The Disciplining Effect of Concern for Referrals for Better Informed Agents: Evidence from Real Estate Transactions *

Lan Shi† Christina Tapia‡

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Abstract

Using the future residence of home sellers, we compare a seller who will relocate to another state and thus will likely not provide referrals with a seller who remains in the state and thus might bring referrals. We find that moving-out-of-state sellers' residences take more days to sell than staying-in-state sellers yet without any price benefits. Moreover, among moving-out-of-state sellers, an uninformed moving-out-of-state seller's residence stays on the market for fewer days and is sold at a lower price than an informed moving-out-of-state seller. We also find that a senior seller's house sells faster and for less. We interpret these findings together as supporting that i) a concern for referrals provides discipline to both shirking and manipulation of information by agents and ii) it is important that the client be informed in protecting her own interests in one-shot transactions.

1 Introduction

This paper aims to understand whether and under what conditions a concern for reputation can provide discipline to an agent who has more information than his principal. We examine a particular group of

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†Dept. of Economics, University of Washington. Email: lanshi@u.washington.edu.

‡Dept. of Economics, University of Washington. Email: ctapia@u.washington.edu.

people – real estate agents. For many people, a home is the largest purchase they will make and the most valuable asset they will own. When it comes to selling, in the U.S. residential real estate market a seller (she) usually hires a real estate agent (he) to assist the selling. Selling a house involves not only effort but decision-making. The effort involved in selling a house includes first, initial effort to a) collect information and set the price, b) reach out to his network to generate demand, c) set up the house for sale, and second, effort in maintaining and showing the house as long as the house is on the market. The decision-making involved is the amount of time to leave the house on the market. Imagine the following: A house is listed for $400,000. After two weeks with no offer, an offer of $395,000 comes in. A decision must be made on whether to accept this offer. The benefit of waiting for another day is possibly better offer; the cost includes the effort to maintain and show the house and the opportunity cost of not having the money sooner, e.g, to invest. There are various ways to pay the agent. If we ignore the issues of risk-aversion and cash-constraints, the first-best method of compensation should be to let agents bid for the job of selling the house so that the seller gets the highest bid and the agent keeps 100 percent of the sold value. Under such a contract, an agent selling his "own" house would provide the first-best level of initial effort and make the optimal decision on waiting.

The standard pay method for real estate agents in the U.S. is 3 percent of the selling price.[1] Under such a contract, the agent has incentives to make a quick sale. Imagine the following: When an offer of $395,000 comes in for the $400,000 house, the agent's private signal tells him that he could get a better offer by waiting a bit longer. But since the agent would get only 3 percent of the additional $5,000 with a full-price offer, he would recommend to the seller to take this lower offer. The client does not observe the agent's private signal and may follow the agent's recommendation, resulting in a shorter stay on the market and a lower price than the first-best level.[2] The agent's recommendation must be approved by the client, and clients differ in their ability to figure out whether this recommendation is

[1] This is the case for many other countries.

[2] This is not a surpirsing result, given i) the agent is more informed than the client, and ii) the agent's pay is tied to a performance measure that he can influence in "dysfunctional" way (See Prendergast, 1999 for a large literature on "dysfunctional response.")

good advice or if it merely serves the agent's interests. Agents, therefore, can only manipulate those uninformed clients into falling for the "quick sale." Moreover, if the agent knows that he can make a quick sale by cutting the price, he would not put forward the first-best level of effort.

In real-life the interaction between the client and the agent is not a one-shot interaction; she might need to sell (or buy) another house, or more realistically, might bring referrals by recommending him to her acquaintances. Over time the client is able to get a clearer picture of whether her house was sold at a good price and infer from that her agent's contribution. If the selling price turns out to be low, the client may conclude that her agent either did not observe the correct signal, or he observed the signal but recommended otherwise (for a quick sale). In the first case, he is incompetent; in the latter, he puts his own interest above his client's. Either way, with the client's subsequent ability to evaluate the price she obtained, a good price will lead the seller to assess the agent as having a greater likelihood for being effective.[3] [4] We hypothesize that when an agent is concerned about his reputation and hopes to obtain referrals from his current client, he is more likely to exert additional effort, or to keep the house on the market longer, or both, to satisfy the client.

This paper empirically tests the prediction that the prospect of future referrals gives the agent incentives to i) exert more effort and ii) resist pushing for a "quick sale," by comparing sellers who are moving out of the state with sellers who remain in the state. For a seller who moves to a different house in the same state, she might be asked about her experience with her agent by her friends, colleagues, and old neighbors when they decide to sell or buy. A seller who sells to relocate to another state leaves her friends, colleagues, and neighbors behind; it is unlikely that they would ask her about her experience after she has moved away. In addition, the latter won't be around long enough to evaluate whether her house was sold at a good price. Less effort results in more days to sell, while a quick sale results in both

[3] Put differently, if the selling price turns out to be good for that house, he will be regarded with a greater probability of both being able to observe the correct signal and acting on his observed signal; that is, he is effective, or able to add value, as an agent.

[4] The other dimension is the time to sell. If the house is sold at a reasonable price but takes too long, the client can infer from that that the agent is ineffective.

fewer days to sell and a lower price than first-best.

We use Multiple Listing Service (MLS) data for all residential homes sold between 4/25/2004 through 5/29/2008 in King County, Washington. The data contain detailed characteristics of each home. Each transaction has an original listing price, and selling price, as well as the number of days on market. In addition, each transaction lists the seller's name and new location, indicating whether the seller will stay in the same state or move to another state. We use a hedonic pricing model with natural log of selling price as the dependent variable and we examine days on market as well. We find that compared with staying-in-state sellers, moving-out-of-state seller' residences take over 20 percent more days to sell, yet without any price benefits, suggesting that agents exert less effort for out-of-state sellers. Moreover, among out-of-state sellers, when the seller's house is vacant, and thus the seller is relatively uninformed, her residence stays on the market 15 percent shorter and sells 2.3 percent lower, than when the owner occupies the house and thus is better informed. This suggests that when there is no discipline from future referrals, the agent will take advantage of his clients, but only those who are uninformed and unable to defend themselves.

Senior sellers (age over 65) have less ability to figure out the true performance of her agent than the younger sellers likely because they have less time or chat less with others or use online information less, so agents are less concerned about "impressing" them. Further, senior sellers are less informed at the time and less able to fend off agents' recommendation of shorter stays on the market. We find that senior sellers' houses stay on the market for 11 percent fewer days, resulting in a price reduction of 1.7 percent.

We interpret these findings together as evidence of i) the effect of concern for referrals in disciplining both shirking and manipulation of information by agents and ii) the importance of the client being informed in protecting her own interests in one-shot transactions. Our results are robust to comparing moving-out-of-*town* versus staying-in-*town* sellers or moving-out-of-*state* versus staying-in-*town* sellers, correlations of error terms in the price and days on market regressions, and controlling for the vacancy of the house (and the visual effect of a vacant house), and the preference of sellers for waiting.

A related work on real estate agents' behavior is Levitt and Syverson (2008). They examine agents' behavior when selling their own houses versus their clients' houses; we examine agents' behavior when selling for a client who can provide future business versus one who cannot. Their study focuses on the information advantage that agents possess to "manipulate" the sellers to sell quickly, while our paper examines both agents' effort and their decision to "rush to sell." The magnitude of their estimates is quite compatible with ours; details are in the text.

This paper contributes to the literature on the disciplining effect of concern for reputation for sellers, in particular, experts (for an excellent review on this topic, see Bar-Isaac and Tadelis, 2008). Common to other expert-client situations, the client observes her real estate agent's recommendations, but is unable to discern whether he is making a recommendation that is best for her interests. She can after a while, however, evaluate whether the sale price is good, when she gets more information on sale prices for similar houses.[5] Our results suggest that the reputation mechanism is at work in this setting of real estate agents and clients. The key difference between reputation mechanism at work here and a "bad" reputation story for experts as in Ely and Valimaki (2003) is our maintained assumption that within a reasonable amount of time, the client is able to evaluate the true contribution of her agent. Another key factor that makes the reputation mechanism at work is that agents who rush clients to sell might not dominate the real estate agent service market so that the benefit of a better reputation dwarfs the gain from current manipulation of clients.[6]

This paper differs from other papers on reputation in that the learning is done at the client level rather than at the market level: Although the selling price is verifiable information, the market (the general public or a third-party) cannot do an equally good job of inferring the agent's contribution since they do not have the subtle information on the house's characteristics, which the client possesses. Also different from many papers on the impact of concern for future business on more informed experts, the

[5] In other cases of expert and client, it might take a long period to figure out the result of his recomendations, like in the case of a doctor and his patients. For a mortgage broker and his clients, it might take a relatively short period.

[6] Whereas in market for investment service, the benefit from a reputation for long-term performance is dwarfed by the gain from current pursuit of current profit opportunities, so the reputation mechanism is not working in that kind of setting.

issue here is the dysfunctional response to the combination of i) better informed (real estate) agents and ii) the use of an explicit pay scheme in compensating these agents.[7]

The moral of this paper is that an agent's concern for reputation does provide discipline, provided that the client will likely provide future business or referrals and that she can evaluate his performance. But when that is infeasible, an uninformed client will get "ripped off." Two things can help improve the client's welfare. First, a client who does not have referral potential should use an agent recommended by a person who will remain in the state and thus will get feedback from the seller on the agent's performance. Second, the client should try to educate herself to be more informed, for example, by using online technology to collect information. Indeed, technological innovations like the internet, search engines like Google, and websites like Zillow.com have greatly reduced the cost of information-gathering.[8]

The most related empirical work examining the prospect of future business for "experts" are Hubbard (2002) and Schneider (2007). The former examines how the concern for future business makes emission inspectors less likely to classify a car as failing the emission test. The latter examines whether the prospect of having repeat business disciplines auto mechanics from exaggerating the needed repairs.

The rest of the paper is organized as follows. In Section 2 we develop the model and hypotheses. In Section 3 we describe the MLS data and the summary statistics. in Section 4 we provide the empirical results and in Section 5 we conclude.

2 The Model

An owner of a residence (she) hires a real estate agent (he) to sell her residence. The agent would then set a price based on the house's characteristics and his estimates of the demand, and spend effort (e) to reach his network to find buyers. If there is no offer after several weeks of effort, the client and the agent

[7] If pay for performance is not used (e.g., the agent is paid fixed-pay) or muted (e.g., the agent is paid based on customers' satisfaction), agents will likely exhibit less distortion in attempting a "quick sale," and rather "take it easy," that is, the inefficiency is too little effort.

[8] The availability of low-cost information dissemination might also raise the viability of other forms of selling, like selling by owner.

need to decide whether to reduce the listing price to generate an offer or wait, knowing that the seller might get an (or a better) offer by leaving the house on the market for a few more days. Specifically, the production technology is that $p = p(a, DK, X, \varepsilon)$, where p is the price at which the house is sold, a is the agent's talent, DK is the decision on whether to keep the house on the market for more days (to get a better price), X is a vector of the house's characteristics, and ε are random shocks. Examples of a are the agent's ability in tapping his network to make the sale or the ability of the agent in bargaining; examples of ε are whether the buyer is an aggressive bargainer or local market conditions. The days it takes to sell the house (D) is $D = D(a, e, DK, \varepsilon_D)$, where e is the agent's effort and ε_D are random shocks. While e affects how fast the house is sold, it is unlikely to affect the price p, which depends on the characteristics of the house (X) and the buyer's willingness to pay (DK affects whether the house matches with the right buyer).

Effort e is a choice variable for the agent and unobservable to the client. Denote $E(.)$ as the expected value, we assume that $\frac{\partial E(p)}{\partial a} > 0, \frac{\partial E(p)}{\partial DK} > 0$, $\frac{\partial E(p)}{\partial X} > 0$ and $\frac{\partial E(D)}{\partial a} < 0$, $\frac{\partial E(D)}{\partial e} < 0$, $\frac{\partial E(D)}{\partial DK} > 0$.

Whether to keep the house on the market for more days depends on the assessment of potential demand with additional waiting. The client is advised by the agent on the decision on DK, that is, the agent usually makes a recommendation on DK and the client decides whether to accept it or not. DK can also be thought of as the decision on whether to cut the price, accept an offer that is below the listing price, or set the price too low in the first place.

Assume that the client and the agent are risk-neutral. The seller's utility (u) increases with the price (p) and decreases with days it takes to sell (D). The agent's utility (u^A) increases with the compensation he gets and decreases with D. His disutility of D has two components. First, in waiting for one more day, he loses the interest from getting the money earlier. Second, additional days require on-going effort, in the form of maintaining the house, showing the home to prospective buyers, etc., until the house is sold. Denote the first item as $r * D$ where r is the interest rate, and the second item as cost of effort , which is increasing and linear in $D : c * D$. The agent exerts initial effort (e) to generate demand and the cost of effort is $C(e)$, which is increasing and convex in e. Assume that the agent's utility is

separable in p, D, and $c(e)$: $u^A = w - r*D - c*D - C(e)$. The agent's talent a is unknown to the client, but she knows the distribution of a. Assume that $a \sim N(0, \sigma_a^2)$, $\varepsilon \sim N(0, \sigma_\varepsilon^2)$, and $\varepsilon_D \sim N(0, \sigma_{\varepsilon_D}^2)$.[9]

2.1 Level of DK and e that Maximize the Client's Interests

If the agent had to pay money to the seller for the right to sell her house and would then keep the revenue from the sale (as if he is selling his own house), he would put up the first-best level of e and DK. Specifically, e^{FB} and DK^{FB} would

$$\underset{e,\ DK}{Max}\ E[p - r*D - c*D - C(e)].$$

$$s.t. \quad p = p(a, DK, X, \varepsilon) \text{ and } D = D(a, e, DK, \varepsilon_D)$$

FOC on e and DK, we have

$$-r\frac{\partial E(D)}{\partial e} - c\frac{\partial E(D)}{\partial e} - C'(e) = 0, \tag{1}$$

$$\frac{\partial E(p)}{\partial DK} - r\frac{\partial E(D)}{\partial DK} - c\frac{\partial E(D)}{\partial DK} = 0. \tag{2}$$

Equation (1) shows that the gain to more effort is fewer days to sell the house, which saves on the cost of waiting in terms of lost interest and on-going effort. The first-best level of effort is the level that equates the marginal benefit and the marginal cost. Equation (2) shows that the gain to more waiting is the expected increase in price. The first-best level of waiting is the level that equates the marginal benefit and the marginal cost of waiting.

2.2 Level of DK and e when Agents are Paid 3% of the Sold Price

In the U.S. agents are usually paid 3% of the selling price. Assume for now that the agent can decide on DK. The agent then chooses e and DK to

$$\underset{e,\ DK}{Max}\ E[3\%p - r*D - c*D - C(e)],$$

[9] The two random variables, ε and ε_D, can be correlated.

subject to the same constraints. FOC on DK, we have

$$3\%\frac{\partial E(p)}{\partial DK} - r\frac{\partial E(D)}{\partial DK} - c\frac{\partial E(D)}{\partial DK} = 0. \tag{3}$$

Comparing (2) and (3), we can see clearly that $DK < DK^{FB}$. This result is not surprising. After all, the agent is bearing the full cost of waiting in terms of lost interest and on-going effort, yet only gets 3% of the extra dollar that may come from the extra waiting. In real life, though, the final decision on whether to accept a low offer, or cut the price, is made by the client; that is, the agent's recommendation on low DK or a price cut must be approved by the client.

An agent collects a private signal about whether there is demand for the house; after all, that is why a client hires an agent. He receives a signal about whether there is demand for the house (after all the effort is made). If it is a bad signal suggesting that demand is low, the price should be reduced a bit. If it is a good signal suggesting there is strong demand, then it is best to wait. However, the agent can claim that it is a bad state (for the local market or for demand for the seller's house) and suggest a price-cut.[10] If the client can see through the "self-interest" and manipulation of the agent's price-cut recommendation when it is actually the good state, she will veto the recommendation. So the prediction is that $DK < DK^{FB}$ only when the client is un-informed, that is, when she cannot accurately identify the good state or bad state. Some clients are more able to fend off the agent's self-serving recommendation. For example, some clients actively collect information on local demand and prices of recently sold houses while others are more passive. Therefore,

$$DK < DK^{FB} \text{ if } I_d \text{ is low},$$

where I_d is the client's ability to defend her interests by fending off the agent's self-serving recommendation. Further, knowing that he can always persuade the client into a price cut to sell the house, the agent has less incentive to exert the first-best level of effort in selling. That is, $e \leq e^{FB}$.

[10] In other words, short DK represents what we usually call "manipulation" or "rushing to sell."

2.3 When Sellers Can Potentially Provide Referrals

Now suppose there are two periods. In period 1 the agent serves the seller. In period 2 the client is truly able to evaluate whether she got a good price for her house (and might bring referrals to the agent). Denote I_e as the client's ability to evaluate whether the price (p) she got is a good price or not. When sellers can evaluate their agents' effectiveness and potentially can provide referrals, the agent not only values the utility from serving her in the current transaction, but also the future business she can bring through referrals. Formally, with the lower subscript denoting the period, the agent

$$\underset{e,\ DK}{Max}\ E[3\%p - r * D - c * D - C(e)] + \gamma * I_e * (\frac{\partial \hat{a}}{\partial p_1} + \frac{\partial \hat{a}}{\partial D_1}), \tag{4}$$

subject to the constraints $p = p(a, DK, X, \varepsilon)$ and $D = D(a, e, DK, \varepsilon_D)$. Note that γ is the value from referrals, I_e as the client's ability to evaluate whether the price (p) she got is a good price or not, and $\hat{a}$ is the client's assessment of the agent's effectiveness based on observed p_1 and D_1. It is natural to assume that $\frac{\partial \hat{a}}{\partial p_1} > 0$ and $\frac{\partial \hat{a}}{\partial D_1} < 0$. F.O.C. on DK_1 and e_1, we have

$$3\%\frac{\partial E(p)}{\partial DK_1} - r\frac{\partial E(D)}{\partial DK_1} - c\frac{\partial E(D)}{\partial DK} + \gamma * I_e * (\frac{\partial \hat{a}}{\partial p_1}\frac{\partial p_1}{\partial DK_1} + \frac{\partial \hat{a}}{\partial D_1}\frac{\partial D_1}{\partial DK_1}) = 0, \tag{5}$$

$$-r\frac{\partial E(D)}{\partial e_1} - c\frac{\partial E(D)}{\partial e_1} - C'(e_1) + \gamma * I_e * \frac{\partial \hat{a}}{\partial D_1}\frac{\partial D_1}{\partial e_1} = 0, \tag{6}$$

From (6), dropping the subscript for brevity thereafter, for e,

$$\frac{\partial e}{\partial(\gamma * I_e)} > 0,$$

that is, lack of discipline due to no future business leads to less agent effort. From (5), for DK, we have $\frac{\partial DK}{\partial(\gamma * I_e)} > 0$ .That is, the prospect of referrals based on the agent's true performance provides discipline to the agent; he is less likely to attempt a quick sale. To isolate the effect of γ and I_e,

$$\frac{\partial DK}{\partial(-\gamma)} < 0$$
$$\text{and } \frac{\partial DK}{\partial(-I_e)} < 0,$$

that is, lack of discipline when there is no concern for future business, either due to a lack of future referrals ($-\gamma$), or lack of the client's ability to truly evaluate the agent's performance ($-I_e$), leads to

more pushing for a quick sale. More informed clients can still protect their own interests, however, so it is the uninformed ones (low I_d) that the agent can "manipulate." Although we can't measure DK and e directly, we know that for e: $\frac{\partial D}{\partial e} < 0$, and for DK: $\frac{\partial p}{\partial DK} > 0$ and $\frac{\partial D}{\partial DK} > 0$. We thus have testable predictions:

$$\frac{\partial D}{\partial(-\gamma)} > 0; \tag{7}$$

$$\frac{\partial p}{\partial(-\gamma)} < 0 \text{ and } \frac{\partial D}{\partial(-\gamma)} < 0 \text{ if } I_d \text{ is low.} \tag{8}$$

$$\frac{\partial p}{\partial(-I_e)} < 0 \text{ and } \frac{\partial D}{\partial(-I_e)} < 0 \text{ if } I_d \text{ is low.} \tag{9}$$

In short, we are going to use data to test the three hypotheses below. First, without the prospect of referrals, the agent would exert less effort to generate demand, which would result in more days on the market. Second, among sellers without the prospect of providing referrals, the agent is more likely to push for a "quick sale" when serving an uninformed seller than an informed one, resulting in lower price and fewer days. Lastly, among sellers who cannot evaluate the agent's contribution (and, thus the agent does not care to "impress" them), the agent is more likely to push for a "quick sale" when serving an uninformed seller than an informed one.

3 Data and Summary Statistics

We use Washington Multiple Listing Service (MLS) data for residential homes sold in King County between April 2004 and May 2008. A Multiple Listing Service is an association of real estate brokers the members of which agree to share listings with one another. To examine the role of referrals we focus on the sales of existing residential homes. We therefore exclude new homes and "presales," and transactions for homes with corporate owners (e.g., banks, mortgage companies, construction or development companies, owners designated as L.L.C.s) since referrals for these transactions likely operate through a different mechanism. Transactions were deleted if key identifiers were missing or had apparent errors.[11] Summary statistics are provided in Table 1. The final data set contains 70,000 transactions.

[11] For example, observations are dropped if the MLS number is blank, or the Agent ID is blank, or the city-state of the owner's new residence is listed as "undisclosed." Homes with an age (year_built - year listed) of over 115 years, 0 or over 5

For this analysis, we focus on the distinction between two types of sellers: those who will stay in the Washington state and those who will move out of the state. We call them staying-in-state and moving-out-of-state sellers, respectively. If a person sells a house and moves out of the state, she will leave behind her old neighbors, friends, colleagues, and other acquaintances, who probably will not ask her for a recommendation when they need to sell their residence or buy one; she thus will generate few referrals to her selling agent. Whereas if a person sells her house and stays in the state, her old neighbors, friends, and colleagues might call her for an agent recommendation, so she likely will generate referrals. Also, a seller who stays in state has a greater ability to evaluate whether her house is indeed sold at a good price.

We therefore use an indicator variable for whether the seller will stay in the Washington State to measure the prospect of future referrals.[12] In sensitivity checks, we work with an indicator variable for whether the owner will stay in the same *city*. The data contain information on the city, state, and country of the seller's new residence. A staying-in-state (moving-out-of-state) seller is an owner who is selling his home in King County, Washington and whose new residence is located in (outside of) Washington State. Close to six percent of all observations are moving-out-of-state sellers.

Our dependent variable is the final selling price and days on the market. The data contains the final selling price and two fields pertaining to days: 1) days on market (DOM thereafter), days that this property, listed under this multiple listing number, was active on the market; and 2) cumulative days on market (CDOM thereafter), days that this property, listed under any multiple listing number, was active on the market. A home can expire off the listing service when the owner's contract with the agent expires and the home remains unsold. The house can then be relisted as new on the market, with a new

bathrooms, over 7 bedrooms, or with original_listing_price/selling_price greater than 10 or less than 0.10, were excluded as data entry errors or outliers.

[12] A critique for this identification strategy is that anticipating that she might get poorer service from her agent, a moving-out-of-state seller should get an agent who is recommened by her friend who is staying in the state. That way, the prospect of her giving feedback to her in-state friend will provide some discipline. But then even a seller who stays in the state will get an agent who is recommended by her friend too; for our identification strategy to work, we are relying on the fact there is some difference in the prospect of referrals between a seller who stays versus a seller who leaves.

MLS number (often with a price drop); CDOM will continue to add up. A home also can be relisted as new on the market if the seller drops the price by 5 percent or more from the current list price, but CDOM still will continue to run. Only when a home has been off the market for a full three months does the CDOM clock stop.

For the purpose of our analysis, we want the dependent variables to capture the selling price and days it takes to sell the house. The cumulative days on market is thus the better variable. If the house is off the market for more than three months and re-listed, DOM variable is equivalent to CDOM variable. If, however, the re-listing is due to changing of the agent, we might want to separate the current transaction from the prior and then the days on market is superior to CDOM. Unfortunately, our data set only contains transactions of houses sold, so we do not have instances when a house was listed but did not sell. That is, we do not have the previous listings for this house to see whether previous listings involved a different agent or a different price. In our data, CDOM is equal to DOM for 65,999 observations (85.7%). We mainly use cumulative days on market and the results using days on market are very similar (shown in Table 5, Sensitivity Check.)

Table 1 provides summary statistics. For staying-in-state sellers, the median final selling price is $414,900, and the median cumulative days on the market is 27 days. For moving-out-of-state sellers, the median final selling price is $376,000, and median cumulative days on the market is 40 days.

The main control variables are location and house characteristics. It is well known that a key factor in the value of real estate is its "location." For example, a house that is located in a school district with good schools is sold at a higher price than an otherwise identical house in a school district where school quality is poor. To control for this location factor, we include school district dummy variables and the five-digit zip code in which the house is located. There are 105 zip codes in our MLS data set for King County. The MLS data also contains detailed information on the characteristics of each house. Shown in Table 1, staying-in-state sellers' houses have a median 2040 square feet, 3 bedrooms, 2.3 bathrooms, and is 35 years old. Moving-out-of-state sellers' have a median 1950 square feet, 3 bedrooms, 2 bathrooms, and is 40 years old. The right column of Table 1 shows additional information. Compared

with staying-in-state sellers, a lower percentage of moving-out-of-state sellers have hardwood floors, a view, or are connected to public utilities indicated by sewer access versus septic tank. The MLS data contain an agent quality rating of the house; agents rated a greater percentage of the staying-in-state sellers' houses as above average.

An important characteristic of a house on the market is its occupancy status. A house is either occupied by owner, occupied by tenant, or vacant, and it is a known fact that a vacant house sells for less and takes longer to sell. Part of it is a visual effect – buyers can't visualize whether this empty house will meet their needs or a vacant house can look uncared for or shabby. Forty-one percent of all the houses in our data are vacant. A vacant home can be "staged", i.e., furnished so that although vacant, it appears nicely decorated and lived-in. Three percent of vacant houses are staged. A vacant house also means that the owner is not living in the house, therefore the owner is not present to "monitor" the agent's actions, such as stuffing the flyer box or maintaining the yard and appearance of the house. As a result the agent might exert lower effort on this home, resulting in more days to sell.

Further, an absent moving-out-of-state seller has more difficulty in collecting information on local demand, for example, than an occupying moving-out-of-state seller. Therefore, among moving-out-of-state sellers who will provide few, if any referrals, the absent seller has less information to counterargue, or is more easily convinced by her agent's recommendation. We thus use vacancy interacting with moving-out-of-state to measure the degree of being "manipulatable" for a seller who promises little or no future business for the agent. Table 1 shows that there is big difference in the vacancy rate across the two types of sellers: the vacancy rate for staying-in-state houses is 38% and that for moving-out-of-state houses 85%.[13]

Senior sellers might have less future referrals than younger sellers, since they are unlikely to

[13]This is likely because a person who sells a house and moves out of the area is i) moving for job relocation or ii) moving to retirement home that is out of the area, and a person who sells a house and remains in the area is for i) wanting a bigger or smaller house, or ii) moving to a better school district, or iii) moving to retirement home in the same area. People can still reside in their old house while searching for a bigger house or a house in better school districts, but a person who needs to work in another area most likely has to move out sooner for the new job, leaving the house vacant.

engage in many future transactions and their friends are likely senior too. Further, a senior seller has less time to figure out whether her house is truly sold at a good price (low I_e in the model). Finally, a senior seller is less informed (for example, less savvy in using online information to assess the demand) and thus easier to manipulate by her agent (low I_d). We are able to collect information on whether the seller is a senior citizen through a variable which indicates that the seller claimed a senior property tax exemption in the previous tax year. Four percent of the sellers in our data are senior citizens (65 years old or older).

Some sellers are savvier than others in terms of being informed and well armed to engage in a real estate transaction, and are not easily susceptible to the agent's push to sell fast (I_d is high). Unfortunately, we do not have any demographic data on the sellers such as degree earned or proficiency with online technology. However, we are able to collect data to assess the savviness of a neighborhood. If we believe that the housing market is segregated in that families with similar economic and educational backgrounds live in the same neighborhoods, we can use a district's savviness to proxy for a seller's savviness. We have two measures of area-level "savviness": 1) the percent of population (25 years old or older) with at least a bachelor's degree, by five-digit zip code, and 2) the number of internet providers by five-digit zip code. Our first measure of savviness assumes that individuals with at least a bachelor's degree will be more informed about the local market and more internet-savvy in accessing on-line real estate resources. Figures for this measure were obtained from 2000 Census data. The 25 percentile of the percentage is 27% and the 75 percentile is 53%.

Our second measure of savviness assumes that zip code areas with more internet providers (and, therefore, internet access) will contain sellers who are more connected in terms of on-line real estate information resources. Federal Communications Commission (FCC) collects data (through Form 477) on the number of holding companies reporting high-speed service in each area and we include these figures by zip code in Washington State.

We have some information on agents, such as whether they work for independent real estate

firms (including working for themselves) or work for a chain.[14] Seventy-one percent of all agents work for a chain. They also differ greatly in terms of the number of finished transactions. An agent does a median two deals per year, with the 25th percentile completing one and the 75th percentile completing three.[15]

Sellers differ in their tendency to sell the house fast, or the weight they put on the price and days on market. Agents remarked in the MLS data whether a seller is "motivated" or want to sell the house "as-is." A motivated seller is a seller who is relatively eager to sell, probably compared with a seller who, for example, needs to find a new house before selling this one. An "as-is" seller does not wish to change the house and thus is probably more willing to concede in price to make the sale.

4 Regression Results

4.1 Basic Results

Our baseline econometric specification is

$$log(p_j) = \beta_1 \text{oos}_j + \beta_2 vacant_j + \beta_3 * vacant\_non\_stage + \beta_4 \text{oos}_j * vacant_j + \beta_5 senior_j + \beta_X X_j + \alpha_L + \alpha_t + \alpha_i + \varepsilon_j,$$

and

$$log(D_j) = \gamma_1 \text{oos}_j + \gamma_2 vacant_j + \gamma_3 * vacant\_non\_stage + \gamma_4 \text{oos}_j * vacant_j + \gamma_5 senior_j + \gamma_X X_j + \alpha_L + \alpha_t + \alpha_i + \epsilon_j,$$

where p is the selling price, D is the days on the market, j refers to house j, i refers agent i, *oos* is an indicator variable for a seller who will move out of the state, *vacant* is an indicator variable for whether the house is vacant, *vacant_non_stage* is an indicator variable for a house that is vacant and not staged, senior is an indicator variable for the seller who is 65 years old or older, X_j contains house j's characteristics, α_L is the location variable proxied by the zip code of the house, α_t is the year fixed effects, and α_i is the agent fixed effects when applicable. Under this specification, β_1 and γ_1 capture

[14] The two chains that have the largest number of transactiosn in our data are John L. Scott and Windermere.

[15] These figures reflect all agents. The figures are low because all the part time agents are included.

the impact of no referral potential on price and days to sell of her house, β_2 and γ_2 capture the effect of lack of input-monitoring and uninformedness due to the absence of the seller for staying-in-state sellers, β_3 and γ_3 capture the "visual" effect of a vacant house, and β_4 and γ_4 capture the effect of no referral potential when she is also not present to monitor her agent's input and is uninformed. From Section 2, our hypotheses are are i) $\gamma_1 > 0$ (from Equation (7)), ii) $\beta_4 < 0$ and $\gamma_4 < 0$ (from Equation (8)), and iii) $\beta_5 < 0$ and $\gamma_5 < 0$ (from Equation (9)). Most columns use zip-code*year fixed effects. We compute robust standard errors that are clustered at the level that corresponds to the applicable fixed effects.

The results are shown in Table 2; the left panel shows results on selling price and the right one on days on the market. We introduce the variables gradually. In column 1, we include only the moving-out-of-state variable, the house characteristics variables, and year fixed effects. In column 2, we introduce zip-code*year fixed effects to capture unobservable factors that affect houses in the same zip code in a given year.[16] Column 3 introduces the dummy variable for whether the house is vacant. Column 4 adds the variable for whether the vacant house is staged. Column 5 includes the interaction variable of being a moving-out-of-state seller *and* absent seller, column 6 adds the variable for a senior seller, and column 7 use agent fixed effects to account for the possibility that out-of-state sellers might choose different kinds of agents than in-state sellers. We treat results in columns 6 and 7 as our baseline results.

We see from columns 6 and 7 that the coefficients on vacant_non_stage is negative in price regression and positive in days on market regression. This suggests that a non-stated vacant house sells for a lower price and takes more days to sell than a staged vacant house, and the "visual" effect is large: The non-staged vacant house sells for 3.7% less and takes an extra 13% more days to sell than a staged vacant house.

We also find that the house of a staying-in-state seller who is absent from her house takes 19% more days to sell and is sold at a similar price than a staying-in-state seller who occupies her house,

[16] The zip-code*year fixed effects allow zip-code fixed effects to change over years, thus are more flexible than zip-code and year fixed effects.

suggesting less effort due to the absence of the staying-in-state seller. Since absence means both lack of input-monitoring and being uninformed, and the former leads to lower effort (thus more days on market) and the latter leads to more rush-to-sell (fewer days and lower price), this result suggests that the lack of input-monitoring dominates the uninformedness effect for an absent staying-in-state seller.

There are three main results pertaining to our predictions from column 6. First, $\gamma_1 > 0$, that is, while the price of a moving-out-of-state seller's house is not significantly different from that of a staying-in-state seller's house, it takes 22% more days to sell, suggesting less effort devoted to a seller who has little prospect for referrals.

Second, the house of a moving-out-of-state seller who is absent is on the market for 19% fewer days and sells for a 2.9% lower price than a house of a moving-out-of-state seller who is present. The negative coefficient on the interaction term of moving-out-of-state*vacant suggests that the "quick sale" effect, due to the uninformedness of the client, is present and dominates the possible effect due to the lack of "input-monitoring." The input-monitoring effect suggests that for a vacant house, it is harder for an out-of-state seller than an in-state seller to monitor her agent's inputs, therefore it should take more days to sell the house and we find fewer days.[17] Therefore the results suggests that when agents are not disciplined by the concern for referrals, they "manipulate" clients who are relatively uninformed ($\frac{\partial p}{\partial(-\gamma)} < 0$ and $\frac{\partial D}{\partial(-\gamma)} < 0$ if I_d is low).

Third, houses of senior sellers take 9% (2.5) fewer days and sell for 1.7% lower price than non-senior sellers, suggesting the "quick sale" type of actions by agents toward sellers who are less able to evaluate the agent's true performance and are less able to defend themselves in transactions ($\frac{\partial p}{\partial(-I_e)} < 0$ and $\frac{\partial D}{\partial(-I_e)} < 0$ if I_d is low).[18] We interpret these three results together as evidence for i) the disciplining

[17] For example, while both kinds of sellers can ask their neighbors to help check the appearance of their to-be-sold property, a seller still in the state can drive back to check; an out-of-state seller faces a much higher cost of doing so. Therefore according to this effect, the coefficient on the interaction term should be positive in the days-on-the-market regression and 0 in price regression. Yet we found that the the coefficient on the interaction term of oos*vacant is negative in the days-on-the-market regression and negative in price as well, suggesting first that the "quick sale" effect is there, and that it dominates any possible effect from lack of input-monitoring.

[18] The magnitude of manipulation (1.7% price reduction) for senior sellers is smaller than that (2.9% price reduction) for

effect of potential referrals on the agent and ii) that pushing for a quick sale in one-shot transactions is greater for sellers who are less informed and thus cannot defend themselves.

In column 7 where we use agent fixed effects rather than zip-code*year fixed effects, the magnitudes of the estimates are slightly smaller yet still statistically significant: for an agent that sells for both staying-in-state and moving-out-of-state sellers, it takes him 21% more days to sell a moving-out-of-state than a staying-in-state house, and among moving-out-of-state sellers, an absent seller gets 15% fewer days and sell for 2.3% less than present sellers.

The estimates are economically significant. The median days on the market in our data is 29 and median price is $401,000, so 15% fewer days (in the agent fixed-effect results) means 4.4 fewer days and 2.3% lower price means $9,223 less. That is, with the "quick sale" effect, among sellers who have little referral potential, a seller who is relatively easy to "manipulate" gets 4.4 days less on the market and sells for $9,223 less, a sizable amount, than an informed seller.

The estimates are also comparable with other estimates in the literature. Levitt and Syverson (2008) found that at the mean level, a house owned by the agent's client is on the market 10% fewer days and sells for 3.7% less than a house owned by the agent; our finding is that at the mean level,[19] among clients without prospect of providing referrals, the house of an uninformed seller (thus unable to fend off her agent's manipulation) is on the market 7.8% fewer days and sells for 2.3% lower price than that of an informed seller.[20] These numbers suggest that given that selling one's own house could be regarded as the first-best outcome, the prospect of referrals brings the outcome of a spot transaction closer to the first-best outcome.

Table 3 reports the coefficients on the house characteristics, and they are plausibly estimated. We see in Table 3 that several characteristics have a positive, significant effect on the actual selling price of the home: total useable rooms, bathrooms, covered parking, view, and when the listing agent reports

absent versus present moving-out-of-state sellers.

[19] Note that the analysis in the preceding paragraph used the median number.

[20] The absolute numbers between the two studies are not directly comparable; the mean days to sell and house price are 93.62 days and $271,405 in their study of Chicago data from 1992-2002 and the mean days to sell and house price are 56.6 days and $488,969 in our study of King county, WA data from 2004-2008.

that the house condition is either "very good," "remodeled," "restored," or "under construction." The natural log of selling price is negatively affected (and significant) when house condition is reported as "fair," "fixer," or just "good."

4.2 Further Evidence

Importance of Being Savvy

While the potential for referrals appears to deter the agent from i) shirking and ii) quick-sale for less informed clients, could a client discipline the agent by becoming more informed (making I_d greater), especially when she can't bring referrals? Further if the client is informed and can fend off the agent's recommendation of a lower price, then the agent can't resort to selling the house by recommending a price-cut and thus needs to work hard to find a buyer. The net result for price is that the house is sold at a higher price. The net result for days on market depends on which effect prevails: The diminished ability to push a quick sale would lead to more days, while the higher effort will lead to fewer days. An "informed" client is one who is savvy about the local real estate market and takes advantage of the current resources available reporting daily information on local housing prices and characteristics (e.g., Zillow.com), and is thus more likely to fend off an agent's attempt to manipulate information. Column 3 of Table 4 show results for our first measure of savviness (percent of the population 25 years old or older, by zip code, with at least a bachelor's degree). Since the informedness variable is at zip-code level, we give up the zip-code fixed effects and include agent fixed effects and year fixed effects.

The coefficient on the savviness variable in the price regression is .72, which means that compared with a seller in a zip-code community that is 25th percentile (27%) in percentage of residents having a college degree, the house of a seller in a zip-code community that is 75th percentile (53%) is sold at a price that is $.72 * (.53 - .27) = 18.7$ percent higher; it also takes $.23 * (.53 - .27) = 6.0$ percent fewer days to sell. This evidence suggests that a savvy seller experiences less manipulation (leading to higher prices) and more agent effort (leading to fewer days to sell).[21] The magnitude of these coefficients appears to

[21] The coefficient on the interaction term of oos*savvy is insignificant in both the price and the days on market regressions,

be large. A caveat is that part of the effect in price could be due to that an area with a high percentage of college-educated residents is probably also an area that has good schools, nice views, better locations, etc., and thus the houses there are valued more.

As an alternative "savviness" measure, we use the number of holding companies that reported providing high-speed internet service in each zip code. This should indicate the degree to which sellers in that area are connected to the internet (and therefore can take advantage of on-line real estate information via websites like Zillow.com). Moreover, this measure is less likely to be correlated with the selling price of a home. Column 4 shows the results using this measure of "savviness". The results are qualitatively similar to that using the first savviness variable. We interpret these two results as evidence that by being more informed the sellers can better protect their own interests.

Desperate to Sell for Moving-Out-of-State Sellers?

Can the negative coefficient on the interaction term of moving-out-of-state and vacant in the price regression be explained by the fact that a moving-out-of-town seller who is already living in another residence is more desperate to sell and thus has less bargaining power? A vacant house is a waste of resource, and this is true for either moving-out-of-state or staying-in-state sellers, so it is unclear that a vacant moving-out-of-state seller has less bargaining power than a vacant staying-in-state seller. Further, we are able to collect some information on how desperate the seller is and we include it as an explanatory variable with the regression results in column 5 of Table 4. Indeed when a seller sells her house "as-is" the selling price is 6 percent less and it sells 21.8% faster than otherwise. A motivated seller probably gets a lower priority since the agent knows that she will need to sell. They sell at 3.9% less and takes 66% more days. Even after including all these added controls, the coefficients on our variables of interest, those on moving-out-of-state, out-of-state*vacant, and senior, are barely affected.

Independent Agents versus Agents Working for Brokerage Firms

Agents either work for themselves or a brokerage firm. Most agents work for the latter. While an agent working in a firm might get business from people who call the firm for service, agents working

suggesting that the effect of being a savvy seller is not particularly stronger for moving-out-of-state sellers.

for themselves do not have that benefit and must keep current clients happy so that they will bring referrals.[22] Agents working for themselves therefore should face a greater pressure to make current clients happy and thus should be less likely to push for a quick sale, resulting in longer days and higher price for his client. Meanwhile one of the benefits of working for a large brokerage firm like a chain is that the selling agent, while waiting for the buying agent to contact him, can also reach out to the buying agents in the same chain (since they might know each other) to inquire about possible interest. It is therefore unclear what is the net effect for sellers of using an agent working for themselves vs. a firm.

In the data we are unable to identify whether the agents work for themselves or a firm; we only have information on whether they work for an independent brokerage firm or a chain. Agents working in an independent brokerage firm might be the owner, but might be employees of that firm. With this caveat, column 6 of Table 4 reports results after including an indicator variable for agent working in independent brokerage firm. The result shows that homes of sellers using an agent from an independent brokerage sell for 1.7% lower and take 9% more days. We find in column 7 a 1.6% price premium for an agent of a chain selling to an agent from the same chain. This evidence suggests that the resource benefit of a chain dominates the better incentives provided by working for oneself.[23]

4.3 Sensitivity Results

Seemingly Unrelated Regression

In the analysis above, we estimate equations for selling price and days on the market separately. The selling price of a home and the number of days on the market are not independent and are likely either positively or negatively correlated. For one thing, if the price is set too low then it may take fewer days to sell, creating a positive correlation between the two; for the other, a bad housing market will lead to lower price and longer days, creating a negative correlation. We use the Seemingly Unrelated Regression (SUR) approach to address this issue; results are presented in column 3 of Table 5.[24] The magnitude of

[22] The "price" for getting clients from a large brokerage chain is that the agent only gets half of the 3% that is paid to the seller's brokerage.

[23] The caveat is that these results are the lower bound of the incentive effect of working for oneself.

[24] For SUR resuls we use a specification with zip code and year effects, not zip*year effects as in the baseline specification,

the coefficients remain identical to that from the same specification without SUR (as expected) and the standard errors of the estimates turn out to decrease when the correlation of error terms is taken care of, raising the statistical significance of all estimates. In all, after accounting for possibly correlated error terms in the price and days-on-the-market equations, the previous patterns persist.

Staying-in-city vs. Moving-out-of-city

One concern regarding the "in-state" vs. "out-of-state" sellers distinction is that it treats an in-state seller who moves to a city far away from her sold home the same as a seller who moves to a city just adjacent to the city of her previous home. For the purpose of identifying the prospect of referrals, the former may have greater likelihood of bringing referrals than the latter and the in-state vs. out-of-state dichotomy does not incorporate this subtle variation. One way to get at this problem is to compare sellers who are staying-in-town with sellers who are moving-out-of-town. Twenty-five percent of the data represent moving-out-of-town sellers. For moving-out-of-town sellers, 78.5 percent of their houses are vacant while 23% of staying-in-town sellers' homes are vacant. Column 4 of Table 5 contains the results of our staying-in-town vs. moving-out-of-town analysis. We see that it takes 23.6% more days to sell the house of a moving-out-of-town seller compared with a staying-in-town seller's house, a number very similar to the moving-out-of-state vs staying-in-state distinction. A moving-out-of-town seller's house is sold 25% faster than a staying-in-town seller's house, a number that is somewhat greater than the distinction between moving-out-of-state vs. staying-in-state. A vacant moving-out-of-town seller's house sells for almost the same price as an occupied moving-out-of-town house, unlike the base finding that a vacant moving-out-of-state seller's house sells for 2.9% less than an occupied moving-out-of-state seller's house. The difference makes sense since even if the house is vacant for both moving-out-of-state and moving-out-of-town sellers, the latter is likely more informed than the former and can better fend off her agent's recommendation to cut price and sell fast.

Moving-out-of-state vs. Staying-In-town

because using zip*year effects blows up the matrix size. Column 2 provides the estimation results using zip code and year effects without SUR for comparision.

Using the staying-in-town vs. out-of-town dichotomy to identify referral potential has its own weakness. While a seller may move out-of-town, the staying-in-town vs. out-of-town dichotomy treats a close town the same as a town hundreds of miles away. The former in fact may have more referral potential than the latter and this dichotomy does not incorporate that variation. To purify the effect of a seller who is clearly outside an agent's market, i.e, no referral prospect, versus a seller who remains within the agent's market, we test our predictions with the two "extreme" groups: staying-in-town sellers vs. moving-out-of-state sellers. Results are shown in column 5 of Table 5 and they are very close to our baseline findings.

5 Conclusion

This paper examines the disciplining effect that a concern for future referrals provides to real estate agents who are more informed than the clients they serve. Using the future residence of home sellers, we compare a seller who will relocate to another state and thus will not provide referrals with a seller who remains in the state and thus might be able to evaluate the agent and, based on this, bring referrals. We find that compared with staying-in-state owners, moving-out-of-state owners' residences take more days to sell, yet without any price benefits, suggesting that agents exert less effort for sellers with few potential referrals. More importantly, among sellers without referral potential, a house with an absent owner (and thus an owner who is uninformed and unable to fend off her agent's recommendation), stays on the market shorter, and is sold at a lower price. This suggests that agents push for a "quick sale" with sellers who have little referral prospects and are less "informed." We also find that houses of senior sellers, who can't evaluate the agent's performance as well and are uninformed to fend off manipulation, sell faster and for a lower price. We interpret this as evidence of i) the effect of referrals in disciplining shirking and manipulation of information by better informed agents and ii) that in one-shot transactions uninformed clients fall prey to their agents' "manipulation" more easily than informed ones.

A combination of commission pay, which provides agents incentives to close as many deals as

possible, with our findings that a concern for reputation curtails agents' "dysfunctional" behavior in quick sale, provide an explanation for the existence of the current commission pay method for real-estate agents.[25] Altogether these forces explain why this market functions well with relatively little regulation. However, in many other markets where service providers (the better-informed agents) compete for clients' business, clients have limited ability to evaluate the agent's long-term performance (either due to complexity or the long period of time evaluation entails) and thus the agent is not disciplined by a concern for reputation for long-term performance. Market competition will force the better-informed agents to be concerned about reputation for short-term performance and thus boost short-term performance by manipulating the uninformed clients.[26] These markets lend themselves to regulation.

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[25] For a one-shot client-agent relation, the client should try to use an agent recommended by an in-town acquaintance and spend some effort in equipping herself with information to safeguard her interests.

[26] And the use of pay for short-term performance will make it worse.

TABLE 1

Summary Statistics

	ALL Median	In- state Median	Out-of- state Median
OBS. (N)	77,000	72,476	4,524
DOM	25	25	29
CDOM	29	29	39
Selling Price	$401,000	$402,000	$397,975
Square Footage	2,020	2,020	2,000
Price Per Sq. Ft.	$214	$214	$213
Total Useable Rooms	4	4	4
Bedrooms	3	3	3
Bathrooms	2.3	2.3	2
Age	37	36	40

	ALL Percent	In- state Percent	Out-of- state Percent
OBS. (N)	77,000	72,476	4,524 (6%)
owner-occupied	56%	59%	6%
tenant	3%	3%	9%
vacant	41%	38%	85%
very good	28%	28%	21%
good	19%	19%	20%
average	3%	3%	5%
fair	1%	1%	3%
fixer	1%	1%	4%
remodeled	6%	6%	4%
restored	0%	0%	0%
brick exterior	14%	14%	13%
hardwood floors	67%	68%	62%
sewer access	86%	86%	85%
view	60%	60%	58%
staged	3%	3%	6%
natural gas	63%	63%	59%
forced air	84%	84%	82%
walk-in closet	40%	40%	35%
near bus	74%	75%	71%
townhouse	3%	3%	3%
manuf. home	1%	1%	2%
“as-is”	3%	3%	9%
"motivated"	2%	2%	3%

Data reflect residential homes sold in King County, Washington from April 25, 2004 through May 29, 2008 excluding new homes; bank, construction, or other company-owned property; homes sold due to bankruptcy or foreclosure or as part of an estate; homes with greater than seven bedrooms, zero or greater than five bathrooms, or with an age of 0 or greater than 115. DOM = “days on market.” CDOM = “cumulative days on market” and reflects the cumulative days a property is active on the market until it is sold. For example, if a home is re-listed with another agent, the DOM would re-set to zero while the CDOM would reflect the running total.

TABLE 2 **Selling Price and Days on Market Estimates for Moving-out-of-state vs. Staying-in-state Sellers**

Dependent Variable:	log(selling price)							log(cumulative days on market)						
Independent Variables:	1	2	3	4	5	6	7	1	2	3	4	5	6	7
out-of-state	-0.0251	-0.0289	-0.0159	-0.0160	0.0064	0.0064	0.0177	0.2195	0.2161	0.0736	0.0738	0.2223	0.2227	0.2144
	(0.0040)	(0.0036)	(0.0038)	(0.0038)	(0.0094)	(0.0094)	(0.0103)	(0.0189)	(0.0183)	(0.0180)	(0.0180)	(0.0426)	(0.0426)	(0.0448)
vacp	---	---	-0.0287	0.0067	0.0080	0.0080	0.0094	---	---	0.3137	0.1847	0.1937	0.1936	0.3866
			(0.0021)	(0.0054)	(0.0054)	(0.0054)	(0.0062)			(0.0102)	(0.0335)	(0.0335)	(0.0336)	(0.0335)
vacp*non-staged	---	---	---	-0.0380	-0.0380	-0.0377	-0.0369	---	---	---	0.1386	0.1385	0.1399	-0.0716
				(0.0054)	(0.0054)	(0.0054)	(0.0062)				(0.0331)	(0.0332)	(0.0333)	(0.0337)
oos*vacp	---	---	---	---	-0.0290	-0.0294	-0.0229	---	---	---	---	-0.1927	-0.1945	-0.1503
					(0.0101)	(0.0101)	(0.0114)					(0.0502)	(0.0501)	(0.0502)
sr	---	---	---	---	---	-0.0171	-0.0081	---	---	---	---	---	-0.0905	-0.1002
						(0.0048)	(0.0051)						(0.0252)	(0.0267)
Fixed Effects	year	zip*year	zip*year	zip*year	zip*year	zip*year	agent ID and year	year	zip*year	zip*year	zip*year	zip*year	zip*year	agent ID and year
R-squared	0.7921	0.7068	0.7082	0.7085	0.7086	0.7087	0.7197	0.1676	0.1008	0.1166	0.117	0.1172	0.1174	0.1676
N	64,379	64,379	64,379	64,379	64,379	64,379	64,379	64,157	64,157	64,157	64,157	64,157	64,157	64,157

Columns 2 – 6 include area*year measured by “zip-code * year” fixed effects. The data for residential sales in King County, WA contains 105 five-digit zip codes. "Oos" = "out-of-state" and “Vacp” = Vacant house with no occupant, for example, no tenant, housesitter, or relative. “Sr” indicates if the owner is a senior (at least 65) and claimed a senior property tax exemption in the previous tax year. Standard errors below estimate (in parentheses). Robust standard errors in column 1; robust, zip-year clustered standard errors in columns 2-6; robust, agent-ID clustered standard errors in column 7.

TABLE 3 **House Characteristic Coefficients***

		Coefficient	Robust S.E.
	total useable rooms	0.0221	0.0019
	bedrooms	-0.0444	0.0027
	bathrooms	0.0976	0.0053
	covered parking	0.0300	0.0015
	sewer access	0.0291	0.0071
	log square feet	0.3718	0.0200
	log lot size	0.1111	0.0048
Age of home:	6-10 years	-0.0273	0.0049
	11-25 years	-0.0919	0.0062
	26-50 years	-0.1483	0.0076
	51-75 years	-0.0947	0.0087
	over 76 years	-0.0461	0.0092
	walk-in closets	0.0098	0.0032
	vaulted ceilings	0.0047	0.0028
	bus access	-0.0227	0.0026
	basement	-0.0351	0.0029
	brick exterior	0.0273	0.0033
	hardwood floors	0.0326	0.0026
	view	0.0460	0.0030
	townhouse	-0.1433	0.0100
	manufactured home	-0.3305	0.0116
	total fireplaces	0.0366	0.0028
Condition:	fixer	-0.1330	0.0095
	fair	-0.0507	0.0087
	remodeled	0.0426	0.0039
	restored	0.0565	0.0115
	average	-0.0436	0.0046
	good	-0.0191	0.0021
	very good	0.0204	0.0024
	feb	0.0122	0.0037
	mar	0.0336	0.0038
	apr	0.0455	0.0040
	may	0.0596	0.0039
	jun	0.0781	0.0040
	jul	0.0871	0.0046
	aug	0.0918	0.0048
	sep	0.0975	0.0052
	oct	0.0903	0.0057
	nov	0.0844	0.0063
	dec	0.0952	0.0058

* Coefficients on house characteristics using zip*year fixed effects specification in Column 6 of Table 2.

TABLE 4 **Further Results: Selling Price and Days on the Market Estimates for Moving-out-of-state Sellers**

Dependent Variable:	log(selling price)							log(cumulative days on market)						
Independent Variables:	1	2	3	4	5	6	7	1	2	3	4	5	6	7
out-of-state	0.0064	0.0177	0.0046	0.0175	0.0085	0.0067	0.0061	**0.2227**	**0.2144**	**0.1859**	**0.2144**	**0.2260**	**0.2210**	**0.2227**
	(0.0094)	(0.0103)	(0.0136)	(0.0103)	(0.0094)	(0.0095)	(0.0094)	(0.0426)	(0.0448)	(0.0719)	(0.0448)	(0.0426)	(0.0426)	(0.0425)
vacp	0.0080	0.0094	0.0033	0.0092	0.0073	0.0070	0.0083	**0.1936**	**0.3866**	**0.3880**	**0.3866**	**0.1886**	**0.1992**	**0.1936**
	(0.0054)	(0.0062)	(0.0058)	(0.0062)	(0.0053)	(0.0053)	(0.0053)	(0.0336)	(0.0335)	(0.0335)	(0.0335)	(0.0336)	(0.0337)	(0.0336)
vacp*non-staged	**-0.0377**	**-0.0369**	**-0.0297**	**-0.0368**	**-0.0361**	**-0.0363**	**-0.0381**	**0.1399**	**-0.0716**	**-0.0734**	**-0.0716**	**0.1428**	**0.1317**	**0.1399**
	(0.0054)	(0.0062)	(0.0059)	(0.0062)	(0.0054)	(0.0054)	(0.0054)	(0.0333)	(0.0337)	(0.0337)	(0.0337)	(0.0331)	(0.0335)	(0.0333)
oos*vacp	**-0.0294**	**-0.0229**	**-0.0195**	**-0.0227**	**-0.0285**	**-0.0301**	**-0.0289**	**-0.1945**	**-0.1503**	**-0.1506**	**-0.1504**	**-0.1879**	**-0.1905**	**-0.1945**
	(0.0101)	(0.0114)	(0.0110)	(0.0115)	(0.0101)	(0.0102)	(0.0102)	(0.0501)	(0.0502)	(0.0502)	(0.0502)	(0.0500)	(0.0500)	(0.0500)
sr	**-0.0171**	-0.0081	-0.0074	-0.0086	**-0.0158**	**-0.0174**	**-0.0173**	**-0.0905**	**-0.1002**	**-0.1004**	**-0.1002**	**-0.0870**	**-0.0887**	**-0.0905**
	(0.0048)	(0.0051)	(0.0048)	(0.0051)	(0.0048)	(0.0048)	(0.0048)	(0.0252)	(0.0267)	(0.0267)	(0.0267)	(0.0248)	(0.0251)	(0.0252)
seller savviness	---	---	**0.7183**	0.0039	---	---	---	---	---	**-0.2340**	-0.0002	---	---	---
			(0.0133)	(0.0008)						(0.0554)	(0.0029)			
oos * pct B.A.	---	---	0.0154	---	---	---	---	---	---	0.0718	---	---	---	---
			(0.0248)							(0.1362)				
motivated	---	---	---	---	**-0.0399**	---	---	---	---	---	---	**0.6698**	---	---
					(0.0044)							(0.0264)		
"as-is"	---	---	---	---	**-0.0628**	---	---	---	---	---	---	**-0.2193**	---	---
					0.0051							(0.0287)		
indep	---	---	---	---	---	**-0.0170**	---	---	---	---	---	---	**0.0977**	---
						(0.0019)							(0.0095)	
same firm	---	---	---	---	---	---	**0.0160**	---	---	---	---	---	---	**-0.0017**
							(0.0025)							(0.0126)
Zip*Year FE	**Yes**	--	--	--	**Yes**	**Yes**	**Yes**	**Yes**	--	--	--	**Yes**	**Yes**	**Yes**
Agent_ID and year FE	--	**Yes**	**Yes**	**Yes**	--	--	--	--	**Yes**	**Yes**	**Yes**	--	--	--
R-squared	0.7087	0.7197	0.7463	0.72	0.7098	0.7092	0.7089	0.1174	0.1676	0.1679	0.1676	0.1267	0.1189	0.117
N	64,379	64,379	64,379	64,379	64,379	64,379	64,379	64,157	64,157	64,157	64,157	64,157	64,157	64,157

The data include residential sales in King County, WA. "Oos" = "out-of-state" and "Vacp" = Vacant house with no occupant, for example, no tenant, housesitter, or relative. "Sr" indicates if the owner is a senior (at least 65) and claimed a senior property tax exemption in the previous tax year. Columns 1 and 2 repeat the results from columns 6 and 7 of Table 2 for the sake of comparison. In column 3, "seller savviness" is measured by the percentage of adults 25 years old or older with at least a bachelor's degree by five-digit zip code ("pct B.A."). In column 4, "seller savviness" is measured by the number of holding companies reporting high-speed service in each zip code (from FCC form 477). The variable "indep" indicates whether the seller's agent was working for a chain or independent real estate office. "Motivated" and "as-is" indicate inclusion of these adjectives in the "Agent Only Remarks" in the MLS data. Column 7 is the same specification as column 6 of our baseline results in Table 2, except for the "same firm" indicator variable. Robust standard errors below estimate (in parentheses).

TABLE 5 Sensitivity Results - Selling Price and Days on Market Estimates for Out-of-state Sellers

Dependent Variable:	log(selling price)					log(cdom)					log(dom)
Independent Variables:	1	2	3	4	5	1	2	3	4	5	6
out-of-state	0.0064	0.0049	0.0048	0.0061	-0.0058	0.2227	0.2251	0.2251	0.2394	0.2359	0.1715
	(0.0094)	(0.0093)	(0.0067)	(0.0094)	(0.0044)	(0.0426)	(0.0409)	(0.0388)	(0.0423)	(0.0209)	(0.0386)
vacp	0.0080	0.0079	0.0082	0.0016	0.0071	0.1936	0.1893	0.1893	0.2195	0.2198	-0.0015
	(0.0054)	(0.0047)	(0.0048)	(0.0060)	(0.0055)	(0.0336)	(0.0298)	(0.0278)	(0.0405)	(0.0347)	(0.0281)
vacp*non-staged	-0.0377	-0.0380	-0.0381	-0.0322	-0.0373	0.1399	0.1494	0.1494	0.1526	0.1444	0.2143
	(0.0054)	(0.0047)	(0.0049)	(0.0061)	(0.0054)	(0.0333)	(0.0300)	(0.0281)	(0.0397)	(0.0332)	(0.0287)
oos*vacp	-0.0294	-0.0291	-0.0290	-0.0279	-0.0001	-0.1945	-0.1925	-0.1925	-0.2338	-0.2549	-0.1960
	(0.0101)	(0.0100)	(0.0076)	(0.0102)	(0.0049)	(0.0501)	(0.0463)	(0.0441)	(0.0506)	(0.0268)	(0.0440)
sr	-0.0171	-0.0171	-0.0169	-0.0176	-0.0167	-0.0905	-0.0909	-0.0909	-0.0526	-0.0912	-0.0659
	(0.0048)	(0.0042)	(0.0040)	(0.0056)	(0.0048)	(0.0252)	(0.0243)	(0.0231)	(0.0273)	(0.0252)	(0.0230)
Fixed Effects	zip*year	zip code & year	zip code & year	zip*year	zip*year	zip*year	zip code & year	zip code & year	zip*year	zip*year	zip*year
R-squared	0.7087	0.852	0.8522	0.7089	0.7064	0.1174	0.1927	0.1927	0.117	0.1143	0.0879
N	64,379	64,379	64,157	64,379	52,665	64,157	64,157	64,157	64,157	52,488	64,098

Columns 1 repeats the results from columns 6 of Table 2 for the sake of comparison. Column 2 shows results using zip code and year fixed effects while column 3 shows Seemingly Unrelated Regression (SUR) results. Column 4 uses the "moving-out-of-town" vs. "staying-in-town" instead of the similar "state" distinction used previuosly. Column 5 restricts the seller residence categories to "staying-in-town" and "moving-out-of-state"--the two "extreme" categories that represent the greatest difference in referral potential among sellers. The data for residential sales in King County, WA contains 105 five-digit zip codes. "Oos" = "out-of-state" and “Vacp” = Vacant house with no occupant, for example, no tenant, housesitter, or relative. “Sr” indicates if the owner is a senior (at least 65) and claimed a senior property tax exemption in the previous tax year. Column 6 utilizes natural log of "days on the market" as the dependent variable with the independent variables as in column 1. Standard errors below estimate (in parentheses). Robust standard errors in columns 2 and 3; robust, zip-year clustered standard errors in columns 1, 4, 5, and 6.