**REVIEW OF THE LITERATURE**

Anchoring is a well-studied bias in psychology and behavioral sciences[[1]](#footnote-1). The seminal work on anchoring was first conducted by Tversky & Kahneman (1974), who conducted the experiment described in the introduction[[2]](#footnote-2). The anchoring effect is extremely complex, and many studies have attempted to understand its nature and implications. For instance, some studies show that people formulate estimates more quickly when provided with numbers to anchor on[[3]](#footnote-3), while others show that anchoring decreases, but does not altogether vanish, with increased cognitive ability[[4]](#footnote-4). Other work demonstrates that anchoring is extremely difficult to avoid, even if the anchors are obviously incorrect.[[5]](#footnote-5) A myriad of studies exist on anchoring: for a survey of the anchoring literature, see Furnham & Boo (2011)[[6]](#footnote-6).

Within economics generally, various work has been conducted with historical market data by examining prices for unchanging goods with shifting demand to assess potential anchors[[7]](#footnote-7) [[8]](#footnote-8). Much of the anchoring research in economics uses experiments, surveys, or multiple-choice tests to understand questions about how individuals form estimates and judgments in the presence of an anchor[[9]](#footnote-9) [[10]](#footnote-10) [[11]](#footnote-11). The bias has been studied in many socioeconomic contexts such as accounting[[12]](#footnote-12), real estate[[13]](#footnote-13), the courtroom[[14]](#footnote-14), public goods[[15]](#footnote-15), and international finance[[16]](#footnote-16). Of course, anchoring has been researched in the context of auctions as well[[17]](#footnote-17) [[18]](#footnote-18). For example, one bizarre experiment was conducted by Prelec and Ariely (2006), who asked students to write down the last two digits of their Social Security number, then bid for various items such as chocolate, computer equipment, or a textbook[[19]](#footnote-19). The students who had higher digits submitted significantly higher bids, even when explicitly reminded that Social Security numbers had nothing to do with price. In the case of a ’98 Cotes du Rhone wine, the high-digit students submitted bids that were, on average, over three times what the low-digit students had submitted. Wolk and Spann (2008) study bidding in online auctions in the presence of an anchor[[20]](#footnote-20). They find that bidders tend to respond strongly to internalized anchors such as knowledge of past prices for a good, while they respond to external anchors (such as advertiser-suggested bids) moderately and only when those numbers are not implausibly high.

The art auction market is no exception to anchoring, and the literature shows that first numerical impressions do seem to significantly impact prices, auctioneer estimates, and sale volume. Here, we provide an overview of research that studies anchoring in the art market, which is still a nascent topic.

To our knowledge, a discussion paper by Beggs & Graddy (2005) is the first to examine anchoring effects (i.e. “reference dependence”) as well as loss aversion[[21]](#footnote-21) in the art auction market. To identify anchoring – specifically, the marginal impact of past price on current price (which is our definition) – they first construct two datasets of repeat auction sales of Impressionist and Contemporary paintings, including not only hammer price but also hedonic characteristics such as artist and medium. Their regression model isolates anchoring effects on the price for a second sale by controlling for hedonic characteristics as well as unobserved inputs into price such as bidder behavior. Beggs & Graddy in this paper, believe anchoring effects on the sale price can primarily be attributed to the buyers. The authors find strongly significant evidence for anchoring in both Impressionist and Contemporary genres, though no significant asymmetry between gains and losses appears for anchoring, and loss aversion is not evident either[[22]](#footnote-22).

The anchoring analysis in that discussion paper is formalized further in Beggs & Graddy (2009), which using the same resale approach and data, dives deeper into anchoring effects on price, presale estimates, and the probability of a sale[[23]](#footnote-23). For price, they find that anchoring effects are stronger for Impressionist art pieces than for Contemporary ones, particularly for items that are resold quickly after a first sale. They also find an association between presale low estimates and anchoring, although anchoring does not seem to significantly affect the probability of sale (which is estimated with a probit model). The anchoring analysis conducted by Beggs & Graddy (2009) forms the basis of our own approach, and we attempt to replicate some of their results for resold paintings in a later section.

Graddy et al. (2014) further extends the work in Beggs & Graddy (2009) and Beggs & Graddy (2005) by studying anchoring (as well as loss aversion) with more data[[24]](#footnote-24). The anchoring part of their model is mostly unchanged from Beggs & Graddy (2009). They again find significant evidence of anchoring, and validate the original paper’s finding that anchoring effects are stronger for items that are resold more quickly. However, they are more unclear on who to attribute anchoring effects to.

Bruno and Nocera (2008) study how anchoring affects presale estimates using a unique dataset of nearly 1,000 Italian paintings that have been sold at least twice (1985-2006)[[25]](#footnote-25). They regress the range of presale estimates on a multi-leveled dummy variable for anchoring to account for multiple past prices (anchors). Subsequently, the authors find significant evidence of anchoring. First, the existence of past prices makes the presale estimate range narrower, presumably because the auctioneer grows more confident[[26]](#footnote-26). Second, Bruno and Nocera find that the existence of a past price corresponds to the presale estimate range being more closely centered on the true hammer price. Hence, both the bias and variance of the presale estimate range seem to decrease in the presence of anchors. These findings are consistent with what we learned through interviews, namely, that specialists at auction houses do research past sales before formulating estimates (as described earlier).

In “Ordering, revenue and anchoring in art auctions” (2015), Hong et al. study how the ordering of art auction sales can lead to anchoring effects[[27]](#footnote-27). For the semiannual Auction Week, a two-week auction series held every spring and fall across New York City[[28]](#footnote-28), Sotheby’s and Christie’s have an arrangement to alternate who holds their auction first – a natural experiment. Using 26 years of Auction Week data and an adapted version of the resale model in Beggs & Graddy (2009), Hong et al. find that opening sale revenues significantly anchor later sales during the rest of an Auction Week. Specifically, they discover that if more expensive paintings are sold first, then Sotheby’s and Christie’s will pull in higher total revenue (approx.. +21% higher), and more works will sell overall (approx.. 11% more sales). They state that their anchoring coefficients are quantitatively comparable to those from Beggs & Graddy (2009).

One of the key results from the literature is that anchoring tends to strengthen as resale is closer ….

take turns Auction Week in New York City every year, which provides a natural experiment for studying

A much wider, though still relevant, literature exists on other biases that could impact art prices.

for items that are resold quickly.

the anchoring (and also loss aversion) in more depth

< at end, more tangential works such as ‘failing to meet the reserve price’, ‘declining values’, ‘does the sun shine on art prices’ etc.>

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Anchoring, resale – less important since it’s an unstable assumption to assume that artwork (e.g. prints, become torn faded etc.; even replacing canvas on back – RB ’15) remains the same over time – MB ’00. Hence, if even the same artwork does not remain the same, why not use substitutes? (if does remain same, probably more impressionist art since better taken care of over time, more famous works; this may be another reason why Impressionist art shows stronger anchoring effects, compared to Contemporary art, in Beggs & Graddy (2009)).

1. Furnham, Adrian, and Hua Chu Boo. "A literature review of the anchoring effect." *The Journal of Socio-Economics* 40.1 (2011): 35-42. [↑](#footnote-ref-1)
2. Tversky, Amos, and Daniel Kahneman. "Judgment under uncertainty: Heuristics and biases." *science* 185.4157 (1974): 1124-1131. [↑](#footnote-ref-2)
3. http://soco.uni-koeln.de/files/jpsp73.pdf [↑](#footnote-ref-3)
4. Bergman, Oscar, et al. "Anchoring and cognitive ability." *Economics Letters*107.1 (2010): 66-68. [↑](#footnote-ref-4)
5. Strack, Fritz; Mussweiler, Thomas (1997). "Explaining the enigmatic anchoring effect: Mechanisms of selective accessibility.". Journal of Personality and Social Psychology 73 (3): 437–446. doi:10.1037/0022-3514.73.3.437. [↑](#footnote-ref-5)
6. Furnham, Adrian, and Hua Chu Boo. "A literature review of the anchoring effect." *The Journal of Socio-Economics* 40.1 (2011): 35-42. [↑](#footnote-ref-6)
7. Rajendran & Tellis (1994); Greenleaf (1995); Geltner (2011); Dougal et al. (2012). [↑](#footnote-ref-7)
8. Furnham, Adrian, and Hua Chu Boo. "A literature review of the anchoring effect." *The Journal of Socio-Economics* 40.1 (2011): 35-42. [↑](#footnote-ref-8)
9. Frykblom, Peter, and Jason F. Shogren. "An experimental testing of anchoring effects in discrete choice questions." *Environmental and resource economics* 16.3 (2000): 329-341. [↑](#footnote-ref-9)
10. Winter, Joachim. "Bracketing effects in categorized survey questions and the measurement of economic quantities." (2002). [↑](#footnote-ref-10)
11. Flachaire, Emmanuel, and Guillaume Hollard. "Starting point bias and respondent uncertainty in dichotomous choice contingent valuation surveys."*Resource and energy economics* 29.3 (2007): 183-194. [↑](#footnote-ref-11)
12. Kinney Jr, William R., and Wilfred C. Uecker. "Mitigating the consequences of anchoring in auditor judgments." *Accounting Review* (1982): 55-69. [↑](#footnote-ref-12)
13. Bucchianeri, Grace W., and Julia A. Minson. "A homeowner's dilemma: Anchoring in residential real estate transactions." *Journal of Economic Behavior & Organization* 89 (2013): 76-92. [↑](#footnote-ref-13)
14. Mussweiler, Thomas. "Sentencing Under Uncertainty: Anchoring Effects in the Courtroom1." *Journal of applied social psychology* 31.7 (2001): 1535-1551. [↑](#footnote-ref-14)
15. Green, Donald, et al. "Referendum contingent valuation, anchoring, and willingness to pay for public goods." *Resource and Energy Economics* 20.2 (1998): 85-116. [↑](#footnote-ref-15)
16. Nianhang, Xu, and Wu Shinong. "A Study on Anchoring Effect for Non-tradable Share Reform of Listed Companies in China [J]." *Economic Research Journal* 1 (2007): 009. [↑](#footnote-ref-16)
17. Lucking‐Reiley, David, et al. "Pennies from ebay: The determinants of price in online auctions\*." *The Journal of Industrial Economics* 55.2 (2007): 223-233. [↑](#footnote-ref-17)
18. Ku, Gillian, Adam D. Galinsky, and J. Keith Murnighan. "Starting low but ending high: A reversal of the anchoring effect in auctions." *Journal of Personality and social Psychology* 90.6 (2006): 975. [↑](#footnote-ref-18)
19. Ariely, Dan, George Loewenstein, and Drazen Prelec. "Tom Sawyer and the construction of value." *Journal of Economic Behavior & Organization* 60.1 (2006): 1-10. [↑](#footnote-ref-19)
20. Wolk, Agnieszka, and Martin Spann. "The effects of reference prices on bidding behavior in interactive pricing mechanisms." *Journal of Interactive Marketing* 22.4 (2008): 2-18. [↑](#footnote-ref-20)
21. Beggs, Alan, and Kathryn Graddy. "Testing for reference dependence: An application to the art market." (2005). [↑](#footnote-ref-21)
22. Loss aversion is another behavioral bias that says losses are felt more strongly than equivalent gains. [↑](#footnote-ref-22)
23. Beggs, Alan, and Kathryn Graddy. "Anchoring effects: Evidence from art auctions." *The American Economic Review* 99.3 (2009): 1027-1039. [↑](#footnote-ref-23)
24. Graddy, Kathryn, et al. "Anchoring or loss aversion? Empirical evidence from art auctions." (2014). [↑](#footnote-ref-24)
25. Bruno, Brunella, and Giacomo Nocera. "Investing in art: The informational content of Italian painting pre-sale estimates." *Available at SSRN 1179183*(2008). [↑](#footnote-ref-25)
26. Specifically, both the relative and absolute range between low and high estimates. [↑](#footnote-ref-26)
27. Hong, Harrison, et al. "Ordering, revenue and anchoring in art auctions." *The RAND Journal of Economics* 46.1 (2015): 186-216. [↑](#footnote-ref-27)
28. http://www.artspace.com/magazine/news\_events/the\_heat\_index/how\_to\_understand\_new\_york\_record\_auction\_week-52310 [↑](#footnote-ref-28)