

FHFA STAFF WORKING PAPER SERIES



Are Appraisal Management Companies Value-Adding? – Stylized Facts from AMC and Non-AMC Appraisals

Jessica Shui
Shriya Murthy

March 2018

Working Paper 18-01

FEDERAL HOUSING FINANCE AGENCY
Division of Housing Mission & Goals
Office of Policy Analysis & Research
400 7th Street SW
Washington, DC 20219, USA

Many thanks to Andy Leventis and members of FHFA’s Research Oversight Committee for their support and comments that greatly improved this research, as well as to Bob Witt and Sam Frumkin for sharing their expertise.

Federal Housing Finance Agency (FHFA) Staff Working Papers are preliminary products circulated to stimulate discussion and critical comment. The analysis and conclusions are those of the authors and do not necessarily represent the views of the Federal Housing Finance Agency or the United States.

**Are Appraisal Management Companies Value-Adding?
– Stylized Facts from AMC and Non-AMC Appraisals**

Jessica Shui and Shriya Murthy
FHFA Staff Working Paper 18-01
February 2018

Abstract

In this paper, we study whether there are any systematic quality differences between appraisals associated and unassociated with appraisal management companies (AMCs). We find that compared to non-AMC appraisals, AMC appraisals on average share a similar degree of overvaluation despite being more prone to contract price confirmation and super-overvaluation. AMC appraisals also share a similar propensity for mistakes, despite employing a greater number of comparable properties. Our evaluation employs relatively simple statistical comparisons, but the results indicate no clear evidence of any systematic quality differences between appraisals associated and unassociated with AMCs.

Keywords: appraisal management company, appraisal, appraiser, quality, Home Valuation Code of Conduct

JEL Classification: G21 · L85 · R3

Jessica Shui
Federal Housing Finance Agency
Office of Policy Analysis & Research
400 7th Street SW
Washington, DC 20219, USA
jessica.shui@fhfa.gov

Shriya Murthy
Federal Housing Finance Agency
Office of Policy Analysis & Research
400 7th Street SW
Washington, DC 20219, USA
shriya.murthy@fhfa.gov

1 Introduction

Appraisal management companies¹ gained prevalence after the recent financial crisis as intermediaries with the ability to prevent lenders from directly pressuring appraisers—thereby improving appraisal quality and adding value to the appraisal industry. Whether they have realized such potentials is now a growing debate. AMC advocates believe that in addition to acting as firewalls between lenders and appraisers, AMCs contribute a quality assurance step to the appraisal process. Some advocates may believe additionally that the thriving of AMCs represents an increasing specialization of appraisal management and appraisal services.² Each of these circumstances would lead to consumers acquiring less biased and better quality appraisal reports and consequently to lenders achieving reduced credit risk as well as reduced management time and effort. Those on the other side of the debate believe that AMCs offer no quality assurance contribution and in fact tend to hire the least expensive rather than the most suitable appraisers. They also claim that AMCs set unrealistic deadlines, effectively rushing appraisal reports. Under these circumstances, rather than having higher quality appraisals, AMCs could in fact reduce the overall quality of appraisals, and in doing so, increase credit risk in the long run. Opponents also cite the fact that because AMCs take a cut of prevailing appraisal fees, their prevalence has caused and will continue to cause an appraiser shortage, the result of which, *ceteris paribus*, is increasing appraisal costs for future borrowers.

The need for a lender-apraiser firewall has been documented in a number of papers. Research has highlighted that appraisers face pressure from lenders. Such pressure along with other factors have led to some appraisers viewing themselves more as price validators than as independent evaluators (Appraisal Institute (1997); Smolen and Hambleton (1997); Lentz and Wang (1998); Wolverton and Gallimore (1999); and Murray (2010)). If AMCs serve successfully as firewalls, they should be able to correct the established appraisal confirmation bias and lower the degree of overvaluation.³

The second main way in which AMCs can theoretically increase appraisal quality is by serving as a fresh pair of eyes. An appraiser may be unable to catch many of her own mistakes; working autonomously, those mistakes could go undiscovered. An AMC can implement a review process to identify errors and inconsistencies and improve the overall quality.

¹ Appraisal management companies are intermediary platforms between lenders and appraisers. Specifically, they receive real estate appraisal requests from lenders on whose behalf they contract with one or more independent appraisers to perform appraisal services. They ultimately take a cut of the appraisal fees paid by lenders to appraisers. From an operational perspective, AMCs complete administrative tasks such as taking and assigning appraisal orders, supervising the appraisal process, reviewing, verifying, and delivering appraisal reports, collecting fees, and compensating appraisers.

² We should observe AMC appraisal quality increase over time if such specialization happens.

³ Both are well documented in previous literature (Baum et al. (2002); Fout and Yao (2016); and Calem et al. (2015)).

In this paper, we study whether there is any systematic difference in quality between appraisals associated and unassociated with AMCs. Ideally, we would compare two appraisal reports written at the same time for the same house by the same appraiser, one associated with a typical AMC and one not. We do not directly observe this ideal scenario in our dataset, of course; instead, we approach it by employing data filtering to construct two comparable samples with similar average property characteristics. In order to keep our analysis at a high level, we mainly utilize fundamental mean comparisons as opposed to regression techniques. While this may mean that our results are by nature not definitive, we believe they are reliable and strongly suggestive; both the aforementioned data filtering and the data slicing in our sensitivity analyses serve as effective controls. Furthermore, by exhibiting and comparing results from analyses before and after data filtering, we explicitly assess the extent to which some differences in the types of properties appraised may explain cross-sectional differences in appraisal quality.

We start with a dataset containing appraisal information associated with loan applications submitted to one of the largest Government-sponsored Enterprises from the fourth quarter of 2012 through the first quarter of 2016. Containing a unique flag indicating AMC association or the absence of such, it enables us to directly compare AMC and non-AMC appraisals. We focus on a set of relevant quality measures whose construction methodology we adopt from Shui and Murthy (2017).

One *caveat* to mention is that our set of measures is certainly not universal. It is a subset of the relevant measures that might be constructed using the information available and particularly addresses valuation-related anomalies⁴ and technical mistakes. Future research is warranted to refine existing and construct new quality measures so that finer differences between AMC and non-AMC appraisals can be captured.

A straightforward comparison of AMC and non-AMC appraisals in this subset reveals that they involve a similar average degree of overvaluation and frequency of mistakes, but that AMC appraisals are more prone to contract price confirmation and extreme levels of overvaluation, despite tending to use a significantly greater number of comparable properties. Any of these results may be influenced by possible selection bias, however. For example, the types of properties appraised by AMCs may be fundamentally different from the types appraised by independent appraisers—and if the former tend to be more difficult to appraise, AMC appraisals are potentially subject to greater overvaluation. It is also possible that appraisers who work for AMCs exclusively are fundamentally different from others.

⁴ One such tracked “anomaly” is the presence of contract price confirmation, i.e., valuation at exactly the contract price. Consistent with existing literature (Calem et al. (2015)), we treat this as problematic.

To control for various types of selection bias, we further refine our subset by restricting it to appraisals associated with appraisers who have completed at least 20 AMC and 20 non-AMC appraisals per year over the years of our sample. Under this control, we find similar results with smaller magnitudes. We also explore the effects of competitiveness and seasonality and our results remain robust.

It is worth mentioning that we observe neither a universe of appraisers nor a comprehensive portfolio for any given appraiser represented in our sample. As for the latter, many of our statistics serve as lower-bound estimates. One such statistic is the number of AMC appraisals performed by an appraiser per year.

The remainder of this paper is organized as follows. In Section 2, we briefly review the background of appraisal management companies as well as the existing literature concerning appraisers and appraisals. Section 3 describes the data and subsamples. Section 4 presents results and robustness checks. Section 5 provides our conclusions.

2 Background

2.1 Background of the Appraisal Management Company

AMCs have existed since the late 1960s, but did not become key players in the home valuation industry until the recent housing bubble, when complaints about appraisers being pressured with the insecurity of future business⁵ to purposely confirm or exceed the contract price (such that there is no impediment to loan origination) became widespread. These complaints led to New York Attorney General Andrew Cuomo, Fannie Mae and Freddie Mac,⁶ and the Federal Housing Finance Agency jointly issuing the Home Valuation Code of Conduct (HVCC) in May of 2009. In the interest of establishing appraiser independence, HVCC mandated that, while lenders and parties acting on behalf of the lender may request additional information relating to the appraisal or to the appraiser's basis for a particular valuation, as well as the correction of "objective factual errors," neither may attempt to influence the development of an appraisal report.⁷ It also mandated that neither the staff involved in loan production itself nor those parties who hold a personal interest in the closing of a loan (such as mortgage brokers) may be involved in selecting or communicating with appraisers, adding that lenders must be able to demonstrate the employment of "prudent safeguards" to segregate loan production from collateral evaluation.

⁵ Such pressure may come from (for example) lenders, mortgage brokers, or real estate agents.

⁶ Together Fannie Mae and Freddie Mac are known as the Enterprises.

⁷ See https://www.fhfa.gov/Media/PublicAffairs/Documents/HVCCFinalCODE122308_N508.pdf.

Following the implementation of HVCC, lenders searched for ways to achieve and to demonstrate the segregation it required and turned increasingly to using appraisal management companies to this end. This suggests that their potential to act as a firewall between loan origination and collateral evaluation, outweighing their other reputed value additions, ultimately caused AMCs to flourish.⁸

This trend brought a considerable amount of anxiety to the appraiser community, however. The U.S. Government Accountability Office (GAO) reported that, according to mortgage industry participants, AMCs “typically charge lenders about the same amount that independent fee appraisers would charge lenders when working with them directly” and absorb at least 30 percent of this fee.⁹ Many appraisers believe that as a result of this, an appraiser’s marginal compensation per appraisal has generally fallen with the rise of AMCs and exacerbated a long-term decline in the number of appraisers.¹⁰

The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, addressing appraisal activities among a host of topics, replaced the HVCC and to some extent responded to the concerns that arose from it. Having established appraisal independence requirements consistent with those established by its predecessor, the act decreed that fees paid to appraisers must be “at a rate that is customary and reasonable.”¹¹ Separately from the discussion of reasonable fees, it also established AMC “minimum requirements,” such as that an AMC must register with the state(s) in which it operates, employ only licensed and certified appraisers, and ensure that all appraisals are performed independently and without influence or coercion.¹²

2.2 Research on Appraisers’ Institutional Incentives

There is a rich body of literature related to appraisers’ institutional incentives. Many studies have documented that appraisers perceive themselves more as price validators than as third party evaluators as a result of lender pressure (Appraisal Institute (1997); Smolen and Hambleton (1997); Wolverton and Gallimore (1999)). The basis for this lies in the institutional setting that appraisers are independent contractors and must maintain a good relationship with lenders in order

⁸ In July of 2011, the U.S. Government Accountability Office (GAO) reported that “between 60 and 80 percent of appraisals are currently ordered through AMCs, compared with less than half before HVCC went into effect in 2009” and that “some lenders incorrectly believed they were required to use AMCs in order to be in compliance with HVCC,” according to appraisal industry participants.

⁹ See the previous footnote.

¹⁰ For more details, see https://www.washingtonpost.com/realestate/need-an-appraisal-right-away-it-may-cost-more-than-you-d-expect/2016/09/12/5ce8fa98-790c-11e6-bd86-b7bbd53d2b5d_story.html?utm_term=.5e0f58107eed.

¹¹ For more details, see 15 USC § 1639(e) (Dodd-Frank Wall Street Reform and Consumer Protection Act § 1472): <https://www.congress.gov/111/plaws/publ203/PLAW-111publ203.pdf>.

¹² See 12 USC § 3353 (Dodd-Frank Act § 1124).

to secure future business (Lentz and Wang (1998); Murray (2010)). Loss of appraiser objectivity often results in well-documented confirmation bias and overvaluation. Research has found that confirmation bias is even more severe at specific LTV notches; information loss can be so severe that appraisals are sometimes less informative than automated valuation models (Calem et al. (2015) and Fout and Yao (2016)). It has also shown that appraisals are over-smoothed and that a significant number of appraisers are unable to reflect time- and price-sensitive information due to search frictions (Baum et al. (2002)). All of these lead to increased credit risk for lenders.

There are but a few studies specifically related to the impacts of AMC usage and HVCC. Ding (2014) and GAO (2011) highlight that the proliferation of the former is one direct impact of the latter. Calem et al. (2015) find that appraisals associated with AMCs are less prone to contract price confirmation than other appraisals. It is not hard to explain why our analysis shows the opposite result (that AMC appraisals are more prone to contract price confirmation than non-AMC appraisals are) given the following two reasons. First, their sample is altogether different from ours, especially in terms of the time period covered.¹³ Second, their result demonstrates that the gap between AMC and non-AMC appraisals in the likelihood of contract price confirmation has narrowed over time; following this trend, it is possible that with the proliferation of AMCs since the time period of their sample, AMC quality has deteriorated and this gap has narrowed further and reversed.¹⁴

One main concern regarding AMCs is that they take a cut of the prevailing appraisal fees they charge lenders, leaving appraisers with substantially less than what they would get were they working independently. Recently, there have been a significant number of reports on this lower appraiser compensation resulting in appraiser shortages, which in turn lead to delayed closings and rush fees that increase costs to homebuyers.¹⁵

¹³ Calem et al. (2015) employ 800,000 appraisals completed from 2007 through early 2012. As we will mention in our data section, our full sample contains roughly 5.3 million appraisals from the last quarter of 2012 through the first quarter of 2016; our sample restricted to “full-time” appraisers contains about 1.6 million appraisals.

¹⁴ Specifically, Calem et al. (2015) find that in 2009, “AMC appraised values were about 80 percent as likely to be identical to the contract price, as appraised values were submitted by appraisers who were hired directly by the lender.” However, they also illustrate that the gap has narrowed over time.

¹⁵ One such report can be found at https://www.washingtonpost.com/realestate/need-an-appraisal-right-away-it-may-cost-more-than-you-d-expect/2016/09/12/5ce8fa98-790c-11e6-bd86-b7bbd53d2b5d_story.html?utm_term=.5e0f58107eed.

3 Data and Methodology

We employ a subset of the Uniform Appraisal Dataset, gathered by the Enterprises through the Uniform Collateral Data Portal (UCDP), to conduct our analysis. Our subset consists of active appraisal records associated with loan applications submitted to one of the largest Government-sponsored Enterprises from the last quarter of 2012 to the first quarter of 2016.¹⁶ It contains a unique flag that takes one of three values respectively corresponding to the presence of, the absence of, and uncertainty regarding AMC involvement in the appraisal: “AMC,” “non-AMC,” and “unknown.” This flag is formed from two possible fields; if a business unit field based on the UCDP login ID is unpopulated, the flag relies on a field containing an appraiser-supplied lender management name. Once we restrict our sample to purchase money mortgage appraisals,¹⁷ we are left with 6,207,742 records; of these, 62% are confidently identified as being associated with AMCs and 23% are confidently identified as being unassociated with AMCs. We keep only records in these two categories and filter out abnormalities¹⁸ to construct the “full sample” of our analysis. To be thorough, we also include in the appendix analysis results on appraisals associated with refinance mortgages.

Following the methodology described in Shui and Murthy (2017), we construct the following appraisal quality measures: *wrong attributes*, *failed to find*, *exact*, *percent overvaluation* and *super over*.¹⁹ We flag an appraisal as “*wrong attributes*” if it contains a mistake in any of three fields (the number of bathrooms, the number of bedrooms, and the square footage).²⁰ Similarly, we flag an appraisal as “*failed to find*” if the appraiser indicated in the report that she did not find any prior sales of the subject property within three years but we find such a prior sale in public record data. The latter three measures are also consistent with other existing literature (Ding (2014); Calem et al. (2015); and Ding and Nakamura (2016)). We capture confirmation bias by flagging an appraisal as “*exact*” if the appraisal value matches the contract price.²¹

¹⁶ We exclude appraisals associated with short sales or with foreclosed properties. We do not observe appraisals related to non-Enterprise mortgages—however, given that such appraisals are a very small portion of the mortgage market, we believe our data are representative.

¹⁷ We identify purchase-money mortgages as described in Shui and Murthy (2017).

¹⁸ For example, we exclude records with empty address fields or extreme values.

¹⁹ These are known respectively as *any_wrong*, *failed to find*, *exactly*, *gap_p*, and *super_over* in Shui and Murthy (2017).

²⁰ The criteria for determining that a given one of these three fields contains mistakes differs from Shui and Murthy (2017). In this paper, we compare the value for a given field to the values for that field in the appraisals associated with the directly-preceding and subsequent transactions of the subject property. For example, if the reported number of bathrooms for a subject property is one, but preceding and subsequent appraisals indicated that the number exceeded one, we flag the appraisal as having a mistake in the number of bathrooms.

²¹ We recognize that in some circumstances it might be reasonable for an appraiser to appraise at exactly the contract price. However, given the extraordinary frequency of contract price confirmation, it is difficult to view it as anything other than problematic. The same assumption and rationale applies to overvaluation and super-overvaluation—although cases will exist in which properties are appropriately given values well above the sales price, the relatively

“*Percent overvaluation*” reflects the percentage difference between an appraisal’s appraised value and its contract price.²² “*Super over*” indicates that such *percent overvaluation* equals or exceeds six percent.²³

Table 1 gives an overview of the purchase-money mortgage appraisal samples employed in our analysis. As mentioned above, the full sample contains those purchase-money mortgage appraisal records clearly associated or unassociated with an AMC; it contains roughly 5.33 million observations. The “main” sample consists of the “full” sample restricted to records associated with appraisers whose average number of purchase-money mortgage appraisals per year is at least 20 in AMC and non-AMC categories separately; in other words, our primary analysis focuses on appraisals performed by full-time appraisers²⁴ who perform appraisals both independently and for AMCs.

In order to explore the effects of AMC competitiveness, we create “group 1” through “group 4” from the main sample; we divide observations into four quartiles based on the count of unique AMCs per ZIP code. Group 1 is the portion of the main sample that consists of appraisals whose ZIP code contains a number of AMCs less than or equal to the 25th percentile, while group 4 is the portion that consists of appraisals associated with the most competitive ZIP codes. Table 2 gives AMC, appraisal, and appraiser counts for the average ZIP code in each of these latter four “competitiveness” samples.²⁵

As suggested in Table 1, we also construct variables that flag the quarter in which the appraisal was performed. This allows for an assessment of whether there is any seasonal pattern in the relationship between AMCs and relative performance.

high frequencies of overvaluation and super-overvaluation are troublesome and their occurrences are likewise difficult to view as anything but problematic.

²² We are aware that such a percentage difference can be positive or negative (or zero), but given that it overwhelmingly tends to be positive, we believe that the term “overvaluation” justifiably reflects its statistical nature.

²³ Both Ding (2014) and Ding and Nakamura (2016) define a significantly high appraisal as an appraisal whose appraised value is higher than its contract price by five percent or more—in other words, as an appraisal whose percent overvaluation matches or exceeds five percent. We increase our threshold to six percent to be more conservative.

²⁴ Though we do not know definitively whether appraisers are working full time, we believe the restriction is a valid proxy.

²⁵ Less competitive areas are more likely to be rural areas. Properties in rural areas are generally more difficult to appraise as they have fewer comparable properties.

Table 1: Overview of Purchase-Money Mortgage Appraisal Samples

	Number of AMC Appraisals	Number of non-AMC Appraisals	Number of Appraisers
	(1)	(2)	(3)
Full Sample	3,706,217	1,624,561	66,830
Main Sample	858,688	718,099	4,504
Group 1 (least competitive)	212,875	186,122	4,407
Group 2	231,714	192,445	4,222
Group 3	198,729	167,672	3,458
Group 4 (most competitive)	215,370	171,860	2,453
Quarter 1	222,392	183,775	4,501
Quarter 2	235,692	198,336	4,496
Quarter 3	219,223	185,945	4,499
Quarter 4	181,381	150,043	4,496

Notes: Table 1 gives an overview of the samples employed in our analysis of purchase-money mortgage appraisals. The “main” sample is the “full” sample restricted to appraisals performed by an appraiser whose average number of purchase-money mortgage appraisals per year is at least 20 in AMC and non-AMC categories separately. Hence, the number of appraisers represented among AMC records and among non-AMC records is identical in the main sample; it is comparable in the remaining eight samples, which are based on the main sample.

Table 2: Per ZIP Code Statistics for Purchase-Money Mortgage Competitiveness Samples

	Average Number of AMCs Per ZIP Code	Average Number of Appraisals Per ZIP Code	Average Number of Appraisers Per ZIP Code	Average Appraisals to Appraiser Ratio Per ZIP Code
	(1)	(2)	(3)	(4)
Group 1 (least competitive)	11.49	89.46	11.11	12.90
Group 2	24.12	218.08	23.82	16.02
Group 3	34.86	383.60	35.61	17.11
Group 4 (most competitive)	57.50	866.67	72.20	16.30

Notes: Table 2 gives some per ZIP code statistics for each of the four purchase-money mortgage samples constructed to explore the effects of AMC competitiveness. Samples are based on the main sample, which is restricted to appraisals performed by an appraiser whose average number of purchase-money mortgage appraisals per year is at least 20 in AMC and non-AMC categories separately.

4 Results

We conduct a straightforward comparison of the AMC and non-AMC averages of a handful of key variables in a given sample. We focus on those variables, shown in Table 3, that we believe are essential to our study and that are sufficiently populated. Such variables can be placed into three categories: appraised value and prices,²⁶ basic property characteristics,²⁷ and appraisal quality measures.²⁸ Basic property information helps us detect any potential selection bias, while a variety of appraisal quality measures helps us form a broad and unbiased view of the overall quality of AMC and non-AMC appraisals.

4.1 Main Results

Table 3 Columns 1 – 2 demonstrate the straightforward comparison. Four main takeaways include: 1) AMC and non-AMC appraisals share a similar average degree of overvaluation, as captured by the percentage gap between the appraised value and the contract price. 2) AMC and non-AMC appraisals share a similar propensity for mistakes. But 3) AMC appraisals are more prone to contract price confirmation and “super-overvaluation”; despite 4) employing a significantly greater number of comparable properties on average.²⁹

Regarding the third point, one might argue that there is obviously a selection problem. The propensity of AMC appraisals for super-overvaluation might be justified if AMC appraisals tend to be performed for properties that are harder to appraise, such as high-end, idiosyncratic houses. Columns 3 – 4 employ the main sample, which corrects for such selection bias by restricting the sample to appraisals performed by an appraiser whose average number of purchase-money mortgage appraisals per year is no less than 20 in AMC and non-AMC categories separately.³⁰ Results echo those described in Columns 1 – 2 but with AMC appraisals exceeding non-AMC appraisals in contract price confirmation and super-overvaluation by a smaller difference.³¹

²⁶ These include the valuation, the contract price, and the sales price.

²⁷ These include the number of bedrooms, the number of bathrooms, and the square footage.

²⁸ These include the number of comparable properties used, *wrong attributes*, *failed to find*, *exact*, *percent overvaluation*, and *super over*.

²⁹ Despite having performed t-tests to compare sample means, we choose to provide only the means and standard deviations of each sample and omit the standard errors of the mean estimates in our paper. Due to large sample sizes, almost all of the sample means are significantly different from each other.

³⁰ After restricting to “full-time” appraisers, the differences in property value and characteristics between AMC and non-AMC appraisals are smaller, as can be seen in Table 3.

³¹ It is possible that some AMCs require appraisals to be supported by a minimum number of comparable properties, which may explain our finding that AMC appraisals are associated with a greater number of comparable properties on average. Of course, it would not explain our finding that AMCs have a greater propensity for super-overvaluation.

Overall, we find little evidence that there are any systematic differences between AMC and non-AMC appraisals, except that AMC appraisals use a greater number of comparable properties and are subject to a slightly higher probability of contract price confirmation and super-valuation.

Table 3: Differences in AMC and Non-AMC Purchase-Money Mortgage Appraisals

		Full Sample		Main Sample	
		(1)	(2)	(3)	(4)
		AMC	Non-AMC	AMC	Non-AMC
Valuation	Mean	289,253.07	271,476.06	267,880.74	268,544.93
	SD	176,216.08	163,889.13	158,755.66	157,436.42
Contract Price	Mean	284,626.00	266,462.43	263,239.52	263,785.95
	SD	174,520.05	161,706.06	156,568.48	155,278.08
Number of Bathrooms	Mean	2.0385	2.0327	2.0662	2.0665
	SD	0.7099	0.7139	0.7218	0.7168
Number of Bedrooms	Mean	3.2609	3.2317	3.2772	3.2645
	SD	0.8012	0.7968	0.7977	0.7958
Square Footage	Mean	1,970.91	1,977.92	2,019.95	2,015.75
	SD	794.13	796.28	822.82	810.50
Number of Comps	Mean	5.3829	4.8072	5.2583	4.9401
	SD	1.2189	1.2893	1.2299	1.2649
Wrong Attributes	Mean	0.0131	0.0113	0.0113	0.0111
	SD	0.1135	0.1058	0.1056	0.1046
Failed to Find	Mean	0.0098	0.0089	0.0079	0.0082
	SD	0.0985	0.0940	0.0884	0.0904
Exact	Mean	0.2641	0.2267	0.2395	0.2256
	SD	0.4408	0.4187	0.4268	0.4180
Percent Overvaluation	Mean	0.0222	0.0244	0.0224	0.0227
	SD	0.0720	0.0690	0.0665	0.0643
Super Over	Mean	0.0105	0.0081	0.0089	0.0079
	SD	0.1019	0.0897	0.0938	0.0884
		<i>N</i>	<i>3,706,217</i>	<i>1,624,561</i>	<i>858,688</i>
		<i>718,099</i>			
Sales Price	Mean	279,331.16	251,703.17	251,421.45	249,758.54
	SD	163,014.99	147,923.54	142,020.89	142,224.41
		<i>N</i>	<i>1,382,313</i>	<i>632,247</i>	<i>309,268</i>
					<i>260,216</i>

Notes: Table 3 reports the differences in appraisals associated and unassociated with AMCs for two samples: the unrestricted full sample and the main sample, which is restricted to appraisals performed by an appraiser whose average number of purchase-money mortgage appraisals per year is at least 20 in AMC and non-AMC categories separately.

4.2 Competitiveness

Even though there is no clear evidence of any systematic quality difference between AMC and non-AMC appraisals, it is still possible that AMC appraisals outperform non-AMC appraisals in certain types of markets. For example, in a very competitive market, only AMCs good at building relationships with clients and securing business will survive; such AMCs will attract appraisers who want to concentrate on appraising and not on forming business-client relationships. If that is indeed the case, we should see that AMC appraisals are higher in quality than non-AMC appraisals in more competitive areas.

To test this, we employ the main sample divided into quartiles based on the total number of unique AMCs in each ZIP code during our sample period. Group 1 comprises records of the least competitive ZIP codes; group 4 the most. As before, the only significant difference we find between AMC and non-AMC appraisals is that AMC appraisals tend to use a greater number of comparable properties and are subject to a slightly higher probability of super-overvaluation and contract price confirmation.

As shown in Table 4, greater demand is correlated with lower degrees of overvaluation and super-overvaluation, a higher number of comparable properties employed, and a lower likelihood of mistakes; areas with a greater number of AMCs tend to see these trends. Additionally, the likelihood of contract price confirmation is lower in the most competitive areas compared to less competitive areas.³² All of these observations are consistent with the view that competition may have a positive effect on the quality of appraisals.

While this series of analyses yields some interesting insights, in general our results do not show systematically clear differences between AMC and non-AMC appraisals. We find no evidence overall that AMC appraisals are of higher quality than non-AMC appraisals or vice versa.³³ A similar series on appraisals associated with refinances yields similar results (refer to appendix).

³² Contract price confirmation declines from the second most to the most competitive ZIP cluster, though it rises from the least to the second-least competitive.

³³ We additionally perform a robustness check employing ZIP code Herfindahl-Hirschman Index values in place of ZIP code AMC counts and indeed find our results to be robust (refer to Appendix Table 6).

Table 4: Market Competitiveness and Differences in AMC and Non-AMC Purchase-Money Mortgage Appraisals

		Group 1: Least Competitive ZIPs		Group 2		Group 3		Group 4: Most Competitive ZIPs		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
		AMC	Non-AMC	AMC	Non-AMC	AMC	Non-AMC	AMC	Non-AMC	
Valuation	Mean	247,115.10	244,642.84	253,930.34	256,832.14	273,268.58	278,148.82	298,443.34	298,176.44	
	SD	171,299.53	167,142.45	155,338.34	156,047.02	151,987.95	152,734.48	150,367.48	146,782.41	
Contract Price	Mean	241,784.27	239,351.14	249,362.64	252,184.07	268,902.34	273,551.69	294,150.92	293,712.25	
	SD	169,317.18	165,402.40	153,212.39	153,897.49	149,784.39	150,341.14	147,636.52	144,082.10	
Number of Bathrooms	Mean	1.8307	1.8411	1.9451	1.9620	2.0866	2.0980	2.4103	2.3967	
	SD	0.6699	0.6685	0.6792	0.6824	0.6658	0.6708	0.7341	0.7246	
Number of Bedrooms	Mean	3.1093	3.1016	3.1951	3.1925	3.2786	3.2777	3.5301	3.5087	
	SD	0.7647	0.7590	0.7703	0.7720	0.7868	0.7956	0.8065	0.8020	
Square Footage	Mean	1,789.38	1,792.56	1,875.28	1,893.80	2,017.55	2,032.48	2,405.70	2,377.70	
	SD	701.46	700.10	753.75	758.60	778.47	784.40	904.83	876.06	
Number of Comps	Mean	5.1984	4.8061	5.2403	4.8896	5.2602	5.0066	5.3351	5.0771	
	SD	1.2580	1.3014	1.2388	1.2790	1.2287	1.2438	1.1887	1.2102	
Wrong Attributes	Mean	0.0120	0.0117	0.0112	0.0110	0.0114	0.0114	0.0105	0.0100	
	SD	0.1089	0.1077	0.1054	0.1045	0.1061	0.1062	0.1021	0.0996	
Failed to Find	Mean	0.0084	0.0086	0.0094	0.0098	0.0088	0.0095	0.0048	0.0049	
	SD	0.0911	0.0925	0.0967	0.0985	0.0933	0.0968	0.0694	0.0695	
Exact	Mean	0.2397	0.2340	0.2499	0.2386	0.2512	0.2305	0.2172	0.1970	
	SD	0.4269	0.4234	0.4330	0.4262	0.4337	0.4212	0.4124	0.3978	
Percent Overvaluation	Mean	0.0306	0.0308	0.0232	0.0232	0.0195	0.0197	0.0161	0.0165	
	SD	0.0810	0.0796	0.0682	0.0653	0.0602	0.0575	0.0518	0.0480	
Super Over	Mean	0.0112	0.0101	0.0109	0.0099	0.0090	0.0076	0.0043	0.0034	
	SD	0.1054	0.1001	0.1038	0.0991	0.0943	0.0870	0.0654	0.0580	
		<i>N</i>	212,875	186,122	231,714	192,445	198,729	167,672	215,370	171,860
Sales Price	Mean	249,003.92	242,377.95	243,958.32	243,120.30	258,079.82	260,438.41	262,488.49	266,319.28	
	SD	156,526.29	152,698.22	137,708.27	137,395.13	133,669.66	137,511.00	128,886.40	130,477.91	
	<i>N</i>	97,438	87,598	96,813	80,769	71,407	57,542	43,610	34,307	

Notes: Table 4 reports the differences in appraisals associated and unassociated with AMCs for the main sample divided into four quartiles based on ZIP code AMC counts. The main sample is restricted to appraisals performed by an appraiser whose average number of purchase-money mortgage appraisals per year is at least 20 in AMC and non-AMC categories separately.

4.3 Seasonality

Although our main and competitiveness analyses suggest that there is no overall difference between the quality of AMC and non-AMC appraisals, it is still possible that a seasonal effect exists. If AMCs are particularly good at streamlining the appraisal process, they might be better able to maintain the quality of their appraisals during busy seasons than self-supporting, unallied appraisers, who, like all other professionals, are more prone to mistakes when they are overwhelmed. In this case, AMC appraisals will demonstrate significantly higher quality than non-AMC appraisals during the busy season.

To test for a seasonality effect, we employ the main sample divided into four samples based on quarter. As shown in Table 5, quarter two is the busiest, followed by quarters three, one, and finally four. Each individual season echoes our aforementioned main results; seasonality does not appear to affect the performance of AMC appraisals relative to non-AMC appraisals. However, there are some interesting seasonal patterns regardless of AMC association.

First of all, the second quarter shows lower degrees of overvaluation and super-overvaluation while the fourth quarter shows higher degrees of the same. Secondly, in contrast, the tendency for contract price confirmation is higher in the second quarter and lower in the fourth. Thirdly, mistakes in house attributes as well as in recent historical sales information are more likely in the second quarter.

The second and third observations are expected and easily explained: an increase in workload causes people to make more mistakes and to look for time-saving shortcuts; in the context of appraisals, shortcuts may include contract price confirmation. The first observation is a little trickier to rationalize. It is possible that busy seasons see more high-end houses on the market, broadening the availability of relevant comparable properties for high-end subject properties and reducing the potential for (super-)overvaluation.

Table 5: Seasonality and Differences in AMC and Non-AMC Purchase-Money Mortgage Appraisals

		Quarter 1 Sample		Quarter 2 Sample		Quarter 3 Sample		Quarter 4 Sample	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		AMC	Non-AMC	AMC	Non-AMC	AMC	Non-AMC	AMC	Non-AMC
Valuation	Mean	266,410.31	266,409.33	270,522.62	271,696.93	266,570.40	267,211.71	267,834.42	268,646.37
	SD	158,740.80	157,503.42	159,701.22	158,672.82	157,214.16	155,675.66	159,352.32	157,818.09
Contract Price	Mean	261,735.99	261,582.88	266,503.75	267,469.88	261,959.25	262,458.83	262,388.77	263,259.30
	SD	156,530.06	155,410.50	157,825.41	156,685.91	154,952.69	153,407.98	156,857.87	155,466.65
Number of Bathrooms	Mean	2.0813	2.0824	2.0655	2.0583	2.0530	2.0543	2.0644	2.0729
	SD	0.7215	0.7162	0.7179	0.7142	0.7185	0.7141	0.7307	0.7238
Number of Bedrooms	Mean	3.2817	3.2732	3.2849	3.2654	3.2697	3.2545	3.2706	3.2650
	SD	0.7987	0.7942	0.7962	0.7949	0.7935	0.7961	0.8035	0.7986
Square Footage	Mean	2,024.53	2,024.67	2,028.39	2,018.14	2,008.59	2,002.04	2,017.11	2,018.67
	SD	825.39	814.49	822.88	810.73	815.56	804.54	828.15	812.48
Number of Comps	Mean	5.2951	4.9701	5.2497	4.9377	5.2305	4.9104	5.2580	4.9434
	SD	1.2398	1.2831	1.2242	1.2560	1.2222	1.2538	1.2334	1.2669
Wrong Attributes	Mean	0.0100	0.0100	0.0128	0.0122	0.0116	0.0112	0.0105	0.0107
	SD	0.0997	0.0995	0.1123	0.1097	0.1072	0.1052	0.1019	0.1031
Failed to Find	Mean	0.0078	0.0080	0.0088	0.0092	0.0075	0.0084	0.0072	0.0071
	SD	0.0880	0.0890	0.0934	0.0952	0.0862	0.0912	0.0845	0.0840
Exact	Mean	0.2369	0.2212	0.2572	0.2454	0.2397	0.2253	0.2193	0.2050
	SD	0.4252	0.4151	0.4371	0.4303	0.4269	0.4178	0.4138	0.4037
Percent Overvaluation	Mean	0.0228	0.0237	0.0194	0.0200	0.0220	0.0223	0.0263	0.0258
	SD	0.0672	0.0666	0.0633	0.0606	0.0648	0.0622	0.0713	0.0686
Super Over	Mean	0.0091	0.0080	0.0080	0.0068	0.0083	0.0080	0.0105	0.0091
	SD	0.0949	0.0889	0.0889	0.0820	0.0906	0.0889	0.1020	0.0949
		<i>N</i>	<i>183,775</i>	<i>235,692</i>	<i>198,336</i>	<i>219,223</i>	<i>185,945</i>	<i>181,381</i>	<i>150,043</i>
Sales Price	Mean	250,869.36	248,775.02	256,203.37	255,858.69	249,119.59	246,675.26	248,705.80	246,509.79
	SD	142,479.05	143,504.36	143,352.57	143,469.53	139,979.38	139,911.37	142,093.16	141,673.93
		<i>N</i>	<i>76,989</i>	<i>85,330</i>	<i>73,839</i>	<i>81,024</i>	<i>68,943</i>	<i>65,925</i>	<i>54,016</i>

Notes: Table 5 reports the differences in appraisals associated and unassociated with AMCs for two samples: the unrestricted full sample and the main sample, which is restricted to appraisals performed by an appraiser whose average number of purchase-money mortgage appraisals per year is at least 20 in AMC and non-AMC categories separately.

5 Conclusion

Appraisal management companies became prominent largely due to their nature as intermediaries that prevent lenders from directly pressuring appraisers to “facilitate” transactions, but this function was only intended to be the means to an end—a means of approaching unbiasedness in appraisals. Simply playing the firewall is not all an AMC can do to improve appraisals; there is still the matter of quality assurance. An accurate, well-documented appraisal cannot support an inflated valuation.

In this paper, we specifically study the differences in quality between appraisals associated and unassociated with appraisal management companies. Our analysis indicates that, when compared to non-AMC appraisals, AMC appraisals generally demonstrate a similar degree of overvaluation. At the same time, AMC appraisals are seen to be more prone to contract price confirmation and super-overvaluation. Beyond valuation statistics, AMC and non-AMC appraisals seem to share a similar propensity for mistakes, a somewhat-unexpected finding given that the former tend to use a greater number of comparable properties.³⁴

Our research has two main policy implications. In the first place, AMCs can be more effective, specifically in fulfilling their roles as firewalls and in implementing quality assurance—a main administrative function that also happens to be crucial to the objective that prompted their expansion. Secondly, borrowers’ access to credit may be affected by this lack of effectiveness in the long run. Some would argue that because AMCs take a cut of prevailing appraisal fees and decrease appraisers’ take-home pay, their growing prevalence may have contributed to an appraiser shortage. This shortage could lead to increased costs and growing timelines for appraisals in the future.

Although our evaluation employs relatively basic statistical comparisons,³⁵ the results provide scant evidence of any systematic quality differences between appraisals associated and unassociated with AMCs. Future research can focus on the incentive and organizational structures of AMCs as well as on the network structure among AMCs and lenders. Such structures might have substantial impacts on appraisal quality.

³⁴ One might assume that a greater number of comparables would be correlated with a greater amount of appraiser effort, which in turn would be inversely correlated with the number of mistakes.

³⁵ We employ a set of appraisal quality measures that is not universal; similarly, we observe neither a universe of appraisers nor a comprehensive portfolio for any given appraiser represented in our sample, to the extent that many of our statistics serve as lower-bound estimates.

References

- Appraisal Institute, GAO Report Signals FHA Fraud, Mismanagement, and Abuse; Calls for Stricter Review, *Appraiser News in Brief*, 1997, 4:6, 1.
- Baum, A., Crosby, N., Gallimore, P., McAllister, P., & Gray, A. (2000). The influence of valuers and valuations on the workings of the commercial property investment market. In *Royal Institution of Chartered Surveyors/Investment Property Forum, London*.
- Calem, P. S., Lambie-Hanson, L., & Nakamura, L. I. (2015). Information losses in home purchase appraisals. Federal Reserve Bank of Philadelphia Working Paper 15-11.
- Diaz, J. (2009). How appraisers do their work: a test of the appraisal process and the development of a descriptive model. *Journal of Real Estate Research*.
- Ding, L. (2014). The Pattern of Appraisal Bias in the Third District During the Housing Crisis. Federal Reserve Bank of Philadelphia CDS&E Discussion Paper
- Ding, L., & Nakamura, L. (2016). The impact of the home valuation code of conduct on appraisal and mortgage outcomes. *Real Estate Economics*, 44(3), 658-690.
- Diskin, B. A., & Gatzlaff, D. H. (1994). An Examination of the Earnings of Real Estate Appraisers. *Journal of Real Estate Research*, 9(4), 507-524.
- Jenkins, D. H., Lewis, O. M., Almond, N., Gronow, S. A., & Ware, J. A. (1999). Towards an intelligent residential appraisal model. *Journal of Property Research*, 16(1), 67-90.
- Lentz, G., & Wang, K. (2009). Residential appraisal and the lending process: A survey of issues. *Journal of Real Estate Research*.
- Lins, M. P. E., de Lyra Novaes, L. F., & Legey, L. F. L. (2005). Real estate appraisal: A double perspective data envelopment analysis approach. *Annals of Operations Research*, 138(1), 79-96.
- Murray, J. K. (2009). Issues in Appraisal Regulation: The Cracks in the Foundation of the Mortgage Lending Process. *Loy. LAL Rev.*, 43, 1301.
- Pagourtzi, E., Assimakopoulos, V., Hatzichristos, T., & French, N. (2003). Real estate appraisal: a review of valuation methods. *Journal of Property Investment & Finance*, 21(4), 383-401.
- Shui, J., Murthy, S. (2017). Under What Circumstances do First-time Homebuyers Overpay? – An Empirical Analysis Using Mortgage and Appraisal Data. Federal Housing Finance Agency Working Paper 16-3.
- U.S. Government Accountability Office (GAO) (2011). Residential Appraisals: Opportunities to Enhance Oversight of an Evolving Industry. Available at www.gao.gov/new.items/d11653.pdf.

Wolverton, M., & Gallimore, P. (2009). Client Feedback and the Role of the Appraiser. *Journal of Real Estate Research*.

Appendix Table 1: Overview of Refinance Appraisal Samples

	Number of AMC Appraisals	Number of non-AMC Appraisals	Number of Appraisers
	(1)	(2)	(3)
Full Sample	3,069,739	688,570	64,153
Main Sample	347,760	221,985	2,952
Quarter 1	121,123	80,317	2,949
Quarter 2	83,680	56,777	2,947
Quarter 3	65,369	37,587	2,943
Quarter 4	77,588	47,304	2,947
Group 1 (least competitive)	92,110	60,712	2,882
Group 2	79,680	53,257	2,633
Group 3	86,255	55,555	2,286
Group 4 (most competitive)	89,715	52,461	1,537

Notes: Appendix Table 1 gives an overview of the samples employed in our analysis of refinance appraisals. The “main” sample is the “full” sample restricted to appraisals performed by an appraiser whose average number of refinance appraisals per year is at least 20 in AMC and non-AMC categories separately. Hence, the number of appraisers represented among AMC records and among non-AMC records is identical in the main sample; it is comparable in the remaining eight samples, which are based on the main sample.

Appendix Table 2: Per ZIP Code Statistics for Refinance Competitiveness Samples

	Average Number of AMCs Per ZIP Code	Average Number of Appraisals Per ZIP Code	Average Number of Appraisers Per ZIP Code	Average Appraisals to Appraiser Ratio Per ZIP Code
	(1)	(2)	(3)	(4)
Group 1 (least competitive)	8.03	33.01	7.47	6.26
Group 2	17.56	92.35	17.42	8.73
Group 3	26.48	154.07	27.22	8.49
Group 4 (most competitive)	43.92	288.53	40.66	9.31

Notes: Appendix Table 2 gives some per ZIP code statistics for each of the four refinance samples constructed to explore the effects of AMC competitiveness. Samples are based on the main sample, which is restricted to appraisals performed by an appraiser whose average number of refinance appraisals per year is at least 20 in AMC and non-AMC categories separately.

Appendix Table 3: Differences in AMC and Non-AMC Refinance Appraisals

		Full Sample		Main Sample	
		(1)	(2)	(3)	(4)
		AMC	Non-AMC	AMC	Non-AMC
Valuation	Mean	341,600.12	329,691.78	340,628.13	341,211.79
	SD	200,538.74	195,931.28	202,071.07	198,281.79
Predicted Contract Price	Mean	316,601.75	298,283.12	314,812.45	310,635.70
	SD	193,957.47	187,514.13	194,656.57	190,642.60
Previous Sales Price	Mean	254,273.86	246,518.36	255,864.29	255,402.58
	SD	171,939.56	167,927.54	173,132.38	170,497.10
Number of Bathrooms	Mean	2.0420	2.0130	2.0188	2.0144
	SD	0.6785	0.6939	0.6780	0.6863
Number of Bedrooms	Mean	3.3464	3.3111	3.3183	3.3145
	SD	0.7968	0.7998	0.7989	0.8034
Square Footage	Mean	1,979.07	2,002.07	1,978.69	1,997.39
	SD	762.13	791.34	776.60	791.39
Number of Comps	Mean	5.4437	4.8220	5.3533	4.9574
	SD	1.1615	1.2751	1.1427	1.2306
Wrong Attributes	Mean	0.0030	0.0021	0.0030	0.0024
	SD	0.0545	0.0463	0.0546	0.0486
Failed to Find	Mean	0.0121	0.0144	0.0110	0.0127
	SD	0.1094	0.1192	0.1044	0.1121
Percent Overvaluation	Mean	0.2021	0.2570	0.1978	0.2339
	SD	0.9106	1.0287	0.8744	0.9579
<i>N</i>		3,069,739	688,570	347,760	221,985

Notes: Appendix Table 3 reports the differences in appraisals associated and unassociated with AMCs for two samples: the unrestricted full sample and the main sample, which is restricted to appraisals performed by an appraiser whose average number of refinance appraisals per year is at least 20 in AMC and non-AMC categories separately.

Appendix Table 4: Market Competitiveness and Differences in AMC and Non-AMC Refinance Appraisals

		Group 1: Least Competitive ZIPs		Group 2		Group 3		Group 4: Most Competitive ZIPs	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		AMC	Non-AMC	AMC	Non-AMC	AMC	Non-AMC	AMC	Non-AMC
Valuation	Mean	265,156.98	277,590.15	318,083.85	324,373.00	356,618.99	357,460.98	422,762.47	414,726.54
	SD	183,093.38	184,816.63	197,314.27	196,063.27	201,165.51	197,882.06	192,576.56	188,910.45
Predicted Contract Price	Mean	232,871.01	237,867.59	288,413.78	289,737.96	332,769.70	330,630.74	405,122.55	394,889.23
	SD	166,208.05	167,087.10	184,459.84	182,822.58	191,995.89	189,538.32	192,032.01	188,186.73
Previous Sales Price	Mean	202,713.90	209,081.74	241,428.11	245,951.40	269,141.52	271,142.45	310,489.83	301,935.14
	SD	155,164.89	157,755.94	166,761.08	167,119.19	173,147.20	172,529.68	178,076.96	171,256.98
Number of Bathrooms	Mean	1.8948	1.9099	1.9738	1.9783	2.0571	2.0505	2.1491	2.1339
	SD	0.6796	0.6934	0.6881	0.7040	0.6694	0.6768	0.6483	0.6470
Number of Bedrooms	Mean	3.2069	3.2075	3.2941	3.3016	3.3543	3.3540	3.4196	3.4095
	SD	0.7878	0.8013	0.7964	0.7964	0.8001	0.8087	0.7958	0.7923
Square Footage	Mean	1,890.72	1,921.80	1,980.37	2,007.48	2,025.91	2,044.45	2,022.09	2,024.81
	SD	745.04	769.53	791.15	808.03	794.54	807.40	770.14	775.83
Number of Comps	Mean	5.2223	4.7105	5.3090	4.8885	5.3921	5.0254	5.4900	5.2410
	SD	1.2100	1.2631	1.1599	1.2245	1.1397	1.2264	1.0369	1.1342
Wrong Attributes	Mean	0.0021	0.0016	0.0028	0.0021	0.0034	0.0031	0.0036	0.0027
	SD	0.0463	0.0399	0.0531	0.0462	0.0579	0.0554	0.0601	0.0523
Failed to Find	Mean	0.0091	0.0104	0.0110	0.0127	0.0106	0.0132	0.0135	0.0150
	SD	0.0949	0.1017	0.1042	0.1119	0.1022	0.1140	0.1153	0.1214
Percent Overvaluation	Mean	0.3128	0.3715	0.2218	0.2579	0.1562	0.1786	0.0984	0.1087
	SD	1.1538	1.2593	0.9219	1.0003	0.7310	0.8062	0.5506	0.5495
<i>N</i>		<i>92,110</i>	<i>60,712</i>	<i>79,680</i>	<i>53,257</i>	<i>86,255</i>	<i>55,555</i>	<i>89,715</i>	<i>52,461</i>

Notes: Appendix Table 4 reports the differences in appraisals associated and unassociated with AMCs for the main sample divided into four quartiles based on ZIP code AMC counts. The main sample is restricted to appraisals performed by an appraiser whose average number of refinance appraisals per year is at least 20 in AMC and non-AMC categories separately.

Appendix Table 5: Seasonality and Differences in AMC and Non-AMC Refinance Appraisals

		Quarter 1 Sample		Quarter 2 Sample		Quarter 3 Sample		Quarter 4 Sample	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		AMC	Non-AMC	AMC	Non-AMC	AMC	Non-AMC	AMC	Non-AMC
Valuation	Mean	349,096.91	345,251.43	338,086.62	339,816.28	325,774.52	327,816.97	342,662.90	346,671.23
	SD	203,325.45	196,903.87	200,997.00	199,221.87	198,621.84	195,950.70	203,378.52	200,803.38
Predicted Contract Price	Mean	323,701.71	315,318.56	314,133.63	311,134.52	299,992.84	296,682.86	314,153.26	313,172.71
	SD	197,290.20	190,787.99	194,229.01	191,627.67	190,126.89	186,115.06	193,957.86	192,243.29
Previous Sales Price	Mean	267,479.65	263,999.20	254,582.48	253,740.70	237,182.04	235,964.06	254,854.02	258,246.71
	SD	177,452.45	172,429.00	171,912.31	169,061.09	164,640.25	161,953.23	173,132.40	174,216.28
Number of Bathrooms	Mean	2.0335	2.0207	2.0235	2.0171	1.9912	1.9920	2.0138	2.0185
	SD	0.6764	0.6861	0.6762	0.6834	0.6762	0.6847	0.6829	0.6909
Number of Bedrooms	Mean	3.3307	3.3217	3.3204	3.3147	3.2949	3.2869	3.3163	3.3239
	SD	0.7966	0.8022	0.8024	0.8052	0.7935	0.7956	0.8028	0.8090
Square Footage	Mean	2,000.14	2,015.91	1,984.15	1,993.14	1,939.06	1,951.14	1,972.69	2,007.82
	SD	780.92	793.75	776.45	787.32	764.42	780.19	778.86	799.55
Number of Comps	Mean	5.3649	4.9518	5.3413	4.9307	5.3344	4.9595	5.3641	4.9973
	SD	1.1538	1.2372	1.1285	1.2201	1.1413	1.2273	1.1414	1.2338
Wrong Attributes	Mean	0.0023	0.0015	0.0031	0.0025	0.0036	0.0033	0.0034	0.0029
	SD	0.0480	0.0389	0.0552	0.0498	0.0599	0.0573	0.0586	0.0541
Failed to Find	Mean	0.0113	0.0128	0.0123	0.0141	0.0101	0.0119	0.0100	0.0117
	SD	0.1056	0.1123	0.1104	0.1178	0.0997	0.1085	0.0994	0.1074
Percent Overvaluation	Mean	0.1921	0.2256	0.1916	0.2200	0.2047	0.2494	0.2076	0.2522
	SD	0.8701	0.9398	0.8746	0.9552	0.9024	0.9865	0.8569	0.9681
<i>N</i>		<i>121,123</i>	<i>80,317</i>	<i>83,680</i>	<i>56,777</i>	<i>65,369</i>	<i>37,587</i>	<i>77,588</i>	<i>47,304</i>

Notes: Appendix Table 5 reports the differences in appraisals associated and unassociated with AMCs for the main sample divided into four quarters. The main sample is restricted to appraisals performed by an appraiser whose average number of refinance appraisals per year is at least 20 in AMC and non-AMC categories separately.

Appendix Table 6: Market Competitiveness and Differences in AMC and Non-AMC Purchase-Money Mortgage Appraisals using Herfindahl-Hirschman Index (HHI)

		Group 1: Least Competitive ZIPs		Group 2		Group 3		Group 4: Most Competitive ZIPs		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
		AMC	Non-AMC	AMC	Non-AMC	AMC	Non-AMC	AMC	Non-AMC	
Valuation	Mean	245,810.00	245,783.32	263,236.44	262,192.57	274,353.79	275,979.59	288,414.25	291,393.02	
	SD	159,338.90	157,001.98	158,880.46	157,204.85	158,644.41	159,433.38	155,034.41	152,117.34	
Contract Price	Mean	240,877.24	240,860.40	258,366.82	257,276.16	269,817.84	271,267.08	284,190.98	286,952.50	
	SD	157,453.33	155,359.01	156,641.42	154,924.76	156,476.71	157,188.80	152,410.88	149,490.72	
Number of Bathrooms	Mean	1.8761	1.8851	1.9814	1.9767	2.0897	2.0970	2.3192	2.3118	
	SD	0.6704	0.6719	0.7001	0.6890	0.7033	0.7015	0.7360	0.7310	
Number of Bedrooms	Mean	3.1425	3.1316	3.2092	3.1964	3.3037	3.2948	3.4546	3.4392	
	SD	0.7675	0.7672	0.7877	0.7802	0.7897	0.7887	0.8109	0.8119	
Square Footage	Mean	1,835.04	1,843.10	1,916.85	1,904.88	2,038.53	2,039.54	2,290.90	2,279.63	
	SD	718.82	725.15	778.15	762.81	815.82	803.09	895.82	874.74	
Number of Comps	Mean	5.1390	4.7820	5.2655	4.9369	5.2782	4.9494	5.3520	5.0961	
	SD	1.2698	1.2892	1.2336	1.2691	1.2173	1.2613	1.1875	1.2182	
Wrong Attributes	Mean	0.0106	0.0109	0.0115	0.0116	0.0129	0.0116	0.0102	0.0102	
	SD	0.1024	0.1039	0.1068	0.1069	0.1126	0.1069	0.1004	0.1006	
Failed to Find	Mean	0.0085	0.0089	0.0090	0.0095	0.0085	0.0089	0.0056	0.0057	
	SD	0.0916	0.0940	0.0944	0.0969	0.0916	0.0938	0.0744	0.0755	
Exact	Mean	0.2359	0.2333	0.2437	0.2279	0.2459	0.2289	0.2325	0.2126	
	SD	0.4246	0.4229	0.4293	0.4195	0.4306	0.4201	0.4224	0.4092	
Percent Overvaluation	Mean	0.0275	0.0277	0.0238	0.0239	0.0211	0.0214	0.0171	0.0173	
	SD	0.0735	0.0728	0.0676	0.0649	0.0656	0.0631	0.0579	0.0531	
Super Over	Mean	0.0094	0.0087	0.0099	0.0090	0.0102	0.0090	0.0060	0.0048	
	SD	0.0967	0.0931	0.0991	0.0946	0.1005	0.0942	0.0771	0.0690	
		<i>N</i>	217,362	175,901	214,184	179,520	211,829	181,339	215,311	178,120
Sales Price	Mean	244,907.61	239,166.31	251,307.12	248,838.64	255,793.09	256,818.25	257,379.35	263,620.45	
	SD	144,958.42	142,936.84	142,218.90	140,370.71	141,893.28	144,990.77	135,824.87	138,091.23	
	<i>N</i>	96,893	82,275	84,988	71,985	74,467	60,577	52,919	43,836	

Notes: Appendix Table 6 reports the differences in appraisals associated and unassociated with AMCs for the main sample divided into four quartiles based on ZIP code HHI values. The main sample is restricted to appraisals performed by an appraiser whose average number of purchase-money mortgage appraisals per year is at least 20 in AMC and non-AMC categories separately.