# FACULTEIT ECONOMIE EN BEDRUFSKUNDE

# PRICE SETTING IN ART AUCTION MARKETS

Aantal woorden: 13.198

Thomas Hanssens Stamnummer : 01271236

Domien Karuranga Stamnummer : 01302360

Promotor: Prof. dr. Mustafa Disli Co-promotor: Prof. dr. Koen Inghelbrecht

Masterproef voorgedragen tot het bekomen van de graad van:

Master of Science in de Handelswetenschappen

Academiejaar: 2016-2017



# FACULTEIT ECONOMIE EN BEDRUFSKUNDE

# PRICE SETTING IN ART AUCTION MARKETS

Aantal woorden: 13.198

Thomas Hanssens Stamnummer : 01271236

Domien Karuranga Stamnummer : 01302360

Promotor: Prof. dr. Mustafa Disli Co-promotor: Prof. dr Koen Inghelbrecht

Masterproef voorgedragen tot het bekomen van de graad van:

Master of Science in de Handelswetenschappen

Academiejaar: 2016 - 2017



Deze pagina is niet beschikbaar omdat ze persoonsgegevens bevat. Universiteitsbibliotheek Gent, 2021.

This page is not available because it contains personal information. Ghent University, Library, 2021.

# NEDERLANDSE SAMENVATTING

Deze empirische studie analyseert 518 willekeurig geselecteerde schilderijen die geveild werden door drie gekende veilinghuizen (Sotheby's, Christie's en Dorotheum) tussen 2003 en 2015. In het eerste luik wordt de impact van de financiële crisis op de kunstmarkten bestudeerd. Hierbij wordt onderscheid gemaakt tussen de periode voor, tijdens en na de crisis. Daarnaast wordt nagegaan welke meetbare factoren de prijs beïnvloeden. De studie toont aan dat voornamelijk de geschatte prijs een invloed heeft op de eindprijs van het schilderij. Bijkomend is ook de leeftijd en de afmetingen van het kunstwerk een bepalende factor voor de eindprijs van het kunstwerk. Verder blijkt dat de geschatte waarde vooral bij Christie's en Sotheby's onder het eindbod ligt. Het prijszettingsbeleid van de verschillende veilinghuizen is bovendien sterk verschillend. Deze studie kan voor kunstinvesteerders een inzicht geven omtrent een betere diversificatie van hun portfolio. Voor kunstverzamelaars is het interessant omdat ze een betere indicatie krijgen van de te verwachten eindprijs.

# PREFACE

In this section, we would like to thank everyone that helped us during the writing process of our master thesis.

Firstly, we would like to thank Professor Dr. Mustafa Disli. He allowed us to take on this topic. We would like to thank him for his guidance, constructive feedback and insight.

Secondly, we would like to thank Mr. Demeester Luc. As a frequent art buyer, he was able give us an understanding of the process of buying art and gave us a glance into the world of art collecting.

Lastly, we would like to thank Caroline Van Cauwenberge. She was able to provide us relevant literature and information that she acquired during her internship at Sotheby's London.

# ABSTRACT

This study seeks to answer the question as to how prices are set in the art auction markets and how they developed during the recent period of economic downturn.

Variables that determine the price of a painting are analyzed using a hedonic price index, consisting of 518 paintings, sold at Sotheby's, Christie's and Dorotheum between 2003 and 2015.

In a regression model, characteristics such as the size and age of a painting are found to have a positive effect on the final price of a painting at auction. During the financial crisis, a negative relationship was found between dimension and final sales price.

This study also shows that the three selected auction houses handle contrasting pricing strategies. While sales in the art auction markets were affected by the recent financial crisis, auction markets restored rather quickly.

# **KEYWORDS**

Art Auction Markets - Price of Art - Art and Finance - Financial Crisis

# TABLE OF CONTENTS

1.INTRODUCTION	1
2. LITERATURE REVIEW 2.1 SELLING ART	3
2.1.1 THE ART MARKET	3
2.1.3 AUCTION HOUSE COMMISSIONS 2.1.4 THE RISE OF NEW CHANNELS TO SELL ART	
2.2 EFFICIENCY OF THE ART MARKET	6
2.3 PRICING	7
2.3.1 THE AUCTION PROCESS	
2.3.3 PUBLIC AUCTION RESULTS	۵ ع
2.3.5 EXOGENOUS FACTORS THAT INFLUENCE THE AUCTION PRICE . 2.4 ART AND FINANCE	
	<b>1</b> 3
2.4.1 DEVELOPMENTS IN THE EMERGING ART AND FINANCE INDUSTR 2.4.2 DIVERSIFICATION BENEFITS	13
2.4.3 RETURNS	
2.5 FINANCIAL CRISIS	17
3. DATA AND METHODOLOGY	19
3.1 RESEARCH QUESTION	19
3.2 DATA	19
3.2.1 PERIODS AND AUCTION HOUSES	
3.2.2 VARIABLES	
4. EMPIRICAL RESULTS	25
4.1 PRICE SETTING	25
4.2.1 PRICE SETTING BEFORE THE FINANCIAL CRISIS	
4.2.2 PRICE SETTING DURING THE FINANCIAL CRISIS	
4.2.3 PRICE SETTING AFTER THE FINANCIAL CRISIS	
4.5 AVERAGE MARGIN	30
4.6 LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH	31
5. CONCLUSION	32
6. REFERENCES	X
7. APPENDIX	APPENDIX I.I

# LIST OF ABBREVIATIONS

AE	Art Economics
FC	Financial Crisis
SOABER	Simultaneous Online Auction Bidder
TEFAF	The European Fine Art Foundation

# LIST OF FIGURES

Figure 1 - World Art Market Total Sales by Continent in 2016 (TEFAF, 2017)	3
Figure 2 - Value and Volume of Transactions in the Global Art Market (AE, 2015)	9
Figure 3 - Art as an Alternative Asset Class, 1970-2014 (Kräussl et al., 2016)	.18
Figure 4 – Average Yearly Paintings offered on Artvalue.com	.20
Figure 5 – Margin before, during and after the economic crisis	.30

# LIST OF TABLES

Table 1 - Regression Model 1 Entire Period (2003-2015)	25
Table 2 - Regression Model 2 Entire Period (2003-2015)	27
Table 3 - Regression Model Period 1 (2003-2007)	28
Table 4 - Regression Model Period 2 (2008-2010)	29
Table 5 - Regression Model Period 3 (2011-2015)	29

# "The real value of art is not always revealed by the price set upon it"

Jeffrey Loria

# **1.INTRODUCTION**

Price setting in art auction markets has been studied extensively in the last decades. Yet, clear evidence of the impact of the financial crisis on price setting in art auctions still has to be discovered.

Auction house experts and art enthusiasts developed methods to estimate the value of paintings (Sproule & Valsan, 2006). However, to outsiders, the valuation given to certain paintings might be difficult to understand as prices seem excessive often times. The question remains if the valuation differs between auction houses. Auction houses might have varying methods of determining the value of a painting. Not only because their price-estimating models differ, but also because they have different experts. Additionally, each auction house has its own field of expertise.

Just recently, a painting sold for a record-breaking amount. On May 19, 2017, an untitled painting by Jean-Michel Basquiat sold for \$110,487,500 at Sotheby's. A record price for an artwork by an American artist at auction (The Financial Times, 2017). The painting, from 1982, was last sold in May 1984 at Christie's for \$19,000. The remarkable price increase raises the question if including art in an investment portfolio, leads to diversification benefits. In general, art has a low correlation with other assets (Moses, 2002). Results differ depending on the period that is analysed. Although diversification benefits might occur, most art collectors buy art solely for passion. The investment aspect of buying art is only a secondary benefit for the avid collector.

This study constructs a monthly hedonic price index using public auction data of 518 paintings, sold at three separate auction houses between 2003 and 2015. The regression model includes characteristics of paintings such as the size, the medium, the auction house where it was sold, the age of the painting, the estimated price and the final sales price at which the painting was sold. By conducting a regression analysis over three time periods (Before, during and after the financial crisis of 2007) the possible difference in pricing methods and the impact of the crisis is observed.

Rather than to focus on a small, specific group of painters or art movement, this study includes a random selection of paintings by various painters. Giving a perspective on price setting in art auction markets on a more global scale.

This study is motivated by the downturn of the global art market precipitated by the recent financial crisis and seeks to answer the question as to how prices are set in the art market and how this evolved between 2003 and 2015.

Results show that the age of the painting, the dimensions of the painting but mainly the estimated price have a significant and positive effect on the final sales price of a painting. During the financial crisis, the dimension of the painting was found to have a negative effect on the sales price.

The amount of paintings offered by auction houses Christie's and Sotheby's decreased between 2003 and 2015.

Margins, or the difference between the average estimated price and final sales price, saw a slight drop during the financial crisis. Though the margin restored quickly after 2010.

This study provides scientifically relevant information by analysing the impact of the economic crisis on art auction markets. The results of this study are of importance for art collectors and investors. Especially investors who are looking for an alternative for the volatile stock exchange and are interested in investing in art to diversify their portfolio. The results will help collectors, looking to sell an art piece, determine which variables influence the final sales price at auction.

The remainder of the study is structured as follows:

The second section gives an overview of the available literature and discusses studies already conducted on the subject. Subsequently, the data and methodology are illustrated. The empirical results are presented in the next section, accompanied by a critical reflection towards the literature. Some limitations of this study and suggestions for further research are brought up. Finally, the conclusion summarizes all findings and practical implications for investors and art collectors.

# 2. LITERATURE REVIEW

## 2.1 SELLING ART

### 2.1.1 THE ART MARKET

According to the yearly Art Market Report by The European Fine Art Foundation (TEFAF, 2017), global art market sales amounted to an estimate of \$45 billion in 2016. Total global art market sales were estimated to be around \$44 billion in 2015. Auction house sales dropped 18.5 percent last year, to \$16.9 billion. This drop is partially due to a significant drop in prices for the traditional big-sellers such as Picasso (down 50 percent) and Andy Warhol (down 68 percent). Foreign exchange, namely the decline in value of the British Pound, accounted for some of the drop. The number of items sold at auction last year fell by 21.5 percent. Private sales by dealers, however, increased in value with as much as 20 percent in 2016, accounting for some 70 percent of all sales worldwide (Karabell, 2017).



Figure 1 - World Art Market Total Sales by Continent in 2016 (TEFAF, 2017)

In 2015, the share of galleries and dealers by continent was distributed as follows: 53 percent of art galleries and dealers are located in Europe, 37.5 percent in The Americas, 9 percent in Asia. The remaining one percent of art galleries and dealers are located in Africa and Oceania (TEFAF, 2017). The auction market for art and antiques in The Americas dropped from being the largest auction market with a share of 37.5 percent in 2015 to the second largest with 27.5 percent of world action sales in 2016. Primarily due to a large fall in the number of consignments at auction, lots offered fell by 9.5 percent. Additionally, the strong dollar is making the United States less attractive to foreign buyers. Auction sales in The Americas in 2016 totalled \$ 4.65 billion (TEFAF, 2017).

#### 2.1.2 ENGLISH AUCTIONS

Sotheby's, Christie's and other English auction houses invented and refined English auction rules. In an English auction, the bidding starts out low and the price rises as bidders increase their offers. When the bidding stops, the item for sale is "hammered down". The "hammer price" is the final sales price of the artwork. The artwork will only be sold when the "hammer price" exceeds the "reserve price". The "reserve price" is set by the seller. If the bidding does not reach this price, it goes unsold and will be "bought in". When a painting fails to sell at auction or is "bought in", the painting is returned to the consignor. The reserve price is not revealed. It is prohibited for sellers to participate in the auction of the painting they are selling. This in order to prevent them from "bumping" the price during the bidding process (Ashenfelter, 1989). Auction sales are mostly concentrated during the periods May-June and November-December (Pesando, 1993).

The art auction market has been present for several centuries. In the past, its customer base was almost exclusively made up of dealers, professionals and museum curators. The market was largely a wholesale market. The problem with a wholesale customer base, from the auctioneer's point of view, is that it leaves up to 50 percent of the potential profit from sales price to be gathered by the dealer. In the seventies, auction houses were not satisfied with what they were receiving. So, they decided to move their customer base to a more retail clientele. To lure individual collectors, auction houses levelled the playing field by making their own estimates of the value of the art piece. In order to remain cautious, they started publishing a low and high estimate (Mei & Moses, 2005).

#### 2.1.3 AUCTION HOUSE COMMISSIONS

In principle, auction houses act on behalf of the seller. In reality, the auction house receives a compensation from both the seller and the buyer. For most auction houses, the buyer's premium is around 10 percent of the "hammer price" or sales price. This fee is negotiable, primarily depending on the importance or predicted value of the work or collection being offered for sale. The seller's commission varies between 5 and 15 percent, depending on the type of art that is being sold. As an example, for a hammer price of \$ 1,000, the seller will receive \$ 850 and the buyer will pay \$ 1,100 to the auctioneer. Since 1979, these fees have changed numerous times.

Now, one can pay up to 20 percent on the first \$ 100,000 and 12 percent on everything that is above \$ 100,000 (Mei & Moses, 2005).

If a painting goes unsold, the seller will have to compensate the auction costs, since the auctioneer does not receive a commission. Auctioneers usually charge the seller a fee for unsold items or "buyback", often a percentage of the reserve price set by the seller. This gives the seller an incentive to keep the reserve price low (Ashenfelter, 1989). The buyback covers several fees, such as the cost for the catalogue photography, a compensation for outside expertise and insurance (Grant, 2010). Auction houses compete on fees and reputation, the more valuable or desirable your artwork or object, the less sales commission an auction house is willing to charge. If Sotheby's offers a 1 percent sales commission, and Christie's wants 4 percent, you would go with Sotheby's. The reserve price is typically around 60 to 80 percent of the low estimate, this again is negotiable. For legal reasons, the reserve price cannot be above the low estimate. Auction houses compete to get the sellers artwork by providing higher price estimates. This is of course constrained by the fact that, if the reservation price is too high, the painting may fail to sell. Moreover, auction houses must protect their credibility throughout the years by giving an accurate prediction. As experts in the field, they have to understand all market conditions (Mei & Moses, 2005).

#### 2.1.4 THE RISE OF NEW CHANNELS TO SELL ART

Previous centuries were dominated by big auction houses such as Christie's and Sotheby's, where everything was settled in-house. The 21th century brings new players to the market who choose to sell art through different channels. The evolution of online art sales means that the value of the global online art market has risen to \$ 3.75 billion in 2016, up 15 percent from 2015. This gives the online art market an 8.4 percent share of the overall art market (Hiscox, 2017). Two big players in this market are Saffronart and Bidandhammer, who both only sell Indian contemporary art. Although the majority, around 79 percent, of the art bought online in 2017 had an average value below \$5,000. Buying art online, sight-unseen, presents a big challenge for buyers (Hiscox, 2017). Although, around 60 percent of art galleries report that online art buyers are getting more confident buying higher priced art. Because of the success of online art auctions, traditional auction houses like Sotheby's and Christie's adopted the technology to make online bidding and viewing easier.

Dass et al. (2011) developed a system called SOABER (Simultaneous Online Auction BiddER) which helps choosing the most interesting art pieces out of the whole lot in an online art auction.

The first variable called the dynamic forecasting model measures the level of competition on the auction and on the bid, as well as information about the price movement. A second variable is the wallet estimator, which measures the willingness to pay of the other bidders. When the current highest bid is larger than the bidder's wallet, the system will stop bidding. This also counts if the expected bid is higher than the bidder's wallet. The last variable is called the bid strategiser, which embeds the forecasting model into a fully automated decision system. The study concluded that the price velocity increases rapidly in the beginning and again near the end of an auction. The negative effect of an artist's previous year's values on this year's price could imply that bidders are looking for "bargains" (Dass et al., 2011). Here bids will be more aggressive. In the beginning of an auction, a negative effect of the size on the art price is found. This changes into a positive effect nearing the end of the auction. This result is similar to a previous study by Czujack et al. (1996). The same effect is found for auction history and the art medium across auction competition. On the contrary, we see that the opening bid has an initial positive effect on the price. The results of SOABER is that it has the highest bidder surplus and percentage of items won. This system can be used in different kinds of auctions, such as timber auctions and intellectual property auctions.

## 2.2 EFFICIENCY OF THE ART MARKET

Although older research suggests that buyers and sellers alike can approach the auction process with the assumption that they are entering a fair game (Louargand & McDaniel, 1991), more recent research claims the opposite.

Markets are said to be efficient when prices fully reflect all available information. Oosterlink and Szafarz (2013) tested whether the art market is weakly efficient or not. Because art does not yield dividends, they computed the annual return of art by subtracting the US risk-free rate. They conclude that the net return of art indexes is showing an exceptional high positive auto-correlation.

The way art auction markets are functioning today brings up a major source of inefficiency. In practice, the seller gives a confidential reserve price. When the trade is not realized, no price is observed and the index cannot be incorporated in the information. Resulting in an upwards price bias, that may explain their positive return auto-correlation.

Secondly, they believe that it is structurally impossible for auction prices to be efficient, because the seller can set a reserve price on their artwork. And since the hammer price is solely determined by bidding, there is no upper limit. Additionally, the law of one price does not count. Two exact same prints will fetch a different price in the United States and Europe. The average price for prints sold in the United states was 7 percent higher than in London. Prices can vary between auction houses as well. Sotheby's New York was found to be 14 percent more expensive than Christie's New York for an identical piece of art (Pesando, 1993). If markets were to be efficient, sellers and buyers trust actual prices and a reserve price would not be unnecessary (Oosterlinck & Szafarz, 2013). Botha et al. (2016) came to the same conclusion for the South African art market. The art market was found to be inefficient, thereby exacerbating the risk of investing in art. Since the price of art does not include every piece of information, we can assume that the Efficient Market Hypothesis does not hold for the art market.

### 2.3 PRICING

### 2.3.1 THE AUCTION PROCESS

The auction process starts when the owner of an artwork contacts the auction house with the intention to sell. Experts of the auction house analyse the artwork and determine its approximate worth. The seller is given the option to set a minimum price that he is willing to accept, called reserve or reservation price. The reservation price is not made public but the estimated range is set above it. The reservation price is mutually agreed upon by the owner of the artwork and the auction house. The pre-auction estimates account for many other components, such as the reputation of the painter, location of the sale, condition of the artwork, subject matter, financial market outlook, etc. Due to the nature of their profession, art experts are in the best position to have knowledge of these factors, as they differ for each individual painting. Resulting is the best possible estimate of the expected final sales price (Sproule & Valsan, 2006).

#### 2.3.2 THE ESTIMATED PRICE

A study by Ekelund et al. (2013) concluded that the estimated price is often undervalued, this in order to attract more buyers. Due to the "estimation bias" (Ekelund et al., 2013) buyers are attracted to the low estimated price and assume that they might be able to get the artwork for a bargain as reported by Dass et al. (2012).

By letting more buyers compete against each other, auction houses are able to obtain a higher ending sales price. Ashenfelter and Graddy (2003) confirm that experts are able to make accurate estimates of the potential hammer price.

## 2.3.3 PUBLIC AUCTION RESULTS

The results of art auctions are made public and often collected in online databases. This creates the possibility to value items outside the auction market. The information on prices allows traders to make transactions outside the auction system. If transactions were only done privately, this valuation method would obviously not be possible. While trades outside the auction markets and valuation based on auction sales are less frequent in art sales, this technique is frequently used to sell smaller, more frequently traded goods like fine wines (Ashenfelter, 1989).

# 2.3.4 CRITERIA THAT DETERMINE THE PRICE OF ART

Several studies have been conducted in the past determining which factors influence the sales price of paintings, granted this is not the first art price index. Higgs (2010) previously evaluated the consequences of the financial crisis on the art auction market. Although her research was limited to the Australian art market. De la Barre et al. (1994), Agnello and Pierce (1996), Higgs and Worthington (2005) and Higgs (2010) all used the hedonic price index method to estimate art price indices. Their results will be compared to the findings of this analysis.

Sotheby's specialists consider ten criteria to determine the value of art: authenticity, physical state, rarity, provenance, historical importance, subject matter, size, fashion, medium and quality (Sotheby's, 2016). The medium is the first variable specialists look at. They determine the type of paint that was used and the surface that was painted on. The materials that were used influence the durability. Oil on canvas is considered the most durable medium. Oil is the most sought-after medium because of its long-lasting quality and the fact that it does not easily fade with natural light (Higgs, 2010).

Documentary evidence is needed to confirm the authenticity of the piece. Every object that is worth something is worth being forged. Before paintings are sold by Sotheby's, they undergo thorough testing to confirm authenticity. A signature is a sign of authenticity.

According to Ursprung et al. (2010), prices increase by roughly 27 percent if a work of art is signed. Specialists analyse the style and technique peculiar to the painter and compare it to previous work, using forensic and digital authentication methods. A painting in bad condition does not necessarily have a negative impact on its value. However, if there is an old painting in pristine condition, value will be much higher. The more time passes, the higher the chance that the condition of a painting has been negatively affected. Paint cracking is common for older paintings, due to temperature changes and poor storage methods. Restoring a painting in bad condition before the auction takes place is generally not worthwhile. Restoring a painting lowers the value as the next owner might prefer the painting in its original state.

The older a painting is, the rarer it becomes. The art auction market is very supply driven. Rare pieces create "Auction Magic". Buyers eager to purchase the piece, will drive up the bidding price as they believe no other occasion to buy a similar piece will present itself.

Craftsmanship and quality makes art unique and special. The relative quality and merits of each work contributes to the rarity of the artwork. Collectors are willing to give up condition issues if a painting is rare. It is becoming harder to find rare pieces nowadays. The pool of rare collectibles diminishes as they are kept in private collections or in museums. Sotheby's recognizes that no estimate will hold how rare something is (Sotheby's, 2016).



Figure 2 - Value and Volume of Transactions in the Global Art Market (AE, 2015)

The graph above (Financial Times, 2015) is based on data from The European Fine Art Foundation report from 2015. Since the crash in 2009, the value of art sees a striking increase while, the volume, or items sold, only increases slightly.

The total value of the art that is being sold is growing faster than the number of pieces offered, indicating that rarity leads to increased value (Vox, 2016).

Size matters but bigger is not always better. For different artists, size has a contrasting meaning. Certain collectors prefer a statement piece that is going to fit on the entire wall of their house. Large paintings are often considered master pieces as they allow the painter to paint a bigger picture and include intricate details.

Paintings of monumental scale however, have a backwards effect on the value, as storage and display issues occur. As mentioned before, this element depends on the painter. In the case of Francis Bacon, who makes either big or small paintings, the smaller paintings have the tendency to go for much higher prices at auctions.

The story of the ownership or provenance adds value to painting as well (BBC, 2015). If a story can be attached to the sale of the painting, the sales price will increase tremendously. If a painting was part of the collection of an historically important figure, the piece becomes much more interesting as collectors like context. Historical importance is an absolute marker of value. Art can be an historical document as they reflect the world around the artist in a broader context (Sotheby's, 2016). Additionally, the reputation of the artist has tremendous influence on the value of the painting according to Don Thompson (2008). Certain artist with little to no reputation depend on the reputation of the dealer or auction house to obtain a high sales price. They promote, educate, and help artists to gain fame and success (Vox, 2016). The name of the artist, as a brand, influences what a collector is willing to pay for it (Hernando & Campo, 2017).

Trends are also present in the art market, just as in fashion, they come back around. Although certain paintings are timeless and never go out of style. It is important to buy art that you personally like and appreciate as trends change rather quickly (Sotheby's, 2016).

## 2.3.5 EXOGENOUS FACTORS THAT INFLUENCE THE AUCTION PRICE

Beggs and Graddy (1997) claim that the moment a painting is sold during an auction also has an influence on the relationship between the sales price and the estimated price. The final bid, relative to the auctioneer's estimated price, declines throughout the course of an auction. Beggs and Graddy (1997) called this "The afternoon effect".

The margin between the estimated price and the sales price of an artwork that is sold in the beginning of an auction is higher than an artwork sold later during the same auction, even in the presence of strategic, risk-neutral buyers. Most auction houses are aware of the fact that later bidders on similar items are more likely to pay lower prices, but they are uncomfortable about revealing this information to uninformed bidders. Inexperienced bidders expect similar items to be sold at the same price. If buyers would notice auctions are often an exception to this rule, the credibility of the auction house might be affected. Therefore, auction houses try to disguise this irregularity by offering smaller lots of the same item before offering larger lots. Since most bidders see nothing anomalous in quantity discounts, declining prices per unit seem more acceptable (Ashenfelter, 1989). Ginsburgh and Van Ours (2007) report that price will decline, until it reaches an equilibrium value.

Another aspect that has a lasting effect on the price is when the item goes unsold. Beggs and Graddy (2007) find that paintings that have previously failed to sell, will sell the next time for around 28 percent less than other paintings. When a painting is 'bought-in' by the auctioneers, it may be put up for sale elsewhere at later auctions or they take it of the market. There are three ways that this could affect the final price. The first one is when buyers are trying to learn more about the true value of an item. If this is the case, then past failure could lead to lower prices. Secondly, reserve prices can have an increasing and decreasing effect on the final observed price. However, it is perfectly feasible that a previous failure may lower the reserve price because of an urgency from the seller to sell. Finally, downward trends in the value of an item can result in lower prices of the final observed sale. Because of the correlation between the failure to sell and a downward trend in price. Beggs and Graddy (2007) compared paintings which have failed in the middle auction (sold, fail, sold) to those who came twice to auction successfully (sold, sold). It is possible that information in the art market decays over time. This happens especially amongst casual buyers. When a seller changes houses it indicates that there is some urgency to sell his painting. However, sellers who change houses can achieve a significantly higher price after their painting fails to sell, than those who resell at the same auction house (Beggs & Graddy, 2007).

De Silva et al. (2012) examined how mood variations influence subjective risk and hence auction prices for art in London during the period 1990-2007. They chose London, because of the well-known art auctions, and even more importantly the variation of sunshine is very high.

In their study they break apart the value of art into future resale value on one hand, and emotional utility that buyers have of owning an object on the other. The last variable is strictly personal. Because the value one derives from viewing a painting is different for all bidders. When the total value of a painting primarily consists of a private value component, the variation in mood will influence the auction price. People who are in a positive emotional state tend to make optimistic judgements about the expected of distribution returns and risk. In addition to the weather effect, Kamstra et al. (2003) show that there is considerable seasonal variation in stock returns that correlate with the length of the day. Their research was done in different international stock markets located in both hemispheres. They labeled it as seasonal affective disorder (SAD). The value of the common value component is independent of any temporary factor affecting the private value component (De Silva et al., 2012). Sotheby's and Christie's formed a cartel in order to jointly adjust their commission rates, which they receive from sellers. After the auction houses publicly announced the up rise in commission rates, bidders were aware of an increase in estimated prices. Bidders that bought art, solely for an investment purpose, incorporated the auction house estimate in their bidding, resulting in more aggressive bidding. Causing the prices to shift upwards. Weather information was collected from the British atmospheric data center and art data from the auction houses Sotheby's and Christie's in Britain over the period 1990 and 2007. The cartel that was formed by the two auction houses, Christie's and Sotheby's, did not result in a variation of the amount of paintings sold. Good weather has a negative effect on the probability of sale. Mood only seems to affect the lower end of the price distribution (De Silva et al., 2012).

Recently, a new kind of fund-raising strategy has emerged, Charity Art auctions. In these kind of auctions, that often take place online, artists sell their artwork for a common charity. Potential buyers are able to bid against each other knowing that most or all of the proceedings will go to a specified charity. This phenomenon became popular after the terrorist attacks of 9/11. Artists made artwork to sell under the auction for America, listed on the online shopping company eBay. Charity auctions can be a valuable fund-raising strategy. However, Canals-Cerda (2014) observed "Donor fatigue". Donation tend to lessen as the time after a dramatic event goes by. This observation is comparable to "The afternoon effect" measured by Beggs and Graddy (1997) in the art auction market.

### 2.4 ART AND FINANCE

#### 2.4.1 DEVELOPMENTS IN THE EMERGING ART AND FINANCE INDUSTRY

In their annual Art and Finance report (2016), Deloitte highlights the main trends and developments in the emerging Art and Finance industry.

The art market growth showed signs of slowing down toward the end of 2015 and in early 2016. This combined with slower economic growth, increasing volatility in the financial markets and geopolitical uncertainty, the effect on the art market is becoming more complex and unpredictable.

78 percent of wealth managers surveyed believed that art and collectibles should be a part of wealth management offering. This is an increase of 55 percent compared to 2014. 72 percent of the surveyed art collectors buy art for passion with an investment view, while only 6 percent of art collectors indicated that they are buying art for a mere investment purpose (Deloitte, 2016). The results of this survey conducted by Deloitte clearly show the increasing interest of investors in the art market. A lack of regulation is seen as the main hurdle for incorporating art into a wealth management service offering. The number of art funds created on a global basis is currently increasing steadily (Pownall, 2013). Art funds are investment funds dedicated to the generation of returns through the acquisition and disposition of works of art (ARTFA, 2013). A number of funds have successful launched to date. Most famous of which is The Fine Art Fund founded by Phillip Hoffman, a former executive at Christie's auction house. The Fine Art Fund Group claim to produce an average return of 9 percent before fees are deducted. The Group is understood to hold \$ 200 assets under management, distributed across several funds (The Fine Art Group, 2017).

#### 2.4.2 DIVERSIFICATION BENEFITS

Art has lower volatility and low correlation with other assets, making it more attractive for portfolio diversification (Moses, 2002). Higgs (2010) reports that art only marginally underperformed the home and stock market between 1986 and 2009. The low correlation between these markets suggests portfolio diversification benefits.

These findings explain the increased interest of investors in art as an investment, as mentioned above in the survey conducted by Deloitte (2016). Investing in an art appears to be a good option for portfolio diversification.

As more wealthy investors already tend to invest in physical art pieces, art funds are an excellent alternative for people with less available cash looking for the diversification benefits that art investments offer.

Goetzmann (1993) used transaction prices of paintings brought to market over the period from 1715 till 1986 to construct an art return index. The index allows a comparison of painting price movements to stock-market fluctuations. It also gives an evaluation of the risk and return characteristics of art investments. Evidence was found that art is an unattractive investment for a risk-averse investor. Prices increased with 6.2 percent while stock prices increased at a rate of 2.6 percent between 1715 and 1986. The growth in art prices was accompanied with high volatility. Additionally, a strong, positive correlation was found with other assets, particularly with the London Stock Exchange. Renneboog and Spaenjers (2012) conducted a similar study and concluded that art had appreciated in value with an average of 3.97 percent per year, in real US dollar terms, between 1957 and 2007. Calculated price increases differ heavily depending on the period that is analysed and the method of data collecting. The South African art market does not offer the opportunity to diversify portfolios dominated by either property, bonds, or shares (Botha et al., 2016).

Strong division exists between researchers on the topic of the correlation between art and other assets. Critics suggest that no clear answer can be formulated to this problem. Researchers face two obstacles when analysing this correlation (Dangelo, 2017). First, art sales occur less frequently than financial trades, a lack of data entails. The next obstacle researchers face is the use of the repeated-sales method.

Using this method, researchers evaluate the price increase of paintings that are resold at least twice over the course of a certain period of time. The main disadvantage of this method is that only 15 percent of sales in art auctions are repeated sales (Dangelo, 2017), therefore only a select amount of the available data is used. Additionally, every piece of art is different. It becomes challenging to compare how one art piece would sell with respect to another (Dangelo, 2017).

#### 2.4.3 RETURNS

The Repeated-sales method is often used to calculate the return that art generates over a specific time period. For art investments, returns increase with the investment horizon. Short-horizon art investors focus on arbitrage. Their returns increase with arbitrage across auction houses and locations. On the contrary, long-horizon art investors focus on value. They favour masterpieces as well as ancient artworks and abstain from venue arbitrage (Heungju et al., 2017). Art dealers are inclined to advise their clients to buy masterpieces that are more expensive and presumably, outperform the market. No evidence has been found to support this statement however (Pesando, 1993).

In a bold expression art dealer Edward Merrin observes that "... it's always better to buy one \$ 10,000 object than ten \$ 1,000 objects, or one \$ 100,000 object – if that is what you can afford – than ten \$10,000 ones" (Merrin, 1988). Anderson (1974) examined paintings as an investment between 1780 and 1970 and found that the rate of price appreciation is far above the long-term average return. More recent studies indicate that the return of art investments is more in line with traditional investments (Agnello et al., 1996).

Worthington and Higgs (2004) found that the returns on paintings are much lower and the risks are much higher than conventional investment markets. The ownership and storage of art involves a significant level of risk. Paintings can easily be stolen or ruined in a fire. Therefore, a risk premium should be deducted from the profit to reveal the true underlying rate of return (Baumol, 1986). Buelens and Ginsburgh (1993) revisited Baumol's (1986) conclusion which states that returns on bonds are higher than returns on paintings. They claim beating the market is not impossible since certain segments of the art market offer significantly higher returns. It is, however, ill-advised for amateurs to be lured into the purchase of art supposing they can beat the game financially. Professionals, who have devoted their lives to art collecting can assume to outperform the amateur (Baumol, 1986).

The only way to obtain a significant return on art investments is through buying a piece when it is rather unknown and to sell it when it becomes popular. Just like in the financial market, the price evolution of an asset is difficult, if not impossible, to predict.

Art is an illiquid asset because selling an artwork is not an immediate process, despite the mechanism used. Dealers, auction houses and galleries usually incur in complex processes to complete a transaction between a buyer and a seller. Furthermore, transaction costs are much higher in the art market than in most financial markets (Artemundi Global Fund, 2015).

Charlin and Cifuentes (2017) criticise previous research claiming it is impossible to make a reliable statement regarding returns on art investments. Previous research discarded confidence intervals as conclusions were only based on single-point estimates. Using the bootstrap method to estimate the confidence intervals, they were found to be quite wide (Charlin & Cifuentes, 2017). Frey and Reiner (1995) argue that previous research was restricted to auction data and neglected transaction costs and taxation. Even after correction of these factors, returns of art investment are seemingly lower than returns on other financial assets

Art collectors generally do not purchase art as an investment, rather, they collect art for the love and passion for a piece. They are opposed to the fact that wealthy people are showing an increasing interest in the art world solely with an investment perspective. Resulting in higher sales prices at auction. While it is not the main concern of the avid art collector, the consensus of previous research is that returns on art investments are lower than returns on other financial assets.

### 2.5 FINANCIAL CRISIS

In 2007, the art market reached unprecedented heights. Total sales in the global market for fine and decorative art reached just over  $\in$  48.1 billion. In the autumn of 2008, the market turned. The following months saw a serious increase in unsold rates and strong price corrections. In 2008, total sales in the global market for fine and decorative art were down over 12 percent from 2007, reaching  $\in$ 42.2 billion (TEFAF, 2010). Two years later, in 2010, the crisis was already seen as a distant memory. After two years of declining sales, the global market rose 52 percent to reach  $\in$  43 billion (TEFAF, 2011). In 2014, the global art market reached a total of over  $\in$  51 billion in 2014, an increase of 7 percent over 2013 and the highest level ever recorded (TEFAF, 2015).

It was not the first time that the global art market had experienced a negative downturn. In 1990 a similar trend occurred. The American economy was in a recession during the Gulf War, this had a negative impact on financial markets and institutions. Due to the introduction of restrictive monetary policy and banking sector crisis, Japanese investors showed less interest in art during the "bubble period" of the Japanese economy (mid-1980s until the early 1990s) (Hiraki et al., 2009). This were the main causes for a global recession. As buyers left the market, sales prices decreased and the amount of unsold works increased (Art Media Agency, 2015).

The economic crisis did not only affect the auction sales and return of collectors, art fundings by governments decreased as well. As governments cut spending in response to the recession, political parties considered replacing art funding with tax breaks to attract investors. In times of economic depression, the art and culture sector are one of the first to undergo government fund cuts (Walsh, 2010).

A recent study published by the University of Luxembourg (Kräussl et al., 2016) predicts that the art market bubble is about to burst. By identifying the market conditions that led up to the collapse of two previous art market bubbles in 1990 and 2008 and comparing them with the symptoms that we are seeing today. The researchers concluded that the current art market is showing signs of overheating (Neuendorf, 2016).



Figure 3 - Art as an Alternative Asset Class, 1970-2014 (Kräussl et al., 2016)

The graph ut supra compares the top 500 artists with real estate prices, the evolution of the gold price as well as the Standard & Poor's 500 stock market index.

The dip in the art market in the nineties and the remarkable recovery following the financial crisis is apparent.

The researchers argue that such market growth is unsustainable, warning there is a bubble in the making that is likely to burst, similarly to what took place in 1990 and during the recent economic crisis. The increase of paintings sold for record-breaking amounts in recent months might confirm these findings (Kräusl et al., 2016).

Recent numbers show that the Global Art Sales fell 11 percent in 2016. Falling to the lowest level since the financial crisis as increased economic and political volatility weighed on auction sales. Unlike other markets, the art market is supply-driven. As economic and political risks surge, sellers hold off on selling their art. Unlike auction sales, private sales have not been negatively affected. As the outcome of an auction is rather uncertain and involves a higher level of risk, sellers tend to avoid auctions and close sales on the private market (Kazakina, 2017).

Analysts remain cautious for their outlook for the year 2017. With sellers holding back as economic and geopolitical uncertainty continues in many countries. Buyers, on the other hand, might view art and antiques as "a relative safe haven amidst volatility elsewhere," increasing prices for the works that appear on the market (TEFTA, 2015).

# 3. DATA AND METHODOLOGY

# 3.1 RESEARCH QUESTION

The main purpose of this study is to construct a regression model which analyses if physical characteristic variables, like dimension, medium, the age of a painting and more, have an influence on the price of an art piece. This model will clarify which variables have the biggest influence on the final sales price of a painting at auction. The same regression is repeated using auction data from before, during and after the financial crisis. Additionally, the average margin between estimated price and final sales price of three individual auction houses will be compared, to evaluate the impact of the recent economic crisis on art pricing.

# 3.2 DATA

## 3.2.1 PERIODS AND AUCTION HOUSES

Due to their distinctiveness, individual artwork prices cannot easily be aggregated into sufficiently large homogeneous groups. The two most important empirical approaches that address these issues are the repeated-sales method and the hedonic price method (Collins et al., 2009). The latter method is used in this analysis. A hedonic index is any price index which describes how product price could be explained by the product's characteristics (Hill, 2011). The repeat-sales method is used to evaluate the price increase of paintings that are resold at least twice over the course of a certain period in time.

This study compares the price of art over the course of three different time periods. The first selected time period being from 2003 until 2007. This time period will be used as an indicator for the price of art pieces before the economic crisis. The second time period, between 2008 and 2010, is a reference for the price during the economic crisis. The third and last time period, from 2011 until 2015, was used to analyse the price of art after the economic crisis.

The financial crisis was initiated by a crisis in the subprime mortgage market in the USA at the end of 2007. Artprice (2009) reports that 2008 can be seen as a turning point for the art market, after 7 years of consecutive increases in prices. In 2011, art markets started showing signs of recovery.

Art auction sales revenues reached levels comparable to 2007, the most successful year in history for art auctions (Artprice, 2011). It is based on these findings that the period between 2008 until 2010 was selected as the reference period of art prices during the financial crisis.





The Graph ut supra gives an overview of the average yearly amount of paintings offered by each auction house before, during and after the financial crisis, listed on Artvalue.com. The size of each auction house can also be deduced from this graph. Dorotheum is clearly a smaller auction house in comparison to Christie's and Sotheby's. However, Dorotheum is the only auction house to increase the amount of paintings offered. The average amount of paintings that were auctioned almost doubled. On average, almost 2,400 paintings were offered on a yearly basis between 2003 and 2007. This number increased to over 4,000 between 2011 and 2015. Christie's and Sotheby's. On average, almost 13,000 paintings were submitted on a yearly basis between 2003 and 2007 by Sotheby's. Offerings lowered to 7,700 between 2011 and 2015.

Considering the supply of auction houses is heavily dependent on collectors wanting to sell their art, one might conclude that collectors are reluctant to sell. Potentially as a result of growing economic instability during these periods.

However, not all paintings listed on Artvalue.com are sold, the database also includes unsold paintings. Consequently, it is difficult to draw conclusions from this graph.

An increase in offered paintings by Dorotheum for example does not necessarily mean that more paintings are being sold.

The three auction houses were selected based on the size of their inventory and sales (Therichest, 2014). The auction houses included in the analysis are Christie's, Sotheby's and Dorotheum.

Since the database of Artvalue.com does not provide data of older sales of auction houses in Asia, we decided to focus on the three auction houses mentioned above. While Dorotheum might not be considered as one of the biggest auction houses in the world, it is the most important in Europe (Artnet, 2014). By focussing on American and European houses we hope to see the impact of the recent economic crisis on the most affected continents.

Sotheby's and Christie's are both British auction houses with the distinction that Sotheby's has its headquarters in New York City. Both own salerooms locations all over the world. Dorotheum is one of the oldest auction houses in the world as it was established in 1707. It has its headquarters in Vienna, Austria and is the largest auction house in continental Europe. Branches exist in Vienna, in Prague the capital city of the the Czech Republic , in the Italian cities Milan and Rome, as well as in Düsseldorf, Munich and Brussels. (Artnet, 2017)

In our dataset, we made sure to select a wide variety of paintings with different origins and art movements. By combining data from completed sales from the three auction houses mentioned ut supra, this study believes in obtaining a general view of art pricing in the global art auction market as well as the impact of the economic crisis on the global art auction market.

#### 3.2.2 VARIABLES

Data was manually selected from Artvalue.com. This website offers free and unlimited online access to a database of auction results from auction houses around the world. 160,000 artists are referenced in this database and approximately 1,500,000 auction results have been collected since 1987, from an average of 900 international auction houses (Arvalue,2017).

Previous studies focussed on a selected group of painters or a specific art movement and analysed the price evolution of these paintings over the course of time. Considering Artvalue.com only started published auction results after 1987, this type of analysis was not possible.

Every month, at least one painting was randomly selected for each auction house over the course of three periods. Our dataset consists out of a total of 518 paintings and their representative sale data. This sample size was selected based on the study done by Ekelund et al. (2013). Auction data of 500 paintings was analysed in this study to determine if art auction estimates were biased.

Variables include estimated price, the auction house where the painting was sold, dimensions of the painting in square meters, home, medium, age and a dummy variable indicating if the painter was alive at the time of the auction or not.

For the first time period (2003-2007) 200 art sales were selected, 40 paintings per year or 13 for each auction house. For the second time period (2008-2010) 120 art sales were selected. Fewer artwork sales were selected for this period due to the shorter time span. For the last time period (2011-2015) 200 paintings were selected.

The dependent variable in the regression model is the sales price in USD. The highest sales price in the dataset is \$ 44,685,182. This amount was paid in 2014 for a painting by Francis Bacon at a Sotheby auction sale. The average sales price is \$ 361,000, the lowest price paid for a painting is \$ 447. For paintings sold in different currencies, Artvalue.com provides historic exchange rates.

The first independent variable included in the dataset is the estimated sales price. Specialists working for the auction houses estimate the potential sales price. The estimated price range is published by auction houses in glossy and beautifully produced catalogues which are sent to collectors and other potential buyers<sup>1</sup>. It includes a high and low estimate, typically written in the format of "\$ 14,000,000 - \$ 18,000,000" or a permutation thereof (Goldstein, 2012). The average estimated sales price of our dataset is \$ 193,000 or 43 percent lower than the average final sales price.

Using dummy variables, the three auction houses were included in the regression model, Dorotheum was used as reference.

Next, the dimension of the painting, measured in square meters  $(m^2)$ , is taken up in the dataset. The average dimension of a painting is 0.729 m<sup>2</sup> or 7290.01 cm<sup>2</sup>. The biggest painting included in the dataset is 12.005 m<sup>2</sup>, the smallest has a dimension of only 0.0147 m<sup>2</sup>.

Paintings that were selected come from across the world, Close to 50 different countries were counted in our dataset. In this study was decided to include a variable to analyse if there is a home bias. Paintings originating from the county where the auction house has its headquarters could potentially be more expensive. The US was selected as the home market for Sotheby's, The United Kingdom for Christie's and Austria for Dorotheum.

Most of the paintings selected are oil, painted on canvas. For this reason, a dummy variable was computed for "oil on canvas" and "other media". Other media include oil on panel, acrylic on canvas, oil on cardboard and more. 301 paintings or 58 percent of the paintings included in the dataset are oil paint on canvas.

Another dummy variable was computed, to make a distinction between painters that were deceased and those who were alive when the painting was auctioned.

<sup>&</sup>lt;sup>1</sup> Thanks to Mr. Demeester, we had an insight in two of catalogues Sotheby's. Both were from November 14th, 2006. One was solely a collection of the earlier deceased Belgian collector Vanthournout, who had great knowledge of items which would become popular over the next years. As Mr. Demeester told us, Roger Vanthournout bought a painting titled "Version No.2 Lying Figure with Hypodermic Syringe" by a well-known painter Francis Bacon in Lille, France for less than \$ 2,000. In the 2006 catalogue, the painting had an estimated selling price between \$ 9,000,000 - \$ 12,000,000. The other catalogue is about contemporary art. With art from Andy Warhol, Brice Marden and Roy Lichtenstein. Each art lot is catalogued by title, used material, size, date and estimated Value. Provenance, earlier exhibition locations and a well detailed literature of the artwork are also mentioned.

The age of the painting was determined by subtracting the date of sale with the year in which the painting was painted. The dataset contained a lot of missing values for this variable. Only 256 paintings had a date of completion as it is hard to determine the date on which a painting was made. For this reason, we excluded this variable in the first regression model.

A potential shortcoming of this dataset is that no differentiation between more well-known painters and less sought after pieces are made. Certain auction houses might trade more popular paintings and therefore have a higher average sales price. Experts often base the value of a painting on its condition and the reputation of the painter (Sproule & Valsan, 2006), two elements that were not included in this model. For certain painters, elements like colour and theme are important factors to determine the price. Therefore, it is very likely that the regression model suffers from omitted variable bias. Critics of the hedonic price method argue that auctions have high proportions of unsold art, usually around 30 to 40 percent. A sample based on sold paintings therefore automatically excludes 'less desirable' art objects, introducing a bias in the price index (Goetzmann, 1996). While this bias is certainly present in the dataset, Goetzmann (1996) found no substantial impact of this bias on the physical characteristic variables, such as dimension, medium and auction house. <sup>2</sup>

<sup>&</sup>lt;sup>2</sup> Ms. Van Cauwenberge as well as Mr. Demeester mentioned that certain problems might occur using a large diversified sample of art pieces. Trends change in the art market as every generation has its own specific taste. This creates fluctuations in demand and thus in prices of certain art styles The following study tries to offset this by randomly selecting the paintings. This is where their second concern is. The sample size is too little to fully implement the fluctuations of art taste. Furthermore Ms. Van Cauwenberge indicated that contemporary art has other value factors than old master art does. Secondly, each artist has its own value factors e.g. in art pieces of Fontana colour is an important determining factor. These variables are specific for each painting and hard to determine, therefore they were not included in the regression model.

# 4. EMPIRICAL RESULTS

### **4.1 PRICE SETTING**

We considered the following linear regression model:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + b_7 X_7 (+b_8 X_8) + e$$

- Y = dependent variable (Sales price)
- $X_1$  = first independent variable (Estimated Price)
- X<sub>2</sub> = second independent variable (Christie's)
- X<sub>3</sub> = Third independent variable (Sotheby's)
- *X*<sub>4</sub> = Forth independent variable (Dimension)
- $X_5$  = Fifth independent variable (Home)
- $X_6$  = Sixth independent variable (Medium)
- X<sub>7</sub> = Seventh independent (Painter Alive)
- $X_8$  = Eight independent variable (Age Painting)
- e = error term

Variables	Estimated	t
	Coefficient	
Constant	0,446	(2,552)**
Estimated price	0,965	(50,654)***
Christie's	0,153	(1,877)*
Sotheby's	0,309	(3,571)***
Dimension	0,052	(1,682)*
Home	-0,132	(-1,644)
Medium	0,034	(0,515)
Painter Alive	-0,108	(-1,148)
$R^2$	0,874	
F	509,489***	
Ν	515	
* <i>p</i> < 0,10, ** <i>p</i> < 0,05, *** <i>p</i> < 0,07	1	

Table 1 - Regression Model 1 Entire Period (2003-2015)

A multiple linear regression was calculated to predict the sales price of a painting at auction. Independent variables include the estimated price, the auction house where the painting was sold, the dimension, whether it was sold in the home country of the auction house or not, the medium and a variable which indicates if the painter was alive on the date of the auction or not.

The dependent variable "Sales price" is the natural logarithm of the price of a painting.

The variable "Age Painting" was not available for each data entry, resulting in a lot of missing values. Therefore, this variable was only included in the second regression model.

The estimated coefficients of the pricing regression model are presented in the table above. A significant regression equation was obtained (F=509.489, p<0.001), with an  $R^2$  of 0.874.

For one unit increase in estimated price, the model predicts that the sales price will increase with 0.965, ceteris paribus.

When a painting is sold at Christie's or Sotheby's, the sales price will increase with 0.153 and 0.309 respectively, compared to Dorotheum ceteris paribus.

One of the physical characteristics, included in the regression model is the dimension of an artwork. A positive and significant coefficient of 0.052 was found. Indicating that an increase in dimension of a painting with one square meter, will increase the sales price with 0.052, ceteris paribus.

Agnello and Pierce (1996) found the price maximizing size to be 5.25 square meters for old masters and 1.70 square meters for modern and contemporary works. Ursprung et al. (2010) found that prices of oil paintings increased up to a size of roughly 10 square meters but declined for larger dimensions. Prices do, however, decline beyond a critical size. This critical size appears to be determined by wall sizes in ordinary collectors (Ursprung et al., 2010).

No significant value is found for the variable "Home". Consequently, no evidence is found for the presence of a home bias in the art market. Steiner et al. (2013) found that the home bias in private art collections turned out to be strong. It is highest for Asian and African collections and smaller for European and North American collections. "The home bias can partly be accounted for by high export and import restrictions" (Steiner et al., 2013). Vosilov (2015) confirmed these findings for sculptures. Art prices were found to be higher when auctioned in the home country of the artist compared to outside of the artist's home country. Vosilov (2015) indicated familiarity and patriotism as a possible explanation of the bias.

Higgs and Worthington (2005) found that deceased artists at the time of the auction is associated with a price increase of 1.1338 percent. Higgs (2010) reported a price increase of 1.2498 percent for paintings by artists who deceased prior to the auction.

Around 84 percent of the painters included in our dataset passed away before the auction of their painting. In our regression model, the variable 'Painter Alive' does not have a significant effect on the final sales price.

Higgs (2010) reported that, work executed in oil, commands higher sales prices, with an increase of 6.4840 percent over the standard work. Higgs and Worthington (2005) found that oil increased the price with 6.1552 percent. In our regression, we did not find a significant coefficient for the variable "Medium".

The second model ut infra includes the variable "Age Painting" calculated as the difference in years between the year the painting was sold and the year the painting was completed. Only 256 data entries had a value for this variable, resulting in a lot of missing values.

Variables	Estimated	t
	Coefficient	
Constant	0,310	(1,150)
Estimated price	0,963	(37,332)***
Christie's	0,170	(1,267)
Sotheby's	0,293	(2,166)**
Dimension	0,1	(2,629)***
Home	-0,086	(-0,731)
Medium	-0,077	(-0,787)
Painter Alive	0,006	(0,043)
Age Painting	0,002	(2,380)**
$R^2$	0,886	
F	249,096***	
N	256	
*n<0.10 **n<0.05 ***n<	· 0.01	

p < 0,10, p < 0,05, p < 0,01

Table 2 - Regression Model 2 Entire Period (2003-2015)

While interpreting these results, it is important to keep in mind that the regression model only contains 256 observations. Just like the previous regression model, estimated price has the highest estimated coefficient (0.963).

A painting sold at Sotheby's will sell for significantly higher prices than the average painting sold by Dorortheum (0.293), ceteris paribus.

Just as in the previous regression model, the dimension seems to positively influence the final sales price. An increase in dimension of a painting with one square meter will increase the sale final price with 0.1, ceteris paribus.

The age of a painting has a small but significant effect on the final sales price (0.002). If the age of a painting increases with one year, the final sales price will increase with 0.002, ceteris paribus.

## **4.2.1 PRICE SETTING BEFORE THE FINANCIAL CRISIS**

Using auction data of 199 paintings sold between 2003 and 2007, the following regression model was calculated.

Variables	Estimated	t
	Coefficient	
Constant	0,991	(2,849)***
Estimated price	0,891	(23,288)***
Christie's	0,264	(1,749)*
Sotheby's	0,509	(3,199)***
Dimension	-0,037	(-0,505)
Home	-0,159	(-1,164)
Medium	0,166	(1,364)
Painter Alive	-0,208	(-1,055)
$R^2$	0.797	
F	112.132***	
Ν	199	
*n < 0.10 $**n < 0.05$ $***n < 0.05$	11	

\*p < 0,10, \*\*p < 0,05, \*\*\*p < 0,01 Table 3 - Regression Model Period 1 (2003-2007)

For the period before the financial crisis, only the variable "estimated price" (0.891), "Christie's" (0.264) and "Sotheby's" (0.509) are found to have a significant, positive effect on the final sales price.

Variables	Estimated	t		
	Coefficient			
Constant	-0,013	(-0,043)		
Estimated price	1,019	(30,636)***		
Christie's	0,035	(0,241)		
Sotheby's	0,183	(1,186)		
Dimension	-0,082	(2,097)**		
Home	0,120	(0,794)		
Medium	-0,016	(-0,133)		
Painter Alive	-0,082	(-0,508)		
$R^2$	0,915			
F	180.072***			
Ν	118			
* <i>p</i> < 0,10, ** <i>p</i> < 0,05, *** <i>p</i> < 0,01				

### **4.2.2 PRICE SETTING DURING THE FINANCIAL CRISIS**

Table 4 - Regression Model Period 2 (2008-2010)

During the financial crisis or between 2008 and 2010, the estimated price, had a positive effect on the sales price (1.019), a higher value than found in any other regression model.

The dimension is the only other significant explanatory variable. Size had a negative impact on the final sales price (-0.082)during the financial crisis.

### **4.2.3 PRICE SETTING AFTER THE FINANCIAL CRISIS**

Variables	Estimated	t
	Coefficient	
Constant	0,337	(1,351)
Estimated price	0,998	(36,453)***
Christie's	0,097	(0,804)
Sotheby's	0,184	(1,391)
Dimension	0,054	(1,267)
Home	-0,197	(-1,431)
Medium	-0,027	(-0,266)
Painter Alive	-0,032	(-0,245)
$R^2$	0.906	
F	271.679***	
Ν	198	
* <i>p</i> < 0,10, ** <i>p</i> < 0,05, *** <i>p</i> < 0,01		
Table C. Damasalan M		0045)

Table 5 - Regression Model Period 3 (2011-2015)

After the economic crisis, only the estimated price had a significant, positive effect on the sales price (0.998).

### 4.5 AVERAGE MARGIN

Looking at the margin between the estimated price and the final sales price of the paintings selected in our data, a significant increase is noticeable. While the amount of paintings offered has decreased, the revenue of the auction houses most likely has not been affected. A higher final sales price means that the commission that the auction houses receive increases. The higher margin might also be a confirmation of the "estimation bias" as mentioned ut supra (Ekelund et al., 2013). When auction houses set the estimated prices lower, to attract more buyers, the margin between the final sales price and the estimated price will seem higher.



Figure 5 – Margin before, during and after the economic crisis

The average margin, or difference between the final sales price and estimated price, is depicted in the graph above. Distinction is made between the different auction houses selected over the three time periods. Values in the graph above should be interpreted as follows: if the margin of a painting sold at Sotheby's was 114 percent on average before the financial crisis, then the final sales price was 114 percent higher than the average estimated value of the painting. Average estimated value being the sum of the upper and lower estimate divided by two.

The margin on the average painting sold at Sotheby's continued to increase, even during the financial crisis. Before the financial crisis, paintings sold for 114 percent over the estimated value. During the crisis, the margin increased to around 123 percent on average.

For the period after the financial crisis, a lower margin is noticeable as the average painting sold for 89 percent over the estimated value. Even though the margin was still rather high during the crisis, total revenues went down from around \$ 700 million in 2008 to \$ 500 million in 2009. Revenue increased exceptionally in 2010 reaching over \$ 800 million (Sotheby's, 2010).

It is apparent that the average margin of Christie's auction house was affected the most during the financial crisis. Average margins before the crisis were the highest of the three auction houses at 133 percent. During the financial crisis, paintings sold at 59 percent over their estimated price. After 2011, margins recovered and paintings sold for 102 percent over the estimated value.

The average margin of Dorotheum does not seem to be affected by the crisis as it has actually increased over time. The margin grew from 24 percent before the crisis, to 46 percent during the crisis. Paintings sold for 56 percent over the estimated value at Dorotheum after 2010.

When looking at the average margin of the three auction houses combined, a dip is noticeable during the financial crisis. The average margin during the financial crisis being around 76 percent. Rapid recovery is made as average margin returned to around 82 percent after the financial crisis. Considering the fact that 2007 is viewed as one of the best years for the art market in history (Artprice, 2011), the margin does not quite recover to a level equal to the period before the financial crisis which were around 90 percent.

## 4.6 LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

Using a more extensive dataset, more significant results would potentially have been found. The dataset does not account for unsold paintings, leading to a potential bias. Certain variables that are known to influence the price of art, like the popularity and reputation of the artist, are hard to measure and were therefore not included in the dataset.

A suggestion for further research would be to compare the return of art to the market return before, during and after the economic crisis. Using the repeated-sales method.

# 5. CONCLUSION

With the rise of new channels through which art is being sold and the surge of art funds, the benefits of investing in art are being challenged. Especially during the recent period of economic downturn. Diversification benefits might occur due to the low correlation with other assets. Returns on art are found to be below the market return, depending on the timespan that is analyzed.

The amount of offered paintings by auction houses Christie's and Sotheby's decreased between 2003 and 2015. Indicating that art collectors are reluctant to sell during times of financial and geopolitical uncertainties. Despite the reduced supply, value reached unseen heights. The diverging relation between value and volume illustrates the importance of rarity on the sales price of art.

For the entire period (2003-2015) the estimated price, the auction house, the dimension and the age of the painting all positively influenced the final sales price. During the financial crisis the size of a painting was found to have a negative effect on the sales price.

Margins, or the difference between the average estimated price and final sales price, saw a slight drop during the financial crisis. Though the margin quickly restored after 2010.

Although the art auction market was negatively affected by the recent financial crisis, in 2014 total sales in the global art market reached the highest level ever recorded. The art market reestablished itself rather quickly. Though signs of a potential bubble are apparent.

# 6. REFERENCES

- Agnello, R., & Pierce, R. (1996). Financial Returns, Price Determinants, and Genre Effects in American Art Investment. *20*, 359-383.
- AMA. (2015, July 23). *The 90s Crisis and Its Consequences*. Retrieved from Art Media Agency: https://en.artmediaagency.com/112441/art-in-the-90s-the-art-marketcrisis-2/)
- Anderson, R. C. (1974). Paintings as an investment (Vol. 12:). Economic Inquiry.
- Artemundi Global Fund. (2015). Liquidity in the Art Market. Aremundi.
- ARTFA. (2014). What are Art Funds. Retrieved from The Art Fund Association: http://www.artfundassociation.com/ what are art funds/basic af.html
- Artnet. (2011). Art Market trends 2010. Saint-Romain-au-Mont-d'Or: Artnet.
- Artprice. (2009). Art market trends 2008. Retrieved from artprice.com: https://imgpublic.artprice.com/pdf/trends2008\_en.pdf
- Artprice.com. (2012). Art Market Trends 2011A. Retrieved from Artprice.com: https://imgpublic.artprice.com/pdf/trends2011\_en.pdf
- Ashenfelter, O. (1989). How Auctions Work for Wine and Art. *Journal for Economic Perspectives, 3*(3), 23-36.
- Ashenfelter, O., & Graddy, K. (2003). Auctions and the price of art. *Journal of economic literature*, 763-786.
- Barrett , C. (2015, May 12). Value of the global art market hits record €51bn in 2014. Retrieved from The Financial Times: https://www.ft.com/content/cad245a0-f889-11e4-8e16-00144feab7de
- Baumol, W. (1986). Unnatural Value: Or Art Investment as Floating Crap Game. *The American Economic Review*, *76*(2), 10-14.
- Beggs, A., & Graddy, K. (1997). Declining values and the afternoon effect: evidence from art auctions . *The RAND Journal of Economics*, *28*(3), 544-565.
- Beggs, A., & Graddy, K. (2007). Failure to meet the reserve price: the impact on returns to art. *Springer science and business media*, 301-320.
- Botha, F., Snowball, J., & Scott, B. (2016). Art Investment in South Africa: Portfolio diversification and art market efficiency. *South African Journal of Economic and Management Sciences*, *19*(3), 358-368.
- Brady, A. (2016). Art Business Auction house private sales. *Applo-The international art magazine*, *184*(644), 88–89.
- Buelens, N., & Ginsburgh, V. (1993). Revisiting Baumol's 'art as floating crap game'. *European Economic Review*, *37*(7), 1351-1371.
- Canals-Cerda, J. J. (2013). Charity Art auctions. SSRN Electronic Journal, 76(6), 924– 938.
- Charlin, V., & Cifuentes, A. (2017). On the uncertainty of art market returns. *Finance Research Letters*, 21, 186–189.
- Collins, A., Scorcu, A., & Zanola, R. (2009). Reconsidering hedonic art price indexes. *Economics Letters, 104*, 57-60.
- Czujack, C., Flores, R., & Ginsburg, V. (1996). On long-run price comovements between paintings and prints. *Economics of the Arts. Selected Essays*.
- DAngelo, M. (2017, Februari 10). *What Sotheby's Mei Moses Doesn't Tell You*. Retrieved from Medium: https://medium.com/@madelaine\_arthena/what-the-mei-moses-art-indices-dont-tell-you-d556b9c41aaf
- Dass, M., Wolfgang, J., & Shmueli, G. (2011). Maximizing bidder surplus in simultaneous online art auctions via dynamic forecasting. *International Journl of Forcasting*, 1259-1270.

- David, G., Oosterlinck, K., & Szafarz, A. (2013). Art market inefficiency. *Economics letters*, 23-25.
- de la Barre, M., Docclo, S., & Ginsburgh, V. (1994). Returns of Impressionist, Modern and Contemporary European Paintings 1962-1991. *Annales d'Économie et de Statistique, 35*, 143-181.
- De Silva, D., Pownall, R., & Wolk, L. (2012). Does the sun shine on art prices? *Journal of* economic behavior & organization, 167-178.
- Deloitte. (2016). Art and Finance. Retrieved from Deloitte.com: https://www2.deloitte.com/lu/en/pages/art-finance/articles/art-financereport.html#.UXo9pXA-7fE
- Ekelund, R. B. (2013). Are art auction estimates biased? *Southern Economic Journal*, 80(2), 454–465.
- England, R. (Director). (2015). What makes art valuable? [Motion Picture].
- Etro, F., & Stepanova, E. (2017). Art Auctions and Art Investment in the Golden Age of British Painting. *Scottish Journal of Political Economy, 64*(2), 191-225.
- Evans, S. (2008, October 31). *Financial Crisis Cools Down Art Market*. Retrieved from Forbes: https://www.forbes.com/2008/10/31/christies-sothebys-frieze-pf-artin\_se\_1031artmarket\_inl.html
- Frey, B. S., & Pommerehne, W. W. (1989, October). Art Investment: An Empirical Inquiry. Southern Economic Journal, 56(2), 396-409.
- Frey, B., & Reiner, E. (1995). On the return of art investment return analyses . *Journal of Cultural Economics*, *19*(3), 207–220.
- Galbraith, J., & Hodgson, D. (2015). Statistical prediction of art prices at auction.
- Ginsburgh, V., & Van Ours, J. (2007, Januari). On organizing a sequential auction: results from a natural experiment by christie's. *Oxford economic papers*, pp. 1-15.
- Goetzmann, W. (1996). How costly is the fall from fashion? Survivorship bias in the painting market. *Economics of the Arts*, 71-84.
- Goetzmann, W. N. (1993). Accounting for Taste: Art and the Financial Markets Over Three Centuries. *The American Economic Review*, *83*(5), 1370-1376.
- Goldstein, A. (2012, November 8). *A Beginner's Guide to Art Auctions*. Retrieved from Artspace:

http://www.artspace.com/magazine/art\_101/art\_market/art\_101\_a\_guide\_to\_auct ion\_lingo-5558

- Grant, D. (2010, July 14). *The Auction World's Buy-Ins and Post-Sales*. Retrieved from Huffingtonpost: http://www.huffingtonpost.com/daniel-grant/the-auction-worlds-buy-in\_b\_645575.html
- Hernando, E., & Campo , S. (2017). Does the Artist's Name Influence the Perceived Value of an Art Work? *International Journal of Arts Management, 19*(2), 46-58.
- Heungju, P., Lan, J., Tianyu, L., & Zhiyong, T. (2017). Horizon analysis of art investments: Evidence from the Chinese market. *Pacific-Basin Finance Journal, 41*, 17-25.
- Higgs, H. (2010). Australian Art Market Prices during the Global Financial Crisis and two earlier decades . Griffith University , Accounting, Economics and Finance . Brisbane : Griffith University .
- Hill, R. (2011). Hedonic Price Indexes for Housing. OECD Statistics Working Papers.
- Hiraki, T., Takezawa, N., Spieth, D. A., & Ito, A. (2009). How Did Japanese Investments Influence International Art Prices? *Journal of Financial and Quantitative Analysis*, 1489-1514.
- Hiscox. (2016). The Hiscox Online Art Trade Report 2016. London: Hiscox.
- Hiscox. (2017). The Hiscox Online Art Trade Report 2017 A market yet to awaken? London: Hiscox.

Kamstra, M., Kramer, L., & Levi, M. (2003). winter blues: a SAD stock market cycle. *American economic review*, 324-343.

Karabell, S. (2017, March 15). *Just How Big Is The Art Market?* Retrieved from Forbes: https://www.forbes.com/sites/shelliekarabell/2017/03/15/just-how-big-is-the-artmarket-leaders-do-some-serious-numbers-crunching/#7dbe21577dbe

- Kazakina, K. (2017, March 22). *Global Art Sales Fall 11% to Lowest Point Since Recession*. Retrieved from Bloomberg: https://www.bloomberg.com/news/articles/2017-03-22/global-art-sales-fall-11-tolowest-point-since-financial-crisis
- Kinsella, E. (2016, May 10). *Analysis*. Retrieved from Artnet: https://news.artnet.com/market/christies-postwar-and-contemporary-eveningsale-493985
- Kräussl, R., Lehnert, T., & Martelin, N. (2016, January). Is there a bubble in the art market? *Journal of Empirical Finance*, *35*, 99-109.
- Lee, D. (Writer), & Lee, D. (Director). (2016). *The formula for selling a million-dollar work of art* [Motion Picture].
- Louargand, M., & McDaniel, J. (1991). Price Efficiency in the Art Auction Market. *Journal* of Cultural Economics, 15(2), 53–65.
- Mandel, B. R. (2009). Atas an investent and conspicuous consumption good. *The american economic association*, 1653-1663.
- McDaniel, M. A. (1991). *Price efficiency in the art auction market* (Vol. 15). Journal of Cultural Economics.
- Mei, J., & Moses, M. (2002). Art as an Investment and the Underperformance of Masterpieces. *The American Economic Review*, 92(5), 1656-1668.
- Mei, J., & Moses, M. (2005). Vested interest and biased price estimates: evidence from an auction market. *The journal of finance*, 2409-2435.
- Merrin, E. (1988). Art & Auction (Antiques), 131.
- Moses, J. M. (2002). Art as an Investment and the Underperformance of Masterpieces (Vol. 92). The American Economic Review.
- Munteanu, A., & Pece, A. (2015). Investigating Art Market Efficiency. *Procedia Social and Behavioral Sciences, 188*, 82-88.
- Neuendorf, H. (2016, Januari 19). Academics Say the Art Market Bubble Is About to Burst—Are They Right? Retrieved from Artnet: https://news.artnet.com/market/artmarket-bubble-report-409136
- Nowé, Y., & Saelens, B. (2017). Moral Pendulum in Investment Decisions. Thesis.
- Pesando, J. (1993). Art as an Investment: The Market for Modern Prints. *The American Economic Review*, 83(5), 1075-1089.
- Pownall, R. (2007). Art as a Financial Investment. *Maastricht University*.
- Pownall, R. (2013, May 8). *Tilburg University*. Retrieved from TIAS School for Business and Society:

https://www.tias.edu/en/knowledgeareas/area/finance/article/investors-find-safehaven-in-art-investments

- Reddy, S., & Dass, M. (2006, May). Modeling on-line art auction dynamics using functional data analysis. *Statistical science*, pp. 179-193.
- Renneboog, L., & Spaenjers, C. (2012). Buying Beauty: On Prices and Returns in the Art Market. *Management Science*, *5*9(1), 36 53.
- Resch, M., Steiner, Lasse, F., & S, B. (2013). Home is where your art is: The home bias of art collectors. *Working Paper Series, University of Zurich, Department of Economics*(135).

Romano, M. (2015, Januari 20). Retrieved from Bloomberg: https://www.bloomberg.com/news/articles/2015-01-20/christie-s-sotheby-sreport-record-art-sales-in-2014

- Sotheby's. (2011). Annual Reports. Retrieved from Sotheby's: https://investor.shareholder.com/bid/annuals.cfm
- Sotheby's. (2016, December 20). *The Value of Art*. Retrieved from Sotheby's: http://www.sothebys.com/en/news-video/value-of-art.html
- Sproule, R., & Valsan, C. (2006). Hedonic Models and Pre-Auction Estimates: Abstract Art Revisited. *Economics Bulletin, 26*(5), 1-10.
- TEFAF. (2010). TEFAF Art Market Report 2010. Maastricht: TEFAF.
- TEFAF. (2011). TEFAF Art Market Report 2011. Maastricht: TEFAF.
- TEFAF. (2015). TEFAF Art Market Report 2015. Maastricht: TEFAF.
- Telegraph Reporters. (2017, March 1). *News*. Retrieved from The Telegraph: http://www.telegraph.co.uk/news/2017/03/01/gustav-klimt-painting-sells-record-47971250-sothebys/
- The European Fine Art Foundation . (2017). *TEFAF Art Market Report 2017.* Maastricht: TEFAF.
- The European Fine Art Foundation. (2015). *TFAFA Art Market Report 2015.* Maastricht: TFAF.
- The Fine Art Group. (2017). *Art Investment*. Retrieved from https://www.fineartgroup.com/
- Thompson, D. (2008). The \$12 Million Stuffed Shark: The Curious Economics of Contemporary Art. New York.
- Ursprung, H. W., & Wiermann, C. (2010). Reputation, Price, and Death: An Empirical Analysis of Art Price Formation. *Economic Inquiry*, *49*(3), 697–715.
- Vosilov, R. (2015, August 3). Art Auction Prices: Home Bias, Familiarity and Patriotism. *Umea School of Business and Economics*.
- Walsh, J. (2010, February 17). *European art & the financial crisis: yes, it matters*. Retrieved from Global Comment: http://globalcomment.com/european-art-the-financial-crisis-yes-it-matters/
- Worthington, A., & Higgs, H. (2004). Art as an investment: Risk, return and portfolio diversification in major painting markets. *Accounting and Finance*, *44*(2), 257-272.

# 7. APPENDIX EXCERPT FROM ARTVALUE.COM

«2064»\*, Christie's Interiors, New York, Thursday, December 18, 2008

#### Lot 1

#### DEPORTES (DESPORTES) Francisque, 1849-1899 (France)

Title : Still life of flowers in a vase on a table Date : Signature : sig.

#### Category : Paintings Medium :

Dimensions : Cm : 86,4 x 106,7 cm Inch : 34 x 42 in



CHRISTIE'S

#### Estimate : 3 000 USD - 5 000 USD

Sold :	4 000 USD with BP								
	3 166 EUR	4 000 USD	2 695 GPB						

 Add to basket
 Send by email

 Image
 Print Page
 Add this artist to my alerts

# EXCERPT FROM THE DATASET

Title	Painter	Nationality	Age Painter	Dead/alive	Date completed	Medium	Dimensions (cm2)	Date of Sale	Auction house	Estimated Value	Sa	le Price (USD)
Still life of flowers in a vase on a table	DEPORTES (DESPORTES) Francisque	France	1849-1899	C	)	oil on canvas	9218,88	18/12/2008	Christie's	\$ 4.000,00	\$	4.000,00
Power of the Panda (Happy)	PRUITT Rob	USA	*1964	1	1999	other	4391,13	14/01/2008	Christie's	\$ 5.000,00	\$	5.000,00
The artist's muse	CHAPLIN Charles	France	1825-1891	C	)	Oil on canvas	2377,35	23/01/2008	Christie's	\$ 24.585,00	\$	64.711,00
Mi	PICABIA Francis, (Francis Martinez de Picabia)	France	1879-1953	C	1929	other	15375,9	04/02/2008	Christie's	\$ 983.450,00	\$	2.680.478,00
Dilli Dilwalon Ki	PURKAYASHTA Ashim	India	*1967	1	2005	other	4167,6	20/03/2008	Christie's	\$ 12.500,00	\$	17.500,00
Baby Boy with Red Face	ZHANG XIAOGANG	China	*1958	1	L	Oil on canvas	3264	24/05/2008	Christie's	\$ 640.870,00	\$	1.621.080,00
A Spring Day in Venice	RICO Y ORTEGA Martín	Spain	1833-1908	C	)	Oil on canvas	1591,52	08/04/2008	Christie's	\$ 60.000,00	\$	55.000,00
Dorelia in a red hat, in front of a prickly	JOHN Augustus Edwin	UK	1878-1961	C	)	oil on canvas	798,6	04/06/2008	Christie's	\$ 49.170,00	\$	77.912,00
Full tide on the Harridge	FOX Charles James	UK	1822- 1914	C	)	oil on canvas	9677,4	22/07/2008	Christie's	\$ 3.442,00	\$	11.082,00
Ha Long Bay, Vietnam	ROULLET Gaston	France	1847-1925	C	)	oil on canvas	3870,96	24/09/2008	Christie's	\$ 4.917,00	\$	7.117,00
After the storm	MULLER (MÜLLER) William James	UK	1812-1845	C	)	oil on canvas	695,4	05/08/2008	Christie's	\$ 1.375,00	\$	987,00
On a sandy track in summer	SCHELFHOUT Andreas	Netherlands	1787-1870	C	)	other	1200	14/10/2008	Christie's	\$ 14.000,00	\$	13.186,00
Girl with a Cat	BOTELLO Ángel Barro	Spain	1913-1986	C	1982	other	12078	20/11/2008	Christie's	\$ 32.500,00	\$	37.500,00