Evidence of Buyer Bargaining Power in the Stockholm Residential Real Estate Market

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Abstract

This study investigates whether uninformed buyers pay higher prices for single-family houses than do other buyers and tests whether the bargaining power increases with information. Data on real estate prices and attributes is examined, as well as household characteristics and buying process from Stockholm. The results suggest that uninformed buyers pay a higher price than informed buyers do. Bargaining power is not found to be weaker for a first-time buyer but it is weaker if the household has participated in several biddings and lost. Repeated bidding-and-losing households are more willing to increase their reservation price and pay a higher overall price compared to other households.

Is it possible to receive a bargain in the real estate market? If a bargain implies that one is paying less for something than another is or that something is ''bought for less than its value,''[1] then bargains can only exist if there is some inefficiency in the market. That is to say, some potential buyers and/or sellers could take advantage of the inefficiency and make abnormal profits. However, this means that some buyers and/or sellers are ''losers'' or relatively worse off. Naturally, a person with less information about real estates in general and the local real estate market in particular is a candidate to be that loser. This study investigates whether less-informed buyers pay more for the same kind of house than well-informed buyers do.

In the 2000, almost 70% of the single-family homebuyers in Stockholm were first-time buyers. Does that mean that they have a disadvantage in the real estate market because they are potentially less informed? This should not be the case in a well-functioning competitive housing market. These homebuyers may purchase other types of houses due to income, credit, and liquidity constraints (see Turnbull and Sirmans, 1993; and Ortalo-Magné and Rady, 2006), but they should not purchase a house for a higher price compared to a former-owner household, ceteris paribus. However, if the local real estate market is not well functioning (e.g., a very thin market with few transactions), then first-time buyers may pay too much for the same type of real estate.

On the other hand, Kestens, Thériault, and Des Rosiers (2006) show that educated former-owner households are prepared to pay a premium for specific locations and certain real estate attributes. More precisely, Kestens et al.'s estimates indicate that first-time buyers gain a discount of up to 4%. Quite the opposite, the hypothesis in the current study is that well-informed households could pay a lower price for a comparable house than uninformed buyers if the local real estate market is inefficient. For example, Ferreira and Sirmans (1995) find that a higher transaction price is more likely to be coupled with first-time homeownership. The objective of the current paper is to analyze whether well-informed buyers have an advantage in the local real estate market by purchasing real estates at a discount, thus having stronger bargaining (negotiation) power.

The next section presents the theoretical framework and a brief literature review. The third section thoroughly discusses the empirical methodology used, and section four presents the available data and descriptive statistics. Section five presents the econometric analysis of the Stockholm single-family real estate market. Finally, section six summarizes and concludes the paper.

A Search and a Bargaining Model

Information, the search process, and the transaction cost are all very important elements in a well-functioning housing market. If all the market participants (i.e., potential buyers and sellers) do not have the same information and if the information does not directly capitalize into real estate prices, the market is inefficient, and it is thus possible for participants to collect abnormal profits. There are different degrees of housing market efficiency, from weak forms of efficiency to strong forms, depending on how well and at what speed new information capitalizes into prices [see Fama's (1970) seminal article on capital market efficiency]. Market situations can exist in which there is a weak form of efficiency, but with no arbitrage opportunities due to the high transaction cost. For example, based on empirical evidence, Evans (1995), Ferreira and Sirmans (1995), and Clayton (1998) all argue that the real estate market is not completely efficient, but the high transaction cost reduces the possibility of reaping above normal profit.

The Search Model

In answering the research question, both theoretical modeling (as in Stigler, 1961; Telser, 1973; Rothschild, 1974; Yinger, 1981; Cronin, 1982; Wheaton, 1990; Quan and Quigley, 1991; and Yavas, 1992) and empirical modeling (Turnbull and Sirmans, 1993; and Lambson, McQueen, and Slade, 2004) use the search model framework.

One way to describe the standard search model is to first assume that sellers are willing to sell their single-family houses at different prices according to some

distribution (e.g., Turnbull and Sirmans, 1993; and Lambson, McQueen, and Slade, 2004). Second, assume buyers are heterogeneous and can distinguish between informed and uninformed buyers. Third, assume that uninformed buyers have a different belief about the price distribution. However, the buyer can gain knowledge about the price distribution while searching. Finally, assume that finding a house for sale is associated with a search cost.

Furthermore, assume that the search cost varies between different groups of potential buyers. The search cost includes, among other things, the travel cost to visit different houses for sale (the visual inspection cost) and the cost of ordering, for example, technical inspections. Being an unformed buyer is associated with higher marginal search costs.

Finally, assume that the potential buyer has no recall option, that is, the buyer cannot return to an offer previously rejected. However, this assumption has no effect on the optimal search strategy (Rothschild, 1974).

An optimal search strategy for the buyer exists such that the buyer will accept any price less than or equal the optimal reservation price while s(he) will continue searching if the price is higher than the reservation price (see Rothschild, 1974, Lippman and McCall, 1976, Reinganum, 1979; Lambson, McQueen, and Slade, 2004; and Einav, 2005). The buyer will continue to search until the marginal search cost is equal to the expected price that maximizes the buyer's assessment of the net value of the house. Hence, the optimal search is a trade-off between getting a lower price by searching one more time against accumulated costs from search (Rosenfield and Shapiro, 1981). Evidently, the optimal search strategy indicates that if the search cost is higher, the stopping rule will trigger earlier, and thereby, on average, buyers with a high search cost will pay more compared to low-search-cost buyers.

Hence, the outcome of the search is determined by the price distribution and the search cost. However, the buyers' knowledge about the price distribution does also affect the optimal search strategy (e.g., Telser, 1973, Kohn and Shavell, 1974; Rothschild, 1974; and Rosenfield and Shapiro, 1981). For example, Rothschild examines the effect that buyers learn about the price distribution while they are searching. The most important result indicates that small error when it comes to the assumed price distribution may create substantial changes in number of searches and the cost (see Rothschild, 1974; and Rosenfield and Shapiro, 1981). While buyers may adjust their expectation of the price distribution while searching and change their behavior, the search cost will increase and thereby the stopping rule will trigger earlier. Alternatively, buyers with an incorrect belief about the price distribution, but not gaining knowledge and correcting their expectation of the price distribution while searching, will also adjust the ''stopping'' rule. If the buyer has a higher price expectation, this expectation will trigger the buyer to stop searching for a house earlier.

The Bargaining Model

Rubinstein (1982) established the bargaining model, which was used in a real estate context in, for example, Quan and Quigley (1991) and Yavas (1992). Following Arnott (1989), each buyer searches across sellers. After the buyer and the seller have met, a trade can be established if the buyer's reservation price of the house exceeds the seller's offer price. The difference between transaction price and offer price defines the surplus to be divided between the buyer and the seller. That is, if the match produces a lot of surplus then bargaining can start to produce a mutually agreeable price. If the seller has a strong bargaining power, the price will be closer to the buyer's reservation price and vice versa.

Quan and Quigley (1991) show that the buyer will stop searching for a house earlier if the seller is not a price taker and thereby the buyer cannot extract the entire surplus. The reservation price will be higher in a situation were the buyers and the sellers are bargaining. Strong buyer-negotiation power decreases the price and strong seller-bargaining power increases the price.

The Empirical Literature

Turnbull and Sirman's article (1993) is one of the first that empirically examines whether less informed buyers—in this case, first-time buyers and out-of-town buyers—pay a significantly different price than former-owner households and in-town households. They estimate a hedonic price equation in which they have included household characteristics such as information about whether or not the buyer is a first-time homeowner. They do not find any effect on price for different groups of buyers, and their conclusion is that the multiple listing service guarantees that the housing market is efficient.

Watkins (1998) investigates whether first-time buyers in Glasgow in the early of 1990s pay more for houses than former-owner households do. By separating the data into two sub-groups and estimating two different hedonic price equations, he tests whether the estimates are statistically different or not. His conclusion is that they are not and that regardless whether you are a first-time buyer or a former-owner buyer, the local real estate market in Glasgow is efficient and one group does not pay more than other does.

Also using a search model framework, Lambson, McQueen, and Slade (2004) investigates whether out-of-town buyers pay more for single-family houses. Their theoretical model predicts that they do pay a premium due to higher search costs, a time constraint, and a belief that the prices are generally higher than they actually are. Empirically, they find evidence consistent with their theoretical model. Their findings indicate that out-of-town buyers purchased, on average, larger houses at a higher price. Controlling for that in a hedonic framework, their results still show that out-of-town buyers pay a premium amounting to approximately 5%.

Kestens, Thériault, and Des Rosiers (2006) explicitly integrate heterogeneity into the hedonic equation by interacting real estate attributes with socio-economic characteristics, such as age and educational level. They also relate real estate attributes with a variable indicating whether the buyer is a first-time homeowner. Their results show that highly educated and former-owner household do pay a premium in ''order to fulfill social homogeneity.'' Furthermore, their results suggest that a first-time buyer pays around 4% lower for a comparable house than do former-owner households. The authors argue that the first-time buyers get the better price ''by waiting longer to close a deal.''

As discussed earlier, another way to examine empirically the research question is to investigate the determinants of the bargaining outcome in single-family housing transactions. This is what Song (1995) did in his article. The basic idea was to explore whether housing attributes and household characteristics could explain the variation in the so-called discount ratio, which he defines as the difference between the asking price and transaction price divided by the asking price. Edelstein (1974) and Turnbull and Sirmans (1993) are examples of studies that use the concept of a discount ratio. The first hypothesis tested in Song (1995) concerns whether implicit hedonic prices relating to housing attributes are over or under valued by buyers and sellers. The second hypothesis is about whether the first-time buyer has an effect on the bargaining outcome. Song's results indicate that first-time buyers do not bargain less than former-owner households do. However, a buyer's income influences the bargaining results, together with the asking price. Both of these attributes influence the results in an explicitly positive way since the discount rate rises as income and the offer price increase. The real estate attributes do not affect the bargaining outcome, thus indicating that they are priced correctly in an initial stage of the selling process.

Harding, Rosenthal, and Sirmans (2003a) examine the bargaining strength between buyers and sellers on a number of single-family real estate markets in the United States. By using household characteristics of both buyers and sellers in a hedonic framework, they investigate how these characteristics affect the bargaining power. Their main results appear to indicate that women are weak bargainers compared to men, that wealth has a negative effect on bargaining power, and that first-time buyers have less bargaining strength compared to former-owner households. Households with school-age children seem to have more bargaining power compared to other families during the school year.

Harding, Knight, and Sirmans (2003b) is an extension from the earlier article. It allows that bargaining strength influences the hedonic implicit prices concerning the underlying real estate attributes. Their conclusion is that bargaining power has an impact on transaction price. Specifically, they found ''evidence that bargaining power alters attribute prices, although we do not find a consistent pattern across markets.'' Another study measuring bargaining power finds that bargaining strength varies considerably among different groups of buyers (Colwell and Munneke, 2006).

Empirical Methodology

The first methodology used to answer the research question is to some extent similar to Watkins' (1998) methodology, but the current study has access to more data about the amount of information the buyers have. The in-depth analysis considers information about who the first-time buyers are, information about the buying process, as well as buyer characteristics, such as their educational level, number of children, and income.[2]

The second method employed to answer the research question is somewhat comparable to the methodology used by Song (1995); namely, it relates the discount ratio to a combination of real estate, household, and buying process characteristics.

The Hedonic Price Equation

A cross-sectional hedonic equation of house prices in the municipality of Stockholm, Sweden is constructed. A hedonic equation is a regression of house prices against attributes that determine these prices. The interpretation of regression coefficients is as estimates of the implicit (hedonic) prices of these attributes. The method has a long tradition from Haas (1922) and Court (1939)[3] to the seminal article by Rosen (1974), as well as to recent articles such as Kestens, Thériault, and Des Rosiers (2006) and Day, Bateman, and Lake (2007). Following the literature, the hedonic price equation is equal to:

$$P = X\beta_1 + N\beta_2\varepsilon, \qquad (1)$$

where P is an $1 \times n$ vector of observations of the dependent variable (normally in log form), β_1 is a $k \times 1$ vector of parameters (regression coefficients) associated with exogenous explanatory variables, X, which is an $n \times k$ matrix. The stochastic term ε is assumed to have a constant variance and normal distribution. Assume that all relevant attributes are included in the matrix X, that is, no omitted variable bias problem exists, as the omitted variables are orthogonal to the included variables in the matrix X. The matrix X can be decomposed into, for example, structural housing attributes and neighborhood attributes.

The hedonic price equation will be estimated using all observations. Moreover, some groups of buyers (represented by the matrix N in Equation 1) will be treated with extra regressors in the hedonic price equation. The parameter β_2 is a vector of parameters associated with explanatory variables, N.

Spatial Autocorrelation

Spatial econometrics explicitly accounts for the influence of space in housing price models [see Anselin (1988) as a standard reference]. If the spatial dimension is

not included in the hedonic price model, estimated parameters may be biased, ineffective, and inconsistent. To some extent, the spatial autoregressive models try to pick up the effect of spatially omitted variables.[4]

The first step in the analysis is to estimate a hedonic regression model of house prices using housing structural characteristics and neighborhood attributes with ordinary least squares (OLS). In the second step, Moran's I is used to test for the presence of spatial autocorrelation (e.g., Wilhelmsson, 2002). Here we define the spatial weight matrix as the inverse square distance between houses.

The Discount Ratio

The second type of model utilized is a regression model explaining the bargaining outcome. By relating the difference between offer price and transaction price (P) on real estate attributes and household characteristics, the bargaining outcome can be examined. The definition of the dependent variable is equal to (e.g., Song, 1995):

$$d = \frac{(\text{asking price} - P)}{\text{asking price}} * 100. \tag{2}$$

As information about the sellers' offer price is not available, the asking price is used as a proxy for the sellers' offer price. The asking price normally differs from the offer price in that the asking price is larger. Hence, the empirical discount ratio can be both positive and negative. The ''true'' discount ratio is not defined if the transaction price is lower than the sellers' reservation price (i.e., no transaction occurs). The discount ratio (d) is positive if the asking price is higher than the transaction price and negative if the transaction price is higher than the asking price. The positive discount ratio is an indication that the local real estate market could be characterized as a ''buyer's market''; if the discount ratio is negative, it could be characterized as a ''seller's market.''

According to Zack and Sackley (1991), a buyer's market can be described as a market situation where buyers have no problem finding a house, and are relatively better off than the sellers are. The reverse situation characterizes a seller's market; see also discussion in Quan and Quigley (1991). The discount ratio equation is equal to:

$$d = X\beta + Z\gamma + M\eta + \varepsilon, \tag{3}$$

where Z is the socio-economic attributes of the buyer and M represent the characteristics of the buying process. The matrix X represents as before the real estate attributes.

A problem not examined earlier is whether the determinants have a different effect on the discount rate depending on whether the asking price is higher or lower than the transaction price. If the house is sold at a discount, it is due to the seller lowering their reservation price; if it is sold at a premium, it is due to the buyer changing their reservation price. This matter is examined by including interaction variables between X, Z, and M with a dummy variable indicating if *d* is positive (sold with a discount).

Data and Descriptive Analysis

The empirical analysis is based on cross-sectional data that originally included 968 transactions of single-family houses in 2000 in Stockholm, Sweden. Besides the normal transaction data, such as price, size, quality, and the exact spatial location (longitude and latitude coordinates), the data set is supplemented with data relating to real estate attributes and household characteristics collected by a postal survey.

By conducting a similar questionnaire as Anglin's (1997), several questions about the household, the buying process, and the structural real estate attributes, could be posed to all households that bought a single-family house in 2000 and still owned it in 2003. The response rate was around 65%. Hence, the total number of observations included in the sample is now 618. The second data source comes from Björklund, Dadzie, and Wilhelmsson (2006) and consists of 189 observations. The additional data contain information about the asking price and the time-on-the-market, which makes it possible to calculate the discount ratio and examine the bargaining outcome.

Exhibit 1 summarizes the data with a description of the attributes and transaction prices. The average transaction price is SEK 2.5 million; however, the variation around the average price is substantial. The asking price is on average lower; hence, the discount ratio is on average negative, but the variation is high. The typical single-family house in the sample is around 50 years old, with approximately 120 square meters of living space over five rooms.

Sixty-seven percent of the buyers are first-time buyers. This percentage of first-time buyers is a comparable to Reno (Song, 1995), a lower number compared to Boston (Newburger, 1995) and the U.S. in general (Harding, Rosenthal, and Sirmans, 2003a), and a higher figure compared to the Quebec area (Kestens, Thériault, and Des Rosiers, 2006) and the Ontario area (Anglin, 1997) in Canada. The variation between sub-markets in Stockholm is substantial (from 45% to 86%).

To overcome some of the informational disadvantage, the percentage purchasing an external technical inspection of the house amounts to 85%. Most of the buyers have visited several ''open houses,'' which is the most common way in Sweden to show a house for sale to potential buyers. The average number of visual inspections is 10–15 inspections. An international comparison shows a similar

Exhibit 1 | Descriptive Statistics

	Abr.	Unit	Average	Std. Dev.
Property Attribute				
Price	P	Swedish crone, SEK	2,547,583	1,214,785
Asking price[a]	AP	Swedish crone, SEK	2,318,206	960,168
Discount ratio[a]	d	Ratio	−28.09	81.67
Living area	LA	Square meters	118.86	42.80
Lot size	LS	Square meters	724.08	265.51
Rooms	R	Number of rooms	5.03	1.33
Quality	Q	Index	27.62	5.90
Sea view	SV	Binary, 1 if sea view	0.05	0.23
Age	A	Year	51.34	18.33
Distance	D	Meters from CBD	8,753.10	2,695.99
Jacuzzi	B	Binary, 1 if Jacuzzi	0.08	0.27
Garage	G	Binary, 1 if garage	0.62	0.49
3-glass window	FP	Binary, 1 if 3-glass	0.21	0.41
Maintenance	M	Binary, 1 if need of maintenance	0.50	0.50
Road Traffic	RT	Binary, 1 if close to road traffic	0.29	0.45
Electric heating system	HS	Binary, 1 if electricity	0.20	0.40
Month	MT	Index, month of sale	6.95	3.42
Household Characteristics				
First-time	FT	Binary, 1 if first-time buyer	0.67	0.47
Inspection	VI	Number of visual inspections 1 = '1–5 inspections' 2 = '6–10' 3 = '11–20' 4 = '>21'	2.47	1.15
Technical inspection	TI	Binary, 1 if technical inspection	0.85	0.36
Radon inspection	RI	Binary, 1 if radon inspection	0.21	0.40
Bidding	Bid	Number of bidding experience 0 = '0 biddings' 1 = '1–2' 2 = '3–4' 3 = '5–7' 4 = '>7'	1.47	0.98
Time-on-market	Tom	Index, house on the market 1 = '1–5 days' 2 = '6–14' 3 = '15–21' 4 = '>22'	2.28	0.95
Higher Education	Hedu	Number of family members with higher education	1.32	0.78
Income	Inc	Income class (1–9)	5.42	2.02
Children	Ch	Number of children	1.54	1.06

Note: Unless noted, the number of observations is 618.
[a]189 observations.

pattern in other countries. For example, a buyer in Ontario, Canada inspected around 15 houses before purchasing a house (Anglin, 1997). When it comes to biddings (auctions), not that many of the buyers have experience. On average, the buyers have been part of only two to four biddings. Most of the auctions used in the single-family real estate market in Sweden are of the ''English Auction'' type. However, the data do not contain information as to whether or not any other type of auction was ever used.[5]

The time-on-the-market is relatively short. It takes around two to three weeks to sell a house, that is, the time from advertisement in the newspaper to writing a contract. This number is a very low time-on-the-market compared to, for example, Arlington, Texas with 58 days on the market (Anglin, Rutherford, and Springer, 2003) or the 125 days in Pennsylvania at the end of the 1980s (Asabere and Huffman, 1993). However, information in the current study is only available from the buyer concerning the time-on-the-market, which could understate the actual number of days on the market. Nevertheless, the local housing market in Stockholm during this period can definitely be characterized as a ''seller's market.'' However, some sub-markets can be described as a ''buyer's market'' with longer time-on-the-market and positive discount rates.

Data concerning the buyer's characteristics, such as the educational level, income, and number of children, supplements the buying process data (Exhibit 2). For example, the data show that most of the buyers have a university degree. The taxable income data are characterized into nine income classes, where one is equal to the lowest income in the data set, and nine is equal to the highest income. The ''average'' income class is around five, with a relatively high standard deviation. Very few of the buyers have children, and the average number of children per household is only 1.5.

First-time buyers normally start their ''housing career'' by purchasing their first house in low-priced areas because of, among other things; credit restraints [see Ortalo-Magné and Rady (2006) for a similar discussion]. Surprisingly, the sub-areas farthest away from the city exhibit the lowest share of first-time buyers. Exhibit 2 presents the variables concerning the buying process and the household characteristics. The data are separated based on how well informed the buyers are. First-time buyers are assumed to be potentially uninformed and less experienced.

The data weakly confirm the findings by Baryla and Zumpano (1995), Zumpano, Elder, and Baryla (1996), Anglin (1997), Rosenthal (1997), and Baryla, Zumpano, and Elder (2000) that first-time buyers search longer in the sense that they visit more open houses and carry out more visual inspections than experienced former-owner households. These researchers all found that more experienced buyers took less time to buy a house compared to inexperienced buyers. It could even be that some categories of buyers *like* the shopping process itself. In the words of Gibler and Nelson (2003): ''They will want to visit open houses and inspect more properties before making a decision just because they enjoy the process.'' The data

Exhibit 2 | First-time Buyers and Former-owner Households (percent)

	First-Time Buyer	Former-Owner Households
Price	2,410,677	2,838,433
Living area	112.42	132.38
Room	5.03	5.43
Quality	27.62	28.61
Visual inspections (1–5)	25	35
Visual inspections (>21)	28	22
Biddings (1–2)	45	44
Biddings (>7)	4	5
Technical inspection	87	80
Radon inspection	19	22
Time-on-market (1–5 days)	17	22
Time-on-market (>22 days)	15	17
No family member with higher education	18	22
No children	19	22
High income class (2 highest classes)	15	20
Low income class (2 lowest classes)	8	8

also confirms that first-time buyers normally buy smaller houses of lower quality to a lower price than former-owner buyers do.

The findings do not show that uninformed first-time buyers are engaged in more bidding. However, they do compensate for their potential lack of building knowledge by using external technical inspections more frequently. They are also typically less involved in very quick sales (i.e., with time-on-the-market less than a week). Moreover, the statistics show that first-time buyers are more likely to have no children and to have a lower income [as Ferreira and Sirmans (1995) found], but on the average are more highly educated.

Econometric Analysis

The estimation of the hedonic price equation uses several attributes to explain the price variation. The first three attributes quantify indoor space (living area), outdoor space (lot size) in square meters, and the number of rooms. The fourth attribute in the model measures indoor quality. Data provided by the owner of the single-family house (for tax purposes) made it possible to construct this attribute. The fifth attribute is a binary variable that indicates whether the single-family

house has a sea view or not. The sixth and seventh variables in the model are age and age squared. The definition of age is equal to the difference between building year and year of transaction. The eighth attribute measures the distance in meters from the house to the central business district (CBD).

Attributes nine to eleven are all binary variables indicating whether the house has the specific attribute (Jacuzzi, three-glass windows or a garage). Attribute twelve indicates whether the house is in need of outdoor maintenance, such as a need for a new roof or drainage system. Attribute thirteen measures the proximity to disturbing road traffic, and attribute fourteen is a binary variable indicating whether the house has an electrical heating system. The hypothesis regarding the last attribute is that it has a negative impact on single-family house price, as a hot water or hot air heating system is the preferred distribution system of heating since it is more efficient, flexible, and comfortable.

Finally, a time-drift variable is introduced to control for time (number of months since the first selling month in the data set). In order to reduce spatial dependency, the last attributes included are longitude and latitude coordinates (e.g., Wilhelmsson, 2002; and Galster, Tatian, and Pettit, 2004). Moreover, to further deal with the issue of spatial dependency, the hedonic model includes eleven binary variables concerning sub-areas. The sub-areas are defined as the administrative parishes.

Hedonic Prices and Uninformed Buyers

Exhibit 3 displays the estimates. The first model includes only real estate and neighborhood characteristics, and the following eight models include ''uninformed'' buyers or at least, ''potentially uninformed'' buyers as regressors in the hedonic price equation. The second model includes all additional regressors at the same time.

The third model includes a dummy variable for first-time buyers; the fourth buyers with only one to five visual inspections and the fifth, buyers with experiences from one or two bidding processes. The sixth model includes a dummy variable for buyers that did not order a technical inspection, and the seventh model contains buyers that did not order a radon inspection. Finally, the eighth model includes a dummy variable indicating that the sale process took less than a week.

The cost of obtaining professional technical evaluation of the building is almost the same for all buyers. Thus, it is not expected that those buyers that do not order a technical inspection are less informed and therefore paying more for the house. By comparing houses where the buyers ordered a technical inspection with sales where they did not, the latter properties are found to be sold for a lower price, that is, a discount. The buyer purchases, to some extent, the real estate ''as is'' when it comes to quality. The transferring of some of the unique real estate risk from seller to buyer is one reason why the buyer pays a lower price.

Exhibit 3 | Regression Results

	All	VIF	All	VIF	First Time Buyer	Few Inspections	Few Biddings	Technical Inspection	Radon Inspection	Short Tom
Constant	409.90**		377.58**		414.70**	410.21**	408.17**	368.88**	412.07**	408.74**
	(4.63)		(4.38)		(4.67)	(4.68)	(4.69)	(4.21)	(4.65)	(4.63)
Liv	0.0042**	2.7	0.0041**	2.7	0.0042**	0.0041**	0.0041**	0.0042**	0.0042**	0.0042**
	(11.71)		(11.74)		(11.64)	(11.61)	(11.65)	(12.03)	(11.73)	(11.63)
Lot	0.0000	1.5	0.0000	1.5	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001
	(0.45)		(0.69)		(0.43)	(0.17)	(0.48)	(0.60)	(0.46)	(0.66)
Rooms	0.0295**	2.0	0.0335**	2.1	0.0288*	0.0306**	0.0319**	0.0310**	0.0297**	0.0309**
	(2.96)		(3.45)		(2.47)	(3.10)	(3.25)	(3.15)	(2.97)	(3.10)
Qual	0.0047*	1.5	0.0046*	1.5	0.0047*	0.0045*	0.0049**	0.0041*	0.0047*	0.0052**
	(2.46)		(2.48)		(2.47)	(2.38)	(2.61)	(2.13)	(2.45)	(2.71)
Sea view	0.2421**	1.1	0.2666**	1.2	0.2325**	0.2614**	0.2500**	0.2630**	0.2413**	0.2442**
	(5.43)		(6.05)		(5.11)	(5.91)	(5.71)	(5.95)	(5.41)	(5.50)
Age	−0.0067*	31.8	−0.0063*	32.3	−0.0066*	−0.0065*	−0.0068*	−0.0067*	−0.0065*	−0.0066*
	(−2.35)		(−2.29)		(−2.31)	(−2.30)	(−2.44)	(−2.39)	(−2.25)	(−2.34)
Age^2	0.0001**	31.3	0.0001**	31.9	0.0001**	0.0001**	0.0001**	0.0001**	0.0001**	0.0001**
	(2.96)		(2.68)		(2.94)	(2.83)	(2.84)	(3.00)	(2.84)	(2.94)

Exhibit 3 | (continued)

Regression Results

	All	VIF	All	VIF	First Time Buyer	Few Inspections	Few Biddings	Technical Inspection	Radon Inspection	Short Tom
Distance	−0.0001**	15.6	−0.0001**	16.0	−0.0001**	−0.0001**	−0.0001**	−0.0001**	−0.0001**	−0.0001**
	(−3.72)		(−4.03)		(−3.54)	(−3.72)	(−3.77)	(−3.82)	(−3.75)	(−4.03)
Jacuzzi	0.1511**	1.1	0.1658**	1.1	0.1498**	0.1603**	0.1685**	0.1528**	0.1504**	0.1515**
	(4.17)		(4.66)		(4.12)	(4.40)	(4.71)	(4.28)	(4.15)	(4.20)
3-glass	−0.0002	1.3	0.0000	1.3	−0.0003	−0.0026	−0.0033	−0.0067	−0.0009	−0.0029
	(−0.01)		(0.00)		(−0.01)	(−0.10)	(−0.13)	(−0.26)	(−0.04)	(−0.11)
Garage	−0.0280	1.1	−0.0361	1.2	−0.0293	−0.0310	−0.0342	−0.0289	−0.0267	−0.0291
	(−1.37)		(−1.82)		(−1.43)	(−1.54)	(−1.70)	(−1.44)	(−1.30)	(−1.43)
Maintenance	−0.1051**	1.1	−0.0910**	1.1	−0.1051**	−0.1016**	−0.0956**	−0.1028**	−0.1052**	−0.1022**
	(−5.38)		(−4.79)		(−5.37)	(−5.26)	(−4.96)	(−5.35)	(−5.39)	(−5.25)
Traffic	−0.0600**	1.1	−0.0683**	1.1	−0.0588**	−0.0626**	0.0632**	−0.0637**	−0.0599**	−0.0616**
	(−2.78)		(−3.24)		(−2.71)	(−2.93)	(−2.98)	(−2.99)	(−2.77)	(−2.85)
Heating	−0.0758**	1.3	−0.0851**	1.4	−0.0747**	−0.0776**	−0.0820**	−0.0819**	−0.0760**	−0.0789**
	(−2.85)		(−3.29)		(−2.80)	(−2.95)	(−3.14)	(−3.11)	(−2.85)	(−2.90)
First-time buyer	—		−0.0275	1.2	−0.0210	—	—	—	—	—
			(−1.34)		(−0.99)					

Exhibit 3 | (continued)

Regression Results

	All	VIF	All	VIF	First Time Buyer	Few Inspections	Few Biddings	Technical Inspection	Radon Inspection	Short Tom
Few inspections	—		0.0163 (1.71)	1.5	—	0.0337** (4.12)	—	—	—	—
Few biddings	—		0.0325** (2.91)	1.5	—	—	0.0466** (4.87)	—	—	—
Technical inspection	—		0.1104** (4.26)	1.1	—	—	—	0.1170** (4.47)	—	—
Radon inspection	—		−0.0193 (−0.83)	1.1	—	—	—	—	−0.0177 (−0.74)	—
Short TOM	—		−0.0304** (−3.13)	1.1	—	—	—	—	—	−0.0284** (−2.83)
Adj. R^2	0.6944		0.7200		0.6942	0.7031	0.7058	0.7044	0.6941	0.6986
(Prob) Moran's I	0.023		—		—	—	—	—	—	—

Note: The dependent variable is the natural logarithm of price. Coefficients concerning sub-area variables, month, and coordinates are not presented in the table. *t*-values are in parentheses. VIF = Variance inflation factors.

*Significant at the 5% level.

**Significant at the 1% level.

Everything else being equal, the buyer wants compensation for taking more risks, hence, a lower price.

Buyers with less experience concerning the bidding process are ending up paying more for a single-family house. In addition, properties exposed on the market for a very short time are sold for less compared to properties with a longer time-on-the-market. Not surprisingly, buyers who try to inform themselves about the housing market and visit many open houses do pay less compared to the buyers who do not make so many visual inspections. However, the results show that a first-time buyer does not pay more compared to the average buyer.

The Moran's I statistic is equal to 2.39[6] in the model using all observations; consequently, the null hypothesis of no spatial correlation is rejected.[7] The results from the spatial autoregressive model are shown in the Appendix. The overall conclusion is that there is only a modest problem with spatial autocorrelation. The variance inflation factor (VIF) is used to investigate the existence of multicollinearity. The principle that VIF in excess of 10 indicates multicollinearity is used in the literature (e.g., Des Rosiers, Lagana, and Thériault, 2001). For the first two models, the magnitudes of VIF are lower than the threshold that indicates no problem with multicollinearity.

Bargaining Outcome

The models in Exhibit 4 try to explain the bargaining outcome, that is, the variation in the discount ratio. The method used is comparable to that in Turnbull and Sirmans (1993) and Song (1995). The determinants are a combination of real estate, neighborhood, and household characteristics. The parameters are estimated in two different models. The first model includes all observations and the second includes all observation but incorporates an interaction variable between the attributes and a binary variable indication if d is positive.

In the first model, real estate attributes, neighborhood characteristics, and household characteristics can explain almost 75% of the variation in the discount ratio. The second model can explain slightly above 80% of the variation. The VIF measures indicate only modest problem with multicollinearity. Not surprisingly, living area and number of rooms seem to be correlated, as well as the two bidding variables and the two offer price variables.

The interpretation from the first model is that the age of the house, the need for renovation (maintenance), and the proximity to road traffic are all real estate and neighborhood attributes that do not have an influence on the bargaining outcome. Thus, the seller prices them correctly when (s)he sets the asking price.

Moreover, a sea view and a Jacuzzi are two attributes that will increase the difference between asking and transaction price. Hence, the seller understates these two variables. The same is true for the living area variable. As the relationship between living area and the discount ratio is negative, it suggests that the seller

Exhibit 4 | Regression Results of Bargaining Outcome

	Model 1			Model 2		
	Coefficient	t-value	VIF	Coefficient	t-value	VIF
Property Attributes						
Living area	−0.7408**	(−5.86)	3.2	−0.6616**	(4.68)	5.2
Quality	−1.7254*	(−2.53)	1.9	−2.6324**	(−3.36)	3.2
Age	−0.2102	(−0.77)	2.8	−0.0929	(−0.36)	3.8
Heating	28.7827*	(2.97)	1.8	24.7793*	(2.22)	3.2
Maintenance	−1.8948	(−0.26)	1.4	−5.8903	(−0.69)	2.5
Garage	13.4620	(1.85)	1.3	14.7632	(1.64)	2.7
Jacuzzi	−53.2047*	(−4.16)	1.3	−67.5832**	(−4.68)	2.2
Rooms	−5.6744	(−1.53)	2.7	−8.2284	(−1.85)	5.1
Interacted with $d > 0$						
Living Area	—			0.5629	(1.73)	43.9
Quality	—			2.6239	(1.88)	48.8
Age	—			0.9870*	(2.20)	19.0
Heating	—			−20.0464	(−1.04)	5.5
Maintenance	—			16.4320	(1.14)	5.1
Garage	—			−19.2908	(−1.39)	4.9
Jacuzzi	—			85.1599**	(2.96)	2.5
Rooms	—			13.9097*	(1.99)	40.4
Neighborhood Characteristics						
Distance	0.0079**	(2.69)	7.6	0.0086**	(3.07)	9.2
Sea view	−81.0442**	(−5.26)	1.4	−85.2014**	(−5.69)	1.8
Traffic	5.5572	(0.69)	1.3	1.4912	(0.16)	2.2
Interacted with $d > 0$						
Distance	—			−0.0019	(−0.76)	22.6
Sea view	—			69.4234	(1.40)	1.9
Traffic	—			−7.2467	(−0.49)	14.5
Household Characteristics						
Buyers income class	5.2333**	(2.82)	1.4	7.5169**	(3.58)	2.5
Higher education	−0.9807	(−0.23)	1.3	1.8915	(0.37)	2.4
Number of children	0.4046	(0.11)	1.6	−0.1522	(−0.04)	2.6
First-time buyer	7.9220	(1.05)	1.3	3.4596	(0.39)	2.5
Number of shows	−3.2464	(−0.89)	1.8	−5.6862	(−1.27)	3.5
Number of biddings	−22.1793**	(−2.06)	11.6	−23.2535	(−1.48)	32.4
Number of biddings-sq.	4.0771	(1.50)	10.6	4.1977	(1.19)	23.6
Technical inspection	2.3155	(0.23)	1.3	5.7993	(0.43)	3.1
Asking price	0.0001	(6.53)	28.6	0.0001**	(2.48)	147.9
Asking price-sq.	−0.0000**	(−4.54)	28.4	−0.0000	(−0.71)	252.0
Time-on-market	2.9010	(0.74)	1.3	5.8833	(1.36)	2.1
Interacted with $d > 0$						
Buyers income class	—			−12.6823**	(−3.26)	5.4
Higher education	—			1.0818	(0.13)	5.4
Number of children	—			4.9258	(0.71)	11.1

Exhibit 4 | (continued)
Regression Results of Bargaining Outcome

	Model 1			Model 2		
	Coefficient	t-value	VIF	Coefficient	t-value	VIF
First-time buyer	—			13.7741	(0.98)	52.9
Number of shows	—			9.2410	(1.39)	28.8
Number of biddings	—			11.1481	(0.51)	11.0
Number of biddings-sq.	—			−2.5167	(−0.44)	518.0
Technical inspection	—			−18.6921	(−0.98)	345.7
Asking price	—			−0.0001	(−1.76)	12.2
Asking price-sq.	—			0.0000	(0.59)	5.2
Time-on-market	—			−13.9955	(−1.82)	3.1
Constant	−101.95	(−1.58)		−53.36	(−0.80)	
Adj. R^2	0.7411			0.8041		

Note: The dependent variable is *d*. *t*-values are in parentheses (White's robust standard error estimates). Fixed-effects concerning sub-markets are not presented in the table. The number of observations is 179.
*Significant at the 5% level.
**Significant at the 1% level.

overvalues small houses, as the asking price should be lower or undervalued by the buyer as the transaction price should be higher (Song, 1995). An alternative interpretation is that smaller houses are more standardized (Haurin, 1988) or that the market for that type of house may be more liquid (Anglin, Rutherford, and Springer, 2003). Moreover, the impact of the distance from the CBD on real estate prices appears to be a variable that the sellers understate. Properties located far away from the CBD are on an average overstated by the seller.

Household characteristics give the impression of being less important when it comes to bargaining outcomes. The coefficient concerning income is significantly different from zero, indicating that the bargaining outcome is generally higher for higher incomes. Whether the buyer has a higher educational degree or not, does not have any impact on the bargaining results. Being a first-time buyer also has no impact on the bargaining outcome. That is to say, first-time buyers are not disadvantaged in the bargaining process and they do not end up with an inferior bargaining outcome compared to more experienced former-owner households. This finding confirms the results by Turnbull and Sirmans (1993) and Song (1995), but not the finding reported by Harding, Rosenthal, and Sirmans (2003a) that ''first-time buyers are the weak bargainers relative to experienced repeat buyers.''

Moreover, buyer households' number of children is not found to have any impact on bargaining power as in Harding, Rosenthal, and Sirmans (2003a). One reason a child effect is not found could be that the issue about the school district is not that important in Sweden compared to, for example, the U.S. A large number of articles examining the relationship between public school quality and real estate prices in the U.S. exist, and the conclusive evidence shows that the relationship is positive (e.g., Brasington and Haurin, 2006). However, as a parent in Sweden you always have the right to let your children attend schools in another district or municipality. Sweden has vouchers and many private schools. Hence, the school district is not expected to be very important in the pricing of single-family houses and in the bargaining power in Sweden.

On the other hand, compared to buyers with no experience, experienced buyers do end up with a poor bargaining outcome. Hence, the estimated parameter does not have the expected sign. The reason could be that experienced buyers only bid on properties where the asking price is relatively correct from the beginning, or more likely, that they have adjusted their own reservation prices upward as they lose more biddings. That is, a bid and lose experienced buyer is not at all a well-informed buyer. Quite the contrary, it seems that they are less informed about the local real estate market, as they feel they have to increase their reservation price. This also confirms the conclusion from Rothschild's (1974) theoretical model that the buyer's reservation price revises as the buyer gains knowledge about the price distribution.[8]

As stated earlier, there is no fundamental reason to believe strongly that the bargaining power is equal in a situation in which the seller has set too high an asking price, compared to a situation in which the transaction price will be higher than the asking price after a bidding process. That is, it is more reasonable to expect that the bargaining outcome is or will be different in a ''buyer's market'' compared to a ''seller's market.'' The results from the second model clearly indicate that real estate attributes do not play an important role in explaining the variation in the (positive) discount ratios except for age and the existence of Jacuzzi. Moreover, the coefficient concerning the buyer's income has a negative sign and is significant. Hence, as income increases, the discount ratio becomes less positive. The interpretation here is that bargaining power is weaker as incomes increase.

The coefficient concerning the bidding experience variable is negative, indicating that bargaining power is weaker as bidding experience increases. The parameter concerning number of biddings is still negative but of lower magnitude, and the parameter regarding squared number of biddings is even more positive (almost significant). This indicates that, eventually, bidding experiences are something positive when it comes to negotiation skills.

The most striking result here is firstly that the coefficient concerning income is significantly positive. Hence, as the buyer's income increases, the discount rate

(or premium rate) will be closer to zero and it can be concluded that the buyer's bargaining power increases with income. Hence, income does not play an important role when it comes to a single-family house sold at a discount, but *is* important when it comes to a house sold at a premium. This result is contrary to Harding, Rosenthal, and Sirmans (2003a), who state: ''The pattern of estimates implies that wealth has a negative effect on bargaining power.'' However, the results in the current study show that when prices are bided downward, a high-income family would pay more for the same house compared to a low-income household, but the reverse is true if prices are bided upward.

Furthermore, the time-on-the-market attribute has a weak impact on the discount ratio. The coefficient is positive and weakly statistically significant. The interpretation is that the discount ratio will become higher as time-on-the-market increases. Thus, a longer time-on-the-market has a positive effect on the transaction price (the premium will be lower).

Conclusion

The objective of the paper is to investigate whether potentially uninformed buyers such as first-time buyers, pay a different implicit price for real estate attributes compared to other groups of households, and to test whether the bargaining power increases with the level of information.

A unique data set from Stockholm, Sweden is empirically examined. This data set has relevant information about real estate attributes and transaction prices, along with information about household characteristics and characteristics of the buying process. Overall, the results do not show that first-time buyers pay less for the same type of house as others or that former-owner households are willing to pay more for a certain location. The results do not confirm, for example, Kestens, Thériault, and Des Rosiers' (2006) Canadian results. However, the hypothesis cannot be rejected that well-informed buyers, for example, who have been on many visual inspections, pay less for the same type of single-family house.

Moreover, technical inspections are important, but a technical inspection does not imply that the buyer will pay less. Contrarily, it appears empirically that those buyers that do not order a professional technical inspection get a discount as they are buying a single-family house with a potentially higher risk.

Household characteristics seem to be of less importance when it comes to bargaining outcomes. Being a first-time buyer does not have any significantly impact on the bargaining outcome. This finding confirms the results by Turnbull and Sirmans (1993) and Song (1995). Surprisingly, compared to buyers with no experience, buyers with experience from bidding processes end up in a bargaining outcome that is generally weaker. Finally, higher income seems to increase bargaining power when the housing market is characterized as a ''seller's market.''

Appendix

Exhibit A1
Spatial Autoregressive Model

	All	First-Time Buyer	Few Inspections	Few Biddings[a]	Technical Inspection	Radon Inspection	Short Tom[a]
Liv	0.0040	0.0043	0.0051	0.0051	0.0060	0.0041	0.0037
	(11.50)	(9.51)	(5.76)	(10.66)	(7.29)	(10.36)	(5.10)
Lot	0.0000	0.0000	−0.0001	0.0001	−0.0001	0.0000	−0.0002
	(0.40)	(0.18)	(−0.45)	(0.61)	(−1.03)	(0.28)	(−1.56)
Rooms	0.0279	0.0263	0.0101	−0.0001	0.0663	0.0321	0.0511
	(2.89)	(2.15)	(0.44)	(−0.01)	(2.68)	(3.02)	(2.43)
Qual	0.0046	0.0041	0.0102	0.0038	0.0077	0.0041	0.0075
	(2.49)	(1.72)	(2.17)	(1.41)	(1.53)	(2.01)	(1.54)
Sea view	0.2325	0.1917	0.4009	0.3329	0.3148	0.2411	0.1510
	(5.46)	(2.13)	(4.93)	(5.96)	(3.38)	(5.05)	(1.84)
Age	−0.0057	−0.0054	−0.0083	−0.0088	−0.0177	−0.0051	−0.0057
	(−2.08)	(−1.55)	(−1.11)	(−2.17)	(−2.98)	(−1.68)	(−0.89)
Age^2	0.0001	0.0001	0.0002	0.0001	0.0003	0.0001	0.0001
	(2.61)	(2.11)	(1.88)	(2.76)	(4.21)	(2.18)	(1.95)
Distance	−0.0001	−0.0001	−0.0000	−0.0001	−0.0000	−0.0001	−0.0001
	(−3.45)	(−3.15)	(−0.67)	(−5.11)	(−0.06)	(−3.24)	(−0.32)
Jacuzzi	0.1553	0.1354	0.1424	0.1082	0.4095	0.1540	0.2170
	(4.43)	(2.90)	(1.91)	(2.15)	(4.61)	(3.97)	(3.13)
3-glass	−0.0007	0.0042	−0.0295	−0.0058	−0.1906	0.0006	0.0205
	(−0.03)	(0.13)	(−0.47)	(−0.15)	(−2.84)	(0.02)	(0.37)
Garage	−0.0283	−0.0297	−0.0018	−0.0445	0.0201	−0.0424	0.0343
	(−1.43)	(−1.24)	(−0.04)	(−1.51)	(0.38)	(−1.96)	(0.78)
Maintenance	−0.1058	−0.1193	−0.1313	−0.0940	−0.1848	−0.1277	−0.0540
	(−5.62)	(−5.13)	(−2.74)	(−3.33)	(−3.48)	(−5.96)	(−1.24)
Traffic	−0.0545	−0.0379	−0.0549	0.0676	−0.0842	−0.0592	−0.0109
	(−2.61)	(−1.50)	(−1.05)	(−2.17)	(−1.48)	(−2.54)	(−0.24)
Heating	−0.0790	−0.0495	−0.1396	−0.1225	−0.1866	−0.0690	−0.1422
	(−3.09)	(−1.54)	(−2.05)	(−3.22)	(−2.61)	(−2.32)	(−2.27)
Adj. R^2	0.7013	0.6655	0.5952	0.7475	0.7514	0.7163	0.7106
n	599	405	168	264	90	477	111

Note: Coefficients concerning sub-area variables, month, and coordinates are not presented in the table. t-values are in parentheses.
[a]No sub-area effects.

Endnotes

[1] Merriam Webster's Pocket Dictionary.

[2] There is no information about the seller's characteristics, although it would be of equal interest. Omitted variable bias may affect the analysis.

[3] According to Colwell and Dimore (1999), Haas (1922) produced a hedonic study fifteen years before Court (1939), but Court introduced the term hedonic.

[4] To the extent that people living in a location tend to be similar to each other, the spatial coefficient may be interpreted as a way to include omitted variables on sellers' characteristics.

[5] All sales used a real estate agent. In Sweden, a real estate agent is formally responsible to both the buyer and the seller. However, the seller pays the fee to the agent.

[6] Significant at a 5% level of significance (Prob $<$ 0.05).

[7] The inclusion of the longitude and latitude coordinates substantially reduced the spatial autocorrelation.

[8] Anecdotal evidence can be found in statements such as ''Their [Sam and Barb] offer was $25,000 more than the asking price. When I asked why they offered so much higher, considering there were no other buyers in the mix, the couple told me that losing out in previous attempts had shaped this latest bid.'' Dunning, D., ''Timely advice helps couple avoid money pit.'' Newspapers–Advertising supplement, Friday, May 11, 2007.

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