

# The Seller's Trade-Off

A comparison between offline and online markets for auction houses



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### **Abstract**

Despite the increasing success of online platforms, there have been many claims that the Internet is not right for selling high-end artworks. Our research empirically analyzes the difference between selling an artwork in a brick-and-mortar auction house and in an only-online auction house. Using a data set of over 1631 hammer prices and estimate observations collected over a period of 12 months, we compare pricing and estimate behavior between Dorotheum and Auctionata. Furthermore, the differences in sale rates and transaction costs are highlighted. We find that sale rates and hammer prices on the online Auctionata are lower than the ones reached by the brick-and-mortar Dorotheum. Furthermore, the higher the estimated value, the wider the estimation window seems to appear and thus the more likely the artwork will be sold on a brick-and-mortar auction house.

We conclude that online auctions have not reached yet their full potential in comparison to already established traditional auction houses. However, online newcomers do not have to be necessarily seen as an alternative for the sellers to traditional auction houses, but more as an additional channel.

Keywords: Art Auctions – Digitalization – Transaction Costs — Estimate Dispersion

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## I. Introduction

Digitalization is having an impact on the art market, giving rise to new auction houses operating online. Earlier this year, the Hiscox Online Art Trade Report estimated the value of the online art trade to have reached \$3.27 billion, growing up to 24% from the last year. Art buying patterns and motives are changing. According to Robert Read, Head of Fine Art at Hiscox, almost half of this year's respondents had bought art online, up from 39% in 2014 and art is seen as an increasingly tradable asset online (Read, 2016).

The success of online auctions has sparked innovation in traditional art houses such as Christie's and Sotheby's to invest and adopt the new technologies to facilitate easier viewing and bidding. More importantly, several auction houses are nowadays fully embracing the pure-play online auction format with great success.

The Internet has not only gave accessibility to more participants in online auctions, but it has also reduced transaction costs for both buyers and sellers and has contributed to the possibility for the participants to join at any time. Despite these improvements, are there limits to what can be sold online? One may argue that the Internet is not suitable for selling high-end items, because potential buyers will resist bidding large sums for goods they have not seen. Art is something that needs to be looked at and discussed. On the other hand several counterexamples exist.

A seller choosing between auctioning online or through a traditional auction house faces a compromise. On the one hand, the transaction costs are lower online. On the other one hand, online bidders, worrying more about the physical conditions of the artwork might bid lower, achieving lower hammer prices. Correspondingly, the following research question will be guiding the research:

**RQ: How can a seller assess whether it is better to consign an artwork in a brick-and mortar or online auction house?**

Sub-RQ: What are the variables influencing the seller's choice?

In this thesis we will perform a comparative study between the German based online auctioneer Auctionata AG and the Austian brick-and-mortar auction house Dorotheum GmbH. Using fine arts auctions results of both auctioneers will serve to

make specific statements on realized prices and price estimates, allowing for a comparison between the two sale channels.

To complement the findings on the research question, the transaction costs as well as the accuracy of estimates for each auction house will also be regarded. Furthermore, we will investigate on specific categories which seem to exhibit a more accurate behavior than the sample as a whole.

The remainder of this paper is arranged in the following manner. In Chapter 2, we give a brief overview of the role of auction houses in the art market to then analyze more in depth the main features of brick-and-mortar and online auctioneers. Furthermore, we will also highlight the process of consigning an artwork and bidding in both markets. In Chapter 3, the differences between online and offline auctioneers will be highlighted as well as the implications for their participants. It will be shown that digitization has improved several market conditions, but that at the same time online pure-players do not seem to have reached their full potential in comparison to well-established auction houses. The discussion will allow us to deliberate on what are the key aspects to take into consideration when choosing between a traditional auction house rather than an online newcomer. Chapter 4 will introduce the comparative study between Auctionata and Dorotheum and the methods employed in the analysis. Comparing the auction results and price estimates of both auction houses will allow to answer the research question on whether a seller do better online or offline. In chapter 5 we present the results, followed by the interpretation of the very same in chapter 6 and concluding remarks in chapter 7.

## II. Art Auctions

### 2.1 Introduction

The art market differs substantially from other markets due to its extremely fragmentary nature. The uniqueness and heterogeneity of artworks makes the supply curve inelastic and the demand depending on subjective criteria, such as aesthetic perceptions, cultural values, portfolio diversification or conspicuous consumption (Singer & Lynch, 1994; Velthuis, 2011a; Horowitz, 2011). Moreover, the lack of valid and consistent information channels or transparent systems to circulate information about the art market structure, its mechanism and the development of the estimated value for artistic goods, increases the degree of casualness in price formation (Codignola, 2003). The value of art therefore, cannot be objectively determined and relies on the credibility of the experts within the art world (Velthuis, 2011a). Moreover, the art market has to cope with the irregularity of art trades and with special transaction costs.

Within the art market, the auction houses dominate the secondary segment, where mostly deceased artists and already market-tested artworks are traded. The activity of auction houses is accompanied by the market share held by art dealers. However, demand for art assets seems to be increasingly turning to auction sales, where exchanges are more transparent (Codignola, 2003; Pinker, Seidmann and Vakrat, 2003). Additionally, following Marinelli and Palomba (2011), during an auction the true, current market value “as [an] adequate approximation of true equilibrium price” is determined (p.213). The efficiency of the auction system is thus a key determinant of the cost of distributing works of art in a globalized market, favoring the auction houses instead of art dealers (Ashenfelter and Graddy, 2003; Codignola, 2003). Hence within the secondary market, many dealers are no longer able to cope with auction performances, unless they have the economic power to opt for a global strategy, multiplying their branch offices abroad, as in the case of Gagosian.

The rules to participate and to bid at art auctions have remained unchanged over two centuries. The major English auction houses, Christie's and Sotheby's, have practiced, refined and developed an auction protocol that is still commonly used by many other auction houses today (Ashenfelter, 1989; Ashenfelter and Graddy, 2003).



In the so-called English system, the bidding begins low and edges upward as bidders escalate their bids (Ashenfelter, 1989 p.24)

## 2.2 Advantages in selecting auction houses

*“Without auctions, the art world wouldn't have the financial value it has. There is no law to say that someone will buy your Cattelan, but the auctions give a sense that most of the time, most things will sell. If people thought they could not resell – or that if they died, their heirs couldn't sell, many wouldn't buy a thing”. Thornton, 2008*

Economists seem to agree that there is a good reason for using auctions to sell art.

Auction houses, unlike galleries which also perform a role of intermediation under a cultural point of view, by selecting the artists and increasing their fame, are essentially commercial structure: the prices chosen have already a solid market, therefore they are more representative and of proven quality. On the other one hand, the choice of buying in a gallery might be economically more convenient, both for the facility of negotiation for a lower price<sup>1</sup> and for the possibility to make good investments on artists who are not completely established<sup>2</sup>.

However, for many buyers, especially inexperienced ones, purchasing a work that has already had a first market estimate, provides greater security guarantees (Brosio & Santagata, 1992). By following a strict protocol, auctions have a transparency in the negotiations that gives participants confidence that they are being treated fairly (Pinker, Seidmann and Vakrat, 2003).

With an auction one starts low and hopes that fierce competition will drive the price up, ending up high; there is in theory no upper limit to the price level that competition between two bidders may achieve. It does not always work in favor of the auction, but often it does. In fact, the art market regularly produces prices realized in the heat of the chase at auction that would not have been achievable by private treaty. Whatever price a collector got from a dealer, he would have had the suspicion that he could have got more at auction (Hook, 2014 p. 307).

Beyond any purely economical aspect, collectors tend to appreciate the presence of a precise deadline, which helps to concentrate the timing of purchases, the convenience of having frequent sales per year and the buyer's anonymity guaranteed by the auctioneer (Thornton, 2009; Brosio & Santagata, 1992). Galleries may pose “entry

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<sup>1</sup> Similarly to an auction, even in a gallery the price is normally contracted starting from an initial price,

<sup>2</sup>It requires however an excellent knowledge of the trend of the art market.

barriers” among which, for example, waiting lists for the purchase of work of a determinate artist, or favoritisms towards the more renowned collectors<sup>3</sup>.

Last but not least, the spectacular characteristics of a public sale. Still for many, fine art is considered to be a hedonic product, the consumption of which is driven more by the experience itself combined with the aesthetic pleasure that derives from it, rather than for its functional benefits. Thus, within the secondary market, the auction seems to be the ideal places for selling art, a commodity whose value is vastly inflatable by fantasy, aspiration and human rivalry (Hook, 2014). Still nowadays auctions are the worldwide showcase, where the buyer, through the purchase of an important and famous work of art, can obtain a confirmation of his own social status.

### 2.3 Brick-and-mortar auction process

The traditional brick-and-mortar auctions have four steps: consignment, cataloguing, exhibition and sale (Kazumori and McMillan, 2005).

#### 2.3.a Consignment

Auction houses use many mechanisms in order to attract potential sellers. The first is the press release issued by the ‘Department of Public Relations’ of the auction house at the end of each public auction which, through the publication of the exceptional achievements obtained (record as artist, works sold above the high estimate, overall record result) pave the way for future deliveries. Another important work is carried out by the ‘Customers’ Service’, which publishes records and sales projection of a particular artist. Marketing efforts implemented by the ‘Department of Proposals’, such as catalogues and events preview magnificently presented, represent as well the reasons of selection by a seller of a determinate auction house.

Property owners wanting to sell something through a traditional auction house “consign” it, in other words they are legally transferring a property to an agent for sale on the owner’s behalf. This makes the auction house responsible for the property until the item is sold. In order to consign it, prospective sellers would contact the specialist department most relevant to the item for sale. Specialist departments cover fields such as “Old Master Paintings”, “Nineteenth-Century Furniture”, and “Chinese Contemporary Art. If the appropriate Sotheby’s specialist considers the property

owner's item likely to be valuable, he or she might arrange a visit, request photographs, or ask the owner to send the items to Sotheby's in New York or London (Hallowell, 2001). The item is valued on the basis of its provenance, authenticity, rarity, condition, quality and market trends. After examining the property, the specialist would research recent prices fetched by comparable objects and present the owner with an appraisal of potential market value (Hallowell, 2001). After setting a price estimate, a seller is allowed to set a confidential *reserve price* that is no more than the low end of the estimate. Below this reserve price, the owner's property cannot be sold but it could instead be returned to the seller, who is nonetheless required to pay the auction house for its services (*Ibid*).

If the seller and the specialist agree on the estimate and the reserve price, a contract is signed. The contract foresees a commission charged to the seller, on a sliding scale based on the mid-estimate (if the piece is unsold) or based on the sale price achieved (if the piece sold) (Casadeus-Masanell & Wise, 2010). The commission ranges from 10% to 20% according to the auction house (Sotheby's.com and Christie's.com). Among the other costs, the seller is also responsible for paying for the piece to be featured in the auction catalogue and for it to be insured (Casadeus- Masanell & Wise, 2010).

### 2.3.b Cataloguing

Three months before an auction, no more property can be included in the sale (Casadeus & Wise, 2010). Energies are devoted to market the items that will feature in the live sale.

One primary and efficient marketing tool exploited by the traditional auction houses is the catalogue. Catalogues that recall those of museums both for presentation refinement, with high definition images for each lot presented on glossy paper and for the presence of voluminous essays, written by experts of auction houses, on the particular historical and artistic importance of works. It is a step of fundamental importance, since catalogues represent the best information tool available to the buyer (Hallowell, 2001). The lots are accurately photographed and described<sup>4</sup>. The description also includes the physical condition of the lot and the history of its ownership (if available), without forgetting the reference notes ad an upper and lower estimate of the selling price (See Exhibit). Particularly expensive, rare pieces are

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<sup>4</sup> A "lot" is a single item or several pieces grouped to be sold at a particular auction.

listed as “estimate upon request” or have no mention of estimates at all (Casadeus Masanell & Wise, 2010).

Each specialist department within the auction house have a list of ‘habitues’ who receive free catalogues for some or even all auctions in a particular category. Generally, the catalogues are mailed to potentially interested buyers otherwise they are sold by subscription. The cost of an auction catalogue might range from \$60 up to \$100 (Sotheby’s.com). An executive estimated that the cost of the catalogue production – including photographs- and mailing, compared with the associated revenues, amounted to break-even (Hallowell, 2001).

In addition, the specialists prepare a ‘condition report’ for each individual lot, available upon request. These reports provide more detailed descriptions about the lot, reporting any imperfection, irregularity or damage (See exhibit). However, as stated in catalogues, “...prospective bidders should inspect the property before bidding to determine its condition, size or whether or not it has been repaired or restored”.<sup>5</sup>

### 2.3.c. The Exhibition

A four or five day public exhibition is set up before each auction (Casadeus & Wise, 2010; Hallowell, 2001; Kazumori & McMillan, 2005). The items are removed from the storage and displayed to the public. This is a crucial and essential moment for brick-and-mortar houses, since potential bidders can inspect and examine the artworks closely. As Jane Tennant, director of Tennant Auctioneers, said: “*The appreciation of art is subjective and visual, and no amount of catalogue description, condition reports or high resolution photos can prepare someone for how an object will make them feel in reality*”<sup>6</sup>.

Works’ preparation is fundamental, requiring a careful work of choice on how and where to exhibit works, to strengthen their characteristics, both aesthetic and commercial (Hook, 2014). During the viewing, auction house sales personnel walk the floor, making use of their selling talent and expertise, to answer questions (Casadens Masanell & Wise, 2010). Officially called ‘specialists’ or informally referred to as ‘experts’, what distinguishes them from the connoisseur or the critic is their ability to trade. In the words of P. Hook: “*the expert is less concerned with*

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<sup>5</sup> Quoted from the Sotheby’s catalogue *Contemporary prints: New York*, November 5, 1988, published by Sotheby’s.

<sup>6</sup> The quote of Jane Tennant is taken from an interview on Apollo-magazine.com. Visualized 20 February 2016.

*whether a painting is good that whether it is authentic (...) On their words hangs whether a work is worth \$5 million or nothing'* (p.200). In no other area of the arts does academic expertise confer this financial power, bringing them closer to the figure of analyst or broker (Hook, 2014).

#### 2.3.d The auction

Finally there is the auction itself.

The exhibition is dismantled and the lots are stored behind the stage where the auctioneer is standing. Individuals wanting to bid, have their credit approved by the auction house, before the sale takes place (Hallowell, 2001; Casadeus & Wise, 2010; Kazumori & McMillan, 2005). The auction begins precisely at the reported time: after the auctioneer has quickly greeted the audience, and explained the condition of sale and, if necessary, announced the lots withdrawn at the last minute, he begins the auction session by calling the first lot of the catalogue. The auctioneer plays a strategic role for the success of the auction. He has to manage bids in the auction room for more than two hours, including those through the phone and the web. At the same time he has to keep the interest high while remaining extremely convincing (Hook, 2014; Thornton, 2009). He will often change the tone of his voice, the expressions used and he will highlight certain works to arouse great interest (Thornton, 2009).

When the item exceeds the reserve price, and it is the only offer in the auction room, then the lot is awarded, or sold. The adjudication price is called hammer price, to which the fees charged to the buyer must be added, the so-called buyer's premium.

## 2.4 Digitalization of art auctions

With the advent of the twenty-first century, even the auction houses have adjusted and expanded their operations to the digital world.

Electronic markets based on the Internet have become popular venues for conducting business transactions (O'Brien 2001a; Grenier 2001; Pinker, Seidmann & Vakrat, 2003). They have greatly expanded the variety of goods and services that can be bought and sold using auction mechanisms (Blanco & Rodriguez, 2002). Following Bajari and Hortacsu (2004) cut flowers, seafood, classic cars, jewelry, coins antiques, and art are now auctioned online as well as in traditional sales. Furthermore, online

auctions present a number of advantages. They not only increase the number of items auctioned but also the number of potential buyers. In this type of auction anybody can easily become a bidder. In many cases bidding only requires the filling out of a registration form. Once this has been done, anyone can enter his bids. Hence, the average transaction costs will decrease as online auctions increase their share of auctions markets (Blanco & Rodriguez, 2002). Additionally Internet is breaking spatial and temporal constraints for both buyers and sellers.

This increasing art consumption and facility of trading has led to the emergence of new intermediaries with online-only auction services, foremost among these SaffronArt, Auctionata and Paddle8. Their economic impact is rapidly growing. Based on this trajectory, according to the Hiscox Online Art Trade Report 2016, we could expect the online art market to be worth \$9.58 billion by 2020 (Read, 2016). As a result, traditional auction houses are devoting more energy and resources to capturing new audiences and bids online, evolving their digital strategies.

## 2.5 Online auction process

The services provided by online auctions are not different from the original system. Similarly to traditional auctions, the most popular type of auction is the English one, for the simplicity in the bidding transmission method and clarity in the auction results. The rules are similar, however the process differs in several aspects. The stages of the auction development are divided into: registration of auction participants; auction preparation; sales process; evaluation of offers; conclusion of the auction and payment by the winner (D. Amor, 2001).

The process of getting sellers to consign lots is identical to the process used for traditional auctions. However, once consigned, each lot is entered into inventory and stored temporarily (Hallowell, 2001). Similar to an auction catalogue, auctioneers and experts must fill a form regarding the description of the object to be sold with its relative physical conditions. For each lot on sale, a high quality image attached to a brief description is available. Additionally, for each lot, an approximate packing and shipping cost is provided. Shipping costs vary with the size and location of the object (Hallowell, 2001, Pownall and Wolk, 2013). A Sotheby's executive compared shipping in traditional versus online auctions: "*In traditional auctions, slightly more*

*lots was shipped than taken away by hand". In the dot com auctions, 100 percent of the items are shipped...You cannot sell a \$300 item that costs \$500 to ship without creating a clicker shock. We have had auction winners try to withdraw their bids when they learn what shipping will cost. The better the information you provide online, the less buyer remorse will result* " (Hallowell, 2001 p.7).

Once the announcement is ready, users can browse the online catalogue displayed on the platform. The websites usually facilitate search, by carefully designing set of categories and subcategories to organize the listings. Additionally, users can search the listings by key-words, category, price range and completed items. This allow users to gather considerable information about similar products, which is useful in forming a bid (Bajari and Hortacsu, 2004). If the information provided is not satisfactory, a customer service is made available for all type of questions concerning the web site and the auction process. The call centers often operate 24 hours a day, seven days a week.

To subscribe to bids, a registration is needed. Bidders are required to fill in a form, providing their detailed and truthful personal information, which will be verified. The auction ends with the conclusion of the deal where the winning bidder who has offered the highest price is communicated, thus winning the auction.

## 2.6 Summary

The art market is composed of a large set of monopolistic markets which are characterized by the absence of a standardized valuation system and thus moderated by intermediaries who match supply and demand. Among them, in the secondary market, traditional auction houses play now more than ever a fundamental role. Their efficiency and ability to market value as an adequate approximation of the true equilibrium price, make it difficult for other intermediaries to replicate.

Furthermore, the advent of digitization has enlarged the access to the art market for an increasing number of users. If on the one hand bidders are spoiled for choice of where to buy, on the other one hand the seller is given the benefit of the doubt. In the next chapter, the main advantages and disadvantages between the two markets are underlined, especially from the seller's perspective.

### III. Offline market vs Online Market

#### 3.1 Introduction

In the last decade the Internet has lowered transactions and increased the number of buyers, sellers and good in auctions. Moreover, traditional auction houses are facing problems. Data from The TEFAF Art Market Report 2016 tend to confirm that Sotheby's reported a fourth quarter loss of \$11.2 million and predicted a significant drop in sales in the first half of 2016 compared to last year (McAndrew, 2016). Hence, in principle the Internet should increase competition. However, despite the incredible success of online auctions, art auctions still face difficulties to completely affirm themselves through the Web.

#### 3.2 Competition between traditional auction houses and the new online platforms

##### 3.2a Expertise

The exclusive treatment by traditional auction houses of items of the high-end segment of market, as well as the reputation and the already established client base for this particular segment of the market make the competition between the two types of intermediaries if not low, very difficult (Ashenfelter and Graddy, 2011). Following Ashenfelter (1989), "*the auction business is an interesting example of an industry where the cost of building a reputation act as a significant entry barriers to new competitors*"(p.27) While anyone can have an opinion, distinguishing the expert from the amateur can be problematic and times consuming (Arora and Vermeulen, 2013b); hence customers are likely to turn to established and reputable experts that have served the test of time rather than to new intermediaries (Arora and Vermeulen, 2013a). Moreover, expertise is one of the most important features of traditional auction market agents such as brick and mortar auction houses (Blanco & Rodriguez, 2002). The long histories of companies such as Sotheby's or Christie's has awarded them with an important credit in the art market that provides them with a better starting point in the present struggle between traditional and online auction firms to control fine arts auction market (Blanco & Rodriguez, 2002; Ashenfelter & Graddy, 2003).

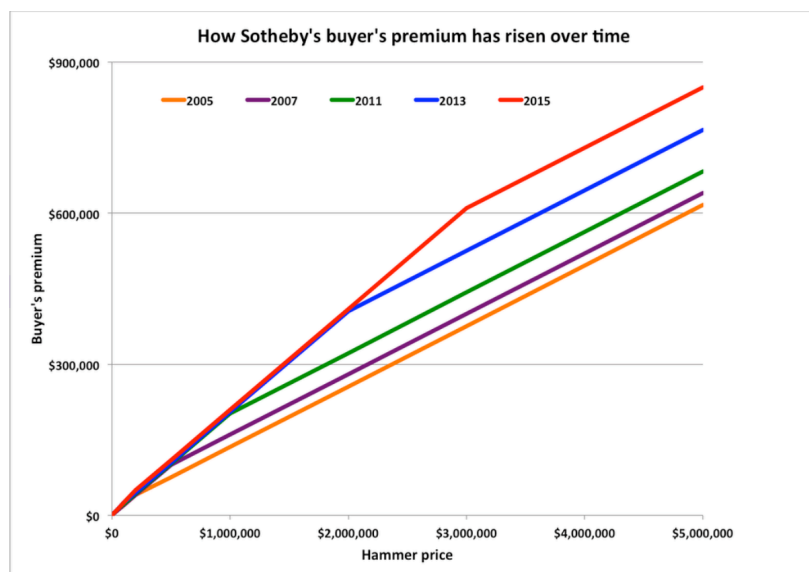


### 3.2.b Transaction costs

If on the one hand for the new online auctions, the impossibility of competing with the established top-tier auctioneers is self-evident, on the other one hand the successes achieved on the low and middle market are being reported more than once on the headlines of the magazines. And if online players cannot rely on a centuries-old reputation, they can instead continue to lower their transaction costs. They can benefit in fact from extensive listings and powerful search technologies that create liquid markets for specialized product categories, reducing considerably their fees, usually made of seller's and buyer's premium, among other costs (Bajari and Hortacsu, 2004).

As noted by Caves (2000), the seller and buyer's premiums represent a wedge between the reservation price of the seller and the willingness to pay of the buyer. Generally, they change according to the price fetched. Taking Sotheby's as an example, the buyer's premium starts at 25% of the hammer price for the first \$200,000; then 20% of any amount above that but less than \$3 million; and then 12% of anything above \$3 million (Sotheby's.com). The seller's premiums similarly start from a 15% and might go down, which can be seen as a system committing a consignor to only one auction house (Heskia, 2002). However, in the last years the rates have been rising drastically for the traditional auction houses (Salmon, 2015; Heskia, 2002).

Figure 1



Source: Fusion.net

As shown by a study conducted on the top-tier auctioneer Sotheby's (Figure 1), in the space of ten years, the buyer's premium has more than double. Taking as an example a \$3 million artwork, this has gone up from \$376,000 to \$610,000, highlighting an increase of more than 62% (Salmon, 2015). This substantial growth on buyers' premiums has led to a drop in the amount that sellers would have originally taken home. Always referring to the results of the above-mentioned study, considering a \$410,000 painting, even with a low commission, the seller is receiving only 82% of the value of the work. Five years ago, by contrast, a painting worth the same amount in total would have been hammered down for \$435,000. So a consignor paying no seller's commission would have received an extra \$25,000 – and would have taken home more than 86% of the value of the work (Salmon, 2015).

If on the one hand online new players cannot reach the dimension of the big two, who still attract the top level lots with the advantage of their market power, some observers expect smaller auction platforms to be more flexible about charges, favoring lower or middle-end sellers (Costello & Bensinger, 2000). Both smaller auction houses and online auctions are gaining market share and are competing with a more effective business model in the lower or middle segment of the art market. In this sense, the two brick-and-mortar giants are facing a difficult time and their operations can no longer compete with the 3-12% in premiums charged by online auctions as opposed to the industry standard of 20 to 25 percent (Weiss, 2016). As Alexander Gilkes- co-founder and president of Paddle8- stated, the power of online auctions lies in the ability to lower transaction costs for buyers and sellers by eliminating hefty expenses like printing physical catalogues and paying for prime real estate to display works in a physical gallery space, often in the most expensive part of a given city (Apollo, 2014). Additionally, transaction costs in the art auction business not only consists of the seller's and buyer's premiums and extra costs charged on illustration in the catalogue, but also transport and insurance (Heskia, 2002). And whereas the auction houses premiums do not make that much of a difference anymore, the physical shipping still does. In an era where consumers expect 24/7 immediacy, the Internet has shortened the timelines. Traditional auctions have very strict and long schedules to accommodate publishing catalogues, shipping works to the physical saleroom, and the outdated tradition of only selling specific categories during specific months. In the words of Alexander Gilkes: “ *Paddle8 can receive information about a work of art on a Tuesday, evaluate it and put it into a sale beginning on a Thursday, sell it by the*

*time the sale closes the following Thursday, and have it shipped directly from seller to buyer, with no middle man”* (Apollo, 2014).

### 3.2.c Information asymmetry

There is one set of frictions that the Internet has not reduced however: those of verifying quality (Kazumori and McMillan, 2005). If the art world is characterized by risk and uncertainty, the most relevant matter over which buyers are uncertain is the appropriate value of an artwork. Consequently the ‘information asymmetry’ problem constitutes one of the biggest limitation posed to the impressive growth of online auctions (Bajari and Hortacsu, 2004; Kazumori and McMillan, 2005). In traditional retail markets, buyers are able to examine the merchandise before a purchase and take possession immediately upon payment. In online markets, buyers cannot check the quality or authenticity of good before committing to buy they must pay in advance of receiving anything. In this way, Internet commerce may aggravate the conventional lemons problem (Krungman & Wells, 2008), where the quality of an item is only known to the seller and therefore creates opportunities for misrepresentation of objects and fraudulent behavior by sellers (Bajari and Hortacsu, 2004; Kazumori and McMillan, 2005; Velthuis, 2011a). In order to reduce risk and asymmetric information problems, online platforms are trying instead to offer buyers unprecedented access to information (Massad and Tucker, 2000, Mei and Moses, 2005; Arora and Vermeylen, 2013a). This access allows buyers to analyze the market and develop a bid price with greater confidence as to what previous buyers willingly have paid for similar items. Providing easy access to information on artists’ historical auction record for example, will spur competition and help bidders make more informed choices during the auction (Ashenfelter, 1989).

### 3.2.d Local vs International

Finally, Internet is breaking the spatial and physical constraint, contributing to an ever-increasing globalization. The art market in fact has become internationalized up to the point of becoming a worldwide market, leaving behind a juxtaposition of communicating national markets (Codignola, 2003). While the activity of the biggest international auction houses are still bound to the most important venues in New

York, London and Paris, where auction prices in these cities are a benchmark for worldwide prices in work of art, online players instead benefit of non-specific locations and have enlarged potential demand both geographically and socially. This translates into more flexibility for both seller and buyer to consign and purchase the desired artwork. It has to be considered however that not only big international auction houses exist. At a regional level for example, domestic auction houses could be preferred over online platforms. Especially for artworks that work better at a national level, online platforms would offer the same disadvantages as for international auction houses, with severe export regulations and high VAT (Heskia, 2002).

To conclude, every new method of trade offers an opportunity for economic agents to compare its costs and benefits. According to Zhe Jin and Kato (2007) such comparison motivates sorting across market segments and reshapes the whole marketplace. The Internet provides an excellent example, introducing substantial search cost savings over brick and mortar retailers but at the same time imposing new obstacle for sellers to convey quality. The online auctioneers in this sense are becoming the sector's new leaders but they still face important threats related to risk and uncertainty. Is the Internet right for selling art? Just for fear of jeopardizing their own reputation, the traditional auction houses are reluctant to totally entrust their brokerage activity to the web, however, as we have seen, this scenario is gradually changing towards a more important opening to the huge basin of cyberspace.

Still the final choice where the work of art is to be sold relies upon the seller. In the next paragraph, the crucial parameter for whether the consignor does better online or offline is explained.

### **3.3 The seller's choice**

The seller's choice between an online and traditional auction format involves a tradeoff between duration, transaction costs and reachability, favoring online auction and information generation, expertise and reputation, favoring a traditional brick-and-mortar auction.

Under the same conditions, a factor of considerable importance for the choice lies in the estimate offered by the auction house. Experts perform a minimum and a maximum estimate of the item's sale price, based on its properties and on auction

prices previously reached by similar works. Most of the empirical literature of auctions suggests that estimates do have an impact on the hammer price (Ashenfelter, 1989; Hodges, 2012; Mei & Moses, 2005; Kazumori & McMillan, 2005; D'Souza & Prentice, 2002) and they are generally good predictors (Ashenfelter, 1989; Louargand and McDaniel, 1991; Abowd and Ashenfelter, 2002). In contrast many other authors have provide empirical evidence of a systematic upward or downward bias of pre-sale estimates. Consignors often orient their choice towards an auction house which may offer the highest estimate, according to the opinion for which a high estimate leads to a higher auction result (Valsan & Sproule, 2008; Pardo-Guerra, 2001;); or in contrast, a high estimate could instead keep possible buyers away, while lower estimates may lead to a greater number of offers, which is why the auction house often tends to suggest the seller a more conservative approach in terms of estimate (Louargand & McDaniel, 1991; Ashenfelter & Graddy, 2011; Mei & Moses, 2005).

In most cases, the truthfulness of the work's initial value proposed by the auction house is a true assessment and honesty is considered the best policy for an auctioneer (Milgrom & Weber, 1982; Ashenfelter, 1989; Beggs & Graddy, 1997; Ekelund et.al., 1998; Bowens & Ginsburg, 2002; Mei & Moses, 2005). Economic theory on the one hand and common sense on the other seem to prove this policy right. Moreover, as above-mentioned, the art market is dominated by risk and uncertainty. Revealing information would drive low bidders to make offers in a more aggressive way, thus generating a positive impact on competition with other bidders and in a considerable increase of bids in the auction room. In any case, the final estimate is formulated especially based on the specialist's experience and on his opinion about the market trend (Ashenfelter, 1989; Da'Souza & Prentice, 2002; Dass & Reddy, 2008). Hence, both over and under estimation can give a negative signal with regards to the auctioneers expertise and reputation, previously mentioned as the key features of auction houses.

If the industry wisdom affirms that traditional auction houses rather than online newcomers usually fetch higher hammer prices, what primarily determines whether the seller does better selling an artwork online or offline does not depend from the expected price (Kazumori & McMillan, 2005; Marinelli and Palomba, 2011). What matter is the dispersion of valuation, or in other words the estimation window provided by the auctioneer (Kazumori & McMillan, 2005; Hodges, 2012; Marinelli & Palomba, 2011). Nowadays, most of the auction houses, from the brick-and-mortar

to the online ones, provide catalogues and web information regarding the lot on sale, setting a price window rather than one estimate, a ratio within which they predict the hammer price to lie in. This window represents the low and high estimate of the inspected item, and it is sometime referred as *estimate dispersion* (Kazumori & McMillan, 2005; Baye et al., 2001). Whatever the potential strategic price setting is, a buyer is likely to be influenced by the estimate's dispersion value. Kazumori and McMillan (2005) comparing auctions simultaneously held by Sotheby's offices and by Sotheby's online at Ebay in 2002, argue that the larger the estimate dispersion, the higher the probability to sell the item offline rather than online. The trouble appears to be that the mid-price artworks, purchased mostly for private aesthetic reasons, are too "high-touch" to allow potential buyers to make an accurate assessment of their value (Brooks, 2003). Buyers may mis-estimate their personal valuation when it is only available for inspection on the Internet. A wide estimation window in this sense, implies that the Internet auction mechanism tend to build in a bias, where the buyer recognize that winning an auction is conditional on being the most optimistic bidder about the item's worth, in other words having the highest estimate, and thus tends to overpay the item (Bajari and Hortacsu, 2004; Mei and Moses, 2005; Kazumori and McMillan, 2005). This phenomenon, usually refers as the "winner's curse", cannot be ameliorate by improved information about the item's true value, since the value depends on the taste of the buyer (Brook, 2003). The result is a drop of participation on Internet and depressed bids (Brooks, 2003; Mei and Moses, 2005; Bajari and Hortacsu, 2003; Kazumori and McMillan, 2005). The more precise the estimation window, the more likely the buyer will purchase an artwork online.

Accordingly, some findings have confirmed that wider estimation window tend to go along with higher realized prices (Mei and Moses,2005; Kazumori & McMillan, 2005). The intuition that extremely high value items should not be sold online therefore is typically correct. However, the consensus is not homogenous. Hodges (2012) argues in line with Marinelli and Palomba (2011) that a wide estimation window will reduce the buyers' willingness to pay, since the works seems illiquid and non-marketable and consequentially, a lower final hammer price will be realized.

Regardless which view is correct, setting the estimation window is to be seen as one of the crucial activities of an auction house and can lead to the choice of a traditional auction house rather than a online auction platform depending on its accuracy.

### 3.4 Summary

So far, we have seen in which respect online and offline auctions differ. Both present some peculiarities and some advantages toward consignors and buyers. Following previous studies, the seller's choice between a distribution channel rather than another is influenced by duration, transaction costs and reachability, favoring online markets and information generation, expertise and reputation favoring traditional brick-and-mortar auction. Moreover, a few academic have attempted to give an empirical explanation to such differences, analysing the variance of the estimate windows set by the auctioneers.

## IV. Methodology

### 4.1 Introduction to the research design and methods used

Previous empirical researches have mainly focused on comparison of Internet and conventional retailers for homogeneous products or as regards to user behavior.

Still we have not reached yet a consensus about potentials and limitations of online markets for sellers, especially in the cultural economic field. In this paper, we try to answer needs for more precise understandings of online markets by studying how a seller uses online or offline channels in practice and what metrics will influence its behavior. The aim is thus to empirically investigate the differences between brick-and-mortar auction houses and only-online auctions. Moreover, the strategy used in this comparative research will follow 'the most similar systems' designed theorized by Lijphart and Smelser (1971). The purpose is to test hypothesized empirical relationships between variables that are as similar as possible. For this reason, a first step is to increase the number of observations as much as possible, reduce complexity, find comparable case studies and restricts the analysis to key variables.

The first section of this chapter is concerned with the data collection procedure and the variables available for the analysis. Further, the research design is presented, discussing both analyses of the whole sample and of a sub-sample, namely paintings.

### 4.2 Data collection

#### 4.2.a *The population*

A previous research has compared data from the top-tier auctioneer Sotheby's and its online auctions held via Ebay (Kazumori and McMillan, 2005). The reasons behind this choice are essentially two. First, Sotheby's along with Christie's holds 7% of the global art transactions (Ehrmann, 2015). In other words together they dominate around half of the art auction market. Secondly, unlike the latter, Sotheby's is a public company, whose data are easily reachable and obtainable. Moreover, at the time the research was published, most of the online platforms were not yet born.

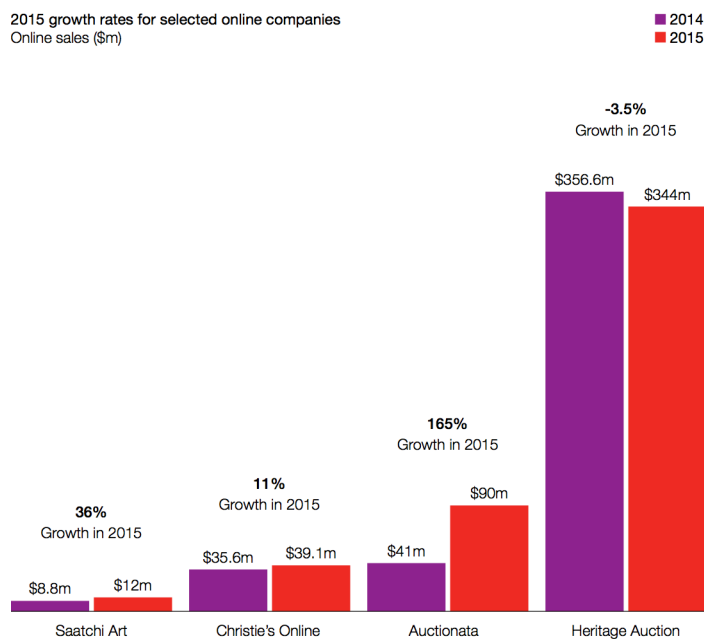
Unlike previous studies, the intent of this thesis is to compare two distribution channels belonging to two different populations.



*Auctionata*

With a growth of +165% compared to the previous year and a turnover of 90 millions dollars – more than double compared to the giant Christie's with its online platform Christie's.com (Read, 2016) - Auctionata is taken as benchmark for the online market. Founded in 2012 in Berlin with a second headquarter in New York, it is considered the biggest European online auction house and ecommerce company specializing in art, antiques and collectibles. The auctions are held weekly via live stream and they are designed according to the English auction system. Auctionata's employees and experts network is composed of approximately 300 people across its offices in Berlin, London, New York, Zurich, Rome and Madrid.

**Figure 2**



Source: Hiscox Online Art Trade Report, 2016

*Dorotheum GmbH & Co KG*

As a means of comparison for the offline market, the brick-and-mortar auction house Dorotheum was selected. Founded in 1707 in Vienna and privatized in 2001, it is considered one of the world's oldest auction houses, as well as the largest auction house in both Continental and German-speaking Europe, with more than 600 annual sales of works of art, antiques, furniture and jewellery held in four major auction

weeks a year at the Palais Dorotheum in Vienna <sup>7</sup>(Forbes, 2014; Dorotheum.com). Having raised its profile following the most successful results in its history, Dorotheum has expanded internationally with representative offices in Munich, Dusseldorf, Milan, Rome, London, Prague and Brussels, all of which hold regular previews of the major auction items (Dorotheum.com). Today the company accounts for 700 employees, 200 of whom are employed in non-Austrian offices, and 100 experts and specialists.

#### *4.2.b Sample and Sampling methods*

The sample was derived directly from Artnet.com, an online art platform founded in Berlin in 1989 with the aim of bringing more and more transparency within the art market. It was born as a *Price Database* for prices index and prices of auctioned works of art from the early eighties until today. With more than 8 millions results of auctioned items, obtained from 1400 different auction houses from all over the world, Artnet is considered the most comprehensive archive of auction results for fine art, design and jewellery and it provides detailed and objective information as well as in-depth examinations of art prices (Artnet.com).

The sample consists of auction results from Auctionata and Dorotheum of a one-year-time period, related to the last year of sales 2015 (12/2014-12/2015). Selecting the sample was bound to two restrictions. First, the companies do auction items with variety of themes including, among others, wines, antique toys, vintage clothing and watches. By means of selecting only art related auctions for the analysis, 64 auctions were selected. Second, no piece of artwork is comparable with another. As a consequence, a comparison can only yield valid results when made between (unique) items that are considered as being as homogeneous as possible. The main suggestion proposed by experts was to concentrate upon a specific artistic period and upon a specific country; the reason is that, even if the main factors affecting price are the same for each segment or intermediary of the art market, each one has its own specific rules that differentially affect the price (Marinelli and Palomba, 2011). Here we focus on auctions covering Modern and Contemporary Art, and thus the other markets (“Old Masters”, “19<sup>th</sup> century paintings” and “Classic Paintings” ect.) are not considered. The artistic periods of reference were selected according to two reasons.

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<sup>7</sup> Dorotheum uses as well the English auction system.

First, as mentioned by the TEFAF report 2016, Postwar and Contemporary Art accounted for the largest section of the fine art auction market (46 percent by value) and the Modern art remained the second largest section of the fine art auction market, accounting for 30 percent of the value of sales (McAndrew, 2016). Secondly, both Auctionata and Dorotheum hold auctions in which both Contemporary Art and Modern Art are showed. The auction titles often include both *genres* (i.e. “Modern and Contemporary Art” or “20<sup>th</sup> Century Art” etc.). It is thus difficult to take into consideration just one artistic period. Additionally, the auctions were selected according to the geographical area, thus considering auctions held in Berlin for Auctionata and in Vienna for Dorotheum, respectively leaving aside the results of the international offices.

As a consequence, the 64 auctions of fine art were reduced to 32. In chronological order, the auctions selected for the dataset are showed in Table 1 and Table 2. The sample consists of 1631 valid observations. The 1936 items that have been not sold, equalling an average of 54% sales, will be the unit analysis as unsold items, by nature failed to reach their estimated prices and are therefore not to be regarded (Mei & Moses, 2005).

**Table 1**

Overview of Dorotheum's auctions in the dataset

Date	Auction Title	Lots	Sold	Ratio
24/02	Modern and Contemporary	231	134	58%
06/05	Modern and Contemporary Art	242	140	58%
09/06	Modern Art	108	59	55%
10/06	Contemporary Art I	80	52	65%
11/06	Contemporary Art II	182	102	56%
24/11	Modern Art	114	73	64%
25/11	Contemporary Art I	88	75	85%
26/11	Contemporary Art II	155	118	76%
17/12	Modern and Contemporary	211	102	66%
		1411	855	61%

**Table 2**

Overview of Auctionata's auctions in the dataset

Date	Auction Title	Lots	Sold	Ratio
27/01	Modern Art	128	38	30%
25/03	Impressionism and Modern Art	91	36	40%
26/03	Postwar and Contemporary Art	107	35	33%
31/03	Modern Masters	64	17	27%
19/05	20 <sup>th</sup> Century Art	137	18	13%
19/05	Impressionist and Modern Art	114	59	52%
06/06	Postwar and Contemporary Art	163	63	39%
24/06	From Monet to Klee	93	33	35%
25/06	Blue Chips: Postwar and Contemporary Art	120	46	38%
24/09	Meet the Masters: From Monet to Pop	98	62	63%
24/09	Meet the Masters: Contemporary	125	63	50%
25/09	The Golden Age of Modern Art	83	39	47%
29/10	Picasso, Mirò, Chagall and Dali	62	36	58%
30/10	Pop Art	52	26	50%
30/11	German Art of the 20 <sup>th</sup> Century	135	39	29%
01/12	German Zeitgeist: Postwar Art	169	59	35%
03/12	Spain: Modern and Contemporary	74	23	31%
04/12	China Now! & Asian Contemporary Art	91	20	22%
04/12	Born in the USA: Modern and Contemporary Art	105	49	47%
05/12	British Modern and Contemporary Art	93	27	29%
07/12	100 Masterworks	95	31	33%
Tot		2199	819	37%

A higher percentage of successful sales in traditional auctions than online are predicted by the theory, given optimizing behavior by the seller. The theory predicts a 100% sale rate in traditional auctions. Given the bidder's participation costs, the seller always wants a sale (McAfee and McMillan, 1987). In reality, the sale rate is less than 100%, because there will be another opportunity to sell the item in the future (Kazumori and McMillan, 2005). The following data are in accord with this. Overall, the sale rate is 61 per cent in traditional auctions and 37 per cent in online markets. On the other one hand, the frequency of online auctions suggests a higher flexibility for the customer and consequently also for the seller, due to the overcoming of physical and geographical spaces. As highlighted in Table 2, the online auctions can

be held repeatedly over the same month, while the traditional auction houses are bound to less annual sales but with a larger number of items on the list, due to the high participation costs.

The types of items auctioned are compared in Table 3, with the breakdown of sale rates by category. Being difficult to classify the assets objectively into categories, we follow Artnet's categorization of fine art items. In their categories, there are Paintings; Drawings; Mixed Media; Prints and Multiples; Sculptures; Photographs; Installations and Design. The following categories, 'Sculptures', 'Photographs', 'Installations' and 'Design', relatively few in number, were reassembled in a single recoded category named 'Other'.

**Table 3**

Recoded Category – Sale Rates

	Live		Online	
	Frequency	Ratio	Frequency	Ratio
Paintings	378	46.6%	307	37.5%
Drawings	123	15.1%	90	11.0%
Mixed Media	174	21.4%	90	11.0%
Prints and Multiples	43	5.3%	244	29.8%
Other	94	11.6%	88	10.7%
Total	812	100.0%	819	100.0%

These data are almost consistent with data from elsewhere. At Sotheby's New York auctions in 2000, the sale rate for paintings and prints altogether accounted for the 83% of the total sales (Kazumori and McMillan, 2005). Although the ratio per paintings for Dorotheum is quite high, the sale rate of prints and multiples remains low. A possible explanation is that the online market seems more suitable to sell this specific category of fine art. As a matter of fact, prints and multiples account as the second most sold category for Auctionata. These findings go hand in hand with the results obtained in the ArtTactic survey of dealers' perception of the online market (Read, 2016). Paintings, Prints followed by Drawings are the most purchased categories online (Figure 3).

Figure 3

If you have bought fine art directly online, what type of medium have you bought?			
	2014	2015	2016
Paintings	55%	69%	72%
Prints	52%	59%	72%
Drawings	21%	35%	39%
Photographs	40%	39%	53%
Sculpture	21%	24%	31%
New media art (video/digital)	12%	12%	18%

ArtTactic Survey of dealers' perception of the Online Art Market  
Source: Hiscox Online Art Trade Report

### 4.3 Methods I

Following the literature, the seller's first consideration when choosing between a distribution channel rather than another are how much money he will spend and how much money he will get. Hence, the first part of the analysis aims to highlight the differences between Dorotheum and Auctionata when looking first at the transaction costs and then at the transaction prices.

#### 4.3.a Transaction Costs

The transaction costs for both distribution channels are recorded below.

The buyer premiums of the domestic Austrian auction house have reached the same price level as its international competitors, showing an average of 25% of the hammer price per lot, down to a 15% for the pricier artworks. Considering that the prices fetched by Dorotheum are more likely to represent the first €100.000-segment, Auctionata surprisingly positions itself not so far from the 25% buyer's premium of the brick-and-mortar house, charging the collector with a fee amounting at 23,80% of the hammer price. However, contrary to the usual terms, the online platform Auctionata does not seem to charge the fee as a proportion of the overall cost, setting a fixed buyer premium up to €1,000,000. Among other expenses, collectors in the European Union pay no sales tax but must pay an Artist' Resale Right for up to 70 years after the artist's death (Loader-Wilkinson, 2010). Usually varying between

0.25% and 4% of the value of the work, the amount of contribution remains once again fixed for Auctionata with a 2.1% while Dorotheum applies a different rate according to the hammer price.

Not included in the table are the personal expenses (e.g. travel costs) incurred by buyers participating to the physical auction at Dorotheum. We do retain however that the following expenses might add to the choice between a physical space or an online purchase.

**Table 4**

Buyer's transaction costs

	DOROTHEUM	AUCTIONATA
<b>Transportation</b>	As per separate agreement	2,98%
<b>Buyer Premiums</b>	25% up to €100,000.- 22% above €100,000.- 15% above €600,000.-	23,80%
<b>Contribution to the Resale Royalty</b>	4% up to €50.000.- 3% up to €200.000.- 1% up to €350.000.- 0.5% above €350.000.-	2.1%
<b>Interest</b>	6% tot.	---

- a. All the percentages refer to the hammer price per each lot, including VAT  
 b. VAT Standard Rate in Germany amount at 19%  
 c. VAT Standard Rate in Austria amount at 20%

As regard to vendors' premiums, both auction houses heavily charge the sellers with fees ranging around 20%. Similarly as for the buyer's charges, Dorotheum regulates the amount taking into account the estimated price, whereas Auctionata maintains the same percentage of 23,80%. It must be noted, however, that overall the amount of transaction costs the seller incurs offline is greater. Despite the lack of specific information about tariff of charges<sup>8</sup>, the brick-and-mortar auction adds a fee for the cataloguing of the lots put on sale, an advance interest of 4% and some handling fees. As regard to valuation transportation and storage, Auctionata proposes fixed commissions whereas Dorotheum varies its fees depending on the number and on the volume of the lots.

<sup>8</sup> Signaled as: "as per separate agreement"

**Table 5**

## Seller's transaction costs

	DOROTHEUM	AUCTIONATA
<b>Valuation</b>		
<5 lots	As per separate agreement	Free of charge
<10 lots	As per separate agreement	€119. - *
>10 lots	As per separate agreement	€119. - **
<b>Transportation</b>		
	As per separate agreement	2, 98%
<b>Storage</b>		
	> 1% p.l. /acc. to volume	2.38 %
<b>Seller Premium</b>		
	22% up to €3000. - 15% above €3000.- 9.6% from €10,000.-	23,80%
<b>Advance interest</b>		
	4% tot.	---
<b>Catalogue</b>		
	As per separate agreement	---
<b>Retraction /auction fee</b>		
the day of the auction	24% on the starting price	---
for displayed items on the catalogue	18% on the starting price	---
<b>Handling fee</b>		
	From €12.- to €50.-	---
<b>Additional notes</b>		
	for every consignment, an account is maintained	

a. All the percentages refer to the hammer price per each lot, including VAT

b. VAT Standard Rate in Germany amount at 19%

c. VAT Standard Rate in Austria amount at 20%

\* as a lump sum + €59,50.- for each 30 minutes of performance

\*\*as a lump sum + 2,38 % of the calculated average value of all items

## 4.3.b Transaction Prices

The transaction price is intended to be the hammer price, or the price upon which the auctioneer's hammer falls, determining the sale price, but it does include in this case buyers' premiums and thus reflecting the final prices paid by purchasers<sup>9</sup>.

The summary statistics of the sales prices in offline auctions and online auctions is recorded below.

<sup>9</sup> The auction results provided by Artnet.com include the buyer's commission ( Artnet.com)



**Table 6**

Descriptive statistics of the variable Transaction Price (N=1631)

	Transaction Price Dorotheum	Transaction Price Auctionata
N	812	819
Range	393075	199460
Minimum	325	540
Maximum	393400	200000
Mean	16455.37	9445.81
Median	6250.00	3766.00
Mode	8750 <sup>a</sup>	3750
Std. Deviation	33659.860	18523.174
Skewness	6.340	5.461
Std. Error of Skewness	.086	.085
Kurtosis	52.718	37.988
Std. Error of Kurtosis	.171	.171

a Multiple modes exist. The smallest value is shown.

A first overview of the data as presented in Table 6 reveals that the starting price range of items auctioned at Auctionata starts as low as €540 for a sculpture in bronze of Joe Tilson and ranges till €200.000 for an oil on canvas by Liu Ye, classifying the auctioneer as a participant of the lower and middle segment of the secondary market (McAndrew, 2016). Likewise the brick-and-mortar auction house operates in the same segment of the art market. The highest offline auction price in the sample is €393.400 for an oil on canvas of Alfons Walde and the lowest-offline auction price is €325 for a porcelain collectible of Gundi Dietz.

Even if we would expect a higher value for the lowest offline auction price in comparison to the lowest online auction price, the means clearly state that there is difference between both auction houses. The data show that the average sale prices in offline market are nearly twice as those recorded in the online market. Following Kazumori and McMillan (2005), we interpret this difference as strong evidence that the seller sells different assets in online and offline markets.

Although the mean suggests an average winning bid price range exceeding respectively €16.000 for Dorotheum and €9.000 for Auctionata, the median and mode relativize these findings. As a matter of fact, the median is insensitive to extreme scores, whereas the mean is not, and thus it better represents the centermost value of both samples (Salkind, 2014). For both auction houses, the median and mode values are significantly reduced, maintaining however a consisting difference between them. The most frequent realized price for the online market is €3750, whereas the smallest frequent value for the offline market €8750.

Histograms of selling prices are given in Charts 1 e 2. For both auction houses, the distribution is substantially positively skewed. In the case of each channel distribution a handful of 'masterpieces' was detected, pushing the average very high. These outliers suggested thus, high values of skewedness and kurtosis. It is a common phenomenon in the cultural sector, especially for the secondary market of auctions, where price escalation and extreme cases of underperformance are no rarity (Velthuis, 2005). Additionally as the dataset is moderately large, the more the sample reflects the population from which it was drawn, and thus the likelihood of outlying values becomes greater (Osborne & Overbay, 2004).

Because of a non-normal distribution, the transformation has been necessary. Following Field (2013), the sample was inspected for human error, but none could be detected. To test the effect of outliers, an ANOVA was performed. Removal of outliers produced significant effect, reducing in most cases errors of inference. Furthermore, trimming the outliers has been preferred since the cornerstone of our analysis lies on the average performances of both auction houses.

**Table 7**

Descriptive statistics of new dataset for variable Transaction Price (N=1488)

	Transaction Price Dorotheum	Transaction Price Auctionata
N	752	736
Range	42211	18744
Minimum	325	540
Maximum	42536	19284
Mean	9624.97	4915.92
Median	5625.00	3450.00
Mode	8750 <sup>a</sup>	3750
Std. Deviation	9599.507	4171.023
Skewness	1.420	1.403
Std. Error of Skewness	.089	.90
Kurtosis	1.368	1.368
Std. Error of Kurtosis	.178	.180

a Multiple modes exist. The smallest value is shown.

The new dataset is presented in Table 7. Although the sample is reduced for less than 100 observations per auction house, the data suggest a much more moderate value of skewness and kurtosis. The means are consistent with the previous dataset, showing a noteworthy difference between the auction houses. The value for Dorotheum remains twice as the value of Auctionata. Moreover, the mode is perceived as unchanged. The new dataset appears to be valid.

Beyond looking at the overall performance of transaction prices for both auction houses, it is of interest and in line with previous research to detect possible differences with regards to similar characteristics of the item sold. The largest number of sold items for both markets within the same category, was 'Paintings'. As mentioned before, it constitutes the largest category by far for both Modern and Contemporary Art at Dorotheum. Whereas it is the first category per number at Auctionata, even if it is followed very closely by the category 'Prints and Multiple'.

The results emerging from the descriptive statistics of the dataset of paintings (Table 8) are, once again, in line with the expectations. The average sale prices for items belonging to the same category are higher offline than online. The difference in means remains considerably large, even if the mode for Auctionata is closer to the one achieved in Dorotheum, compared to the modal values found for the whole sample. One explanation is that, although the average prices are higher for the brick-and-mortar auction house, the range of prices is at the same time noticeably larger, starting from €375 up to approximately €43.000<sup>10</sup>. Surprisingly, Auctionata starts with a higher lowest-value of €625 for a painting sold, however, up to just an average of €19.000.

**Table 8**

Descriptive statistics for the Dataset Paintings (N= 598)

	Transaction Price Dorotheum	Transaction Price Auctionata
N	339	259
Range	42161	18659
Minimum	375	625
Maximum	42536	19284
Mean	10489.55	5832.19
Mode	8750	7500
Std. Deviation	9536.255	4528.752
Skewness	1.204	1.062
Std. Error of Skewness	.132	.151
Kurtosis	.752	.304
Std. Error of Kurtosis	.264	.302

In accordance with the industry wisdom, the data showed so far, demonstrate that generally transaction prices achieved in a traditional auction house are higher than the ones achieved by an online platform. Moreover, we also have attempted to convey two cases as homogenous as possible, selecting for both auction houses a certain

<sup>10</sup> The outliers were discarded from the subsample.

category of items with the same artistic period. Although the results are less severe than the ones predicted by the theory, they do underline a difference between the two distribution channels.

#### 4.4 Methods II

The second part of the analysis aims to answer the research question, and thus we will explore in this section, how the seller allocates an asset between offline and online auctions.

Following the theoretical part, the main assumption is that the choice between selling an asset in a traditional auction house or in an online platform might depend upon the item's expected value (estimate) and the variance of this value (estimation window or estimate dispersion).

Before comparing the average of the estimates and their dispersions among the auction houses, an analysis to see how far they are good predictors of the hammer prices was conducted. Following previous researches, unbiasedness has been set equal to a zero percent difference between the estimated value and the realized price (Hodges, 2012; Dass & Ready, 2008). Beyond calculating this value, a simple regression analysis was conducted to accept or reject the null hypothesis of unbiasedness. Following Chanel et al (1996) and D'Souza and Prentice (2002) the realized price was regressed against the estimated price  $P^e$ , set as the estimation interval mid-point. Rejection of the null hypothesis requires the coefficient of  $P^e$  to be different from zero, whereas acceptance requires the coefficient to be zero (D'Souza & Prentice, 2002). The aggregate nature of the data available and the lack of bidding information (such as the opening bid, the bid arrival data, number of bidders, etc.) for specific auctions precluded one from looking at the dynamics of price formation during the auctions (Dass and Reddy, 2006).

Subsequently, a probit regression was conducted on the estimates and their dispersions to test the theoretical proposition. The variables chosen for the analysis are both continuous and categorical (Table 9). We use the auctioneer's presale announcement of high and low estimates to get measures of the estimate average and dispersion. We take the mean of these two numbers to be the mean of the estimate distribution and the difference between them to measure the dispersion. The difference between high and low estimates is not an ideal measure of dispersion of

signals, but no other measure is available, and this is standard in the literature of auctions (Ashenfelter, 1989; Bauwens and Ginsburgh, 2000; Mei and Moses, 2002; Kazumori and McMillan, 2005).

This method has been favored over a regular multiple regression analysis, as the outcome of a probit regression is a binary response variable related to a set of explanatory variables (Field, 2013). The aim is to predict probabilities that items fall into two categories of binary response (offline/online) as a function of the explanatory variables *estimate average* and *estimate dispersion*. Moreover, the probit model has been extensively used in many previous researches on comparative designs (Ashenfelter and Graddy, 2011; Kazumori and McMillan, 2005).

**Table 9**

Overview and description of variables

<i>Given</i>	<i>Description</i>
Distribution Channel	Live Auction or Online Auction
Auction Number	The Number of the individual Auction, chronological by date
Category	Painting, Mixed Media, Drawing, Print & Multiples, Sculpture, Photograph, Design, Installation
Medium	Materials used to create the work of art
Period	Modern Art or Contemporary Art
Low Estimate	Representing the lowest value of the range in which the lot might sell at auction
High Estimate	Representing the highest value of the range in which the lot might sell at auction
Transaction Price	It is the price upon which the auctioneer's hammer falls, determining the sale price, but it does include the buyer's premium.
Artist	Name of the artist
<i>Added</i>	
Recoded Category	Painting, Mixed Media, Drawing, Print & Multiples, Other
Estimate Average	Average value of the range between low and high estimate
Estimate Dispersion	Difference between high and low estimate

## V. Results

### 5.1 Introduction

We discuss the results of the analysis in the following manner.

First, the results to test unbiasedness of estimates are being reported for the whole sample and subsequently for the dataset of paintings. Second, the relative findings of a correlation between Estimate Average and Estimate Dispersion are being highlighted. Further, the impact of Estimate Average and Dispersion on both distribution channels is being discussed through a probit regression. Ultimately, we proceed with observations on the subsample 'Paintings' in terms of characteristics possibly influencing the choice of an offline auction house rather than an online one.

### 5.2. Test for bias

The results of the simple regression analysis to accept or reject the null hypothesis of unbiasedness for both auction houses, where the realized price is dependent and the estimate price independent variable are the following. The prediction power of the regression for the brick-and-mortar auction house is satisfactory with  $R^2=.811$  ( $F=3224.092$ ,  $p<.001$ ). However, the unstandardized regression coefficient is not equal to zero and therefore the null hypothesis, unbiasedness, is to be rejected. As regards to the online platform Auctionata, the results are similar with  $R^2=.796$  ( $F=2869.262$ ,  $p<.001$ ). Once again, the unstandardized coefficient being different from zero, the null hypothesis of unbiasedness is to be rejected also for the online channel.

**Table 10**

Results of tests for unbiasedness – Whole Dataset

Dorotheum			Auctionata		
	b	Std. Error		b	Std. Error
Constant	910.979*	216.123	Constant	748.515*	104.281
P <sup>c</sup>	1.182*	0.021	P <sup>c</sup>	1.035*	0.019
Durbin-Watson	1.577		Durbin-Watson	1.148	

\* sig. at  $p<.001$

Zero or first order correlation is also to be rejected as for the result of the Durbin-Watson test. As the value of  $P^e$  is above zero, underestimation is to be assumed.

The regression analysis performed on the subsample of paintings also show similar results (Table 11). The predictive power of the model for both samples is significant with  $R^2 = .824$  for Dorotheum and  $R^2 = .807$  for Auctionata. The coefficients are not equal to zero ( $F=1577.805$ ,  $p < .001$ ) and ( $F=1075.942$ ,  $p < .001$ ), hence unbiasedness is to be rejected.

The variance of  $P^e$  to zero is relatively consistent, suggesting a moderately biased assessment between estimate and realized price for both auction houses, especially for Auctionata.

**Table 11**

Results of tests for unbiasedness- Dataset Painting

Dorotheum			Auctionata		
	b	Std. Error		b	Std. Error
Constant	921.859*	324.609	Constant	759.161*	198.107
$P^e$	1.171*	0.029	$P^e$	1.022*	0.31
Durbin-Watson	1.451		Durbin-Watson	1.373	

\* sig. at  $p < .001$

Overall, the findings for both samples highlight that estimates of pre-sale prices are significantly biased if taken as the mid-point of the high and low estimates, suggesting that overall the estimates are biased downward. This pattern holds for each individual category of artworks (Table 12). Looking closer at our two samples in fact, per each category of artworks on average the price exceeds the estimate mid-point at least at the 15%. The average low estimate appear to be a better predictor than the mid-point of the estimation window. But this can also be considered as odd, since the midpoint is an intuitive choice and one can hardly explain why experts would not center their range on their best price prediction (Bauwens and Ginsburgh, 2000).



**Table 12**

Percentage of price above estimate mid-point per category at Dorotheum and Auctionata

DOROTHEUM	Painting	Mixed Media	Drawing	Other	Total Sample
N	339	163	120	88	752
Avg. low estimate	6776.99	6179.75	4670.00	5461.36	6135.90
Median low estimate	4000.00	3500.00	2500.00	2000.00	3800.00
Avg. high estimate	9566.12	8663.80	6521.42	7890.72	8613.52
Median high estimate	6000.00	5000.00	3500.00	3000.00	5000.00
Avg. hammer price	10489.55	9229.57	8049.68	8742.24	9624.97
Median hammer price	6875.00	5625.00	4125.00	3353.00	5625.00
Avg. estimate mid-point	8171.55	7421.78	5595.71	6676.04	7374.71
Median estimate mid-point	5000.00	4250.00	3000.00	2500.00	5625.00
Avg. Price is above M (%)	+28,37%	+24,36%	+43,85%	+30,95%	+30,51%

AUCTIONATA	Painting	Print	Mixed Media	Drawing	Total Sample
N	259	230	85	84	736
Avg. low estimate	3923.55	2492.70	3741.88	2759.52	3258.06
Median low estimate	3000.00	1700.00	2400.00	2000.00	2100.00
Avg. high estimate	6003.42	3483.45	5162.18	4272.13	4796.88
Median high estimate	4000.00	2340.00	3000.00	3000.00	3250.00
Avg. hammer price	5832.19	3906.80	5132.67	4262.46	4915.92
Median hammer price	4128.00	2500.00	3500.00	3095.00	3450.00
Avg. estimate mid-point	4963.48	2988.07	4452.03	3515.83	4027.47
Median estimate mid-point	3500.00	2035.00	2530.00	2500.00	2990.00
Avg. Price is above M (%)	+17,50%	+30,75%	+15,29%	+21,24%	+22,06%

## 5.2 Estimate Average and Estimate Dispersion: Correlation and Regression Analysis

A Pearson product-moment correlation coefficient was then computed to assess the relationship between the estimate average of an artwork and its estimate dispersion. There was a positive and strong correlation between the two variables,  $r = 0.876$ ,  $n = 1488$ ,  $p < 0.01$ . A scatterplot summarizes the results (Appendix).

Overall, there is a statistically significant correlation between the Estimate Mean and the Estimate Dispersion. However, we cannot make any other conclusions about this Relationship based on this number. In order to analyze the relationship between the two variables, a simple regression analysis was performed.

Table 13

Correlation between Estimate Average and Estimate Dispersion

		<b>Correlations</b>	
		Estimate Average	Estimate Dispersion
Estimate Mean	Pearson Correlation	1	.876**
	Sig. (2-tailed)		.000
	N	1488	1488
Estimate Dispersion	Pearson Correlation	.876**	1
	Sig. (2-tailed)	.000	
	N	1488	1488

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**Table 14**

Regression calculated to predict the Estimate Avg. based on the Estimate Dispersion

	Unstandardized coefficients		Std Coefficients
	b	Std Error	Beta
(Constant)	1898,028	270,664	
Estimate Dispersion	2,241	.029	,884

a. Dependent variable: Estimate Average

A simple linear regression was calculated to predict the Estimate Mean based on the Estimate Dispersion. A significant regression equation was found ( $F(1,1629)=5806.653$ ,  $p<.000$ ), with an  $R^2$  of .781. However, the regression coefficient is not equal to zero and therefore the null hypothesis, of no relation between the variables, is to be rejected.

The descriptive statistics of the Estimate Average and the Estimate Dispersion of the dataset reported in Table 15 reconfirm these findings. The estimate dispersion is higher for Dorotheum and consequently so is the pre-auction estimate average value.

The highest mean estimate in our offline auctions is a painting realized by Hermann Nitsch, at €37,500; the highest online is a Sam Francis' lithograph, at €25,000. The lowest mean estimate in our offline auctions a Gundi Dietz collectible in porcelain, at €250; the lowest online is a bronze sculpture by Thomas Duttonhoefer, at €450.

Concerning the variable 'Estimate dispersion', the result is similar. Although less apparent, the value of the mean is higher in the offline market rather than in the online one. The highest estimate dispersion in the offline auctions is a mixed media by Franz West at 17000; the highest online is an oil on canvas by Edward Cucuel, at €15000. The lowest estimate dispersion in the offline auctions is a drawing by Heinz Stangl, at €100; the lowest online is a Hans Erni lithograph at €0.

**Table 15**

Descriptive statistics of Estimate Average and Estimate Dispersion for both distribution channels.

	Dorotheum		Auctionata	
	Estimate Average	Estimate Dispersion	Estimate Average	Estimate Dispersion
N	752	752	736	736
Range	37250	16900	24550	15000
Minimum	250	100	450	0
Maximum	37500	17000	25000	15000
Mean	7374.71	2477.62	4027.47	1538.83
Std. Deviation	7317.479	2663.729	3597.047	1977.078
Skewness	1.477	1.900	1.864	2.655
Std. Error of Skewness	.089	.089	.090	.090
Kurtosis	1.636	3.804	4.243	8.783
Std. Error of Kurtosis	.178	.178	.180	.180

These cases further suggest, as we would expect, that items with a higher average value show a higher dispersion of value estimates. This is the case in our data. The correlation between the mean of the high and low estimates and their difference is 0.8. The analyses conducted so far suggest that the pre-auction estimate dispersion does indeed reflect the degree of valuation uncertainty and that this valuation uncertainty appears to be greater for Dorotheum rather than for Auctionata.

### 5.3 Probit regression

Finally, we are interested to see whether a greater estimate average and correspondingly a greater estimate dispersion is likely to lead to the choice of Dorotheum or not. The dependent variable 'Distribution Channel' was redefined as a dichotomous variable with 0 for Online Channel/Auctionata and 1 for Offline Channel/Dorotheum. The predictor variables of interest are the level of estimate dispersion and the estimate average of the items took into consideration.

The probit regression was run only on the subsample Paintings (N=598), in order to have a dataset as homogeneous as possible, giving thus interesting results. The other datasets, namely 'Prints', 'Mixed Media' and 'Drawings' were too small to provide equally significant results.

The results of the probit regression of the choice of offline(1) or not offline (0\online) regressed on mean and dispersion of estimates of the subsample Paintings (N= 598) are reported in Table (16).

**Table 16**

Results for probit regression

OFF	Coeff.	Std. Error	z	P>z
EstDisp	.0001669	.00000422	3.95	0.00
EstAvg	.000123	.0000192	6.40	0.00
Cons	-.2157085	0.808077	-2.67	0.00
Obs		598		
LRchi2		59.14		
Prob>chi2		0.00		
PseudoR2		0.0723		

The model as a whole has a good predictive power, the likelihood ratio chi-square of the model being equal to 59.14 with  $p < 0.001$ . Despite a strong positive correlation between the two independent variables, each is significantly different from zero. An increase in the Estimate Dispersion is more likely to lead to the choice of  $Y=1$  (Dorotheum| Offline Channel), raising the z-score of  $\Pr(Y=1)$  by 0.0001669. So raising Estimate Dispersion has a constant effect on  $Y$ . Similarly, an increase in the Estimate Average will lead to an increase in the z-score of  $\Pr(Y=1)$  by .00023.

## VI. Interpretation

The seller's choice between the traditional brick-and-mortar house Dorotheum and the only-online auction platform Auctionata is influenced by different parameters.

While we rely on relatively simple econometrics for this study, a number of interesting characteristics are readily apparent.

The offline auctions held by Dorotheum, not only present on average higher sale rates compared to online auctions held by Auctionata but - the segment of the market being similar - they also reach higher hammer prices. The bulk of Auctionata transactions takes place below €10,000, a segment usually attained by 84% of online art buyers according to the Hisconx Online Art Report (2015) while Dorotheum present an average transaction price ceiling above €10,000.

Nevertheless, the arguments do not immediately suggest that the seller positions more expensive items on traditional auction houses. Moreover, literature also agrees by advising of the presence of some objective factors typical to each work, which have an effect on its price: year of production, size, artistic trend and the technique employed in its execution and most importantly the artist's renown, which we do not have analyzed and compared.

Then why do sellers choose to sell the expensive art assets in traditional auction houses?

It is primarily dependent of the relevant transaction costs and the expected revenue the different mode of sales might bring.

Our findings suggest that Dorotheum charge the seller with a lower premium in comparison to Auctionata, however, it is also true that the brick-and-mortar house presents overall more additional expenses and a higher buyer's premium. Consistent with Hallowell (2001) and Ashenfelter and Graddy (2011), the sellers generally incur in higher expenses in brick-and-mortar auctions due to the cost of holding previews or exhibitions, printing highly detailed catalogue and indirectly paying for the bidders' entry. These transaction costs are proportionate to the sale price for Dorotheum, whereas the general expenses are fixed for Auctionata; hence if the expected sale price from an offline auction does not cover these transactions costs, the seller will not hold the auction (Ashenfelter & Graddy, 2003; Mei and Moses, 2005; Velthuis, 2011a).

Internet auctions on their side require fewer employees and thus have lower overhead and higher profit margin for auctioneers. Overhead costs are usually a significant portion of the operating cost of businesses and Internet auctioneers can rely on programs to manage transactions and automate the bidding process. This is the case with Auctionata and its 300 employees, twice less in comparison to the Austrian auction house. Moreover, the online company is changing its business strategy with a focus on maximizing cost-efficiency by cutting staff (Bodick, 2015; Li, 2015). If the initial effort to establish and enlarge their operations was made by a large cadre of employees, going forward the online company is taking advantage of “its unique technological business model to operate with great efficiency” (Bodick, 2015). Subsequently, these general costs saving could translate to lower transaction costs to both buyer and seller. With less transaction fees paid to auctioneers, sellers can sell cheaper items on the Internet, making profit out of it, rather than colliding with brick-and-mortar miscellaneous expenses.

The relative findings are in line with what predicted by Pesando (1993), whom, comparing prices of identical prints sold at Sotheby's New York and Christie's New York, finds that in average the prices reached by Sotheby's are 14 percent higher than the one fetched by the private auction house. One could argue that is the general demand for the type of art object under investigation that determines the price and not the auction house, and as we have previously seen this appear to be the case. But additionally as reported above, even for the same year, prices for similar art objects differ between auction houses. It is usually stated in the auction literature (Pesando, 1993) that larger auction houses tend to increase the price (Forsund and Zanola, 2006).

A second finding, in line with the theory, suggests that the limits of online auctions compared to offline processes differ depending on the valuation uncertainty of the artwork put up for sale.

A lower expected value usually implies that the asset has a shorter range of estimate dispersion (Kazumori and McMillan, 2005; Mei and Moses, 2004; Gershkov and Toxvaerd, 2004). Our results, confirm the expectations, showing a high correlation between the estimates average and the estimation windows. Additionally the probit regression shows that the wider the estimate dispersion, the higher the expected value, and the more likely this would lead to the choice of Dorotheum. This could be

interpreted as lower estimate dispersions are preferred in online distribution channel since the seller cannot reveal complete information through the website, preferring thus a more accurate estimation window. Although technology is providing more tools to satisfy the customers, with zooming technologies, high-resolution pictures and high-speed connection, the item cannot be inspected, as it usually is during a pre-sale exhibition held by an offline auction house. Moreover, the role performed by specialists during previews is lacking, and their ability to gain the respect and trust of the consignor, can be crucial in the delivery decision to an auction house rather than to another one. As far as good is the information reported on the webpage and the possibility to compare it with other online sources, the characteristics of the painting are left behind. As claimed by Kazumori and McMillan (2005), among others (Marinelli and Palomba, 2011; Mei and Moses, 2005), a painting reproduced on a computer screen loses much of its vigor and one could barely advocate the opposite. The depth and texture of the oil paint, the gradations of light and shade, the subtleties of the colors are unlikely to be captured regardless the technological performance. With prints, photographs and collectibles, arguably, something closer to full information can be conveyed to online bidders (Kazumori and McMillan, 2005).

If on the one hand a more accurate estimation window proves the role as knowledgeable expert of the market and justifies reputation (Pardo – Guerra ,2011), on the other one hand it is also true that the guidelines to translate aesthetic value into monetary term are kept confidential. As Kazumori and McMillan (2005) argue, a Van Gogh painting being unique, it is hard to extrapolate from past auction prices of other Van Gogh paintings. As a consequence the dispersion results higher for its uniqueness rather than for a lack of expertise. A Salvador Dali print, by contrast, may exist in dozen or more copies, several of which could be auctioned in a single season (Pesando, 1993). With a *nonunique* item like a print or a collectible, a photograph or a stamp, the history of prices fetched by others can be a useful resource to assess its value, and as matter of consequence, the estimate dispersion results lower and thus more precise than a painting. Consequently, the higher estimate dispersion found for artworks sold at Dorotheum and the lower dispersion for those present at Auctionata, may lead to the conclusion that the traditional brick-and-mortar auction house focuses on more refined artworks or\and on categories of artworks, where a precise estimate is harder to deduce. One may argue in the contrary, that due to lower estimate windows, Auctionata provides more accurate estimates than Dorotheum. As regard to their



expertise however, both auction houses seem to generate biased estimates. The results of our analysis suggest in fact systematic downward bias. Many scholars claim that underestimation encourage potential buyers (D'souza and Prentice, 2001; Lourgang and McDaniel, 1991; Mei and Moses, 2005). On the other way round, downward bias could also be a strategy to attract and bind potential sellers. Underestimation could lead to a string of pleasant surprises for sellers, who see their hopes and expectations exceeded. As notated by Valsan and Sproule (2008) many firms underestimate their current results in an attempt to surprise the market with better than expected results in the near future.

Finally, both auction houses have a reputation to defend. Dorotheum with more than 300 years of experience can be associated with the old-centuries giants Christie's and Sotheby's, which maintain a respectable and refined image by preserving and enhancing a certain form of conservatism in setting the estimates. In the words of Mei and Moses (2005), these auctioneers might look foolish and careless if the artworks consistently failed to fetch the expected price. On the other side, Auctionata, new comer among the only-online platforms has to build and enhance a certain level of trust for both buyers and sellers. In online auction research, reputation is typically considered the key indicator of trust (McKnight & Chervany, 2001; Pavlou, 2003; Pavlou and Gefen, 2005). Ba and Pavlou (2002) define trust as the buyer's belief that a transaction with a seller will occur in a manner consistent with expectations. Accordingly, underestimation might be seen also for Auctionata as a strategy to bind consignors.

The last piece of indirect evidence for the seller's choice is that an expensive asset with a small valuation uncertainty can be successfully sold also in online auctions. The history of successful online auctions have seen for example a copy of the Declaration of Independence sold at 8.14 million at Sotheby's.com in 2000 (Kazumori and McMillan, 2005), while at Auctionata an Egon Schiele watercolor from 1916 sold at €1.5 million, became the most-expensive work ever auctioned online. The intuition once again is that these two items were suitable for online sale due to their intrinsic nature (a print and a drawing) suggesting a better researchability and comparability among similar artworks and consequently a more accurate estimate.

## VII. Conclusions

A number of limitations are to be mentioned with regards to interpreting the results. First, we have attempted to give an empirical explanation to the seller's choice between a traditional auction house and an online platform, comparing a dataset of artworks. However an artwork differ from other goods. The value of art is not equitable or measurable. Its determinants are related to aesthetic and artistic values, but neither artistic nor aesthetic values are objective or universal (Oberender & Zerth, 2002; Bonus & Ronte, 1997). Accordingly, the demand may depend on aesthetic deliberations, portfolio diversification or conspicuous elements (Velthuis, 2011a). With regards to our analysis of paintings, the amount of cases per category has been partially too small to produce significant results. A dataset with a bigger population would solve this issue. Last but not least, the analysis has been conducted removing the outliers. We do believe however that the outliers were too far out from the mean and therefore they could be justifiably eliminated without affecting the assumptions.

Throughout this paper we have discussed the potential of online art markets compared with more traditional auction mechanisms. We argued in line with Mei and Moses (2005) and Arora and Vermeulen (2013a) that the Internet is providing unprecedented access to information and transparency to buyers. Furthermore, it has lowered the entry barriers with less physical boundaries and less transactions fees. However, in line with Arora and Vermeulen (2013b) there still seems to be an upper price limit to online art sales. Online auctions have not up to now reached their full potential and sellers have been reluctant to opt for this new distribution channel for high-value items. According from our data however, what primarily determines whether the seller does better selling in an online platform rather than in a traditional auction house is the uncertainty of value of a given category of artworks. Additionally the seller might be influenced by the relative transaction costs and by the level of reputation of the auction house. Our findings seem to confirm previous research, but the analysis could be extended in various ways. As online auctions become increasingly popular, there is a growing need for marketing or management researchers to investigate the nuances of this particular means of exchange, searching for differences and similarities between online auctions and more traditional auction mechanisms. For instance, more general assumptions about bidders' valuations and

bidder numbers could be incorporated and how the different auction's duration affect them could be considered. A great deal also need to be learned about demographic, attitudinal and other differences between online buyers and in-person buyers.

Furthermore, future studies may focus on the weight of reputation systems when choosing between two different sale channels, developing and improving our understanding of the online auction phenomenon. If the ground has been tested as regards to Ebay and Amazons' rating systems and buyers feedbacks, no analysis have been conducted so far for the art market sector.

Although the traditional auction players are increasingly addressing the online opportunity effectively, the advent of online auction players such as Artnet, Artsy, Paddle8, and Auctionata aggressively pursuing market share implies that the Christie's and Sotheby's dominance in the traditional art market is going to be hard to replicate online. By the time the thesis was concluded, the two biggest only-online auction platforms, Paddle8 and Auctionata have announced a merger; forming an complementary partnership between Europe and America from the standpoint of geographical reach, user demographics, sales formats and sales categories. In their push to claim the middle market of the international auction industry, they found they might make better allies than enemies. The new company instead of stealing the sellers and buyers from the brick-and-mortar auction houses is banking on increased online-auction buying from its own new and young audience of online-savvy collectors.

Perhaps we should not ask ourselves if online auctions are the future of art trade or what is the best choice between the new young digital world and the traditional elitist system. The new online auctions are not to be necessarily seen as an alternative for the sellers to traditional auction houses, but more as an additional channel. There are reasons to believe that the physical auction room will always serve a purpose for the trophy works that make up the core of Sotheby's and Christie's business, continuing to be the site for the drama of the evening sales in New York or London. And whereas the bricks-and-mortar titans will remain the venues for million-dollar works, the online newcomers will dominate together the sub-portion of the art market, heading toward an efficient, inclusive and seamless collecting experience, suitable for the new 21<sup>st</sup>-century collector.

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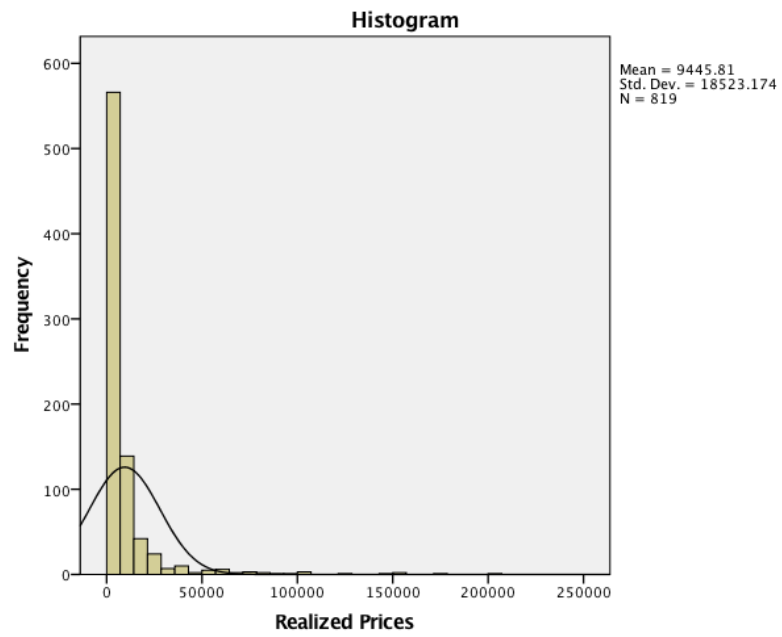
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## APPENDIX 1

**Table 1**

Auctionata Auction Prices

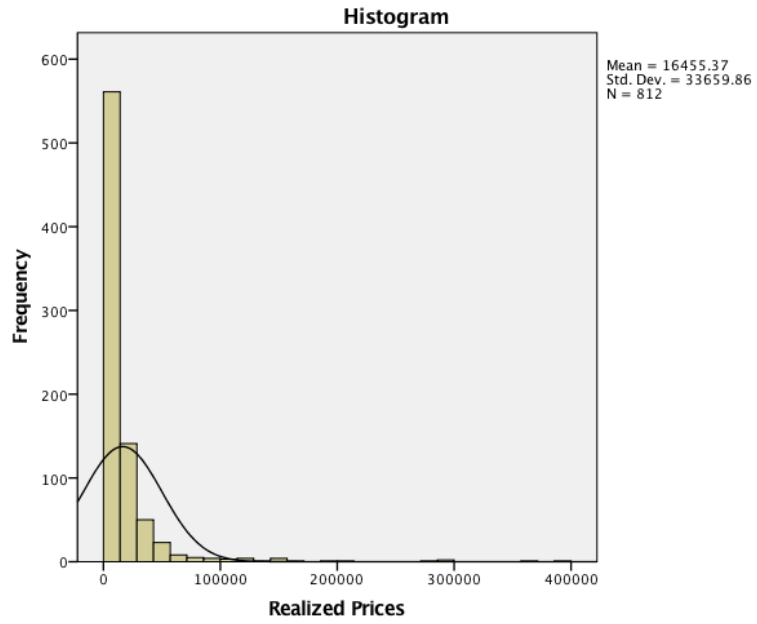


**Table 2**

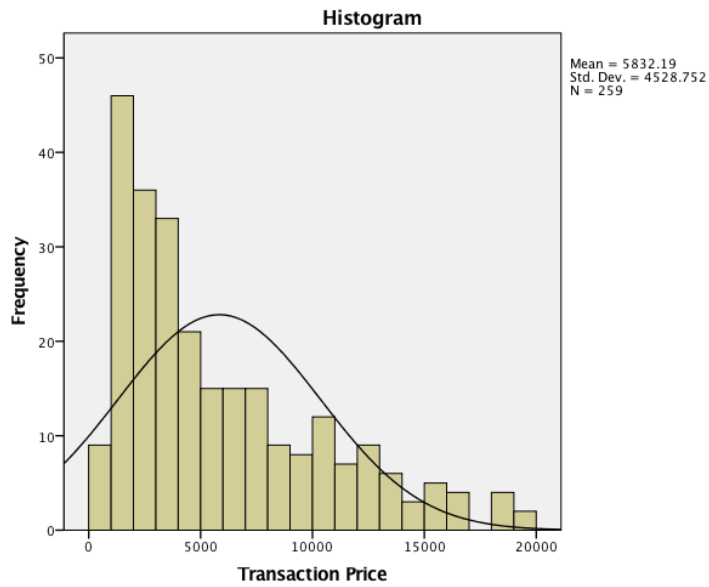
Dorotheum Auction Prices



# The Seller's Trade-Off

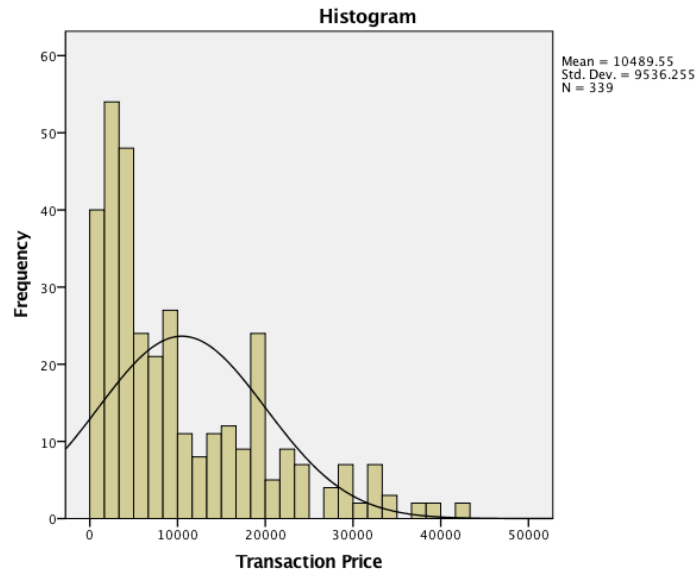


**Table 3**  
Dataset Painting Online (N=)

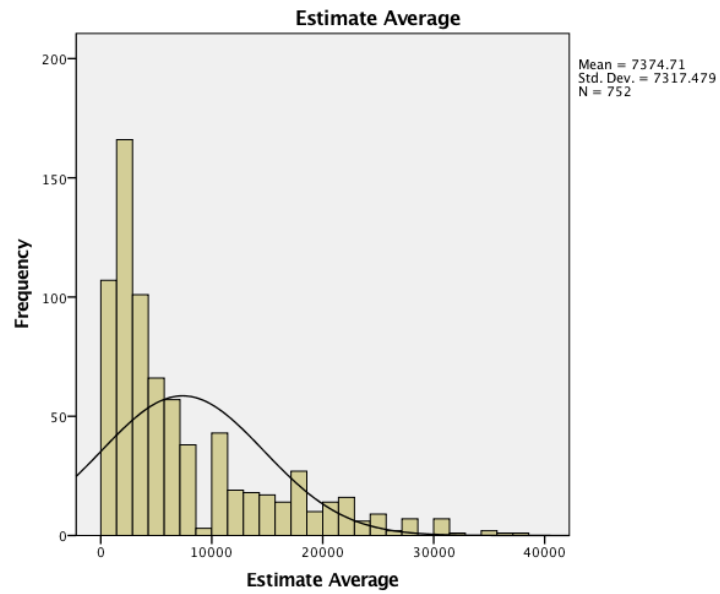


**Table 4**  
Dataset offline painting (N=)

# The Seller's Trade-Off



**Table 5**  
Estimate Average for Dorotheum



**Table 6**  
Estimate Dispersion for Dorotheum

# The Seller's Trade-Off

