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BARGAINING POWER: DO INDIVIDUALS OUTPERFORM GROUPS?

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Bargaining power: Do individuals outperform groups?

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Abstract

The goal of this study is to examine the relative bargaining power of individuals versus groups, with a specific focus on gender distinctions among single individuals. Utilizing the Inverse Probability Weighting methodology on property transactions in Corsica in the time span 2012-2017, our research reveals that single individuals tend to possess greater bargaining power compared to those in non-single relationships. Single buyers pay 9.43%-9.48% less when purchasing from group sellers and 12.91%-13.44% less when purchasing from single sellers compared to group buyers. The magnitude of this effect for singles is even larger for male singles. Moreover, our analysis uncovers an asymmetry in bargaining power dynamics, indicating a prevalence of greater power among buyers as opposed to sellers.

Keywords: Bargaining power, Gender, Hedonic regression, IPW, Single
JEL: C21, J16, R30.

Introduction

Negotiation plays a central role in market transactions and the importance of this role is magnified in markets characterized by heterogeneous goods and heterogeneous agents. A focus of recent literature in this area is the measurement of relative bargaining power of buyers versus sellers in the housing market (Harding, Rosenthal and Sirmans, 2003). HRS find that trader type (intermediary, resident, or investor) and agent characteristics (age, domicile, nationality, and language facility) have an impact on sales price. However, little attention has been devoted to investigating differences in bargaining power between single individuals and more than one bargainer, which we refer to as a *group*. Indeed, agents may enter the market as individuals or in groups, that is, together with other individuals like family members or business partners.

Our single versus group distinction is becoming more important due to the growing number of single-person households in the EU. In 2017, approximately one-third of households in the European Union consisted of single adults with no children.[1] Negotiation is an activity that involves several costs, such as time, effort, and psychological stress. Once both parties recognize that an agreement is possible, negotiation proceeds as long as the expected benefit is greater than the cost of continuing to negotiate. However, the costs of group negotiations are likely higher than individual negotiations because, unlike individuals, group decisions face the prospect of internal negotiations with other members of the group *in addition* to the external negotiations with the opposite side of the transaction. Thus, group negotiating costs can be no lower than individual negotiating costs due to this potential extra

[1] Data source at the following link: https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20180706-1

layer of negotiations. These increased bargaining costs can lead groups to stop negotiating earlier than they would if they were single agents, resulting in a loss of bargaining power. Countering this argument is the expectation that as acquiring information is costly, individual traders might have less access to information than a group of *individual* traders. Absent excessive free-riding, the *potential* additional information available to groups could lead to an increase in their bargaining power. Although group decisions can face increased costs and, perhaps, increased benefits, our expectation is that singles should have relatively more bargaining power.

This increased bargaining power stems from the fact that single people have fewer constraints on relocation decisions (Catney and Finney, 2016). Thus, singles are positioned to make more efficient location and housing decisions as their decisions can be taken absent any internal negotiations *within the family*. This flexibility should provide greater bargaining power for singles with the implications being that single buyers should pay less, on average, and single sellers should receive more, on average, for comparable housing as compared to *groups* of individuals (couples or families). Being single should have a measurable effect on economic behavior and outcomes.

The goal of the paper is to determine whether or not single individuals do, in fact, have more bargaining power than groups of individuals and, if so, how much is the increased bargaining power worth in negotiations? Our empirical investigation into the presence and magnitude of the *single* effect in housing transactions is based on the PERVAL dataset, managed by ADSN (*Association pour le développement du service notarial*, a subsidiary of the Notariat), which records transactions concerning all types of property in France. We focus specifically on transactions between private individuals and groups and exclude purchases and

sales made by companies and public entities. The transactions in our dataset occur in Corsica between 2012 and 2017.

The use of hedonic methods to investigate our research question is greatly complicated by variation in buyer and seller preferences and variation in the types of properties shown by the real estate agents. To mitigate potential selection biases stemming from these issues, we employ Inverse Probability Weighting (IPW) to measure buying and selling price differences. As far as we know, ours is the first attempt to use the IPW method to measure relative bargaining power.

The IPW method is a two-step process. In the first step, one estimates the probability of each sample participant being single, as opposed to being in a group, as a function of several property characteristics using, most often, a logit model. Based on the logit estimation results, a set of weights are constructed and high weights are assigned outcomes in which single agents resembling group agents. This reweighting permits the generation of counterfactual scenarios even though such scenarios are not present in the raw data. Specifically, the procedure matches each property traded by *single* agents with a comparable property traded by *groups* (Narita et al., 2023). This permits an examination of price differences among different types of buyers and sellers *based on comparable properties* from our pseudo sample.

The paper is organized as follows. The next section summarizes recent literature in the area. Section 3 presents a description of the data. Our empirical approach and main results are presented in Sections 4 and 5, respectively. The final section concludes.

Literature Review

Over the last twenty years, many studies have used the HRS model to estimate the relative bargaining power of real estate buyers and sellers, as a function of a number of characteristics. For example, Colwell & Munneke (2006) consider Corporations, Banking entities, and Individuals as agents, as well as combinations of these groups, in their examination of relative bargaining power. Hayunga & Munneke (2021) use a similar classification of buyers and sellers in their investigation of relative bargaining power. Biagi et al. (2021) investigate the difference in bargaining power between residential home traders and real estate investors, and find the former to be relatively stronger bargaining power than the latter.

A second line of research in this area focuses on the relative bargaining power of buyers and sellers depending on whether or not they reside near the property traded. Ling et al. (2018) distinguished two possible effects that can explain possible price premiums: search costs and anchoring behavior bias. They find that the relative impact of the former is greater than that of the latter. Using a latent class model, Caudill et al. (2019) show that the bargaining power of these different groups changes according to the level of attractiveness (touristic and/or economic) of the areas concerned.

Finally, a large number of studies consider the effects of demographic characteristics on relative bargaining power. These studies examine characteristics such as the level of wealth, (HRS, 2003; Steegmans & Hassink, 2017), the race of the agent (Ihlanfeldt & Mayock, 2009), and the presence of children in the household (Steegmans & Hassink, 2017), particularly school-age children (HRS, 2003).

Of the many buyer-seller characteristics, gender and marital status are of particular interest as the results on their impact on bargaining power are mixed. HRS (2003) find that

men have more bargaining power than women. Ihlanfeldt & Mayock (2009) show that for certain racial combinations, married couples have more bargaining power than single men, but their results indicate no difference in bargaining power between single women and single men. Steegmans & Hassink (2017) also find no gender difference in bargaining power, but do find relatively lower bargaining power for married couples as compared to singles of either gender. More recently, Andersen et al. (2021) find no significant difference in bargaining power between men and women and conclude that the gender differentials found in some studies may be due to inadequate consideration of the characteristics of the properties demanded — that is, the observed difference in bargaining power is due to a difference in preferences— a problem our approach seeks to circumvent.

In addition to these applications of the HRS model, a number of studies have focused on gender and marital status differences in real estate transactions. For example, Seagraves and Gallimore (2013) focus on the impact of the gender of real estate agents hired by buyers and sellers. Their results suggest that, in the case of two-agent negotiations, there are no significant differences in the negotiation skills of men and women. The differences observed in terms of selling price, time on market, and agent income are more likely to be due to a selection bias on the part of buyers or sellers. For example, sellers might tend to choose a man or a woman according to their expectations in terms of the reserve price and time on the market. In the same vein, Pham et al. (2021) seek to identify the channels through which the gender of the real estate agent can have an effect on selling price and time on the market. The authors distinguish between the ex-ante beliefs of buyers/sellers that may influence their choice of agent *and* the ex-post bargaining power of agents.

Absent the bargaining power framework, Tsai (2018) uses survey data to investigate the extent to which an individual's gender may affect sentiments about real estate transactions. The author highlights several significant gender differences that may contribute to different outcomes between men and women in the housing market. For example, men are more optimistic while women are more risk averse and more loss averse.

Finally, Goldsmith-Pinkham & Shue (2022) investigate, more generally, gender differences in the homeowner's annualized realized return. According to the authors, these gender differences can be largely explained by differences in execution prices. That is, women often obtain lower execution prices due to disparities in their initial list price selections and, subsequently, negotiated discounts compared to the list price. Another finding by Goldsmith-Pinkham & Shue (2022), of particular relevance for this work, is that couples perform better than single women, but worse than single men when annualized realized return is considered. However, Goldsmith-Pinkham & Shue (2022) qualify this finding, stating that their results should not be interpreted as evidence of women's lower relative bargaining ability in real estate transactions. They argue that the observed differences in outcomes may indeed be due to gender differences in preferences and/or constraints related to child care and the school calendar system.

Data, Variables, and Limitations

Our analysis is based on an original dataset (the so-called PERVAL[2]) identifying all property transactions in Corsica in the time span 2012-2017.[3] All the information included in

[2] Data source at the following link: https://www.perval.fr
[3] This dataset is used in the recent work by Caudill et al. (2020) and Biagi et al. (2021).

the dataset is compiled by the Chamber of Notaries (Chambre de Notaires), including the sales price, contract signature date, selected buyer and seller characteristics (trader type, sex and residence), and all publicly recorded housing characteristics. In addition, the dataset contains the exact address of each property from which we are able to estimate travel times to various neighborhood amenities, namely services (doctors, pharmacies and schools) and environmental goods (sea-view, beaches and downtown areas). To estimate the bargaining power dynamics between individual buyers and sellers, properties traded by companies or public institutions are excluded from the dataset. Our final dataset includes 12,262 property sales, of which only 5,334 have complete information about property characteristics.

Variables. Our outcome variable is the logarithm of the sales price of the property. Our treatment variable is *single* status. Our data set includes 8,089 group sellers and 4,173 single sellers, among whom 1,905 are men and 2,268 are women. The group buyers number 7,027 and single buyers total 5,235, with 2,667 males and 2,568 females. In the PERVAL dataset there are some limitations on the identification of agents as *single* or *group*. First, the PERVAL dataset does not provide information on the number of co-owners and the nature of their relationships. That is, we do not know whether the co-owners are in a relationship, kinship, or business partnership or some combination. In addition, there may be uncertainty regarding the identification of buyers and sellers as *individual* agents. For example, though negotiations may be finalized by a single individual, we do know how many individuals are represented by the signee. Thus, our data set provides information on the signatories of the contract but we know nothing about other parties that may be involved in the transaction. For example, a couple purchasing a property jointly may decide at the time of purchase that only one person will sign the contract. Alternatively, the property may be owned exclusively

by one member of the couple, who later decides to sell the property in order to purchase a co-owned property. When transactions with co-owned assets are observed, whether the co-owners are a couple or not is unknown. This is surely the case when real estate sales involve properties inherited by multiple heirs who collectively sell their co-owned property. This selling example aside, we believe that the *purchase* of jointly owned properties suffers less from this type of measurement problem. Unfortunately, one cannot determine *single* or *group* status with certainty. However, despite these limitations, we believe that our analysis provides important results about the difference in bargaining power between single and group agents. In fact, the measurement error we have described above likely represents only a small fraction of the dataset and thus may affect the magnitude but not the direction of our findings regarding the difference in bargaining power between single and group agents.

As explanatory variables we have access to an impressive list of property characteristics.[4] These characteristics include *Apartment* which is a dummy variable equal to one if the house is an apartment and zero otherwise. *Intermediation* is a dummy variable with one indicating the presence of an intermediary in the transaction. *Mortgage* is a dummy variable indicating the presence of a mortgage on the property. *Furnished* is a dummy variable indicating that the unit is furnished. *Reverse* indicates the presence of a reverse mortgage. *FullProperty* is a dummy variable equal to one indicating that the buyer has full property rights which are transferred upon endorsement of the contract. *Rooms* is the number of rooms in the dwelling. *Bath* is the number of bathrooms in the dwelling. *Floor* is the floor on which the unit is located. *Balconies* is a dummy variable equal to one if the

[4] More detailed information about the variables is given in Caudill et al. (2020).

property contains at least one balcony. *Garden* is a dummy variable equal to one indicating that the property has a private garden. *Size* indicates the number of square meters of floorspace. *OverFive* is a binary variable that indicates that the property unit was constructed at least five years prior to the contract date.

Our dataset also contains information on some locational amenities associated with the property. *Beach* is time to the beach in minutes. *Doctor* is the number of minutes to the nearest doctor. *Pharmacy* is the number of minutes to the nearest pharmacy. *Primary* is the number of minutes to the nearest primary school. *Downtown* is the number of minutes to downtown. *Seaview* is a proxy for the quality of the sea-view from the property, calculated by using ArcGIS (Nagy, 1994; O'Sullivan and Turner, 2001; Caudill et al., 2020; Biagi et al., 2021).[5]

The dataset includes the year of the trade (*Year*) and the area in which the property is located (*Town*). The former takes into account any idiosyncratic effect related to the time of the trading, while the latter controls for any local features affecting the outcome variable. The territory of Corsica is divided into eight areas centered around the following towns: Ajaccio, Bastia, Calvi, Corte, Ghisonaccia, Ile Rousse, Porto Vecchio, and Propriano.

Table 1 provides the frequency distribution of single and group agents according to classification as *sellers* or *buyers*. This distinction results in four buyer-seller configurations. Using S for single and G for group, the four buyer-seller configurations are GG, SG, GS, and SS. For example, in this notation SG indicates a single buyer and a group seller. Table 1 shows

[5] By exploring the property altitude and position using the geo-coordinates, the sea-view index is determined as the ratio of visible sea area within a radius of 20 km around the apartment, ranging from 0 to 100 with zero indicating no view of the sea and 100 being a full view.

the mean value of the outcome variable, expressed in logarithms, for each of the four groups. The t-tests for mean differences all lead to rejection of the null, indicating the presence of statistically significant differences in the average value of real estate deals across the four groups. Group sellers and group buyers trade more expensive real estate properties (11.8209), while the lowest average value is observed in the case where both the seller and buyer are single (11.5056). This first exercise shows that there are important differences in the final traded price depending on the status of buyers and sellers involved in the transaction. This can be considered as a first confirmation of the existence of different bargaining power between single and group traders. In any case, this result could be biased if type of real estate traded is not the same among the four different buyer-seller configurations.

Empirical Model

In order to evaluate the impact of principal type (single *vs* group) on sales prices we employ the following log-linear hedonic regression model in which the logarithm of the sales price is regressed on a long list of explanatory variables representing property characteristics:

$$(1)\ lnP = \beta_0 + \beta_1 Apartment + \beta_2 Intermediation + \beta_3 Mortgage + \beta_4 Furnished + \beta_5 Reverse + \beta_6 FullProperty + \beta_7 Rooms + \beta_8 Bath + \beta_9 Floor + \beta_{10} Balconies + \beta_{11} Garden + \beta_{12} Surface + \beta_{13} OverFive + \beta_{14} Seaview + \beta_{15} Beach + \beta_{16} Doctor + \beta_{17} Pharmacy + \beta_{18} Primary + \beta_{19} Maintown + \theta_1 GG + \theta_2 SG + \theta_3 GS + \theta_4 SS + \sum_j \gamma_j Year_j + \sum_k \delta_k Town_k + \varepsilon.$$

The year of the sale (*Year*) and the local area in which the property is located (*Town*) are included to control for time and location fixed effects. The marginal impacts of *Intermediation*, *Mortgage*, *Furnished*, *Reverse*, *Full*, *Rooms*, *Baths*, *Floor*, *Basement*, *Balcony*, *Garden*, *Size*, and *Seaview* are expected to be positive and the marginal impacts of *Apartment* and the travel time variables; *Beach*, *Doctor*, *Pharmacy*, *Primary*, and *Maintown*, are expected to be negative. As per Davidoff and Welke (2017), we expect the coefficient of *Reverse* to be negative because the presence of a reverse mortgage generally reduces the net gain to selling the home. A random error term, ε, completes the model.

To estimate relative bargaining power, we include four dummy variables representing the four *buyer-seller* configurations described above: *GG*, *SG*, *GS*, and *SS*. After controlling for property characteristics, the direction and magnitude of the bargaining power for each buyer-seller configuration can be estimated. In the first estimation, *GG* is the omitted configuration. Thus, θ_2, θ_3 and θ_4 represent the difference between *GG*, the reference configuration, and *SG*, *GS*, and *SS*, respectively. In this case θ_2 measures the relative bargaining advantage of a single buyer when facing group sellers and θ_3 measures the relative bargaining advantage of a single seller when facing group buyers. To simplify the calculation of the bargaining power with reference to single agents, we re-estimate Equation (1) with *SS* as the omitted reference group. In this re-estimation θ_2 represents the relative bargaining advantage of group sellers when buyers are single and θ_3 represents the relative bargaining advantage of group buyers when sellers are single.

Table 2 presents the descriptive statistics (means and standard deviations) of the real estate properties traded in each of the four agent configurations presented above. Also, t-tests

comparing the differences between groups for selected characteristics are shown as compared to the group in which the seller and buyer are groups (*GG*). We observe statistically significant differences in the average property characteristics traded across buyer-seller configurations. For example, singles as compared to plural agents tend to trade more for flats which are smaller in size and have fewer bedrooms, bathrooms, balconies, and private gardens. On average, singles utilize mortgages more frequently than plural agents and seek out furnished properties more often. Differences between the groups are also apparent in terms of preferences for certain amenities: assets purchased by single agents are, on average, closer to the beach, a doctor's office, a pharmacy, a primary school, and the city center.

These statistical differences may indicate important and significant difference across the four buyer-seller configurations. In order to circumvent this issue, we employ a Doubly-Robust Inverse Probability Weighted Regression Adjustment (IPWRA) procedure where group determinants are included to further protect against the bias due to observables (Ascione et al., 2024). IPWRA is a standard approach to adjust for observed confounding factors by creating a pseudo-population in which confounding factors are absent. Thus, the average outcome in the pseudo-population approximates the average outcome that would have been observed if group membership had been randomly assigned (Narita et al., 2023). This doubly robust standardization is applied as part of a two-step procedure (Uysal, 2015). First, a multinomial logit model is fitted to investigate the impact of property characteristics on the probability of membership in our four buyer-seller configurations. For each configuration, predictions are obtained for each property *i* based on the fitted model, the so-called propensity scores, and these are used to derive a set of weights. The second step is to estimate a weighted version of the log linear hedonic regression model (Equation 1, using the weights obtained in

the first step. This doubly robust procedure reduces problems associated with model misspecification (Funk et al., 2011).

As a further check, we also employ the Augmented IPW estimator (AIPW). Unlike the IPWRA estimator, the AIPW estimator includes a bias-correction term in the treatment model which corrects for any misspecification. The bias-correction term is calculated as the difference between the observed outcome and the predicted outcome from the treatment model, multiplied by the inverse of the propensity score. The AIPW estimator is equivalent to the IPWRA estimator if the treatment model is correctly specified. Both AIPW and IPWRA estimators have the doubly-robust property (Stata, 2013). As expected, we observe an improvement in the balance in the sample after applying the IPW (see Table A1 in Appendix). All empirical analyses are performed using the command "teffects" in STATA17.

Estimation Results

For the sake of comparison, we estimate Equation (1) by OLS. These results are given in Column (1) of Table 3. The three coefficients of interest represent the average difference in log-price between each buyer-seller configuration using GG as the reference configuration. On average, the three groups, *SG*, *GS*, *SS* exhibit lower sales prices compared to *GG* and these three differences are statistically significant. If *SG* is compared to *GG*, we are examining sales involving groups (*GG*) with sales in which only the buyer is single. The estimated negative coefficient represents the average bargaining power of single buyers as compared to group buyers when sellers are plural. In other words, conditioning on the seller being plural, a single buyer reduces the sales price by about 10.88 percent, on average. Similarly, by comparing *GS* to *GG*, one can estimate the average bargaining power of group sellers compared to single

sellers, given the presence of a group buyer. Our OLS results indicate that group sellers receive, on average, 3.43% more for similar properties than their single counterparts.

Column (2) of Table 3 presents the OLS estimation results for Equation (2). In this regression, bargaining power values are calculated conditioned on single sellers (buyers). Compared to the single counterpart, group buyers pay an average of 9.67% more than singles, but no difference in average sales price is observed between group and single sellers.

Unfortunately, as discussed earlier, OLS estimates may be greatly affected by sample selection bias. In fact, one can easily imagine that single and group agents trade dissimilar properties, effectively operating in largely different submarkets. This behavior will certainly affect the sales prices. OLS cannot solve this estimation problem which can lead to biased results. As discussed previously, we propose using the IPW approach to mitigate the potential sample bias.

Our estimation results using IPW are given in Columns (2)-(6) of Table 3. Empirical results include both the AIPW and the IPWRA approaches. Both provide very similar results. First, conditioned on the seller being non-single, we find that single buyers pay sales prices somewhere between 9.43% and 9.48% lower than group buyers. In this scenario, single buyers exhibit more bargaining power than group buyers. This effect is even higher when trading with a single seller. In this situation, single buyers are able purchase at prices that average between 12.91% and 13.44% lower than group buyers.

Second, conditioned on a group buyer, we find no statistically significant difference between sales prices obtained by single and group sellers. Contrary to our OLS findings, after adjusting for observed confounding factors, single and group sellers have the same bargaining power. When looking at trades with a single seller, a significant bargaining power between

single and group sellers is observed. Compared to single sellers, group sellers obtain sales prices between 5.87% and 6.41% higher.

Thus, we find that regardless of seller type, single buyers always show more bargaining power than group buyers. Group sellers have more bargaining power than single sellers, but only when trading with single buyers.

As we stated previously, our data set allows us to identify single agents according to gender. Thus, we can investigate whether or not there are differences in bargaining power between male and female single agents. To empirically investigate this issue, we re-estimate Equations (1) incorporating three categories for agent: group agent, male single agent and female single agent. These distinctions lead to three agent types for each side of the trade resulting in a total of nine buyer-seller combinations.

Table 4 provides the main results of our IPWRA outcomes.[6] We estimate the potential-outcomes means, expressed in terms of logarithm transformations of prices, for each combination of buyer and seller used in the analysis. Table 4 also contains the t-test of each buyer-seller configuration. The right side of Table 4 gives the t-tests for buyer's bargaining power values, conditioned on the status of the seller. In general, single buyers have more bargaining power than group buyers regardless of the gender of the seller. Single male buyers have the most bargaining power, especially when trading with a single female seller. We conclude that single males are able to obtain lower prices compared to group and female single buyers.

[6] AIPW approach provides equivalent results. They are in the Appendix (see Table A2).

For the selling side, we observe a similar pattern. Single male and group sellers have some bargaining power compared to female single sellers. In other words, on average, single female sellers sell for lower prices compared to non-single and male single sellers for similar properties.

Conclusions

For the Corsican real estate market, we find that single agents have more bargaining power than groups of agents (Table 3, column (3)-(6)). The increased bargaining power of single buyers compared to group buyers results in between 9.43% and 9.48% lower purchase prices when buying from group sellers and paying between 12.91% and 13.44% less when buying from single sellers. When selling a property, our findings indicate that group sellers have more bargaining power than single sellers but only when trading with single buyers. This gain is translated into an increase in the sales price by from 5.87% and 6.41%. No difference in bargaining power is observed between single and group sellers when trading a property with group buyers.

When differentiating singles according to gender, we find that the previously discussed bargaining power for singles is mostly due to *male* singles. mentioned bargaining power goes mostly to single men. They are able to pay less when trading with either group agents or female agents, *and* they receive a higher price when selling to female or group agents.

In conclusion, we use IPW to mitigate or reduce the sample bias problem that can characterize this type of empirical analysis. The results provide an important contribution to the study of bargaining power in real estate trading. The present analysis documents that non-

singles suffer a bargaining power deficit when purchasing real estate. This may reduce their chances of participating in this type of market or, at best, could lead to sub-optimal decisions.

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TABLES

Table 1. Sample means by Buyer-Seller Configuration

lreal_price	Single buyer	Group buyer	|t-test|
Single seller	11.506	11.706	7.189***
	(1,966)	(2,207)	(4,173)
Group seller	11.560	11.821	12.389***
	(3,269)	(4,820)	(8,089)
|t-test|	2.195***	4.638***	
	(5,235)	(7,027)	(12,262)

obs. in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

Table 2. Summary Statistics by Buyer-Seller Configuration

Configuration	GG	SG	GS	SS			
VARIABLES	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	|t-test|[a] A *vs* B	|t-test|[b] A *vs* C	|t-test|[c] A *vs* D
Apartment (=1)	0.581	0.741	0.631	0.782	15.80***	4.63***	16.05***
	(0.49)	(0.43)	(0.48)	(0.41)			
Intermediat. (=1)	0.182	0.172	0.170	0.177	1.122	1.22	0.435
	(0.39)	(0.38)	(0.38)	(0.38)			
Mortgage (=1)	0.216	0.265	0.198	0.262	5.12***	1.71*	4.1288***
	(0.41)	(0.44)	(0.40)	(0.44)			
Furnished (=1)	0.3865	0.3385	0.346	0.322	4.42***	3.16***	4.99***
	(0.49)	(0.47)	(0.48)	(0.47)			
Reverse (=1)	0.003	0.004	0.012	0.016	0.83	4.78***	5.94***
	(0.05)	(0.06)	(0.11)	(0.12)			
FullProperty (=1)	0.990	0.990	0.986	0.973	0.15	0.79	4.64***
	(0.11)	(0.10)	(0.12)	(0.16)			
Rooms	3.219	2.886	2.949	2.671	8.16***	5.55***	11.27***
	(1.92)	(1.59)	(1.81)	(1.518)			
Bath	1.244	1.093	1.157	1.048	10.27***	4.92***	11.33***
	(0.61)	(0.46)	(0.55)	(0.39)			

Floor	1.021	1.484	1.114	1.628	11.40***	2.09**	12.50***
	(1.67)	(1.82)	(1.69)	(1.94)			
Balconies (=1)	0.7749	0.7477	0.762	0.708	2.21**	0.87	4.57***
	(0.42)	(0.43)	(0.43)	(0.46)			
Garden (=1)	0.416	0.249	0.358	0.216	15.78***	4.66***	15.93***
	(0.49)	(0.43)	(0.48)	(0.41)			
Surface	76.665	64.796	68.651	64.976	3.53***	1.92*	2.45**
	(168.48)	(36.71)	(41.22)	(136.26)			
OverFive (=1)	0.072	0.052	0.083	0.084	3.51***	1.68*	1.75*
	(0.26)	(0.22)	(0.28)	(0.28)			
Seaview	10.031	10.623	10.605	10.000	2.38**	2.03**	3.28***
	(10.94)	(11.12)	(11.19)	(11.36)			
Beach	9.776	9.835	9.381	9.086	0.21	1.25	2.11**
	(12.34)	(12.55)	(12.18)	(11.93)			
Doctor	6.823	5.531	6.496	4.871	6.37***	1.40	8.29***
	(9.25)	(8.53)	(8.69)	(7.65)			
Pharmacy	6.926	5.629	6.529	4.927	6.18***	1.65	8.17***
	(9.613)	(8.74)	(8.91)	(7.95)			
Primary	4.932	4.030	4.696	3.602	5.91***	1.33	7.48***
	(7.07)	(6.22)	(6.46)	(5.49)			
Maintown	21.036	17.149	20.209	16.289	9.16***	1.71*	9.52***
	(18.80)	(18.67)	(18.90)	(18.38)			

GG: both seller and buyer are non-single. Group SG: buyer is single while seller is not. Group GS: seller is single while buyer is not. Group SS: both seller and buyer are single.

[a] The absolute value of the t-test between groups GG and SG;

[b] The absolute value of the t-test between groups GG and GS;

[c] The absolute value of the t-test between groups GG and SS;

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

Table 3. Treatment effects: single vs non-single agents

VARIABLES buyer-seller comparison	(1) OLS (naive)	(2) OLS (naive)	(3) AIPW	(4) AIPW	(5) IPWRA	(6) IPWRA
SG vs GG	-0.109***		-0.095***		-0.094***	
	(0.02)		(0.01)		(0.01)	
GS vs GG	-0.034**		-0.025		-0.024	
	(0.01)		(0.02)		(0.02)	
SS vs GG	-0.131***		-0.159***		-0.153***	
	(0.02)		(0.03)		(0.02)	
GG vs SS		0.131***		0.159***		0.153***
		(0.02)		(0.03)		(0.02)
SG vs SS		0.022		0.064**		0.059**
		(0.02)		(0.03)		(0.026)
GS vs SS		0.097***		0.134***		0.129***
		(0.02)		(0.03)		(0.03)
House characteristics	YES	YES	YES	YES	YES	YES
House amenities	YES	YES	YES	YES	YES	YES
Year controls	YES	YES	YES	YES	YES	YES
County controls	YES	YES	YES	YES	YES	YES
Observations	5,334	5,334	5,331	5,331	5,331	5,331
R-squared	0.58	0.58				
Log-likelihood			-6,969.48	-6,969.48	-6,969.48	-6,969.48

Robust standard errors in parentheses. Other controls: *Apartment*, *Intermediation*, *Mortgage*, *Furnished*, *Reverse*, *FullProperty*, *Baths*, *Floor*, *Balconies*, *Garden*, *Doctor*, *Pharmacy*, *Primary*, *Downtown*, *Maintown*, *Seaview*. Observations have been reduced to ensure common support in the distribution of weights among the four groups.

***Indicates statistical significance at the α=0.01 level.

**Indicates statistical significance at the α=0.05 level.

*Indicates statistical significance at the α=0.10 level.

Table 4. Potential-outcome means: IPWRA approach

Groups		Buyer			|z-test|	|z-test|	|z-test|
		Non-single[D]	Single Female[E]	Single Male[F]	(D *vs* E)	(D *vs* F)	(E *vs* F)
Seller	Non-single[A]	11.881 (0.03)	11.814 (0.03)	11.776 (0.03)	3.01***	5.45***	1.68*
	Single Female[B]	11.825 (0.03)	11.804 (0.03)	11.693 (0.04)	0.84	3.12***	2.30**
	Single Male[C]	11.882 (0.03)	11.728 (0.06)	11.858 (0.04)	2.47**	0.63	1.92*
|z-test| (A *vs* B)		3.02***	0.38	2.17**			
|z-test| (A *vs* C)		0.05	1.44	2.07**			
|z-test| (B *vs* C)		1.81*	1.22	3.66***			

[a]Robust standard errors in parentheses. Other controls: *Apartment*, *Intermediation*, *Mortgage*, *Furnished*, *Reverse*, *FullProperty*, *Baths*, *Floor*, *Balconies*, *Garden*, *Doctor*, *Pharmacy*, *Primary*, *Downtown*, *Maintown*, *Seaview*
***Indicates statistical significance at the α=0.01 level.
**Indicates statistical significance at the α=0.05 level.
*Indicates statistical significance at the α=0.10 level.

APPENDIX

Table A1. Covariates Balance

	GG	SG	GS	SS			
Single seller	No	No	Yes	Yes			
Single buyer	No	Yes	No	Yes			
VARIABLES	Mean	Mean	Mean	Mean	|t-test|[a] A *vs* B	|t-test|[b] A *vs* C	|t-test|[c] A *vs* D
Apartment (=1)	0.774	0.842	0.688	0.832	5.08***	4.50***	3.43***
Intermediation (=1)	0.252	0.247	0.256	0.249	0.37	0.21	0.19
Mortgage (=1)	0.219	0.279	0.190	0.247	3.88***	1.80*	1.57
Furnished (=1)	0.439	0.423	0.484	0.410	0.92	2.25**	1.37
Reverse (=1)	0.004	0.004	0.006	0.005	0.09	0.36	0.29
FullProperty (=1)	0.989	0.992	0.991	0.989	0.57	0.41	0.22
Rooms	3.066	2.950	3.371	2.871	2.33**	3.80***	3.19***
Bath	1.154	1.092	1.264	1.082	4.29***	3.75***	4.17***
Floor	1.518	1.768	1.223	1.712	3.64***	4.10***	2.44**
Balconies (=1)	0.770	0.787	0.793	0.754	1.17	1.42	0.86
Garden (=1)	0.222	0.155	0.305	0.166	5.00***	4.39***	3.33***
Surface	72.210	67.289	78.271	66.822	3.20***	2.69***	2.07**
OverFive (=1)	0.103	0.080	0.097	0.111	2.26**	0.55	0.56
Seaview	10.740	11.034	10.992	10.816	0.75	0.56	0.17
Beach	6.892	6.880	6.295	6.988	0.03	1.56	0.23
Doctor	4.628	4.149	5.342	3.942	1.58	1.91*	2.22**
Pharmacy	4.533	4.076	5.229	3.819	1.49	1.83*	2.29**
Primary	3.810	3.361	4.386	3.312	1.81*	1.75*	2.04**
Maintown	16.269	13.835	17.566	15.226	4.26***	1.87*	1.41

[a] The absolute value of the t-test between groups A and B;
[b] The absolute value of the t-test between groups A and C;
[c] The absolute value of the t-test between groups A and D;
*** p<0.01, ** p<0.05, * p<0.1

Table A2. Potential-outcome means: AIPW approach

Groups		Buyer			|z-test|	|z-test|	|z-test|
		Non-single[D]	Single Female[E]	Single Male[F]	(D *vs* E)	(D *vs* F)	(E *vs* F)
Seller	Non-single[A]	11.882 (0.03)	11.815 (0.03)	11.755 (0.03)	4.18***	4.03***	2.15**
	Single Female[B]	11.825 (0.03)	11.789 (0.03)	11.676 (0.05)	1.15	2.43**	1.70*
	Single Male[C]	11.883 (0.03)	11.723 (0.06)	11.853 (0.04)	2.46**	0.72	1.85*
|z-test| (A *vs* B)		3.08***	0.72	1.32			
|z-test| (A *vs* C)		0.04	1.44	2.60***			
|z-test| (B *vs* C)		1.85*	0.97	2.73***			

[a]Robust standard errors in parentheses. Other controls: *Apartment*, *Intermediation*, *Mortgage*, *Furnished*, *Reverse*, *FullProperty*, *Baths*, *Floor*, *Balconies*, *Garden*, *Doctor*, *Pharmacy*, *Primary*, *Downtown*, *Maintown*, *Seaview*
***Indicates statistical significance at the α=0.01 level.
**Indicates statistical significance at the α=0.05 level.
*Indicates statistical significance at the α=0.10 level.

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