

The Relative Performance of Real Estate Marketing Platforms: MLS versus FSBOMadison.com*

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Abstract

A good real estate agent might make up some of the commission he or she is paid by helping the seller get a more favorable outcome. We match several data sets to compare the outcomes obtained by sellers who listed their home on a For-Sale-By-Owner (FSBO) web site versus those who used an agent and the Multiple Listing Service (MLS). We do not find that listing on the MLS helps sellers obtain a significantly higher sale price. Listing on the MLS does shorten the time it takes to sell a house.

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1 Introduction

A large number of housing transactions are carried out with the help of realtors.¹ Realtors provide expertise (on pricing, conditioning the house for sale and bargaining) and convenience (by showing the house, advertising and holding open houses and helping with the paperwork). Another advantage of working with a realtor is access to the Multiple Listing Service (MLS), a database that compiles information on all the properties listed by local realtors. For these services realtors charge a commission at, or around, 6%. The commission rate has been stable over time and across regions and has been the subject of scrutiny antitrust authorities.

The advent of the internet has affected many markets. The real estate market is one of them. Internet sites facilitate direct (by owner) marketing. Direct marketing was always possible using newspapers, flyers and other forms of advertising. However, the internet is a cheaper and potentially more effective form of direct marketing. Sellers can post rich information, photos as well as virtual tours. For-Sale-By-Owner (FSBO) web sites provide an alternative platform, or two-sided network, that competes directly with the MLS network.

In this paper we study the functioning of intermediation, or brokerage, in real estate markets. Brokerage in real estate markets is important for several reasons. According to the Bureau of Economic Analysis the size of the real estate brokerage market as a share of GDP has been increasing over time, and in 2005 accounted for 0.9% of GDP. In addition to being a large industry, efficiency in the brokerage market impacts the functioning of real estate markets. Finally, from a public policy point of view, foreclosure of competition from the MLS has recently been the focus of several antitrust cases.²

We assess the role and performance of realtors relative to sales by owner. In particular, we quantify the cost of hiring a realtor. The actual cost of hiring a realtor is the commission minus the price premium that the agent might generate and the financial savings from a faster sale. The price premium may largely offset the commission, or even more than make up the commission.³ We quantify the actual monetary cost of using an agent by comparing the

¹Real estate agents are licensed by the state. A realtor is a real estate agent who is a member of the Realtor Association.

²See for example <http://www.ftc.gov/opa/2006/07/recompetition.htm> or <http://www.ftc.gov/opa/2006/10/realestatesweep.htm>.

³The National Association of Realtors website claims, based on the 2005 Home Buyer & Seller Survey

performance of listing by owner to transactions with realtors. We also assess other outcome measures like time on the market and the overall probability of sale for these alternative channels.

We focus on the city of Madison, Wisconsin, where a single web site (fsbomadison.com) has become the dominant for-sale-by-owner platform. With the cooperation of fsbomadison.com we gained access to all FSBO listings since the start of the platform. We combined the FSBO data with data from two other sources. First, from the South-Central Wisconsin Realtors Association we got access to all MLS listings in the city. Second, we matched every listing with data from the city of Madison. The city of Madison assessor office maintains a database with the full history of transactions on every property together with an exhaustive set of property characteristics. By merging these data sets we get a complete history of events that occurred for virtually every single family home listed in the city between January 1998 and December 2004. A history of a listing includes: date and platform of initial listing, moves across platforms, and outcome (eventual sale date, and price if sold). These data sets allow us to compare the performance of the listing platforms in terms of marketing outcomes.

We find that the average sale price of homes that sell on FSBO is higher than the average price of homes that sell with a realtor. The characteristics, reported in the city assessor's database, of houses sold on the different platforms are somewhat different. However, after controlling for these observed characteristics the FSBO premium persists.

Even with the very rich set of controls at our disposal two concerns remain. First, there might be unobserved house characteristics that affect both the decision to sell on FSBO and prices. For example, homes that are easier to sell (i.e., conform better to the taste of the population) may be more likely to be listed and sold through FSBO. At the same time these popular homes may confer a price premium. To deal with unobserved house heterogeneity we examine properties that sold multiple times. Estimates are essentially identical to those computed using just a single sale and a rich set of controls. We therefore conclude that unobserved house heterogeneity, that is fixed over time, does not seem to be a problem.

that "the median home price for sellers who use an agent is 16.0 percent higher than a home sold directly by an owner; \$230,000 vs. \$198,200; there were no significant differences between the types of homes sold."

The second concern is the selection of sellers into FSBO. Sellers may differ, for example, in their patience or bargaining ability.⁴ More patient sellers are likely to get a better price, regardless of the platform they choose. At the same time they may be more prone to list on FSBO. In that case we will get a positive correlation between FSBO and sale price.

We deal with the potential seller selection issue in several ways. First, we compare the houses that initially listed on FSBO, did not sell, but instead were eventually sold through MLS, to those that listed and sold on FSBO. These two groups of houses sell on different platforms but belong to the initial population that selected FSBO. If we think that the owners of these houses are similar, and that the reason some sold while others did not is luck of the draw, then the difference in price will give us the causal effect of FSBO. We find that houses that listed and sold on FSBO sell for a small, and not statistically significant, premium compared to houses that listed on FSBO initially but that were eventually sold on MLS. Even if moving from FSBO to MLS depends on seller type the selection bias should be reduced, as the group of FSBO listers is more homogenous than the population as a whole. This comparison should at least provide a cleaner, perhaps not completely clean, platform comparison.

Our second approach to deal with seller heterogeneity is to compare FSBO sales to realtors' own properties sold on the MLS. Levitt and Syverson (2006) find a premium for realtors' own properties sold on the MLS. They attribute this price gap to an incentive problem. Repeating the analysis in our data we get a premium almost identical to Levitt and Syverson. We compare this to the premium sellers get on FSBO. Both are by owner transactions, thus, do not suffer from the agency problem identified by Levitt and Syverson. Since realtors are professional this comparison should bound the impact of selection. Even if the homeowners who use FSBO are better bargainers than the typical homeowner, it is reasonable to assume they are no better at bargaining than professional realtors. We find that the FSBO premium is similar to the premium realtors obtain when selling their own homes. In line with the previous findings, this suggests no price differences across platforms.

The third approach we take to deal with seller heterogeneity is to compare transactions of

⁴For a descriptive study of bargaining patterns using English data see Merlo and Ortalo-Magné (2004), and Merlo, Ortalo-Magné and Rust (2006) for a structural model of bargaining using the same data.

the same seller using different platforms. We matched seller names across transactions and compare their performance across platforms. We find no price premium across platforms. Namely, the initial FSBO premium vanishes once we add a seller fixed effect. To confirm that the FSBO premium is explained by seller selection, we estimate the price premium of FSBO sellers while selling on the MLS. We define as a FSBO seller those sellers that sell on FSBO sometime during the sample. Then we estimate the hedonic price regression for MLS transactions only. The FSBO seller dummy carries a premium similar to the FSBO premium. The estimate suggest the latter was driven by seller effects rather than platform effects.

Finally, we examine various factors that impact the sellers decision to sell on FSBO as instrumental variables. For example, we used the fraction of previous sales on FSBO in the seller's neighborhood. The point estimates we find are consistent with a FSBO premium. However, the instruments are very weak and the standard errors are very large.

All the approaches used to deal with selection lead us to the same conclusion: the two platforms deliver the same prices. There is no support in our data to the claim that the MLS delivers a higher price. This is not to say that realtors do not provide value to the seller. The cost of such convenience provided by realtors seems to be the full commission (or half the commission since part of the FSBO transactions involve a realtor).

Comparing other outcomes, we find that houses initially listed on FSBO tend to take slightly longer to sell but have a higher probability of eventually selling. The longer time to sell is driven by two factors. First, a proportion (about 20%) of FSBO listings that move to the MLS after initial failure. The shift from FSBO to MLS entails the risk of staying 68 more days on the market. Second, the probability of a quick sell is larger for houses initially listed on the MLS.

2 Realtors and FSBOMadison.com

Historically, most real estate transactions have been performed using real estate agents. A homeowner wishing to sell their home will contract with a real estate agent offering them exclusivity for a limited period, usually 6 months, and agreeing to pay a commission, of

usually 6% of the sale price, if the house is sold during that period.⁵ The commission is typically split between the listing agent, who is the agent that contracted with the seller, and the selling agent, who is the agent that brings the buyer. Some states, for example, Wisconsin, where our data come from, also recognize the status of buyer agency.⁶ If a buyer agent is involved in the transaction, s/he deals with the listing agent to settle the terms of the transactions, and gets the selling agent commission. When the same agent lists and sells the property, this agent gets the whole commission.

In order to become a real estate agent one has to be licensed by the state. In most states this requires a short course and to pass a licensing exam. A real estate agent becomes a realtor when s/he joins the realtor association and subscribes to its code of ethics. Joining the association provides the agent with several advantages, one of them is access to the MLS.

Working with an agent, and agreeing to pay the commission, gives the homeowner access to a number of services. The National Association of Realtors (NAR) argues that Realtors provide valuable help with setting the listing price, preparing the house, checking potential buyers' qualifications, showing the house, bargaining the terms of the deal, and handling the paperwork. Another advantage of working with a realtor is access to the MLS. In the market we examine this involves the ability to list on the South Central Wisconsin MLS, which costs a minimal fee, \$10 as of 2007, but requires membership in the organization.

In 1998 an alternative to the MLS was launched in Madison, Wisconsin: the website FSBOMadison.com. Christie Miller and Mary Clare Murphy recruited 9 listings from for-sale ads in the local newspaper, added Mrs. Murphy's house and launched their website with 10 listings. From the get-go, the strategy of FSBOMadison.com was to provide a cheap no-frills service. In exchange for a fee of \$75 initially, \$150 for most of the period of our sample, homeowners can post their listing on the website (property characteristics, contact details and a few pictures). FSBO provides sellers with a yard sign similar to those provided by realtors but with the distinctive logo and color of FSBOMadison.com. Listings are kept active for 6 months, more if the fee is paid again. FSBOMadison.com has been successful,

⁵For a discussion of the commissions charged by agents see Hsieh and Moretti (2003) and references therein.

⁶The difference between a buyer agent and a selling agent is mostly a legal one having to do with the contractual agreement, or lack of it, between buyer and agent.

establishing itself as basically the only website for for-sale-by-owner properties in the city.

Properties are removed from the site upon instruction of the homeowners. Typical events that trigger removal include sale of the property, withdrawal of the property from the market, or transfer of the property to the MLS platform. The staff of FSBOMadison.com monitors listings on the MLS and extinguishes any listing from their website that ends up on the MLS. This is done primarily to avoid disputes with the MLS.

Real estate agents will occasionally be involved in FSBO sales when they represent the buyer and one of the parties to the transaction accepts to pay a buying agent commission, typically 3%. When such sales occur, the real estate agent may create a listing on the MLS and declare it as sold right away. In Madison, all such listings get a specific code that identifies them as FSBO listings. This enables us to identify some of the FSBO sales that are executed with the help of a realtor without being listed by a realtor. Note that the typical buyer agency agreement does not allow the household to buy a FSBO home without payment of a commission to the realtor.

Recently, a number of limited-service brokers have emerged. In Madison, the dominant firm appears to be Madcity Homes (www.madcityhomes.com). Madcity Homes charges \$399 to list a house on the MLS for 6 months and also provides the seller with a yard sign. The homeowner gets no other service. Additional services are available for an extra fee upon request. The homeowner is responsible for paying the 3% commission to any realtor that sells the house, whether the realtor is under buyer agency agreement or not. No commission must be paid if the sale does not involve a realtor. By the end of 2004, when our sample ends, this firm had too few listings for us to analyze the extent to which limited-service brokerage yields different outcomes than full-service MLS listings or FSBOMadison.com listings.

3 Theoretical Framework

In this section we briefly present a theoretical framework to think about the matching of buyers and sellers in the real estate market. Coles and Muthoo (1998) present a stock-and-

flow model of matching between unemployed workers and vacancies.⁷ Their stock-and-flow model, mildly adapted, will be useful to think about platform choice and selection issues. There are many issues like incomplete information, learning about market conditions or own property, that affect decisions but we will not consider.

The basic idea of their model is as follows. There is a flow of new buyers (sellers) into the market in every period. Entrants are immediately put in contact with the stock of agents on the other side of the market. There is a probability λ that a house fits the needs of the buyer. Buyers costlessly observe whether they have gains from trade with each house currently on sale. Namely, they find out which of the houses currently in the stock of houses for sale meet their needs. If they find a single agent to trade with, they split the gains from trade. If instead a newcomer meets multiple counterparts, she receives simultaneous offers generating a Bertrand-type game. Agents that trade leave the market. Incoming buyers (sellers) that do not find a match, or fail to trade, join the stock of buyers (sellers).

Coles and Muthoo show that in equilibrium matched players always trade (due to complete information). In equilibrium there is no trade among the stocks, if there were gains from trade they would have traded already. Thus, in equilibrium newcomers trade with the stock. The stock of buyers (sellers) only finds gains from trade –match– with the flow of sellers (buyers).

We explore two variations: (i) we consider the coexistence of two competing platforms, F and M , where agents can participate and (ii) house and seller heterogeneity. The later will help us think about unobserved heterogeneity and potential biases once we get to the data.

Platform Choice We make the following assumptions in order to capture the main practical differences across platforms. First, we assume that the existence of the platform F is known to only a proportion of agents.⁸ Only informed agents have a choice, uninformed

⁷See also Coles and Smith (1998), and Taylor (1995), and for a discussion of brokerage choice Salant (1991), Yavas and Colwell (1999) and Munneke and Yavas (2001).

⁸Heterogeneity in the disutility of trading without a realtor can also drive platform choice. Some sellers are aware of the option of sale by owner but may find it too costly to show the house and bargain.

ones trade in M .⁹ Second, we assume there is an asymmetry between buyers and sellers. While informed buyers can shop on both platforms, sellers choose a single platform. This exclusivity is required by the MLS. Third, listing in M , in addition to the exclusivity, involves a commitment to pay a transaction cost (or commission) C should the house sell within τ periods of listing. These assumptions make F a cheaper alternative, involves no fees. At the same time F involves less exposure, thus a lower matching rate.

Heterogeneity We think of houses differing in their degree of liquidity, λ . Owners of more liquid houses, which get more matches, may systematically opt for one of the platforms, and at the same time sell at a premium (as they generate more offers). Sellers may also be heterogeneous, for example, in their patience or bargaining ability. Patience in this model will affect both platform choice as well as transaction price given a platform.

Implications Within this framework, informed buyers shop, and match, on both platforms. The probability of matching in either platform depends on sellers behavior, namely, on what proportion of the properties lists on each platform. Uninformed buyers and sellers face no choice, they shop exclusively on M .

Informed sellers have to choose an exclusive platform. The trade off is between an expensive and more effective platform, M , and the non-fee F platform that offers exposure to fewer buyers. For any specific property, the extra exposure leads to higher success rate.

Claim 1 *For given seller and house characteristics, on M we should observe shorter time to sell and higher success rate, holding time on the market fixed.*

The benefit of listing in F is common to all sellers, however, the more patient the seller or liquid the property the less costly it is to use F . Thus, the appeal of F depends on seller patience and liquidity of the property, λ .

Two implications are immediate. First, impatient sellers and non-liquid properties list in M . Moreover, they have no incentive to ever move to F should they fail to match in M . The reason is that buyers in F also shop in M , failure to match in M means that no matches

⁹Although not necessary, it is reasonable to assume that the set of buyers aware of F is a subset of those aware of M . For example, out of town buyers are less likely to be familiar with fsbomadison.

will be found in F either. Having explored all the stock of buyers, the seller can only wait for the flow of incoming buyers. Since the flow is larger in M , impatient sellers stay there.

In contrast, patient sellers and owners of liquid properties prefer to list in F . If they fail to match in F , they move to M to try to match with the rest of the stock of buyers (those that shop only on M). Once they explored M , all stock has been exhausted, thus, they have no incentive to move back to F . The incentives just described can be summarized in the following claims.

Claim 2 *A proportion of sellers try F first, if they fail to match they move to M and stay (matching the flow in M). There are no moves from M to F*

Claim 3 *More patient sellers and sellers with easier to sell houses list on F first.*

F provides a cheaper way to explore a subset of the stock of buyers. The attraction of this option increases with the proportion of informed buyers, and declines with the number of sellers that list in F (sellers compete for the stock of buyers). As the number of informed buyers increases the success rate (probability a seller finds a match) increases. However, the extra success draws more listings. As more informed buyers shop in F more sellers list, equilibrating the success rate.

Claim 4 *As the proportion of informed buyers increases the success rate at F is stable*

Since, given similar terms, buyers are indifferent between the platforms, as frictions disappear they would not pay any of the premium.

Claim 5 *As frictions vanish (i.e., more buyers become patient and informed about F) prices across platforms tend to coincide*

In sum, the model suggests that sellers are likely to list using FSBO to expose their property to a subset of the stock of buyers, if they fail to match, they move on the MLS for exposure to the rest of the stock, and subsequent flow of buyers.

4 Data

We obtained data from FSBOMadison.com, the South-Central Wisconsin Realtors Association, the City of Madison and Dane County. We merged the data into a single database, organized by parcel numbers as designated by the City.

MLS data The South-Central Wisconsin Realtors Association provided us with all listing activity on their Multiple Listing Service between 1/1/1998 and 5/23/2005. For each listing, we know the address of the property, its parcel number, whether the property is a condo or not, the listing date, and the status of the listing. In addition, whenever relevant, each record contains the expiration date of the listing, the accepted offer date, the closing date and the sale price as recorded by realtors.

FSBO data The owners of the FSBOMadison.com website provided us with information on all the listings with their service since it started in 1998. For each listing, we know the address of the property, the last name of the seller, the date the property is put on the web and sometimes information about the outcome of the listing. At this point, we use data for the years 1998-2004, with an address in Madison.

City Data The city of Madison is located within Dane County. The city database provides information on sale prices and large set of property characteristics, about both the parcel and the buildings. In addition, the county maintains a county-wide database with location information for each parcel. We use this database to obtain spatial coordinates for each property. The county and the city do not use the same parcel numbers for condominium. Whenever there are such incompatibilities, we use Streetmap to locate the properties.

4.1 Descriptive Statistics

Merging the above data sets and excluding listings as defined above we get 15,616 listings, which represent 12,384 unique properties, in 1998 to 2004. In Table 1 we describe these listings. A row represents where the property was initially listed. The columns represent the eventual outcome of the listing, namely, whether it sold and how. Actual histories can be

more complicated, like listing with several agents or leave a platform to then return, but we mostly abstract from these complications.

The market share of FSBO in listings during the entire sample period is roughly 20%. We define a non-sale as any listing that showed up in either MLS or FSBO but was not recorded later in the city data with a sales price. Approximately 87% of the properties eventually sell. Out of the properties that sell, 95% sell through the initial listing platform. The remaining 5% are almost completely switches from FSBO to MLS. Switches from MLS to FSBO are almost nonexistent, accounting for just 0.3% of the MLS listings.

This is consistent with the predictions of the model (i.e., Claim 1) by which some sellers may try the cheaper platform first but they have no incentive to return. Moreover, should they prefer not to try the stock in F they would not come back for its flow. The market share of FSBO in properties sold is roughly 14%, slightly below its listing share.

Since FSBO was only introduced in 1998, these numbers somewhat underestimate the current FSBO market share. Therefore, in the rest of Table 1 we present the breakdown for every other year of the sample. FSBO's share in listing and in outcome increases over time. By 2004, the last year of the sample, FSBO share in listing is over 27%, and the share in sales is almost 20%.

To judge the success of each platform we look at the proportion of properties that sell through their first listing. Of the 3,140 initial FSBO listings 2,153 or 68.6% sell on FSBO while 84.9% of initial MLS listings (10,718 out of 12,476) sell on MLS. While there is a clear trend in FSBO listing, increasing from 6% in 1998 to 27% in 2004, the trend in success rate is less clear. The success rate in 2004, 71.2%, is higher than the rate in 1998, 63.1%. However, there is no clear trend in the intermediate years. This is line with Claim 4.

Just as the penetration of FSBO increases over time it also differs across neighborhoods. In Table 2 we present the FSBO penetration rate across different assessment areas. These areas are defined by the City of Madison for assessment purposes. We get similar variation if we look at elementary schools areas. The FSBO listing share vary between 7.9% and 43.6%. The top FSBO share neighborhoods tend to be close to campus. Similar variation is present also in the FSBO share of sales.

The success rate of FSBO listings varies by neighborhood. For neighborhood with at

least ten FSBO listings the success rate ranges from 31% to 100% (with one outlier at 9%). The mean success rate is 66% and the standard deviation is 13.2%. There is a positive relation between the propensity to list using FSBO and the success rate, which can be seen through a linear regression. Using the estimated slope, one standard deviation increase in the success rate translates into 2 percentage points increase in the propensity to list FSBO.

In the analysis below we compare the performance of properties sold through FSBO and through MLS. A key question is whether these properties are comparable. In Table 3 we explore this issue. It compares several of the house characteristics in the data. The columns present the mean and standard deviation for properties listed initially through FSBO and MLS. The last two columns present the difference between these means and the t-statistic of the difference. The differences in the means for most characteristics are small. However, because of the reasonably large sample sizes the differences are significant in some cases. For example, FSBO properties are somewhat older, tend to be on smaller lots and have smaller basements, but have somewhat newer roofs and furnaces.

5 Results

5.1 Outcomes by FSBO and MLS channels

We now explore the differences in outcome for properties sold through FSBO and MLS. In Tables 4-6 we present the results from regressing sale price, time on the market and the probability of a sale, on a FSBO dummy variable and various controls.

In Table 4 we display the effect of channel on price. In the top panel of the table the dependent variable is the logarithm of price, while in the bottom panel we regress the price level on various controls. The sample in columns (i) through (iv) includes only properties that sold on the channel they were originally listed. In the first column we regress price on a dummy variable that equals one if the house was sold on FSBO (divided by 100). If listing channel is determined at random, and the seller cannot switch from the channel they were assigned then this regression measures the causal effect of selling on FSBO. In the spirit of this ideal situation the sample includes only houses that sold on the channel

they originally list. The results suggest that on average there is a large positive premium for selling on FSBO, roughly a 11 percent premium or 14,800 dollars. Since the dependent variable is the sale price, and not the sale price net of commission, this premium is on top of the saved commission. The magnitude of the premium is driven by the time trends in the data that we saw in Table 1. Over time prices have gone up and so has the share of FSBO sales. Indeed, once we control for year and month time dummy variables and a linear time trend, in column (ii), the effect goes down to roughly 4 percent, or 3,000 dollars, but is still statistically significant.

The numbers in Table 3 suggest that there is some difference in the observed characteristics of houses sold through FSBO and MLS. If the houses sold on FSBO have more attractive characteristics, then the FSBO dummy variable will also capture the impact of these features, rather than the effect of selling through FSBO. Furthermore, Table 2 suggests that FSBO has a higher share in some areas. If these areas are more attractive this will bias our estimates.

In order to control for the differences in houses we construct an hedonic model of prices. Column (iii) reports the results from this model. In the controls we include the characteristics of the house, displayed in Table 3. The effect of selling on FSBO is mostly not effected and stays at roughly 4 percent. This is consistent with the numbers in Table 3 that suggested that while some characteristics were statistically different, the differences seemed small. In column (iv) we also control for neighborhood characteristics by including neighborhood fixed effects. The coefficients on these controls are of no direct interest. However, the key is that we are able to explain 92.4 percent of the variation in the logarithm of price, and 89.3 percent of the variation in price. The impact of selling through FSBO goes down to approximately 3.2 percent, or 5,000 dollars.

The regressions in columns (i) through (iv) focused on the impact of the channel through which the house was sold. In column (v) we explore the impact of the initial listing channel. There are two differences relative to the results in column (iv). First, the sample now includes switchers: houses that initially listed on one channel but that sold through the other. These are mostly houses that listed on FSBO but ended up being sold through MLS. Second, now the FSBO dummy is defined as being initially listed on FSBO, as apposed to being sold

through FSBO.

This regression is of interest for a potential seller asking what is the expected impact on price if they list on FSBO, and then behave optimally (depending on how lucky they were with the FSBO stock of buyers), regardless of where they end up selling. The results suggest that the premium for listing on FSBO, which is estimated at 3.1 percent, is almost identical to the premium for selling through FSBO.

To further explore the distinction we also examine, in column (vi), the regression that includes both the initial listing channel and the sales channel. We see that there is a small additional – statistically significant – premium of selling on FSBO of 0.7 percent. This premium is driven by the very small number of houses that initially listed on MLS, but were eventually sold on FSBO. In the last column we separate these houses and find that now the additional premium of selling on FSBO disappears, but that these houses command a large premium, over 6 percent relative to houses that listed and sold on MLS.

Overall the results in Table 4 deliver a surprising result. Sellers on FSBO are able to sell their houses at a premium relative to MLS. In addition, sellers that initially list their houses on FSBO but that then move to MLS also command a significant premium. The causal interpretation of the results relies on random assignment to platform, or random success, conditional on time, house and neighborhood characteristics. Random assignment is a strong assumption in this context. We deal with selection in the next section. Even after considering selection effects we find that the commission is born by the sellers (see next section).

We now examine other outcomes. In Table 5 we focus on the total time to sell. Time to sell is defined as the time between the initial listing and the sale date as recorded in the city data. The dependent variable in all regressions is the total time to sell, and the controls follow a similar structure to Table 4. In columns (i) through (iv) we focus on the sample of houses that sold on the channel where they were initially listed.

Without any additional controls, the results in column (i) suggest that total time to sell is 4 days shorter when selling on FSBO. Once we control for year and month dummies, and for house and neighborhood characteristics, the effect of selling on FSBO is not statistically significant. The additional controls change the R-squared very little, compared to the sale

price where the house and neighborhood characteristics explained a large fraction of the variation.¹⁰

In the last three columns we once again study the full sample of houses that sold, not just houses that sold on the channel originally listed. In column (v) we find that sellers who originally list on FSBO should expect to take 20 days longer to sell. This is largely driven by houses that originally listed on FSBO but then switch to MLS. The results in column (vii) allow us to separate the effects in four groups. The base group are properties listed and sold on MLS. Relative to this group the properties listed and sold on FSBO take 1 day longer, the same result we found in column (iv). For houses that listed on FSBO but eventually sold on MLS the time to sell is almost 64 days longer. This is not surprising since moving to MLS means starting from scratch. Finally, for houses that listed on MLS but that were sold through FSBO the expected time to sell is 120 days longer.

To further characterize the differences of outcomes between the two channels we report, in Table 6, the effect of channel on the probability of sale. In all cases we regress a dummy variable, which varies by column, on channel dummy variables, year and month dummy variables, a linear time trend, house and neighborhood characteristics.

We start by examining in columns (i) and (ii) the probability of a sale. The dependent variable is equal to one if the property sold. A non-sale is defined if we do not observe a sale price in the city data. Overall in the sample 87 percent of the properties sold. The properties initially listed on FSBO tend to have a higher probability of eventually being sold, although some of them are eventually sold through MLS. In column (ii) we separate the properties into four groups depending on initial listing and final channel. If the property sold the final channel is the channel where it sold, otherwise it is the last channel used for listing. We find that relative to the base group – properties that listed and sold on MLS – properties that sold listed and sold on FSBO are roughly 1.1 percentage points more likely to sell, although the difference is not statistically significant. The properties that listed on FSBO but eventually switched to MLS are even more likely to sell. Relative to the base group they are roughly 4 percentage points more likely to sell. The properties that list MLS

¹⁰Time on market is defined by the timing of closing which depends on considerations hard to predict, thus a lower explanatory power is expected.

and switch to FSBO are less likely to sell, but this is an extremely small group and the effect is not estimated precisely.

In columns (iii)-(viii) we examine the probability of a sale, conditional on eventually being sold, within a fixed number of days. We look at 180, 90 and 60 days. We find a patterns similar to what we saw in Table 5: the properties listed on FSBO tend to take longer to sell. Thus, within a fixed interval of time a FSBO property is less likely to sell. Although FSBO listings are somewhat more likely to eventually sell, their initial success is lower than MLS. This is mainly driven by the properties that start on FSBO and switch to MLS. In columns (iv), (vi) and (viii) we separate the properties into four groups. The FSBO listing that sold on FSBO are less likely to sell within 60 or 90 days. This is consistent with MLS exposing sellers to a bigger stock of buyers (as in Claim 1). The properties that start on either FSBO or MLS, and then switch, take an even longer time to sell and thus are much less likely to sell within a fixed time period.

5.2 Selection

In the previous section we documented the difference in outcomes for properties listed on FSBO and MLS. A key issue in interpreting the results is selection. There are two separate concerns. First, are properties sold on FSBO comparable to those sold on MLS? We control for a rich set of observed house characteristics, but it is still possible that there are unobserved differences that are correlated with the platform choice. Second, even if the house unobserved characteristics are not correlated with the channel, the sellers attributes might be. We now discuss both of these issues in detail.

5.2.1 Unobserved House Characteristics

As we show in Table 2 there are some differences in observed characteristics between the properties listed on FSBO and MLS. These differences are not large but in some cases they are statistically significant. Indeed, once we control for house and neighborhood characteristics, in the regressions we display in Tables 4-6, the results change somewhat. The differences

in the observed characteristics might suggest that there are differences in characteristics unobserved by us. To examine this issue we exploit properties that were sold multiple times in our sample using different platforms. As long as the unobserved characteristics are constant over time looking at properties that sold multiple times, and including a house fixed effect will control for the unobserved characteristic

In our sample, there are 2,020 properties that sold more than once. The majority, 1,869, sold twice, with 146 and 5 selling three and four times. Together this yields 4,196 sales. Out of these sales 3,371 (or 80%) were listed and sold on MLS, 628 (15%) listed and sold on FSBO, 194(5%) listed on FSBO and sold on MLS, and only 3 listed on MLS but sold on FSBO. Out of the 2,020 properties that were sold multiple times we have 645 that were sold using different channels in different times.

In Table 7 we present results using this sample. Different columns focus on different outcome variables. In all regressions we include year and month dummy variables and a linear time trend. In almost all cases the results are similar to those we found in Tables 4-6, where we controlled for differences across properties using the house and neighborhood characteristics. We also display in Table 7 similar regressions using the same sample, but dropping the fixed effects and controlling for differences using the house and neighborhood characteristics instead. Once again the results are essentially identical.

Together these results suggest that there is no bias in the estimates due to an unobserved house effect that is fixed over time. This should not be surprising. The differences in the observed characteristics were not large and controlling for them did not make a large difference. Since most unobserved house characteristics, that we can think of, seem (roughly) fixed over time we conclude that we should not be concerned over the impact of unobserved household characteristics on our estimates.

5.2.2 Seller Selection

If seller type affects both price and platform choice our estimates will be biased. For example, some sellers might be better or more patient at bargaining and therefore able to get a higher price regardless of the channel they use. Being more patient, according to the model, they are also more like to list in FSBO. Absent appropriate controls for seller type we will overestimate

the effect of selling on FSBO.

We explore several ways to deal with this problem. The first approach is to compare the differences in outcomes between those sellers who listed on FSBO and sold on FSBO and those that initially listed on FSBO but ended up switching to MLS. If FSBO listers are a more homogenous group than the sample as a whole, the selection problem should be attenuated; or eliminated if the success on FSBO is driven by factors unrelated to sellers' type.

The results in Table 4 suggest that conditional on listing on FSBO there is a small, and not statistically significant, increase in price from also selling on FSBO.

We find essentially the same result if we focus on the sample of initial FSBO listings. If we believe that moves to MLS, after listing on FSBO, are purely driven by random forces then the estimates suggest that the two platforms deliver the same prices. There is no gain in the sale price from selling on MLS relative to FSBO.

Even if moving to MLS depends on seller type the selection bias should be reduced, as the group of FSBO listers is more homogenous than the population as a whole. Namely, in the range of sellers, these observations belong to the set that self selected into FSBO. Furthermore, it is not clear that the selection indeed dictates a bias. Consider selection on patience. Is it the more patient seller who moves to MLS or the less patient? A patient seller may stay longer on FSBO. On the other hand, moving to MLS entails a long wait (given the findings in the previous section), thus it might be that the more patient sellers are those that decide to move on to the MLS. In other words, there might be selection, but its relation to sales price is less clear.

The results of time to sell and the probability of a sale, displayed in Tables 5-6, can not be directly compared for this purpose. Once a seller switches from FSBO to MLS it is only natural that it takes longer to sell. So it is not surprising that the total time to sell increases.

Our second approach to quantify the role of unobservable seller characteristics is to compare FSBO sales to realtors' transactions of their own properties. These transactions provide us with a "sale by owner" using the MLS. Levitt and Syverson (2006) report that realtors are able to obtain better prices when they sell properties in which they have an ownership stake relative to properties, sold by the same realtors, where they are not owners.

We assume that realtors are no worse at selling their own properties than non-agents. In other words, the effect of realtors selling their own homes is an upper bound on the impact of seller selection.

The results are presented in Table 8. The variable "Sold by Owner" is a dummy variable that equals one for all sales by either a realtor selling their own home on the MLS, or a sale on FSBO. The variable "Sold on FSBO" equals one for sales on FSBO, and therefore its coefficient measures directly the difference between the performance of FSBO sales and sales by owner/agents on MLS. The regressions in columns (i) and (iii) include only properties that sold on the channel where they were initially listed. The results in the other columns include all properties that sold.

As in Levitt and Syverson we find that owners obtain a premium when selling properties in which they have an ownership share. However, for price, time to sell and probability of sale within 180 days there is no statistically significant difference between agent/owner and sales on FSBO. FSBO sales are less likely to happen within 60 or 90 days. Furthermore, if we control for heterogeneity across realtors in performance, we find that listing on MLS with top realtors ownership commands a premium over FSBO. This suggest that FSBO does not entail a penalty or premium and it is consistent with the findings from comparing FSBO listings only.

We also examined instrumental variables regressions to control for the potential correlation between FSBO and the unobserved characteristics. In all these cases the impact of FSBO was not statistically different than zero. However, depending on the exact functional form the standard errors were very large, which is consistent with the instrumental variables being only weakly correlated with the decision to use FSBO. Indeed the "first stage" verifies this. The instruments we tries include the neighbors' propensity to list, or their success, in FSBO.

Our final approach is based on the fact that some sellers make multiple sales during the sample period. We use the observed multiple sales to control for unobserved seller heterogeneity. Matching names across transactions we identified 265 sellers who listed properties using different channels, these involved 744 sales. The results are presented in Table 9. In the first column we regress the logarithm of price on a dummy variable that equals one if

the seller sold a property using FSBO any time during the sample, not necessarily at that observation. The sample includes all the sales in the sample and the regression includes the usual time, house and neighborhood controls. We see that most of the effect of FSBO we saw in Table 4 can be explained by this dummy variable.

This might not be too surprising since this coefficient is a weighted average of the sellers that sold only once using FSBO and those that sold more than once and used FSBO at least once. Since the first group is larger they might explain most of the effect. For that reason in column (ii) we run the same regression but constrain the sample to include only properties that listed on MLS. The results suggest that FSBO sellers are indeed likely to get a higher price even when selling through MLS. On average they get 1.6% more. Note, that they take on average roughly 10 more days to sell, suggesting that they are more patient. All this suggests that seller selection is indeed present. However, it is not enough to fully reverse the result that MLS does not command a premium.

In the last two columns in the table we restrict the sample to the properties sold by sellers who had multiple sales/listings. In column (iii) we report the result of regressing the log of price, and time to sell, of the properties sold by these sellers on a dummy variable that equals one if the property was listed using FSBO, and the usual controls. We include also fixed effects for the sellers. The results suggest that when listing on FSBO these sellers get 1.65% higher price, but the effect is not statistically significant. There is virtually no effect on the time to sell. In column (iv) we repeat the analysis with a dummy variable that equals one if the property is listed and sold using FSBO. There are 225 different sellers that sold multiple properties using different channels involving 631 sales. As in column (iii) we include seller fixed effects. The results suggest that there is no statistical difference in the price and the time to sell is significantly lower.

In summary in this section we explored various ways to control for seller selection in the decision to use FSBO. The results suggest that indeed selection is present. After controlling for selection we find that the FSBO premium disappears, but there is no evidence that MLS provides any premium relative to FSBO.

6 Concluding Remarks

In this paper we examine the relative performance of two competing networks: MLS and FSBO. Our results suggest the two platforms command similar prices. Even after controlling for differences in house and seller characteristics we find that MLS offers no advantage in the sale price. This is not to say that using an agent is not valuable. Realtors can save sellers time and generally help through a stressful and maybe difficult period.

What do our results imply for market structure in the brokerage industry in Madison? If one believes that sellers are aware of the FSBO option, and know that there is no premium associated with MLS, then our results suggest that a large fraction of the population is willing to pay a significant amount for the services provided by realtors. Thus, despite the 6% commission rate, realtors are going to continue to maintain a high market share. An alternative view is that FSBOMadison.com is still diffusing. As more people become aware of it, and more importantly as more sellers realize that there might not be any price penalty associated with using it, its share of the market will increase.

The data set we use in this paper comes from one market. We selected this market because of the availability of data and the willingness of FSBOMadison.com and the local realtors association to cooperate with us and share their data. At this point we cannot generalize beyond this market. Without further data and analysis we do not know if our results hold more broadly. As we show the penetration rates of FSBOMadison.com vary widely across neighborhoods. It is our impression, based on casual observation, that the penetration rates of FSBO vary across markets. Understanding what drives this variation and the forces behind the diffusion of FSBO is key to understanding the broader implications of our findings.

The data we analyzed so far end at 2004. We are in the process of cleaning data for 2005 and 2006. The importance of the additional data is that they allow us to study a market during a more difficult time, during a cooler housing market. We could see if the cost or, returns to, using a realtor vary with the cyclicalities of the market.

References

- [1] Coles, Melvyn and Abhinay Muthoo. "Strategic Bargaining and Competitive Bidding in a Dynamic Market Equilibrium" *Review of Economic Studies* 1998, 65, 235-60.
- [2] Coles, Melvyn and Eric Smith. "Marketplace and Matching" *International Economic Review*, 1998, Vol 39, No 1.
- [3] Follain, James, Terry Luter and David Meier. "Why Do Some Agents earn more than others" *The Journal of Real Estate Research*, Fall 1987, 73-81.
- [4] House, Christopher and Emre Ozdenoren. "Durable Goods and Conformity" mimeo University of Michigan.
- [5] Hsieh, Chang Tai and Enrico Moretti. "Can Free Entry be Inefficient? Fixed Commissions and Social Waste in the Real Estate Industry" *Journal of Political Economy* 111(5), 2003
- [6] Levitt, Steven and Chad Syverson. "Market Distortions When Agents are Better Informed: The Value of Information in Real Estate Transactions", University of Chicago mimeo.
- [7] Merlo, Antonio and François Ortalo-Magné. "Bargaining over Residential Real Estate: Evidence from England" *Journal of Urban Economics*, September 2004, 192-216.
- [8] Merlo, Antonio, François Ortalo-Magné and John Rust. "Models of Bargaining and Price Determination of Residential Real Estate: Theory and Evidence" 2006 mimeo University of Maryland.
- [9] Munneke, Henry and Abdullah Yavas. "Incentives and Performance in Real Estate Brokerage: Theory and Evidence" *Journal of Real Estate Finance and Economics*, 2001, 22, 5-21.
- [10] Salant, Stephen. "For Sale by Owner: When to Use a Broker and How to Price the House" *The Journal of Real Estate Finance and Economics*, 1991, 4, 157-173.

- [11] Taylor, Curtis. "The Long Side of the Market and The Short End of the Stick: bargaining Power and Price Formation in Buyers', Sellers' and Balanced Markets" *The Quarterly Journal of Economics*, August 1995, 837-855.
- [12] Yavas, Abdullah and Peter Colwell. "Buyer Brokerage: Incentive and Efficiency Implications", *Journal of Real Estate Finance and Economics*, 1999, 18: 259-277

Table 1: Properties by Initial Listing Platform and Outcome, By Year

List\Outcome	MLS	FSBO	Unsold	Total
1998 to 2004				
MLS	10,718 (85.9%)	31 (0.3%)	1,727 (13.8%)	12,476 (79.9%)
FSBO	697 (22.2%)	2,153 (68.6%)	290 (9.2%)	3,140 (20.1%)
Total	11,415 (73.1%)	2,184 (14.0%)	2,017 (12.9%)	15,616
1998				
MLS	1,807 (84.2%)	3 (0.1%)	335 (15.6%)	2,145 (94.0%)
FSBO	43 (31.2%)	77 (55.8%)	18 (13.0%)	138 (6.0%)
Total	1,850 (81.0%)	80 (3.5%)	353 (15.5%)	2,283
2000				
MLS	1,285 (87.0%)	4 (0.3%)	188 (12.7%)	1,477 (80.3%)
FSBO	106 (29.3%)	226 (62.4%)	30 (8.3%)	362 (19.7%)
Total	1,391 (75.6%)	230 (12.5%)	218 (11.9%)	1,839
2002				
MLS	1,456 (86.7%)	4 (0.2%)	220 (13.1%)	1,680 (76.8%)
FSBO	99 (19.5%)	380 (74.7%)	30 (5.9%)	509 (23.3%)
Total	1,555 (71.0%)	384 (17.5%)	250 (11.4%)	2,189
2004				
MLS	1,564 (81.1%)	9 (0.5%)	355 (18.4%)	1,928 (74.4%)
FSBO	103 (15.5%)	480 (72.4%)	80 (12.1%)	663 (25.6%)
Total	1,667 (64.3%)	489 (18.9%)	435 (16.8%)	2,591

The year is defined by initial listing date. An unsold property is defined as not having a sales price in the city data.

Table 2: FSBO Penetration Rates, By Area

	FSBO Listing Share (%)	FSBO Outcome Share(%)	Properties Sold
Area 70	43.6	33.7	101
Area 28	39.3	25.0	56
Area 17	37.7	28.1	231
Area 89	33.8	27.0	148
Area 19	27.7	18.1	155
Area 1	26.5	18.7	219
Area 21	24.5	16.1	143
Area 2	20.9	14.1	206
Area 88	19.4	12.6	325
Area 76	17.8	12.9	309
Area 39	12.2	7.7	181
Area 73	9.4	7.3	382
Area 86	7.9	2.4	165
Overall	20.1	14.0	15,808

An area is defined by the City of Madison for assessment purposes. The above areas are a sample out of areas defined by the city.

Table 3: Sample Property Characteristics by Listing Channel

Characteristic	MLS		FSBO		Difference	t-stat
	Mean	Std. Dev.	Mean	Std. Dev.		
age (as of 2007)	46.35	24.39	48.29	26.46	1.94	3.71
# of bedrooms	3.07	0.72	3.05	0.68	-0.02	-1.46
# of full bath rooms	1.59	0.67	1.58	0.65	-0.01	-0.58
# of rooms	3.66	1.20	3.68	1.15	0.03	1.02
total sq footage	1,735.58	697.33	1,717.28	582.36	-18.30	-1.29
lot size	9,605.51	5,393.50	9,017.61	5,260.41	-587.90	-5.20
basement sq footage	998.43	381.88	959.41	329.76	-39.03	-4.98
inside condition	3.71	0.55	3.64	0.60	-0.07	-5.54
outside condition	3.75	0.49	3.75	0.51	-0.01	-0.90
roof age (as of 2007)	26.14	23.97	24.89	24.26	-1.25	-2.48
furnace age (as of 2007)	26.24	23.36	24.89	23.40	-1.35	-2.74
central air	0.81	0.39	0.82	0.38	0.01	1.63
quality class	4.79	1.16	4.84	1.07	0.05	1.90
street noise	16.13	26.90	15.35	26.47	-0.78	-1.38
water front	0.39	5.31	0.26	3.96	-0.13	-1.25
parcel view	2.03	0.20	2.02	0.18	-0.004	-0.94

The above characteristics are a sample of those available to us from the city data. Inside condition is defines as .., outside condition is defines as ..., quality class is... and parcel view is The sample include 12,476 houses listed with MLS and 3,140 houses listed with FSBO.

Table 4: The Effect of Channel on Price

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
Dependent variable: logarithm of price							
Sold on FSBO/100	10.75 (0.92)	4.02 (0.85)	3.96 (0.35)	3.18 (0.27)	–	0.69 (0.45)	0.34 (0.47)
Initially Listed on FSBO/100	–	–	–	–	3.05 (0.24)	2.55 (0.40)	2.82 (0.41)
MLS Listing, Sold on FSBO/100	–	–	–	–	–	–	6.07 (1.95)
$R^2 =$	0.015	0.190	0.870	0.924	0.925	0.925	0.927
Dependent variable: price (in 1000's of dollars)							
Sold on FSBO	14.81 (2.02)	2.93 (1.93)	5.19 (0.85)	5.06 (0.71)	–	0.28 (1.05)	-0.57 (1.08)
Initially Listed on FSBO	–	–	–	–	5.04 (0.62)	4.83 (1.05)	5.50 (1.08)
MLS Listing, Sold on FSBO	–	–	–	–	–	–	14.84 (5.07)
$R^2 =$	0.007	0.124	0.842	0.893	0.894	0.894	0.894
Time Controls	no	yes	yes	yes	yes	yes	yes
House Characteristics	no	no	yes	yes	yes	yes	yes
Neighborhood Effects	no	no	no	yes	yes	yes	yes
$N =$	12,871	12,871	12,871	12,871	13,599	13,599	13,599

All columns report results from OLS regressions. In columns (i)-(iv), the sample includes only properties that sold in the channel they originally listed. The sample in column (v) -(vii) also includes properties that sold on a different channel than originally listed. Time controls include year and month dummy variables and a linear time trend.

Table 5: The Effect of Channel on Time to Sell

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
Sold on FSBO	-3.73 (1.68)	-3.65 (1.67)	-0.77 (1.63)	1.49 (1.65)	—	-61.04 (2.83)	-67.91 (2.91)
Initially Listed on FSBO	—	—	—	—	20.24 (1.51)	64.05 (2.52)	69.42 (2.57)
MLS Listing, Sold on FSBO							119.66 (12.10)
Time Controls	no	yes	yes	yes	yes	yes	yes
House Characteristics	no	no	yes	yes	yes	yes	yes
Neighborhood Effects	no	no	no	yes	yes	yes	yes
N =	12,870	12,870	12,870	12,870	13,598	13,598	13,598
R ² =	0.001	0.018	0.148	0.173	0.179	0.207	0.213

All columns report results from OLS regressions. The dependent variable is total time to sell, measured in days, from the date of the initial listing until the sale date, recorded in the city date. In columns (i)-(iv), the sample includes only houses that sold in the channel they originally listed. The sample in column (v) -(vii) also includes houses that sold on a different channel than originally listed. Time controls include year and month dummy variables.

Table 6: The Effect of Channel on Probability of Sale

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)
Dependent variable: dummy variable equal to 1 if:	Conditional on sale, sold within:							
	Sold		180 days		90 days		60 days	
Initially Listed on FSBO/100	1.90 (0.69)	–	-7.58 (0.73)	–	-11.75 (1.10)	–	-10.07 (0.96)	–
FSBO listing sold on FSBO/100	–	1.09 (0.78)	–	-0.49 (0.81)	–	-2.52 (1.25)	–	-5.93 (1.09)
FSBO listing moved to MLS/100	–	4.01 (1.21)	–	-28.77 (1.23)	–	-35.77 (1.90)	–	-20.94 (1.65)
MLS listing moved to FSBO/100	–	-3.90 (5.24)	–	-20.94 (5.65)	–	-7.93 (8.67)	–	-10.69 (7.56)
Mean of dependent variable(%)	87.1		87.5		53.0		23.5	
N =	15,616				13,599			
R ² =	0.134	0.134	0.132	0.161	0.118	0.134	0.083	0.088

All columns report results from OLS regressions. The dependent variable is a dummy variable, which varies by column. In columns (i) and (ii), the sample includes properties that were not sold, while in columns (iii)-(viii) the sample is only properties that a sale was eventually observed. All regressions include year and month dummy variables, a linear time trend, house and neighborhood characteristics.

Table 7: House Fixed Effects Regressions

Dependent variable:	log of price				time to sell			
Initially Listed on FSBO/100*	2.44 (0.49)	2.63 (0.41)	—	—	25.67 (3.47)	19.97 (2.48)	—	—
FSBO listing sold on FSBO/100*	—	—	2.34 (0.55)	2.71 (0.46)	—	—	9.52 (3.88)	3.60 (2.70)
FSBO listing moved to MLS/100*	—	—	2.83 (0.85)	2.40 (0.75)	—	—	68.82 (5.99)	70.89 (4.42)
MLS listing moved to FSBO/100*	—	—	4.23 (1.22)	3.44 (3.87)	—	—	23.98 (45.08)	52.31 (34.08)
House Fixed Effects	yes	no	yes	no	yes	no	yes	no
House+Neighborhood Char	no	yes	no	yes	no	yes	no	yes

Dependent variable: dummy variable equal to 1 if:	Sold			Conditional on sale, sold within:				
				90 days		60 days		
Initially Listed on FSBO/100	0.30 (0.34)	0.52 (0.24)	-14.43 (2.79)	—	—	-7.38 (2.51)	—	—
FSBO listing sold on FSBO/100	—	—	—	-6.01 (3.15)	-1.21 (2.23)	—	-2.48 (2.84)	-1.45 (2.01)
FSBO listing moved to MLS/100	—	—	—	-36.44 (4.87)	-37.63 (3.65)	—	-20.33 (4.38)	-22.46 (3.30)
MLS listing moved to FSBO/100	—	—	—	-31.96 (24.14)	33.68 (18.75)	—	6.77 (21.75)	-1.02 (16.94)
House Fixed Effects	yes	no	yes	yes	no	yes	yes	no
House+Neighborhood Char	no	yes	no	no	yes	no	no	yes

*In columns where the dependent variable is "time to sell" the independent variables are not divided by 100.

All columns report results from OLS regressions. The sample includes properties where multiple sales were observed, there are 2024 such properties involving 4206 sales. In columns where "sold" is the dependent variable the sample also includes properties that were listed more than once, at different times even if they did not sell, there are 2788 such properties involving 5030 listings. All regressions include year and month dummy variables and a linear time trend.

Table 8: FSBO versus Sales by Agent/Owner on MLS

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
Dependent variable:	log of price		time to sell		sold in 60	sold in 90	sold in 180
Sold by Owner/100	2.16 (0.70)	1.88 (0.68)	-1.10 (4.19)	-3.52 (4.36)	2.47 (2.75)	7.39 (3.17)	2.18 (2.08)
Sold on FSBO/100	1.07 (0.74)	1.17 (0.72)	2.56 (4.42)	0.49 (4.60)	-6.82 (2.90)	-7.10 (3.35)	0.21 (2.20)
N=	12,871	13,599	12,870	13,598	13,599	13,599	13,599

All columns report results from OLS regressions. In columns (i) and (iii), the sample includes only houses that sold in the channel they originally listed. The sample in columns (ii) and (iv) -(vii) also includes houses that sold on a different channel than originally listed. All regression include year and month dummy variables, a linear time trend, house and neighborhood characteristics.

Table 9: Controlling for Unobserved Seller Heterogeneity

	(i)	(ii)	(iii)	(iv)
Dependent variable: logarithm of price				
Initially Listed on FSBO/100			1.65 (1.15)	
FSBO listing sold on FSBO/100				1.38 (1.32)
FSBO Seller/100	2.71 (0.25)	1.64 (0.53)		
Dependent variable: time to sell				
Initially Listed on FSBO			0.69 (7.70)	
FSBO listing sold on FSBO				-21.68 (8.84)
FSBO Seller	-0.82 (1.57)	10.51 (3.25)		
Sample	all sales	MLS listings	sellers w/ multiple listings/sales	
Fixed Effects	no	no	yes	yes
N=	13,599	10,749	744	631

All columns report results from OLS regressions. In column (ii) the sample includes only properties there were listed on MLS. In columns (iii) and (iv) the samples include properties sold by sellers with multiple sales between 1998 and 2004, there are 265 sellers that sold properties listed using different channels, involving 744 sales, 225 seller sold properties using different channels, involving 631 sales. The regressions in columns (iii) and (iv) include seller fixed effects. All regressions include year and month dummy variables, a linear time trend, house and neighborhood characteristics.