



**MS thesis**  
**Financial Economics**

**Aesthetic Alpha**  
The economics of art investment

Gunnar Gylfason

Advisor: Birgir Þór Runólfsson. Ph.D.

Faculty of Economics

June 2020



**HÁSKÓLI ÍSLANDS**

**Aesthetic Alpha**  
**The economics of art investment**

Gunnar Gylfason

A thesis towards an MS-degree in Financial Economics

Advisor: Birgir Þór Runólfsson

Faculty of Economics

School of Social Sciences, University of Iceland

September 2020

Aesthetic Alpha.

This paper represents a 30 ECTS credit thesis towards the fulfillment of an MS degree in Financial Economics from the Faculty of Economics, School of Social Sciences, University of Iceland.

© 2020 Gunnar Gylfason

No part of this thesis may be copied or distributed without the consent of the author.

Reykjavík, 2020

## **Preface**

This thesis is in partial fulfilment of the requirements for an M.Sc. degree in Financial Economics at the University of Iceland. The thesis holds the value of 30 ECTS credits out of 90 ECTS requirements for the degree. The advisor of this project was Birgir Þór Runólfsson, Ph.D. and I would like to thank him for his guidance and advice throughout the process of writing this thesis. I would like to dedicate this thesis to my partner Berglind and my daughter Viktoría Lind whose motivation, encouragement, and support proved invaluable. I would also like to thank my family and friends whose support was immeasurable.

## **Abstract**

This thesis aims to explore the characteristics of art investment from an economic standpoint by comparing existing literature and using techniques from modern portfolio theory. The objective of this thesis is to explore whether art is profitable as an investment. That is, are the expected returns enough to justify the additional risk incurred? The thesis reviews the formation of the art investment market and defines art as an investable asset as well as examines the key economic factors of the art asset class. This thesis also discusses the non-pecuniary return component of art investment or the aesthetic returns of art in order to account for and explain ulterior motives investors would have when investing in art. The author reviews and compares the methods of measuring art returns, repeat sale regressions and hedonic regressions and analyses their advantages and shortcomings concluding that though different they provide mostly uniform results. In order to find a comparable metric for determining the performance of art investments in prior literature on art investment, the historical returns and economic cycles of art investments are examined, and a common measurement Sharpe's ratio is calculated to provide a suitable metric for different investment periods. Ultimately the risk-adjusted performance of the art investment market for the last two decades as measured by a market index is calculated. The results of those performance measurements indicate subpar performance compared to investments in stocks. Due to the limited data available on private art sale transactions the exclusion of those prices from the data sets of prior studies and this one, as well as the fact that auction prices can be considered as wholesale prices, the author concludes that the results of historical comparison from prior studies and the results measured by this thesis can be greatly improved by gaining access to price data for private sale transaction since a large share of the market transactions are private. Furthermore, the results support the claim of aesthetic enjoyment being a predominately driving factor when it comes to investments in art.

# Contents

Preface .....	4
Abstract.....	5
Contents.....	6
List of figures.....	8
List of tables .....	8
1 Introduction.....	9
2 Art investment overview .....	12
2.1 How are people investing in art?.....	15
3 Investments and modern portfolio theory.....	16
3.1 Measuring the risk-adjusted performance of art.....	19
4 Art as an investable asset .....	21
4.1.1 Pricing of art .....	24
4.1.2 Equilibrium prices .....	25
4.2 Hedging properties of art .....	27
4.3 Liquidity and the holding period effect .....	28
5 Investing in art.....	31
5.1 Art investment funds .....	31
5.2 Fractional ownership of art .....	33
5.3 Art derivatives.....	35
6 Measuring art returns.....	37
6.1.1 Index construction methodologies.....	37
6.1.2 Repeat sale and hedonic regression comparison.....	39
7 Risk-return profile of art.....	41

7.1	Returns.....	41
7.1.1	Art return considerations .....	42
7.2	Risk analysis of art .....	43
7.3	Historical performance of art .....	45
7.3.1	Economic cycles of the art market .....	48
7.4	Investment performance in recent years.....	49
8	Conclusions and discussions.....	51
	References .....	54

## List of figures

Figure 1. The efficient frontier of CAPM with the standard deviation of returns denoting the risk of the portfolio.....	17
--	----

## List of tables

Table 1: <i>Note.</i> Adapted from Ashenfelter and Graddy (2003) Auctions and the price of art. <i>Journal of Economic Literature</i> , 41(3) 763-787. A collection of art investment performance collected from various studies. Data for estimating the risk-free rate was obtained from Damodaran, n.d. The Historical Returns of stocks bonds and t-bills.....	47
--	----

# 1 Introduction

In the latter part of the 20<sup>th</sup> Century, art investments gained more attention from academics. Some consider them to be a worthwhile endeavor, having found them more or less as lucrative as investments in other asset classes (Stein, 1977). Others have found art to perform worse than other assets especially with regard to their additional risks (B. Frey & Pommerehne, 1989; B. Frey & Reto, 2013). Some have even likened investing in art to a crap game (Baumol, 1986).

Reitlinger's three-volume series *The Economics of taste: the rise and fall of picture prices 1760-1960* marked the beginning of academic analysis of the economics of art investment. Following Reitlinger's research, armed with the quantitative tools and the financial theories developed by Markowitz (1952) and Sharpe (1964) academics analyzed the art market and reviewed its performance using a more formalized approach. Since then, papers have been published in the field of art investing ranging from topics on art price index methodologies and art market performance to asymmetries and efficiencies in the art market. The papers of Baumol (1986), Frey & Pommerehne (1989), Goetzmann (1993), Mei & Moses (2002), Renneboog & Spaenjers (2013), Stein (1977) focus on art investments in general. In such a market, where knowledge between parties can vary, problems of asymmetric information are highly applicable. Coffman (1991) researched this topic in a paper on art investment and asymmetrical information. With artworks selling for astonishing prices, the rationality of the art market has often come into question. Chanel (1995) and Singer & Lynch (1997) published papers examining the behavior of participants in the art market. Several studies mention the importance of considering the nonpecuniary returns art investments can bring the investor and how to measure those returns. Among these papers are Candela et al. (2013), Chanel et al. (1994), Mamarbachi et al. (2008), Spaenjers et al. (2015) and Stein (1977). The main methodologies used to measure returns on art have also been studied by Renneboog & Spaenjers (2013), who compared the two main methods used, and Ginsburgh et al. (1996), who argued for one method to be favored over the other. Biases in art prices can arise from several factors. Papers by Anderson (1974), Ekelund et al. (2013) and Korteweg et al. (2016) examined the causes for these biases and methods to mitigate these biases. The papers of Ashenfelter & Graddy (2003)

and Frey & Eichenberger (1995) cover the literary field on art investment returns and provide an aggregated overview of the field.

Many of the above studies differ in opinion on the merits of art as an investment. However, the consensus seems to be that art is not an attractive investment choice. This thesis represents a summary and a cross-section of these studies, tries to summarize different economic aspects of the art market and draw a conclusion about them and thus provide an economic overview of art investing.

With these differing opinions of prior studies with regards to the profitability of art investments, there is reason to examine the art market as an investment opportunity from an economic standpoint and use an applicable common metric to compare the studies. By developing an understanding of the economics of art investing through a selective review of the literature focused mainly on the return on art investment, the author's objective is to determine art's merit as an economic investment for individual investors and answer the following question: Can art be a profitable investment? A further objective is to determine if the existing approaches for constructing art price indices can be used or improved upon in order to use them as financial instruments akin to exchange-traded funds (ETFs), funds whose performance is measured by the movement of an index tracking an underlying group of assets or a small market (Bodie et al., 2018).

The author does not have a background in art history, but rather a more financial and quantitative background with only a brief professional relationship with the art world. The author has tried to include the qualitative aspects of art investing while acknowledging their lack of qualitative knowledge and aesthetic appreciation of art. Nevertheless, the focus of this dissertation leans toward the quantitative aspects of the art market.

The first part of this analysis provides a brief overview of the formation of the art investment market and how it stands today. This part further introduces the basic concepts behind modern portfolio theory, whose concepts are used to measure art according to its risk-adjusted performance. The second part establishes the characteristics of art as an investable asset, categorizes it as an asset class, examines the economic concepts that apply to art and its pricing, and define the current status and modus operandi of the art investment market and the means by which investors have access to art investments today. The final part discusses the major methodological considerations regarding the measurement of art returns and the composition of art indices. It also identifies and reviews the risk, return and efficiency of art markets and reviews the historical returns measured by previous studies. Finally, these studies are investigated to see if there is a common trend regarding art

investment and provide a measurement of the performance of art investment over period of 1998 to 2019.

## 2 Art investment overview

Art has accompanied humanity since prehistoric times. Decorative cave paintings dating back as far as 40,000 years have been discovered (Pike et al., 2012). Art as a form of decoration and expression has played a fundamental role in the development of culture and society, and many of the insights and information about prehistoric cultures and civilizations have come from their art. Art will always be an aesthetic and creative pursuit. Artists, like everyone else, need to make a living and have done so through the sale of their creative work, thereby establishing the relationship between art and money. For a long time, artists made their living by having their work commissioned for wealthy individuals who appreciated their work. Records on the prices and demand for commissioned art date back to as early as the 15th Century. The first public art auction was held in England at the end of the 17th Century, which marked the evolution of a supply-demand economy for art from the previous patronage system of commissioned artwork (Horowitz, 2011). During the mid-18th Century, two of today's most dominant auction houses were founded, Sotheby's and Christie's<sup>1</sup>. At the beginning of the 20th Century, La Peau de l'Ours, "the skin of the bear," was established in France. It is thought to be the first art investment fund.

Collecting art has been a long-standing tradition with wealthy individuals and through the commoditization of art investors have also started to collect and purchase art for financial gains. The allocation of wealth in art has increased in the last decades, with collectibles accounting for 5% of the portfolios of ultra-high net worth individuals<sup>2</sup> in 2019. As of 2019, the global sales turnover in the art market amounted to \$64 billion (McAndrew, 2020). From 2014 to 2019, the number of high- and ultra-high-net-worth individuals grew by 27% and 29%, respectively, and the number of billionaires rose by 30% to 2,335 during the same period (Knight Frank, 2020). This worldwide trend of increasing wealth, alongside the spread of knowledge on collectible markets, sparked the interest of a much larger community in the investment of collectibles (Picinati, 2010).

---

<sup>1</sup> Sotheby's and Christie's were founded in 1744 and 1766, respectively (Christie's, n.d.-a; Sotheby's, n.d.)

<sup>2</sup> Ultra-high net worth individuals are persons with a net worth exceeding US\$ 30 million excluding their residence (Knight Frank, 2020).

Unsurprisingly, record prices for art has been observed by the media. The media has reported on transactions such as the record-breaking sale of Picasso's *Boy with the Wooden Pipe* (*Garçon à la Pipe*) in 2004, which sold at a Sotheby's auction for \$104 million (Sotheby's, 2004). Another notable transaction is the sale of *Salvatore Mundi*, the last painting by Leonardo Da Vinci in a private collection. The painting was sold at a 2017 Christie's auction for \$450 million, making it the most expensive piece of art ever sold (Christie's, n.d.-b). News of purchases such as these have a widespread impact. In the case of the aforementioned Picasso piece, they even went as far as inspiring the 2017 hit "Slide" by Calvin Harris.<sup>3</sup> These record prices might lead observers to question how these prices are determined and if they indicate record returns in the art market. Being the extraordinary economic good that it is,<sup>4</sup> art's characteristics as an asset affect art investments. To achieve positive gains from art investing, the intrinsic value and carrying cost of art need to be taken into consideration, as well as its material risk, a critical factor of art. The participants in the art markets fall into two groups, each with their own motives. The first group is speculators, who are after the record returns implied by the record prices mentioned above, and the second group is collectors. While museums purchase at the top of the information curve, collectors tend to buy before all price-relevant information is known a (Coffman, 1991). In the classical economic sense, the increased demand created by these participants, along with the restricted supply of their desired objects, would be the cause for the record prices. However, the question remains of what is actually influencing these prices. Are prices in the art markets equilibrium prices and if not what is preventing supply and demand from reaching market clearing equilibrium prices resulting in "false" economic prices for art?

The academic consensus on art investing is that it is not financially lucrative, yields lower rates of return compared with financial assets, and bears higher risk (Baumol, 1986; Frey & Pommerehne, 1989). One may wonder why collectors and other wealthy individuals invest in art. A possible explanation might be the presence of the non-financial enjoyment of owning art, that is the aesthetic dividends that come with owning art (Stein, 1977) or the social prestige that owning art can bring (Goetzmann, 1993). Perhaps art

---

<sup>3</sup> Throughout the song, the phrase: "...Empty my bank account... And buy that Boy with a Pipe" can be heard. Alluding to the Picasso painting (Bychawski, 2017).

<sup>4</sup> Stein (1977) described art to be an extraordinary economic good, being durable consumer goods and financial assets simultaneously.

investment provides additional benefits other than high monetary returns and appreciation. Some have noted that art is potentially a safe-haven asset that protects wealth, as its prices highly correlate with safe-haven asset classes such as bonds and real estate (di Torcello, 2017), and some have suggested that art can serve as an inflationary hedge (Coslor & Spaenjers, 2016). With art's non-substantial returns and higher-than-average risks, can an individual investor who is neither a collector nor one who has speculative motives expect to find success in art investing? Art returns have outperformed their equity investment counterparts during periods of upswings in the economic cycle.<sup>5</sup> However, as with other markets, timing is a crucial factor in the attainment of such gains, both with regards to entry timing and the holding period, as risk-adjusted returns can be significantly improved when the holding period is longer than three years (di Torcello, 2019).

After examining several centuries of developed art markets, academics finally tried to provide an answer regarding the investment quality of art. Between 1961–1970, Reitlinger published the book series *The Economics of taste: the rise and fall of picture prices 1760-1960*, which introduced a more quantitative approach to investing in art and brought to light the favorable inflationary hedging properties of art (Horowitz, 2011). In the years that followed, art investment became a more prevalent topic among economists.<sup>6</sup> With the advent of modern portfolio theory, along with Reitlinger's papers, art investment became a legitimate business and sparked a wave of art investment funds. Nevertheless, almost none survived the decade that followed (Horowitz, 2011). Not only did these new art investing enterprises enter the art market; so did art financial service firms. In 1967, in partnership with Sotheby's, the London's Sunday Times began publishing the Times-Sotheby's index, which describes aggregate prices for art (Coslor & Spaenjers, 2016). Citibank became the first large financial institution to offer art financial advisory in 1979 through its Art Advisory Service, and Sotheby's launched its financial services division in 1988 (Horowitz, 2011). With academia's attention on art investing and the greater access to art investment services, it can be stated that this era marked the beginning of the current art market.

---

<sup>5</sup>Anderson (1974) reported a 17% gain on impressionist paintings for the period 1951-1969 concurrent with the observation period ending at the culmination of the 1960's art boom.

<sup>6</sup>Anderson (1974), Baumol (1986) and Frey & Pommerehne (1989) all use data from Reitlinger in their studies.

## **2.1 How are people investing in art?**

Art is sold through art dealers, art fairs, galleries, and auction houses. In 2019, 60.1% of those sales occurred in opaque private markets, where transaction details remain undisclosed. The highly-publicized auction market accounts for most of the other global art sales, accounting for 37.8% of art sold in 2019 (McAndrew, 2020). In addition to conventional methods, investing through the art funds mentioned above is a way to minimize the investment overhead of art, especially for the individual who is not driven by the aesthetics of the art invested in and prefers passive management of their investments. In recent years, the art market has undergone many transformations with the arrival of new investment products and sales channels, such as online sales platforms for art and the fractional ownership model of art where investors can purchase shares of art rather than owning the whole piece, providing everyday investors access to more expensive artwork. Some firms offering such fractional ownership in art also have trading platforms where artwork shares can be traded (di Torcello, 2017).

Today's investors have access to indices made by academics as well as professional art advisory services to brief them on the developments and trends in the art market. Nevertheless, the question remains: are these indices based on adequately rigorous methods and data, and are they able to provide investors with accurate assessments of the art market? One well-known shortcoming of art indices is that they have only limited access to data on privately traded art. To pave the way for developments such as the use of these indices as underlying references for exchange-traded funds, the shortcomings of art index methodologies need to be analyzed.

In the chapters that follow, this thesis covers the points mentioned above to leave the reader with a deepened knowledge of the art investment market, its workings, and its opportunities.

### **3 Investments and modern portfolio theory**

Bodie et al. (2018)<sup>7</sup> define an investment as a current commitment of money or other resources in the expectation of reaping future benefits. Some types of investments are the following:

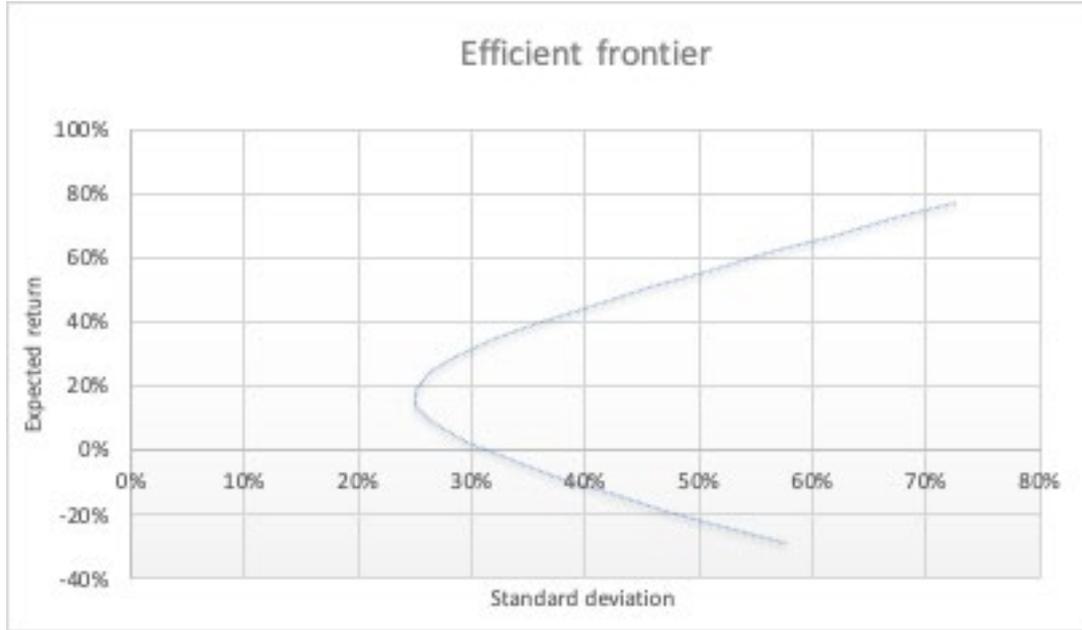
1. Purchasing stock in anticipation of an increase in the company's value;
2. Exchanging money for a company's bond that provides a regular coupon payment;
3. Purchasing new production machinery to increase production capacity.

This thesis will focus on the first and second types of investments and how such investments can be made with art as the asset invested asset. In practice, a collection of investments is called a portfolio. A portfolio can consist of many different assets and asset classes. When managing a portfolio, investors can consider modern portfolio theory (MPT), also known as mean-variance analysis since it focuses on the mean and variance of investment returns. MPT was introduced by Markowitz (1952) in the paper “Portfolio Selection” and later improved upon by Sharpe (1964) in the article “Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk.” In brief, MPT describes ways of allocating assets to a portfolio to maximize its expected return, given an investor’s risk tolerance. The theory provides investors with techniques for efficiently diversifying their portfolios. It introduces the notion of the efficient frontier, which is the subset of “efficient” investment combinations among all possible combinations. MPT states that an investor should choose from this subset of efficient portfolios based on their desired return goals and risk appetite. The efficient frontier contains all the portfolios that have the least amount of risk given a desired return and all portfolios that have the highest amount of return given

---

<sup>7</sup> The financial theories and definitions provided in this chapter and onwards are referenced from the textbook Investments by Bodie Z, Kane A and Marcus A.

an acceptable risk rate or  $P(\min(\text{Var}_p), \max(E(r_p)))$  (Baumol, 1986). An illustration of the efficient frontier can be found in Figure 1.



**Figure 1. The efficient frontier of CAPM with the standard deviation of returns denoting the risk of the portfolio.**

An extension of the MPT is the capital asset pricing model (CAPM) developed by Lintner (1965), Mossin (1966) and Sharpe (1964). Using linear regression, the CAPM analyzes the relationship between the systematic risk of an asset and returns. A general example of the CAPM is shown in Equation (1).

$$E(R_{art}) = R_f + \beta_{art}(E(R_m) - R_f) \quad (1)$$

$E(R_{art})$  and  $E(R_m)$  are the expected returns on art and the market portfolio, respectively.  $R_f$  is the risk-free return, and  $\beta_{art}$  is the measurement of art's contribution to the total variance of the market portfolio or the systematic risk of art. The formula for the systematic risk or  $\beta_i$  of an asset  $i$  is described in Equation (2), which calculates the ratio of the asset's covariance relationship with the market and the market variance.

$$\beta_i = \frac{\text{Cov}(R_i, R_m)}{\text{Var}(R_m)} \quad (2)$$

Although a useful and widespread tool for investment performance analysis, the CAPM is constrained by its underlying assumptions about the behavior of investors and market structure. Candela et al. (2013), acknowledged the limitations of CAPM when applied to

the art market.<sup>8</sup> It is, therefore, necessary to review the constraints introduced by these assumptions when attempting to use the CAPM for markets such as the art investment market. The CAPM assumes:

1. Investors are rational and optimize for mean and variance.
2. Investors have a single period planning horizon.
3. All investors have the same expectations of the risk-adjusted performance of the investments on the market.
4. Markets consist only of assets that are traded publicly, short positions are allowed, and investors can borrow or lend at the risk-free rate.
5. Market transactions have no transaction costs.
6. All market information is publicly available.
7. Transactions on the market are not taxed.

The first and third assumptions relate to investor's general behavior regarding investments and are considered by the author to hold in the art market. The fourth and fifth assumptions are not recognized by the author as valid since it is not possible to take short positions and borrow or lend artworks without a premium on the risk-free rate (Campbell, 2007; Ralevski, 2011) or without considerable transaction costs (Frey & Eichenberger, 1995). Furthermore, with only a little over a third of art sales in 2019 coming from public auctions (McAndrew, 2020), the assumption that markets consist of only publicly traded goods, as stated in the fourth assumption, cannot be validated. Moreover, the majority of sales occur privately, with no transaction details available; the sixth assumption six is therefore also invalid. The final assumption regarding the tax-free nature of transactions is not straightforward to transfer to the art market since art sales can occur in different countries, which have varying tax rates (Frey & Eichenberger, 1995). Europe has a value-added tax on art, and the United States has a sales tax in most states (Jovic, 2019). Frey & Eichenberger (1995) also note that art investments can be used to eliminate or lower the tax burden of an investor. One can argue that the presence of these tax alleviations can

---

<sup>8</sup> Candela et al. (2013) observe that the assumption of short selling cannot be fulfilled by the art market.

offset the taxation imposed on transactions. In this thesis, the seventh assumption is considered valid given that the literature consulted did not account for taxes when considering the returns on art investments.

In this thesis, the author uses the techniques of MPT and CAPM to analyze art as an investment and compare it to other more common, well-known investable asset types. One of the key elements of MPT is that risk and reward should always be evaluated together. To compare and assess different investment choices, the author uses the Sharpe ratio to measure risk-adjusted performance.

### 3.1 Measuring the risk-adjusted performance of art

The Sharpe ratio was proposed by the economist and Nobel laureate William F. Sharpe (1966). The ratio describes the relationship between return and volatility. It is also called the reward to volatility ratio to emphasize the main purpose of MPT, which is to calculate the risk-adjusted performance of investments. The ratio can give an investor an idea of the amount of risk taken to achieve a desired return. In other words, it describes the reward of the investment distributed per unit of risk variation (Sharpe, 1966). One wants the ratio to be as high as possible.

$$\text{Sharpe ratio} = \frac{R_p - R_f}{\sigma_p} \quad (3)$$

The ratio described in Equation (3) takes the risk premium, which is the difference between the return of an asset and the risk-free rate<sup>9</sup> and divides it by the standard deviation of the asset's annual rate of return, representing the risk of the asset. A Sharpe ratio near one is considered acceptable since it means that the additional risk taken carries a positive contribution toward the investment's return. A near-zero or negative ratio would mean that the investor is not being rewarded or is even paying a premium for the additional risk taken on when choosing that investment over the risk-free investment. Say that a portfolio containing paintings has an average annual return of 5% and the risk-free rate that can be achieved through treasury bills is 1%. Along with a standard deviation of 20% for the

---

<sup>9</sup> The risk-free rate is the return investors earn by investing in assets considered to be risk-free. Such assets are government bonds or treasury bills.

paintings portfolio the Sharpe ratio is then  $\frac{4\%-2\%}{20\%} = 0.1$ , which implies that the investor is getting 0.1% in return for each unit of risk. Conversely, if the same investment had a slightly higher return had a lower standard deviation, say 5%, the ratio would be  $\frac{6\%-2\%}{5\%} = 0.8$ , entailing that the investor is almost receiving a 1% return for each percentage of risk.

The Sharpe ratio is a powerful tool when analyzing and comparing different investments, as it helps in understanding how an investment performs by considering its risk, not just its return.

## 4 Art as an investable asset

The considerable amount of art sales turnover in recent years raises several questions. How profitable is investing in artworks and how are record prices for art depicted being determined? What are the characteristics of art as an investable asset and what must one consider when investing in art?

Investments are grouped into different categories, commonly known as asset classes. Equities, bonds, cash or cash equivalents, and alternative investments are examples of asset classes (Corporate Finance Institute, n.d.). There is usually not much correlation between asset classes, and in some cases, there is a negative correlation between classes. Having a portfolio that includes different asset classes can reduce the risk exposure of the portfolio through diversification (Mamarbachi et al., 2008; Mei & Moses, 2002; Pesando, 1993). Some asset classes will require different types of management styles, either passive or active (Scott Jr., 1994). Art, can most definitely be considered as a collectible commodity, as it provides consumption benefits not unlike other commodities (Scott Jr., 1994). Therefore, art belongs in the category of alternative investments. Alternative investments are considered to be those investments that fall outside the scope of the other three categories, and these alternative investments include hedge funds, private equity, real estate, commodities, and collectibles (Connor et al., 2010).

### *The intrinsic value of art*

Art does not generate regular financial returns in the form of dividends or coupon payments like equities and bonds. Art, however, is a commodity since it provides enjoyment. The enjoyment or utility art gives to its owner can be considered its psychic returns or the benefits of consuming the object (Connor et al., 2010). Enjoyment of art can also arise from the prestige of owning the asset (Frey & Pommerehne, 1989; Frey & Eichenberger, 1995).<sup>10</sup> Financial returns on art, however, stem from the appreciation of the object's value. Non-financial returns or, in other words, psychic or nonpecuniary returns on art can,

---

<sup>10</sup> Frey & Pommerehne (1989) concluded that the consumption benefits of owning art included the prestige brought with it and Frey & Eichenberger (1995) state that the *ownership effect* of art give rise for a possible explanation of the absence of art rental markets.

however, be considerable. In this thesis, the author refers to the non-financial returns that investors can expect to gain from owning art as the aesthetic returns of their investment.

### ***Aesthetic returns***

Aesthetic return can be described as the enjoyment of viewing the art or displaying it to others or as the prestige of its ownership (Connor et al., 2010; Frey & Eichenberger, 1995). Another possible source of aesthetic return is the diamond in the rough effect, which can give the purchaser or current owner nonpecuniary returns from having found something rare and valuable in something that was in plain sight and thought previously to have been of lesser value or worthless (Coffman, 1991). The joy of ownership has been ranked the number one factor of importance ultra-high-net-worth individuals consider when purchasing passion investments (Knight Frank, 2020), suggesting that the aesthetic returns (or consumption benefits) of art investment being a sizeable contributing factor to investor's choices.

### ***A cash flow negative asset***

When carrying art investments, the investor must consider various expenditures relating to the ownership of the asset. These expenditures can be insurance, which can be substantial for some artworks, ranging between 0.1% to 0.5% of the object's value, (Frey & Pommerehne, 1989; Frey & Reto, 2013) and storage costs, as is the case with real assets such as commodities, equipment, and vehicles. Art investments also usually require a more active management style in comparison with other investments, similar to real estate. This management style requires that an investor select and curate their portfolio and accurately time buying and selling decisions, all of which costs their time and attention (Scott Jr., 1994). The cost of management is either paid through specialist fees or through the opportunity cost of time. With no dividends and holding costs, art is a cash flow negative asset.

### ***Liquidity concerns of art***

Artworks are considered to be unique and have low turnover compared to other assets (Dimson & Spaenjers, 2011). Therefore, they are not considered to be liquid (Chanel et al., 1996). Keynes (1978, p. 59) referred to investments being liquid when they can be realized by investors on short notice without incurring losses, liquidity can then be referred to as the ease of which investors can achieve value for their investment on short notice. Illiquid assets, for example, real estate and paintings, can be hard to sell quickly, and a quick sale

may require a substantial discount on the price at which the asset could be sold in an unrushed situation. Investing in art usually requires holding periods longer than three years<sup>11</sup> (see di Torcello, 2019, p. 141). The low liquidity of art is in part due to its associated transaction costs, which makes art ill-suited for short-term trading (Lovo & Spaenjers, 2018; Picinati, 2010). Another factor determining art's lack of liquidity may possibly be the length of the process of bringing an artwork to auction.

### ***The material risk of art assets***

Although studies most often only account for the financial risk or the fluctuations in price, there are several other risks involved with art investments that can have a significant impact on the financial success of the art investor. With art being a durable consumption good, there is always the risk of it being damaged or stolen. As art prices have increased over the years, so has the frequency of art thefts (Frey & Pommerehne, 1989). British Rail Pension Fund experienced such risk when a T'ang horse sculpture was stolen on its way to auction (Coslor & Spaenjers, 2016). Reattribution risk is also something to consider when investing in art. Reattribution risk is the risk of a lesser-valued artist being credited for the creation of an artwork that was previously thought to have been created by someone else, in some cases, a "blue-chip" artist. A notable example of this risk is the case of the painting *Daniel In the Lions' Den* by Peter Paul Rubens. The painting was sold at a Christie's auction in 1882 and 1885 for £1,680 and £2,520, respectively. Seventy-eight years later, the painting was believed to be the work of Reubens's apprentice, Jacob Jordaens, and sold at a 1963 auction for a mere £500. However, two years later, the painting's attribution was reverted to Reubens. It was then subsequently acquired by the Metropolitan Museum of Art in New York for £178,600, leaving the purchaser of the work in 1963 with a handsome 1,789.44% annual return on the painting (Frey & Pommerehne, 1989). The risk of forgery is a variation of attribution risk that one also faces when investing in art. It is apparent from the Reubens example that the role of experts in art investing is significant. However, even experts cannot fully guarantee that something is indeed genuine (Frey & Pommerehne, 1989). The following section look more closely at the role of these experts.

---

<sup>11</sup> This thesis will further cover the topic of the connection with holding periods and transaction costs in chapter 4.3.

### **4.1.1 Pricing of art**

Because there is no regular income from art investments, the usual investment pricing models, such as discounted cash flow valuations, are of limited use. In previous studies, auction prices were used. It is important to briefly examine the mechanics of art auctions and the process in which auction prices are determined.

#### ***4.1.1.1 Art auction mechanics***

The two dominant auction houses in the world, Christie's and Sotheby's, were both established in the 18th century.<sup>12</sup> They hold their auctions in an English style. The English auction style is an open outcry, ascending price auction in which the auctioneer calls out prices and solicits responses from participants. When there are no more bids, the item is "hammered down," and the item is sold if the bid price exceeded the predetermined reserve price<sup>13</sup> the price the item is sold at is called the "hammer price." If the bid price is below the reserve, the item is not sold and is considered "bought-in" by the auctioneer. With this type of auction, the price an artwork sells for will always be the highest price a buyer is willing to pay for it (assuming the price exceeds the reserve value). The demand for the object determines the final price; however, the appraised value of the object also guides the final hammer price.

#### ***4.1.1.2 Appraisals as a price guideline***

The price of art is determined by two different but symbiotic factors, the price a work is sold for and the appraised value of the art. The appraised value or the value of the artwork is the monetary value assigned to artwork before it is sold at auction. This appraised valuation provides a basis for the low and high estimates of the work. These estimates affect the final price in such a way that artworks are not sold if they do not pass the reserve, with the reserve value usually set around the low estimate of the appraisal value (Ashenfelter & Graddy, 2003). Therefore, it can be stated that the appraisal of an object can have a determining factor or at least a guiding effect on the selling price through the high- and low-estimates provided by experts.

---

<sup>12</sup> Sotheby's and Christie's accounted for 20.25% and 19.83% of the annual turnover of the auction market respectively which totaled to US\$ 24.2 billion in 2019 (McAndrew, 2020).

<sup>13</sup> A reserve price is a predetermined limit price agreed upon by the seller and the auctioneer. It is by convention, set around the low estimate of the object (*Sotheby's Glossary*, n.d.).

The appraisal of an artwork is done by art experts using relative valuation (Picinati, 2010). When performing this relative valuation, a combination of qualitative and quantitative factors are taken into consideration. Among them are the following.

- The **condition** of the art piece is one of the most critical factors. Has the object maintained its condition and integrity since its creation? Does the condition affect its appearance, or has it been restored?
- The acquisition history or **provenances** of the art piece and recent prices fetched for similar works by the same artist.
- The **subject matter** of the artwork; different subjects from the same artist can be valued very differently.
- The **rarity** of a piece by a given artist being brought to market.
- The **regularity** which an artwork is put up for auction can have adverse effects on its value.
- The object's historical **bought-in** rate can lead to lower values (“How to Value Art,” n.d.).

With no formal approaches to artwork appraisal in place, the process of appraising art is highly qualitative and can vary between experts. Ekelund et al. (2013) found a clear downward bias on the estimates provided by the auction houses. They theorize that conservative forecasting by auction houses is done in an attempt to maximize profit. With conservative forecasts, sellers are likely to sell if the bidding has exceeded far beyond their expectations and buyers are encouraged to bid when bargains appear to be under the hammer.<sup>14</sup>

#### 4.1.2 Equilibrium prices

According to the principle of equilibrium, market prices adjust until the demand for something is equal to the amount supplied.

In a competitive market such as the art market, the aggregated demand of all consumers, form the market demand curve; similarly, the sum of individual supply curves forms the

---

<sup>14</sup> Armstrong et al. (2015) introduce a Golden Rule Checklist of 28 guidelines which allow non-experts decision-makers to evaluate the forecasts of experts. Especially useful for situations in which the uncertainty and probability of bias are considerable, and decision-makers are likely to be intimidated by forecasting experts.

supply curve. At the intersection of these aggregate supply and demand curves of market participants lies the market price or the equilibrium price (Varian, 2010).

### ***Inelastic supply of art***

The supply side of artworks is highly inelastic since the majority of art is held by private collectors whose motives to sell are unknown. The increase in supply from private collections depends mainly on “the four Ds”: death, debt, divorce and dissolution. Prominent works of art in museums have selling restrictions in place and (Mamarbachi et al., 2008) are not affected by the four Ds, for the dissolution of museums is extremely rare.

Baumol (1986) suggests that there are no equilibrium prices for art, and art prices can be considered unnatural in a classical economic sense since the supply side of artworks is completely inelastic, at least for deceased artists. Furthermore, Baumol states that this inelasticity incapacitates the process of achieving price equilibrium in art markets. Art, by his account, does not adhere to supply and demand laws. Great demand for works of certain artists, for example, Picasso, will not lead to an increased supply of their work. The supply for works by artists in demand is also shrinking regularly due to reattributions and museum acquisition (Spaenjers et al., 2015).

These observations of supply determinants in the art market lead to the special case of the market equilibrium model with fixed supply, where supply is fixed at a given number. One can argue that this model applies to the art market due to its inelastic supply. In this model, the amount supplied is independent of the price and demand determines the price entirely.

### ***Externally driven demand***

The demand for luxury consumption may be driven by the increase in income of wealthy households and investors’ sentiments towards the art market (Renneboog & Spaenjers, 2013; Spaenjers et al., 2015)<sup>15</sup>

Studies have suggested that the globalization of aesthetic values and the conforming of taste towards Western-style art have also increased the demand for specific artwork by

---

<sup>15</sup> Goetzmann (1993) examined lagged relations of investor wealth and art returns and found that greater wealth leads to increased art prices. Goetzmann performed a Granger test on annual data for art returns and growth of share prices in the London Stock Exchange, indicating a strong presence of a causal relationship between the art and stock market, with the art market tending to follow the stock market. Renneboog & Spaenjers (2013) found that art market sentiment was a vital determining factor of the art price cycle.

increasing the number of interested parties (Goetzmann, 1993; Goetzmann & Spiegel, 1995). (Goetzmann, 1993) and (Goetzmann & Spiegel, 1995) suggested that increasing conformity in taste towards Western-style art impacted the increasing demand for art along with population growth. Changes in tax regulations can also impact the demand for art since, in many countries, purchasing art can reduce one's tax burden (B. S. Frey & Eichenberger, 1995). If tax regulations were to change, the demand for art would likely be affected in that jurisdiction. Some have even suggested that the variation on hours of daily sunshine can have a positive upwards effect on auction prices (De Silva et al., 2012). The specific factors that drive demand for art have and will most likely never be determined quantitatively, with the upper limit for art demand only being constrained by the wealth and desire of the collectors (Goetzmann, 1993).

## **4.2 Hedging properties of art**

Not all studies agree on arts potential for diversification. Some claim that art markets are caused by equity returns and move along with major stock markets. (Stein, 1977) states that values of paintings are not secure during an economic recession and claims that they are subject to the same ups and downs of the stock market. However, Stein does not support that conclusion with data. Recently, studies have shown a more compelling case for the hedging properties of art (Mandel, 2009).

Candela & Scorcu (1997), Mamarbachi et al. (2008), Mei & Moses (2002) and Renneboog & Spaenjers (2013) all put forth findings supporting the claim that art is not correlated or has a low correlation with financial assets such as stocks and equity. The findings of Candela & Scorcu (1997) in particular support the conclusion that art is only slightly correlated with other real assets such as gold and real estate as well as outperforming these assets' returns for the period; art's return was 3.7% while gold and real estate showed returns of 2.35% and 1.06%, respectively. The non-existent or negative correlation between art, treasury bills, and bonds shown in Mei & Moses (2002) and Renneboog & Spaenjers (2013) suggests that a portfolio containing art would suitably hedge against the negative movements of these assets, especially bonds.

In addition to the findings of Renneboog & Spaenjers (2013), Dimson & Spaenjers (2011) found that stamps, being a collectible item, have partial hedging characteristics against inflation. Furthermore, Renneboog & Spaenjers (2013) also found evidence of a positive correlation between art prices and lagged returns of financial assets, which lends credibility to their hypothesis that equity returns can affect art price growth since, with art

being a luxury consumption item, a rise in investment income of wealthy households would lead to an increase in demand for art. Such trends are shared with other collectibles such as stamps. Furthermore, Dimson & Spaenjers (2011) found that stamps are positively correlated with lagged equity markets. Coffman (1991) suggested a countercyclical relationship between the art and stock markets. The reason the relationship is lagged is that an increase in the flow of money into art markets occurs after the financial markets become less desirable, although this effect only applies to art classified as blue-chip (Coffman, 1991).

Goetzmann (1993) found a moderate to high correlation between art and the bond and stock markets, with correlation coefficients of 0.54 and 0.78, respectively, for the period of 1900–1986. Goetzmann’s findings suggest that such a correlation would make art a poor choice for diversification purposes against those assets. However, he found a very weak correlation (0.18) with inflation.

The consensus in the literature concerning art investment seems to be that art can be a useful hedge against inflation since it can maintain its real value in the long term Candela & Scorcu (1997), upon casual inspection of their art market index and the consumer price index (CPI), found that there were significant deviations in the art index from the CPI during art market booms, but the market would always fall back in line with the CPI, suggesting art is suited for inflationary hedging.

### 4.3 Liquidity and the holding period effect

As mentioned in Section 4, due to high transaction costs, it is typical for an investor to expect to carry art for 5–7 years before being able to realize a return on investment.<sup>16</sup> One measure which could provide insights regarding the liquidity of the art market is the bought-in rate, which can indicate the level of difficulty of liquidating an artwork in a specific category. A low buy-in rate indicates high demand and liquidity, whereas a high buy-in rate suggests the opposite (Evoli, n.d.).

Candela & Scorcu (1997) stated that only art that is traded at the major auction houses has the liquidity needed to equate them with other alternative assets and justify the high fees paid to auction houses, which they view as the price paid for the increased liquidity.

---

<sup>16</sup> Return on investment or ROI is the calculated percentage change between the cost of investment and the current value.  $ROI = \frac{\text{Current value} - \text{Purchase cost}}{\text{Purchase cost}}$ .

Given the low liquidity of art, the length of holding periods of art can have a significant impact on the performance of the investment.

In examining holding periods, Frey & Pommerehne (1989) found that as holding periods increase, the more attractive investing in art became with respect to risk and return. Investments with holding durations between 20 and 39 years yielded an annual 1.7% return with a standard deviation of 6.3%; however, investments held for 100–119 years had the same returns but with lower risk, having a standard deviation of 2.4%. However, it is worth noting an apparent bias of these findings. A 100-year-old painting is much more likely to be a rarity than a 20-year-old painting, as the value of collectibles like art is heavily influenced by their age. The older an item is, the more likely it is to provide decent and consistent returns. Acknowledging this bias, it can furthermore be stated that, for the art investor, patience is a virtue. Baumol (1986) found that substantial gains or losses were only experienced for investments with holding periods of less than 50 years, and as the holding period grew, the variability of returns reduced and approached zero, as expected from a mean-reverting random process. These findings are in accordance with Gavazza (2011) who concluded that, when assets have a thin market, which is the case for art markets, firms tend to hold on to investments for extended periods because they expect the profitability of the investment to rise in the long run. These findings are further supported by Mamarbachi et al. (2008), which observed that the longer the period between purchase and resale, the less likely the art would be “bought-in.” Conversely, the probability of a buy-in rose when art was auctioned soon after purchase.

Due to factors in auction mechanics, the difference of the value between the auction winner and the bidder with the second-highest bid for the item will lead to a negative return for the winner if the holding period is short (Goetzmann & Spiegel, 1995). This difference can be represented as the difference in the aesthetic (or private) value between the winner and underbidder. This premium of value for the winner has come to be known as the “winner’s curse” and can be considered an implicit cost conditional upon discovering that a bidder was the highest bidder. The winner’s curse can be described formally as a liquidity premium for art (Goetzmann & Spiegel, 1995). When winners resell an artwork immediately or when holding periods are short, the seller is more likely to experience the winner's curse. Goetzmann & Spiegel (1995) found no evidence of the winner’s curse for the investor holding art for longer periods but rather found a positive gain on the sale, as new participants enter the market to drive up demand. After reviewing the studies mentioned above, the author here concludes that the returns investors can expect from art

are related to how long they expect to hold said investments—meaning that the art markets are better-suited for the patient investor.

## 5 Investing in art

The size of the art market has increased in recent times. Total art sales were estimated at \$64.1 billion in 2019, with a growth of 4.93% per year, for an overall growth of 62% in the past decade (McAndrew, 2020). In 2018, capital allocated to investments in collectibles accounted for 5% of the portfolios of ultra-high-net-worth individuals,<sup>17</sup> and The Wall Street Journal ranked collectibles as the best investment choice for the year, with investors averaging a gain of 10.2% during a year when the S&P500 index posted a loss of 5.1% (Chilkoti, 2018). Investors looking to access the art investment market have several possibilities for acquiring art. The most common way of investing is purchasing the object directly from either auctions, dealers, art fairs, or galleries (McAndrew, 2020). This thesis does not go into the details of direct purchases and assumes they are well-known. Aside from direct purchases, art funds and firms providing securitized art are among the other possibilities. This section covers these investment options as well as current and future developments for art investing.

### 5.1 Art investment funds

Investing through art funds provides investors with access to the art market without having to acquire and carry expensive artworks directly themselves. Art funds are available to investors with a minimum investment ranging from \$500,000 to \$1 million (Hube, 2019). The 2017 Deloitte Art and Finance Report (di Torcello, 2017) estimated the art fund market, in terms of assets under management (AUM), to be worth \$834 million, down from \$1.2 billion in 2015.

#### *Notable art investment funds*

La Peau de l'Ours (“the skin of the bear”) was probably one of the first art investment funds. The fund was established in 1904 by the French financier André Level. Over its lifetime, the fund collected annual contributions from its 13 partners. In 1914, the fund sold its entire collection at auction, quadrupling the value of its initial investment (Horowitz, 2011; Picinati, 2010). As mentioned in Chapter 2, several art funds were

---

<sup>17</sup> (Knight Frank, 2020)

established in the 1970s. Among them is the British Rail pension fund (BRPF), which was in operation from 1974 to 1989. The BRPF was not an art investment fund, as it allocated only a small portion of its capital toward art. It was, however, the first genuine investment vehicle in the art investment market (Horowitz, 2011). While several others followed, only the BRPF survived the 1970s wave of art funds. In 1985, The New York Times reported on the state-of-the-art investment fund market and stated that, although a good idea, the rise in the mutual fund approach to art in the 1970s had no survivors (Bender, 1985). The article omits the then still operational BRPF, whose final liquidation of art investments came in 2000 (Horowitz, 2011). A notable example of the performance of an art investment fund in recent years is the Artemundi Global Fund (AGF). The AGF was a fund that operated from 2010–2015 and had a minimum investment of US \$250,000. After winding down its operations, the fund published its financial returns. They published the impressive result of 85.36% return on \$211,000,000 in assets under management. The fund realized a return on 97% of the items sold and only accounted for losses on 3% of the portfolio, amounting to an average net annual return of 17.07% (Artemundi Global Fund, n.d.).

### ***The life cycle and structure of art funds***

Art funds are usually set up as closed-end funds<sup>18</sup> with fund durations ranging from 5–10 years. Typical operation during the lifecycle of a 10-year fund is allocating capital towards art investment in the first four years, reaching a no purchase mark around year three or four where from then on the fund can only hold and divest assets (Horowitz, 2011). Art funds share the fee structure of hedge and private equity funds following the 2/20 model, where investors pay a 2% yearly fee of their assets under management and 20% performance fee on the returns (Foster & Young, 2008).

### ***The benefits of art investment funds***

Art funds provide several benefits to the art investor as well as the art market itself. The funds believe their presence increases liquidity and transparency by injecting new capital that would have otherwise not been directed towards the art market (Horowitz, 2011). They delegate the active management of the art portfolio to expert consultants employed by the fund so that the investors do not have to concern themselves with portfolio management.

---

<sup>18</sup> Closed-end funds, raise a fixed amount of capital before allocating it for investing. Once capital has been raised, no additional shares of the fund sold, and the fund is closed for new investment (Dimson & Minio-Kozerski, 1999).

Similar to hedge funds, art funds are often incorporated in tax-favorable countries such as the British Virgin Islands, a country that does not impose a tax on capital gains (Horowitz, 2011). Funds located in such tax havens can be considered more efficient since they can reinvest capital gains without taxation. The structure of art funds and their large pools of capital enable them to acquire art through expert consultants and apply strategies that minimize their holding costs and maximize their return. One such strategy employed by art funds is the practice of loaning or renting out artworks to their investor's galleries, museums, and other interested parties in order to reduce insurance premiums and storage costs while simultaneously hedging against casualty risk or the risk of an artwork losing its value from damage (ArtTactic, n.d.).

### ***The shortcomings of art investment funds***

As is the case with hedge funds, when reviewing the investment performance of art funds, biases in their reporting must be accounted for. Because art funds are unregulated, they are not compelled to report on their performance. Self-selection bias is likely to arise.<sup>19</sup> Survivorship bias is also worth mentioning since funds that have folded or were not able to raise adequate capital are not included in reported data on art funds (Connor et al., 2010). In the 2017 *Art & Finance Report* (di Torcello, 2017), wealth managers claimed that the main challenges of art investment funds are the lack of track records, liquidity, post-investment transparency, and the unregulated nature of the art fund market. Furthermore, the report states that the art fund industry is unlikely to evolve until it has addressed these challenges. In last year's edition of the *Art & Finance Report* (di Torcello, 2019), it was announced that the publishers were moving away from coverage of the art fund industry due to a decrease in transparency, noting that art funds had been moving their operations out of the public eye. These observations signal that art funds must address these issues if they are to be considered viable options for investors.

## **5.2 Fractional ownership of art**

The concept of securitization of art is not new. It is the method that art funds have been using for many years. Art funds pool collections of artworks into a fund that is securitized.

---

<sup>19</sup> Self-selection bias is the bias towards good performance, which occurs when underperforming funds opt-out of disclosing their returns, whereas funds with excellent performance are eager to report their returns

In recent years, fractional ownership of art through securitization of single artworks has been on the rise (di Torcello, 2019). The process of securitization is to take an artwork and incorporate it into an investment vehicle. A fixed number of shares are then issued and sold through a public offering providing investors with fractional ownership of the artwork through their shares. The artworks ideal for securitization are those considered to be blue-chip.<sup>20</sup> Usually out of reach for everyday investors, investments in blue-chip art allow these investors to have more liquid investments with better performance than was offered before the arrival of blue-chip securitized art (Ehrmann, 2018; Golovina, 2018), although academics are not all in agreement with this claim.<sup>21</sup> The goal of the companies offering fractional ownership of art is to transform the asset class of art into “a liquid and efficient vehicle that offers controlled exposure to fine art in their portfolios” (di Torcello, 2017, p. 195). Fractional ownership offers investors access to art investment with initial costs as low as \$20 per share in the case of Masterwork’s offerings (Securities and Exchange Commission, 2020), much lower than the \$250,000 investment minimums for some investment funds. Lower minimum investment amounts reduce the barrier to enter the art investment markets for investors and increase liquidity in the art investment markets.

Among the firms offering retail investors co-investments are The Fine Art Fund and the newcomer Masterworks, which enables retail investors to invest in blue-chip art. Masterworks has offered artwork by notable artists such as Monet and Basquiat. In April 2020, the company announced the offering of shares in *The Mosque* (1982) by Jean-Michel Basquiat. The offering consisted of 284,420 shares at a price of \$20 per share (“Masterworks 006 Offering Circular,” 2020) and an appraisal value of \$6 million done by a third-party appraisal firm, indicating a built-in IPO discount of 5.5%. At the time of this writing, 50% of the offering had been committed to by investors (“Jean-Michel Basquiat,” n.d.).

---

<sup>20</sup> Similar to investing where blue-chip means established and is an indicator of quality. Art market analysts define blue-chip art to be art created by the more widely recognized and established artists with reliable past sale performance, lending credence to the marketability of objects created by that artist (Golovina, 2018).

<sup>21</sup> Singer & Lynch (1997) found evidence that category one art or “blue chip” performed three times better than the art classified as category three. The hypothesis that blue-chip art or art created by the “old masters” has better performance than art created by lesser-known artists have come under criticism mainly by (Mandel, 2009; Mei & Moses, 2002; Pesando, 1993).

Another less conventional approach to investing in the art market is fractional ownership using cryptographic tokens. Cryptographic tokens represent assets or access rights stored in a distributed ledger.<sup>22</sup> Digital entities or shares of art are registered on these distributed ledgers and traded through smart contracts. Smart contracts are transactions on the ledger in which the transaction's terms are encoded. Only once these terms have been met is the transaction fulfilled and the tokens exchanged (Ølnes et al., 2017). For example, for the sale of a painting, the seller encodes the contract on the ledger, and once the buyer has registered payment into the ledger for the transaction, the trade is made. Many of the firms offering fractional ownership plan to offer or already offer marketplaces or trading platforms for the art shares (di Torcello, 2019).

### 5.3 Art derivatives

Derivatives are financial instruments whose value derives from the values of other assets. These other assets, be them real or financial, are often referred to as the underlying. Derivatives are considered to be a powerful tool for hedging and speculative investing. As useful as derivatives are, they can be quite complicated and risky if not properly used and have even been described as “weapons of mass destruction” by the legendary investor Warren Buffett (Buffett, 2003, p. 15). In the art world, derivatives have not yet fully developed into investable products. The author has found limited reporting at all on the actual usage of derivatives in art. One example which comes close was the methodology used by an emerging art hedge fund in 2007 called The Art Trading Fund. The fund announced that they had found a way to invest and hedge their investments in the art market, claiming to be the only hedge fund in art since others did not have a hedge. The approach of The Art Trading Fund was supposed to identify indicators and securities that had a very strong correlation with the art market and hedge their art investments by shorting them through derivatives (S. Johnson, 2007).<sup>23</sup> However, there have been signs of the emergence of derivative products for the art investment market. The company Artprice, a company providing price databases and econometric analysis on the art market as well as an online selling platform, announced the launch of its Artprice100™ index in

---

<sup>22</sup> A distributed ledger DLT, is a storage system, containing immutable records of transactions and is distributed across different locations and accessible by its participants (Ølnes et al., 2017).

<sup>23</sup> The financial results of Art trading fund were not found during the writing of this thesis—indicating that the fund was not able to raise sufficient capital and get off the ground.

2018, and in the press release accompanying the launch, the company hinted that such derivative products were on the horizon (Ehrmann, 2018).

Bringing derivatives to the art investment market could improve efficiency. (Ralevski, 2011) concluded that there was much need for art derivatives and that they would benefit the market. Furthermore, industry professionals claim that the arrival of art derivatives is “just around the corner” (Ralevski, 2011). With the advent of art derivatives, CAPM's fourth assumption regarding short selling is fulfilled, and thus, the accuracy of its application to art investing is increased.

## **6 Measuring art returns**

In order to compare the return on art with other financial assets, the return and risk profile of art needs to be established in a historical sense. Price indices provide a way to evaluate these metrics. Indices provide the “average investor” with a view on the historical price trends in the art market and can serve as a benchmark against which the financial merits of an investment can be measured (Coslor & Spaenjers, 2016; Mamarbachi et al., 2008). Some of the indices developed in academia have been commercialized, with Sotheby’s having adopted the index developed by Mei and Moses, and other indices having been developed by private enterprises such that developed by Artprice (Ehrmann, 2018).

Artworks are heterogeneous due to their uniqueness, and their heterogeneity makes predicting price movements difficult since price observations of the same item (repeat sales) are infrequent (Chanel et al., 1996). Prices of prints are an exception. Repeat sales of prints are far more frequent than with other artwork, providing them with more data points for return calculations (Pesando, 1993). Art is similar to real estate in the sense that real estate is also heterogeneous and has the constraint of only a few recorded transactions for each item. Unsurprisingly therefore, many of the same methodologies used for measuring real estate prices have been applied to art prices.

This section discusses the different approaches taken by each methodology as well as discusses some of their possible faults.

### **6.1.1 Index construction methodologies**

For heterogeneous assets like art and real estate, the construction and development of indices can prove to be quite difficult (Coslor & Spaenjers, 2016). Previous studies have developed art market indices and used them to provide insight into the investment performance of art. Although robust by academic standards, the indices created have come under criticism for their weak methodologies and inability to describe art's performance accurately (Ralevski, 2011).

The choice of data is an essential aspect in constructing any price index, art indices being no exception. Multiple studies have acknowledged that a lack of data is a shortcoming of art indices, stating that the opacity of the art market is a barrier for the

application of rigorous quantitative modeling.<sup>24</sup> Many indices use, at least in part, the dataset assembled by Reitlinger (Baumol, 1986; Frey & Pommerehne, 1989). Reitlinger's data was on paintings created by deceased artists who he deemed notable, while he excluded others (Frey & Pommerehne, 1989). Using such opinionated data can lead to biases in an index.

Because the data in prior literature stems only from publicly available auction prices, which account for about half of the volume of sales in the art market (Coslor & Spaenjers, 2016), selection bias is a factor when constructing indices using this data (Goetzmann, 1993). Goetzmann (1993) further states that, in addition to the selection bias, indices constructed from auction transactions do not account for the stylistic risk of art investing, a factor which he deems to be of high importance. Korteweg et al. (2016) observed that, when accounting for selection bias, the annual returns dropped from 10% to 6.5%. Stein (1977) assumed that the painting price points included in the dataset he studied, consisted of artwork that was independently and randomly selected from the set of auctionable paintings. This is an optimistic assumption since, as mentioned, auction houses only select art that has a high probability of selling for a premium. By contrast, they are reluctant to sell art that does not have such a likelihood, and consequently, auction data likely fails to capture the variance in prices of less demanded art (Frey & Pommerehne, 1989; Goetzmann, 1993). The Mei Moses index has come under criticism for its selection bias as its only includes art sold at auction through Christie's or Sotheby's, two of the most prestigious auction houses in the world (Renneboog & Spaenjers, 2013). If not accounted for, the possible selection bias of data will lead to a fundamental flaw in the index (Korteweg et al., 2016).

Two approaches have been prevalent in academic literature for measuring the return on art using price indices (Frey & Reto, 2013). One is the repeat sale regression approach (Baumol, 1986; Dimson & Spaenjers, 2011; B. Frey & Pommerehne, 1989; Goetzmann, 1993; Mei & Moses, 2002) and the other is hedonic regression (Chanel et al., 1994; Renneboog & Spaenjers, 2013).

---

<sup>24</sup> Baumol (1986) and Frey & Pommerehne (1989) both state that the art market did not provide the continuous data required for sophisticated analysis of data.

### **6.1.2 Repeat sale and hedonic regression comparison**

Repeat sale regressions (RSRs) are typically used to estimate returns on a collection or a portfolio of assets whose transactions are infrequent (Chanel et al., 1996). The RSR uses the purchase and sale transactions of individual items to form price pairs and identify “repeat sales.” These price pairs provide an estimation of the fluctuations in price over time for the representative or average asset. The use of RSRs has been prevalent in the real estate market (Case & Shiller, 1987; Goetzmann, 1993), which bears similarities to the art market with regards to asset heterogeneity.

A benefit of RSRs when analyzing art markets is that they do not require the measurement of quality, with the quality of art remaining constant over time (Case & Shiller, 1987). Art bought and sold at auction is likely to be well kept and properly stored, and therefore, one can assume that the quality of art being held remains constant over time, making RSRs suitable since they do not account for changes in quality over time. Another benefit of RSRs stated by Goetzmann (1993) is that the indices constructed by using RSRs provide the investor with gross returns from specific sale records of the underlying data and are not affected by different qualitative factors specified by the hedonic model.

Several biases can affect the construction of an index using RSRs. (G Candela & Scorcu, 1997) noted that, due to the heterogeneity of art, an accurate comparison of price appreciation could only be done for each individual item, severely restricting the number of observations allowed in a regression set. Case & Shiller (1987) also acknowledged this shortcoming of RSRs and noted that this approach “wastes” data. By including art that has most likely appreciated in value and therefore been put up for auction repeatedly, increases the probability of higher price observations. Conversely, underperforming art or art not likely to have appreciated is less likely to be brought up for auction (Frey & Pommerehne, 1989; Goetzmann, 1993) and thus omitted from the construction of the index. When RSRs have been used in the real estate market, this shortcoming has also been acknowledged and the set of houses sold repeatedly is thought not to be representative of the general market for homes (Case & Shiller, 1987).

To potentially improve upon the accuracy of RSRs, Case & Shiller (1987) excluded properties that were sold more than five times on the US housing market from their dataset, eliminating the bias from overly desirable properties on the general sample.

An alternative to RSRs is hedonic regression. In contrast to RSRs, which limit the dataset to repeat sales of the same items, hedonic regression includes all available data. In

a hedonic regression, a set of dependent variables are selected to represent the factors that supposedly affect the pricing of the underlying artwork (Chanel et al., 1994). For the art market, some of the variables included in the regression can be artist, movement, period, and dimensions. Using hedonic regressions, price indices can be created in the two following ways. The first is to run separate regressions on data for each period, providing an equation that can predict the value of a standardized item of art during that period. Another approach is to run a single regression for all periods, including dummy variables for the period when the sale occurred. The dummy allows for the constant term to shift over time to reflect movements in prices (Case & Shiller, 1987), and therefore it can be concluded that hedonic regressions are well-suited to building an index that represents the movement of prices over time. Advocates favoring this approach over the RSR method state that there is no reason to believe that art auctioned only once offers biased price information (Candela & Scorcu, 1997).

When using hedonic regression for price calculations, the relationship of the hedonic factors and prices depends crucially on defining and including the “correct” set of dependent variables. Even if the set of factors is incomplete, the hedonic regression approach is considered less biased and more precise than repeat sale regressions because it uses all available data (Chanel et al., 1994). In contrast to RSR models, where quality is held constant over time, quality can have a considerable impact on the price of the painting using hedonic regression (Goetzmann, 1993). Hedonic regressions could underestimate the effect that taste has on prices since they implicitly assume that the factors determining prices remain constant over time (Case & Shiller, 1987).

Both the above methods provide adequate estimates of art market price variation over time, and it is difficult to conclude which method is better suited for the construction of price indices. Lastly, studies that have measured returns with both methods and compared their results found that both show similar returns (Anderson, 1974; Chanel et al., 1994).

## **7 Risk-return profile of art**

Modern portfolio theory suggests that the performance of investments is determined by their risk-return characteristics. In order to compare art investment with other investments, returns and risks need to be calculated. Art investors can be divided into pure speculators and pure collectors, and their behavioral characteristics can differ across the spectrum with regard to risk, regulation, cost, and change in taste (B. S. Frey & Eichenberger, 1995). These two groups take different approaches to art investment and the returns and risks involved. It is, therefore, imperative to clearly define the attributes of risk and return so investors can acknowledge and evaluate those factors depending on their placement on the speculator-collector spectrum.

### **7.1 Returns**

The well-known type of return on an asset is the return realized from its appreciation. Art, having the unique quality of being a financial asset and a durable consumer good, can carry a secondary form of return, the nonpecuniary returns one can receive from art (Stein, 1977). Spaenjers et al. (2015) described the aesthetic part of art returns as the value individuals are willing and able to pay for having it in their possession. Stein (1977) stated that any superior performance of an art investment could be attributed entirely to its aesthetic pleasure and that value that cannot be captured by speculative investors.

Frey & Pommerehne (1989) stated that there must be factors other than value appreciation that play a significant role in the motives of art investors. Among these factors are aesthetic returns the investor receives when holding art as an investment. Several methods for measuring these aesthetic returns are covered in the academic literature on art investments, some qualitative and others quantitative. Some credit aesthetic returns to the opportunity cost investors would incur when choosing art over a better-performing stock portfolio (Baumol, 1986). This opportunity cost can be found by comparing the differences between the return on art and the return on financial assets via a residual method (Frey & Eichenberger, 1995).

When reviewing the literature to date, Frey and Eichenberger (1995) expressed that most studies focused heavily on the quantitative performance of art's value, and disregarded the determinants of psychic returns. With the CAPM alpha intercept often being used to measure aesthetic returns (Chanel et al., 1994; Stein, 1977), artwork is shown to underperform because the aesthetic returns are not accurately priced.

A value of zero for aesthetic returns is a reasonable assumption for the investor who is indifferent to the nonpecuniary benefits of an artwork. A value below zero would mean that artwork has a negative utility for its owner. Candela et al. (2013) suggested that measuring aesthetic returns of art could be improved through another method for calculating the aesthetic (or psychic) risk of the invested artwork and multiplying it with the market price of risk, in other words, the Sharpe ratio. Introduced by Candela et al. (2013), this method provides a consistent non-negative value for assets with idiosyncratic risks, as is the case with art and aesthetic returns.

Two separate studies, one by Baumol (1986) and the other by Stein (1977), have estimated the aesthetic return on art to be 1.5% and 1.6%, respectively. The study by Stein (1977) examined returns during the period from 1946 to 1968 and found the aesthetic return by measuring the Jensen's alpha. The study of Baumol (1986) used an opportunistic cost model for the period of 1652 to 1961 by estimating the aesthetic return as the difference between art returns (0.5%), and equity returns 2.0%. It is interesting that these two separate studies, undertaken close to 10 years apart from one another and using different sources and time periods, found such similar results for the art market's aesthetic return, although the period used by Stein is a subset of the period examined by Baumol.

Goetzmann (1993) suggested that, when the aesthetic returns of art are accounted for, they could explain why investors would choose to include this relatively volatile asset in their portfolio. The aesthetic return of art could offset the variability of the portfolio, improving its attractiveness.

### **7.1.1 Art return considerations**

Art returns have been estimated in previous economic literature using auction prices due to the notorious difficulty of collecting data on private market transactions from art dealers and galleries. Auction prices can be viewed as wholesale prices, while private or retail market prices have a markup of 50–70% depending on the underlying value of the artwork (Candela & Scorcu, 1997; Frey & Pommerehne, 1989). Given that the returns estimated in previous studies are based on auction transactions, leaving out a large share of market

transactions<sup>25</sup>. It is apparent that with the inclusions of private transaction the results on the performance of art returns can be greatly improved providing a more descriptive sample of the whole art market.

The main differences when comparing the returns on collectibles with those of financial securities are transaction costs and holding periods (Dimson & Spaenjers, 2011). Transaction costs are the fees that auction houses add to the final sale price. Without the inclusion of these costs, expected art returns are not what they seem, and the picture painted of returns can hardly be considered accurate. Most studies on the returns of paintings do not account for the transaction costs involved when purchasing them, but these costs range from 10% to 30% (Frey & Pommerehne, 1989). Consequently, there is an upward bias of returns. Studies such as Dimson and Spaenjers (2011) and Frey and Pommerehne (1989) do consider transaction costs when calculating returns.

The prices reported as auction prices do not always represent a sale transaction. In some cases, bought-in rates are recorded as transactions (Goetzmann, 1993). That is, unsold works are bought-in at the reserve price, which is usually set around the lower estimated appraisal value. These bought-in paintings can skew the return results since the reserve might have been set unreasonably high. Korteweg et al. (2016) removed bought-in records from the dataset to avoid this bias. By omitting bought-in records and with the inclusion of transaction costs Korteweg found that the annual average return on art was significantly decreased.

Art returns can also be affected by the adverse behavior of market actors. Prices at auctions can, in some cases, be artificially inflated through so-called “buy-back” schemes where sellers put up paintings for auction and then purchase the painting themselves through an intermediary (Stein, 1977). Another type of manipulation on prices was mentioned by Chanel et al. (1994), where the high price of a Van Gogh painting was financed through the auction house itself, and the winner of the bid was unable to pay that loan back.

## **7.2 Risk analysis of art**

Aside from the material risk factors mentioned in Section 4, the investment risk of art is defined as the fluctuations in the returns over time. The literature has focused its analysis

---

<sup>25</sup> Transactions in the dealer sector, that is non-auction transactions accounted for 52% of transactions in 2019 (McAndrew, 2020).

on auction prices. Therefore, the price variance of investments have also been estimated using those prices (Stein, 1977).

A known disadvantage of alternative assets such as art is that their prices tend to suffer from smoothed returns. That is, the stated returns underestimate the risks involved (Geltner, 1993). Smoothing occurs in returns of alternative asset prices due to the recorded prices not being transactions but rather appraisals, which tends to lead to smoother prices (Connor et al., 2010). For collectibles especially, smoothing can present itself due to the appraised values of art being dependent upon previous prices (Dimson & Spaenjers, 2011). In the case of bought-in works reported as transactions in auction records, these are problematic if the bought-in rate is high. (Getmansky et al., 2004) found a significant impact on the Sharpe ratio of alternative assets in the presence of mild smoothing. If un-smoothing techniques are not correctly applied to price data or bought-in transactions are not cleansed, the systematic risks of art investments can be underestimated (Connor et al., 2010; Coutts et al., 2020; Getmansky et al., 2004). Mei & Moses (2002) accounted for this and do not include bought-in paintings.

Another cause for concern when investing in art is the underestimation occurring from nonsynchronous prices (Connor et al., 2010). The auction houses stagger their auctions in order to maximize the participation of potential buyers because of these nonsynchronous prices with lags up to several weeks. As an example, let us take two similar artworks by a well-known artist with prices  $p_{i_t}$  and  $p_{j_{t-1}}$ . One sells at an auction in April denoted as  $t$ , including information at time  $t$ , and the other in March denoted as  $t - 1$ . Since art prices are infrequent and discrete, the work sold at time  $t$  includes more pricing data. It has been demonstrated that covariance for returns on the assets in such a scenario has a downward bias, implying that the variance and measures of systematic risk  $\beta$ -values will also be biased (Connor et al., 2010).

In addition to the smoothed and nonsynchronous prices, Korteweg et al. (2016) found that the Sharpe ratio is lower when corrected for selection bias and transaction costs; the corrected data had a Sharpe ratio of 0.04, whereas without these corrections for selection bias and transaction costs, the Sharpe ratio was 0.24. Therefore, the transaction costs and selection bias of art price data also affects risk calculations.

Quattrocchi & Strati (2014) argued that market sentiments can have a tremendous impact on risk and mentioned that confidence in the art market can have a lagged effect on markets themselves. For example, 10 months before the art market collapsed sentiments towards art markets, as measured by an art market confidence index, had already fallen

40%. They implemented a risk measurement called  $\alpha$ -hedging, which is the volatility adjusted for market sentiment.

### **7.3 Historical performance of art**

The recent reports of highly valued art sold at auction for record prices in recent years mentioned in Chapter 2. pose again the question introduced by (Coffman, 1991), whether these sensational prices were in line with what should be expected with art investments or are opinions skewed representational bias where the high prices reported in the news overshadow the less memorable ones not publicized. Frey & Eichenberger (1995) stated that, although with plenty of anecdotal evidence of superior returns, there is no concrete evidence lending support to such returns.

Economic studies comparing investments in art often use the returns on equities as a benchmark for art investing. These studies sometimes omit the dividends paid out by stocks when comparing equity returns to those in art Frey & Eichenberger (1995). With this critical part of equity returns omitted, it introduces a bias in favor of art returns when the two investment classes are compared. Impartial views on historical returns are vital for investors in art. Therefore, the challenges and biases, as presented above, are vital when reviewing the returns of art investments.

In Table 1 the author here has reviewed the studies mentioned in the paper of Ashenfelter & Graddy (2003), who collected studies on art returns and aggregated their findings. The studies were examined, and the standard deviation was obtained from them in order to calculate the Sharpe ratio for the studies, which was used as an indicator of the investment performance found in each study. Studies that did not provide a standard deviation in their results were omitted from this aggregation. Another component of the Sharpe ratio, the risk-free rate, was determined by calculating the geometric average of annual returns on a 10-Year Treasury bond for the years corresponding to the investment horizon of the study in question. The yields of 10-year Treasury bonds were chosen as a proxy for the risk-free rate since the US government backs them, and the geometric average was taken in order to obtain an aggregate metric of the risk-free rate for each period studied. The data consists of rates dating back to 1928, and in studies on time periods before 1928, for the lack of data, the risk-free rate is calculated from 1928 up until the end year of each study's investment horizon. Studies posting real returns use the real risk-free rate. Others use the nominal risk-free rate. This usage of real and nominal risk-free rates is done to

avoid mismatch in the calculation of the Sharpe ratio, which subtracts the risk-free rate from the return of the art asset in the denominator of the ratio.

**Table 1: Note.** Adapted from Ashenfelter and Graddy (2003) Auctions and the price of art. *Journal of Economic Literature*, 41(3) 763-787.

A collection of art investment performance collected from various studies. Data for estimating the risk-free rate was obtained from Damodaran, n.d. The Historical Returns of stocks bonds and t-bills

Author	Period	Method	Std. dev	Return posted	Risk-free rate	Sharpe ratio	Real/nominal
Anderson (1974)	1780–1960	hedonic	56.00%	3.30%	2.92%	0.01	nominal
Stein (1977)	1946–1968	repeat sales	27.92%	3.70%	2.22%	0.05	nominal
Frey and Pommerehne (1989)	1635–1949	repeat sales	5.30%	1.40%	1.69%	-0.06	real
	1950–1987	repeat sales	4.70%	1.60%	0.45%	0.25	real
Buelens and Ginsburgh (1993)	1700–1961	hedonic	5.27%	0.87%	1.04%	-0.03	real
Pesando (1993)	1977–1991	repeat sales	19.94%	1.51%	3.18%	-0.8	real
Goetzmann (1993)	1716–1986	repeat sales	56.50%	3.20%	4.46%	-0.02	nominal
	1850-1986	repeat sales	65.50%	6.20%	4.46%	0.03	nominal
	1900-1986	repeat sales	52.80%	17.50%	4.46%	0.25	nominal
Mei and Moses (2001)	1875–2000	repeat sales	42.80%	4.90%	5.07%	0.00	nominal

For the studies of Anderson (1974), Goetzmann (1993), Stein (1977) and the second period in Goetzmann's study, the Sharpe ratio was near zero. In the studies of Buelens & Ginsburgh, (1993), Frey & Pommerehne (1989), Pesando (1993), and the first period considered in the study of Goetzmann (1993), the Sharpe ratio was negative, indicating that investors were better off investing in the risk-free asset. The studies with the highest Sharpe ratio of 0.25, Frey & Pommerehne (1989) and Goetzmann (1993), also had a time horizon ending in the midst of the 1980s art boom (Elsworth, 1990). A desirable Sharpe ratio is higher than 1. Sharpe ratios below 1 entail that the performance of art investments are suboptimal. Upon reviewing the data in Table 1, it is quite apparent that the reward for art investment compared to its risk is quite dismal. Among the studies reviewed, the best Sharpe ratio showed only a quarter of a unit in return for each unit of risk added. To put this finding in perspective, the Sharpe ratio for the US stock market was 0.39 from 1976 to 2011 (Frazzini et al., 2013), which is slightly better than the best period for art examined here. It can therefore be concluded that the returns on art investments are unable to adequately offset their risk, as is the case with the stock market.

### **7.3.1 Economic cycles of the art market**

Goetzmann (1993) identified three periods of economic boom in the art market: 1780–1820, 1840–1870, and 1940–1986, with the last period producing dramatic price increases, signaling a fundamental change in demand in the art market. From 1840 to 1870, art prices rose when there was a period of deflation for consumer prices. For the other two periods, art rose along with consumer prices. Furthermore, he also noticed three periods of downturn: 1830–1840, 1880–1900, and 1930–1940. These periods of decline in the art markets coincided with deep economic depressions in the UK and the US. The author here has observed that the downturns were much shorter than the upswings in the art market, which averaged 38 years. Still, the downturns lasted for an average of 13.3 years, similar to trends in economic cycles. As is the case with markets for other types of assets, the economic cycles of art markets are cyclical, but the art market has quickly rebounded after economic recessions.

In the wake of the 2007 global economic downturn, a sharp correction of prices and an explosion in bought-in rates occurred, more than doubling it from 2% at the end of 2007 to 5% in October 2008. Correspondingly, average art prices contracted by 14.5%. It was the market's first contraction since 1990 (Artprice, 2008). This example of the forecasting ability of the bought-in rate in the 2007 economic downturn suggests the effectiveness of

the bought-in rate as an early indicator of a future equilibrium change in the art market. Reserve prices, which are the primary determinant of whether an object is sold at auction or not, do not include the new sentiment of the market (Artprice, 2008). This results in higher price expectations than the market can fulfill in its changing state, leading to higher buy-ins. It can therefore be concluded that an increase in bought-in rates serves as a canary in the coal mine forecasting a downturn in the art market.

#### 7.4 Investment performance in recent years

When looking at the performance of art in recent years, the Art Price Global Index provided by Artprice.com is used as a proxy for art prices. The Art Price Global Index is based on all fine art auction results recorded by Artprice.com aside from antiques and furniture, with auction results converted into US dollars (Artprice, 2019).

When calculating returns based on the Art Price Global Index, the expected return on art investments for the period of January 1998 to July 2019 is 4.03%, with a standard deviation of 22.33% compared to returns of 6.1% and a standard deviation of 13.23% of the S&P 500 market index.<sup>26</sup> The Sharpe ratio calculated for this period is -0.038, meaning that the investor is paying a premium on the risk undertaken with art investments. For the same period, the Sharpe index for the S&P 500 was 0.77, much closer to acceptable standards.

These subpar returns compared to the market indicate that there is some other motive for investors to allocate capital toward art. In Section 7.1 on art returns, aesthetic returns were defined as one of the alternative motives for investing in art other than financial gain. In order to price these aesthetic returns, the author here uses the single-index model. The single-index model is a linear regression model for estimating the sensitivity or beta of an index, and the alpha intercept represents the abnormal excess return of the index relative to the market. The regression equation for the single-index model is

$$(r_i - r_f) = \alpha_i + \beta_i(r_M - r_f) + e_i \quad (4)$$

In Equation (4) the dependent variable is the excess return of a security  $r_i - r_f$ , which depends on the excess return of the index  $r_m - r_f$ . The data providing, the excess market return, as well as the risk-free rate, was obtained from Kenneth French (French, 2020). In running the regression, the alpha intercept was -0.1504, indicating that the market

---

<sup>26</sup> (Yahoo! Finance, 2020)

underperformed by -15.04%. In the empirical studies of Chanel et al. (1994 and Stein (1977), the  $\alpha$ -intercept of CAPM was used to define the aesthetic returns, representing the performance of the asset in excess of the market excess return. In order to achieve a positive explanation of the value of aesthetic returns, the alpha is negated. When negating this intercept, a 15.04% aesthetic return on art for the period examined is revealed. This percentage represents the non-pecuniary gains of art investments. Although this value is an estimate, it shows more clearly that the reasons for investing in art are more than its financial returns of 4.03% giving rise to the fact that the abnormal excess returns, or the alpha of the art investment is of an aesthetic nature. The author here would like to note that as discussed in section 7.1.1 these index measurements used to obtain these results consist only of auction results omitting the large share of private transactions. Art investment funds aim to only acquire and sell their investments through private dealers in order to minimize transaction costs and improving their returns (ArtTactic, n.d.). This strategy of art funds gives rise to substantial improvements on the results of this analyses by the inclusion of data for private transactions.

## 8 Conclusion

Art investments can hardly be considered as well studied as investments in some of the other asset categories such as equities. Given the opaque nature of the art market its analysis can provide quite a challenge. However, some characteristics of art, discovered in this thesis are considered to be imperative for the investor considering investing in art. For one, when considering investing in art, looking at the total monetary return on art investment does not tell the whole story. Being a durable consumer good, art provides the owner, that is the investor, a non-monetary psychic return from the aesthetic enjoyment or prestige from owning the artwork. Another important thing to consider is that like other consumer goods, art investments can incur holding costs and since it does not provide a financial revenue stream, holding art investments is cash flow negative. Most works of art have low liquidity making the duration of which art investments should be held, relatively long. Studies have shown that the performance of art investments is closely related to the length of the period holding the art investment with a relationship between good performance and longer holding periods. Making it suitable for more patient capital.

For the investor interested in art invested there are several sale channels available to him for the purchase of art. Auction houses are a predominant supplier in the art world as well as art dealer. Auction houses are, however, considered to be more of a wholesale supplier. More affluent investors also have access to art through art investment funds, but the investments of art through art investment funds have been decreasing with investment managers citing the lack of track records and transparency to be a major hindrance for these funds to be a viable option for their clients. A trend that is unlikely to reverse with funds moving their operations further out of the eye of the public. New participants have emerged, providing access to the art market for investors who want to invest in blue-chip art and lack the large amounts of capital to acquire the entire piece are emerging, allowing a wider population of investors to access to art investments by lowering the cost of access through the fractional ownership of art. In turn, these firms offering fractional ownership also look to improve the liquidity of art investments and create a more developed financial market for art investments through blockchain technology.

Upon reviewing the literature covering art investment, a consensus seems to have emerged that art does not outperform investments in their equity counterpart. The risk-adjusted performance of art investments extrapolated from prior studies show that the best risk-adjusted performance found, showed a Sharpe ratio of 0.25, providing only a quarter of a unit in return for each unit of risk added. When examining these performances based on the returns posted on art, one must be aware of what data the returns are based on and by which means they are measured. Indices constructed from art prices with the purpose of reporting on the returns on art investment are heavily dependent on data from auction houses, omitting prices from private transactions. This increases the likelihood of a considerable selection bias contained within the data set used for the index construction. Even though the choice of index methodology can differ, the outcome of the methodologies has been found to provide similar results for art returns.

The indices that have been constructed for the art market have not been considered robust enough to be able to represent the art market as an underlying for an investment product such as ETF's. In order for that to be possible more data representing the whole of art prices needs to be readily available, the aim of many newcomer companies offering art investments is to provide a platform for trading small fractions of art, and through these platforms, art prices can become more accessible. It is likely that in the near future, the possibility of index trading on art markets would be a possibility with the advent of these new companies.

With the purpose of confirming whether the findings and results of prior studies still hold, this thesis measured the performance art investment for the past two decades by comparing the Art Price Global index to the stock market represented by the S&P 500 index. The results showed that art does not provide a better expected return than stocks and has more risk involved when considering monetary returns. That is the performance of art investments is poorer than in stocks, in alignment of the views of prior studies. Given these findings, the author hypothesises two reasons for the popularity of art investments. One being that art being a safe haven asset for turbulent times having positive correlations with other safe haven assets and also with art being able to maintain its value over time with regards to inflation makes it an attractive hedging asset. The other case for investing in art are the aesthetic returns which have been estimated using

the CAPM alpha and were estimated for the period from January 1998 to July 2019, to be a substantial 15.04%. Since the results indicate that art investment do not outperform the market when adjusting for risk, it can be concluded that the alpha or the abnormal excess return of the art investment is purely aesthetic.

## References

- Anderson, R. C. (1974). Paintings as an investment. *Economic Inquiry*, 12(1), 13–26.
- Armstrong, J. S., Green, K. C., & Graefe, A. (2015). Golden rule of forecasting: Be conservative. *Journal of Business Research*, 68(8), 1717–1731.
- Artemundi Global Fund. (n.d.). *Artemundi Global Funds's Up-to-Date Information (2010-2015) FINAL*. Artemundi Global Fund Financials; Artemundi Global Fund. Retrieved April 4, 2020, from <http://artemundiglobalfund.com/financials/>
- Artprice. (2008, May). *The crisis spreads to the art market*. Artmarketinsight - Artprice.Com; Artprice. <https://www.artprice.com/artmarketinsight/the-crisis-spreads-to-the-art-market>
- Artprice. (2019). *Art Price Global Index*. Artprice. <https://imgpublic.artprice.com/pdf/agi.xls>
- ArtTactic. (n.d.). *ArtTactic Podcast*. Arttactic. <https://arttactic.com/podcast/javier-lumbreras-artemundi-global-fund/>
- Ashenfelter, O., & Graddy, K. (2003). Auctions and the Price of Art. *Journal of Economic Literature*, 41(3), 763–787. <https://doi.org/10.1257/002205103322436188>
- Baumol, W. J. (1986). Unnatural Value: Or Art Investment as Floating Crap Game. *The American Economic Review*, 76(2), 10–14. <http://www.jstor.org/stable/1818726>
- Bender, M. (1985). HIGH FINANCE MAKES A BID FOR ART. *New York Times*, 3–3. <https://www.nytimes.com/1985/02/03/business/high-finance-makes-a-bid-for-art.html>
- Bodie, Z., Kane, A., & Marcus, A. J. (2018). *Investments*. McGraw-Hill Education.
- Buelens, N., & Ginsburgh, V. (1993). Revisiting Baumol's "art as floating crap game." *European Economic Review*, 37(7), 1351–1371. [https://doi.org/10.1016/0014-2921\(93\)90060-N](https://doi.org/10.1016/0014-2921(93)90060-N)
- Buffett, W. (2003). *Annual Shareholder Letter*.
- Bychawski, A. (2017, May). *Frank Ocean explains lyric from new song "Slide."* <https://www.factmag.com/2017/02/25/frank-ocean-explains-lyrics-new-song-slide/>
- Campbell, R. (2007). *Art as collateral: Credit default swap derivatives in banking*.
- Candela, G., & Scorcu, A. E. (1997). A price index for art market auctions. An application to the Italian market of modern and contemporary oil paintings. *Journal of Cultural Economics*, 21(3), 175–196. <https://doi.org/10.1023/A:1007442014954>
- Candela, Guido, Castellani, M., & Pattitoni, P. (2013). Reconsidering psychic return in art investments. *Economics Letters*, 118(2), 351–354.

- Case, K. E., & Shiller, R. J. (1987). *Prices of single family homes since 1970: New indexes for four cities.*
- Chanel, O. (1995). Is art market behaviour predictable? *European Economic Review*, 39(3), 519–527.
- Chanel, O., Gérard-Varet, L.-A., & Ginsburgh, V. (1994). Prices and returns on paintings: An exercise on how to price the priceless. *The Geneva Papers on Risk and Insurance Theory*, 19(1), 7–21.
- Chanel, O., Gérard-Varet, L.-A., & Ginsburgh, V. (1996). The Relevance of Hedonic Price Indices: The Case of Paintings. *Journal of Cultural Economics*, 20(1), 1–24. <http://www.jstor.org/stable/41810572>
- Chilkoti, A. (2018). The Best Investments of 2018? Art, Wine and Cars. *The Wall Street Journal*. <https://www.wsj.com/articles/the-best-investments-of-2018-art-wine-and-cars-11546232460>
- Christie's. (n.d.-a). *About Christie's: The History of Christie's*. Christie's. Retrieved May 8, 2020, from <https://www.christies.com/about-us/welcome-to-christies#About-Us>
- Christie's. (n.d.-b). *Leonardo's 'Salvator Mundi' sets new auction record in New York*. Retrieved May 23, 2020, from <https://www.christies.com/features/Leonardo-and-Post-War-results-New-York-8729-3.aspx>
- Coffman, R. B. (1991). Art investment and asymmetrical information. *Journal of Cultural Economics*, 15(2), 83–94. <https://doi.org/10.1007/BF00208448>
- Connor, G., Goldberg, L. R., & Korajczyk, R. A. (2010). Alternative Asset Classes. In *Portfolio Risk Analysis* (pp. 271–298). Princeton University Press. <http://www.jstor.org/stable/j.ctt7sm49.18>
- Corporate Finance Institute. (n.d.). *Asset Class—Overview and Different Types of Asset Classes*. Asset Class - Overview and Different Types of Asset Classes. Retrieved March 2, 2020, from <https://corporatefinanceinstitute.com/resources/knowledge/trading-investing/asset-class/>
- Coslor, E., & Spaenjers, C. (2016). Organizational and epistemic change: The growth of the art investment field. *Accounting, Organizations and Society*, 55, 48–62.
- Couts, S., Gonçalves, A., & Rossi, A. (2020). Unsmoothing Returns of Illiquid Funds. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3544854>
- Damodaran, A. (n.d.). *Historical Returns on Stocks, Bonds and Bills—United States*. Retrieved May 4, 2020, from [http://pages.stern.nyu.edu/~adamodar/New\\_Home\\_Page/datafile/histretSP.html](http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/histretSP.html)
- De Silva, D. G., Pownall, R. A. J., & Wolk, L. (2012). Does the sun “shine” on art prices? *Journal of Economic Behavior & Organization*, 82(1), 167–178.

- di Torcello, A. (2017). *Art & Finance Report 2017* (5th ed.). Deloitte Luxembourg and ArtTactic.
- di Torcello, A. (2019). *Art & Finance Report 2019 6th edition* (6th ed.). Deloitte Luxembourg and ArtTactic.  
<https://www2.deloitte.com/content/dam/Deloitte/lu/Documents/financial-services/artandfinance/lu-art-and-finance-report-2019.pdf>
- Dimson, E., & Minio-Kozerski, C. (1999). Closed-end funds: A survey. *Financial Markets, Institutions & Instruments*, 8(2), 1–41.
- Dimson, E., & Spaenjers, C. (2011). Ex post: The investment performance of collectible stamps. *Journal of Financial Economics*, 100(2), 443–458.  
<https://doi.org/10.1016/j.jfineco.2010.12.005>
- Ehrmann, T. (2018, May). *Artprice launches its “blue-chip” Art Market index, Artprice100<sup>®</sup>, designed for financiers and investors*. Artmarketinsight - Artprice.Com; Artprice. <https://www.artprice.com/artmarketinsight/artprice-launches-its-blue-chip-art-market-index-artprice100-designed-for-financiers-and-investors-2>
- Ekelund, R. B., Jackson, J. D., & Tollison, R. D. (2013). Are Art Auction Estimates Biased? *Southern Economic Journal*, 80(2), 454–465.  
<http://www.jstor.org/stable/23809543>
- Elsworth, P. C. t. (1990). The Art Boom: Is It Over, or Is This Just a Correction? *New York Times*, 4–4. <https://www.nytimes.com/1990/12/16/business/the-art-boom-is-it-over-or-is-this-just-a-correction.html>
- Evoli, P. (n.d.). *Liquidity in the art market*. Artemundi Global Fund. Retrieved May 1, 2020, from <http://artemundiglobalfund.com/wp-content/uploads/2014/12/Liquidity-in-the-art-market-FINAL.pdf>
- Foster, D. P., & Young, H. P. (2008). *The Hedge Fund Game: Incentives, Excess Returns, and Piggy-Backing*.
- Frazzini, A., Kabiller, D., & Pedersen, L. H. (2013). *Buffett’s Alpha* (Issue 19681). <https://doi.org/10.3386/w19681>
- French, K. R. (2020). *U.S. Research Returns Data*. [https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data\\_library.html#Research](https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html#Research)
- Frey, B., & Pommerehne, W. (1989). Art Investment: An Empirical Inquiry. *Southern Economic Journal*, 56(2), 396–409. <http://www.jstor.org/stable/1059218>
- Frey, B., & Reto, C. (2013). Why Invest In Art? *The Economists’ Voice*, 10(1), 1–6.  
<https://econpapers.repec.org/RePEc:bpj:evoice:v:10:y:2013:i:1:p:1-6:n:3>
- Frey, B. S., & Eichenberger, R. (1995). On the Return of Art Investment Return Analyses. *Journal of Cultural Economics*, 19(3), 207–220.  
<http://www.jstor.org/stable/41810550>

- Gavazza, A. (2011). The role of trading frictions in real asset markets. *American Economic Review*, 101(4), 1106–1143.
- Geltner, D. (1993). Estimating Market Values from Appraised Values without Assuming an Efficient Market. *The Journal of Real Estate Research*, 8(3), 325–345.  
<http://www.jstor.org/stable/44095449>
- Getmansky, M., Lo, A. W., & Makarov, I. (2004). An econometric model of serial correlation and illiquidity in hedge fund returns. *Journal of Financial Economics*, 74(3), 529–609.
- Ginsburgh, V., Chanel, O., & Gérard-Varet, L.-A. (1996). The Relevance of Hedonic Price Indices. *Journal of Cultural Economics*, 20, 1–24.  
<https://doi.org/10.1007/s10824-005-1024-3>
- Goetzmann, W. N. (1993). Accounting for Taste: Art and the Financial Markets Over Three Centuries. *The American Economic Review*, 83(5), 1370–1376.  
<http://www.jstor.org/stable/2117568>
- Goetzmann, W. N., & Spiegel, M. (1995). Private value components, and the winner’s curse in an art index. *European Economic Review*, 39(3), 549–555.
- Golovina, M. (2018, May). What Is “Blue Chip” Art and How Does It Stack up against the S&P 500? *Masterworks Resource Center*.  
<https://resources.masterworks.io/2018/11/15/what-is-blue-chip-art-and-how-does-it-stack-up-against-the-sp-500/>
- Horowitz, N. (2011). *Art of the Deal: Contemporary Art in a Global Financial Market*. Princeton University Press.
- How to value Art. (n.d.). *Artnet Auctions*.  
<https://www.artnet.com/auctions/Pages/Common/Help/HowToValueArt.aspx>
- Hube, K. (2019). Future Returns: Art Funds Draw Few Investors, But Some Are Worth a Look. *Barron’s*. <https://www.barrons.com/articles/art-funds-draw-few-investors-but-some-are-worth-a-look-01556034302>
- Jean-Michel Basquiat. (n.d.). *Masterworks*.  
<https://www.masterworks.io/artwork/1gpxf6Epjbs9pi5TVKaeov>
- Johnson, S. (2007). Hedge fund sees art as exotic asset class. *Financial Times*.  
<https://www.ft.com/content/9e07df98-1b57-11dc-bc55-000b5df10621>
- Jovic, M. (2019). Taxes You’ll Have to Pay when Purchasing or Selling Art. *Art Acacia*.  
<http://www.artacacia.com/blogs/posts/taxes-you-ll-have-to-pay-when-purchasing-or-selling-art>
- Keynes, J. M. (1978). THE RATIO OF BANK MONEY TO RESERVE MONEY. In E. Johnson & D. Moggridge (Eds.), *The Collected Writings of John Maynard Keynes* (pp. 43–69). Royal Economic Society.  
<https://doi.org/10.1017/UPO9781139520652.004>

- Knight Frank. (2020). *The Wealth Report 2020: The Global Perspective on Prime Property and Investment*. Knight Frank.
- Korteweg, A., Kräussl, R., & Verwijmeren, P. (2016). Does it pay to invest in art? A selection-corrected returns perspective. *The Review of Financial Studies*, 29(4), 1007–1038.
- Lintner, J. (1965). The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets. *The Review of Economics and Statistics*, 47(1), 13–37. <http://www.jstor.org/stable/1924119>
- Lovo, S., & Spaenjers, C. (2018). A Model of Trading in the Art Market. *American Economic Review*, 108(3), 744–774. <https://doi.org/10.1257/aer.20160522>
- Mamarbachi, R., Day, M., & Favato, G. (2008). Art as an Alternative Investment Asset. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.1112630>
- Mandel, B. R. (2009). Art as an investment and conspicuous consumption good. *American Economic Review*, 99(4), 1653–1663. <https://doi.org/10.1257/aer.99.4.1653>
- Markowitz, H. (1952). PORTFOLIO SELECTION. *The Journal of Finance*, 7(1), 77–91. <https://doi.org/10.1111/j.1540-6261.1952.tb01525.x>
- McAndrew, C. (2020). *The Art Market 2020: An Art Basel and UBS Report* (pp. 384–384). Art Basel, UBS.
- Mei, J., & Moses, M. (2002). Art as an investment and the underperformance of masterpieces. *American Economic Review*, 92(5), 1656–1668. <https://doi.org/10.1257/000282802762024719>
- Mossin, J. (1966). Equilibrium in a Capital Asset Market. *Econometrica*, 34(4), 768–783. <http://www.jstor.org/stable/1910098>
- Ølnes, S., Ubacht, J., & Janssen, M. (2017). Blockchain in government: Benefits and implications of distributed ledger technology for information sharing. *Government Information Quarterly*, 34(3), 355–364. <https://doi.org/10.1016/j.giq.2017.09.007>
- Pesando, J. E. (1993). Art as an Investment: The Market for Modern Prints. *The American Economic Review*, 83(5), 1075–1089. <http://www.jstor.org/stable/2117549>
- Picinati, A. (2010). Why should art be considered as an asset class ? In *Deloitte*. Deloitte Luxembourg. <https://www2.deloitte.com/lu/en/pages/art-finance/articles/art-as-investment.html>
- Pike, A. W. G., Hoffmann, D. L., García-Diez, M., Pettitt, P. B., Alcolea, J., De Balbín, R., González-Sainz, C., De Las Heras, C., Lasheras, J. A., Montes, R., & Zilhão, J. (2012). U-series dating of paleolithic art in 11 caves in Spain. *Science*, 336(6087), 1409–1413. <https://doi.org/10.1126/science.1219957>

- Quattrocchi, L., & Strati, F. (2014). Art & finance: Fine art derivatives. *Atti Della Accademia Peloritana Dei Pericolanti*, 92, B3-1, B3. <https://doi.org/10.1478/AAPP.92S1B3>
- Ralevski, O. (2011). Hedging the Art Market: Creating Art Derivatives. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.1304602>
- Renneboog, L., & Spaenjers, C. (2013). Buying Beauty: On Prices and Returns in the Art Market. *Management Science*, 59(1), 36–53. <http://www.jstor.org/stable/23359604>
- Scott Jr., J. H. (1994). Managing Asset Classes. *Financial Analysts Journal*, 50(1), 62–69. <http://www.jstor.org/stable/4479714>
- Securities and Exchange Commission. (2020). *Masterworks 006 Offering Circular*. Securities and Exchange Commission. <https://www.sec.gov/Archives/edgar/data/1800977/000149315220004188/form253g2.htm>
- Sharpe, W. F. (1964). CAPITAL ASSET PRICES: A THEORY OF MARKET EQUILIBRIUM UNDER CONDITIONS OF RISK. *The Journal of Finance*, 19(3), 425–442. <http://www.jstor.org/stable/2977928>
- Sharpe, W. F. (1966). Mutual Fund Performance. *The Journal of Business*, 39(1), 119–138. <http://www.jstor.org/stable/2351741>
- Singer, L. P., & Lynch, G. A. (1997). Are multiple art markets rational? *Journal of Cultural Economics*, 21(3), 197–218. <https://doi.org/10.1023/A:1007447326729>
- Sotheby's. (n.d.). *About Us*. Online; Sotheby's. Retrieved May 8, 2020, from <https://www.sothebys.com/en/about>
- Sotheby's. (2004, May). *Garçon a La Pipe*. Sotheby's. <https://www.sothebys.com/en/auctions/ecatalogue/2004/property-of-the-greentree-foundation-from-the-collection-of-mr-and-mrs-john-hay-whitney-impressionist-and-modern-art-n07989/lot.7.html>
- Sotheby's Glossary*. (n.d.). Sothebys.Com; Sotheby's. Retrieved May 8, 2020, from <https://www.sothebys.com/en/glossary>
- Spaenjers, C., Goetzmann, W. N., & Mamonova, E. (2015). The economics of aesthetics and record prices for art since 1701. *Explorations in Economic History*, 57, 79–94.
- Stein, J. P. (1977). The Monetary Appreciation of Paintings. *Journal of Political Economy*, 85(5), 1021–1035. <http://www.jstor.org/stable/1830343>
- Varian, H. R. (2010). *Intermediate Microeconomics: A Modern Approach: Ninth International Student Edition*. WW Norton & Company.
- Yahoo! Finance. (2020, May 23). *S&P 500—Historical Data*. Yahoo Finance. <https://finance.yahoo.com/quote/%5EGSPC/history>

