

The role and biasedness of pre-sale estimates in auctions

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Abstract

This paper dwells on the role of pre-sale estimates in auctions. It analyses how it benefits the key stakeholders like buyers, consignors, and auction houses. This paper, then, moves on to study the prevalence of estimate bias in auctions. It examines the presence of estimate bias in the context of South Asia using SaffronArt auction data by using various methods of calculating bias. The result shows that there's a consistent downward bias in the SaffronArt estimates over the years, and in only 30% of the total artworks, the actual price falls within the estimate window.

Introduction

Auctioneers describe pre-sales as the price range that auction house's experts come up with within which they believe a work of art will sell for after taking multiple factors like title of painting, artist, size of painting, medium, provenance, past sales data, and sales data on similar artworks among others. It is believed that these numbers are educated guesses by the experts' in trying to gauge the actual market value. An interesting question in economics has been to find out if pre-sales estimates match well up the actual hammer price. Hammer price is described as a price realized by an item sold at auction. This paper first examines the key roles the pre-sale estimates play in auctions. It analyses how each key stakeholder i.e buyer, consignor, and auction house benefits from the existence of pre-sale estimates. A shifting role and need of pre-sale estimates in the growing digital era is also discussed in this paper. It also touches upon the auction houses' motives in biasing estimates i.e deliberately underestimating and overestimating the pre-sale estimates to gain more profit. Estimation bias occurs when pre-sale estimates conflicts with the actual prices realized. This paper reviews existing literature on pre-sales estimates to find out the prevalence of estimate bias in past auction sales. By analyzing auction data of SaffronArt, one of the leading art auction houses of South Asia, this paper examines estimation bias in the context of South Asian art. By adopting three different methods of calculating bias, this paper finds out how well SaffronArt estimates line up in comparison with hammer prices.

The role of pre-sale estimates in auctions

Why are there estimates? What is the role of pre-sale estimates in auctions. These are some interesting questions related to pre-sale estimates. No previous literature has primarily focused on studying the roles of pre-sale estimates in auctions. This paper tries to fill up that gap and inspect the key role that pre-sales offer to its key stakeholders i.e buyers, consignors, and auction houses. This section covers how each of these parties gains from the existence of pre-sales estimates, and how the role and need of pre-sale estimates might shift in the digital era.

I. Role of pre-sale estimates to buyers

Starting from the perspective of the buyers, every art buyer would want the pre-sale estimates to represent the accurate and unbiased valuation. Assuming that the making of the pre-sale estimates are unbiased and the auction experts use their best knowledge to come up with the accurate range for the estimates, the pre-sale estimates will serve as a guide to uninformed buyers on the existing market price of a particular art piece. On the other hand, the existence of these estimates would mean that the well-informed buyers could look at those estimates beforehand before deciding whether to participate in an auction or not. For instance, if Christie's has overestimated the price of an art piece and the value of the lower estimate is higher than the amount the buyer is willing to pay, the buyer would rather avoid participating in that auction. Generally, in the real content, the making of these estimates are not always fair and there are many factors like reservation price and auction houses' motives for biasing estimates (which will be discussed later in this paper) which make these estimates less fair and less relevant to the buyers.

However, for the amateur buyers who have limited market knowledge of the art prices, these estimates do play an informative role.

II. Role of pre-sale estimates to consignors

Now, moving on to think from the perspective of the consignors, it is generally not uncommon for consignors to have a high expectation of the amount that their artworks will fetch from an auction. They tend to overvalue their artworks and expect higher reserve value from the auction house than what auction experts think the item would auction for. The reservation price is the lowest price at which a consignor is willing to sell their item. Reservation price is determined after a reasonable negotiation between auction house experts and consignors. There are laws in place, for instance in New York, which doesn't allow the reservation price to exceed the low estimate [Ekelund et al. (2017)]. So, the lower estimate is tied up with the reservation price. The auction houses would encourage consignors to set the lowest reserve possible to raise the chances of the item being sold. This way, the pre-sale estimates set after the negotiation between consignors and auction specialists are likely to be relatively reasonable which prevent the risk of items from going unsold assuming that the low estimates set will lure the bidders in participating in the auction which will in-turn increase the likelihood of item being sold during the auction.

III. Role of pre-sale estimates to auction houses (auction houses' motives for biasing estimates)

Now, in the case of auction houses, the role of pre-sales estimates can be claimed as a marketing tool to sell as many items as possible and, thereby, increase revenue for the auction houses (even though they claim it to be an educated guess of how much the item is going to sell during the auction). Previous literatures have consistently pointed out the various motives of auction houses' in biasing the pre-sales estimates to increase profit for the house. Mei and Moses (2005) mentions how auction houses deliberately underestimate the piece of art to attract more bidders to the auction floor. It is pretty obvious that an art piece with lesser estimates, for instance, \$5,000 - \$10,000 will draw the attention of more bidders as compared to an art piece with estimates, let's say, \$50,000 - \$70,000. Based on the assumption that reservation price and estimates are not set independently which is quite realistic, the underestimation of an item would psychologically convince consignors to ask for a relatively low reservation price. Therefore, auction houses have a motive to undervalue a piece so that they could bargain low reservation prices with consignors which would in turn increase the chance that the item would be sold during the auction. Vaslan and Sproule (2007) touches upon the competitive nature of top auction houses like Christie's and Sotheby's that they have an incentive to set low estimates to maintain their reputable image. For instance, it would hamper the image of Christie's if the hammer price for a piece of item they auctioned falls way below the low estimate that was set for that item. They would rather be happy if the hammer price ends up exceeding the upper-level estimate as it would please consignors and motivate them to keep consigning work of arts to that particular auction house. There are also motives for auction houses to overvalue an item. They have a job to

attract consignors so that they could keep auctioning items and generate revenue for the house. Sometimes, auction houses lure consignors by overvaluing their items in return to get hold of the consignment [Vaslan and Sproule (2007)]. Consignors, intuitively, are drawn to an auction house which offers them a relatively high reservation price. Similarly, the consignor's commission and buyer's premium is how auction houses generate revenue. The more the hammer price, the better the revenue for the auction houses by means of commission and premiums. In case of premium pieces of art consigned by renowned artists, many studies suggest that auction specialists set a relatively high estimate range in hope to fetch maximum price gaining from their brand value in hope that bidders would buy regardless. Assuming that the demand for expensive artworks by renowned artists is inelastic, this idea of overestimating these artworks would in turn generate more revenue in terms of commission and premiums for the auction houses. Mei and Moses (2005) supports this argument that the auction experts have this tendency to overestimate the expensive and premium items in trying to maximize commissions and premiums. Therefore, we can say that the presale estimates play an immense role in increasing profits for the auction house.

IV. Role of pre-sale estimates in the digital era

Back in the days when the internet was not accessible widely and there was limited information available online, the pre-sale estimates by auction experts served a much valuable purpose because both buyers and sellers were not well informed about the

market and those estimates gave some sense of market value to them. Nowadays, with the growing access to the internet and easy availability of online information, every information relating to the artwork like the name of the artist, provenance, medium, size among others are posted online by the auction houses. Also, the data on past sales of the same artwork or similar artworks could be easily found with few clicks. Both consignors and auction houses are starting to post better quality digital images of the artwork online. With some online research, Consignors could easily get a good sense of how much worth their item would be. Bidders, on the other hand, are becoming more and more aware of not being a victim of auction houses' exaggerated estimates which are done in an attempt to get as high a hammer price as possible. Unless an item is extremely rare or new to the market and there is no previous sales data available online on similar artworks, it can be argued that it is much easier nowadays to gauge the appropriate market price which makes the role of pre-sale estimates relatively less useful than it was a decade ago.

The biasedness of pre-sale estimates: literature review

Economists around the world have worked with the past auction data to examine the bias of pre-sales estimates by comparing it with the hammer price (E). Most of the existing literature describes bias as the difference between the mean of low and high estimate, and hammer price [Ekelund et al. 1997]. There have been some exceptions too. Ekelund et al. (1997) describe a new method of calculating bias which express bias as a percentage difference between the mid value of estimate range ($\frac{1}{2} (L+H)$) and hammer price i.e. $(\frac{1}{2} (L+H) - E) / E$) deflecting from

the traditional approach of measuring bias.

The results from the past studies are quite mixed when examining the biasedness of pre-sale estimates.. There are some studies which show that pre-sales estimates line up well with the market price. Ashenfelter and Graddy (2010) study concludes that pre-sale estimates seem to gauge the hammer price pretty well and suggests honesty is an auctioneer's most profitable policy rule. Abowd and Ashenfelter (1988) finds that auction houses price estimates are better predictors than hedonic price models. Hedonic pricing is a model that identifies factors that determine price based on the premise that price is determined both by internal characteristics of the item being sold and external factors that affect it. Louargand and McDaniel (1991) reports that Sotheby's estimates for collectibles of 1989-1990 match well with hammer prices with little to no bias. On the other hand, many other studies suggest the other way around.

Agnello and Pierce (1996) concludes that auction specialists underestimate the pre-sale estimate range in order to please consignors by fetching actual hammer prices higher than the expected amount. Ekelund et al. (1998) study shows that in almost all of the years from 1977 to 1996, the average price of Latin American art was higher than the mid value of the estimated range. They also find that both Sotheby's and Christie's overestimated art (oil-on-canvas pieces) by 2.7 percent. Beggs and Graddy (1997) finds that experts underestimate Impressionist Art pieces. On the other hand, they reveal that Contemporary Art pieces are overestimated.

Estimation bias in the context of South Asian Art Auction

In the context of South Asian art, using data from Saffron Art, one of the leading art auction houses in South Asia, we try to see how well the estimates line up with the actual prices realized, and if there's any biases in the given estimates. The dataset includes 12,419 rows out of which 10,455 were sold, and 1,964 remain unsold. Here, the term "no sales" is commonly referred to as the items that were unsold during auction. This happens when bidders don't reach the consignor's reservation price. In this case, "no sales" comprised around 16% of our whole data. 'No sales' data is skipped in the analysis since it won't have a hammer price attached to it as those were unsold during the auction. '*Winning Bid*' is referred to as the price realized by an item sold at auction. Similarly, '*Mid estimate*' is referred to as the mean of low and high estimates. Here, we look at 3 methods of examining bias:

I. Method 1:

$$\text{Bias} = \text{Mid Estimate} - \text{Winning Bid}$$

$$\text{where, } \text{Mid Estimate} = (\text{Low Estimate} + \text{High Estimate}) / 2$$

Demonstrated in Table I, II and Figure I, II.

II. Method 2:

$$\text{Bias} = (\text{Mid Estimate} - \text{Winning Bid}) / \text{Winning Bid}$$

Demonstrated in Table III and Figure III.

III. Method 3:

In *Method 3*, unlike *Method 1* and *Method 2* where we take mean of low estimates and high estimates as a comparison unit, we look at each data point and count the samples where the winning bid is below low estimates, above high estimates, and between low estimates and high estimates respectively and represent it in terms of percentage.

Demonstrated in Table IV and Figure IV.

Table I

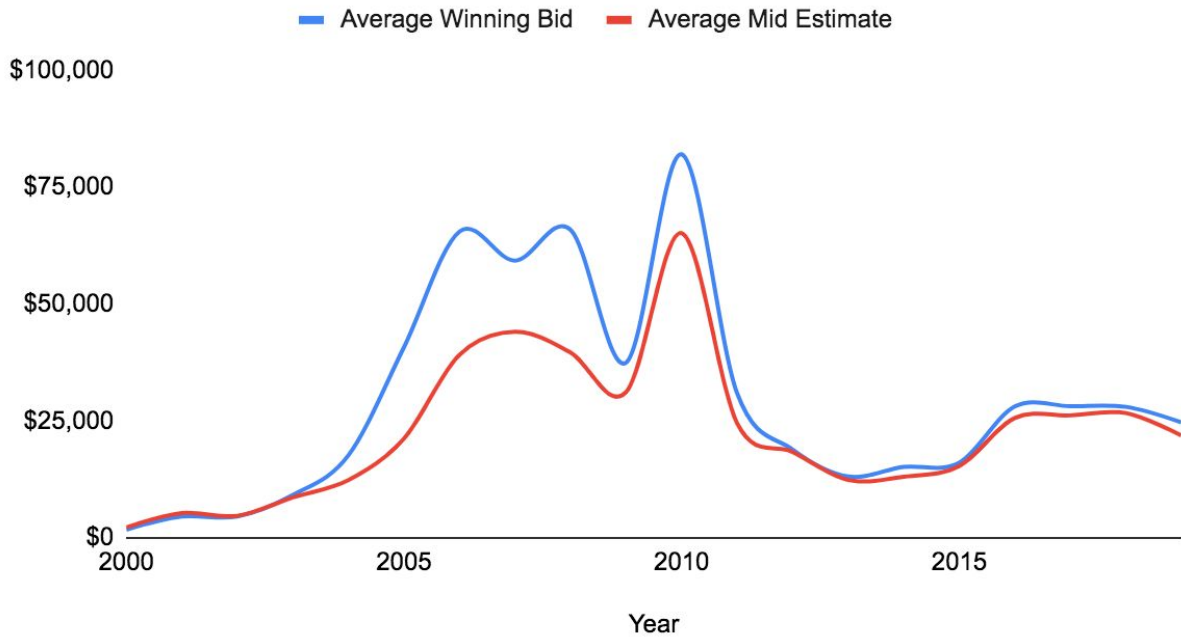
Year	Winning Bid (Average)	Mid Estimate (Average)
2000	\$1,761	\$2,246
2001	\$4,566	\$5,303
2002	\$4,577	\$4,724
2003	\$9,173	\$8,657
2004	\$17,651	\$12,378
2005	\$40,782	\$21,238
2006	\$65,537	\$39,181
2007	\$59,318	\$44,111
2008	\$65,934	\$39,672
2009	\$37,486	\$31,193
2010	\$82,076	\$65,220
2011	\$30,938	\$24,556
2012	\$18,913	\$18,379
2013	\$13,148	\$12,375

2014	\$15,195	\$13,076
2015	\$16,061	\$15,355
2016	\$28,117	\$25,646
2017	\$28,170	\$26,208
2018	\$28,038	\$26,714
2019	\$24,711	\$21,912

In only 3 years (2000, 2001, and 2002), as we can notice, the average mid estimate is greater than the average winning bid. In other years, the average winning bid exceeds the average mid estimate. This suggests that an auction house like Saffron Art, in general, tends to undervalue the pre-sale estimates. In an emerging art market like India, it does make sense for auction houses to attract more bidders by lowering the estimates. Figure I shows that the gap between winning bids and estimates have been quite narrow in recent years. Before 2012, there seemed to be a big gap between price and estimates. However after 2012, the gap has been quite narrow and the average estimates seem pretty close to the average actual prices. One can argue that this might have to do with the growing availability of data and online information followed by the growing experts' expertise in valuing artworks in the recent years.

Figure I

Comparison of Winning Bid and Mid Estimates over the years



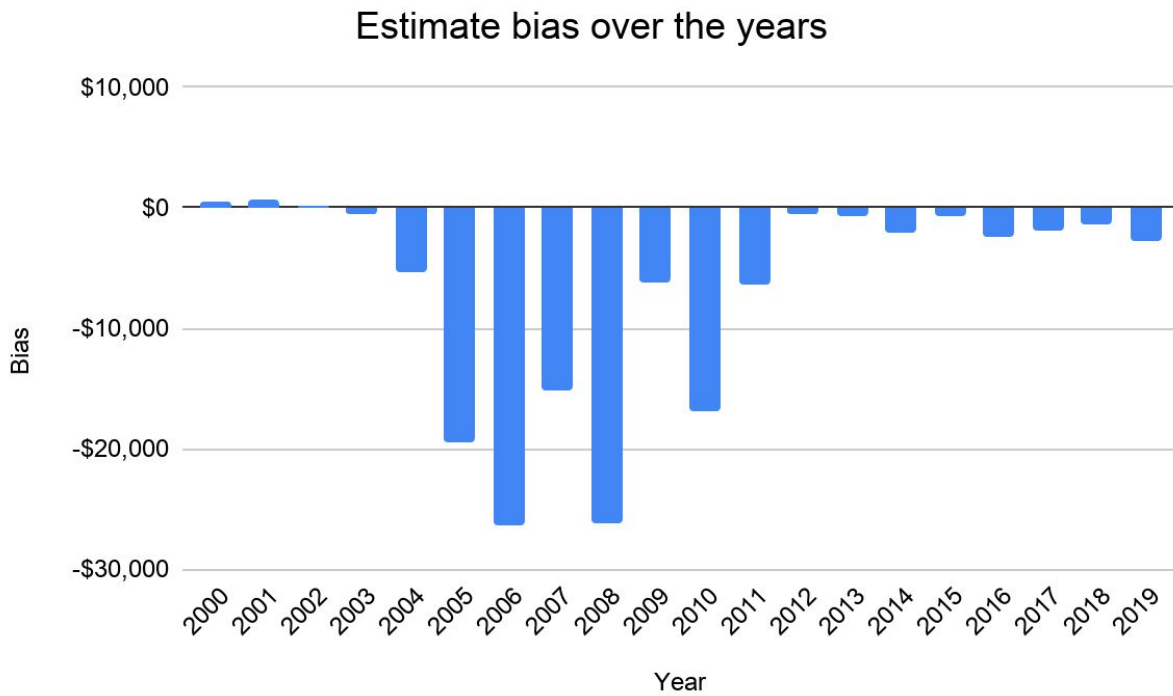
Similarly, the average bias is calculated by subtracting the average winning bid by the average mid estimate as we can see in Table II. We can see that there has been a consistent downward bias over the years. Figure II shows that 17 out of 20 years had a downward bias conveying the prevalence of underestimation trend.

Table II

Year	Bias
2000	\$485
2001	\$737
2002	\$147

2003	-\$516
2004	-\$5,273
2005	-\$19,544
2006	-\$26,356
2007	-\$15,207
2008	-\$26,262
2009	-\$6,293
2010	-\$16,856
2011	-\$6,382
2012	-\$534
2013	-\$773
2014	-\$2,119
2015	-\$706
2016	-\$2,471
2017	-\$1,962
2018	-\$1,324
2019	-\$2,799

Figure II



Here, in Method 2, instead of calculating just the difference between *Mid Estimate* and *Winning bid*, *Bias* is calculated as the percentage difference between *Mid Estimate* and *Winning bid*.

$$Bias = (Mid\ Estimate - Winning\ Bid) / Winning\ Bid$$

The result from Table III is similar to Table II. Here, it is represented in terms of percentage. We notice that the difference ranged from 3% to 48% which shows the volatility of the estimates as shown in Figure III. However, in recent years since 2012, the percentage difference dropped significantly and ranged between 5% and 15%.

Table III

Year	Bias %
2000	28%

2001	16%
2002	3%
2003	-6%
2004	-30%
2005	-48%
2006	-40%
2007	-26%
2008	-40%
2009	-17%
2010	-21%
2011	-21%
2012	-3%
2013	-6%
2014	-14%
2015	-4%
2016	-9%
2017	-7%
2018	-5%
2019	-11%

Figure III

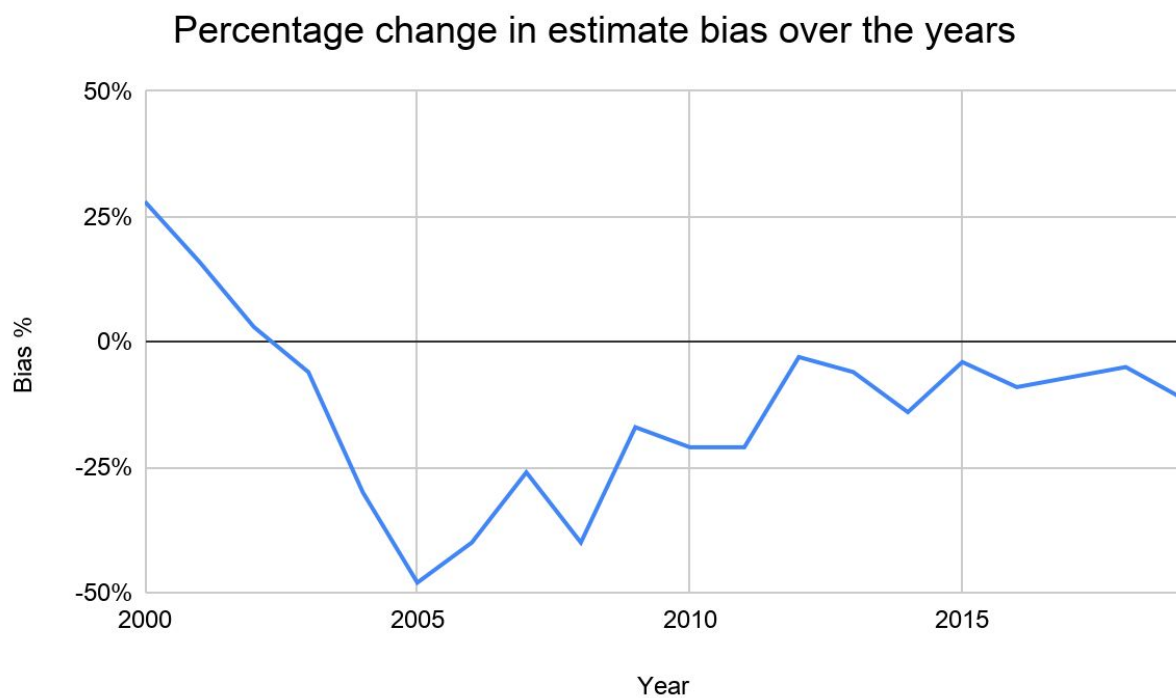


Table IV

Winning bid falling under low estimate	3808	36%	52%
Winning bid exceeding high estimate	3562	34%	48%
Winning bid falling between low and high estimate	3085	30%	--
Total Sample Size	10455	--	--

Figure IV

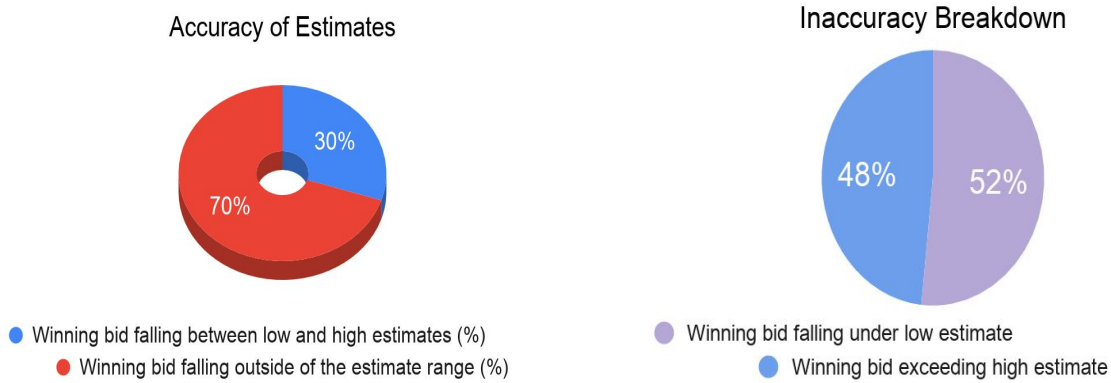


Table IV shows the distribution and accuracy of the estimates in comparison to the winning bids. The result shows that the winning bid fell under low estimates in 36% of the sample data, 34% exceeded high estimates, and 30% accurately fell between low and high estimates. Overall, the auction house accurately predicted the market value of only 30% of the artworks. 70% of the artworks fell outside of the estimate range as shown in Figure IV. Of the 70% inaccurately estimated, 48% of the winning bids fell below low estimate and 52% of the winning bids fell above high estimate. This suggests both underestimation and overestimation of art pieces is quite prevalent in art estimates. This also points out on the volatility of art auctions which make it difficult for auction experts' to accurately estimate artworks to match market value.

Limitations of the methods used to calculate bias

Each of the methods we have used above to calculate bias above has its own limitations. In Method 1, '*Bias*' is referred to as the difference between *Mid estimate* and *Winning Bid* where *Mid Estimate* takes the mean of low estimate and high estimate as a comparison unit. This approach completely neglects the range of the estimates. For instance, let's say we have three art pieces, and their estimated windows are \$70,000 - \$80,000 for piece 1, \$74,000 - \$76,000 for

piece 2, and \$ 65,000 - \$ 85,000 for piece 3. For each piece, we would have a mid-estimate value of \$75,000. This shows that this method doesn't take the range of these estimates into consideration. Similarly, *Method 2* also has a *Mid Estimate* as one of its variables. So, *Method 2* also has the same flaws as Method 1. However, *Method 2* does show the percentage difference to maintain an uniform way of calculation unlike *Method 1*. Talking about *Method 3*, it adopts a different approach and simply counts whether the samples fall under the estimate range or outside of the estimate range. This method also has its flaws. This method doesn't take the magnitude of differences in consideration. For instance, if an art piece with a low estimate of \$30,000 bags a hammer price of \$29,990, then it's taken as a biased sample. Likewise, if an art piece with a low estimate of \$30,000 bags a hammer price of \$25,000, then it's also taken as a biased sample. This method doesn't account for how big the differences are. Therefore, each method we chose has its own benefits and limitations.

Conclusion

Pre-sale estimates are considered an important factor in the auctioning process. For potential buyers, the pre-sale estimates play an informative role. Informative in a sense that it will guide uninformed buyers on how much a particular artwork is worth, and whether they can afford participating in a particular auction sale or not. However, this argument is based on the assumption that auction experts unbiasedly estimate art pieces which is not always the case in the real context. For consignors, after setting a reasonable reservation price for their artworks, the

pre-sale estimates can be taken as a tool to reduce the risk of items going unsold during auction as the reservation price is tied up with the lower value of the estimate window which is set after consulting with auction experts who are well-informed of the art prices. For auction houses, the pre-sale estimates are taken as a marketing tool to increase revenue for the firm. Auction houses have a motive to deliberately underestimate/ overestimate the items whether it be underestimating the value to attract more bidders or overestimating to gain from high premiums and commissions. As the world goes more digital, the role and need of pre-sale estimates is destined to make a shift. The abundance of online information along with well-informed bidders and consignors have somewhat outshadowed the need of pre-auction estimates in the recent years. While pre-sales are supposed to be an unbiased representation of the actual hammer price by the auction houses, the past studies on pre-sale estimates suggest that this is not always the case. The empirical analysis of SaffronArt's South Asian data, using various methods of calculating bias, shows there is a consistent downward bias in the published pre-sale estimates which conveys that the auction house in general tends to undervalue the price of the South Asian artworks. However, the auction house has been relatively more accurate in the current decade as compared to the past decade. Also, the result shows that only 30% of the actual prices fall between the estimate range. This suggests that pre-sale estimates set for a particular item don't necessarily represent the amount it will fetch during the auction.

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