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UNVEILING THE ECONOMIC VALUE OF ART: THE ART MARKET AND THE ROLE OF ART IN THE CONTEXT OF PORTFOLIO ANALYSIS

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INTRODUCTION

The art market where an investor enters nowadays reflects the transformation not only of the financial markets in general, but specifically of the attitude toward a collector embraces art. People buy works of art for a multitude of reasons, and among these the investment motive, chronologically speaking, is only the most recent in a long line. Originally, art was merely a positional good, whereby a collector achieved an aesthetic return that enhanced his own reputation and prestige. It took centuries before an investor began acquiring art with the intention of exploiting its investment opportunity, and even today people usually enter the art market not primarily for the risk-return trade-off but for the diversification role that art fulfills in a portfolio optimization context.

The art market is quite different from the financial markets we are familiar with. Investment opportunities exploit market inefficiency. This is characterized by high risk, illiquidity, non-transparency, non-regulation, high trading fees, uneven audience preferences and short-lasting tendencies. Furthermore, the intrinsic nature of an artwork makes it challenging to set its suitable price because the components one relies on do not adapt to an objective appreciation. Therefore, it has been suggested that there may be no equilibrium but the works' prices might be unanchored and strictly unnatural in the traditional meaning. An important point to take into account is certainly the historical price, but this is somewhat problematic too. Managing to gather information about past prices of the artworks the dealers privately sold is virtually impossible, and besides, it may be that the last purchase and sale dates back several years. In an effort to standardize valuation methods and to assist investors in navigating through all the associated obstacles, indexes and databases have been created to be used to collect information, compare performance, and identify trends.

However, due to a number of reasons, the individual investor is unable or unwilling to afford direct investment in the art market. Alternatively, he can nevertheless benefit from opportunities by means of art funds. Thereby he can behave as a big investor, pooling assets in the fund managed by dedicated professionals in the field. This history began in 1904 with La Peau de l'Ours, and several mostly unsuccessful attempts have been undertaken so far, partly due to technological innovation and the development of new financial instruments. Similar to hedge funds in some respects and private equity in others, art funds employed a range of strategies to ensure the best performance to participants, traditionally buying low and selling high their assets.

It has already been anticipated that one of the reasons, perhaps the principal one, investors decide to enter the art market is because of the diversification role that this alternative investment provides. Due to a low correlation, actually negative in some cases, with traditional financial instruments, art enables one to cover some of the risks that the portfolio normally faces. Moreover, art is a hard asset, and thus - similar to gold and other safe assets - it also serves as a useful vehicle for hedging against inflation.

This work aims to present a general overview of the art market, albeit with some caveats. First, it is essential to clarify from the outset that when discussing art the majority of the time it will refer to fine art, trying to be more specific when possible. Additionally, those risks related to art and the problem of authentication and fraud will not be examined. Finally, the crypto-art world, nft and all the new digital tools developed in recent years will not be addressed.

The first more theoretical chapter briefly introduces the main players active in this market, such as dealers, auction houses, galleries, collectors, fairs and museums, and professionals offering advisory and wealth management services. An explanation of valuation methods for pricing artworks then follows, exploring the complexities associated with both the asset itself in question and the respective market in general, and the creation and use of art indeces. Lastly, art as an investment class is presented, hence how it shifted from being viewed as a consumption good to an investment opportunity and also its use as collateral in the art secured lending market.

The second chapter, conversely, is completely focused on art funds. It begins by tracing a timeline highlighting the most noteworthy cases experienced over the course of history, then analyzes the structure and variety of strategies that can be undertaken including specific references, and concludes the review with the general viability underlying art funds.

The last chapter, and the experimental one, outlines a portfolio analysis including art as an alternative investment, and appreciates the diversification potential this offer. An initial portfolio including different equity and bond indices, geographically diversified, is constructed, and then a second portfolio with art is implemented. Using the Markowitz model, and under some assumptions, the risk-return trade-off is investigated, and optimal portfolios on the efficient frontiers are found.

1. The Art Market and Art as Alternative Investment

1.1 Art Market Players

The major actors involved in the art market are dealers, auction houses, galleries, art advisors and wealth managers. In general, *the art market directly employed an estimated 3 million people*[1], interested in both aesthetic and financial dividend return. Beside the economic impact the social effect must to be addressed, since *the cultural and creative sectors (CCS) constitute a key economic growth driver in many countries*. Moreover, it is worth mentioning the technological development over the recent decade that have transformed the market *as a catalyst for future growth*[2]. The market has been opened up to more global participants, who are enabled to access a broader range of information from an increasing number of digital resources. Thus the market nature itself has evolved *causing a shift from supply-side oriented market to one that is more consumer driven*[3].

1.1.1 Art Dealers

Provided that in the USA no certifying authority for dealers exists, in 1962 the Art Dealers Association of America (ADAA) was founded with the aim of fostering *the highest standards of connoisseurship, scholarship and ethical practice within the profession* (Artdealers.org). *Just under half (47%) of total expenditure in 2023 was conducted through dealers, up by 2% on 2022. The most commonly used channel for purchasing art in 2023 was through a gallery or dealer*[4]. *The market for contemporary art is actually controlled discreetly at commercial player level.* As dealers choose the artworks they decide to deal with, they indirectly curtail market supply and inform public and critics[5]. Hence, they might be deemed as tastemakers who influence what

[1] C. McAndrew, The Art Basel & UBS Art Market Report, 2020
[2] Deloitte, Art and Finance Report, 2021
[3] P. Arora, F. Vermeylen, Art markets, 2013, in R. Towse and C. Hanke, 2013
[4] C. McAndrew, Art Basel & UBS Art Market Report, 2023
[5] I. Robertson, Understanding International Art Markets and Management, 2005

will be perceived as fashionable and educate the buyers. In an effort to restrict an artwork's future resale and investment opportunity, dealers limit instead of maximize the liquidity of work of art: they erect ethical and even quasi-legal barriers between the auction and the avant-guarde circuit to inhibit arbitrage. This dealer conduct may appear illogical from a purely economic standpoint, yet it makes sense given that their aim is to encourage artists and preserve price stability in the long term[6]. In a second stage, exchanges occur through which several principal-agent relationships are established. Recalling that the art market is divided into two distinct trading levels, dealers are active in both the primary and secondary markets. In particular in the former place artworks appear on the open market for the first time thus in might happen that a dealer is directly relating with an emerging artist who is new to the scene thereby requiring an intermediary to support him in managing the complexity of the marketplace and to trade artworks. *The selected orientation* adopted by dealers *normally lies between the extremes of altruistic mission and revenue maximization*[7]. In the secondary market experts' knowledge is particularly important since dealers handle highest quality works of dead or contemporaneous top-tier artists with remarkable and definite resale and investment value. Dealers make pricing decisions on the basis of pricing scripts and impound their commission into the sale price.

1.1.2 Auction Houses

Historically, auction houses act in the secondary art market, yet in the 1980s their target audience changed from wholesale to retail. Originally, auctions were an intermediary trade as the most important source of artwork supply for art dealers[8], afterword auction houses started appealing to end users thus competing with art dealers and commercial galleries. Moreover, *they also provide an outlet for market valuation and make speculation possible*[9]. Through the years, the legislation by which auction houses are governed has also changed becoming less restrictive, so auctioneers began to manipulate the outcome of art actions using controversial practice as the one of

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[6] O. Velthuis, Symbolic Meanings of Prices: Constructing the Value of Contemporary Art in Amsterdam and New York Galleries, 2003
[7] M. Trimarchi, Principal-agent analysis, 2010
[8] DG. De Silva et al., Evolution of a dealer trading network and its effects on art auction prices, 2022
[9] J. Zarobell, Art and the global economy, 2014

"guaranteeing" minimum prices to consignor. Auction guarantees accounted for a record 64.6% of total evening sales value in 2022 suggesting that this remains a key factor in dealing with the ongoing market instability, acting as an "invisible hand" within the auction sector. Thereby there is a tendency toward transferring risks to third-party guarantors indicating that the guarantee market is actively sponsored by external investors as the majority (71%) of guaranteed lots sold demonstrates[10]. On the other hand, the in-house auction guarantees show that auction houses *do not hesitate to take risks in order to capture their consignment*, specifically by 'guaranteeing' the items by financial obligations to the sellers[11]. The auction sector is fundamentally oligopolistic. Since Covid-19 the top three auction houses, namely Christie's, Sotheby's and Phillips, have strengthened their position worldwide in the auction sector, up to accounting for more than half of the global auction market in 2022[12]. Following dealers, buying at auction was the second-largest sales channel collectors chose, with 25% of total expenditure (partly owing to the higher number of collectors in Mainland China) and nearly three-quarters of interviewees who have bought at auction in the first half of 2023. The boost in sales each year after the lowest level triggered by the pandemic is wholly explained by the progression of online-only sales, which have almost tripled, whereas live sales have now rebounded roughly to the same stage as in 2019[13]. Lastly it is worth mentioning that the idiosyncratic component of art prices relies on the market's conditions and the appraisals of possible buyers in an unforeseen manner. As a result, auction prices may differ significantly from pre-sale forecasts and estimations might be extremely unpredictable[14].

1.1.3 Galleries

In 1960 some galleries started to consider themselves as businesses and concept such as marketing and advertising artists began to catch on. During this period a ranking between gallery emerged as the former ones were the launching pad for the others. Some galleries scouted for new talents, organized a debut exhibition for them and

[10] Deloitte, Art and Finance Report, 2023
[11] Artprice, The art market, 2022
[12] Deloitte Art and Finance Report, 2023
[13] C. McAndrew, Art Basel & UBS Art Market Report, 2023
[14] I. Robertson, Understanding International Art Markets and Management, 2005

supplied initial press coverage, whereas a second group screened the artists displayed and selected those with the biggest market potential. In 2002 the Royal Academy in London offered thirty-three commercial contemporary art galleries the chance to display their works. The preface of an accompanying volume labeled The Galleries Book pinpoints the role of all commercial galleries in "the process of evaluating, screening, and disseminating virtually infinite art production around the world". Another function of gallery is to validate the commercial sector's decisions and *convert, over time, cutting-edge contemporary art into the modern and Old Master work of the future*[15]. Galleries play a pivotal part in shaping the evolution of a whole sector and might produce self-revealing predictions about upcoming tendencies via their own selections. Galleries are intermediaries charged with filling the distance between artists and collectors/investors. Galleries select and sponsor specific artists who embody the "supplier side" within this scenario. Furthermore, "success" in this market is clearly evident from the ranking of new artists, introduced by the respective gallery[16]. The best galleries will try to get into major art fairs. Four different levels of gallery trading exist, each can be adjusted for risk. Galleries are evaluated based on four criteria - whether they (1) set trends, (2) achieve top prices, (3) promote their artists sophisticatedly, and (4) organize museum quality exhibitions[17]. Art galleries are simultaneously the epicenter of a multi-billion-dollar market and the creative heart of a city's cultural life. There are roughly 19,000 galleries, most of them scattered between USA and Europe. Galleries struggle to earn profit, as a matter of fact a mere 16% break the $1million hurdle and the most profitable are those dealing in Old Masters, even though the majority is involved in contemporary art. Furthermore, galleries are short-lived, approximately half of all galleries have been opened in the last 20 years[18].

1.1.4 Collectors

Collectors rely on dealers, even multiple dealers, to obtain insights concerning the artists whose artworks they would like to own or are planning to purchase. They are

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[15] I. Robertson, Understanding International Art Markets and Management, 2005
[16] A. Prinz et al., The success of art galleries: a dynamic model with competition and information effects, 2015
[17] I. Robertson, Understanding International Art Markets and Management, 2005
[18] M. Resch, Global Art Gallery Report, 2016

often as knowledgeable as their dealers: they participate in international fairs, subscribe to art publications, follow critics' opinion, meet with artists and attempt to stay updated on the newest tendencies. How they raised the necessary funds to start their collection in the beginning defines the distinctive taste of collectors. The core of many collecting habits lies in the fact and excitement of paying a bargain price are. Stamp-collector and magpie are definitions that precisely depict two categories of collectors; besides, there are speculator collectors who try to get a financial return from their collection. The onset of the 'self-insured collectors' who protect and hedge themselves against errors by acquiring the whole work of a basket of artists and promptly receive the approval by public sector, was characteristic of the avant-garde collecting tycoons of the 1990s[19]. Collector-tycoons do not rely on established dealers to limit ex ante supply. This condition alters the art sector and widens the differential between the top and the rest of the market. They bought huge numbers of various works and relied on the law of large numbers for winning bets[20]. In 2022, the Paul G. Allen Collection became the most expensive collection ever, hammering $1.6 billion at Christie's in New York[21]. Considering high net worth individuals that are the ones with available household financial assets exceeding $1 million in 2023, their expenditures and preferences are crucial in the way some of the main tendencies in the art market develop. Individual factors (37% of collectors), financial reasons (28%) and relationships (14%) are the most common answers in 2023 to which is the most significant motivation for art buyers. The median expenditure on art and antiques by collectors across 11 markets worldwide reached $65,000 in 2022, up by 19% on 2021. Although a mere 10% qualifies himself as 'investors', several collectors actively traded in and out of their collections. It is paramount to recognize the key role of collectors and the tireless effort they demonstrate toward artists and the sector. They are considered potential agents of change, modeling the long-term industry's path and ensuring constant support for the overall creative community. By valuing quality, collectors promote exchanges transcending the familiar and spanning across ideas and backgrounds to build a significant archive of inclusive artistic forms of expression[22].

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[19] I. Robertson, Understanding International Art Markets and Management, 2005
[20] LP. Singer, Phenomenology and economics of art markets: an art historical perspective, 1988
[21] Artprice, The art market, 2022
[22] C. McAndrew, The Art Basel & UBS Art Market Report, 2023

1.1.5 Art advisors, wealth managers and financial services

In recent years, the numbers in the art market have been so impressive they have inspired a new career: advisors who select artworks for their customers on the basis not of aesthetics but of potential return[23]. Art/collectibles investment funds, art advisory, valuation, lending/finance, art collection management and market research are listed among the services offered by art wealth management. According to art professionals, art valuation and art advisory account for the most relevant services they offer, and wealth managers providing valuation services rose to 83% in 2023. Concerning art advisory 60% of collectors believes that this would be an important service for wealth managers to provide. Nevertheless, this percentage is far greater among art professionals, where 85% stated that they consider this the most relevant service for their customers and 78% offer art advisory services. Greater wealth management competition and the constant push toward a holistic, goal-oriented advisory model will lead to an increased emphasis on art and collectibles within traditional wealth management approaches. This transition is probably a plus for the art and finance sector, and holistic advisory relationships are the driving factors: 90 percent of wealth managers said that the urge to build a holistic advisory relationship with their customers is a major factor behind the inclusion of art and collecting in wealth management services. It is evident that the wealth management sector is adopting a wide variety of art-related services: 75% of wealth managers plans to provide art-related services among traditional wealth management services and 74% plan to provide art-specific wealth management services. This clearly shows that a wide and varied provision of art services is becoming the standard for wealth managers interviewed[24].

1.1.6 Art fairs, museums and exhibitions

Fairs serve as a filter mechanism for dealers. Participation in prestigious events like Basel, for instance, acts as a seal validation from the market. The short temporal distance from the Venice Biennale to the Basel art fair evidences the tight connection between international curating and the super art fair. Large-scale international art fairs

[23] The economist, A study in red and black, 2015
[24] Deloitte, Art and Finance Report, 2023

bring high profile to artists and are supplemented by an ever-growing worldwide list of exhibitors[25]. 58% of HNW collectors bought an item at an art fair in 2023. Whilst the pandemic has substantially curtailed the occurrence of art market-related events, the art fair agenda has gradually recovered since 2020, with heavy involvement by collectors, galleries, and artists at exhibitions, fairs, and other major events[26]. If juried exhibitions discover artists, museums select and validate them. The manner in which the museum deals with and displays its items within and as part of its collection affects their state as well as price. Economists repulse the museum conduct of de-accessioning of collection items to finance operating costs because this fails to maximize the museum's resources[27]. The function of museums as places of public education has changed through the years. National and state funding has dropped to the extent that many museums born today, faced with raising the necessary funds from different channels, are constituted as private museums or public-private nonprofit or for-profit partnerships. These depend on private donations rather than being entirely backed by federal or national administrations[28]. The trend of private museums, the *must-have* of 21st century billionaires, has initiated a rapid call for impressive works by *brand-name* artists[29]. The huge collection of artworks in European and American museums has increased the demand for the rare pieces escaped their ownership. *The paradox of museum acquisition* is that it heightens market shortage and intensifies competition among museum administrators as they realize they hold works valued in the tens of millions of dollars. However, the sale of $450million "last" Leonardo in private hands as Christie's presented Salvador Mundi, rests on the premise that the others in public collections will stay there. This is a logical consequence of the tight connection between museum and market[30]. In the past ten years a change has occurred in the art market, namely the incoming to inform and deal with the public as *active consumers rather than passive recipients*[31]. In recent years museums have turned from primarily custodial institutions

[25] I. Robertson, Understanding International Art Markets and Management, 2005
[26] C. McAndrew, The Art Basel & UBS Art Market Report, 2023
[27] I. Robertson, Understanding International Art Markets and Management, 2005
[28] AS. Marcus et al., Teaching history with museums, 2017
[29] G. Adam, Big Bucks: the explosion of the art market in the 21st century, 2014
[30] M. Gammon, The Salvador Mundi may have changed the market for ever – but we have been through this before, 2017
[31] P. Arora, F. Vermeylen, The end of the art connoisseur? Experts and knowledge production in the visual arts in the digital age, 2013

to being more appealing to the public. New focus is given to relations and connections between museum and public[32].

[32] A. Gilmore, R. Rentschler, Change in museum management: from a custodial emphasis to a marketing emphasis, 2002

1.2 The Economic Value of Art

Any artwork might carry *commercial, social and essential value*[33]. Usually market prices are public, hence they reflect both market value, that is what a person is willing to spend, and the intrinsic value of the piece, as embodied by its production costs in addition to other associated with. In the art market none of this exists. Works of art are purchased for various purposes, as "positional goods" to enhance the social prestige of the holder, due to friendship with the dealer, or purely art for art's sake. Thus, the price is *subsidiary to the other benefits of owning them*[34]. Although the factors on which experts base their evaluations are mostly objective, either physical like dimension and state, or "market" such as historical sale prices and past valuations, the process is intrinsically subjective given inputs such as aesthetic and artistic value[35]. There may be no equilibrium, so the artworks' prices might be unanchored and strictly unnatural in the traditional meaning. Since the elasticity of supply is zero in the market for known deceased artists' works, the equilibrium mechanism will be substantially undermined, as opposed to how securities markets work. As a matter of fact, many differences are observed between the two. At first, the fact that some stocks may share common characteristics or attributes, such as industry sector, market capitalization, or valuation metrics, can help investors categorize stocks into homogeneous groups and make comparisons for various analytical purposes. By contrast, even many works about the same subject by the same artist are imperfect substitutes as they are unique, for instance Van Gogh’s Sunflowers. Secondly, a stock market is quasi perfectly competitive, and operators are likely to be independent because many own the same security; conversely, whoever buys a Caravaggio is seen as holding a monopoly on that artwork. Moreover, a certain security is nearly continuously traded, whereas a certain artwork might be resold even one time over a century. Furthermore, stock exchange price is usually publicly disclosed, yet only the direct counterparties in a private sale know the artwork sale price. Finally, in theory we know that the "true" (equilibrium) stock price should be the proportional share of the discounted present value of the company's expected cash flow,

[33] M. Findlay, The Value of Art, 2012
[34] G. Adam, Big Bucks: the explosion of the art market in the 21st century, 2014
[35] PH. Karlen, Aesthetic Quality and Art Preservation, 1983

while no one would argue that he knows the true artwork equilibrium price[36]. The artwork fair price typically results from a qualitative analysis conducted by a specialist on the basis of relative valuation, that is examining the price of comparable items in the marketplace, combined with qualitative elements of the artwork, the demand-supply ratio, consumption utility and personal preferences[37]. As initial step, sales of comparable artworks by the same artist are considered to set market value, yet they may vary materially due to differences in quality, dimension, subject, state, origin and rarity[38]. The buyer may be viewed as paying part of the price in return for the immediate use of the painting, yet paintings are long-lasting meaning that they may maintain their condition almost untouched over centuries. For this reason part of the price may stand for the discounted present value of the future cash flow or other benefits potential holders might expect while owning the paintings. Thus, the potential buyer must consider two sources of uncertainty: how his and society's tastes will change. The price of a painting relies on the expected present value of a future consumption flow of unknown monetary value similar to the way a stock is worth the sum of all its future dividends payments discounted to its present value, thereby artwork prices must be examined in an asset pricing theory framework. Each painting is, to some degree, a unique item and so the sale price does not indicate the general market level. The artist's identity, the dimensions, medium, and support of the work, where it is sold (the auction house or the city), the condition and quality of the artwork itself, and various random elements will further influence the price. The different methods used to price estimation can be divided into two main groups: the "repeated sales regression" and "hedonic regression" approaches. The former compares the sales prices of an artwork over several time periods to obtain periodic return rates; it then averages over all the works of art for which repeated sales happened, to get an average periodic return rate. Creating an art price index like this runs into obvious data issues: repeated sales of same painting may prove hard to identify given published sales data and may include too few to form a precise index. Pesando (1933) considerably alleviates these shortcomings by looking at print valuations, for which serial impressions of same image can actually be treated as the same object. Several previous researches have estimated hedonic regressions. One

[36] WJ. Baumol, Unnatural Value, 1986
[37] A. Picinati di Torcello, Why should art be considered as an asset class?, 2012
[38] WM. Speiller, The favored tax treatment of purchasers of art, 2002

collects information about a range of art sales (at auction for instance) and regresses the price on other available attributes, such as artist, dimension, auction house, period, and so forth. A lot of the regressors will be dummy variables. As an illustration, the period-estimated parameter can be viewed as an index of "average" painting price change after the other artwork-specific variables included are checked. This would be a good proxy for the output of a collector who owns a broad and well-diversified collection of works by different painters, but it would not capture the price movement of a specific painting or artist. It is also worth highlighting that this approach estimates a reduced-form model of pricing at auctions, without disentangling the influences of supply and demand since in a secondary market buyers and sellers are both collectors. In fact, the same player can be both sides of the market (of different works) at the same auction[39]. The most robust predictors for pricing artworks are the dimension, the technique used and the selling price the author may have charged to galleries. The artist's age and location of residence are further powerful predictors, whereas the galleries' attributes, like their age, fame or institutional affiliations, are unlikely to bias the price level[40]. Most nineteenth-century economists realized that the value of work of art cannot easily be explained using supply and demand. Collectors' wealth craving for an artwork stands as the ultimate boundary to its value because aesthetic assessment is subjective. Taste also accounts for another component to the art demand[41]. Prices are more a function of one's wealth and taste in acquiring the work of art than the quantity of labor to make the object[42]. Speaking of a Raphael, no link between the reproduction cost and price exists. The latter heavily reflects who is involved in the sale. If there are no rich and enthusiastic people, the artwork is likely to be acquired by dealers to be traded at a profit[43]. Dealers agree that auctions are the main barometer of value, but they also believe that auction prices are barely meaningful as the result of an exciting moment rather than repeated sales[44]. Bid anchoring is one of the most influential and consolidated biases whereby the past price or pre-sale estimate affects the current one, particularly for items re-sold at

[39] DJ. Hodgson, KP. Vorkink, Asset Pricing Theory and the Valuation of Canadian Paintings, 2004
[40] O. Velthuis, Talking Prices, 2013
[41] WN. Goetzmann, Accounting for Taste: Art and the Financial Markets Over Three Centuries, 1993
[42] T. Hulst, A history of the Western art market, 2017
[43] A. Marshall, Principles of Economics, 1890
[44] O. Velthuis, Talking Prices, 2013

auction more quickly[45]. Analysis suggests that most learning takes place in five-seven auctions, and after eleven bids are reduced by 26%[46]. Dealers are more likely to sell art at fixed prices and absurdly regard accepting the highest bid as "immoral, unethical and controversial." From an economic point of view, preferring fixed prices over auctions is out of line. In theory in a fairly competitive and efficient market prices balance out. Disparities do not persist for long because arbitrage guarantees the so-called law of one price. This is not valid dealing with art since two pricing mechanisms control the market. During the auction, the auctioneer calls prices until supply and demand by directly interacting meet and set the equilibrium price. The second price-setting system is the fixed or posted price: the dealer publishes the price decided earlier and the client tacitly accepts it once that item is sold. Gallery owners keep from lowering their prices when auction ones are higher, whereas at over demand they use waiting lists to ration work[47]. In catalogs, auction houses release a lower and upper pre-sale value estimate for any artwork but not the sellers' reserve prices. Nevertheless, market evidence shows that they usually set reserve prices in a range around 75% of the pre-sale lower valuation[48]. The correlation between reserve prices and lower estimates indirectly detects insights into sellers' confidential artwork appraisals and contributes to a coherent overview of art auctions[49]. Two hypotheses are supported: at first, living artists' artwork prices in dealers markets constantly climb with age, whereas auction prices for the same artist do not exhibit this rigid trend. Indeed, by comparing dealers prices with auction performance, evidence suggests that prices increase over artists lives in both markets. Secondly, the aggregate price level in dealer markets is greater than in auction markets for certain artist's works, as the evidence points out. Moreover, annual trends in the dealer price index show similar growth patterns but are resistant to downward shifts in the auction price index, consistently with the assumption[50]. In a context of risk-averse agents and perfect information so there is no uncertainty, the risk premium is zero[51]. Bidders become more competitive and push bids up if they receive accurate

[45] A. Beggs, K. Graddy, Anchoring Effects: Evidence from Art Auctions, 2009
[46] RAJ. Pownall, L. Wolk, Bidding behavior and experience in internet auctions, 2013
[47] O. Velthuis, Talking Prices, 2013
[48] C. McAndrew, R. Thompson, The collateral value of fine art, 2007
[49] M. Castellani et al., On the relationship between reserve prices and low estimates in art auctions, 2018
[50] M. Hutter et al., Two games in town: a comparison of dealer and auction prices in contemporary visual art market, 2007
[51] PR. Milgrom and RJ. Weber, A Theory of Auctions and Competitive Bidding, 1982

information, as auction houses have an incentive for. Auction house price estimates are strongly related to effective prices achieved and are well close to impartiality[52]. Since the unique value of art is "trivialized" by pricing, art specialists embrace Zelizer's "hostile worlds" perspective: to come to terms with the market as a commensuration process, they dichotomized the economic and cultural value of art via two distinct models, the independent spheres model and the contamination model. According to the former, price is set by the "impersonal forces" of supply and demand that do not affect the cultural appraisal of art though. In the latter the two worlds interact but then the price influences the cultural value of art[53]. Mercification makes value standardized, yet discrimination marks the nature of culture. To be saleable is to be "common," on the contrary of being unique[54]. Art always represents a commodity but lacks its intrinsic value and social utility when closed in a "market circus" and used purely as a commodity because people cannot enjoy it. This inevitable course results in the *collapse of the nuances of meaning, and the visual experience in general, under the brute weight of price*[55]. A viewer interprets a work according to criteria that influence their identity and content as genre, period, and contextual ones. The work evaluation should follow similar but without standards for judging artistic merits and disvalues these cannot be inferred by rationality[56]. The price is therefore arbitrary, and in the primary market it is determined by the dealer. At the higher end it is usually not disclosed as it is not, actually, fixed. Galleries discount heavily for preferred customers, notably those who enhance the artist's reputation. Dealers manipulate the market "rationing" the art, choosing clients and sustaining the work at auction post-sale. Auction prices are "clear as mud"[57]. Dealers are inclined to overestimate prices because these are perceived as demand signals. When negotiations end, the final price incorporates discounts and long-term agreements, such as delayed settlements[58]. Dealers and collectors are often included in trading thus pricing works at auction. For instance, an analysis of publicly

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[52] O. Ashenfelter, How Actions Work for Wine and Art, 1989
[53] O. Velthuis, Symbolic meanings of prices: constructing the value of contemporary art in Amsterdam and New York, 2003
[54] I. Kopytoff, The Cultural Biography of Things: Commoditization as Process, 1986
[55] R. Hughes, The Decline of the City Mahagonny, 1990
[56] S. Davies, The Philosophy of Art, 2006
[57] G. Adam, Big Bucks: the explosion of the art market in the 21st century, 2014
[58] Hutter et al., Two games in town: a comparison of dealer and auction prices in contemporary visual art market, 2007

available market data of Andy Warhol's artworks indicates that fewer than twenty players dominated bidding and twelve regularly acquired items from 2005 to 2013, representing approximately half of the reported acquisitions[59].

1.2.1 Art Indices

Because no methodology but the risk of someone manipulating or fixing prices exists, art indices have been designed to categorize art market transactions and evolutions. An art index is a financial benchmark or measure used to track the performance of the art market. Similar to stock market indices like the S&P 500 or the Dow Jones Industrial Average, art indices provide investors and market participants with insights into the overall trends and movements within the art market. Thus, these analytical instruments are important since they provide agents with information on the aggregate market, specific artists and categories, and the timing of consignments and acquisitions. The heterogeneity of works and limited occurrence of trading make art market assessment challenging. Being unable to investigate the artwork appraisal through financial references, Mei and Moses relied on repeat-sale auction prices to figure out the value movement of art works during several holding periods and collecting categories. They built an annual art index since 1875 (acquired by Sotheby's in 2016) and sub-indices (American, Impressionist, and Old Master). The database for this time period includes 4,896 price pair. It can further be noted that the majority of artworks purchased are kept over a long time (28 years on average), thus very few acquisitions in the first period are immediately resold[60]. In 1967, the Times together with Sotheby's decided to release monthly graphs showing price fluctuations in 12 branches of the art market, hence the Times-Sotheby index. They tried to infer how much art prices were increasing from 1950 on, using data gathered at auctions and an averaging technique similar to that of the Dow Jones. The statisticians established the annual Times-Sotheby's index of the value of every artist's work since the base years 1950-52[61]. During the past fifty years, a growing economic analysis has greatly enhanced what we know about the risk-return characteristics of diversified art portfolios, the correlation between the qualities and prices of artworks, and how average art prices are affected by changes in income,

[59] DN. Horowitz, Price fixing the priceless? Discouraging collusion in the secondary art market, 2014
[60] J. Mei, M. Moses, Art as an Investment and the Underperformance of Masterpieces, 2002
[61] G. Glueck, In Sotheby-land the graphs go up, 1971

wealth distributions and market sentiment. This quantitative literature demonstrates how the art market and a greater economic and social framework are incorporated, yet this scope of study is limited[62]. Although trying to make the sector less murky, art indexes have historically struggled with the shortage of available sales information. They are based on neither half of the market data – auctions - leaving out the majority of the overall market- private galleries and dealers. Furthermore, they usually consider top auction houses and works sold many times, and neglect ones unable to be sold at auction (roughly one quarter of lots)[63]. Data selection is a remarkable concern that biases the index interpretation since auction sales transactions may not properly capture stylistic risk, a key risk factor faced by the art investor. As repeat-sales data mainly concern auction trades, they inevitably target enough in-demand paintings to appeal to competitive bidders. Auction houses lack motivation to arrange sales with limited public attraction. The dealer market handles artworks with few potential customers, with huge remunerations for tailoring specialized works to particular collectors. Hence repeated-sales records miss the price movements of unpopular paintings[64]. The point that these academically and quantitatively designed indexes rely on so narrow and volatile data that "they are like a tower built on very shaky foundations" poses the major challenge. However, an institutional investor who is deciding whether or not to invest in art requires a system for piecing together the available data to measure the asset's return. Therefore, notwithstanding the crucially unfeasible art features, experts devoted much time and energy to building indices that are supposed to be compared with others[65]. Artnet's Price Database provides the most exhaustive collection of global auction records, containing more than 10 million results covering more than 30 years, with more than 1,700 auction houses and 320,000 artists. These indexes should be interpreted only as a guide to the movements of different artwork category, since they do not consider complete information from auction houses and dealer or private sales prices. Moreover, they are not tradable and exclude the high fees charged for buying and selling art[66].

[62] C. Spaenjers et al., The economics of aesthetics and record prices for art since 1701, 2014
[63] K. Tully, How Useful Are Art Indices?, 2014
[64] WN. Goetzmann, Accounting for Taste: Art and the Financial Markets Over Three Centuries, 1993
[65] M. Gerlis, Art as an investment? A survey of comparative assets, 2014
[66] A. Picinati di Torcello, Why should art be considered as an asset class?, 2012

An art market index requires an analogous benchmark index to make its performance meaningful. Yet no known benchmark is an adequate proxy since, in addition to capturing just a portion of overall activity, they primarily do not take taste into account. The consumption-based asset pricing model (CBAPM) introduced pro capita consumption, though this is too broad as it includes all available goods and services. Arbitrage pricing theory (APT) which considers factors such as price-to-earnings (P/E) ratio and predetermined economic variables is a more useful model, nevertheless it does not allow for taste. Moreover, contemporary art sellers cannot hedge a future exposure, facing unfavorable interest and stock index or currency variations, due to the absence of a future art exchange. Something different is using art indexes to predict future prices. Art indices retrospectively measure the time lag between stock market and art market downturns. I. O. Chance, former chairman of Christie's, observed an 18-month interval between the 1929 stock market fall and the art price decline. Mei and Moses observed that probably the most noticeable drop in recent art prices happened at the end of 1990, about three years after Black Monday[67]. There are arguably relationships between art and the financial sectors, and they run approximately together, meaning that there are no systematic shifts. Financial markets respond promptly to economic shocks and affect the art market about one year late, thus stock exchanges might be viewed as advanced predictors of what the art market will experience 12 months ahead. Nevertheless, art is sensitive to fashions, preferences, and tendencies, thus the long-term predictions are rather challenging[68].

[67] I. Robertson, Understanding International Art Markets and Management, 2005
[68] O. Chanel, Is art market behavior predictable?, 1995

1.3 Art Investment: Evaluating Art as an Asset

By now the idea of an artwork as an investment asset is well embedded in our minds but still in the 19th century, albeit the art-informed public was keenly concerned with art prices, art was not bought to create new money but for pleasure, prestige or commemoration[69]. Among other peculiarities, the art market is characterized by the major emphasis on *behavioral anomalies from rationality and subjective expected utility maximization*[70], that is several psychological factors influence the art investor's behavior. Participants in the cultural production sector are "socio-economic maximizers." Artworks are both a commodity and a symbolic item. By negating economics, working "for the love of art, not for the love of money," gallerists quickly accrue "symbolic capital", that is they gain credibility by which they consecrate artifacts or people and install the ones worth both artistic and economic value. This business strategy is successful over the long-term because it can boost sales or prices[71].

High risk, illiquidity, non-transparency, non-regulation, high trading fees, uneven audience preferences and short-lasting tendencies depict the key features typically characterizing art markets. More and more investors are approaching art as an investment vehicle and becoming more sophisticated in their financial and estate planning[72]. In this light, artworks whose current price can be thought of as worth investment, rather than consumption, are considered. The investment rationale will usually be far less relevant than the consumption value to consumers in the case of relatively unknown or newer contemporary artists, whose works are normally low-priced[73]. Nevertheless, compared with other alternative investments, on a risk adjusted return basis, art investing sounds appealing solely by incorporating the art's consumption value as well. Indeed, art stands out from other consumption goods essentially because of its characteristic of offering not merely ornamental facilities and aesthetic prestige but also financial services which are a function of the expected rate of price change and the associated uncertainty[74].

[69] R. Hughes, Art and Money, 1992
[70] BS. Frey, R. Eichenberger, On the Return of Art Investment Return Analyses, 1995
[71] O. Velthuis, Talking Prices, 2005
[72] A. Picinati di Torcello, Why should art be considered as an asset class?, 2012
[73] DJ. Hodgson, KP. Vorkink, Asset Pricing Theory and the Valuation of Canadian Paintings, 2004
[74] RC. Anderson, Paintings as an investment, 1974

The return from holding art involves the price increase as well as the psychic return, also known as the aesthetic dividend, since art initially emerged as a consumer good. The factors driving the magnitude and evolution of psychic gains have been barely addressed with regard to risk, and the investigations on financial yields have mostly ignored this issue that fundamentally differentiates the art market and the pure financial markets. It follows that "pure speculators" exit the market as unexpected financial risk such as price changes and other risk elements rise, whereas "pure collectors" are, ideally at least, indifferent to these risks and purchase and possess art because they enjoy it without caring whether its price fluctuations widen or its attribution becomes more dubious. The purer collectors control the market, the lower the equilibrium financial return; the bulk of the return consists in psychic returns[75].

Moreover, art can help diversify portfolios, hence investors decide to include it among their assets even though its risk-return trade-off per se is not particularly attractive. The idea that the own collection may become more valuable in the future, thus a potential investment, is an additional reason why collecting is spread, thereby offering a chance to purchase both a unique commodity and maybe a profitable asset. As collectibles produce psychic returns to their holder, one would expect to gain a lower financial yield than that of non-collectible financial assets like stocks and bonds. These returns can be quite different due to their different cost of collecting. Hence, an investor who is not passionate about this subject, thus he does not obtain the psychic return, is unlikely to make the desired financial profit. Despite recessionary cycles, common sense believes that the return from art investment and that from traditional alternatives are similar since in some cases they are structured similarly. As opposed to anecdotal evidence on returns, economic analyses of art investment have not supported financial success stories. Art works yield lower returns than financial alternatives, in particular if not diversified, as the results of subject categories and individual artists prove. Therefore, art investments are usually a far sub-optimal investment strategy. The long-term real returns to art investing are low yet still positive, taking into account the associated expenses with the inherent specific fine art risks. On the basis of a large database using a general hedonic price model, the annual nominal total investment return for US

[75] BS. Frey, R. Eichenberger, On the Return of Art Investment Return Analyses, 1995

paintings between 1971 and 1996, factoring market fluctuations, is 4.2% and the risk is materially higher. Hence, the associated total consumption costs are rather significant, making their acquisition as pure investment generally unappealing. This negative finding partly differs once the data is decomposed. An experienced buyer who is blessed and can purchase the best quality can perform far better than keeping the real value of the paintings. The most expensive artworks produce a 9.9% nominal annual return, outperforming all benchmarks other than the S&P500. Nevertheless, the risk is not superior to that of others[76]. Art investments underperform stock market ones due to high risk and trading costs, resale rights, and insurance bonuses. In any case individuals must bear in mind that they can invest indirectly in this sector via art funds. Indirect investment involves missing out on the aesthetic pleasure from artwork acquisition, yet financial returns can be obtained by pooling assets with specialist advice, while getting diversification effects[77]. As stated by Philip Hoffman, Fine Art Fund Group's CEO, who recommends to have 5% of one's assets dedicated to art, "there is a limited supply of rare art, and there is a massive supply of new money coming into the art market, that's why the prices are being pushed up"[78].

What drives prices and their trend over time is still mostly an enigma, but it is evident that how much individuals spend on artworks is the sole ceiling on prices. Due to the attraction of many high net worth collectors, the effect on prices of the change over time in the amount of funds the wealthiest can afford has been analyzed. To capture purchasing power variations, stock market returns are observed, since stocks are more common among richer people in general, and several studies have analyzed the connection between these markets. In order to assess investors' capacity to acquire artworks, the distribution of the highest incomes over time is also investigated, in particular if those also belong to the most affluent people. Thus, the relation between income allocation and art prices is studied empirically and the hypothesis these are not cointegrated is rejected. In the long term, the income of the top earners is a major input in price determination in this market. The influence of income disparity is less obvious. It is shown that income inequality variations affected British art prices in the first part of

[76] RJ. Agnello, Investment Returns and Risk for Art: Evidence from Auctions of American Paintings, 2002
[77] RAJ. Pownall, Art as a financial investment, 2005
[78] T. Watkins, Memories of recession may be driving rise in art prices, 2013

the 20th century significantly, but the conclusion is not supported for the postwar years perhaps because of the globalization in the high-quality art demand[79].

In 2014, 0.5 % of transactions represented nearly half of all artworks value auctioned[80]. Information asymmetries are particularly evident as only affluent individuals can attend these trades[81]. Art sector illiquidity is one of the most evident risks. The bid-ask spread well measures liquidity in all markets. As a rule, the bid price is below the ask price, but there is already a dislocation within the art place - the most similar to the ask price is the reserve fixed at auction which is not made public and it is never above the winning bid. In the art market, the real price of a work is a "moveable feast" concept. A further threat element in any market is the supervision system of operations. The art market has no regulation, and this is frequently why it hinders sound investment. In the stock market, some information must be made public and the independence of those advising investment in selected stocks (share-tipping) must be regulated by law. Insider trading, in which people with knowledge of confidential information benefit from this, is prohibited in most countries. These actions are accepted and common in the art market. Dealers frequently bid at auction on artworks by artists they represent, increasing public value to their holdings. Attendees very probably are unaware they are bidding against one with personal incentive to drive up prices. This may appear to occur because of non-correlation, but actually it may happen because transparency is absent. The scarce and quite often subjective information that becomes nearly worthless as it is gathered is the biggest obstacle to any relative valuation of real art returns. Notwithstanding, to attract the stock-sensitive investor generation, over the last years, a number of attempts have been undertaken to categorize and examine art. Even for banks specializing in private assets, the problem is that the art market is even more elitist and opaque than markets for other alternative assets. Patricia Amberg, head of UBS's art advisory business, stated that it is impossible to ensure that a given artwork will be sold at the predicted price. Banks that have specialized in art lending have benefited from the increased demand for loans secured by artwork, such as Art Capital Group, a partner of UBS, Montage Finance, PlatinumArt, ArtAssure and Emigrant Bank Fine Art Finance.

[79] WN. Goetzmann et al., Art and money, 2011
[80] The economist, A study in red and black, 2015
[81] DN. Horowitz, Price fixing the priceless? Discouraging collusion in the secondary art market, 2014

Lending is constrained in several respects as an artwork is unique and prices so volatile. Art consulting, giving meaning to all art market features, is a booming industry for banks and individuals with rich customers. A potential borrower can only expect a loan against roughly 40%-50% of the work's value, and even experts will not lend below $500,000. Citi Private Bank's minimum loan for artwork was $5 million. Banks with high exposure to private wealth are purely reacting to growing client interest in art-backed loans. A glaring case is that of former hedge fund manager Michael Steinhardt, who in 2011 used part of his $200 million art collection to obtain financing for a $65 million acquisition. The art loan against 20 artworks by artists such as Picasso and Pollock was organized by JPMorgan Chase Bank[82]. Another example is when in 2015 Morgan Stanley's private bank organized a personal loan of an unknown sum for Mr. Cohen, a billionaire investor and noted art collector, guaranteed by "artwork collateral prices"[83].

The art secured lending market keeps growing worldwide even though interest rates are soaring. An international art loan register could assist lenders in securing their guarantees and sustaining market expansion, so borrowers could maintain their artworks' ownership. In the US, a bank can record a loan with the Uniform Commercial Code (UCC) deposit system on any movable asset providing superior standing to the lender in case of default. In Europe no such arrangement exists, and this may have narrowed the appeal for art and similar lending so, in most countries banks have established a service with a credit reference firm or similar. The Art Loss Registry records any existing loans for the lender and verifies the objects before lending so no sale or secondary loan is required without the lender's approval, yet it does not ask for borrower information The ALR has initiated a consultation with art lenders to create an international equivalent of the UCC with no formal statutory support that if used by most banks reaches the same goal. Experts and wealth managers believe that non-transparency poses the most undermining and disruptive problem in terms of art market reputation. By the end of 2023, the total volume of existing art loans is expected to range between $29.2 billion and $34.1 billion (an 11% increase from 2022), although 67 percent of private banks quote the unregulated nature of the art market as the biggest

[82] M. Gerlis, Art as an investment? A survey of comparative assets, 2014
[83] M. Goldstein, Morgan Stanley Provides Billionaire Steven Cohen With Loan Secured by Art, 2016

difficulty. This field is dominated by three main actors: traditional private banks (recourse lenders), boutique specialty lenders, and auction houses (asset-based lenders). The former generally tailor their products to the most respected customers and offer museum-quality art loans with a large secondary auction market, whereas the latter generally target a larger investor, collector, and dealer public and have a wider scope to examine fine art and collectibles at different price levels[84]. Therefore, a non-recourse, general purpose loan can be underwritten, backed solely by the artwork value[85]. Leading auction houses typically provide two kinds of loans: an advance against a work on sale (usually within a year) or a loan against the value of a customer's art collection[86]. Christie's can stipulate contracts other than bidding as in the former case[87]. Sotheby's Financial Services offers customers a broad set of bespoke financing options. Typically, loans are around 40-60% of the total low auction estimate of the artwork proposed as guarantee, most are arranged for two years, and usually extended at maturity. Advances are offered for customers against auction and private sale consignments, but it is not mandatory. In fact, more than two-thirds of the loans issued are term loans without any obligation to sale security. The upside over conventional institutions is that the unique market experience and underwriting approach allows them to fund in discreet transactions with unparalleled speed because their focus is mainly on the art as collateral rather than the customers' financial position, thus substantially cutting down on the quantity of information needed to prepare the loan. Indeed, the customer must submit the documents to check the provenance and ownership of the art offered as security[88]. The inspection a would-be borrower receives from a bank is far greater than the one from an auction house. While the financial check of the former can last for months and involves balance sheets and tax returns, the latter are less interested in client creditworthiness. Although Sotheby's and other boutique lenders are regulated by anti-money laundering laws, they are not subject to the severe reporting obligations of the Bank Secrecy Act or supervised

[84] Deloitte, Art and Finance Report, 2023
[85] K. Tully, How easy is it to get an art-backed loan, 2014
[86] M. Gerlis, Art as an investment? A survey of comparative assets, 2014
[87] Christie's
[88] Sotheby's Financial Services, Your Questions Answered

like depository institutions by federal banking authorities[89]. In 2015 Sotheby's doubled his credit line to approximately $1billion.

Previous research discusses whether higher-priced works over-perform the art market and how returns differ across price levels. The sector is segmented for several reasons, and returns might be skewed apart from a possible "masterpiece effect." Firstly, art is indivisible, thus minor investors typically cannot afford top-end art. Also, the more expensive market pieces are, the more open to speculation they become[90]. The symbol of wealth conveyed by the possession of a masterpiece, being a luxury good, further satisfies art owners. Thus, theoretically speaking, art cannot be compared to other risky assets. Indeed, art returns are broadly unrelated to any production-related variable: masterpieces by defunct artists dominate the top-end sector, and contemporary artists' works barely affect prices, regardless of whether reasonable people agree on what essentially art means, making its provision basically arbitrary. Unlike a stock, art does not entitle investors to an underlying payment stream, so the dynamic demand for art is the only significant driver of investment returns. Among demand drivers for art assets are the savings demand being an investment vehicle and a new "utility dividend" proportional to the art value that characterizes the demand for luxury goods[91]. Art dealers typically recommend that customers acquire the highest-priced masterpieces they are able to afford, convinced that the best artworks by the most acclaimed artists will exceed the market. The claim is that the total return on a masterpiece portfolio will outperform the overall market, for a certain risk level and an undetermined holding period. Moreover, it is often observed that masterworks are less sensitive to market declines. This cannot hold in an efficient art market, as desirable features will merely be compounded in their price. If the commercial view is correct, the estimated price indexes for masterpiece portfolios should be uniformly higher than the estimated price indexes for middle- and lower-level works of art. This is necessary, but not sufficient, to claim that the masterpiece cumulative return is superior for all potential investment time frames. The evidence does not support that masterpieces beat the market[92].

[89] K. Kazakina, Art of Shadow Banking: How an Auction House Got Into the Picture, 2016
[90] L. Ronneboog, C. Spaenjers, Buying Beauty: On Prices and Returns in the Art Market, 2012
[91] BR. Mandel, Art as an Investment and Conspicuous Consumption Good, 2009
[92] JE. Pesando, Art as an Investment: The Market for Modern Prints, 1993

2. Art Investment Funds

2.1 Historical Overview and Evolution

An important line in 20th-century art history was crossed within the art scene in Paris in 1914. Everyone in the industry was excited about the auction of the 145-lot collection referred to as La Peau de l'Ours or "The Bearskin", and the reason for cheering was the sale's remarkable financial success. The thirteen men who had put this collection together over the past decade, led by a businessman called André Level, had always planned to sell it at the end of the ten-year period and had always admitted to being speculators. Even though the relatively low contemporary art prices might indicate the opposite, there was already anxiety about the correctness of investment in emerging artists' artworks. Until the late 1920s, a visual artist's right to profit participation from the resale of his works was not established in French law. Yet this resale condition, the so-called *droit de suite*, became very debated in 1915 as the La Peay de l'Ours promoters voluntarily agreed to set it up years before it was made law by paying back 20% of the earnings to the artists[93]. Especially in the early period, the fund acquired many important works at very low prices. Level's investment was very appreciated because many modern artists had difficulty selling their works. Yet with the growing popularity of modern art, the fund eventually fell out of the business, and in 1910 it was no longer able to buy significant works of art again. Level became "a victim of its own success"[94]. Every member, as well as the leader, deposited 250 francs yearly into a mutual fund to buy works of modern art. Here is the best-known illustration of an enterprise designed to invest in art, referred to as the "first mutual fund in modern art." However, notwithstanding the perceived popularity, historical events (first World War I, followed by the Great Depression, and ultimately World War II) did not allow this precedent to gain a foothold until the 1970s, as the second generation of art investment ventures was born, although all of these activities failed in their initial form before the 10-year mark. For instance, in 1970 in Luxembourg Baron Leon Lambert formed

[93] MC. Fitzgerald, Making Modernism: Picasso and the Creation of the Market for Twentieth-Century Art, 1995
[94] BL. Frye, New Art for the People: Art Funds & Financial Technology, 2018

Artemis, and the year after in Panama Ephraim Ilin founded Modarco (Modern Art Collection, S.A.). Both companies were launched as pure trading firms, with Artemis even calling itself an "Art Investment Banking Firm." No one but the British Rail Pension Fund survived during those years as a large art fund[95].

Actually, the modern history of art investment funds dates back to late 1974, as the BRPF began to diversify its investment by allocating some of its almost total £1 billion ($2.4 billion) capital into art. In those years, it was one of the major pension funds in the nation, founded to support its employees, and Britain's Railways was a unified, state-controlled company. At first fund agreed to acquire artworks mainly because of the economic and financial circumstances prevailing in that two-year period: the 1973 OPEC-led oil crisis had dramatically affected the leading global economies, and inflation hit record levels, with the annual rate in the United Kingdom slightly below 30% and in the United States above 12%. The fund decided that up to 6% of the annual cash flow (about £3 million) would be dedicated to artworks, depending on the existence of appropriate (investment-grade) objects, and that the program would reach a total budget of £40 million probably by the late 1980s. From 1987 to 2000, the fund disinvested its entire collection, accruing an overall profit of £168 million, with an annual total cash IRR of 11. 3%, that is 4% in real terms, considering inflation. The fund has officially announced that its art portfolio investment target has always been merely to outperform inflation during its holding period and never to be compared with equities[96]. The BRPF was introduced to hedge against double-digit inflation by a new approach. Particularly by art enthusiasts, it is usually cited as a successful precedent even though its actual achievements were not entirely supportive. At first, while art returns exceeded inflation, they still did not beat the principal stock markets during the investment horizon. Moreover, BRPF traded during the first Impressionist boom in paintings, so successive funds cannot repeat these conditions. Furthermore, notwithstanding the strategic partnership with Sotheby's, the auction house mainly provided art advisory services and only minor premium discounts for buyers and fees reductions for sellers. Subsequent art investment initiatives have had even more

[95] N. Horowitz, Art of the deal: contemporary art in a global financial market, 2011
[96] J. Eckstein, Art Funds as Asset Class, in Fine Art and High Finance: Expert Advice on the Economics of Ownership (C. McAndrew, 2010)

difficulties. During the peak of the 1980s speculative bubble, Chase Manhattan Bank called for $300 million in investment from pension funds for a closed art fund, yet abandoned it immediately after being unable to collect that capital. At the turn of the 1980s and 1990s, Banque Nationale de Paris (BNP) contributed $22 million to its two new art funds. Hundreds of investors joined in, which was new, although the fund lost more than $8 million at the works' auction in the late 1990s.

In 2001 in London, the Fine Art Fund was launched by former Christie's heads Philip Hoffman and Lord Gowrie. The first fund was designed as a diversified fund focusing on five market segments: Old Masters (best allocation 25-30%), Impressionist (30%), Modern (20%), Contemporary I (1960-85, 15-20%) and Contemporary II (1985-present, 0-5%). Art buyers are the top specialists in each sector and are responsible for placing artworks into the fund, supervising their acquisition and, often, their subsequent sale. After a suitable object is selected, an art consultant reviews the offering and suggests it to management. Objects are paid for no more than 15% of the fund's total capital commitments and acquisitions above 7% of commitments needs the Fund Board's agreement[97]. Hoffman "is not one to let a good crisis go to waste". For example, in late 2008 when the financial sector almost crashed, he grasped the chance to buy artworks at a very interesting price. He describes a collector who years earlier had reluctant to sell art for $5.2 million, then during the crisis he sold the piece for $750,000 because he had desperate cash shortages. Hoffman loves distressed sales. He looks to auction houses for lots that are not purchased and therefore can be bought later at a worthwhile price with the idea of rapidly reselling the works acquired below cost to make a gain or keeping them for long-term re-valuation. This is a common approach that yields a sound return to investors who have deposited between $250,000 and $7 million to join the fund[98]. In 2015, Hoffman closed his FAF I inaugurated ten years earlier that achieved a 5% annual net return. More recently the fund renewed as the Fine Art Group and nowadays handles eight separate funds[99]. This accounts for $1.6 billion value of art transactions executed, 15% weighted average IRR, and $3.3 billion annual valuations in 2022. Present in all sectors of the art market, it has built an unparalleled track record throughout the art

[97] N. Horowitz, Art of the deal: contemporary art in a global financial market, 2011
[98] D. Grant, Secrets of the Fine Art Funds, 2011
[99] A. Shaw, The Problem with Art Funds, 2017

ecosystem, and the current Asian exposure has added more breadth and worldwide scope to The Fine Art Group[100].

During the past twenty years the movement and focus on art investment funds has been limited, yet in the last year new ventures have emerged since the interest in art as an asset and the financial issues of art possession has grown[101]. In 2004, the Dutch bank ABN-AMRO launched a new "art investment advisory service" with the aim of creating a "fund of art funds," that is a fund investing in others. Bank spokesperson Carolein Pors states this failed because not enough art funds were in place and customers were given shares in China Fund and Fine Art Fund as third-party products as an arrangement. Spencer Ewen, managing director of London-based art advisory service Seymour Management, contends that tailoring the notion of art funds to financial institutions is challenging and fundraising takes hard effort and long time. Although he considers art funds to be a positive asset, the results are not yet as desired, he is not certain that major structured vehicles are a better option than smaller, niche funds. The Art Fund Association was established in 2009, yet its website has not been updated in ten years[102].

Current art funds are basically structured as hedge funds or private equity. Yieldstreet's Athena Art Finance, which issued its first thematic Art Equity Fund in 2021, can be used as an example for the former definition, for the latter we consider Masterworks, an art investment platform that offers shares in individual works. Art investment funds attempt to securitize art purchases and sales by providing accredited individual and institutional investors with art market exposure via fund shares. Investors deposit a minimum of $100,000 - $250,000 to join the fund. They are charged a "2 and 20" commission i.e., the Fund's management company subtracts 2% of committed capital annually to meet general and operating expenses and additionally takes a 20% performance fee on profits. This is typically in excess of a hurdle rate of 6 to 8% as is often common among many hedge funds and is based on LIBOR to which a 2- to 3-basis point spread is added. The idea is that an individual would earn this much if he had invested in an income-yielding money market account. Most art funds are set up as

[100] www.fineartgroup.com, About
[101] Deloitte, Art and Finance Report, 2023
[102] G. Adam, B. Mason, Art Funds Struggling, 2005

five- or ten-year closed-end investment vehicles, which implies that, as opposed to the more liquid stock or mutual fund market, investors can only buy shares up to a given moment when the fund is "closed." Castlestone Management's Collection of Modern Art, launched in 2009, is a notable exception being an open-end fund. It is set up as a BVI-regulated mutual fund and accepts investments through accredited financial advisors starting at $10,000. Capital is then "locked in" until predetermined intervals (e.g., quarterly or annually) or the maturity of the fund at which time shareholders can redeem their shares. Funds' capital and investment return goals may differ widely depending on their objectives, management structure, and funding. Some, such as Fernwood and Fine Art Fund, aim to raise hundreds of millions of dollars, while many are in a more moderate range of $15 million to $50 million. Most funds aim for annual after-fee returns between 10 and 15%- FAF in reality seeks 10-20%, although return targets may change as well. About the course of business, the majority of funds operate a multi-level management structure. At the top is a senior management team or investment committee composed by the founders, the chief investment officer, and other trusted consultants. This group, frequently with a solid experience in auction houses and finance, defines the funds' size and mission, gathers money, participates in the due diligence process, and communicates with stakeholders, the press, and the arts and finance communities. Negotiation is usually performed by a team of well-positioned outside art buyers, including gallery owners, private dealers, and former auction house experts with wide customer networks and who can optimally target, find, and exchange works of art with the funds' financial support at a commercial discount. These typically are not on the companies' monthly payroll yet tend to earn fees for placing artworks with the fund plus an interest in the fund's performance, as opposed to senior management and administrative support teams. Art advisors, who are often critics, academics, or retired art market experts, may also intervene between buyers and management to give unbiased advice on trading choices. Moreover, it is worth mentioning that the majority of art funds do not have one-on-one relationships with their traders but usually purchase and sell through dealers who also operate in the business separately from the fund, in contrast to hedge funds and private equity funds.[103]

[103] N. Horowitz, Art of the deal: contemporary art in a global financial market, 2011

2.2 Art Fund Management Strategies

A winning art fund must be consistent and prevent possible conflicts of interest. Thus, the required strategy must compensate advisors to match their interests and investors' ones, devise a feasible investment goal with regard to sourcing and acquisition policy, and a realistic exit strategy worthwhile also in an illiquid market. The fund needs to produce appealing projected returns over the historical risk-adjusted returns obtained by that art sector and requires a continual participation strategy providing value-added perspective to the expected market growth. Moreover, it calls for an optimal financial structure open or closed, accounting for the intermediate and indicative asset valuation implications, without mark-to-market pricing, and aggressively marketing itself, outweighing investor obstacles posed by the opacity surrounding art as an asset class. Frequently, the more sophisticated the investment strategy, the less applicable it is, as the acquisition is largely an opportunistic matter driven by the existence of investment-quality artworks at fair prices rather than a plan. Many acquisition policies hinge on the prompt disposal of artworks to "cash buyers," yet they are feasible only with few funds (buyers) looking for art. Competition among many funds will eventually be self-destructive. Another option is to pursue more niche investment opportunities in specialized fields or in emerging markets, yet if too many funds simultaneously are seeking investments opportunities these markets could get stuck as they are very small[104].

Art fund managers try to deal with art investments as traditional fund managers would. Their investment approach relies on tested methods and disciplines familiar to the management of any asset class: modern portfolio theory, advanced risk management techniques, quantitative methods, and qualitative models and analysis. Using a fund manager's experience and market intelligence, backed by solid financial and art market analysis, art investment funds attempt to offer investors opportunities usually seized only by the world's best collectors and art dealers. With optimized art exposure, these funds are tailored for expert and skilled investors looking for elevated return rates in an inefficient market.

[104] J. Eckstein, Art Funds as Asset Class, in Fine Art and High Finance: Expert Advice on the Economics of Ownership (C. McAndrew, 2010)

After the collection is established and the committed investment term has expired, the artworks are usually sold via an orderly disposal procedure within a predetermined time frame, and the profits, once management and administration commissions have been charged, are shared out to investors. Art funds are useful in reducing some risks of art investment by bringing several main advantages. Indeed, according to their goals, art funds provide a diversified portfolio of works from art market sectors (i.e., antique, impressionist, modern, or contemporary works), which may be weakly correlated with each other, to distribute risk as opposed to concentrating it in a single area that, while it might produce superior yields, creates higher risk as well. Furthermore, a fund structure may mitigate the buying, selling, and holding expenses by pooling assets since, thanks to their higher liquidity funds can often obtain favorable rates and terms from appraisers, auction houses, insurers, and other service providers who would not otherwise be available to a single buyer or dealer. Moreover, a fund's art purchases rely on expected investment returns, liquidity, diversification, and market conditions and are usually selected by top specialists in their sector. Identifying the proper arts to acquire and then sell them at the opportune moment needs greater experience than the average investor. In addition, due to the considerable capital at its disposal, the fund may obtain new, rarely marketed, and thus highly priced artworks. A fund's buyers and advisors may be able to acquire art directly from private holdings and collectors, thereby avoiding dealing with dealers and auction houses. Art enthusiast investors, via a fund may occasionally borrow works temporarily and display them in their own homes. Certain funds may lend their artworks to important museums or exhibitions, thus enhancing their international reputation and increasing their investment value. Art funds are often organized to offer investors a tax-efficient vehicle for art investment, with benefits in terms of estate tax, sales tax, value-added tax, and capital gains tax. Art funds typically purchase artworks over a time horizon and thus can profit from future price movements and avoid expensive items. Obviously, these advantages are possible only if the art fund is well run and the buying and selling decisions are taken by professional, reliable, and unbiased advisors. Furthermore, whatever the fund's advisors' knowledge, given that art is an illiquid asset, the fund could not disinvest as soon or as well as it would like, especially if there is a fixed maturity date because the manager may have little control over the timing of sales and thus disinvest in bad market circumstances.

Managers need several special expertise to guarantee the art fund's success. The first one is the capacity to extract information from the market. Managers must know how to use market analysis and intelligence to identify appealing investment opportunities on attractive conditions. By means of economic and behavioral investigation, regional and sectoral tendencies are detected to seize the opportunity when there are pricing anomalies. When investors choose an art fund manager, they must consider proprietary deal flow and strategic market positioning is an important competitive advantage. The second skill required is being able to increase the fund's asset value. Similar to private equity fund managers, art fund managers attempt to achieve this via curatorial and marketing activities as successful collectors and dealers do. The third ability is managing the portfolio risks at multiple stages. They must continuously observe, examine, and study economic evolutions and market tendencies that are likely to influence future purchases or sales, and they must diversify assets to hedge against exposure to a specific opportunity. Clever art fund managers are well aware of the specific risks involved in buying art, that is, issues of authenticity, condition, and origin, and can evaluate them due to competence, market intelligence, and deep experience. The last needed skill is to network inside the art market. The most talented art fund managers are the ones who have established an internal team as well as built unique partnerships with dealers, curators, economists, art sector specialists, investment experts, and quantitative and qualitative researchers to mine unique art market insights. Furthermore, art fund managers need to make the correct business transactions at the proper moment and at the proper price such as exchanges in the primary and secondary art market, trades centered on a leading art segment, regional and decorative niche deals, and art-related business and financing opportunities.

Artistic funds also differ in their legal form. Typically, participants in a closed-ended fund have to wait for the fund's expiration date so they cannot withdraw shares whenever they like. Open-ended structures do not suit art funds well because their investment strategy is usually not appropriate for providing investors with a regular right to redeem. An art fund can likewise be organized as an "umbrella fund" including a number of segregated sub-funds, and each of these has different art investment features or sectors. Whether they are open or closed-ended funds, its management entity may delegate all or some functions to third-party service suppliers. Internal and external teams are in many cases hired to evaluate such variables as economic conditions, financial and art market trends, and other factors likely to affect pricing, operations, and supply, given that the art funds' market opportunity identification is based on broad proprietary analysis and market information research.

Fundamentally there are two main approaches upon which funds determine their investment strategy, even though the precise ones may differ. These translate the successful practice of two distinct art world professional groups. No matter the strategy employed, most art fund managers prefer tax-efficient structures and favorable tax jurisdictions. The first one is the vertically integrated sector-allocation approach to art-fund-management strategy according to which one buys the artworks that in the manager's view will be the most appreciated in the short-term or in the future in the market with the investment goal of achieving considerable capital appreciation. The highly diversified portfolio is actively managed and includes masterworks belonging to the most consolidated or popular collecting categories, like Old Masters, Impressionists, Moderns, and Contemporaries, each of which has distinct performance characteristics. Any selected art sector will typically as well be required to satisfy basic requirements like relevant market size, maturity of the collector base, independent market behavior, including price performance and volatility, and a long history of related transactions, which enables better tracking and forecasting. Basically, the fund manager conducts top-down allocations across sectors and regularly adjusts the position based on proprietary macroeconomic analysis and long-term art market research. The second is the opportunistic approach. It replicates the global major art dealers and auction houses' actions, with whom they sometimes team up, and identifies regional and niche financial transaction and direct investment opportunities that can yield higher short-term returns. Funds pursuing this strategy focus on collections or portfolios made up of fresh artworks that can be resold via conventional art market channels. They may acquire art for long-term capital appreciation as well as short-term arbitrage and, prior to the financial crisis, have mainly targeted contemporary works from emerging art markets like Asia, the Middle East, and Latin America, and niche fields such as photography and collectibles. Transaction types range from opportunistic purchases and sales of works to obtain prompt returns to financing and equity participations with substantial upward prospective. The opportunities being exploited stem from the intrinsic art market nature, namely, broad product diversification and heterogeneity and lack of efficiency, liquidity, and transparency[105]. The approach further aims to exploit distressed sales and informational asymmetries that exist in the art market in general, for example, through purchases at a significant discount from an investor who may want to rapidly exchange art into cash. Fernwood suggested an eight-stage investment strategy: establish the global allocation, evaluate cash and the use of liquidity, use investment analysis competence, identify and source potential opportunities, execute due diligence and trades, assess portfolio eligibility, perform transactions, and constantly re-evaluate liquidity and exposure. That is, the objective was to implement "continuous and seamless" active management to maximize investment performance[106].

Anthea's investment funds targeted exclusively contemporary art investments, allocating the investor's portfolio among emergent, established, and blue-chip artists. The strategy consisted in investing in artists with promising short-term careers and keeping their works in the fund's portfolio until such time as they would be accredited in the top category, that is: from emerging to established or to blue-chip. The issue was to find these artists and purchase their major works before that time. According to Subba, Founder and Managing Director of Anthea Art Investments AG, this was one of the top approaches followed by art investment funds, based on the singular market situation prevailing then. Indeed, during the last decade, the art market has been growing strongly, with many new collectors entering the field and viewing art from an investment perspective. Art funds are a finance-related product, in the end, so clients are driven by a return-on-investment standpoint, and the investment strategy is accordingly. They mostly do not go to galleries or auction houses to buy fine art, they contact their product-banker to be recommended on the most appropriate funds that invest in art to diversify their investment portfolios[107].

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[105] R. Willette, Art Funds: Current Strategies and Practice, in Fine Art and High Finance: Expert Advice on the Economics of Ownership (C. McAndrew, 2010)
[106] N. Horowitz, Art of the deal: contemporary art in a global financial market, 2011
[107] C. Aluigi, Massimiliano Subba on Art Investment Funds and Anthea, 2020

2.3 Viability and Structural Considerations

Typically, art funds are privately offered investment funds designed to produce returns by purchasing and disposing of artworks. They are managed by a qualified art investment management or advisory firm that earns a management commission and a percentage of the returns generated by the fund[108]. It is not possible to state the exact number of existing art funds, given that, especially in the general art market, no unified rules exist. Moreover, since most funds are non-regulated and are very discreet, perhaps even biased, regarding the information they disclose, any synthetic overview is likely to suffer from a reasonable level of inaccuracy[109]. In 2014, 72 art funds and art investment trusts were reported, including 55 in China. During the year before, additional information about the scope of Chinese art trust industry was disclosed, so the figures above follow revisions to the 2011-2014 data; indeed, 90 Chinese funds and 25 European and U.S. ones were estimated in 2012[110]. Several Chinese funds defaulted because of their irrationally short terms, usually between one and three years, which constrained their strategies and made them risky due to market liquidity problems, combined with an unusually high rate of purchases in the auction market. These funds sometimes needed a 18-20 % yield to break even or produce returns to participants, something feasible only during maximum market expansion so very difficult after 2012[111].

The main rule of art investment is the old one: buy the underpriced works and sell the overpriced ones, that is buy and hold strategy. Art funds might ideally enhance the art market efficiency as they might ease art investment and maximize its liquidity. Furthermore, they might collect art market data in a more efficient way than single investors would. Art funds might allow some groups of investors, otherwise excluded, to enter the art market, enabling them to commit modest capital sums at a low management cost, allowing them to commit modest capital sums at a low management cost. For example, some may view art as a potentially interesting asset class, yet do not like to face the liabilities of effective art property. In addition, others might not have the

[108] www.artfundassociation.com, What are Art Funds
[109] N. Horowitz, Art of the deal: contemporary art in a global financial market, 2011
[110] Deloitte, Art & Finance Report, 2014
[111] S. Malik, G. Nestler, Plotting the art market: An interview with Clare McAndrew, 2016

necessary capital to buy art on their own, though they might like to invest in art[112]. The stock market benchmark index returns are accepted, whereas an actively managed art investment fund potentially can achieve considerably superior performance compared to those expected using public indexes because expert dealers and other art market advisors can consistently add value to the performance shown by the resulting art market metrics[113]. Individuals lacking the space, expert skills, interest, or inclination to acquire and possess single artworks, particularly those who are not collectors and do not care about "the real thing" but appreciate the financial performance of art, can however get exposure to art as an alternative investment by investing in an art fund, instead of directly, and gain some benefits. These involve the advantage of pooled spending in purchasing top quality works, the possibility of obtaining broader diversification, and the perspective of active asset management. Several types of fund structures exist: the pooled funds approach, adopted by a number of private banks that purchase artworks focusing on investment opportunities on behalf of high-net worth clients; the "art expert as adviser" approach, who helps investors to pool their capital and buy investment-grade art by stressing the nature and quality of expert guidance; the fund-of-funds structure, like the one employed in 2004 by ABN Amro; the art hedge fund, which hedges against a possible market decline through derivatives. The Art Trading Fund (ATF) was the first regulated art fund with an art market hedge. In the event of quarter-to-quarter downturns in stocks or the front side of the yield curve, the fund purchased puts on stocks in highly correlated sectors of the art market, like Sotheby's stocks (ticker BID) or in the luxury goods market, such as LVMH or Richemont, thus a synthetic hedge was made up essentially of exchange-traded options on liquid securities, which provided some protection against market drops. One might conclude that the attractiveness and profitability of art as an asset class relies on the perceived comparative perspectives of global financial markets toward the different art market sectors. Some investors value art as being backed by hard assets and as providing relatively favorable risk-adjusted returns[114]. A new development example is art derivative Contracts on Future Sales (CFS). In February 2016 Pi-eX Ltd, based in

[112] BL. Frye, New Art for the People: Art Funds & Financial Technology, 2018
[113] J. Eckstein, 'Investing in art: art as an asset class', in I. Robertson and D. Chong, The Art Business, 2008
[114] J. Eckstein, Art Funds as Asset Class, in Fine Art and High Finance: Expert Advice on the Economics of Ownership (C. McAndrew, 2010)

London, received permission to organize and trade a new art financial instrument called Contracts on Future Sales (CFS). These are standardized derivative products based on specific artworks being sold at major auction houses. CFS solve the art market volatility problem: art owners can hedge their risk against an upcoming sale, as well as buyers can hedge potential future acquisitions at the same time. Institutional investors can purchase standard contracts to enter the art market within an asset diversification strategy. By purchasing CFSs, investors are able to construct synthetic portfolios of selected artworks, corresponding to their investment opinions and preferences, with no need to hold the underlying assets. At auction, the hammer price received for a given artwork is used as the reference for the settlement price of the associated CFS[115].

The rationale for art funds relies on three basic principles: at first, high quality art (generally) becomes more valuable; second, specialists are supposed to exploit opportunities since the art market is not efficient; and third, the art market allows investors to diversify since it is disjointed from other commodities. Art funds are supposed to trade in the resale market, whose values are more consolidated and where artworks can be exchanged more continuously and discreetly[116].

From the 1960s to the 1970s, a careful combination of quantitative and qualitative evaluations substituted simple sales price euphoria; art as an asset and its utility as an inflation hedge were related. In a worst-case scenario, art should maintain its worth better than traditional assets like stocks and bonds, particularly given inflation in which irreplaceable hard assets would typically outperform the overall market. Philip Hoffman, FAF's co-founder and CEO, points out that a corporate stock might lose worth, yet a Canaletto "will never fall to zero." In the 25 years to late 2003, Fernwood estimated that the statistically optimal portfolio composed of 35% stocks, 45% bonds and 20% arts outperformed the 10-year bonds (11.0 vs. 9.9%, respectively), and also endured a risk of only 7.7%, the lowest level across all asset classes in the model including stocks, bonds, gold and art. A portfolio made up of only stocks or bonds would have a worse risk-return profile when compared. Recalling the CAPM and major modern economists, Fernwood concluded that the extremely low (also negative)

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[115] Deloitte, Art & Finance Report, 2016
[116] A. Whyte, Does investing in art funds make sense?, 2014

correlations between art and other asset classes are crucial in the model's results, and a portfolio can be more efficient when also exposed to fine art[117]. Diversifying by art can be paramount when building a portfolio. Art exhibits lower beta so lower systematic risk compared to the S&P 500 therefore it should achieve a lower return in the long-term. Moreover, art as well has larger systematic risk than bonds hence it should yield a superior return in the long-term[118]. Covariance is fundamental. It can be concluded that art can represent a favorable element of a financial portfolio. Returns outperform inflation and are likely to be higher than government bonds, albeit lower than stocks. In addition, a further study of the risk - return profile of the sectors from 1980 to 2006 indicates that fine arts indices themselves are weakly correlated. This suggests the possible gains from owning diversified art portfolios among artists and different art sectors[119]. However, it must be pointed out that achieving the equivalent diversification degree in art as with mutual funds, that may include hundreds of stocks, is far more challenging. Moreover, purchasing or selling fees for artworks are well above what you pay to a stockbroker, long-term capital gains from arts are taxed more than equities, and dividends are just the pleasure of watching the piece[120].

Information costs caused by art market opacity result in market failures. In theory, the cartelization and inefficiency of art markets frequently create lucrative arbitrage opportunities that art funds with access and reliable information could exploit to produce superior returns, also because they make it challenging for outsiders to profit in the secondary market. Nonetheless, in practice, fintech is unlikely to make art funds a judicious candidate for retail or major institutional buyers. Art market information is unreliable and uneasy to obtain, thus the promise of access and information is a chimera. Only insiders have access to the most desirable pieces in the primary art market where very little information is publicly reported. The secondary art market is much less elitist and obscure, yet it looks more transparent than it is in reality because most dealer transactions are private and confidential, and there is no basis for assuming that the information disclosed is accurate or representative. Hence, even the reports are

[117] N. Horowitz, Art of the deal: contemporary art in a global financial market, 2011
[118] J. Mei, M. Moses, Art as an Investment and the Underperformance of Masterpieces, 2002
[119] RAJ. Campbell, Art as a Financial Investment, 2008
[120] C. Palmeri, The Artful Investor: New research calls art a smart investment, but skeptics point to high costs and high risk, 2007

not exhaustive or reliable, although they contain relevant and useful information. Indeed, accurate art market information means insider information, so in order to gather information on a transaction, one must contact a participant in that deal. Consequently, market-makers are generally the most informed and are best positioned to arbitrage. In most cases, art market arbitrage actually needs privileged access. In practice, the primary market is mostly locked to outsiders, and despite entering it via mid- and lower-range galleries, outsiders have limited arbitrage potential. Moreover, the majority of works sold in the primary market will never be valuable in the secondary market. Art funds being outsiders can hardly enter the secondary market as well and possess neither insider information nor privileged access. They owe obligations vis-a-vis their stakeholders and are not allowed to receive or exploit information and access in as easy and effective way as private parties. As a result, art funds usually buy artworks in public auctions on the secondary market.[121].

Today more art market participants defer paying capital gains taxes on art sales through a special tax strategy, becoming an increasingly critical part of boosting art market activity, particularly for high-priced artworks. The House of Representatives' tax bill abolishes the use of the 1031 Exchange for art and holds it for real estate. If it is passed, many art market participants subject to U.S. law could probably decide to keep art for extended terms, thereby art market turnover would notably decline[122]. One means a fund can cut expenses is to offer the opportunity to investors, as the Fine Art Fund does, to borrow fund-owned artworks at a cost of 1.25% of their appraised value, instead of a financial dividend. Exhibition loans, particularly to top museums, is a wise means of actively managing a fund's asset base: the storage and insurance costs, that would usually be paid for by the exhibiting entity, are lowered, and provenance is added to the works as well, theoretically supposed to increase their re-sale price[123].

Pension fund investing offered three distinct benefits over modern art funds because it had infinite funds to buy the highest-quality art objects, access to capital to the overall market (albeit by Sotheby's), and plenty of time to keep the pieces. Many have argued

[121] BL. Frye, New Art for the People: Art Funds & Financial Technology, 2018
[122] D. Woodham, The Tax Strategy That Fuels the Art Market—and That May Be about to End, 2017
[123] N. Horowitz, Art of the deal: contemporary art in a global financial market, 2011

that art is a successful business only when maintained over the long run. Maintenance and transaction costs are simply too expensive to be a short-term investment[124].

Ultimately, one wonders whether funds investing in art are a sound investment. Recorded returns capture general attention, but research shows that investors would be well advised to be cautious given that fine arts returns have been remarkably overstated and risk understated: the fine arts sales index, which art advisors employ to trade art funds, exhibits a far higher average annual return than what research has estimated, using the Blouin Art Sales Index (BASI) auction database, demonstrating that the true annual return on art as an asset class during the period 1972-2010 was about 6.5%, rather than 10% as indicated by the index. Furthermore, the presence of an art fund in one's portfolio does not enhance the possibility of outperforming the portfolio. The reason behind the overstating of returns and the resulting understating of risk is the so-called selection bias[125].

[124] I. Lindsay, Go Figure, 2011
[125] Korteweg A., Kräussl R., Verwijmeren P., Research: Is Art a Good Investment?, 2013

3. Art in Portfolio Analysis: Enhancing Diversification and Performance

3.1 Objectives and Assumptions

The objective of the model to be presented is to assess the potential benefits of including art as an asset class in a portfolio strategy, with a focus on analyzing the risk-return trade-off. The baseline is a basic Capital Asset Pricing Model that is implemented by introducing an art index within the universe of investment opportunities. By identifying the optimal portfolio allocation within this framework, we aim to evaluate the impact of art on portfolio performance and diversification.

The model's assumptions are: investors are Markowitz efficient and they want to target points located on the efficient frontier and base their decisions only on expected return and risk, they have homogeneous expectations meaning that they estimate identical probability distributions for future rates of return, they have the same one-period time horizon; all investments are infinitely divisible which means that it is possible to buy or sell fractional shares of any asset or portfolio; there are no taxes or transaction costs; there is no inflation or any change in interest rates, or inflation is fully anticipated and capital market are in equilibrium. The risk-free rate representing the return on a risk-free investment such as a Treasury bill is taken constant at a very low level (rf= 0.0011).

The model consists of two sections. In the initial stage, a portfolio is constructed using three indices accounting for bonds and three for equities. The objective is to determine an optimal allocation of assets in terms of mean (expected return) and risk (standard deviation). The model identifies the weights assigned to each index to achieve an optimal risk-return trade-off. The resulting portfolio allocation is positioned on the efficient frontier, representing the set of portfolios offering the highest expected return for a given level of risk. In the subsequent stage, the model is expanded to incorporate the opportunity to invest in artistic sub-indexes representing specific segments of the art market. The resulting portfolio allocation is positioned on a second efficient frontier. The focus of the analysis is examining the movement of the efficient frontier when art sub-indexes are included in the portfolio construction process. The upward movement of the efficient frontier suggests the evidence of the portfolio's improved efficiency and enhanced risk-return trade-off, highlighting the diversification advantages afforded by art investments.

The time horizon of the model spans from 2003 to the end of 2023 in order to provide a comprehensive framework for the last two decades and include both periods of market stability and significant market events such as the global financial crisis of 2008-2009 and the COVID-19 pandemic in 2020, and quarterly price indexes are used to avoid daily fluctuations. The indices used were selected in order to construct a diversified portfolio across geographic area, specifically US, Europe and Asia. Concerning bond returns, the Bloomberg US Agg 10+ Year Total Return Value Unhedged USD (I05751US), Bloomberg Pan-Europan Aggregate: 10+ Years Total Return Unhedged EUR (I02508EU) and Bloomberg Asian Pacific 10+ yrs Total Return Index Unhedged JPY (I02853JP) are taken as reference, whereas for the stock market the Bloomberg North America Large & Mid Cap Price Return Index (NAMER), Bloomberg EMEA Large & Mid Cao Price Return Index (EMEAP) and Bloomberg Asia Large & Mid Cap Price Return Index (ASIAP) are considered since they are float market-cap-weighted equity benchmark that cover 85% market cap. When analyzing returns rather than prices, currency differences become less of a concern, moreover we assume no exchange rate fluctuations occur.

Art indices are taken from ArtPrices, since this is one of the most informative and comprehensive database, and normalized to 100 in 1998, they are computed on the basis of all Fine Art auction results registered by Artprice.com and are categorized according to artistic movements, namely 19th Century, Modern Art, Post-War and Contemporary Art.

3.2 Model structure

The first step is to set up the data. The quarterly stock and bond historical price data were downloaded from Bloomberg, and the art data directly from the ArtPrice website. These data were imported in Matlab through the *xlsxread* function. Two matrices made up of the different index prices are constructed as followed: the former contains I05751US, I02508EU, I02853JP, NAMER, EMEA and ASIAP; the latter I05751US, I02508EU, I02863JP, NAMER, EMEA and ASIAP and art classified into 19th century (19th), Mod (MD), Post War (PW), Contemporary (CN). Once these matrices are constructed, returns are calculated from the price data using the *price2ret* function, which computes periodic returns from price data.

These returns are averaged to derive the expected return and the variance-covariance matrix is then computed. Thereafter, a standard portfolio object is initialized with the asset list, risk-free rate and asset return moments are incorporated into it. To provide a basis for comparison, an equally weighted portfolio is created to serve as the object's initial portfolio. A standard or mean-variance portfolio optimization problem is then set up with the aim of maximizing expected return while minimizing portfolio variance. Overall, this code segment conducts portfolio analysis to construct efficient portfolios and identify optimal investment strategies based on historical price data of stocks and bonds across different regions. The analysis considers risk, return, and the trade-off between them to determine optimal portfolio allocations.

Central to this optimization process is the allocation of weights to different assets within the portfolio. One notable aspect of our optimization framework is the allowance for short selling. Traditionally, portfolio optimization models impose non-negativity constraints on the weights, ensuring that investors can only take long positions on assets. However, by relaxing these constraints, our model enables investors to take short positions on assets they expect to decrease in value. This flexibility expands the universe of feasible investment strategies enhancing diversification. In addition to allowing short selling, our optimization framework includes the requirement that the weights assigned to assets sum to 1. This constraint ensures that the portfolio remains fully invested, regardless of the combination of long and short positions taken on individual assets.

Given this initial problem, efficient portfolios weights and portfolio risks and returns are estimated using the *estimateFrontier* and *estimatePortMoments* functions, respectively. A specialized *portolioexamples_plot* function enables to plot all the outcomes being developed here. This figure illustrates the asset distribution according to their mean and standard deviations of returns. It is worth pointing out that this plot function translates quarterly total returns into annualized total returns. The efficient frontier is drawn accordingly.

According to the modern portfolio theory, diversification plays a crucial role in reducing portfolio risk while enhancing returns. The theory suggests that by adding assets with low or negative correlations to existing holdings, investors can achieve a more efficient risk-return profile. The correlation matrix serves as a valuable tool for assessing the relationship between different asset classes and identifying opportunities for diversification within the portfolio.

3.3 Results and Considerations

By examining the correlation matrix, it becomes evident how assets may be combined together so as to diversify the portfolio. It can be noticed that equities have a positive correlation with all art indices, yet the bond indices have a negative correlation with 19th Century Art, Modern Art and Post-War Art. Moreover, the Asian bond index shows negative correlation also with Contemporary Art and equities, yet different categorizations are available.

An investor evaluating the potential of art as an investment may initially question its merit when confronted with data suggesting that art does not offer an attractive risk-return trade-off. Upon examining the graph provided below, it becomes apparent that certain art indexes, particularly those representing 19th-century art and modern art, exhibit negative returns. Additionally, the overall performance of an equal-weighted portfolio that includes art appears less appealing, as indicated by a lower Sharpe ratio. The Sharpe ratio, defined as the ratio of excess return to risk, serves as a measure of portfolio efficiency, with higher values indicating superior risk-adjusted performance.

Despite the apparent drawbacks in art's risk-return profile, the investor recognizes the value of including art in their portfolio due to its diversification benefits. By integrating art indices into the investment mix, the investor gains exposure to assets with unique risk characteristics: in fact, art assets exhibit low correlation with equities, providing risk management benefits, and art display negative correlation with bonds, further enhancing portfolio diversification.

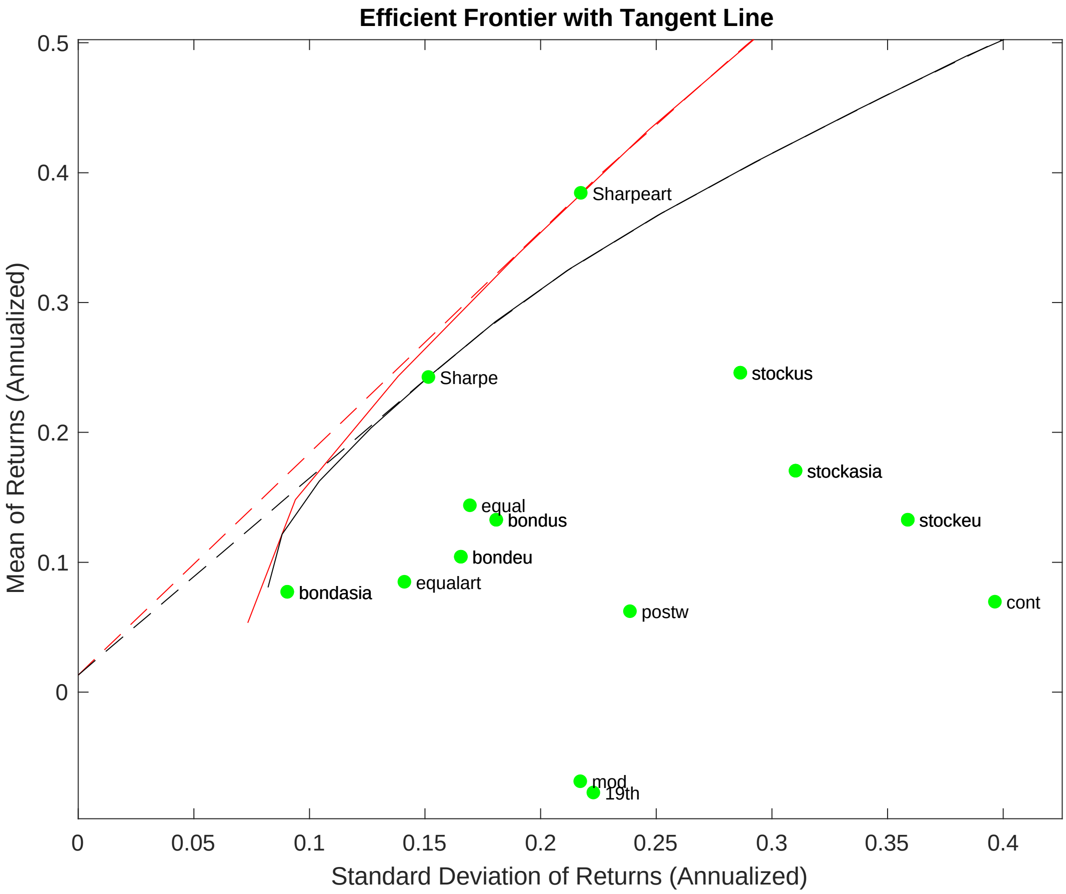

Figure 1: Efficient frontier with Tangenti line in case of stock and bond (black), including art (red)

As depicted in the figure, the inclusion of art indices leads to a higher efficient frontier, signifying the potential for improved portfolio efficiency and risk management, as expected.

The choice to allow the possibility of short selling was made considering that by relaxing this constraint it is possible to obtain a wider universe of investment possibilities and thus greater diversification. If the possibility of short selling were limited there would not be such a pronounced gap between the two frontiers, notwithstanding the efficient frontier including art would still be higher than the one without art due to its low, and even negative in case of bonds, correlation with other assets.

In addition, it is necessary to keep in mind that the assumptions upon which the Markowitz model relies are often criticized for their unrealistic nature in practical investment scenarios. These assumptions oversimplify the complexity of real markets, where investors have different opinions and react differently to market information, and where the presence of market anomalies and deviations from rationality observed in real markets is overlooked. Although it must be considered that the results produced are affected by upside, the model provides a systematic framework for understanding risk and return trade-offs in portfolio construction. By emphasizing diversification and the efficient frontier, Markowitz's model offers insights into optimal asset allocation strategies that can help investors navigate uncertain market environments and achieve their investment goals.

CONCLUSION

The objective of this paper is to present a general overview of the art market, exploring its main characteristics and motivations why an investor should include this alternative asset in his portfolio.

The uniqueness of a work of art at the same time represents its main attraction and its main concern. Assessing a monetary value to a painting is challenging since it is basically trying to price the priceless due to the singular features art embodies. Eventually, the sale price of an artwork does not indicate the general market level but rather how much an investor is willing to pay it. Therefore, buying an artwork used to be a personal prestige matter, the market was niche, and the investor was a collector who gained an aesthetic return. Today, art is no longer considered a consumption good, and even a small investor can enter the market through, for example, art investment funds, managing to behave like a major investor and being able to afford investment opportunities otherwise unattainable. Moreover, with the technological progress and new investment vehicles, the possibilities for strategies have further evolved and expanded.

Art is no longer interpreted as something merely aesthetic, and its importance in wealth management services is now widely recognized, especially for collectors driven by financial motivations. As the latest edition of Deloitte's Art & Finance report points out, 63% of wealth managers have already incorporated art into their wealth management services offerings. The art sector is turning from sentimental to more financial considerations, such as the opportunity to diversify investment portfolios and hedge against inflation.

In fact, the low and even negative correlation of art with more traditional asset classes seemed to be the key driver for choosing to include art in a portfolio. This prompted the quantitative analysis of this actual benefit in the last chapter of this paper. There is a significant difference between the efficient frontier of optimal portfolios including art and those without art, especially if short selling is allowed, and therefore art does have a role in diversifying the investment, as the correlation analysis already suggested. Thus, it is worth considering art in the context of an optimal asset allocation strategy, aiming to exploit its potential to maximize returns.

When deciding whether to include art in an investment portfolio depends on various factors, including an individual's investment goals, risk tolerance, and financial situation. If an investor has a long-term perspective and the expertise to understand market trends, and if he can afford the associated costs, he should consider art as asset class. Art can be considered an alternative investment that offers unique characteristics compared to traditional assets. Investors interested in diversifying their portfolios beyond stocks and bonds should consider allocating a portion of their assets to art.

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