THE EFFECTS OF CASH ON CHANGES IN HOME PRICE: A STUDY OF CASH OFFERS ON RESIDENTIAL REAL ESTATE IN JUPITER FLORIDA

by

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This thesis was prepared under the direction of the candidate's thesis advisor, Dr. Kanybek Nur-tegin, and has been approved by the members of her/his supervisory committee. It was submitted to the faculty of The Honors College and was accepted in partial fulfillment of the requirements for the degree of Bachelor of Arts in Liberal Arts and Sciences.

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To everyone who God used to get me this far.

I didn’t get here by myself.

ABSTRACT

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Real estate transactions are fraught with risks and costs. Transaction delay and failure are risks directly linked to loan approval. Real estate sellers tend to prefer the proceeds from the sale of their home with immediacy and surety rather than with a delay but waiting for loan approval causes such a delay. Using an ordinary least squares regression analysis, I assess whether home sellers are willing to concede discounts to buyers who offer to pay cash, to avoid the risks of transaction failure and delay of payment. I claim that, in contrast to a loan, a cash offer reduces the risk of a failed transaction, and this reduced risk is reflected as a discount on the price of the house greater than any discounts for loan-based transactions. This paper will also assess the magnitude of any discounts as a percentage of the home's last list price on the market.

Keywords: Cash offer, Real Estate, Jupiter Florida, Ordinary least squares regression, Multiple Listing Service

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1. INTRODUCTION

Housing is an expanding industry. Over 8.8 million new homes were purchased within the United States between 2016 and 2017 (Ford, 2019). The median home price for houses purchased between 2016 and 2017 was $228,329 (Ford, 2019). If each of those homes received just a 1 percent discount, the total savings would exceed 20 billion dollars. Such discounts might be possible by purchasing homes with cash offers which may mitigate or remove many of the risks that accompany typical sale terms such as loan agreements.

Homes are often purchased with a loan agreement, and these loans carry risk because the home transaction can be canceled if the mortgage application is denied. These risks impact the seller since she must then wait even longer until receiving a new offer. The seller would not prefer this because she typically desires to close the transaction quickly. Only then can she begin the transaction to buy a new house. Also, the time she spends waiting for another offer reduces the value of her house as it continues to sit on the market. The future value of money theorem states that a payment in the future is worth less than the same amount paid out immediately. If the seller received the money immediately, it could be invested and earn a rate of return over time *t*, making it worth more than the future payment at time *t*. Therefore, a payment accepted for a later date should be adjusted for the decreasing future value of the payment.

Additionally, a seller may even lose her opportunity to buy a new house. If she cannot sell her current house, she may not be able to pay off her current loan in time to apply for a loan on a new house. Due to the surety of cash and the immediacy of payment, cash transactions may mitigate the risks and additional costs associated with loan transactions.[1] My paper addresses whether buyers who offer cash for their home purchases tend to receive a discount on the price of the house. I claim that, despite the dissenting literature (Daneshvary and Clauretie, 2013; and Hansz and Hayunga, 2016), a cash offer does reduce the risk of a failed transaction, and this reduced risk is reflected as a discount on the price of the house determined by a negative movement in price during the negotiation period between the buyer's first offer on a house and the final price of the house. However, like Jauregui et al. *(*2017), I argue that these discounts are not as impactful as other previous studies have indicated (see, i.e., Asabere *et al.,* 1992; Lusht and Hansz, 1994; and Aroul and Hansz, 2014).

Research in the early 1990s pioneered the analysis of potential transaction failure and transaction costs for the seller, claiming that there is a risk premium: an adverse effect on buyers to mitigate the risks of transaction failure (Asabere *et al.,* 1992).[2] Cash payments for homes may reduce these risks and lower transaction costs, resulting in a discount to buyers who offer to pay for houses with cash (Asabere et al., 1992; Lusht and Hansz, 1994; and Aroul and Hansz, 2014). Alternatively, the impact of cash discounts may be vastly overstated in size (Daneshvary and Clauretie, 2013; and Jauregui *et al.,*

[1] Transaction costs include loan processing fees and other fees associated with loan applications.
[2] A risk premium is higher price given to account for and offset costs that the seller does not want to bear. Premiums will be frequently contrasted with discounts in this paper.

2017). Buyers who pay in cash might even pay a premium for their homes (Hansz and Hayunga, 2016). The problem is that if these discounts exist, not every homebuyer takes, or can take advantage of them. Instead, most homes are purchased with loans. If buyers were aware of these discounts for cash offers on homes, they might benefit from some portion of them.

These benefits may be a realistic option for some homebuyers. Home shoppers who may have enough money saved up to pay for a house in cash but could not afford to keep their assets locked up in the equity of the house would normally finance their house with a mortgage. Those individuals may believe they cannot take advantage of any potential discounts for cash purchases. However, they may be able to pay cash, then initiate a reverse mortgage. That way, they can take advantage of a potential discount afforded to cash buyers and keep their money liquid in the long run.

Most academic research on this topic addresses only the sold price or the list price of homes. I contribute to the academic inquiry by using both the sold price and the list price of homes and examine potential driving variables behind any price movements that occur in the time between those two prices. I examine 11,120 transactions on residential single-family homes in Jupiter, Florida between the years 2014 and 2019, using the Multiple Listing Service (MLS) database.[3] The town of Jupiter has a heterogeneous composition of communities, so despite a median income of $79,721, it may be a better illustration of the "typical" American community than the previous literature, many of

[3] The Multiple Listing Service aggregates all residential real estate data including data regarding every home listed on the housing market and it is notable for its comprehensive nature and scope.

which focus on unique subsets of homes (Census, 2019). For example, some have focused on townhomes in more densely populated areas, while others have focused on small affluent golf course communities (Asabere *et al.,* 1992; and Hansz and Hayunga, 2016). Jupiter may therefore provide better grounds for generalization than some of the more focused literature.

Additionally, I categorize all loan transactions into three types: Conventional Loans, Federal Housing Administration Loans, and Veterans Affairs loans. Each of these loan types pose unique risks and costs to every transaction they are involved in. I describe these specific loan types with greater detail in section three.

Section two will explain the background literature regarding discounts for cash transactions. Section three will then address the dataset chosen for this paper, explain each variable's importance, and outline the methodology behind the paper. Section four will subsequently discuss specific challenges in the OLS regression process, the results of those regressions, and how changes in each independent variable affects the dependent variables: discounts on housing prices. Finally, section five will conclude the paper and explain any further implications of the paper that are specific to the results.

2. LITERATURE BACKGROUND

Asabere *et al.* (1992) produced the prevailing conventional theoretical framework for cash discounts. They formalized the idea that cash payments mitigate transaction costs and failed transactions. The authors also asserted that sellers offer discounts to cash

buyers due to the reduced risk accompanying a shorter negotiation period.[4] They sampled 319 row-homes in Upper Darby, Pennsylvania and showed that cash transactions could produce a 13 percent price discount relative to mortgage transactions within that area.

Lusht and Hansz (1994) support Asabere et al.'s (1992) conclusion, by studying a 200-home sample in Allentown, Pennsylvania. They found a 16 percent premium for house transactions contingent on the approval of a conventional loan (Lusht and Hansz, 1994). Though they approached the issue by assessing the presence of premiums, they claimed that "cash discounts averaging 16% are quite plausible" (Lusht and Hansz, 1994: 217).

Aroul and Hansz (2014) also support conventional conclusions concerning cash discounts. They focused on the effect of foreclosures and short sales on house prices, but when they controlled for cash transactions, they saw a statistically significant discount associated with cash transactions. The authors found a discount of around 20 percent, which they partly attributed to unique market conditions because the period they studied overlapped with the United States housing crisis of 2007. The authors were careful to account for the "extreme distress combined with high credit standards" and a large number of home foreclosures in their explanation of the cash discounts, because it might have made discounts more common (Aroul and Hansz, 2014: 295).[5] While Aroul and

[4] Negotiations are shorter because third parties (like banks) are not involved in the transaction. This reduces transaction complexity.

[5] The housing crisis of 2007 caused most investors to panic, meaning they pulled all their investments out of the market and more importantly, many pulled their money out of the banks, as many of the big banks of the time were insolvent. This run on the banks reduced the quantity of loanable funds greatly. To mitigate risk, the banks raised credit qualifications for fear that the borrows would also become insolvent, as they had been doing in droves for the past six months. Additionally, the market's extreme distress would have caused homes to be inordinately discounted due to the amount of foreclosures nationwide.

Hansz (2014) found a much higher discount rate for cash transactions, they acknowledge that unique market conditions may have influenced their findings.

In a departure from the previous literature, Daneshvary and Clauretie (2013), presented an opposing view of cash transaction discounts. Though they focused on how a change in real estate agents affects the selling price, they included cash transactions as a control variable. Their results showed "no discount for cash sales" (Daneshvary and Clauretie 2013: 428), but since their focus was agent change, not cash effects, those results may be questionable.

Hansz and Hayunga (2016) assessed an MLS dataset of sold homes in Pinehurst, North Carolina, and found further evidence against the conventional literature. They observed 1051 single-family residential transactions between 2002-2004 to examine the effect of cash offers on transaction prices. They found that cash buyers paid a premium on the Pinehurst Golf course homes. The authors' reason for the premiums on cash transactions was consistent with Harding, *et al.* (2003), who claimed that individuals who buy more expensive homes do not heavily negotiate for price discounts (Hansz and Hayunga, 2016). They claimed the cash premium in their study exists because the buyers in their sample who can afford to pay with cash are affluent and do not have to negotiate for the cash discount.[6] Therefore, cash buyers in this market may pay as much as 4 percent more for the same property as a buyer with a conventional mortgage (Hansz and Hayunga, 2016).

[6] Buyers who can afford to pay cash for a home are considered affluent for the purposes of my study.

Jauregui *et al.* (2017) were among the latest to publish a dissenting paper regarding cash transactions, finding a discount of approximately 12 percent due to cash financing in their analysis of their base model (Jauregui *et al.* 2017). Their estimate of the cash "discount rate is approximately 32 to 45% less than reported in previous papers" (Jauregui *et al.* 2017: 130). Despite finding a discount, as the conventional literature did, they maintained that previous literature overstates the cash discount.

Some of the literature claims that discounts due to cash transactions are present and significant (Asabere *et al.*, 1992; Lusht and Hansz, 1994; and Aroul and Hansz, 2014). Others believe that the discounts are overstated, or that homebuyers pay more with cash than they would with loans (Daneshvary and Clauretie, 2013; Hansz and Hayunga, 2016; and Jauregui *et al.*, 2017). Given these views in the literature regarding discounts for cash transactions, my paper will study the effects of cash transactions on a large dataset in Jupiter Florida to measure the discount percentage due to cash offers, if there are any.

3. VARIABLES AND DATA

This study is based on 11,120 observations of home purchases gathered from the MLS dataset. Observations were gathered from within the town of Jupiter in Florida and between September 1st, 2014 and August 31st, 2019. I dropped 24 observations while running the regression due to some missing data and errors in the existing data, such as negative *Days on Market*. The summary statistics for the entire data set can be found in Table 1 on the next page.

3.1. Dependent Variables

My main dependent variable is the change between the last list price of the home before it was taken off the market due to a closable offer and the final sold price that the buying and selling negotiators agreed upon for the sale of the house. I measure this change in two ways: the monetary difference and the percentage difference.

Within the Multiple Listing Service (MLS)[7] dataset there are two important measurements of the home price for this study. First, there is the variable titled *List Price*. This variable denotes the last list price before the final offer is made, which establishes a base price to asses any changes. Second, the MLS contains a record of the closing price after the transaction is complete called *Sold Price*. This variable establishes the new price which determines the magnitude of the change, and whether it has risen or fallen.

Equation 1 shows how I determine the direct monetary discount, and Equation 2 shows how I determine the percentage discount:

(1) $$Change\ in\ Price = (Sold\ Price - List\ Price)$$

This way, the monetary change and the percent change will be negative if the price has fallen, otherwise, they will be positive if the price of a home has risen during negotiations.

(2) $$Percent\ Change\ in\ Price = \frac{(Sold\ Price - List\ Price)}{List\ Price} * 100\%$$

[7] The Multiple Listing Service is a database that aggregates residential real estate data for licensed realtors. This database is notable for its comprehensive nature and scope.

Table 1: Summary Statistics

Variable Name	Average	St. Dev.	Min	Max	# of obs.
Change in Price	-28,987.000	105,610	-5,500,000	245,150	11096
Percent Change in price	-3.995	9.4	-72	824	11117
Cash Sale Dummy	0.427	0.50	0	1	11119
Conventional Sale Dummy	0.497	0.50	0	1	11119
FHA Sale Dummy	0.053	0.23	0	1	11119
VA Sale Dummy	0.023	0.15	0	1	11119
Days on Market	68.634	95.30	0	1,577	11116
Days Negotiated	41.232	31.30	0	766	11119
Original List Price[†]	552,140.000	762,360.00	1	34,990,000	11117
No Gov Bod Dummy	0.216	0.41	0	1	11119
HOA Monthly[†]	309.060	295.09	0	4,015	11118
Right	0.772	0.42	0	1	11119
Broker	0.161	0.37	0	1	11119
Right w/Exceptions	0.023	0.15	0	1	11119
Broker w/Exceptions	0.013	0.11	0	1	11119
Right Limited	0.015	0.12	0	1	11119
Broker Limited	0.016	0.12	0	1	11119
REO Dummy	0.045	0.21	0	1	11119
Var/Dual Rate Dummy	0.151	0.36	0	1	11119
Single Family Dummy	0.561	0.50	0	1	11119
Sq Ft Living	2,010.900	1,040.60	0	14,479	11119
Total Floors or Stories	2.037	2.41	0	165	11119
Age of Home	27.008	12.53	0	96	11118
Total Bedrooms	3.018	0.98	0	10	11119
Total Baths	2.552	0.97	0	31	11119
WaterFront Dummy	0.252	0.43	0	1	11119
Priv Pool Dummy	0.288	0.45	0	1	11119
Pets Dummy	0.650	0.48	0	1	11119
Garage Spaces	1.653	8.84	0	504	11119

I chose to include the percentage difference in addition to the monetary difference because the context of the price change will help mitigate a potential upward bias of the data. If the house price was high relative to the sample size, a price change of $500,000 only reflects a 20 percent change in a $2.5 million house, where that same $500,000 change in price might double the value of the average house in the dataset.

As I mentioned in Section One, this method of measuring discounts on real estate is a departure from previous methods and an important difference between much of the previous literature and this study. Where previous studies only use one price marker to determine which houses are discounted, this study examines the *difference* and *percent difference* between two different price indicators: the last list price and the sold price.

There is an inherent problem with using one price marker to determine the price discounts: a single price marker can only provide a static price comparison from one house to another. However, no two houses are the same. In fact, even the same house with the same measurable characteristics is priced differently when sold a second time.

A better way to assess discounts is to measure the price change in each house and determine what variables drive that price change in any given home. Other studies have used a logarithm of the selling price as the dependent variable, but any regression with that dependent proxy will measure the driving variables for the house price, not the driving variables for price movement on a house. While information about cash discounts can be inferred from the data provided by previous models, this model should still show more directly how a cash offer results in an actual movement in the price of a house.

(3) $$Change\ in\ Price\ = f(Terms, T, F, A, H)$$

The changes in price are denoted in formulas three and four as the products of a set of independent variables, and control variables that contribute to the movement in price occurring between the last list price and the final sold price.

(4) $$Percent\ Change\ in\ price = f(Terms, T, F, A, H)$$

Where Terms is the terms of sale: Cash, FHA, and VA. T represents temporal control variables such as *Time on Market*, and *Time Under Negotiations.* F represents financial control variables such as *Original List Price* and neighborhood governance fees. A is administrative control variables relating to the sale process and seller-broker relationship. H contains hedonic control variables relating to home characteristics that are traditionally appealing to the buyer. The formula for these equations is linear. I did not incorporate logarithmic, exponential or quadratic elements. A detailed breakdown of the control variables within each control category is found in the Variable Glossary.

3.2. Independent Variables

The key independent variable driving the change in price, according to my hypothesis, is the type of financing. I have discussed two categories for home financing so far: cash and loan. However, there are three types of loans. The first is the conventional mortgage; this loan is the most common. It is financed directly through the lending bank and is backed by the bank's confidence in the borrower's ability to pay.

The second type of loan is the Federal Housing Administration (FHA) backed loan; while this loan is also financed through the banks, it is also backed by the FHA, allowing high-risk borrowers to acquire mortgages. On average, buyers who seek FHA

loans have worse credit than buyers who pursue conventional mortgages (Hendershott et al., 1997; and Pennington-Cross, and Nichols, 2000: 307).

The third and final type of loan is the Veteran's Affairs (VA) loan; VA loans are also financed by the banks but are backed by the Veteran's Affairs government program. Each of these variables is measured as dummy variables. For example, if a house is financed with cash, then the dummy variable for a cash transaction has a 1, while the dummy variables for the other three transaction types have a value of 0.

FHA and VA loans allow homebuyers the opportunity to purchase homes with much higher loan-to-value ratios (LTV), meaning a buyer can pay a smaller down payment—as little as 3 percent—than typical underwriting allows since the FHA default insurance insures up to 97% of the acceptable value for the home (Hendershott et al., 1997: 209; Asabere and Huffman, 2008: 192; and Jauregui et al., 2019). These high LTV ratios are offset by the presence of additional costs such as higher default insurance premiums and origination fees. Asabere and Huffman argue that these additional expenses will incentivize the buyers to offer low bids, and if those bids are above the seller's "reservation price" the seller will concede to an offer that lies below the list price (2008: 191).[8] Alternatively, looser borrowing qualifications—looser qualifications like the kind provided by FHA and VA backed loans—may encourage buyers to purchase homes at prices beyond what they can afford since highly leveraged funds are more readily available (Jauregui et al., 2019: 380).[9] Additionally, FHA and VA backed buyers

[8] The seller's reservation price is the minimum price the seller would be willing to accept for the property.
[9] A high LTV ratio (over 95%) is considered highly leveraged for the purposes of this paper because a borrower requires a much smaller percentage of upfront capital to control the same level of buying power.

may be less willing to negotiate for price changes in the underwriting period. Either way, discounts would not be realized if the easy availability of highly leveraged funds disincentivizes buyers to negotiate for discounts.

I examine these three financing methods: (1) cash, (2) FHA loans, and (3) VA loans, in contrast to a baseline of conventional mortgages, to determine how they affect the change in price and percent change in price between the list and closing prices of residential real estate in the town of Jupiter, Florida.

3.3. Control Variables

My source of control variables was the MLS dataset. Home prices may change due to numerous factors within the negotiation process. As shown on Table 2: Variable Glossary, I group the control variables into four significant categories: (1) Temporal, (2) Financial, (3) Administrative, and (4) Hedonic.

3.3.1. Temporal

The first control variable category that may affect the price, groups together the proxies that relate to time. *Days on Market* measures the time between the first listing of the house on the market and the date the house went under contract. *Listing Date*, *Sold Date*, and *Under Contract Date* are all used to determine the meta-variables which measure varying periods.

Table 2: Variable Glossary

Type of Variable	Variable	Explanation	Scale
Independent	*Cash Sale Dummy*	Buyer paid cash	Dummy, 1 if "yes"
	Conventional Sale Dummy	Buyer paid with a Conventional Loan	Dummy, 1 if "yes"
	FHA Sale Dummy	If there is a Federal Housing Administration-backed loan	Dummy, 1 if "yes"
	VA Sale Dummy	If there is a Veteran's Affairs backed loan	Dummy, 1 if "yes"
Dependent	*Change in Price*	The difference in price between list price and sold price	Dollars ($)
	Percent Change in price	Percent difference in price between list price and sold price	Percent (%)
Temporal (Control)	*Days on Market*	Days between the initial listing and date sold	# of Days
	Days Negotiated	Days between last offer on house and date sold	# of Days
Financial (Control)	*Original List Price*	The initial offering price of the house	Dollars ($)
	No Gov Bod Dummy	No governing body	Dummy, 1 if "yes"
	HOA Monthly	HOA/POA/COA monthly fees in dollars	Dollars ($)
Administrative (Control)	*Right*	Exclusive Right to the sale	Dummy, 1 if "yes"
	Broker	Exclusive Broker to the client	Dummy, 1 if "yes"
	Right w/Exceptions	Exclusive Right with Exceptions	Dummy, 1 if "yes"
	Broker w/Exceptions	Exclusive Broker with Exceptions	Dummy, 1 if "yes"
	Right Limited	Exclusive Right with Limitations	Dummy, 1 if "yes"
	Broker Limited	Exclusive Broker with Limitations	Dummy, 1 if "yes"
	REO Dummy	If the property is foreclosed (real estate owned)	Dummy, 1 if "yes"
	Var Dual Rate Dummy	Seller pays a different rate if the agent works with a cooperating broker	Dummy, 1 if "yes"
Hedonic (Control)	*Single Family Dummy*	Single Family Home (detached)	Dummy, 1 if "yes"
	Sq Ft Living	Total square footage of the living area	Ft^2
	Total Floors or Stories	Total number of floors or stories	# of floors
	Age of Home	How old the home is in years	# of Years
	Total Bedrooms	Total number of bedrooms	# of Bedrooms
	Total Baths	Total bathrooms, including half baths	# of Bathrooms
	WaterFront Dummy	If the property is considered "Waterfront"	Dummy, 1 if "yes"
	Priv Pool Dummy	If the property has a private pool	Dummy, 1 if "yes"
	Pets Dummy	If the property allows pets	Dummy, 1 if "yes"
	Garage Spaces	Total number of garage spaces	# of Garage spaces

Variable definitions from (Flex MLS, 2014)

The second period is *Time under Negotiations*. If the *Time Under Negotiations* or number of *Days on Market* is increased, the property may lose value, since homes that remain unsold for longer periods tend to lose value (Knight, 2002; and Daneshvary and Clauretie, 2013). However, the opposite relationship may be true as well, if sellers are willing to wait with their houses on the market for a long time they may be able to capture a superior selling price when the right buyer makes an offer with a willingness to pay that is higher than the seller's list price (Asabere and Huffman, 1993).

3.3.2. Financial

The next category in this set of control variables measures financial elements. The first financial independent variable that the model measures is the *Original List Price.* While this variable may not have a major impact on the model, I include it in case there is a correlation between the change in price before the final offer was made, and the price change during negotiations.

No Gov Bod Dummy is a proxy that represents the presence of governing bodies such as an HOA or a condominium association. If there is no governing body present, the proxy will be represented by a 1. This means that a negative coefficient for *No Gov Bod Dummy* indicates that the price is more likely to fall during negotiations over a property without a governing body compared to those with governing bodies. The presence of a governing body may imply additional fees and costs that buyers will be averse to and may cause a negative coefficient for this control variable. Alternatively, the benefits provided by a governing body may appeal to buyers more, causing them to pay a premium for a property with a governing body.

HOA Monthly provides a proxy to control for the additional financial burdens placed upon the buyer for living in the community and the model addresses how that affects price movement. Once that negotiation process is underway a buyer might attempt to negotiate a lower price due to high HOA or governing body fees.

3.3.3. Administrative

There are a few variables that fall into a category I define as administrative. These variables are representations of administrative characteristics such as the relationship between the seller and the Real estate broker that might impact the final sale price of a home.

The list type variables indicate the type of relationship between the realtor and the seller. There are six different types of these relationships. The first is *Right Limited* (exclusive right to sell); this relationship dictates that the owner of the home cannot sell the home without paying the realtor a commission regardless of who finds the buyer since the realtor possesses the exclusive right to sell the property (Flex MLS, 2014). This relationship is used as the baseline for the variable and thus has no direct proxy. The second relationship is an exclusive brokerage: *Broker*. This allows the owner to sell the property directly and only be responsible for paying the buyer's representative's commission (Flex MLS, 2014). The remaining proxies are combinations of exceptions (denoted exceptions) or limited service (denoted *Limited*) with the previous two seller-commission relationships. These combinations can be found in Table 1, the Variable Glossary. Exceptions allow exclusions to the exclusive right or exclusive broker relationship, while limited service implies that the real estate broker does not fully

represent the buyer or the seller (Flex MLS, 2014). These various broker-seller relationships could impact the broker's tenacity in negotiations, so it is important to include them in case they significantly impact the change or percent change in price.

The next administrative variable denotes whether the house has been foreclosed. The proxy *REO Dummy* determines if the house is Real Estate Owned; if so, the lender foreclosed the house, repossessed it, and sold it. Discounts due to REO properties should occur because the lender is not concerned with recouping the full value of the home, only the portion of the loan that remains unpaid. This is in contrast to a homeowner who would prefer to sell the house for enough money to pay the remainder of the loan and recoup the equity she has already invested into the house (Knight, 2002; and Asabere et al. 2015: 164).

The proxy *Var/Dual Rate* documents how the real estate broker gets paid under specific circumstances. A variable or dual-rate payment structure implies that the client has the right to pay a lower rate if the broker puts the deal together with the help of another agent (Flex MLS, 2014).

3.3.4. Hedonic

My dataset includes hedonic elements to capture any specific characteristics that might make discount negotiations more difficult. The variable *Single Family Dummy* distinguishes a property as a single-family detached home (SFD), townhouse, condo, or villa. The proxy *Single Family Dummy* is a binary proxy that yields 1 if the property is an SFD home, and a 0 if not. Since the proxy is a dummy variable, its mean value of 0.561

(found in the summary statistics table) multiplied by 100%, will represent the percentage of transactions that were conducted over SFD homes. In this case, 56.1% of the transactions in this sample were SFD homes. Since SFD homes are more common than other types of homes, buyers negotiate over SFD homes more often, and it is important to determine if this characteristic has any bearing on any potential change in price.

The size of a home is also important to buyers, and the amount of square footage is esteemed as a measurement of size in various hedonic pricing models (Knight, 2002; Daneshvary and Clauretie 2013; Aroul and Hansz, 2014; Asabere et al., 2015; Hansz and Hayunga, 2016; and Jauregui et al., 2019). I capture this by gathering MLS data for the living area, which is measured in square feet. This data is included in the model under the proxy *Sq Ft Living.*

Some buyers may express a desire for multiple levels, while others may want a single-story home (Knight, 2002; and Aroul and Hansz, 2014). This model assesses the impact of the number of levels with the proxy *Total Floors or Stories,* controlling for the hedonic characteristic of a building with more floors in case it significantly impacts the changes in the price of a home.

Age of Home is another hedonic element often considered in a home purchase (Ferreira and Sirmans, 1989; Lusht and Hansz, 1994; Asabere et al., 1992; Knight, 2002; Daneshvary and Clauretie, 2013; Aroul and Hansz, 2014; Hansz and Hayunga, 2016; and Jauregui et al., 2017). For example, in South Florida, it would be important to know that a home was built after the government made concrete block construction mandatory for

hurricane safety. For this reason, older homes may be considered less appealing and discount may be easier.

This model also accounts for other standard hedonic elements such as *Total Bedrooms*, and *Total Baths* (Ferreira and Sirmans, 1989; Asabere et al., 1992; Asabere and Huffman, 1993; Daneshvary and Clauretie, 2013; Aroul and Hansz, 2014; Hansz and Hayunga, 2016; and Jauregui et al., 2019). I gathered *Total Bedrooms* directly from the MLS database, while the proxy *Total Baths*, required me to combine the MLS data on full and half bathrooms. I multiplied the number of half bathrooms by one half, then added them to the number of full bathrooms to yield the weighted proxy: *Total Baths*.

Landscape variables represent the outdoor features of the home that might have an impact on any price negotiations that occur. Waterfront access is one such outdoor property characteristic measured by the dummy variable: *WaterFront Dummy.* A 1 represents a property that is on the water; a 0 represents a property that is not on the water. While this proxy helps control for hedonic characteristics, it is misleading. Many real estate agents have marketed properties as waterfront, yet there is much variation in the quality of the water the house sits on. Since the proxy is a binary variable, it does not account for the large difference in a property that sits on the beach and a property that sits on a drainage creek.

Priv Pool Dummy is another standard hedonic proxy included in this OLS regression (Daneshvary and Clauretie, 2013; Aroul and Hansz, 2014; and Asabere et al., 2015). A 1 represents a property that has a private pool for the proxy *Priv Pool Dummy* and a 0 indicates no private pool.

I also include a proxy for pet restrictions. A 1 for the proxy *Pets Dummy* represents a property with no restrictions on pets. Some properties have size restrictions while others do not allow pets at all, these are represented by a 0. The model also measures the amount of covered, and exclusive, parking available to the buyers via the proxy: *Garage Spaces* (Ferreira and Sirmans, 1989; Daneshvary and Clauretie, 2013; Aroul and Hansz, 2014; and Hansz and Hayunga, 2016).

These four categories describe the types of control variables included in this model. These variables allow the model to determine how significantly cash offers impact the change in price despite the various factors in the previous categories.

4. RESULTS AND DISCUSSION

To assess the impact of the various financing methods on both the monetary change in price and the percent change in price, I ran a regression including all the variables listed in the data section. However, I did not include a binary variable for conventional loan sale terms. I used it as a reference category instead, to avoid the dummy variable trap. When there no reference category for a set of dummy variables, and all categories are included in the model, there is exact multicollinearity in the model. Exact multicollinearity makes it impossible to estimate coefficients, destroying the interpretive power of the model in what is called a dummy variable trap (Dougherty, 2011: 236). To avoid this collapse of interpretive capability, cash, FHA and VA financing are all measured using conventional loan financing as a reference category or baseline.

4.1. Heteroskedasticity

Heteroskedasticity severely and negatively impacts the precision of the estimating equation, so it is important to identify and remedy potential heteroskedasticity. A not-constant variance of the disturbance term in the estimating equation causes heteroskedasticity. This a problem because heteroskedasticity makes the estimating equation inefficient.

There are several tests for heteroskedasticity such as the Goldfeld-Quandt and Breusch-Pagan tests, but I used the White Test since I did not know which variable is driving the heteroskedasticity. This test uses the squared residual for each observation as a proxy for the unobservable variance of the disturbance term (Dougherty, 2011). Then I ran an auxiliary regression of the model's explanatory variables, the squares of those variables, and the cross-products of those variables, using the squared residuals as the dependent variable. I examine these results as a chi-squared statistic with degrees of freedom determined by the total number of regressors in the auxiliary regression.

The test statistic given by the White Test run for the first regression, *Percent Change in price*, is 925.36, and it's 324 degrees of freedom gives it a critical value of just over 386.143 at the 1% significance level. Since the test statistic is greater than the critical value, I reject the null hypothesis of homoskedasticity in this regression. The White Test I performed on the second regression: *Change in Price*, has a test statistic of 4906.0872, and when compared to the critical value of 386.143 at the 1% significance level, I reject the null hypothesis of homoscedasticity in favor of the alternative hypothesis of heteroskedasticity in this regression as well.

Since both models indicate a significant presence of heteroskedasticity, it is important to find a remedy for the inefficiencies its presence causes. To mitigate the issue of heteroskedasticity, I use the robust standard errors approach (Dougherty, 2011). The results of the model with robust standard errors are shown in specifications 2 and 4 for *Percent Change in price* and *Change in Price*, respectively.

4.3. Model One: Percent Change in Price

4.3.1. Terms of Sale

Model One's dependent variable, found in Table 3, is the *Percent Change in Price.* This regression shows that a cash offer increases the likelihood of a discount on the price of a home. To avoid confusion, it is very important to note the exact format of the *Percent Change in Price* data. The data has been multiplied by 100 percent before entering the econometrics software, so in Model One (Table 3), the negative coefficient of 0.7691 for *Cash Sale Dummy* would indicate a 0.7691 percent negative price movement due to a cash offer on a house: a discount.

The difference in measurement of discounts in this study and the measurements in previous literature makes the 0.7691 percent discount found in this study seem minimally impactful. In fact, it is far less impactful than what previous studies have found. Jauregui et al. (2017) who found a 12 percent discount and claim that earlier literature overstated cash discounts, seem to overstate the cash discounts themselves. Even the logic behind these large discounts that previous studies (Asabere *et al.*, 1992; Lusht and Hansz, 1994; and Aroul and Hansz, 2014) posit is suspect. Jauregui et al.'s (2017) estimate is the most conservative at 12 percent, yet even a 12 percent discount on a $500,000 house is

$60,000, which is excessive. However, a 0.769 percent discount results in a $3845 monetary discount, which is much more realistic.

In specification 1 of the *Percent Change in Price* model, the presence of an FHA financing method seems to cause an increase in the price during the negotiation phase. I believe the additional risks and costs that accompany FHA financing methods cause this. However, this may also represent an increased proclivity of buyers to spend more on a house when highly leveraged funds are available than they would if they were required to pay a greater down payment (Jauregui et al., 2019: 380).

4.3.2. Control Variables

In this model, *Days on Market* and *Days Negotiated* are highly significant. However, they carry opposite signs. The negative sign of the coefficient for *Days on Market* suggests that the price begins to fall with more time on the market. The coefficient for *Time Under Negotiations* is positive, indicating that price tends to increase when more time elapses between the buyers offer and the time the house is sold. Given the coefficient direction in this model, the buyer would do well to negotiate quickly and close the sale as soon as possible and minimize the likelihood of a price increase.

HOA Monthly is statistically significant as well. This implies that the discount on the price of the house tends to increase as the neighborhood governance fees increase. As I stated in Section 3, I believe the presence of additional fees due to neighborhood governance decreases buyers' willingness to pay, resulting in negative price movement.

Table 3: Model One: Percent Change in Price

	Specification 1 (Baseline Regression)		Specification 2 (Robust Standard Errors)	
Cash Sale Dummy	-0.7691	(0.1917) ***	-0.7691	(0.1199) ***
FHA Sale Dummy	1.704	(0.4006) ***	1.704	(1.287)
VA Sale Dummy	0.1026	(0.5892)	0.1026	(0.2564)
Days on Market	-0.0075	(0.0010) ***	-0.0075	(0.0009) ***
Days Negotiated	0.0100	(0.0028) ***	0.0100	(0.0030) ***
Original List Price	-0.0000	(0.0000) ***	-0.0000	(0.0000)
No Gov Bod Dummy	0.2647	(0.2616)	0.2647	(0.2287)
HOA Monthly	-0.0010	(0.0004) ***	-0.0010	(0.0000) ***
Broker	0.1036	(0.2397)	0.1036	(0.1604)
Right w/Exceptions	0.2824	(0.5852)	0.2824	(0.2165)
Broker w/Exceptions	0.3334	(0.7819)	0.3334	(0.3313)
Right Limited	-1.196	(0.7235) *	-1.196	(0.9030)
Broker Limited	0.2535	(0.7069)	0.2535	(0.2787)
REO Dummy	3.689	(0.4350) ***	3.689	(1.726) **
Var/Dual Rate Dummy	0.5886	(0.2442) **	0.5886	(0.4941)
Single Family Dummy	0.4079	(0.2891)	0.4079	(0.2240) *
Sq Ft Living	-0.0006	(0.0002) **	-0.0006	(0.0002) **
Total Floors or Stories	0.1039	(0.0403) ***	0.1039	(0.0374) ***
Age of Home	-0.0411	(0.0083) ***	-0.0411	(0.0102) ***
Total Bedrooms	0.2865	(0.1680) *	0.2865	(0.1609) *
Total Baths	-0.1798	(0.1744)	-0.1798	(0.1368)
WaterFront Dummy	-0.3467	(0.2265)	-0.3467	(0.1561) **
Priv Pool Dummy	-0.2057	(0.2476)	-0.2057	(0.2272)
Pets Dummy	0.1820	(0.2140)	0.1820	(0.1189)
Garage Spaces	-0.0074	(0.0100)	-0.0074	(0.0056)
Constant	-1.934	(0.5335) ***	-1.934	(0.5131) ***
Adjusted R-squared	0.0384		0.0384	

While insignificant, *Right Limited* is very impactful and negative indicating that sellers whose realtors have exclusive rights to the commission, and limited service agreements may not bother to negotiate strongly, allowing the price to fall. However, due to the lack of significance and lack of strong underlying theory, I believe this coefficient provides little explanatory power to the model.

In Specification 2 (Robust Standard Errors) of this model, *REO Dummy* is not only significant, but it is also the most impactful coefficient in this model by far. Looking at the sign on the coefficient, an REO property does a buyer no favors and tends to cause a price increase during the negotiation period. This is surprising because the foreclosure status of an REO property indicates that the lender is trying to get rid of the property quickly and is not picky about how much she gets for it beyond ensuring the loan is paid (Asabere et al., 2015). One explanation for this positive price movement is that the MLS might only record the list price as the last price before an auction begins, and since many foreclosed houses are put up for auction, the bidding that pushes up the property's price may be picked up by the model as a massive percentage price increase during negotiations.

Additionally, many foreclosed properties on auction begin at low prices since lenders are only concerned with making the amount of money owed on the loan in a foreclosure sale. Low starting prices cause price movement to be recorded as a much higher percentage of the starting price because a marginal increase in price is a recorded as a larger percentage increase than that same marginal increase in a higher price.

This model also records *Var/Dual Rate Dummy* as both significant and impactful. I believe this variable plays a role in the realtor's motivation: when the realtor's commission is more contingent on sourcing the deal without any other realtors getting involved, she will be less inclined to prolong the negotiation period and will opt to close the deal as soon as possible. However, the positive coefficient on this variable indicates that when the terms of commission require an agent to potentially share the commission with another broker, that agent will be less motivated to close the sale quickly and instead be more willing to allow the price to rise. Since most agents and brokers charge a percentage of the sale price of the home as their fee, an increase in the sale price of the home does them no small disservice.

Regarding the hedonic variables, *Total Baths* and *Priv Pool Dummy's* insignificance, and *WaterFront Dummy's* increase in statistical significance are the only major differences between the models concerning impact, direction, and significance in Model Two. Apart from that, *Single Family Dummy* lost some significance, as well as *Total Bedrooms.*

Unfortunately, this model holds very little explanatory power. The R^2 (0.0376), is extremely low and seems to explain an insufficient amount of the stochasticity of the data, indicating that this model is not a very good fit for this data. However, the P-value of the F-Statistic = 0.000000203, implying that the model itself is still useful to explain the movement in the *Percent Change in price*.

4.4. Model Two

4.4.1. Terms of Sale

Because of Model One's low R^2 value and thus relatively low explanatory power, I include Model Two in Table 4 which serves as a direct measure of the change in price rather than a percentage measure. Model Two's dependent variable is *Change in Price*. In Specification 3 (Baseline), of Model Two, I examine the impact of a cash offer on the direct monetary change in price without robust standard errors, and in Specification 4 (Robust Standard Errors) I examine the same OLS Regression with them. Due to the clear presence of heteroskedasticity in Model Two, I will only examine the statistical significance within Specification 4.

This monetary measurement of price change reveals that a cash offer strongly predicts decrease in price. The model indicates that both the impact and the statistical significance of a cash offer are very high. Compared to other financing methods, the coefficient for a *Cash Sale Dummy* shows that a cash offer will yield a $5,673.76 discount during the negotiation period.

While not directly comparable to many of the previous studies which deal in percentages, a $5673.76 discount on the $503,710 average selling price for homes in the dataset of Jupiter, FL equals an average discount of 1.13 percent. This cash discount converted to an average percent discount is not entirely incomparable to the results of the previous regression in Model Two in which I find a 0.76 percent discount.

Surprisingly, in a clear departure from the theory I posit in Section Three, *FHA Sale Dummy* is a clear contender for offering the most impactful discounts. Both

coefficients relate back to the baseline which is conventional mortgages. This means that with either a cash offer or an FHA loan, the buyer can expect to be able to negotiate the price down a more than $5000 after her initial offer on the house. My initial FHA theory noted two characteristics of FHA loans: *additional* restrictions placed upon which homes the FHA would approve for loans, and *fewer* qualifications placed on which people the FHA would approve for those loans. The additional restriction could increase the likelihood of transaction failure resulting in a price hike for FHA loan applicant during the negotiation process. Additionally, the looser qualifications placed on FHA Loan applicants could result in buyers being less aggressive in the negotiating process. However, it appears that neither of these characteristics play their expected role in this regression. The more precarious financial position of FHA loan applicants seems to drive them to seek larger discounts on homes they have already made offers upon. Sellers might accept this because the sellers who would not yield a discount, self-select themselves out by not accepting FHA offers outright, which leads to a disproportionate number of sellers willing to concede discounts to FHA offers. However, I am unable to find a truly satisfactory explanation for this puzzling result.

4.4.2. Control Variables

The negative coefficient on the proxy *Days on Market* indicates that it is much easier to negotiate a discount over a house that has sat on the market longer than a house that has newly entered the market. *Days Negotiated* and *Original List Price* are also highly significant proxies that impact the size of the discount.

Table 4: Model Two: Change in Price

	Specification 3 (Baseline Regression)			Specification 4 (Robust Standard Errors)		
Cash Sale Dummy	-5673.76	(1754.32)	***	-5673.76	(2180.83)	***
FHA Sale Dummy	-5354.27	(3668.07)		-5354.27	(2467.77)	**
VA Sale Dummy	-1367.47	(5396.76)		-1367.47	(1319.49)	
Days on Market	-34.64	(8.87)	***	-34.64	(22.61)	
Days Negotiated	144.25	(25.97)	***	144.25	(38.00)	***
Original List Price	-0.072	(0.0016)	***	-0.072	(0.04)	**
No Gov Bod Dummy	-1397.97	(2393.57)		-1397.97	(3472.44)	
HOA Monthly	1.826	(3.35)		1.826	(8.18)	
Broker	477.04	(2193.03)		477.04	(1054.55)	
Right w/Exceptions	4029.88	(5350.76)		4029.88	(1737.71)	**
Broker w/Exceptions	2700.65	(7149.71)		2700.65	(2589.98)	
Right Limited	2618.11	(6615.19)		2618.11	(4349.81)	
Broker Limited	791.25	(6481.07)		791.25	(1997.19)	
REO Dummy	1338.37	(3977.72)		1338.37	(5150.43)	
Var/Dual Rate Dummy	-1753.88	(2237.00)		-1753.88	(1550.28)	
Single Family Dummy	7925.47	(2646.02)	***	7925.47	(2623.94)	***
Sq Ft Living	-13.18	(2.04)	***	-13.18	(21.04)	
Total Floors or Stories	593.75	(368.71)		593.75	(237.00)	**
Age of Home	-668.71	(75.81)	***	-668.71	(128.57)	***
Total Bedrooms	5420.33	(1537.05)	***	5420.33	(6689.04	
Total Baths	-5244.13	(1594.88)	***	-5244.13	(3706.22)	
WaterFront Dummy	-2102.05	(2073.06)		-2102.05	(4284.58)	
Priv Pool Dummy	6625.33	(2267.09)	***	6625.33	(2051.90)	***
Pets Dummy	504.97	(1958.49)		504.97	(2306.49)	
Garage Spaces	-59.71	(90.73)		-59.71	(56.11)	
Constant	43976.80	(4881.17)	***	43976.80	(16546.90)	***
Adjusted R-squared	0.3674			0.3674		

Interestingly, *Days Negotiated* seems to increase the price of a home during negotiations. Put simply, the longer negotiations drag on, the more likely it is that the price of the home will go up and the buyer ends up paying more for the home than if the sale closed quickly. Lastly, the original list price seems to have little effect on the likelihood of a discount despite being statistically significant.

It is important to note that in contrast to the theory surrounding the HOA and the *No Gov Bod Dummy* the coefficient for this proxy is negative. Angjellari-Dajci et al., argue that the presence of a governing body is capitalized into the price of the house and the effect is positive (2015: 210). They imply that buyers are attracted to the amenities provided by the neighborhood governing bodies far more than they are averse to additional costs imposed by those governing bodies. Thus, they would argue that the price of the house is driven higher due to the presence of a governing body such as an HOA (Angjellari-Dajci et al., 2015: 210). While their model only accounts for static house prices and not the change in house prices, I believe that the presence of a neighborhood governing body will be capitalized in the price change as well. Initially, I theorized that the presence of a governing body should cause the buyer to negotiate for a discount because of additional costs arising from the fees owed to the governing body. However, the coefficient is negative, indicating that the presence of a governing body is a desirable characteristic, and buyers must tend to prefer this, making them less inclined to negotiate a discount over it.

The final set of characteristics that may increase the likelihood of negotiating a discount are the hedonic characteristics. *Single Family Dummy* describes a property that

is a detached single-family home and holds the most impactful coefficient in the model. The coefficient for this proxy is positive, indicating that detached single-family homes are harder to negotiate over compared to other types of real estate such as townhomes, villas, mobile homes or condominiums. The model indicates a detached single-family home will rise $7925.47 in price compared to a different type of property.

The coefficient for *Sq Ft Living* is negative implying that as the house gets larger, it is easier for a buyer to negotiate a discount. This proxy correlates highly (0.7089) with *Original List Price* as larger houses tend to be more expensive. With higher prices, there is more room for a buyer to negotiate the price down without the seller losing as large a percentage of the sale price. However, the low absolute value of the *Original List Price* coefficient is surprising. I would have expected a larger or more expensive house to see more price movement for the reasons I mentioned earlier in section 3.1. that led me to include the percent difference in addition to the monetary change.

The impact of *Total Bedrooms* and *Total Baths* was very surprising. These two should be highly correlated and both should align closely with the other proxy for the size of the house: *Sq Ft Living.* Even though Model Two shows contradictory signs for *Total Bedrooms* and *Total Baths,* both variables are closely correlated (0.6601). The exact cause of these contradictory signs is unknown.

The last significant variable in this model the binary variable for a private pool. As expected, the presence of a private pool makes it much less likely to negotiate large discounts indicating that sellers and buyers recognize the value a private pool adds to a home and negotiate accordingly.

With an $R^2 = 0.366$ this model accounts for a large portion of the stochasticity in the data and the model itself seems the fit the data considerably better than model 1. Additionally, the P-value for the F-statistic is 0, therefore, while some of the proxies may be insignificant, the model itself is highly significant.

4.5. Joint Significance Tests

Due to the presence of several seemingly insignificant coefficients in the OLS regressions, I conduct joint significance tests to determine if certain groups of proxies contribute anything to the explanatory power of the models. A joint significance test uses two regressions, a restricted regression and an unrestricted (original) one. The test then determines if the proxies removed from the unrestricted regression make a statistically significant difference in the explanatory power of the model, or if the increase in explanatory power was just due to chance. Equation 5 and the key below show the mathematical basis for the tests (Dougherty, 2011: 180).

(5) $$\mathrm{F}(m-k, n-m) = \frac{(RSS_k - RSS_m)/(m-k)}{SSR_m/(n-m)}$$

Where, RSS_k is the residual sum of squares of the restricted regression, RSS_m is the residual sum of squares for the unrestricted regression, *m* is the number of parameters in the unrestricted regression, *k* represents the number of parameters in the unrestricted regression, and *n* represents the total number of observations in the dataset.

Table 5 shows the results of the joint significance test carried out on the five main groupings of variables in Specification 2 of Model One.

Table 5: Model One Joint Significance Tests

Significance of groupings of variables in Model One Specification 2

Restricted Variables	F-Statistic	F Critical Value (1% level)	Significance
Terms of Sale	13.48	3.80	Significant
Temporal	28.34	4.63	Significant
Financial	694.28	3.80	Significant
Administrative	0	2.66	Not Significant
Hedonic	17.00	2.34	Significant

F critical values from (Dougherty, 2011)

As expected, most groupings in Model One are significant, however there two F-statistics of note in Table 5: Financial and Administrative. These two F-statistics are interesting for two very different reasons. The F-statistic for the Financial grouping is extremely large, indicating that this grouping of variables would be significant at even the 0.1% level. However, the second grouping, Administrative, has an F-Statistic of 0, meaning it is not significant at any significance level. The Residual Sum of Squares for the regression restricting the Administrative grouping yields the same value as the Residual Sum of Squares for the unrestricted regression, which meant that the F-Statistic of the administrative grouping equals zero.

The lack of significance in the Administrative variable grouping is not entirely unexpected. The administrative grouping contains all the List Type variables which were noted earlier in the paper for being insignificant in almost every specification. I initially included these variables in the models because I hypothesized that they would determine

agent motivation. Agents who are more motivated should be more aggressive when it comes to house price negotiations. The lack of significance implies one of two things: either List Type is a poor proxy for agent motivation, or agent motivation has little impact on the change in the price of a home.

Like Model One, not every proxy in Model Two is significant. I examine the same groupings of variables using joint significance tests to determine if each grouping of proxies significantly impacts the explanatory power of the model. Table 6 shows the results of the joint significance test for the grouping of variables in Specification 4 of Model Two. Unlike the previous joint significance test, all major groupings are significant, including the Administrative grouping of variables.

Table 6: Model Two Joint Significance Tests

Significance of groupings of variables in Model Two Specification 4

Restricted Variables	F-Statistic	F Critical Value (1% level)	Significance
Terms of Sale	4.72	3.80	Significant
Temporal	36.28	4.63	Significant
Financial	5.82	3.80	Significant
Administrative	11.26	2.66	Significant
Hedonic	4.87	2.34	Significant

F critical values from (Dougherty, 2011)

The change in the significance of the Administrative grouping of variables between Table 5 and Table 6 indicates that the List Type variables are much more significant regarding direct price movement than the percentage price movement. The list

type *Right w/Exceptions* rises two significance levels from Model One. The joint significance of the Administrative grouping may just reflect that internal change in significance of that variable.

5. CONCLUSION

Based on the results of these regressions, the impact of a cash offer on a property is both significant and impactful. Model One's cash coefficient shows a 0.7691% decrease in the price of a house. However, the R^2 for this second model is very low at 0.0384, implying that this model does not fit the data well, and does not have as much explanatory power as model one.

The cash coefficient for Model Two however, shows that a cash offer will yield approximately a $5673.76 decrease in the price of a house between the offer on the property and the sale of the property. Taken in conjunction with the average house price of $503,710, the monetary discount translates into a 1.13 percentage discount. Additionally, the coefficient for cash offers is highly significant and impactful regarding the percent change in price.

Additionally, FHA terms of sale might offer a discount almost equal to cash offers. The regression coefficient for FHA terms in Model Two is -5354.27, which implies that an offer on a house that utilizes an FHA loan could negotiate the price of the house down $5354.27 between the buyers offer and the time the house finally sells.

There are a few variables that would have greatly benefitted this model if the data was easier to gather. Unfortunately, the model does not include a proxy for school districts or schools because of insufficient data documenting elementary, middle, and

high schools in the MLS dataset. I believe this information is very important however and a more extensive study should include this data as a variable since many home buyers may consider homes near a highly rated school more seriously.

Regarding the results of this regression, I recommend home buyers consider offering cash if they are able. If a home buyer has just enough cash saved to buy a house, but not enough cash to buy both a house and continue to cover her expenses, that buyer could purchase the house for cash anyway to obtain the potential discount. She can then seek out a reverse mortgage on the house so that she can "have her cake and eat it too," getting the potential $5673.76 discount for paying cash while also not tying up all her liquidity in home equity. However, buyers should be careful not assume that a cash offer will yield the excessive discounts of 12-20 percent found in previous studies.

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