water and sewer connections to utility main lines for secondary units.
- *The potential market for secondary units amongst homeowners that do not already have them is about 30% of the total universe of such homeowners.*

HOMEOWNER SURVEY

The homeowner survey was intended to sample the existing population of homeowners living within the study corridor in order to ascertain i) the prevalence rate of secondary units for SFR properties within the corridor; ii) the attitudes towards secondary units of homeowners residing on properties that lack them; iii) physical characteristics of extant secondary units; iv) demographic characteristics of homeowners (with and without secondary units) and secondary unit occupants; v) details concerning the economic relationship between secondary unit homeowners and their tenants; and vi) the parking habits of homeowner households (with and without secondary units) and secondary unit occupant households. Because none of the cities lying within the study corridor had reliable records of secondary units within their boundaries – whether permitted or otherwise – it was necessary to survey a sample of randomly-selected SFR properties in order to find ones with secondary units, even though (as expected) a large majority of such properties lacked secondary units. However, receiving survey data from a large number of SFR properties lacking secondary units, in addition to making it possible to derive a secondary unit prevalence estimate, also made it possible to contrast non-secondary unit homeowner households with households that have such units, and to gauge attitudes towards secondary units amongst the households that lack them.

The homeowner survey instrument (Appendix 1), in addition to asking respondent homeowners to answer specific questions, also allowed them to express any opinions they chose to share with the researchers about secondary units, whether or not they had any on their own properties. Some of the resulting responses (edited for spelling and length) are quoted throughout this Working Paper.

While each of these quotes only represents the viewpoint of one particular homeowner that responded to the survey, it nevertheless offers a glimpse into the perspective of one among the individuals whose responses to specific questions are quantified and reported in this document.

Design of homeowner survey

Selection of sample: The properties selected for inclusion in the survey sample were restricted to those lying within the half-mile station areas described in *Yes, but will they let us build? The feasibility of secondary units in the east bay* (IURD WP-2012-02). Only properties classified as SFR by the Alameda and Contra Costa tax assessors were included in the pool of properties that could be selected.[1] Properties were then selected for inclusion in the sample on the basis of random numerical rankings. We dropped properties that could be readily seen to be non-owner occupied (because of either a discrepancy between the property address and the mailing address for the owner, or because the owner was listed as a firm or trust rather than a person) from the sample.[2] This was because i) we presumed that we were much less likely to receive a response from non-owner occupied properties and ii) in this study we are primarily concerned with the actions of owner-occupants and their decisions regarding whether or not to install secondary units on their properties. Finally, properties were selected in the order of the random rankings until a sample of the desired size had been assembled.

Survey modes: We deployed a mixed-mode approach that used three methodologies for contacting and gathering survey responses from homeowners whose properties had been selected to be in the sample. The methodologies were as follows:

1) Every homeowner in the sample selected from parcel data received a postcard (as shown in Appendix 2), sent via U.S. Mail, with a very brief description of this study, an invitation to participate, and a web link to an online survey instrument. Every postcard was printed in English on one side and in Spanish on the other side (with the web link on the Spanish side pointing to a Spanish-language version of the survey instrument). In rough concordance with the Dillman method,[3] all homeowners who had not replied to the first postcard within one week of its mailing were mailed a second postcard. Some homeowners who had not

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[1] Discussions with staff from the various cities revealed that city and county tax assessor records of current land use for residential (and other properties) can sometimes conflict. We relied on the county tax assessor records for building the samples, since these were the comprehensive data sets to which we had access. It is also worth mentioning that the classification of a property as SFR in no way precluded it from having a secondary unit, as the survey results presented in this Working Paper indicate; indeed, it is likely that a majority of secondary units are not included in the assessments of their host properties for the purposes of property taxation. The implications of this are discussed further in *Scaling up secondary unit production in the East Bay: Impacts and policy implications* (WP-2012-5).

[2] Because California estate laws encourage homeowners to place their property in a trust, the assessor's databases include many resident homeowners listed as trusts. We conservatively exclude these properties because of the possibility that the homeowner is non-resident. However, this could introduce a bias by also excluding some resident homeowners, who are likely to be longer-term and more educated residents.

[3] See Dillman, Don, Jolene Smyth and Leah Christian. 2009. *Internet, Mail, and Mixed-Mode Surveys: the Tailored Design Method*. New York: Wiley & Sons.

replied to the survey one week after being mailed the second postcard were mailed a third postcard.[4]

2) Each postcard gave a phone number where a homeowner could leave a voice mail message (whether in English or Spanish) requesting that a paper version of the survey (in the caller's chosen language), along with a pre-addressed and pre-stamped return envelope, be mailed to her home. We included this option in order to be sure that potential survey respondents lacking the knowledge or the means to access the Internet would have a way to respond to the survey other than via the online version.

3) We contacted the moderators of listservs for ten organizations representing the interests of neighborhoods surrounding the station areas in Oakland, Berkeley, and El Cerrito, and asked them to send an e-mail to their lists requesting that single family house owner-occupants respond to the online version of the survey (as in #1 above) or telephone to request a hard copy version (as in #2). This e-mail was written in both English and Spanish, and largely mirrored the wording of the postcard. As a result of this effort, six of the organizations contacted their members requesting that they respond to the survey. In addition, an online newspaper in El Cerrito published a story urging those of its readers eligible to respond to the survey to do so.

As an inducement for their participation, survey respondents were offered the opportunity to enter into a raffle drawing for three prizes: a $200 gift certificate for a popular local electronics store, a $150 BART pass, and a $100 BART pass.

Sample size, response rates and bias: We mailed postcards to 2,529 households. A first subsample of 1,551 households was split almost exactly evenly amongst the five station areas. Following lower level of responses from the Del Norte and Plaza station areas, we decided to have each of them comprise 30% of the properties in the second subsample of 1,001 households, with the other 40% split equally amongst the three other station areas. We received and acted upon 31 separate intelligible requests, received via telephone voice messages, to mail written versions of the survey instrument (all of them in English) to potential respondents, 18 of whom ended up filling out and returning the survey.

We used the minimum sample size formula $n_{min} = p(1-p)(Z_c/E)^2$ to calculate our targets for the desired number of survey responses. For an estimate of the prevalence of secondary units amongst owner-occupied SFR properties in the study area, assuming that $p = 0.2$ (corresponding to the anticipated probability of a given SFR having a secondary unit being 20%), $Z_c = 1.645$ (the Z score corresponding to a 10% confidence interval, typically used in planning studies) and E = 10% (a sampling error of 10%, also commonly used in planning studies) yields a minimum sample size of 43.3. Therefore, a defensible secondary unit prevalence estimate would require 44 survey responses (i.e. 43.3 rounded upwards to the nearest whole number).

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[4] As described further in the following section, the sample was broken into two groups. Non-respondents in the first, larger sub-sample received three postcards, while non-respondents in the second, smaller sub-sample received only two. We decided to forego sending the third postcard to the second sub-sample after we were satisfied that we had received enough responses for statistical validity, as is discussed in the following section.

However, relying upon survey results to draw statistically meaningful inferences about the nature of the secondary unit population requires many more than 44 responses. Using the most conservative value of p, 0.5, yields a minimum sample size of 68 *secondary units*. Because most responses (perhaps four out of five, depending on the actual secondary unit prevalence rate) would be from properties lacking secondary units, we would need on the order of 350 survey responses to be able to make supportable generalizations about various characteristics of the secondary units in our study area.

As it happened, we obtained enough survey responses to meet both the lower threshold for the secondary unit prevalence rate *and* the higher threshold for secondary unit characteristics. We received a grand total of 515 survey responses. Of these, 334 responses originated from the postcard mailings to 2,529 households, corresponding to a response rate of 13.2%. These 334 responses easily exceed the threshold of 44 survey responses needed for a secondary unit prevalence ratio amongst owner-occupied properties in the study area.[5] Of the 334 responses originating from the postcards, 316 were online and 18 were mailed. The remainder of the 515 survey responses, 181, originated as responses to the e-mails sent out to neighborhood group listservs. None of the 515 total survey responses were in Spanish; all were in English.

Of the 515 responses, 87 were reported by respondents to be from properties with secondary units. Using a stricter definition for secondary unit that we employed (discussed below), we determined only 81 of the 87 responses to actually be from properties with secondary units. Still, 81 survey responses from properties with secondary units comfortably exceeds the minimum threshold of 68 responses needed for statistically defensible generalizations about secondary unit characteristics, as discussed two paragraphs above.

Leaving aside the thresholds for statistical significance, we are still left with the question of whether the response set that we obtained is generally representative of the population of SFR properties in the study region. From a geographical standpoint, at least, the responses are reasonably well-balanced, with El Cerrito somewhat over-represented and Richmond significantly under-represented in the response set as compared to the cities' share of station-area SFR lots, but with no glaring discrepancies otherwise observable (Table 1). As discussed in the results section, responding homeowners reported being from households that were, on average, disproportionately high-income, well-educated and comprised of white non-Hispanic people. Finally, the lack of a single Spanish language response out of the 515 received suggests that immigrant homeowners, at least Spanish-speaking ones, are not well-represented in the sample.

In summary, while the responses are sufficiently numerous as to be likely to be broadly representative of the population of SFR properties within the station areas, the foregoing cautions should be kept in mind when interpreting the results.

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[5] We consider responses sourced from postcards, rather than the entire set of responses, to be the appropriate data set to use for calculating the secondary unit prevalence estimate, since the postcards were mailed to a truly random sample of owner-occupied SFR properties lying within the station areas within the study corridor. For all other estimates, we rely on the full response set, not just the portion that originated from postcards.

Table 1. Geographic distribution of survey responses.

City	Postcards mailed (%)	Survey responses (%)	Station area SFR lots (%)
Albany	4.5	2.5	3.5
Berkeley	30.2	42.3	46.8
El Cerrito	34.4	31.7	21.1
Richmond	9.0	1.6	8.6
Oakland	21.9	21.9	20.0
Total	100	100	100

Homeowner survey results

While some of the returned surveys included non-responses to certain questions, seven out of the 515 returned surveys had so many missing responses as to be non-usable. In the end, therefore, we used 508 out of the 515 returned surveys in the response set. The following sections report survey results according to various themes. Note that while results for particular questions for the entire data set are, in many cases, numerous enough to be statistically significant, results for individual cities in most cases are not, and are therefore not presented here.

Secondary unit prevalence. As discussed in the previous section, we considered only 81 of the 87 reported secondary units to meet our minimum standard for actually qualifying as secondary units: namely, having at least one bathroom.[6] Of the 60 survey responses reporting secondary units that were sourced from postcard mailings (as opposed to solicitation from neighborhood listservs), 55 of the secondary units were reported to have bathrooms. We therefore regard 16%, or 55 responses indicating secondary units sourced from postcards units out of a total of 334 responses sourced from postcards, as our best estimate of the proportion of SFR lots in station areas within the study corridor that have secondary units.

Of the 81 properties in the total response set (sourced both from postcards and from neighborhood listservs) reporting at least one secondary unit, 69 properties reported having one secondary unit, 11 properties reported having two extra units, and one reported having three extra units.

Physical characteristics and construction history. As can be seen in Figure 1, the secondary units in the sample set come in a variety of physical configurations, with the most common being, in descending order of frequency, a freestanding structure in the rear yard (approximately one third of the total), a converted first floor or basement, and a converted garage, with these three categories collectively accounting for more than two thirds of all 85 cases.[7]

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[6] Secondary units lacking full kitchen facilities, including a multi-burner stove and an oven, can potentially overcome these deficiencies for the purpose of functioning as fully independent units by relying on hot plates and/or microwave ovens. By contrast, living quarters that lack indoor plumbing cannot be viewed as meeting even a minimal standard for an independent dwelling unit.

[7] Some of the reported results have a number of responses that exceeds 81, the number of properties in the overall data set with secondary units that have bathrooms. This is because some properties have more than

Secondary unit homeowners were asked whether they or a previous owner had instigated the installation of their unit: 23% said that they had done it, while the remaining 77% said that a previous homeowner had undertaken the work (out of 77 responses). All 18 homeowners that reported having overseen the installation of their secondary unit were asked, and answered, the question of who had actually done the physical work of installing the unit. The most common responses were a hired contractor (44%), the respondent's household (22%), and a combination of the two (22%). A friend or relative had done the work in one case, and the other two responses were categorized as "other."

All secondary unit homeowners were asked if their unit has a complete kitchen (defined as a rangetop stove, oven and refrigerator): 88% of the 74 respondents answered that they did, while the remaining 12% answered "no."

Respondents were asked the number of bedrooms in their secondary units. As might be expected, a majority, 63%, of secondary units were reported to be either studios or one-bedrooms, but there were also significant numbers of units that have two bedrooms or even three bedrooms or more (Figure 2).

Figure 1. The physical configuration of reported secondary units.
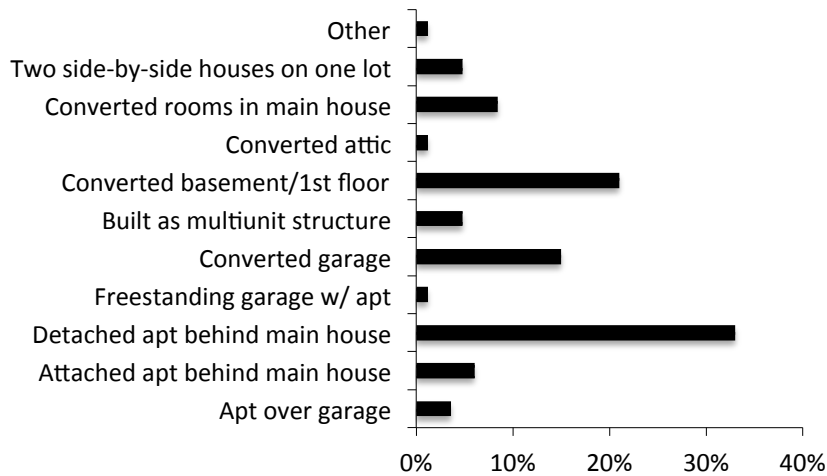

one secondary unit, each of which is counted separately unless otherwise stated. Thus, the data in Figure 2 is derived from a response set of 84 *secondary units*, but these units are associated with a subset of the 81 *properties* that contain at least one secondary unit.

Figure 2. The number of bedrooms reported for the secondary units.
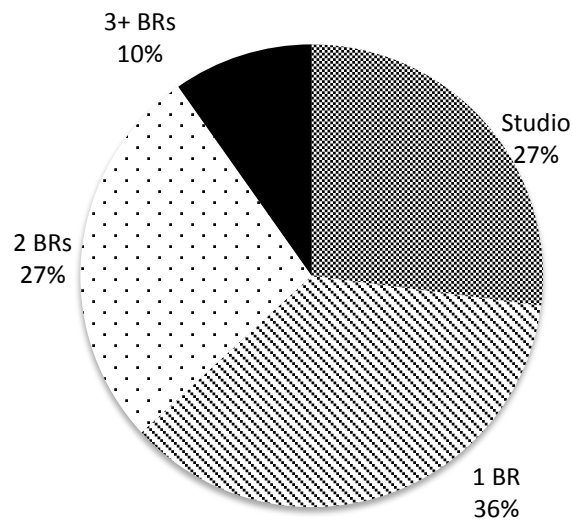
As can be seen in Figure 3, close to a majority of homeowners with secondary units do not know when their units were installed, which suggests that they were installed at least prior to when the respondents purchased their home. Homeowners representing 15 percent of the 84 units for which responses to this question were received reported that their secondary units had been installed within the last five years. For secondary units with particular reported ages (i.e. where the respondents did not answer "I don't know" to this question), the average age of installation for the unit was 38 years.

Figure 3. The reported age of responding homeowners' secondary units.
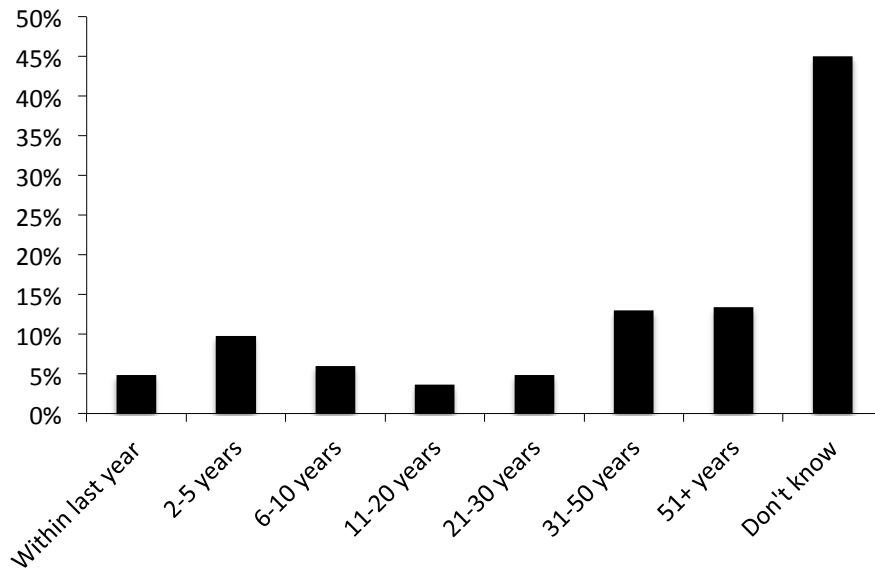
Details of secondary use, occupancy, and rental. The majority (85% of 84 units) of secondary units are reported to be occupied by at least one person. Twelve of the 13 unoccupied secondary units (92%) are reported to be used for a non-residential purpose, such as a home office, workshop or studio space, while the owner of the remaining unit is seeking a tenant. Of the 71 secondary units that are occupied, the relationship of the occupant(s) to the homeowner household was reported for 70 of them. The largest number (46%) of secondary unit occupant households consist of people that the homeowner did not previously know, 26% of the units are occupied by all or part of the homeowner household, and 29% are occupied by relatives, friends, or acquaintances of the homeowner household.

By far the most common methods that homeowners used to find occupants, besides having a part or all of their *own* household occupying the unit (26% of 69 responses), are by already knowing the occupants (25%)[8], Craigslist (25%), and referrals from a known person (7%). Other methods include the tenants already being in place at the time the property was purchased (4%), the University of California-Berkeley Housing Office (3%), and a combination of Craigslist and the UC-Berkeley Housing Office (6%). In 4% of the responses, the secondary unit is separately owned by its occupant as a condominium or tenancy-in-common (TIC).

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[8] There is an inconsistency between the reported figures of 29% of units being occupied by friends, family or acquaintances that are not part of the homeowner household, and 25% of unit occupant households having been sourced via the homeowner household having previously known the occupants. This discrepancy arises because there are two cases in which the respondent reports that the unit is occupied by one or more acquaintances, but that the tenants were sourced via a personal referral. In these cases, presumably, the tenants have become acquaintances *after* moving in, or else the homeowner knew them by reputation beforehand but had not actually met them. Thus, in short, the inconsistency between the two figures arises from an ambiguity in the precise nature of the term "acquaintance," which was not rigorously defined in the survey instrument.

As can be seen in Table 2, 34 out of 41 respondents reported that the occupants of their secondary units pay rent, while the remaining seven stay for free or perform in-kind work in exchange for living in the secondary unit. Rents charged vary widely. (Please refer to the discussion of the results from a separate analytical technique, the rental advertisement data study later in this document, for a much more detailed examination of market rents in secondary dwelling units.) Of the tenants paying rent, 75% are people that the homeowner did not previously know, while the rest are friends, acquaintances, or relatives. All seven of the tenants staying for free or in exchange for in-kind rent are, not surprisingly, friends or relatives of the homeowner.

Table 2. Rent paid by unit size (number of bedrooms).

	Studio	**1 BR**	**2 BRs**	**3+ BRs**	**Total**
Free or in-kind rent	2	3	1	1	**7**
Paid rent	7	12	10	5	**34**
Minimum paid rent ($)	650	550	650	1,250	--
Maximum paid rent($)	1,750	1,500	2,975	2,200	--
Average paid rent($)	948	931	1,486	1,483	--

Demographics of homeowner households. As is evident in Table 3, households with or without secondary units differ little demographically, though they are quite different from residents of the five East Bay cities as a whole (including renter households). The results indicate that, as might be expected, households with secondary units have somewhat smaller household sizes (both with respect to adults and children) than non-secondary unit-owning homeowner households. In addition, adults in secondary unit-owning households are slightly older, earn slightly less, are slightly more likely to be college educated, and are somewhat less likely to be non-Hispanic whites than their non-secondary unit-owning peers. The differences, however, are quite small. Secondary unit-owning households are notable more than anything for their broad demographic similarity to their non-secondary unit-owning peers.

Note that these results indicate, as mentioned in an earlier section, that the respondent households are, in general, highly affluent, comprised of highly educated adults, and comprised of relatively few adults of color. While the income and education results can be regarded with some skepticism, due to a possible tendency for people to exaggerate their income and education status, we should nevertheless bear in mind that the survey results herein appear to be skewed towards a well-off group of homeowners, and calibrate our interpretation of the results accordingly.

Table 3. Demographics of homeowner households with and without secondary units, relative to East Bay study area.

| Demographic characteristic	East Bay*	With Secondary Units		Without Secondary Units	
		Average	Response	Average	Response
Adults in household	1.77	1.73	77 HHs	1.95	404 HHs
Children in household	0.71	0.37	68 HHs	0.43	405 HHs
Avg. age of adults in household	35.4	49.6	117 adults	48.9	771 adults
Household income ($)	$77,775	$105,000	61 HHs	$109,000	382 HHs
White non-Latino adults (%)	34.2	70.8	120 adults	79.7	784 adults
African American adults (%)	22.9	4.2	120 adults	5.2	784 adults
Latino adults (%)	20.7	6.7	120 adults	4.2	784 adults
Asian/Pacific Islander adults (%)	18.8	12.5	120 adults	8.0	784 adults
Adults with high school or less (%)	36.7	5.8	120 adults	4.7	783 adults
College graduates (%)	37.1	82.5	120 adults	78.4	783 adults
Male adults (%)	47.9	42.5	120 adults	46.2	783 adults

* Includes data from Albany, Berkeley, El Cerrito, Oakland, and Richmond from either Census 2010 or the 2005-2009 American Community Survey. Income is adjusted to 2010 dollars.

Demographics of secondary unit occupant households. Survey respondents reported that 73 adults were living in 48 secondary units, for an average of 1.52 adults per secondary unit.[9] The average age for the 68 adults residing in the secondary units with reported ages is 38.6 years, with 17% of the adults ranging in age from 18 to 25 and another 4% with ages 65 and greater. One or more children were reported to be living in only four out of the 50 secondary units (8%) for which this question was answered. The racial/ethnic breakdown of the 62 adult secondary unit occupants for whom this information was provided is as follows: 80% white non-Latino, 8% Latino, 8% Asian/Pacific Islander, and 5% mixed race. Of the 63 adult secondary unit occupants with reported gender, 37% of them are male.

Perceptions of secondary units by non-secondary unit homeowners. The 421 survey respondents that reported not having at least one secondary unit were asked a series of questions regarding their attitudes towards secondary units. One question, which drew 404 responses, asked these homeowners why they do not already have a secondary unit. As can be seen in Figure 4, the potential market for future secondary unit installations – that subset of homeowners that either has already attempted, is actively planning to or might consider installing a secondary unit – is about 30% of homeowners that do not already have such an extra unit on their properties.

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[9] Note that homeowner households were asked to answer questions about the occupants, if any, of the secondary units on their properties, if any. While we considered attempting to ask homeowners to pass along a separate survey to the occupants of their secondary units for them to fill out directly, we concluded that this was unlikely to result in a high response rate, as well as being cost-prohibitive. Consequently, figures on secondary unit occupants should be interpreted with the caution that they originate from information provided by a member of the homeowner household rather than directly from the occupants themselves. Also note that figures for secondary unit occupant demographics exclude instances in which the entire homeowner household occupies the secondary unit – those are included in the previous section summarizing homeowner household demographics.

Figure 4. Stated reasons that homeowners lacking a secondary unit do not already have one.
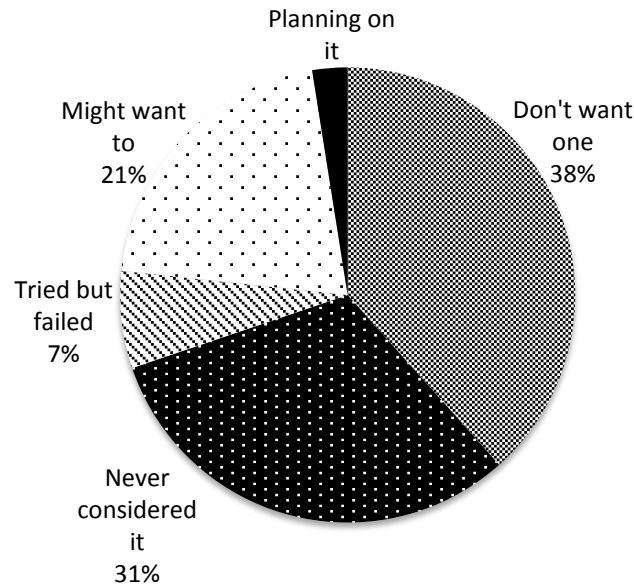
Homeowners that reported having tried but failed to install secondary units were asked for the reason for the failure. Their responses can be seen in Figure 5. The leading reason is an inability to fit the required amount of off-street parking, but other prominent answers are excessive cost and difficulty of the city's regulatory process, among others. One Berkeley homeowner exemplified all three of these leading reasons for not having installed a secondary unit: "To add a unit, one must have noncontiguous parking spaces. I would have to put a car in my front yard, which is probably illegal, or give up the back yard. I have an old garage/studio I would love to turn into an additional unit but [cost] and permits and parking make it difficult [or] impossible."

Homeowners lacking secondary units on their properties were asked if they knew of secondary units on other properties on their block. Out of 407 responses, 61.9% were in the affirmative, 8.6% of homeowners stated that there were no secondary units on their street, and 29.5% were not sure. Homeowners indicating that they knew of secondary units on their street were then asked whether or not they felt that these units had a negative impact on their quality of life, and if so, what the leading negative impact was. Of the 255 responses to this question, by far the most common (62.0%) was that the nearby secondary units have no negative impact on the respondent's quality of life. The leading negative impact reported (24.7%) was an increased number of cars competing for on-street parking. In the words of an El Cerrito homeowner: "Neighbors who have built extra units and rented their property have created tensions and problems because now there are six cars vying for one off-street shared parking spot."

Figure 5. Reasons for failure of attempted secondary unit installations.
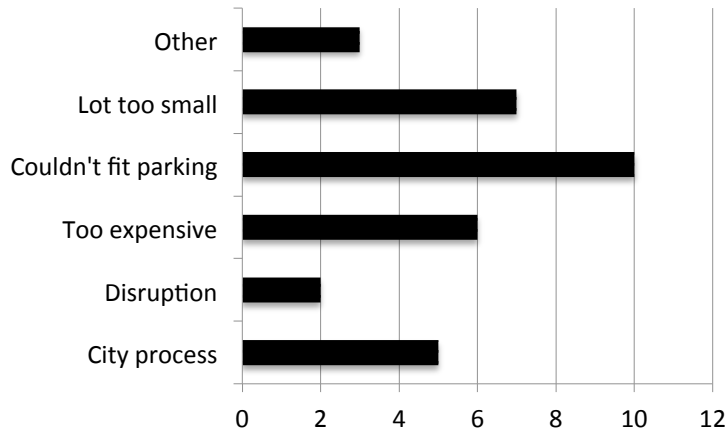
Other negative impacts were reported in much smaller numbers, including the presence of renters on a street mostly occupied by homeowner households (5.1%), density-related impacts (3.1%), unruly tenants (2.0%), aesthetic impacts (1.2%), and reduced property values (0.8%). (Figure 6.) An Oakland homeowner disturbed by the prevalence of secondary units on the local block expressed some of the concerns about increased density that arose with a minority of homeowners: "The extra units, which are rentals, make it difficult to know all the neighbors. People seem to come and go. It makes the block seem less friendly [than] when there was one family per property. I used to know all my neighbors, now I know only a few. I've also seen a big increase in the number of cars on my block since these additional units were added. With all the additional cars, if I didn't have my one parking spot on my property, I would often have to park a block or so away. That would make me think twice about going out at night. It also makes it difficult when friends visit."

Figure 6. Perceived impact of secondary units on quality of life.
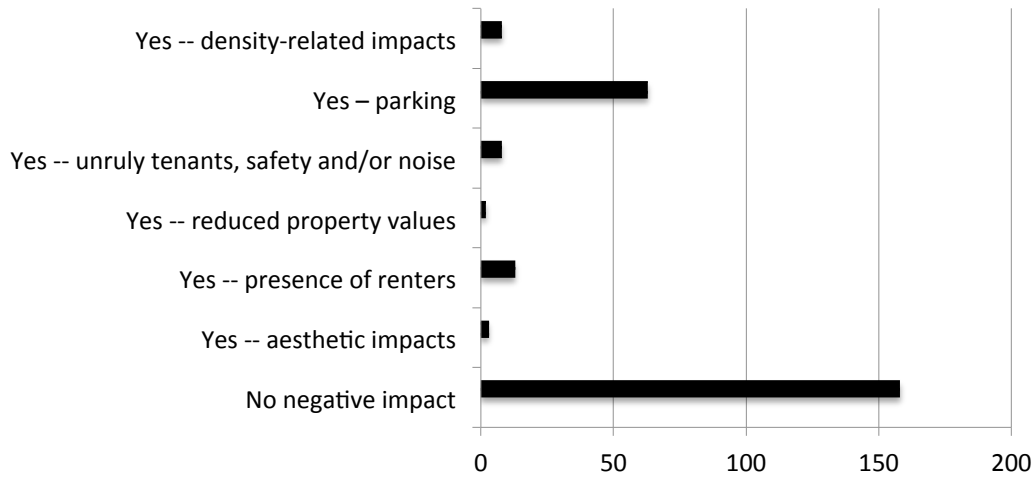
Parking. All homeowner households were asked to report the number of off-street parking spaces on their property (whether in the form of driveway spaces, spaces in a garage, or others), the number of cars their household parks off-street on their property, and the number of cars their household parks on-street. Households reporting having secondary units with occupants were asked how many cars those occupants park off-street on the parcel and how many cars they park on-street.

While the majority of households occupying secondary units have at least one car, 22% (out of responses from 37 properties) have no car at all (Figure 7).

Figure 7. Number of cars parked by households in secondary units.
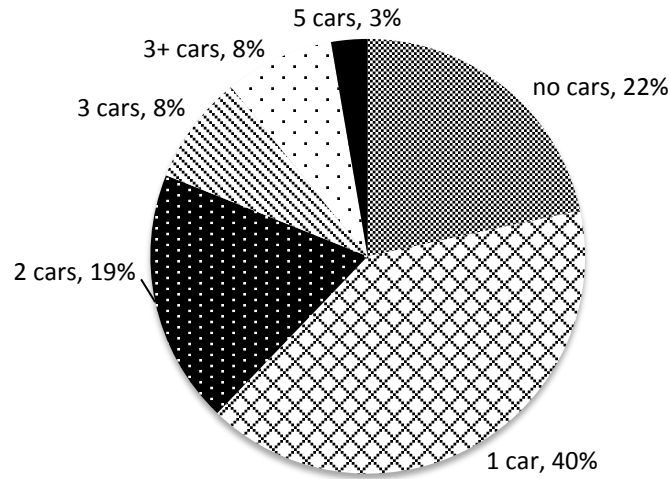
Note: If a given property has more than one secondary unit, all cars reported as having been generated by those units are included in the total for that property.

Meanwhile, households with at least one secondary unit provide off-street parking spaces at a rate that is statistically indistinguishable from houses lacking secondary units (Table 4).

Table 4. Average number of parking spaces reported.

	With secondary unit	Without secondary unit
mean # of off-street spaces	1.86	1.67
standard deviation	1.23	1.16
# of observations	66	406
significantly different @ 95% level?	No	

Note: Statistical significance for the difference of means is determined via a standard two-tailed T-test with a 95% significance threshold.

Properties with secondary units generate a greater number of cars from the combined homeowner household and secondary unit occupant household(s), as can be seen in Table 5. Properties with secondary units generate, on average, 3.35 cars, while properties without them generate an average of two cars, a difference of almost 1.4 cars in the average case. However, when properties with no more than one secondary unit are excluded, the average number of cars generated drops to 2.91, or a (statistically significant) increase of only about 0.9 cars above properties that lack secondary units.[10] As seen in the standard deviation figures, properties with secondary units exhibit more

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[10] In our opinion, properties with only one secondary unit are the relevant analytic category. While many cities might be expected to ease the regulatory burdens that currently prevent SFR properties from legally adding one secondary unit, it is difficult to imagine many cases in which cities would be willing to consider allowing *two* secondary units in areas zoned for single-family houses. For that reason, examining data sets that exclude properties with more than one secondary unit allows us to gain insight into the parking impacts

variability than those without them, implying that a wider range of parking behaviors is seen on such properties than in properties that lack secondary units (something that is presumably related to the large variation in car ownership habits of secondary unit households seen previously in Figure 7).[11]

Table 5. Number of cars generated by units.

	Secondary Units		
	1 or more	0	1
mean # of total cars	3.35	2.00	2.91
standard deviation	1.92	1.05	1.60
# of observations	43*	405	35*
significantly different @ 95% level?	Yes		
significantly different @ 95% level?		Yes	

Note: The difference of means test is done in the same way described in Table 4.

*8 were imputed. The imputation technique is described in footnote #9.

Table 6 shows the number of cars parked *on-street* reported to be generated by properties with and without secondary units, since on-street parking is of concern to some neighbors of secondary unit properties, as evidenced earlier by Figure 6. Properties with secondary units generate an extra 1.1 cars parked on-street, on average, vis-à-vis properties without secondary units. This discrepancy, however, drops to only 0.7 cars when properties with more than one secondary unit are excluded from the analysis.

While interpreting these figures in tandem with the results shown in Table 6 should be done with caution, particularly since we did not impute on-street car generation for some of the incomplete records as we did with the number of total cars,[12] nevertheless an intuitive picture begins to emerge. It would appear that people residing on properties with secondary units "pick up more of the slack" of their available off-street parking spaces by putting more of them to use than their peers living on properties lacking secondary units. This might explain why properties with one secondary unit generate 0.9 more cars than properties without secondary units, but result in only

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of the house-plus-secondary unit configuration that would become much more common under the policy outcome that cities would be most likely to seek.

[11] Note that some of the data records for total and overspill cars used for Tables 5 and 7, respectively, are imputed, as is indicated in the charts. We undertook the imputation in an attempt to boost the sample size for the difference of means computations, since many of the records for secondary unit properties lack all of the data needed to compute total and overspill cars generated. Where enough data was available, imputations were computed by selecting a random value from an assumed normal distribution of the number of cars per person calculated from the set of non-secondary unit homeowner households, and using this to impute the number of cars generated by a secondary unit households from the number of adults reported to comprise the household.

[12] Intuitively, one would expect that on-street parking behavior for secondary unit occupants might differ markedly from that of homeowner households. Thus we decided that it would not be helpful to attempt to impute the former from the latter.

0.7 additional cars parked on-street, despite having on average essentially no extra off-street parking available (as seen in Table 4).[13]

Table 6. The number of cars parked on-street generated by properties with and without secondary units.

	Number of Secondary Units		
	1 or more	0	1
mean # of cars parked on-street	1.97	0.90	1.61
standard deviation	1.61	0.85	1.32
# of observations	35	406	27
significantly different @ 95% level?	Yes		
significantly different @ 95% level?		Yes	

If all of "the slack" of off-street parking spaces were to be taken up (which one might envision occurring under conditions in which all available on-street parking spaces are in use), how many cars would households living on properties with secondary units push out onto the street as compared to their peers living on parcels without such units? One metric that can shed some light on the matter is "overspill cars," which we define to be the difference between the number of cars generated by the household(s) residing on the parcel (as summarized in Table 5) and the number of off-street parking spaces available on the property (as summarized in Table 4). Intuitively, a measure of "overspill cars" is equivalent to the number of cars that are pushed into on-street parking once all available off-street parking spaces on the parcel have been used. (A negative value for the overspill cars metric indicates that the property has more than enough off-street parking spaces for the cars owned by the household or households living on the parcel.)

Table 7 shows the average number of overspill cars generated by properties with and without secondary units. Again, while the discrepancy between the two categories is large (1.1 cars) and statistically significant, it drops to a much lower level (0.7 cars), albeit one that is still statistically significant, when properties with more than one secondary unit are excluded. Properties with only one secondary unit do, however, exhibit an appreciably higher standard deviation in the number of overspill cars that they generate compared to properties without secondary units (2.23 versus 1.40). This suggests the need for flexible policy tools that can span the wide variety of car ownership propensities exhibited by households living on properties with secondary units.

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[13] In the words of a Berkeley homeowner, "No one around here parks in their garage, for various reasons I guess, thus the garage parking spaces are only available in 'theory'." There are several reasons why this might be so. For instance, an off-street space may be arranged in tandem with another off-street space that is used frequently, requiring the owner of one of the cars to move her automobile to make way for the other. A driveway or garage entrance may be narrow and require that a driver back into it slowly and carefully. In many neighborhoods, on-street parking directly in front of the main house is frequently available at least some of the time, and could be perceived as the most convenient option.

Table 7. Overspill cars per unit.

	Number of Secondary Units		
	1 or more	0	1
mean # of cars parked on-street	1.47	0.35	1.09
standard deviation	2.32	1.40	2.23
# of observations	43*	406	35*
significantly different @ 95% level?	Yes		
significantly different @ 95% level?		Yes	

Note: We define the measure of "overspill cars" as the difference between the number of cars generated by a property (as summarized in Table 5) and the number of off-street parking spaces available on that property (as summarized in Table 4). Intuitively, it measures the parking impact of a parcel on its street and (possibly on nearby streets) if all of its off-street parking spaces are being fully used.

* 8 were imputed. The imputation technique is described in footnote #9.

RENTAL INTERNET ADVERTISEMENT STUDY

Purpose and data collection methodology

While the survey of homeowners described above provides many insights into the characteristics, behaviors and attitudes of homeowners, the survey is of limited usefulness for systematically analyzing the open rental market for secondary units, and the ways in which it differs from the corresponding market for rental dwellings that are *not* secondary units. The survey did not collect a sufficient quantity of rental market data on secondary units to make it possible for us to relate these units' characteristics to the level of rent charged via a hedonic model or other quantitative technique. In addition, the questions that we would have needed to add to the survey instrument in order to capture some of the information important to a hedonic analysis might have risked making the survey instrument too long, thus reducing response rates.

We therefore pursued a separate analysis in which we collected data about rental units – both secondary units and other types of dwellings – from advertisements placed on Craigslist.com, a website widely used by San Francisco Bay Area tenants and landlords. Craigslist ads offered several advantages. First, we could assume that landlords placing advertisements seeking tenants on Craigslist were not seeking to rent to people they already knew, and thus were not likely planning to offer "friends and family" discounts. By contrast, as previously described, about 26% of the secondary units in the survey response set are occupied by the homeowner household, while a further 25% are occupied by at least one person known to the homeowning household prior to move-in, whether as an acquaintance, friend, or relative. Second, we could readily collect data on secondary and non-secondary rental units simultaneously, thus making it easy to compare the two. Finally, landlords advertising on Craigslist presumably have a direct financial incentive (one not present for survey respondents) to list all pertinent features of the rental unit that they are offering in order to attract prospective tenants.

During the three-month period of May, June, and July of 2011, we collected unit characteristics from all Craigslist advertisements for secondary units[14] listed for rent and located in the general corridor[15] under study. We also collected information from a similar number of ads for non-secondary rental units.[16] After discarding records that were unusable for lack of essential information (such as rent charged, number of bedrooms, and number of bathrooms), we ended up with a sample of 174 secondary units and 164 non-secondary units.

In usable ads, amenities such as off-street parking, dishwashers and on-site laundry were assumed to *not* be in place unless mentioned, due to the direct incentive for landlords to trumpet all attractive features about the apartments they were seeking to rent. One exception to this general rule was for cooking facilities, which were assumed to be fully provided (i.e., to include the typical minimal configuration of a four-burner range top stove and oven) *unless* otherwise mentioned, due to typical market expectations concerning kitchens. Locational characteristics were captured via three dimensions: a measure of the unit's walkability (from the publicly available website www.walkscore.com), which we took to serve as a proxy for the general level of neighborhood amenity, an index of the crime rate for the local area (from the proprietary website www.neighborhoodscout.com), and the unit's proximity to a freeway, which we assumed to coincide with environmental blight due to noise, fumes, visual impacts and so forth.[17] In a few cases, we needed to impute the values for certain variables that could not be recorded for every record in the data set. Some independent variables that we originally intended to collect, and that indeed might have proved to be useful, such as the number of units in the apartment's building, had to be dropped from our model, because they could not be inferred or plausibly imputed from every single advertisement. Details about all of the variables included in the model are described in Appendix 3.

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[14] A unit was deemed to be a "secondary unit" for these purposes if this characteristic could be ascertained from the advertisement, such as a picture depicting a secondary unit, or text giving some tell-tale description such as "a cottage behind the main house." Note that for these purposes the analytic distinction between a "secondary unit" and a unit in a duplex or triplex is bound to be blurry. The inherent characteristic of a secondary unit of interest for this analysis is that it is located on a property with only two or three units, possibly (though not necessarily) with an owner-operator living on-site or in the immediate vicinity.
[15] This corridor is roughly defined as that portion of the urban East Bay that extends from the bay shore on the west to the topographic break in the hills to the east (corresponding more or less to the "Flatlands," as described in WP-2012-01), from approximately one mile north of El Cerrito Del Norte BART on the north end to approximately one mile south of MacArthur BART on the south end. While this region generally coincides with the areas considered in the rest of this study, it is not limited to only the BART station areas within this corridor.
[16] When collecting data for non-secondary units, we kept gathering these advertisements until their numbers roughly matched those of the secondary unit advertisements. Once the latter exceeded the former, we resumed gathering the latter. Thus, while the non-secondary unit advertisements are a subset of the entire universe of ads placed for units lying within the corridor, one can assume that the sample was randomly drawn.
[17] Because of the high density of freeway coverage in the study area and the consequent ease of accessing a freeway from anywhere within it (no location in the study area lies more than three miles from an on-ramp), we follow the lead of Cervero and Landis in treating close freeway proximity in the urban East Bay as a disamenity with no countervailing proximity-based advantages for slightly greater distances. See Cervero, R. and Landis, J. 1997. "Twenty Years of the Bay Area Rapid Transit System: Land Use and Development Impacts." Transportation Research A, Vol 31, No. 4, pp. 309-333.

The dependent variable used for the hedonic analysis is the adjusted monthly rent. To facilitate a true "apples to apples" comparison, the rent for each unit was adjusted to account for the availability or lack thereof of off-street parking (whether free or paid) and the partial or total inclusion of three utility costs (gas/electric, water/sewer, and cable/Internet) with monthly rent. While four of the secondary units offered opportunities for tenants to offset their rent through on-site work (such as childcare, yard maintenance, etc.), this type of in-kind work was considered to be above and beyond the rental transaction (since it required labor to be performed) and thus was not factored into adjusted rent. Note that for the full data set, we chose to *not* normalize rent by dwelling unit floor area, since square footages were only directly provided in 24% of the real estate ads that were recorded in the data set (the rest were imputed). (We conducted hedonic model runs using both the full data set and the subset that includes only records with directly observable square footages, as is described below in the discussion of the hedonic model results.)

With the variables constructed as described above, we were able to conduct two types of analysis on the data set: 1) a series of difference-of-means tests among the various variables, in order to ascertain the ways in which secondary unit characteristics differ from those of non-secondary units, and to gather summary statistics on these two submarkets; and 2) a hedonic model, which allowed us to compare how various unit amenities and locational characteristics are differentially priced into rents in the secondary unit and non-secondary unit rental markets. The results of these analyses are treated in turn in the following two sections.

Table 8 shows the distribution of dwellings in the data set by municipal jurisdiction. This distribution suggests that a cautionary note be kept in mind when interpreting these results: 60% (secondary units) to 65% (non-secondary units) of the apartments from each category are located in Berkeley and the adjacent unincorporated community of Kensington. By comparison, the Berkeley flatlands and Kensington account for only 38% of the SFR parcels of the study area (Table 8). The concentration of rental units in and around Berkeley may reflect the heavy influence that the local University of California campus exerts on the rental market of the corridor under study, and perhaps of the particular ubiquity of Craigslist as a means of locating rental housing opportunities among the highly educated population of Berkeley. The first concern is perhaps tempered by the timing of the data collection, which occurred in the late spring and early summer, a period during which university students are unlikely to seek housing (although it may be a time during which students are *vacating* housing and leaving the region, and landlords are seeking to fill the resulting vacancies). As can be seen, Oakland and Emeryville are also somewhat over-represented (though less so than Berkeley/Kensington). El Cerrito and Albany are mildly under-represented, while Piedmont and the relevant portion of Richmond are highly under-represented.

Table 8. Distribution of units and SFR parcels by jurisdiction.

Jurisdiction	Non-secondary units (%)	Secondary units (%)	SFR parcels in jurisdiction
Berkeley flatlands	65	60	38
Oakland flatlands	21	24	19
City of Albany	4	6	13
El Cerrito flatlands	8	9	13
S Richmond flatlands	2	1	7
City of Piedmont	< 1	< 1	12
Total	**100%**	**100%**	**100%**

Location of non-secondary and secondary units in data set (left and central columns, respectively) compared against proportion of total study region SFR parcels (right column). Results in the right column are estimated from the following sources: Center for Community Innovation, and 2009 Housing Elements for the cities of Albany, Emeryville, and Piedmont and for the County of Contra Costa (which contains unincorporated Kensington).

Table 9 gives summary statistics for secondary and non-secondary units on a variety of variables, along with the results of a difference-of-means test (T test) performed on each variable. The statistics reveal a number of intuitive, yet notable, differences between rental units that are secondary units versus rental units that are not, suggesting that secondary units occupy a distinctive niche within the overall rental market.

Table 9. The mean value of various characteristics of units, divided into the categories of non-secondary units (left column, N=164) and secondary units (central column; N=174). The right-hand column indicates whether each variable is or is not significantly different, between the non-secondary and secondary unit subsets, at the 95% level of confidence.

	non-secondary units*	secondary units**	significantly different***
physical characteristics			
# of bedrooms	1.52	0.99	yes
# of bathrooms	1.11	1.00	yes
floor area (sf)	703	559	yes
secure entrance (%)	12.8	2.9	yes
economic characteristics			
adjusted monthly gross rent ($)	1,358	1,106	yes
adjusted monthly gross rent per ($/sf)	2.17	2.30	no
adjusted monthly gross rent as % of AMI	68.4	62.4	yes
owner on site (%)	2.4	52.9	yes
Parking			
no off-street parking (%)	45.7	87.4	yes
free off-street parking (%)	31.7	10.9	yes
paid off-street parking available (%)	22.6	1.7	yes
Amenities			
coin-operated laundry (%)	46.3	0.0	yes
free laundry (%)	16.5	45.1	yes
full kitchen facilities (%)	99.4	89.1	yes
Dishwasher (%)	14.0	9.2	no
Microwave (%)	15.1	26.8	yes
Utilities			
included gas/electric (worst = 0, best = 1)	0.052	0.454	yes
included water/sewer fees (worst = 0, best =	0.377	0.583	yes
included cable/Internet (worst = 0, best = 1)	0.040	0.419	yes
locational attributes			
Walkscore (worst = 0, best = 100)	84.5	72.9	yes
crime index (most dangerous = 0, safest =	18.3	40.6	yes
freeway proximity (furthest = 0, closest = 1)	0.241	0.1865	no

First, secondary units are smaller, with on average one half of a bedroom less than non-secondary units, one tenth of a bathroom less, and about 140 sf less floor area. Not surprisingly, the adjusted rent of the average secondary units is considerably less than that of the average non-secondary unit, by about $250 per month. When expressed in terms of Area Median Income, in the manner typical of subsidized affordable housing, the adjusted rents of secondary units are more affordable to a modest though significant degree: the average secondary unit is affordable to a household earning 62% of AMI, versus about 68% of AMI for non-secondary units.[18] While adjusted rent normalized by floor area is slightly *higher* for secondary units (albeit not to a statistically significant degree), we are nevertheless left with a distinct impression that secondary units are more likely than units in the general rental market to provide smaller, more affordable housing packages for the households that are seeking them. If anything, the estimated 6% difference in affordability as a minimum AMI percentage is a lower-bound estimate, since non-secondary units advertised on Craisglist are likely to be less expensive, on average, than apartments rented via other, more costly means (such as freeway billboards, posters in train stations, listings in glossy apartment magazines, etc.). In addition, the secondary units advertised on Craigslist were being rented to strangers, and therefore excluded the share of secondary units (which we estimated in the homeowner survey to be 51%) that are rented to family, friends or acquaintances for free or reduced rents in many cases. If it were possible to include the secondary units occupied by people already known to the homeowner household in the analysis, doubtless the disparity in affordability between secondary and non-secondary units would be even greater.

It is also worth noting that secondary units in the dataset are far more likely (53% versus 2%) to have owners residing on-site than their non-secondary counterparts. This is not surprising when one considers that owner-occupancy of one of the two units on a property consisting of a main house and a secondary unit is mandated by law in the cities of Albany, Berkeley, El Cerrito, Piedmont, and Oakland.[19] The strong contrast in owner-occupancy between non-secondary and secondary units likely accounts for many of the differences between these two housing submarkets. It also provides indirect but strong evidence that secondary units are much more likely to be owned and operated by amateur landlords who earn a portion or a majority of their living from activities other than real estate, whereas non-secondary units are much more likely to be owned and operated by real estate professionals or firms.

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[18] Area Median Income is taken from the 2011 income limit data published by the US Department of Housing and Urban Development for the Oakland-Fremont HMFA, which includes all of Alameda and Contra Costa Counties, which in turn include the entirety of this report's study area. "Affordability" is taken here to correspond to the HUD standard wherein a household expends no more than 30% of its gross income on housing rent plus utility costs. The Area Median Income, again following standard practice, is computed for a household size that equates to 1.5 persons per bedroom in the unit (or 1 person per studio apartment). Our method of adjusting rent to account for utility costs roughly mirrors standard practice in affordable housing, since utility costs, when not covered by the landlord, are effectively deducted from rent for affordability ratio computation purposes.

[19] The reason that owner-occupancy amongst what we are classifying as "secondary units" for the purposes of the rental Internet advertisement study falls short of 100% is some combination of 1) non-compliance with the law by property owners and 2) the inclusion of units in the "secondary unit" data set that, legally speaking, are actually duplexes or triplexes and thus not subject to the owner-occupancy requirement.

Possibly as a consequence of much higher levels of non-professional management, secondary units appear to handle parking for their tenants in a markedly different manner from non-secondary rental units. This can be seen from the distribution of the three mutually exclusive categories of parking leasing for these two submarkets: no parking provided, free off-street parking, and off-street parking offered for a fee. Secondary units are far more likely (87%) to offer no off-street parking whatsoever (whether free or otherwise) than non-secondary units (46%). In the relatively rare cases where off-street parking is offered for secondary units, it is much likelier to be offered for free (11%) than for a fee (2%). A comment from a Berkeley homeowner typifies the most common scenario with secondary units: "There are three households on our block with extra housing units … No one on our block has a usable garage and most do not or cannot use their driveways for parking."

Differences in amenities between secondary and non-secondary units are less dramatic than is the case with parking, but a couple of comments concerning these variables are nonetheless in order. First, the likelihood of secondary units offering a fully-equipped kitchen is lower than for their non-secondary peer units to a modest but statistically significant degree. This could well be reflective of the prevalence of unpermitted secondary units (as discussed in WP-2012-02). This could also explain the somewhat higher incidence of microwave oven provision in secondary units, i.e., microwave ovens could be viewed as a means by which landlords attempt to partially compensate tenants for offering substandard cooking facilities. Indeed, 13 of the 18 secondary units lacking cooking facilities (72%) offer microwave ovens, whereas the one non-secondary unit that does not have full cooking appliances does have a microwave oven.

Some portion or all of three utility bills (gas/electric, water/sewer, and cable/Internet) are markedly and statistically significantly more likely to be included as part of rent in secondary units than in non-secondary units. Note that this should not be taken to imply that secondary units are therefore a better deal for their tenants than non-secondary units, because these utility bills have been factored into the adjusted rent computed for each unit (as described in the previous section). It does, however, mean that housing packages with utility payments included are more common for secondary unit tenants than for their peers not living in secondary units. This discrepancy is likely attributable to 1) the higher likelihood of sharing utility costs with an on-site, amateur landlord and 2) the greater likelihood of single connections to electric lines and gas, water and sewer mains being shared between a secondary unit and other units on the property.

That locational attributes are not dramatically dissimilar between secondary and non-secondary units in the dataset is not terribly surprising, given that the corridor from which the units were selected is a reasonably homogeneous environment in terms of its urban development patterns. Nonetheless, we see that secondary units are, to a modest degree, located in less walkable and lower-crime neighborhoods, and are less likely to be located within close proximity to a freeway, than is the case for non-secondary units. This is to be expected, as secondary units are presumably more likely to be located in predominantly residential and lower-density neighborhoods.

Hedonic model methodology and results

A hedonic model, by regressing the dependent variable (adjusted monthly rent) against the characteristics described in the previous section, can quantify how the average actor in the housing market values certain unit and locational attributes. By modeling the entire dataset, as well as separately modeling the roughly equal portions comprised of secondary and non-secondary units, we can infer whether participants in these two submarkets value attributes differently.

The hedonic model is specified as follows:

$$\ln(adjusted\_rent) = num\_BRs + num\_BAs + sqfootage + SECURE + OWNONSITE$$
$$+ ON\_STREET + COINOP\_LAUND + FREE\_LAUND + MICROW + DISHWASHER$$
$$+ FULL\_KITCHEN + Walkscore + crime\_index + freeway + \varepsilon$$

Here *adjusted_rent* (rent adjusted according to the method described in the first section of this chapter) is the dependent variable; *num_BRs* and *num_BAs* indicate the number of bedrooms and bathrooms, respectively; *sqfootage* is the unit's interior square footage; *SECURE* is a dummy variable indicating whether or not the unit has a secure entry (i.e. an entry that lies behind a locked gate or door with limited access); *OWNONSITE* is a dummy variable indicating whether or not the owner of the rental unit resides on-site in another unit; *ON_STREET* is a dummy variable indicating whether or not the tenant must find parking on the street if she has a car; *COINOP_LAUND* is a dummy indicating whether or not the unit has coin-operated laundry machines on the property; *FREE_LAUND* is a dummy set to 1 only if the unit has access to laundry machines on the property for no charge; *MICROW* is a dummy variable indicating whether or not a microwave oven is included in the unit; *DISHWASHER* is a dummy variable indicating whether or not the unit includes a dishwasher; *FULL_KITCHEN* is a dummy variable indicating whether or not the unit has appliances befitting a full kitchen (four-burner stove and full-sized oven); *Walkscore* is a freely available index of the unit's address's "walkability" from 0 (worst) to 100 (best); *crime_index* is a proprietary index of crime for a given location based on published crime statistics ranging from 0 (worst) to 100 (best); and *freeway* is an index of proximity to the nearest freeway that ranges from 0 (more than 1000' from a freeway) to 2 (within 500' of a freeway).[20] (As previously mentioned, a fuller description of the construction of the variables, along with the imputation procedures used to populate variables with sparse coverage, is provided in Appendix 3.)

The semi-log form of the model allows, in the case of a coefficient k computed by the model for a particular independent variable X, for $e^k - 1$ to be interpreted as the proportional change in the dependent variable resulting from a unit change in X. Thus, if $e^k - 1$ were computed by the model to be 0.2, or 20%, for example, then that would signify a 20% modeled increase in *adjusted_rent*

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[20] In the previous section, this variable was normalized to run from a minimum of 0 to a maximum of 1, rather than from 0 to 2, for ease of interpretation.

with an increase in *X* by one unit. This form therefore allows for an intuitive interpretation of the monetary contribution to rents from the various independent variables that are modeled.[21]

Results from full data set. Table 10 allows a comparison of the results from three model runs: one performed on the full data set, and the other two performed on two subsets, one including only the non-secondary units and the other including only the secondary units. As might be expected, the increase to adjusted rent resulting from the addition of a bedroom is significant and large in each case. The same is largely true for bathrooms (although the magnitude of the increase is smaller), except that this variable is omitted from the secondary unit-only model run as a result of *every single* secondary unit in the data set (all 174 of them) having one bathroom. These results are intuitive, as is the positive and significant effect of square footage (above and beyond what is captured in the bedroom and bathroom variables) in the full data set.

It is interesting to note that the presence of an owner on-site, all else being equal, results in a statistically significant reduction in adjusted rent of almost 9% in the case of secondary units, and none at all in non-secondary units. This result gives support to the supposition that amateur, on-site property owners are less concerned about maximizing rental revenues from tenants, and are perhaps more concerned with maintaining long-term amity with their renters. From the tenant's point of view, this result suggests that secondary units residing on owner-occupied properties are often a housing bargain.

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[21] See, for example, Sirmans, G. Stacy and David A. Macpherson. 2003. "The Value of Housing Characteristics." Washington, DC: National Association of Realtors, December.

Table 10. Hedonic model results (excluding imputed square footages). Results are shown for hedonic model runs performed with the full data set, non-secondary units only, and secondary units only. Note that because the model was run in the semi-log form, and because what is displayed here represents the exponentiation of the model coefficients, each independent variable's value shown here can be interpreted as the percentage change in the dependent variable (adjusted rent) that would result from an increase of one unit of that independent variable.

		Units	
	All	**Non-secondary**	**Secondary units**
regression statistics			
# of data points	336	164	172
r-squared of model run	0.51	0.64	0.41
modeled variable coefficients (%)			
# of bedrooms	**21.0**	**21.5**	**20.0**
# of bathrooms	**13.7**	**15.9**	--
floor area (per 100 sf)	**1.6**	1.5	1.7
secure entry	-0.8	4.6	-12.0
owner on-site	-6.4	-1.2	**-8.7**
no off-street parking	-4.8	**-10.0**	2.6
free laundry	**11.9**	**24.1**	6.5
coin-operated laundry	3.1	6.9	--
microwave oven	5.0	**16.8**	0.6
dishwasher	**11.0**	1.1	**20.8**
full kitchen facilities	**43.2**	24.2	**43.1**
Walkscore (per 10 points)	0.7	2.6	0.2
crime index (per 10 points)	0.4	-0.3	0.0
adjacent to freeway	**-10.0**	**-12.0**	-3.3

Coefficients that are **in boldface** are statistically significant at the 95% level.

Failing to offer on-street parking depresses rents in non-secondary units by about 9%, while the comparable coefficient for secondary units is not statistically significant. The 9% decrease in rent for non-secondary units compares to similar decreases, found in a hedonic study of for-sale housing San Francisco in the mid-1990s, of 12% for SFR and 13% for condominium properties.[22] The 9% reduction found for East Bay non-secondary rental units suggests that while provision of off-street parking, or lack thereof, is priced into transactions in mainstream rental units, this is not the case in the market for East Bay secondary units. Because the vast majority of secondary units in this region appear to offer no off-street parking at all (as shown in the previous section), whether paid or free, it could be that tenants seeking secondary units have little to no expectation of off-street parking being offered, and therefore do not take this factor into account when formulating their bids for housing.

Amenities are reflected in rents to varying degrees. For instance, the availability of free laundry machines on the premises shows up as a strong influence on rent in the overall data set and for non-secondary units, but not in secondary units. Perhaps this is because secondary unit tenants are so often able to share the use of laundry machines with the main house that on-site laundry availability is less of a prized feature than in the general rental market, where a lack of laundry machines usually means relying on a commercial laundromat. Meanwhile, it is difficult to understand the large magnitudes of the coefficients in favor of microwave ovens (for non-secondary units) and dishwashers (for secondary units), particularly the former. Perhaps the offering of microwave ovens in mainstream apartments, which are much less likely to have substandard kitchens (as discussed in the previous section), is associated with other attractive kitchen amenities, while the presence of microwaves in secondary units could more often be a partial recompense for the substandard kitchens more likely to be seen in that submarket (evidence for which was also presented in the previous section). That a large and statistically significant effect of kitchen appliances on rents is only seen for secondary units can be interpreted as the consequence of market participants taking into account the wide variation of kitchen quality in secondary units (whereas mainstream rental units, as previously discussed, tend to have more uniformly up-to-standard kitchens).

It is interesting that none of the three locational effects have significant effects on rent, with the exception of freeway proximity, which depresses the rents offered for non-secondary units. Perhaps the perceived benefit of proximity to commercial and other neighborhood amenities, prized by some tenants, that is reflected in a high Walkscore is negated by decreased tranquility for others. Finally, East Bay renters in general appear to not have a great deal of price sensitivity to crime rates.

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[22] Jia, W. and M. Wachs. 1998. Parking and Affordable Housing. Access 13. See also Litman, T. 2009. Parking Requirement Impacts on Housing Affordability. Victoria, CA: Victoria Transportation Policy Institute, in which it was argued that subsidized rental housing developments could reduce development costs – and thus, presumably, rents – by 10% if off-street parking did not have to be provided.

Lastly, it is worth noting that the model run for the non-secondary units has a considerably higher r^2 value than that for the secondary units (0.64 versus 0.41). This can be interpreted as evidence that the rental market for mainstream rental units is more transparent (given the usage of real estate professionals of rental brokers, apartment magazines, etc.) and thickly traded. On the flip side, one could surmise that the secondary unit rental market, in its much heavier reliance on amateur actors, exhibits more unpredictability in rent levels as a result of varying experience levels amongst its landlords, informal renting practices, less sophisticated tenant sourcing (such as via Craigslist), and the like.

Results using only non-imputed square footages

Because conventional hedonic studies almost always include actual, rather than imputed, unit floor areas, we re-ran the hedonic model described above for a restricted data set that only included units for which actual unit square footage amounts had been specified as a check on the validity of the results from the full data set. The results from the reduced data set are shown in Table 11.

The results highlight the tension between using data points (i.e., properties) that are complete versus using a larger number of data points. They also illustrate the difficulties of collecting data on a black market phenomenon – in a typical hedonic analysis of rental apartments, having an actual floor area value for each dwelling unit in the model would not be an issue.

Restricting the data set to only those units with known square footages reduces the size of the data set by more than three-quarters overall (73% for the non-secondary units and 79% for the secondary units). On the other hand, the r^2 values increase appreciably: from 0.51 to 0.64 for the full data set, from 0.64 to 0.88 for the non-secondary units, and from 0.41 to 0.60 for the secondary units. It would appear that having actual, as opposed to imputed, square footages for the units has a major impact on the predictive power of the hedonic model.

Table 11. Hedonic model results (excluding imputed square footages). Hedonic model results are shown for a restricted data set in which only units with known floor areas are included. (By contrast, Table 10 shows the results from model runs in which units with imputed floor areas are also included.) As in Table 10, each independent variable's value shown here can be interpreted as the percentage change in the dependent variable (adjusted rent) that would result from an increase of one unit of that independent variable.

		Units	
	All	**Non-secondary**	**Secondary units**
regression statistics			
# of data points	80	44	36
r-squared of model run	0.64	0.88	0.60
modeled variable coefficients (%)			
# of bedrooms	**13.0**	**37.1**	1.5
# of bathrooms	16.7	3.0	--
floor area (per 100 sf)	**5.3**	2.1	**5.2**
secure entry	5.3	**22.5**	-26.3
owner on-site	-2.9	-6.0	-3.6
no off-street parking	-4.2	-1.5	-0.3
free laundry	-5.4	13.6	-9.3
coin-operated laundry	-1.9	-0.1	--
microwave oven	2.3	10.8	-1.3
dishwasher	**18.5**	**28.5**	**31.0**
full kitchen facilities	**51.5**	5.6	**70.4**
Walkscore (per 10 points)	-1.1	**10.3**	-3.2
crime index (per 10 points)	0.9	-1.4	0.9
adjacent to freeway	**-11.8**	**-12.9**	-8.6

Coefficients that are **in boldface** are statistically significant at the 95% level.

In the model runs on the restricted data set, the number of bedrooms has a large and significant effect in the expected direction on adjusted rents for non-secondary units, although none for secondary units. Number of bathrooms ceases to have a significant effect – presumably this variable has been absorbed by square footage, whose coefficient becomes large and significant in the case of secondary units. In the restricted data set, a secure entry emerges as a highly valued and significant amenity. Meanwhile, off-street parking recedes as a significant amenity, as do free laundry and microwave ovens. Dishwashers and full kitchens remain very important and significant for secondary units. Owner-occupancy ceases to be significant for secondary units. Finally, the locational factors remain virtually unchanged in the reduced data set.

Thus, in interpreting the results of the hedonic data study, we must exercise some caution with the results presented from the full data set with respect to the importance of owner-occupancy in secondary units, and the importance of off-street parking provision, free laundry, and microwave ovens in non-secondary units, which cease to be significant in the reduced data set. Secondary units in the reduced data set remain highly sensitive to the quality of kitchen facilities (as measured by the presence of a dishwasher and of a full kitchen). Adjusted rents for secondary units also remain much more unpredictable (as measured by r^2 value), thereby confirming that the rental market for secondary units is more idiosyncratic than that for non-secondary units.

CONCLUSION

Using both the homeowner survey and the rental Internet advertisement study, we are able to overcome at least some of the limitations posed by the opacity of the market for secondary unit housing and to gain some insights into the nature of this market. From the homeowner survey, we learn, first of all, that secondary units are a widespread and prevalent, rather than an aberrational and exceptional, phenomenon. This suggests that scholars interested in the functioning of the rental housing market in the San Francisco Bay Area (and probably other high-cost regions like it) would be well-advised to take account of the existing stock of secondary units.

From the homeowner survey we learn about the physical nature of secondary units in the urban core of the East Bay. For instance, most units are freestanding structures or converted garages. In addition, we have survey evidence that suggests that homeowners with secondary units are mainstream insofar as they appear to differ little, from a demographic standpoint, from homeowners who lack such units.

The survey also gives us an indication of what homeowners who lack secondary units at present think about them. Awareness of the existence of secondary units is high, and in most cases the units themselves are seen as relatively benign. Where secondary units *are* viewed negatively, impacts on on-street parking resulting from their tenants are the most common reason. Nonetheless, the potential market for secondary unit installation is quite sizable, with 30% of homeowners expressing at least a potential interest in installing them. This highlights an unusual aspect of

secondary units in relation to other types of rental housing: while they are sometimes seen to pose impacts to local homeowners' quality of life, as is typical with rental housing, they also, quite unusually, are often seen as something from which homeowners could personally benefit.

From the rental Internet advertisement study we are able to infer that even most of the secondary units rented to strangers are owned and operated by homeowners who live on-site. In addition, the survey results tell us that a sizable fraction of secondary units are rented to acquaintances, friends or family, in some cases for free and in other cases, we presume, for reduced rents. Thus, the two methods combine to give us a picture of secondary units as frequently (though not always) forming part of an *amateur-operated* rental market, with some *informal* characteristics. These features are consistent with our view of this type of housing as a black market, or one that operates at least partially outside of governmental taxation and regulation. An Albany homeowner provides a perfect example of this type of informality: "We are on a corner and have five street parking places as well as a driveway and a garage (three places), yet we were forced to add two parking spaces when we added our [secondary] unit. We are now in the process of illegally removing those two [newly-added parking spaces] as they take up virtually the entire back yard." Whereas one would generally assume compliance with off-street parking or other regulations imposed on professionally-managed rental housing, the picture differs considerably for secondary unit housing.

The rental Internet advertisement study, finally, provides fairly strong evidence that secondary units comprise cheaper housing packages to small households of one or two people than what is commonly available in the unsubsidized overall rental housing market. We calculate, as a lower-bound estimate, that this discrepancy corresponds to a savings, for tenants in secondary units, of 6% of AMI on average. Secondary units are cheaper for a variety of reasons: they tend to be smaller, they are less likely to offer off-street parking, they are less likely to provide interior amenities such as dishwashers, and they are more likely to share utility costs with the homeowner or with other units, for example. The hedonic model, using data collected in the rental Internet advertisement study, provides at least some evidence that amateur ownership and operation has a positive influence on secondary unit affordability, although more research will be needed to fully test this claim.

We are therefore left with a striking picture of an important, and often overlooked, segment of the existing market for rental housing in the East Bay, and one that appears to be particularly important for low-moderate to moderate income rental housing. While our two means of probing the rental market for secondary units, the homeowner survey and the rental Internet advertisement study, have provided what we believe to be important insights into this market, much more work will be needed – both using other methods and also studying other high-cost housing markets – to paint a full picture of the elusive phenomenon of existing secondary units.

Appendix 1: Homeowner survey instrument (hard copy, English-language version)

Thank you for participating in our study on housing in the East Bay. This survey should be filled out by the owner (or by one of the owners if there is more than one) of the property to which this survey was mailed. It should take about 15 minutes of your time to fill it out.

PLEASE NOTE THAT WE WILL MAINTAIN STRICT ANONYMITY FOR ALL ANSWERS THAT YOU GIVE. YOUR IDENTITY AND INDIVIDUAL ANSWERS WILL NOT BE SHARED WITH ANYONE OUTSIDE THE RESEARCH TEAM.

Extra Housing Units question

Many residential properties in this area include one or more **Extra Housing Units** in addition to the main dwelling. Extra Housing Units are often rented out to tenants. Extra Housing Units can take different forms, including a first floor or basement that has been converted to a unit, a freestanding backyard cottage, a garage that has been turned into an apartment, and others. (Please see images of several examples of Extra Housing Units below.)
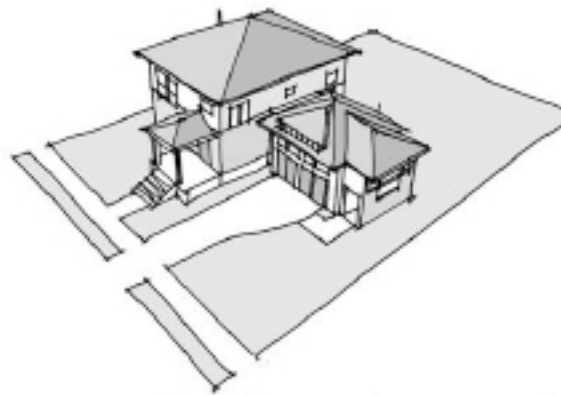
1. How many Extra Housing Units (see above for definition) are on your property? (Circle one.)
    a) I don't have any extra housing units on my property.
    b) 1
    c) 2
    d) 3
    e) 4 or more

If your answer to question 1 was a (i.e., that you have no Extra Housing Units on your property), then skip ahead to question 56. Otherwise, please answer the following questions about each Extra Housing Unit that is on your property.

WE WILL ASK YOU A SERIES OF QUESTIONS ABOUT EACH EXTRA HOUSING UNIT ON YOUR PROPERTY. THE FOLLOWING QUESTIONS ARE ABOUT THE FIRST ONE, WHICH WE WILL CALL EXTRA HOUSING UNIT #1

2. When was the decision made to install Extra Housing Unit #1 on your property? (Circle one.)
    a) It happened while my household owned the property
    b) It happened before my household owned the property

If you answered "It happened before my household owned the property" to question 2, then skip to question 4. Otherwise, proceed to question 3.

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3. Who did the actual construction work of installing Extra Housing Unit #1 on your property? (Circle all that apply.)
    a)   I did it.
    b)   A hired contractor did the work.
    c)   A friend or relative did the work.
    d)   Other _____.

4. How would you best describe the physical layout of Extra Housing Unit #1? (Circle one.)
    a)   Part or all of basement or first floor converted to an apartment
    b)   Garage converted to an apartment
    c)   Apartment above a garage
    d)   Attic converted to an apartment
    e)   Rooms inside main part of house converted to an apartment
    f)   Apartment behind main house and attached to it
    g)   Apartment behind main house and in its own separate structure
    h)   Other: Please describe _____

5. Does Extra Housing Unit #1 have its own complete kitchen (sink, range, and refrigerator)?
Yes   No   (circle one)

6. Does Extra Housing Unit #1 have at least one complete bathroom (toilet, sink, and shower/bath)?
Yes   No   (circle one)

7. How many bedrooms does Extra Housing Unit #1 have? (Circle one.)
   a)   None (it is a studio or efficiency unit)
   b)   1
   c)   2
   d)   3 or more

8. About how many years ago was Extra Housing Unit #1 installed? (If less than one year ago, just mark "0." If you don't know, check "I don't know.")
_____ years ago   _____ I don't know

9. Is Extra Housing Unit #1 occupied by at least one person?
Yes   No   (circle one)

If you answered Yes to question 9, then skip ahead to question 11. Otherwise, proceed to question 10.

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10. Why is Extra Housing Unit #1 currently unoccupied? (Circle one.)
   a)   It needs physical work to be rentable.
   b)   It is vacant, but I am looking for a tenant.
   c)   It is being used as something other than an apartment (home office, workshop, studio, etc).
   d)   Other reason: _____

If you answered question 10, then skip ahead to question 20 (if you have a second Extra Housing Unit) or proceed to question 60 (if you don't).

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11. Which of the following best describes the relationship of the occupant(s) in Extra Housing Unit #1 to you at the time of move-in? (Circle one)
   a)   My household lives in Extra Housing Unit #1.
   b)   Relative(s)
   c)   Friend(s)
   d)   Acquaintance(s)
   e)   I did not know the occupant(s) before move-in.

If your answer to question 11 was a), then skip to question 20 (if you have a second Extra Housing Unit) or question 60 (if you don't). Otherwise, please proceed to question 12.

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12. How did you find the occupant(s) in Extra Housing Unit #1? (Circle all that apply.)
   a)   I already knew the occupant(s)
   b)   Craigslist
   c)   Other Internet source
   d)   Newspaper classified ad
   e)   Referred by someone I know
   f)   Other: _____

13. How much is the rent paid to your household by the occupant(s) in Extra Housing Unit #1? If the occupant(s) are staying in Extra Housing Unit #1 for free, then mark "$0."
$_____ per month

14. Please circle all of the following utilities that are included in the rent, if any, paid to your household by the occupant(s) in Extra Housing Unit #1.

Water/Sewer   Gas/Electricity   Trash/Recycling Pickup

Telephone   Cable TV   Internet

15. How long has the person who has been living in Extra Housing Unit #1 for the longest time lived there?
_____ years   _____ less than one year (check if applicable)
_____ not sure

16. How many total cars do the people (if any) who are living on your property in Extra Housing Unit #1 (if any) normally park **on your property** (i.e. not on the street)? (Please choose one.)
   a)   none
   b)   1
   c)   2
   d)   3 or more

17. How many total cars do the people (if any) who are living on your property in Extra Housing Unit #1 (if any) normally park **on the street** within a five-minute walk of where you live? (Circle one.)
   a)   none
   b)   1
   c)   2
   d)   3 or more

18. How many children (i.e. people under age 18) live in Extra Housing Unit #1?
   a)   none
   b)   1
   c)   2
   d)   3 or more

19. For each adult (i.e. person of age 18 or more) living in Extra Housing Unit #1, please answer the following questions.

Question	Adult #1	Adult #2	Adult #3	Adult #4
What is your best estimate of this person's age?	_____ years	_____ years	_____ years	_____ years
How would you best describe the ethnicity or race of this person? (Circle all that apply.)	White/Caucasian Latino/Hispanic Black/African American Asian/Pacific Islander American Indian/Alaska Native Other: ——————— Mixed Race	White/Caucasian Latino/Hispanic Black/African American Asian/Pacific Islander American Indian/Alaska Native Other: ——————— Mixed Race	White/Caucasian Latino/Hispanic Black/African American Asian/Pacific Islander American Indian/Alaska Native Other: ——————— Mixed Race	White/Caucasian Latino/Hispanic Black/African American Asian/Pacific Islander American Indian/Alaska Native Other: ——————— Mixed Race
What is this person's gender? (Circle one.)	Male Female	Male Female	Male Female	Male Female

20. **THE FOLLOWING QUESTIONS ARE ABOUT EXTRA HOUSING UNIT #2. IF YOU DON'T HAVE A SECOND EXTRA HOUSING UNIT, PLEASE SKIP TO QUESTION #60. OTHERWISE, PROCEED.**
When was the decision made to install Extra Housing Unit #2 on your property? (Circle one.)
   a) It happened while my household owned the property
   b) It happened before my household owned the property

If you answered "It happened before my household owned the property" to question 20, then skip to question 22. Otherwise, proceed to question 21.

21. Who did the actual construction work of installing Extra Housing Unit #2 on your property? (Circle all that apply.)
   a)   I did it.
   b)   A hired contractor did the work.
   c)   A friend or relative did the work.
   d)   Other _____.

22. How would you best describe the physical layout of Extra Housing Unit #2? (Circle one.)
    a)   Part or all of basement or first floor converted to an apartment
    b)   Garage converted to an apartment
    c)   Apartment above a garage
    d)   Attic converted to an apartment
    e)   Rooms inside main part of house converted to an apartment
    f)   Apartment behind main house and attached to it
    g)   Apartment behind main house and in its own separate structure
    h)   Other: Please describe _____

23. Does Extra Housing Unit #2 have its own complete kitchen (sink, range, and refrigerator)?
Yes   No   (circle one)

24. Does Extra Housing Unit #2 have at least one complete bathroom (toilet, sink, and shower/bath)?
Yes   No   (circle one)

25. How many bedrooms does Extra Housing Unit #2 have? (Circle one.)
    a)   None (it is a studio or efficiency unit)
    b)   1
    c)   2
    d)   3 or more

26. About how many years ago was Extra Housing Unit #2 installed? (If less than one year ago, just mark "0." If you don't know, check "I don't know.")
_____ years ago   _____ I don't know

27. Is Extra Housing Unit #2 occupied by at least one person?
Yes   No   (circle one)

If you answered Yes to question 27, then skip ahead to question 29. Otherwise, proceed to question 28.

28. Why is Extra Housing Unit #2 currently unoccupied? (Circle one.)
    a)   It needs physical work to be rentable.
    b)   It is vacant, but I am looking for a tenant.
    c)   It is being used as something other than an apartment (home office, workshop, studio, etc).
    d)   Other reason: _____

If you just answered question 28, then skip ahead to question 34 (if you have a third Extra Housing Unit) or proceed to question 60 (if you don't).

29. Which of the following best describes the relationship of the occupants(s) in Extra Housing Unit #2 to you at the time of move-in? (Circle one.
   a)   My household lives in Extra Housing Unit #2.
   b)   Relative(s)
   c)   Friend(s)
   d)   Acquaintance(s)
   e)   I did not know the tenant(s) before move-in.

If your answer to question 29 was a), then skip to question 38 (if you have a third Extra Housing Unit) or question 60 (if you don't). Otherwise, please proceed to question 30.

30. How did you find the occupant(s) in Extra Housing Unit #2? (Circle all that apply.)
   a) I already knew the occupant(s)
   b) Craigslist
   c) Other Internet source
   d) Newspaper classified ad
   e) Referred by someone I know
   f) Other: _____

31. How much is the rent paid to your household by the occupant(s) in Extra Housing Unit #2? If the occupant(s) are staying in Extra Housing Unit #2 for free, then mark "$0."
$_____ per month

32. Please circle all of the following utilities that are included in the rent, if any, paid to your household by the occupant(s) in Extra Housing Unit #2.

Water/Sewer   Gas/Electricity   Trash/Recycling Pickup

Telephone   Cable TV   Internet

33. How long has the person who has been living in Extra Housing Unit #2 for the longest time lived there?
_____ years   _____ less than one year (check if applicable)
_____ not sure

34. How many total cars do the people (if any) who are living on your property in Extra Housing Unit #2 (if any) normally park **on your property** (i.e. not on the street)? (Please choose one.)
   a)   none
   b)   1
   c)   2
   d)   3 or more

35. How many total cars do the people (if any) who are living on your property in Extra Housing Unit #2 (if any) normally park **on the street** within a five-minute walk of where you live? (Circle one.)
   a) none
   b) 1
   c) 2
   d) 3 or more

36. How many children (i.e. people under age 18) live in Extra Housing Unit #2?
   a) none
   b) 1
   c) 2
   d) 3 or more

37. For each adult (i.e. person of age 18 or more) living in Extra Housing Unit #2, please answer the following questions.

Question	Adult #1	Adult #2	Adult #3	Adult #4
What is your best estimate of this person's age?	_____ years	_____ years	_____ years	_____ years
How would you best describe the ethnicity or race of this person? (Circle all that apply.)	White/Caucasian Latino/Hispanic Black/African American Asian/Pacific Islander American Indian/Alaska Native Other: _____ Mixed Race	White/Caucasian Latino/Hispanic Black/African American Asian/Pacific Islander American Indian/Alaska Native Other: _____ Mixed Race	White/Caucasian Latino/Hispanic Black/African American Asian/Pacific Islander American Indian/Alaska Native Other: _____ Mixed Race	White/Caucasian Latino/Hispanic Black/African American Asian/Pacific Islander American Indian/Alaska Native Other: _____ Mixed Race
What is this person's gender? (Circle one.)	Male Female	Male Female	Male Female	Male Female

38. **THE FOLLOWING QUESTIONS ARE ABOUT EXTRA HOUSING UNIT #3. IF YOU DON'T HAVE A THIRD EXTRA HOUSING UNIT, PLEASE SKIP TO QUESTION #60. OTHERWISE, PROCEED.**
When was the decision made to install Extra Housing Unit #3 on your property? (Circle one.)
    a) It happened while my household owned the property
    b) It happened before my household owned the property

If you answered "It happened before my household owned the property" to question 38, then skip to question 40. Otherwise, proceed to question 39.

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39. Who did the actual construction work of installing Extra Housing Unit #3 on your property? (Circle all that apply.)
    a)   I did it.
    b)   A hired contractor did the work.
    c)   A friend or relative did the work.
    d)   Other _____.

40. How would you best describe the physical layout of Extra Housing Unit #3? (Circle one.)
    a)   Part or all of basement or first floor converted to an apartment
    b)   Garage converted to an apartment
    c)   Apartment above a garage
    d)   Attic converted to an apartment
    e)   Rooms inside main part of house converted to an apartment
    f)   Apartment behind main house and attached to it
    g)   Apartment behind main house and in its own separate structure
    h)   Other: Please describe _____

41. Does Extra Housing Unit #3 have its own complete kitchen (sink, range, and refrigerator)?
Yes   No   (circle one)

42. Does Extra Housing Unit #3 have at least one complete bathroom (toilet, sink, and shower/bath)?
Yes   No   (circle one)

43. How many bedrooms does Extra Housing Unit #3 have? (Circle one.)
    a) None (it is a studio or efficiency unit)
    b) 1
    c) 2
    d) 3 or more

44. About how many years ago was Extra Housing Unit #3 installed? (If less than one year ago, just mark "0." If you don't know, check "I don't know.")
_____ years ago   _____ I don't know

45. Is Extra Housing Unit #3 occupied by at least one person?
Yes   No   (circle one)

If you answered Yes to question 45, then skip ahead to question 47. Otherwise, proceed to question 46.

---

46. Why is Extra Housing Unit #3 currently unoccupied? (Circle one.)
    a)   It needs physical work to be rentable.
    b)   It is vacant, but I am looking for a tenant.
    c)   It is being used as something other than an apartment (home office, workshop, studio, etc).
    d)   Other reason: _____

Please skip ahead to question 60.

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47. Which of the following best describes the relationship of the occupant(s) in Extra Housing Unit #3 to you at the time of move-in? (Circle one.)
    a)   My household lives in Extra Housing Unit #1.
    b)   Relative(s)
    c)   Friend(s)
    d)   Acquaintance(s)
    e)   I did not know the occupant(s) before move-in.

If your answer to question 47 was a), then skip to question 60. Otherwise, please proceed to question 48.

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48. How did you find the occupant(s) in Extra Housing Unit #3? (Circle all that apply.)
    a) I already knew the occupant(s)
    b) Craigslist
    c) Other Internet source
    d) Newspaper classified ad
    e) Referred by someone I know
    f) Other: _____

49. How much is the rent paid to your household by the occupant(s) in Extra Housing Unit #3? If the occupant(s) are staying in Extra Housing Unit #3 for free, then mark "$0."
$_____ per month

50. Please circle all of the following utilities that are included in the rent, if any, paid to your household by the occupant(s) in Extra Housing Unit #3.

Water/Sewer   Gas/Electricity   Trash/Recycling Pickup

Telephone   Cable TV   Internet

51. How long has the person who has been living in Extra Housing Unit #3 for the longest time lived there?
_____ years   _____ less than one year (check if applicable)
_____ not sure

52. How many total cars do the people (if any) who are living on your property in Extra Housing Unit #3 (if any) normally park **on your property** (i.e. not on the street)? (Please choose one.)
    a)   none
    b)   1
    c)   2
    d)   3 or more

53. How many total cars do the people (if any) who are living on your property in Extra Housing Unit #3 (if any) normally park **on the street** within a five-minute walk of where you live? (Circle one.)
    a)   none
    b)   1
    c)   2
    d)   3 or more

54. How many children (i.e. people under age 18) live in Extra Housing Unit #3?
    a)   none
    b)   1
    c)   2
    d)   3 or more

55. For each adult (i.e. person of age 18 or more) living in Extra Housing Unit #3, please answer the following questions.

Question	Adult #1	Adult #2	Adult #3	Adult #4
What is your best estimate of this person's age?	_____ years	_____ years	_____ years	_____ years
How would you best describe the ethnicity or race of this person? (Circle all that apply.)	White/Caucasian Latino/Hispanic Black/African American Asian/Pacific Islander American	White/Caucasian Latino/Hispanic Black/African American Asian/Pacific Islander American	White/Caucasian Latino/Hispanic Black/African American Asian/Pacific Islander American	White/Caucasian Latino/Hispanic Black/African American Asian/Pacific Islander American

	Indian/Alaska Native	Indian/Alaska Native	Indian/Alaska Native	Indian/Alaska Native
	Other: ———————	**Other:** ———————	**Other:** ———————	**Other:** ———————
	Mixed Race	**Mixed Race**	**Mixed Race**	**Mixed Race**
What is this person's gender? (Circle one.)	**Male** **Female**	**Male** **Female**	**Male** **Female**	**Male** **Female**

Please skip ahead to question 60.

Extra Housing Unit questions

56. Which of the following *best* describes why you do not have any Extra Housing Units on your property?
     a)   I have never given any thought to installing Extra Housing Units on my property.
     b)   I don't want any Extra Housing Units on my property.
     c)   I might like to have one or more Extra Housing Units on my property, but I haven't gotten around to installing any.
     d)   I looked into installing one or more Extra Housing Units on my property, but it didn't work out.
     e)   I am planning on installing one or more Extra Housing Units on my property.

57. If your answer to the previous question was *d* ("I looked into installing one or more Extra Housing Units on my property, but it didn't work out,") please answer this question: what was the *most important* reason that you did not end up installing one or more Extra Housing Units on your property?
     a)   It would have been too expensive.
     b)   I couldn't get financing.
     c)   One or more of my neighbors would have been unhappy with it.
     d)   My property couldn't fit the amount of off-street parking required by the city.
     e)   Other city requirement: _____
     f)   Other reason: _____

58. Is there at least one residential property on your street that has one or more Extra Housing Units on it?
     a)   Yes
     b)   No
     c)   I'm not sure

59. If you answered *a* ("Yes") to the previous question, do you think that the Extra Housing Units in one or more residential properties on your street have a negative impact on the neighborhood? (Please circle the best choice.)

a) Yes – too many cars trying to park on my street.
b) Yes – too much noise.
c) Yes – unruly tenants.
d) Yes – other impact: _____
e) No – there is no negative impact.

Transportation questions

60. How many cars (if any) do you and the other people living in **your unit**, and NOT including any people living in any other units on your property (if any), normally park **on your property** (i.e. *not* on the street)?
a) none
b) 1
c) 2
d) 3 or more

61. How many cars (if any) do you and the people living in **your unit**, and NOT including any other people living in your property's other units (if any), normally park **on the street** within a five-minute walk of where you live? (Please choose one.)
a) none
b) 1
c) 2
d) 3 or more

62. How many *currently usable* parking spaces are on your property, including garage and driveway spaces?
a) none
b) 1
c) 2
d) 3
e) 4
f) 5
g) more than 5

Questions about you and your household

63. How many children (people under the age of 18) live on your property in your household (not including children who are living on your property but are members of other households)?
a) 0
b) 1
c) 2
d) 3 or more

64. For each adult (over the age of 18) living in your household (but NOT including people living in Extra Housing Units, if any), please answer the following questions.

Question	You (person filling out this survey)	Adult #2	Adult #3	Adult #4
What is your best estimate of this person's age?	_____ years	_____ years	_____ years	_____ years
How would you best describe this person's race or ethnicity? (Circle all that apply.)	White/Caucasian Latino/Hispanic Black/African American Asian/Pacific Islander American Indian/Alaska Native Other: _____ Mixed Race	White/Caucasian Latino/Hispanic Black/African American Asian/Pacific Islander American Indian/Alaska Native Other: _____ Mixed Race	White/Caucasian Latino/Hispanic Black/African American Asian/Pacific Islander American Indian/Alaska Native Other: _____ Mixed Race	White/Caucasian Latino/Hispanic Black/African American Asian/Pacific Islander American Indian/Alaska Native Other: _____ Mixed Race
What is this person's gender? (Circle one.)	Male Female	Male Female	Male Female	Male Female
Which of the following best describes this person's educational attainment? (Circle one.)	Didn't finish high school High school grad Some college College grad Graduate degree	Didn't finish high school High school grad Some college College grad Graduate degree	Didn't finish high school High school grad Some college College grad Graduate degree	Didn't finish high school High school grad Some college College grad Graduate degree

65. What was your household's before-tax income in the last 12 months? Please include all income, including salaries, wages, investments, government benefits, etc. Please do not include people living in units on your property (if any) other than the one you live in as members of your household for the purposes of this question. (Please choose one.)
   a)   Less than $10,000
   b) $10,000 to $14,999
   c) $15,000 to 24,999
   d) $25,000 to $34,999

e) $35,000 to $49,999
f) $50,000 to $74,999
g) $75,000 to $99,999
h) $100,000 to $149,999
i) $150,000 to $199,999
j) $200,000 or more

Final questions

> **In the next two questions, we will ask you if you would be willing to be interviewed, and if you would like to be part of a raffle. If you do not want to be either interviewed at a later time or included in the raffle, we will replace your name in our records with a number so that your anonymity will be completely protected. If you agree to be interviewed, we will not publish your name. If you elect to be part of our raffle prize drawing but do not agree to be interviewed, we will replace your name with an identifying number once the prizes have been mailed out. We are committed to protecting your anonymity.**

66. While we expect that we will learn a lot from the results of this survey, there is also a lot that we can only learn by doing in-person interviews. Would you be willing to have us contact you to schedule an interview at a later date? As is the case with this survey, strict anonymity would be maintained.
Yes   No   (Circle one)

67. As a thank-you to people who have taken the time to fill out this survey, we are conducting a raffle drawing. The prizes will be 1) a $200 Apple Store certificate; 2) a $150 BART card; and 3) a $100 BART card. Would you like to take part in the raffle drawing?
Yes   No   (Circle one)

68. While we tried to be comprehensive in selecting the questions to include in this survey, there surely are issues that we have not considered. If there is anything else about your experience with housing on your property or in your neighborhood that you would like to tell us about, please write it below.

_____
_____
_____
_____
_____

> **THANK YOU FOR TAKING THE TIME TO FILL OUT THIS SURVEY. PLEASE PUT THE COMPLETED SURVEY INTO THE SELF-ADDRESSED, PRE-STAMPED ENVELOPE, SEAL IT, AND PUT IT IN THE MAIL TO RETURN IT TO THE RESEARCHERS. WE APPRECIATE YOUR TIME.**

Appendix 2: Homeowner respondent solicitation postcard (English-language version)

Dear Homeowner,

You are invited to participate in a survey as part of a study led by Professor Karen Chapple of UC-Berkeley's Center for Community Innovation (CCI). This study looks at the relationship between housing and neighborhood parking issues.

The survey will take about 15 minutes of your time. If you complete the survey, you may enter a raffle in which you could win an Apple Store gift certificate ($200), or one of two BART cards ($150 and $100).

To begin the survey, please go to:

www.surveymonkey.com/s/CHK6YGL

IMPORTANT: your survey ID # is: 110000

If you would prefer a written version of the survey, please call (510) 643-7553 to have one mailed to you.

Thanks!

en español al revés

Ms. Smith
or current homeowner

1234 Main Street

Berkeley, CA 94999-1234

Appendix 3: Summary of variables and imputation methods used in rental market analysis of online apartment advertisements

This section gives a fuller description of how each variable harvested from Craigslist advertisements for rental apartments and used in the hedonic model and for descriptive statistics was computed. In cases where variables were partially populated via imputation, the methodology by which this was done is described.

adjusted_rent is the dependent variable in the hedonic analysis. The baseline rent was ascertained from the advertisement (all advertisements that failed to report a monthly rent were discarded), and then adjusted according to whether or not off-street parking was offered, and whether or not all of part of gas/electric, water/sewer, and cable/Internet utility costs were included in the rent. Where an off-street parking space was offered for a given monthly cost, this cost was added to the rent. Where an off-street parking space was offered for an unspecified price, a price randomly selected from the units *with* specified parking costs was used. Where an off-street parking space was offered for free, the rent was *decreased* by a price randomly selected from the set of units with specified parking costs. (In cases where no off-street parking was offered at all, and where any tenant parking therefore occurred on the public street, *adjusted_rent* remained unchanged but the *ON_STREET* dummy, described below, was flagged.) Upward or downward adjustments were done on the basis of imputation in 76 records (out of a total of 338), while upward adjustments on the basis of directly reported off-street parking charges were done in 33 cases. In cases where gas/electric and water/sewer charges were fully included with rent, monthly rent was adjusted downward by an amount selected from the table of utility allowances (as of 12/1/2010) published by the Oakland Housing Authority for use in subsidized housing rent calculations (electric heating and cooking were assumed, although the amounts were little different than had gas usage been assumed). These allowances vary with the number of persons assumed to be in the household, which in turn vary with the number of bedrooms reported for the unit (1 person is assumed to occupy a studio, and 1.5 people are assumed to occupy each bedroom in a unit that has one or more bedrooms). In cases where one or both of these charges were shared with the landlord, one or both of the amounts of the downward revision(s) were halved. Cable and Internet packages were assumed to be worth $60 per month based on a perusal of offerings by local companies serving the East Bay. In cases where only electric but not gas, or only cable but not Internet, or vice versa, were offered, the adjustment was also cut in half.

 num_BRs and *num_BAs* were straightforward: the number of bedrooms and bathrooms indicated in the ad were recorded in the database. Studio units were recorded as having zero bedrooms. Every advertisement that failed to indicate a number of bedrooms and bathrooms for the unit was excluded from the database.

sq_footage was recorded from the advertisement in cases where it was specified. Since square footage was specified in only 80 out of the 338 records that were recorded, it was necessary to impute square footage for the majority of units. This was done by randomly selecting a square footage amount from the set of units with the same bedroom/bathroom configuration with known square footages. In cases where there were not enough units for this to be possible (as was the case

generally with units with larger numbers of bedrooms), a smaller unit configuration was randomly selected and then square footages were adjusted upward by an assumed 100 sf per bedroom and 50 sf per bathroom (or 25 sf per half bathroom).

SECONDUNIT was recorded as a dummy variable to indicate whether or not a unit is a secondary unit. Note that this variable was not actually included in the hedonic model runs, but rather was used to split the data set into portions of roughly equivalent size exclusively composed of either secondary or non-secondary units.

SECURE is a dummy variable that indicates whether or not a unit has a secure entry (i.e. an entry that lies behind a locked gate or door with access limited to those residing on the property).

ON_STREET is a dummy variable that takes on the value of 0 if off-street parking, whether free or paid, is provided on the property (in which case *adjusted_rent* is adjusted either upward or downward, as described above), and 1 if the only parking to be found is on-street (in which case there is no adjustment to *adjusted_rent*). Free off-street parking, paid off-street parking, and on-street parking are considered to be mutually exclusive categories for each unit.

OWNONSITE is a dummy variable that indicates whether or not the owner of the rental unit resides on the same property in another unit. It was only set in the affirmative if the text of the ad made it clear that the owner was present. Because absentee landlordism is often seen as a negative by renters, it was assumed that this characteristic was *not* in place unless it was specifically mentioned (i.e., since landlords would have an incentive to mention the presence of a landlord in an ad if on-site landlord presence were indeed seen as a good thing).

COINOP_LAUND is a dummy variable that was set to 1 if the ad mentioned the presence of coin-operated laundry machines (washer and dryer) on the same property as the unit.

FREE_LAUND is a (mostly) dummy variable that was set to 1 if the ad mentioned the presence of laundry machines (washer and dryer) on the same property as the unit (whether in the unit or elsewhere on the premises) that the tenant could use for free. In one instance, the ad mentioned that laundry machines could be used only on a Friday or Saturday; in this case, this variable was assigned a value of 0.5.

MICROW is a dummy variable indicating whether or not the unit was equipped with a microwave oven. A microwave oven was assumed to not be provided unless affirmatively specified.

DISHWASHER is a dummy variable indicating whether or not the unit included a dishwasher (assumed to not be provided unless specifically mentioned).

FULL_KITCHEN is a dummy variable that was set to 1 if the unit had up-to-standard kitchen appliances, including a four-burner stove (whether gas or electric) and a full-sized oven. An up-to-standard kitchen was assumed unless the advertisement mentioned otherwise (due to our presumptions about tenants' expectations of rental properties). If an ad made any mention of elements of a substandard kitchen – for example, the presence of a hotplate, two-burner stove, convection oven, or half-sized refrigerator – then a value of 0 was assigned to this variable.

Walkscore is a percentile index ranging from 0 to 100 indicating the "walkability" of any address in the United States. It is measured via a free web tool at www.walkscore.com. Walkability is construed to correspond to the number and variety of businesses and convenience services that can be reached within a short walk of a given location. A value of 0 means that a location is equivalent in walkability to the least walkable locations in the United States and a value of 100 means that it is equivalent to the most walkable locations.

crime_index is a percentile index ranging from 0 to 100 indicating the blended level of violent and property crime rates (from publicly available data) for a given address in the United States. It can be determined via the use of a proprietary web-based tool at www.neighborhoodscout.com. An index of 0 indicates that a location is as dangerous as the least safe neighborhoods in the United States, whereas an index of 100 means that the location is as safe as the safest locations in the nation.

freeway is an index of proximity to a freeway. It takes on a value of 0 if a location is at least 1,000' from the nearest freeway, 1 if it is between 500' and 1,000' from the nearest freeway, and 2 if it is within 500' of the nearest freeway.