Art as an Asset and Keynes the Collector

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Abstract: If art indexes are exposed to transaction-channel selectivity, suffer from survivorship bias, or weight individual assets inappropriately, they may be unrepresentative of art investors' performance. To investigate these issues, we study an actual invested portfolio—the art collection of economist John Maynard Keynes—using valuations that span up to 96 years. We document substantial long-term real returns and show that auction purchases were followed by significantly higher initial returns than primary market acquisitions. We argue that, because of the concentration of art portfolios, indexes based on auction prices for established artists can successfully capture the value-weighted average returns realized by art investors buying in the secondary market. Positive skewness in returns can nevertheless cause most investors to underperform the asset class.

Keywords: alternative investments; art; portfolio concentration; price indexes; skewness.

JEL codes: B26, C43, G11, G12, G14, Z11.

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I. Introduction

A substantial and growing literature examines the risk-return properties of art as an asset class (e.g., Stein (1977), Baumol (1986), Goetzmann (1993), Mei and Moses (2002), Renneboog and Spaenjers (2013), Korteweg, Kräussl, and Verwijmeren (2015)). Such studies typically construct price indexes for the art market based on publicly available information from auction transactions—either through hedonic regressions that track quality-adjusted price levels over time, or through repeated-sales regression methods that estimate average price changes in the market based on returns on objects trading more than once within the sample period. However, an important question is whether changes in transactions-based price indices are representative of the returns realized by collector-investors or instead give a biased view on the past performance of the art market.

The concern about representativeness mainly arises from the fact that sale decisions and reservation prices can be endogenous to recent price appreciation (Goetzmann (1996), Korteweg, Kräussl, and Verwijmeren (2015), Lovo and Spaenjers (2015)), as is also the case for other illiquid assets like real estate and venture capital (Goetzmann and Peng (2006), Korteweg and Sorensen (2010, 2014)). Indexes might suffer from longer-run survivorship bias as well, if artists that have fallen out of fashion never re-enter the art market.[1] One way to deal with the fact that at any point in time most art values remain invisible to the econometrician is to model the nature of the selection bias in observed transaction prices. In the spirit of recent research (Cochrane (2005), Korteweg and Sorensen (2010), Ang et al. (2014)) on the returns to venture capital and private equity investments, Korteweg, Kräussl, and Verwijmeren (2015) correct for sample selection bias in observed art auction transactions using a dynamic Heckman model and find repeated-sales return estimates that are significantly lower than the uncorrected ones.

In this paper, we take an entirely different approach: we analyze the performance of an actual invested buy-and-hold art portfolio. The approach of tracking the value of one particular collection over time has

[1] It is not clear to what extent artists really disappear from the market. Graddy (2013) finds that a 300-year-old quality ranking of artists has held up well over time—taste, she argues, “endures”. Goetzmann (1996) shows that the rate of obsolescence in the auction market is not very large. Deaths and liquidity shocks may make all artworks (re)trade at some point, in which case long-term return estimates should be unbiased (Lovo and Spaenjers (2015)).

the important advantage that we can follow all artworks after the initial investment. There is thus no relationship between the likelihood of observing a valuation and prior return, and no need for an econometric model of sample selection.

A related problem that we can address by considering the performance of a complete collection concerns the different ways in which art can be acquired. Traditional art price indexes are based on auction sales only, even though private transactions through dealers and galleries make up about half of the art market's total turnover (McAndrew (2012)). Whether auction prices and private transaction values are aligned in the secondary (or resale) market may depend on whether negotiated prices between dealers and collectors anchor on auction results.[2] Furthermore, there can be a systematic difference between returns realized on purchases in the secondary market relative to those in the primary market (when an artwork first comes up for sale, typically through a gallery or the artist's studio). It is not unlikely that such a discrepancy exists given the different pricing conventions in the primary market.[3] In this paper, we will be able to compare returns to auction purchases with those realized on other acquisitions.

The art portfolio that we study is that of the economist John Maynard Keynes. Our paper is the first detailed analysis of the long-run performance of an actual art portfolio.[4] It is well known that Keynes (1883–1946) was an active investor in financial assets (e.g., Moggridge (1982), Fantacci, Marcuzzo, and Sanfilippo (2010), Accominotti and Chambers (2015), Chambers, Dimson, and Foo (2015)). Less well-known is that Keynes became an enthusiastic and avid collector of art, books, and manuscripts. As Davenport-Hines (2015) recounts, Keynes purchased artworks through various channels between 1917 and 1945, and bequeathed his entire art collection to King's College in Cambridge upon his death the following year. This collection consists of over a hundred pieces by various artists, including Modern

[2] For other collectible assets, such as investment-quality wine, there can be persistent differences between dealer and auction prices (Dimson, Rousseau, and Spaenjers (2015)).

[3] Prices in the primary market do not necessarily reflect the marginal buyer's willingness to pay. Moreover, all works in a show (at least those of the same size) are typically sold for the same price (Velthuis (2005)).

[4] To our knowledge, Landes (2000) is the only other study to examine the returns to an existing art portfolio, namely the collection of Victor and Sally Ganz. However, their collection was given a high-profile sale at Christie's precisely *because* it had become so valuable. We believe this ex-post selection issue to be much less relevant in our case: Keynes' claim to fame is unrelated to his activities as a collector.

Masters such as Braque, Cezanne, Matisse, Picasso, and Seurat, but also friends and acquaintances of Keynes such as Spencer Gore, Duncan Grant, and William Roberts. It has remained intact to the present day, with the pictures being hung at the College and at the Fitzwilliam Museum in Cambridge.

Our main data sources in this study are an extensive set of records held at the archives of King's College. The records contain a detailed list of all the pictures acquired by Keynes. For a majority of the works, we locate purchase prices and dates from Keynes' own invoices and correspondence together with a few purchase prices from alternative art historical sources. The archival records of King's College also contain multiple valuations and auction estimates post-dating Keynes' death. Moreover, we are able to procure expert appraisals of market value for the important works in the collection at the end of 2013.

We use our hand-collected data to compute the total expenditures by Keynes on his collection over the period 1917−1946, and to estimate overall valuations as of the years 1946, 1959, 1981, 1988, 2000, and 2013. The collection appreciated strongly over time: while Keynes' total expenditures amounted to less than 13 thousand British pounds, the collection had an estimated market value of more than 70 million pounds at the end of 2013. The purchase-price-weighted average annualized return across artworks equals 9.8% (4.7%) in nominal (real) terms. The performance of the Keynes collection since its constituents' acquisitions is almost identical that of equities. Returns appear to have been particularly high in the early decades following investment, suggesting that Keynes was often able to buy at attractive prices. Yet, even over the last half century the collection continued to appreciate at an annualized real rate of at least 4.2%. After procuring four additional valuations for the collection's most important works in 2013, we conclude that our estimate of its performance is robust to averaging across idiosyncratic elements in the valuation of individual art works.[5]

We then turn to examining the cross-sectional variation in returns realized by Keynes over his lifetime. We partition the collection in different ways, and find much lower annualized returns between acquisition and Keynes' death in 1946 on works that were bought on the primary market and on works

[5] While previous literature has studied the average predictive power of estimates in art auction markets (e.g., Louargand and McDaniel (1991), Bauwens and Ginsburgh (2000), Ashenfelter and Graddy (2002)), we are the first to look at differences of opinion across experts for the same artworks. We find substantial disparity in individual valuations—highlighting the need for sellers to seek multiple opinions—but valuations for the complete collection are relatively close to each other.

from lesser-known artists or artists with whom Keynes interacted socially. A regression analysis underlines the lower performance of purchases made directly from artists in the primary market.

Our findings regarding the performance of the Keynes collection yield a number of new insights regarding price indexes as a measure of the returns realized by art investors. First, our results indicate that the average return on works acquired at auction may lie substantially above the performance of works bought through galleries (and, to a lesser extent, through dealers). The implication is that price indexes based solely on auction transactions may overestimate the average realized returns of collectors, especially of those who also buy in the primary market.

Second, a striking feature of the Keynes collection is its high concentration. For example, the ten most expensive purchases sum to 80% of his aggregate expenditures on art. Changes in the total value of the collection have thus to a large extent been driven by price variation in the big-ticket items. In additional analysis, we document the high concentration of the art market more generally. We also show suggestive evidence that (contemporary) artist capitalizations follow a power law, implying that the art market may be "granular" (Gabaix (2011)), and that the returns to art as an asset class are largely driven by the price evolution of the most valuable artists. One implication is that an index based on the price levels of major artists—who are unlikely to fall so much in value that they no longer sell at auction at all—or on sales at large auction houses may therefore fairly accurately capture the evolution of the market portfolio. Interestingly, our conservative and survivorship-free estimate of the return to the Keynes collection after 1959 is indeed close to previous estimates of art market returns based on auction transaction samples. However, the high concentration of the art market highlights the importance of constructing value-weighted rather than equally-weighted indexes, especially when using large databases that also include many low-end transactions.

Third, an important element in the growth of the value of the Keynes collection over time is the stellar performance of one item. An analysis of returns on resales in the global art market over the last quarter century shows that art investment more generally has lottery-like features, i.e., positive skewness and excess kurtosis. Because of return skewness, a typical art investor may underperform the asset class as a whole.

Taken together, our findings suggest that collector-investors wanting to realize a return close to the performance of the asset class necessarily have to construct a diversified portfolio of relatively valuable works in the secondary market. This is of course only feasible for very wealthy individuals. Moreover, there is always a risk of missing out on the winning lottery tickets. At the same time, however, a preference for positive skewness may make underdiversification *attractive* to certain investors, and even partially explain the relatively low risk-adjusted returns to art on average (Barberis and Huang (2008)).

The remainder of this paper is structured as follows. Section II gives a short biography of Keynes the collector. Section III describes our dataset. Section IV analyzes the investment performance of the art portfolio. Section V draws lessons for academics and investors, and Section VI concludes.

II. Keynes the collector

There is no question that Keynes built up a very fine collection over his life. Following his death and that of his wife, Lydia, the artworks passed to Cambridge University's King's College, with the major items housed at the Fitzwilliam Museum in Cambridge. As with so many other buyers, a mixture of motives for acquiring art seems to have been at play in driving Keynes to collect as he did. Keynes had an innate love of the arts, enjoyed the company of artists, and was greatly influenced as to his tastes by the other members of the Bloomsbury Group—a collective of British intellectuals and artists. In addition, he was interested in art as an investment.

Keynes' time as a student in Cambridge demonstrates his early interest in fine art. In a 1905 paper entitled 'A Theory of Beauty', the 22-year old writes: "A fit object is one the contemplation of which *ought* to give rise to a state of mind which is good" (Skidelsky (2003)). In the same year, while in Paris, Keynes visits the Louvre five times, as well as the modern collections at the Palais du Luxembourg (Dostaler (2007)). His first small art purchases follow quickly; Scrase and Croft (1983) write that these acquisitions are "inspired either by personal acquaintance with the artist or by the example set by the behavior of his family and friends". During this time he continues his self-education in the visual arts, and in 1911 becomes a member of the Contemporary Arts Society (Scrase and Croft (1983)), for which he would later act as a buyer.

Keynes also plays a prominent role in the Bloomsbury Group through which he maintains close associations with such British painters as Duncan Grant and Vanessa Bell as well as Roger Fry, the influential art critic and inventor of the term "Post-Impressionism". Indeed, it is these three friends who give him the idea of attending the first sale of the private collection of Edgar Degas in Paris in 1918, with a view to acquiring Impressionist and Post-Impressionist artworks at knock-down prices for the British Treasury, but also to buy some for his personal collection (Munro (2003)). Keynes makes his first major purchases, namely a Cezanne and a Delacroix, at the sale. Cezanne's 'Apples' soon becomes an "object of pilgrimage" (Dostaler (2007)) for his Bloomsbury friends. In the following six years, he makes significant additional acquisitions of paintings by Matisse, Seurat (a study for 'La Grande Jatte'), Renoir, and Cezanne, and drawings by Degas, Modigliani, and Picasso. In many cases his artist friends again seem to play a key role in "inducing" Keynes to buy (Shone and [Duncan] Grant (1975)).[6]

His second wave of major acquisitions follows in the years 1935 and 1937, when Keynes purchases works by Renoir, Picasso, Braque, and Cezanne. Some are bought at the auction houses Sotheby's and Christie's, while others are purchased through art dealers such as Agnew, Wildenstein, and Reid & Lefevre. The Cezanne picture 'L'Enlevement', bought for £3,500 in 1935, is the most expensive acquisition Keynes ever makes, equivalent to about 25 percent of the aggregate lifetime cost of his art purchases.

Either side of this later period, Keynes does not make major foreign acquisitions. During the second half of the 1920s and the early 1930s, Keynes concentrates on becoming a patron of British artists, largely through the London Artists' Association, an organization established in 1926 whose mission was to provide promising artists with a guaranteed income. In these years, he buys works from friends and acquaintances he admired, such as Duncan Grant, Vanessa Bell, William Roberts, Raymond Coxon, and

[6] Nonetheless, Keynes' friends are not always impressed by his personal tastes. Shone and Grant (1975) write that Keynes "attempted to speak and pronounce upon painting on occasion with an authority that was ill-founded". Clive Bell "found his judgment of painters and works of art lamentable", and when Keynes buys a painting upon his own initiative in 1924, his friends remark that it is "the worst picture that Cezanne ever painted" (Skidelsky (2003)).

Walter Sickert. After 1937, and until his death in 1946, Keynes again limits his purchases to a few works by British artists.

Keynes certainly loved the arts, but there is more to his art collecting than an insistence that "wealth should not be hoarded but spent on civilized living" (Skidelsky (2003)). Indeed, Skidelsky questions "how much he really enjoyed pictures, as opposed to the idea of owning them, and supporting those who painted them". Hence, it is no surprise to find that Keynes "was also motivated in his purchases by the idea of art as an investment" (Scrase and Croft (1983)). Accordingly, he wrote that there is "a slight mystery about the prices" of paintings and that "the element of investment may not be entirely absent after all" (Dostaler (2007)). Furthermore, despite no evidence of a sale taking place, his correspondence shows that he considered selling certain artworks, so he definitely had a sense of his reservation prices.

III. Data

In this section we describe the composition of the Keynes collection, explain how we compiled a record of the acquisition cost for each item in the collection, and provide information on the appraised values for the artworks at various dates since Keynes died.

III.1. The Keynes collection

The departure point for our data collection is the 1959 memorandum on the Keynes collection prepared by Richard Kahn, who succeeded Keynes as the bursar of King's College in 1946. This document provides information on the artist, title, and size for all 135 pieces in the collection (Keynes Picture Bequest, pp. 4−13). The memorandum groups together artworks according to their year-1959 location. It includes 26 pictures held at King's College, 23 works on loan to the Fitzwilliam Museum, 85 in the Fitzwilliam picture reserve, and a portrait of Keynes by Duncan Grant on loan to Milo Keynes. Table 1 summarizes the distribution of artworks by artist. In keeping with Keynes' career as a collector described in the previous section, it is not surprising that the collection contains many works by Bloomsbury artists and friends such as Grant, Bell, and Roberts, and items by Impressionist and Post-

Impressionist artists such as Braque, Cezanne, Degas, and Picasso.[7] Table 1 also shows whether the artist was included in the first edition of the influential art history textbook *Art Through the Ages*, published in 1926 (Gardner, 1926), and in the second, revised edition, published ten years later (Gardner, 1936). It becomes clear that many of the Continental European artists bought by Keynes were becoming internationally renowned around the time that he bought them.

[Insert Table 1 about here]

In 1983, the Fitzwilliam Museum organized the exhibition 'Maynard Keynes: Collector of Pictures, Books and Manuscripts' displaying 85 out of the 135 works in the Keynes collection. The exhibition catalogue (Scrase and Croft (1983)) provides detailed background information on each of these works.

III.2. Purchase prices

Having established the artworks in the collection, we search for the prices Keynes paid for its different constituents. Our main source of information is the invoices, correspondence, and other documents in Keynes' personal archive (Personal Papers—Papers Regarding Paintings and Sculpture). From this source, we match his recorded purchases with the artworks in the collection by comparing artist name, title, and year of creation. Further purchase prices are discovered from other sources. We consult the relevant sales catalogues in the archives of Christie's and the National Art Library in London in the case of the three purchases made at Christie's and Sotheby's where we only have the sale date, lot number, and price from the auction house invoice. In addition, the prices paid by Keynes for his seven personal purchases at the Degas sales in March and April 1918 are recorded in his collection of sales catalogues (Personal Papers—Picture Sale and Exhibition Catalogues). Finally, five price matches were made through the following sources: the accounts book of the London Artists' Association (Personal Papers—London Artists' Association Account Books); a catalogue accompanying an exhibition of works of

[7] The Courbet on the 1959 list was later attributed to Thomas Couture. The drawing attributed to Ingres was later attributed to "after Degas" and then to "Degas, after Ingres".

William Roberts (Reid & Lefevre (1935));[8] and our personal correspondence with David Scrase of the Fitzwilliam Museum.[9]

We make two comments on the determination of purchase prices. First, five of the purchases took place in French francs. In these instances, we convert the price to British pounds using either the exchange rate used by Keynes, or a historical exchange rate from Mitchell (1988). Second, sometimes the disclosed purchase price covered the acquisition of more than one work. To determine the price of the individual items, we either use the breakdown mentioned in Keynes' correspondence, or otherwise divide the total price in equal parts.

In total, we are able to identify purchase prices for 73 out of the 135 works. Table 1 summarizes the number of prices that we find for each artist. Many of the items for which we do not have a purchase price are by artists in Keynes' social circle. There are, for example, 19 works by Duncan Grant and four by Vanessa Bell without any documentation on their purchase; at least a handful of these items were gifts (Scrase and Croft (1983)). Other works without a purchase price have always had virtually no financial value, such as two photographs of frescoes by Signorelli, a map of the county of Sussex, and a number of anonymous oil paintings. A focus on the artworks for which we identified purchase prices should thus permit an accurate estimation of the evolution of the collection's overall value. This view is reinforced by the observation that items for which we have purchase prices accounted for more than 95% of the probate valuation of the collection in 1946, and include all 23 works that were on view at the Fitzwilliam Museum shortly after Keynes' death. (In any case, the availability of transaction information in Keynes' correspondence should be uncorrelated to subsequent price appreciation, mitigating worries about selection bias in our return estimates.)

Based on his known expenditures, Keynes invested a total of £12,847 in his art collection. Table 2 shows the annual time series of his expenditures between 1917 and his last known purchase in 1945, and

[8] Three works by Roberts went to Keynes after the show to liquidate the artist's outstanding debt (Roberts (1990)). We use the exhibition prices of these paintings.

[9] One of the remarkable items in the collection is a cubist still life by Georges Braque. David Scrase, who curated the Fitzwilliam exhibition of the Keynes collection, recalled that the Braque was bought by Duncan Grant in a bookshop in Berlin in the early 1920s for 30 shillings. Shone and Grant (1975) confirm the location of the purchase but not the price.

also lists the most expensive purchase in each year. Consistent with our description of the evolution of the Keynes' collection in Section II, the table depicts two main bursts of buying: the years immediately following the end of the First World War and, especially, the mid-1930s. (The purchase-price-weighted average acquisition year equals 1933.) Both periods coincide with years in which Keynes' wealth grew strongly. Scrase and Croft (1983) argue that Keynes' year-1919 purchases were paid for out of profits from the sales of the French edition of 'The Economic Consequences of the Peace'. Skidelsky (2003) writes that, in 1919, Keynes "earmarked some of his first profits from currency speculation for buying pictures", and that by 1935 Keynes was again making profits on the stock market.

[Insert Table 2 about here]

III.3. Valuations subsequent to Keynes' death

A detailed probate valuation was made upon Keynes' death in 1946 by Percy Moore Turner. This document, provided to us by Professor Simon Keynes, grandnephew of the economist John Maynard Keynes, includes valuations for 112 out of the 135 artworks in the collection. Following his death, large parts of the collection were valued multiple times. In 1959, the reputable London art dealer Agnew & Sons valued 105 items in the collection for insurance purposes (Keynes Picture Bequest, pp. 119−129). In 1981, Agnew carried out a near-complete valuation of the collection—131 out of the 135 artworks (ibid., pp. 155−162). In 1988, an insurance valuation under the Government Indemnity Scheme (ibid., pp. 387−390) covered the works lent by King's College to the Fitzwilliam Museum. Auction house Sotheby's carried out a new valuation for insurance purposes of 44 works in 2000, to which we were given access by King's College and the Fitzwilliam.

III.4. Open market valuations at end-2013

In order to obtain an estimate of the contemporary market value of the Keynes collection, we commissioned a valuation from the art advisory and valuation firm Gurr Johns. This resulted in valuation estimates for 27 important works. We also procured four more independent open market valuations from the art market research firm ArtTactic, the art advisory firm and valuer Dickinson, and each of the leading auction houses Christie's and Sotheby's, for the 15 works with the highest 1988 insurance valuations. We provided each of the valuers with a copy of the 1983 exhibition catalogue, but we did not give them access to prior appraisals. We did not inform them of our strategy of seeking multiple estimates for the same pictures.

IV. Empirical findings

In this section, we look first at the growth in the value of the Keynes collection over time. We then check the robustness of our investment performance estimate to the choice of valuer. The section concludes with an in-depth evaluation of the cross-sectional distribution of returns.

IV.1. The investment performance of the Keynes collection

Starting with the 73 works for which we have purchase prices, we compute Keynes' aggregate nominal expenditure over the period 1917−1946. We also estimate the aggregate year-1946, year-1959, year-1981, year-1988, year-2000, and year-2013 valuations, by dealing with missing valuations as follows. If we observe both an earlier and a later valuation, we impute a value by using the median proportion of price appreciation between the two outer dates that is realized by the middle date.[10] For example, among the works for which we have valuations in 1981, 1988 and 2000, a median of 37.5% of the 1981–2000 appreciation is realized by1988, and we use this to impute a year-1988 value for cases where we have a year-1981 and a year-2000 valuation. If we only have a later valuation, which is the case for a handful of works in 1946 and 1959, we use the observed median price ratio between the earlier and the later date to impute a value. If we only observe an earlier valuation, which is often the case in the later years, we update the last available valuation using inflation data from Dimson, Marsh, and Staunton (2002, 2015).

[10] In one case the later valuation is below the earlier valuation, because of a change in attribution. We impute a value using geometric interpolation.

We take this conservative approach because items that are no longer valued may have underperformed the other works.

Table 3 shows the resulting evolution of the estimated value of the Keynes collection. The collection grew in value from a total purchase price of £12,847 to an estimated market value in 2013 of £70.9 million. Crucially, as Table 3 makes clear, the items for which we directly observe valuations—and thus do not have to impute them—account for more than 95% of the total estimated value of the collection at all valuation moments. The valuation of the collection is therefore robust to reasonable changes in the method of imputing missing values. The growth in the value of the Keynes collection over time is also graphed in Figure 1.

[Insert Table 3 and Figure 1 about here]

While the year-2013 valuations reflect what the works can be expected to sell for in the open market (i.e., at auction), the previous valuations are of slightly different natures—and should not necessarily be considered as unbiased estimates of market values. The year-1946 probate valuation is likely to have been a conservative one, as it was not yet clear at the time whether death duties on the picture bequest would have to be paid. The year-1959, year-1981, and year-2000 valuations were performed for insurance purposes. Such insurance valuations typically reflect the cost of immediately replacing the artwork with a comparable object, and therefore are often higher than market valuations. By contrast, the estimate for 1988 should probably be considered as a lower bound on the prevailing true market value of the collection. Government Indemnity Scheme valuations may lag market movements, and prices in many segments of the art market went up dramatically in the second half of the 1980s.

Figure 1 also compares the estimated value of the collection to two different benchmarks in 1946, 1959, 1981, 1988, 2000, and 2013. First, we compute the real value of Keynes' art expenditures in each of these years by utilizing the U.K. inflation series from Dimson, Marsh, and Staunton (2002, 2015). Second, we estimate the total values assuming Keynes had invested in U.K. equities instead of art, by mimicking the amounts and timing of his actual expenditures. For this exercise, we use data on equity returns including reinvested dividends from Dimson, Marsh, and Staunton (2002, 2015).

What can we say about the long-term returns to the Keynes collection based on the valuations represented in Table 3 and Figure 1? The purchase-price-weighted (equally-weighted) average individual artwork return between acquisition and 2013 was 9.8% (8.6%) in nominal terms and 4.7% (3.9%) in real terms. If Keynes had invested the money of each of his outlays on art in equities instead, the year-2013 value of these investments would have been only slightly higher, namely £74.6 instead of £70.9 million. Moreover, it seems that only over the last 25 years this hypothetical equity portfolio has started to outperform the actual art investments. Both the (potentially aggressive) 1959 and 1981 valuations and the (conservative) 1988 valuations far exceed the equity market benchmark. (The 1946 probate valuation may have been biased substantially downwards, and still was close to the value of the hypothetical equity investment.) So the returns to Keynes' art were particularly impressive shortly after purchase, suggesting that Keynes occasionally bought at attractive prices.[11] But the collection continued to perform well as an investment afterwards. Based on the 1959 and the 2013 valuations, we conclude that the collection has appreciated at an annualized real rate of at least 4.2% over the last half century—an average return that is only 1.8% below that of equities over the same period.

IV.2. Robustness to alternative valuations

Our findings reported so far were largely based on end-2013 appraisals received from one expert. However, art is unlike seasoned securities for which there is a publicly quoted price that can be used for valuation purposes, and more like securities issued for the first time at IPO which rely on the opinions of expert investors to reach a valuation. We therefore evaluate the robustness of our estimate of the collection's performance to averaging idiosyncratic elements in the valuation of individual art works. As

[11] The collection's performance over the early years also far exceeds previous estimates of the returns in the art market over the same period. The analysis in section IV.3 clarifies that this outperformance was driven by the (secondary market) purchases of artworks by Modern artists. Keynes was of course well-connected, and often acted on the advice of friends as to what and when to buy. For example, it was Duncan Grant and Vanessa Bell who convinced Keynes to attend the auction of the Degas collection in Paris in 1918, advised him to buy a Matisse and a Seurat when they were for sale in London in 1919, and bought a Braque for Keynes in Berlin in 1924. These acquisitions all turned out to be among Keynes' best-performing art investments, which suggests tentatively that market insiders may be able to outperform the average investor by buying undervalued items—as art funds tend to claim (Horowitz (2011)), and which would imply that Swensen (2009)'s general claim that illiquid asset markets contain profitable speculation opportunities for skilled investors is applicable to art.

explained before, we asked another four experts to value the collection's 15 most important pictures based on their 1988 valuation (when taken together they accounted for more than 90% of the collection's total value). Figure 2 shows the spread (i.e., highest minus lowest) of valuations for each of these artworks. There is considerable disparity: the average spread-to-mean ratio is above one.[12] However, when aggregating across the 15 selected artworks, the relative dispersion in valuations is much smaller, as also shown in the same figure. (This relates to the fact that the rank order of valuers is not always the same.) Replacing the Gurr Johns' valuations used before with the average valuations across the five different valuers does not materially change our estimate of the long-term performance of the collection. For example, the purchase-price-weighted average annual nominal return since purchase would be lowered by only 0.1%.

[Insert Figure 2 about here]

IV.3. Cross-sectional variation in performance

To understand better the drivers of the performance of the portfolio, especially in the initial years following investment, we examine in more depth the cross-sectional distribution of returns. Panel A of Figure 3 graphs for each of the 73 artworks the 1946 real value of each purchase price on the horizontal axis and the 1946 valuation on the vertical axis. The least (most) expensive purchases—in real terms—are located near the left (right) of the graph. The least (most) valuable items in 1946 are located towards the bottom (top) of the graph. Observations above (below) the diagonal line represent artworks for which the probate valuation in 1946 was above (below) the inflation-adjusted purchase price. We can observe a lot of variation in estimated returns, especially for low and middle purchase price levels. Panel B repeats the same exercise post 1946. There is less variance in return estimates, even if some pieces did exceptionally well.

[Insert Figure 3 about here]

[12] One of the valuers also provided us with a list of recent auctions of "comparable" works for each of the selected items in the Keynes collection. However, we do not find evidence of a negative correlation between the availability of price information and dispersion in valuations.

The large variation in estimated returns up to 1946 is not necessarily surprising, because we are comparing appraised values in 1946 to actual transaction prices at purchase. Just like housing prices (Case and Shiller (1987)), art purchase prices contain a transaction-specific random component that appraisals lack. This can also be illustrated by the observation that, even though pre-sale auction estimates are on average correct, the average absolute deviation of the highest bid from the pre-sale estimate can be substantial (McAndrew and Thompson (2007)). If transaction prices contain a random element, then there will always be some purchases that turn out to be better "deals" than others. The more interesting question is therefore whether we can see systematic patterns in the cross-section of individual artwork return.

In Panel A of Table 3, we partition the collection in three ways, and compare annualized real returns between purchase and 1946. First, we consider three channels of purchase. Like other art buyers, Keynes acquired some art through auctions (e.g., Christie's, Georges Petit),[13] some through secondary market dealers (e.g., Goupil or Wildenstein, but also smaller players), and some on the primary market (e.g., at galleries or shows, or through the London Artists' Association).[14] Second, we examine whether there is a return difference according to whether Keynes knew the artist personally or not.[15] Keynes' activity in organizations like the London Artists' Association showcases the importance he attached to supporting artists. Skidelsky (2003) notes that also his personal purchases were often made "out of loyalty" to his

[13] Somewhat atypically, a few of the auction acquisitions are not secondary market purchases: at the sale of Degas' collection in Paris in 1919, Keynes also bought works by Degas himself. Yet, we are really interested in the sale mechanisms in the art market, and therefore we group these acquisitions with other auction purchases.

[14] Because of the existence of commercial galleries that were active on both the primary and the secondary market, it is not always straightforward to classify the non-auction purchases. We generally assume acquisitions to be secondary market ones if the work was more than a few years old at the time of purchase, or if we have evidence of a non-gallery owner prior to Keynes' acquisition.

[15] We consider the following artists as part of Keynes' social circle: Bell, Coxon, Davidson, Derain, Dobson, Fry, Grant, Hitchens, Picasso, Pitchforth, Porter, Roberts, and Sickert. Keynes met Derain and Picasso at a party that he co-hosted (with Clive Bell and Duncan Grant) in 1919, when the artists were in London with the Ballets Russes, for whom they designed sets and costumes. (Picasso would also draw Lydia Lopokova, dancer at the Ballets and later Mrs. Keynes, on multiple occasions.) Yet, Picasso and Derain were arguably much less close to Keynes than the others in the list above, and classifying them outside of Keynes' social circle would magnify the return difference documented in Panel A of Table 3.

friends.[16] Third, we look at whether or not the reputation of the artist affected returns. We define reputation by inclusion or otherwise in a well-regarded art history textbook (Gardner, 1926) written in the early years of Keynes' career as a collector.

[Insert Table 4 about here]

The results in Panel A of Table 4 show that Keynes realized the highest initial returns on art bought at auction, and to a lesser extent on art bought through dealers. Most of this was art by (Post-)Impressionist artists from continental Europe, such as Braque, Cezanne, Degas, Picasso, Renoir, and Signac (and predecessors like Courbet and Delacroix), some of whom were already sufficiently recognized to be included in an art history textbook. Acquisitions in the primary market and of works by lesser-known artists that were friends and acquaintances turned out to be much less profitable financially. (It is worth re-emphasizing that the 1946 valuation is probably a very conservative one and hence our focus is on the differences in returns across different groups of artworks.)

To separate out the different drivers of performance, we perform a regression explaining annualized real returns in Panel B of Table 4. We cluster standard errors on the level of the artist. The first column shows that estimated returns are strongly significantly lower for purchases in the primary market. The second column shows that this result is robust to controlling for five-year purchase period dummies that control for variation in the average price level in the art market at the time of acquisition. After controlling for this purchase channel effect, returns remain lower on works of less famous artists and artists that Keynes interacted with, but not in a statistically significant way.

Both panels of Table 4 also repeat the analysis for the period 1946–1959. As expected, we see much less variation in returns, and the method of purchase no longer helps to explain the variation in price appreciation over this later period. Also the R-squared of the regression is much lower than before.

[16] In 1940, Keynes would comment on three purchases as Sotheby's as follows: "I was supporting the market for three old friends whom I endeavoured to keep going over a period of years at very large cost to my own income" (Personal Papers—Papers Regarding Paintings and Sculpture).

V. Discussion

In this section, we link our empirical findings to the existing knowledge on the measurement of returns in the art market. This allows us to draw lessons for academics studying the market for artworks and other collectibles, and also for collector-investors.

V.1. The importance of the purchase channel

It is clear from Table 4 that the returns realized on purchases at auction may differ in a systematic way from the returns realized on acquisitions through other channels. In particular, the difference in performance relative to primary market purchases may be substantial. Therefore, indexes solely based on auction transactions may not accurately capture the average collector's realized returns. This will of course be especially relevant to collectors of very recent art, where the primary market is important.

V.2. Concentration in the art market

Keynes' art portfolio has always been highly concentrated. The ten most expensive purchases accounted for 80% of his total investments. In 2013, two works account for more than half of the value of the 73-work collection, while the ten most valuable items make up 91% of the total value. This implies that, today, changes in the total value of the Keynes collection are largely driven by changes in the market value of a few artists, such as Braque, Cezanne, Matisse, Picasso, and Seurat. Conversely, what happens to all the lesser-known artists—for example, whether they disappear completely from the secondary market—is not an important driver of returns.

Is the concentration of the Keynes collection reflecting a feature of art as an investment more generally? One approach to evaluate the concentration in the "market portfolio" of art would be to examine the value composition of a large sample of collections, but such data are generally not available. However, the recent financial woes of the city of Detroit led to a number of appraisals of the artworks owned by the Detroit Institute of Art (DIA)—a first-class collection worth billions of dollars. When auction house Christie's valued the 2,773 artworks purchased by the City of Detroit for the DIA, it estimated that just

11 works (fewer than 0.5 percent of the total) accounted for 75 per cent of the overall appraised value (Christie's (2013)). Another valuer looked at the other constituents of the DIA collection (e.g., gifts) and concluded that out of a total of 57,604 works, 350 items (just over 0.5 percent of the total) accounted for about two thirds of their overall value (Artvest (2014)).

An alternative approach to evaluating the concentration in art as an asset class is to consider the concentration of sales across contemporary artists. The output of contemporary artists is typically still being traded very actively at auction, and the concentration in *transactions* may therefore give us an estimate of the concentration in total *value*. Artprice (2014b) reports that in the contemporary art auction market, three artists accounted for 22% of market turnover in 2013. The average price for these top three artists—Basquiat, Koons, and Wool—is over one million euros, even though 66% of all contemporary lots in the world sell for less than 5,000 euros. Based on the data for the 500 best-selling contemporary artists, Figure 4 shows the (log) turnover-based rank of each artist against his or her (log) turnover at auction. We see a near-linear relationship between the two variables, which is confirmed by the results of an OLS regression of log rank on log turnover: the slope coefficient is equal to –0.85, and the R-squared equals 0.99.

[Insert Figure 4 about here]

Such an inverse proportional relation between log rank and log turnover indicates the existence of a power law—an empirical regularity found before in city and firm sizes, and in other economic and financial measures (Gabaix (2014)). If the distribution of artist capitalizations indeed follows a power law as well, then the (contemporary) art market portfolio is extremely skewed and poorly diversified.[17] The art market thus appears to be "granular" (Gabaix (2011)): it may have the same level of diversification as an *equally-weighted* portfolio of only a few dozen artists—in just the same way that a supposedly well-diversified market portfolio of 8,000 stocks may be equivalent to an equally-weighted portfolio of not more than 20 firms (Malevergne, Santa-Clara, and Sornette (2009)).

[17] The (contemporary) art market may be even less diversified than the equity market portfolio. Previous studies (e.g., Axtell (2001)) have found that firm market capitalizations follow a Zipf distribution, which is a special case of the power law with an exponent of 1. A lower power law exponent indicates a higher degree of inequality in the distribution.

If a relatively small set of superstar artists make up a disproportionately large fraction of the value of the art market portfolio, a price index that tracks the works of those artists can be expected to capture rather accurately the evolution of the market portfolio—and also of collections containing a large number of superstar artists. This is especially true because the demand for the most expensive art contains a systematic component linked to wealth and income inequality and the demand for luxury consumption (Goetzmann, Renneboog, and Spaenjers (2011)). Interestingly, our (conservative) estimate of 4.2% of the annualized real return to the Keynes collection after 1959 is indeed close to previous estimates of the performance of the art market based on selective samples of auction data. For example, the high-end London art market index of Goetzmann, Renneboog, and Spaenjers (2011), when linked to an index of Artprice (2014a), shows an annualized real return of 4.1% between 1959 and 2013.

One issue, however, is that most art price indexes are equally-weighted instead of value-weighted. The more concentrated the asset category, the larger the potential for a discrepancy between the returns as estimated by an equally-weighted index and the returns to the market portfolio. Equally-weighted indexes have the additional drawback that they are particularly hard to interpret in the context of (indivisible) artworks.

V.3. Skewness in art returns

A close study of the Keynes collection also points to the importance of recognizing the role of positive outliers in driving overall performance. For example, in Panel B of Figure 3, we can see one item that has a year-2013 valuation of 20 million pounds, while the inflation-adjusted year-1946 value was £15,460. Several other works appreciated from a real value of less than £200 to £300,000–380,000, translating into even higher annualized rates. We do not discern negative outliers of such magnitude. More generally, if we consider the annualized real returns between 1946 and 2013 on the items in the Keynes collection, we find a skewness of 0.76 (and a kurtosis of 3.60).

Does art investment more generally display positive skewness? To answer this question, we use data on resales of identical artworks between 1982 and 2007, taken from Renneboog and Spaenjers (2013) and

Lovo and Spaenjers (2015). Figure 5 shows a histogram of the annualized real returns, where we limit our analysis to real purchase prices above the 90th percentile, in order to focus on the works that drive the art market as a whole. Also, by looking at elevated starting prices, we hope to mitigate the worry that we are only capturing winners: at these price levels items will still be trading at auction even if they lose value.[18] In this sample of 878 resales, skewness equals 1.04 (while kurtosis exceeds 6). Because of return skewness, a typical art investor may underperform the asset class as a whole.

[Insert Figure 5 about here]

V.4. Implications for collector-investors

For collector-investors, our findings suggest that those wanting to realize a return close to the performance of art as an asset class will have to construct a diversified portfolio of relatively valuable works in the secondary market. Such a portfolio is of course out of reach for all but the most wealthy of individuals. Moreover, the positive skewness in artwork returns implies that there is always a risk of missing out on the winning lottery tickets. However, it should also be recognized that positive skewness may have the effect of making underdiversification *attractive* to certain investors (Goetzmann and Kumar (2008)). Preference for positive skewness on the part of investors may even be seen as a reason for the low returns to art on average (Barberis and Huang (2008)), just like it might partially explain the low returns to private equity (Moskowitz and Vissing-Jørgensen (2002)). Long-shot artworks, such as those by possibly emerging artists, may be especially overpriced.

[18] Lovo and Spaenjers (2015) create a subset of the database compiled by Renneboog and Spaenjers (2013), focusing on the transaction pairs with the best matches. The results are similar without the purchase price filter. In the analysis shown here we also dropped three works with an annualized return above 100%. Positive skewness and excess kurtosis is also found in the distribution of annualized real returns in the (smaller but much longer-term) sample of resales of Goetzmann, Renneboog, and Spaenjers (2011).

VI. Conclusion

This paper examines the long-run investment performance of the art collection of John Maynard Keynes. We view the method of analyzing an actual portfolio—and exploiting rich time-dated purchase price and expert valuation data—as complementary to the traditional approach of estimating price indexes using auction prices only, yielding additional insights into the historical returns realized by art collector-investors. We find that, in the first years following Keynes' purchases, his art portfolio strongly outperformed the equity market. Our results suggest that informed art investors can do well in the art market by identifying particularly attractive entry prices. After the late 1950s, the collection continued to appreciate in real terms, even if it did not do as well as equities. Our estimate of the Keynes collection's performance over the last half century is similar to previous art market return estimates based on auction sales data. At the same time, however, the variation in returns across the constituents of Keynes' portfolio illustrates a number of potential issues with auctions-based price indexes: (i) the returns to purchases at auction can differ from those to other types of acquisitions; (ii) because of the high concentration in the art market, an equally-weighted index may provide a biased view of art's performance; (iii) the positive skewness in returns implies that the typical (underdiversified) art investor underperforms the market.

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Table 1. Artists in the Keynes collection

This table shows the composition of the art collection bequeathed by John Maynard Keynes upon his death in 1946. It also shows the distribution of purchase price data points across artists. The last two column indicate whether the artist was included in the 1926 and 1936 editions of the art history textbook *Art Through the Ages* (Gardner, 1926, 1936). More information on our data collection procedure can be found in Section III of this paper.

Artist	# items	# purchase prices	1926 textbook?	1936 textbook?
Atkin	2	0	—	—
Baynes	2	0	—	—
Bell	6	2	—	—
Braque	2	2	—	yes
Brzeska	1	0	—	—
Bussy	1	1	—	—
Calligan	3	0	—	—
Cezanne	4	4	yes	yes
Courbet	1	1	yes	yes
Coxon	3	2	—	—
Daumier	2	0	yes	yes
Davidson	1	1	—	—
Degas	4	4	—	yes
Delacroix	3	3	yes	yes
Derain	3	2	—	yes
Dobson	1	1	—	yes
Friesz	1	1	—	yes
Fry	2	2	—	yes
Gore	2	2	—	—
Grant	27	8	—	—
Hall	1	0	—	—
Hitchens	3	1	—	—
Ingres	1	1	yes	yes
Knight	1	1	—	—
Lhote	1	1	—	—
Lurcat	1	1	—	—
Malkine	1	0	—	—
Marchand	1	1	—	—
Matisse	1	1	yes	yes
Modigliani	2	2	—	yes
Moore	3	0	—	—
Picasso	4	3	yes	yes
Pitchforth	2	1	—	—
Porter	4	1	—	—
Renoir	2	2	yes	yes
Roberts	14	13	—	—
Seurat	1	1	—	yes
Sickert	4	3	—	—
Signac	1	1	—	yes
Smith	1	0	—	—
Swanwick	1	0	—	—
Taylor	1	0	—	—
Wiertz	1	0	—	—
Woolfe	1	0	—	—
Unknown / N.A.	11	3		
TOTAL	135	73	8	17

Table 2. Keynes' annual art purchases and net assets in nominal GBP

This table shows the number of purchases (for which we have price data) by John Maynard Keynes between 1917 and 1945. It also shows Keynes' expenditures, in nominal British pounds, and his most expensive acquisition for each year. More information on our data collection procedure can be found in Section III of this paper. The table also shows some key events in Keynes' life.

Year	# purchases	Expenditures (£)	Most expensive acquisition
1917	1	10.0	Duncan Grant, 'The kitchen', £10, Omega Workshops
1918	2	448.7	Cezanne, 'Still life with apples', £370.5, 1st Degas sale
1919	12	776.3	Seurat, 'Study for La Grande Jatte', £400, Chelsea Book Club
1919	Keynes publishes 'The Economic Consequences of the Peace'		
1920	6	510.1	Renoir, 'A young boy', £285.9, Galerie Vildrac
1921	0	0.0	
1922	4	253.3	Sickert, 'The bar parlour', £125, London Group
1923	0	0.0	
1924	5	846.6	Cezanne, 'Uncle Dominique', £600, Goupil Gallery
1924	Keynes becomes bursar of King's College		
1925	0	0.0	
1925	Keynes marries Lydia Lopokova		
1926	2	11.6	Dobson, 'Nude back view', £8.4, London Artists' Association
1927	3	84.0	Duncan Grant, 'Still life, flower and jug', £63, London Artists' Association
1928	4	170.4	William Roberts, 'Labourers, £100, London Artists' Association
1929	0	0.0	
1930	2	42.0	Raymond Coxon, 'Village street', £31.5, London Artists' Association
1931	8	46.6	William Roberts, 'Boy wearing a sun-hat', £15.8, London Artists' Association
1932	2	55.3	William Roberts, 'Lord and Lady Keynes', £50, commissioned
1933	0	0.0	
1934	3	282.5	Vanessa Bell, 'Interior with figures', £157.5, Reid & Lefevre
1935	5	4,003.6	Cezanne, 'L'enlevement', £3,500, Reid & Lefevre
1936	1	22.0	Lurcat, 'Still life, flowers in vase with sea in background', £22, Reid & Lefevre
1936	Keynes publishes 'The General Theory of Employment, Interest and Money'		
1937	8	4,953.7	Cezanne, 'Undergrowth', £3,000, Wildenstein
1938	3	157.5	Three works by William Roberts, £52.5 each, Reid & Lefevre
1939	0	0.0	
1940	0	0.0	
1941	0	0.0	
1942	0	0.0	
1943	1	78.8	Spencer Gore, 'The toilet', £78.8, Redfern Gallery
1944	0	0.0	
1945	1	94.5	Duncan Grant, 'Cattle in a shed', £94.5, Ernest Brown & Phillips
1946	Keynes dies at the age of 62		

Table 3. The value of the Keynes collection over time in nominal GBP

This table shows the total expenditures by John Maynard Keynes on his art collection over the 1917−1946 time period, and the estimated total value of the collection in 1946, 1959, 1981, 1988, 2000, and 2013, in nominal British pounds. It also shows the number of directly observed valuations, and the proportion of the total estimated value of the collection that these non-imputed values represent, for the same years.

Year	Estimated value of collection (£)	Type of valuation	Imputed as % of total estimated value
1917-1946	12,847	Expenditures	0.0%
1946	31,411	Probate valuation	4.1%
1959	382,575	Insurance valuation	0.6%
1981	4,002,231	Insurance valuation	0.0%
1988	11,301,712	Government Indemnity Scheme	4.1%
2000	41,167,003	Insurance valuation	2.9%
2013	70,858,041	Open market valuation	1.5%

Table 4. Cross-sectional variation in performance

Panel A of this table shows the median, equally-weighted average, and value-weighted average annualized return, in real British pound terms, between purchase and 1946 and between 1946 and 1959, for the Keynes collection as a whole and for different subsamples. Panel B runs a set of ordinary least squares regressions explaining annualized real returns. Standard errors are clustered on the artist level.

Panel A. Comparison of annualized real returns

		Purchase → 1946			**1946 → 1959**		
	N	Median	EW avg.	VW avg.	Median	EW avg.	VW avg.
All	73	–2.4%	–1.9%	–1.3%	12.7%	14.4%	14.5%
Auction	21	7.3%	7.2%	8.2%	13.8%	13.3%	15.6%
Secondary market ex auction	12	2.3%	1.8%	–0.5%	16.8%	17.1%	14.7%
Primary market	40	–5.9%	–7.8%	–12.1%	12.3%	14.2%	10.5%
No social interactions with artist	38	4.5%	4.2%	0.0%	12.5%	13.3%	14.2%
Social interactions with artist	35	–4.8%	–7.0%	–9.9%	13.2%	15.3%	17.6%
Artist not in year–1926 textbook	58	–4.5%	–4.9%	–7.5%	12.6%	13.6%	14.4%
Artist in year–1926 textbook	15	7.3%	9.8%	0.1%	18.3%	17.7%	14.6%

Panel B. Regression analysis explaining annualized real returns

	Purchase → 1946		**Purchase → 1946**		**1946 → 1959**
Secondary market ex auction	–0.098		–0.058		0.032
	(0.060)		(0.068)		(0.031)
Primary market	–0.103	***	–0.108	***	0.006
	(0.037)		(0.034)		(0.038)
Social interactions with artist	–0.060		–0.021		0.040
	(0.043)		(0.046)		(0.025)
Artist in year–1926 textbook	0.104	*	0.103		0.049
	(0.061)		(0.068)		(0.033)
Five–year purchase period dummies?	No		Yes		No
N	73		73		73
R^2	0.25		0.66		0.08

Figure 1. The value of the Keynes collection over time in nominal GBP

This figure shows the total expenditures by John Maynard Keynes on his art collection over the 1917−1946 time period, and the estimated total value of the collection in 1946, 1959, 1981, 1988, 2000, and 2013, in nominal British pounds. It also shows for the same years the real value of the total expenditures, and the total value of investments mimicking Keynes' art purchases in equities. More information on our data collection procedure can be found in Section III of this paper. Data on U.K. inflation and equities come from Dimson, Marsh, and Staunton (2002, 2015).

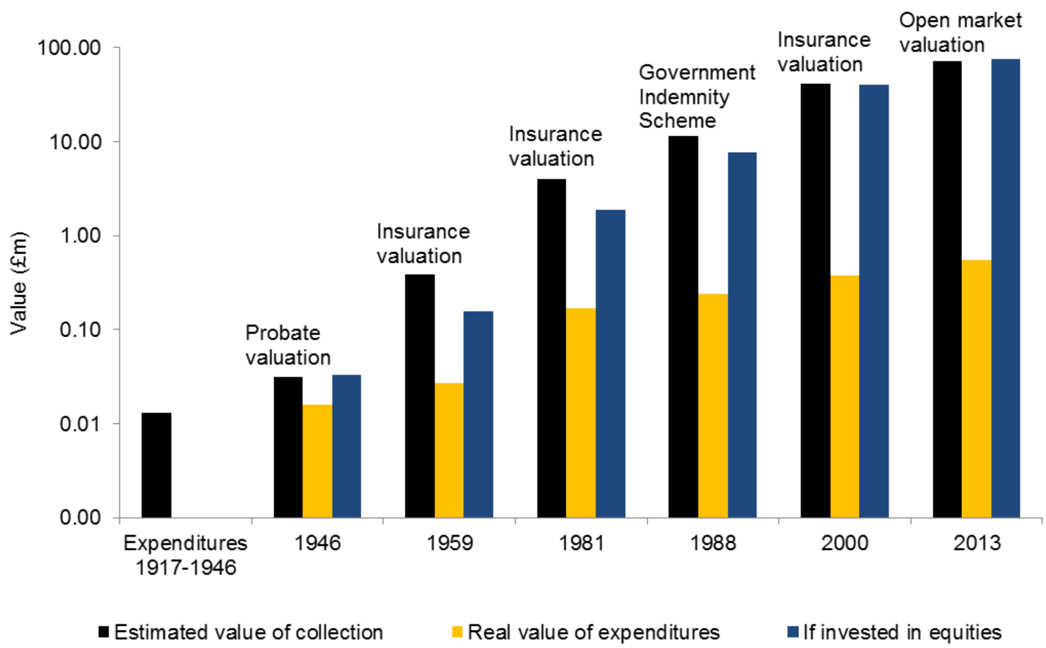


Figure 2. Disagreement between art valuers

This figure shows the range of year-2013 valuations (bars) and the mean valuation (white marker), across five independent art valuers, for 15 artworks in the Keynes collection that were selected according to their year-1988 value. It also shows the range and mean of the different valuations aggregated over the selected artworks. All values are in nominal British pounds. More information on our data collection procedure can be found in Section III of this paper.

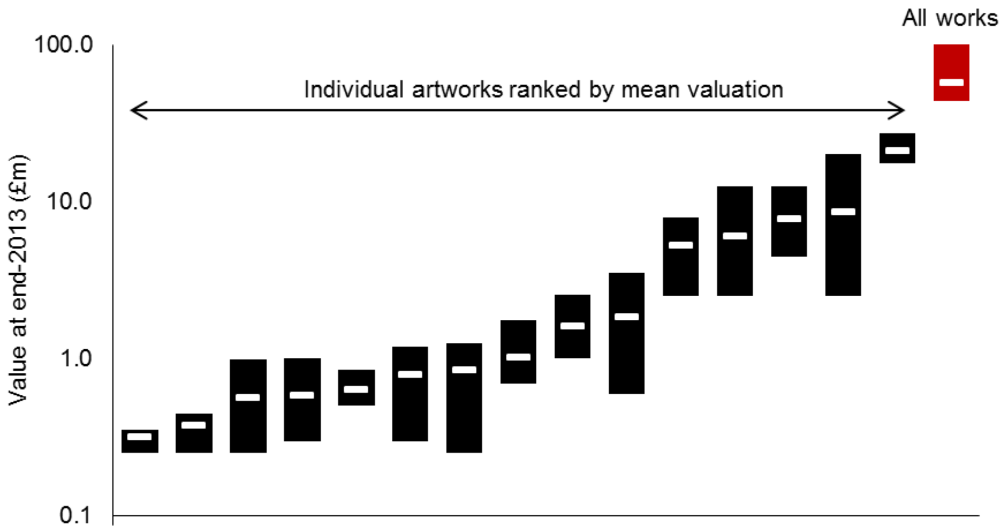
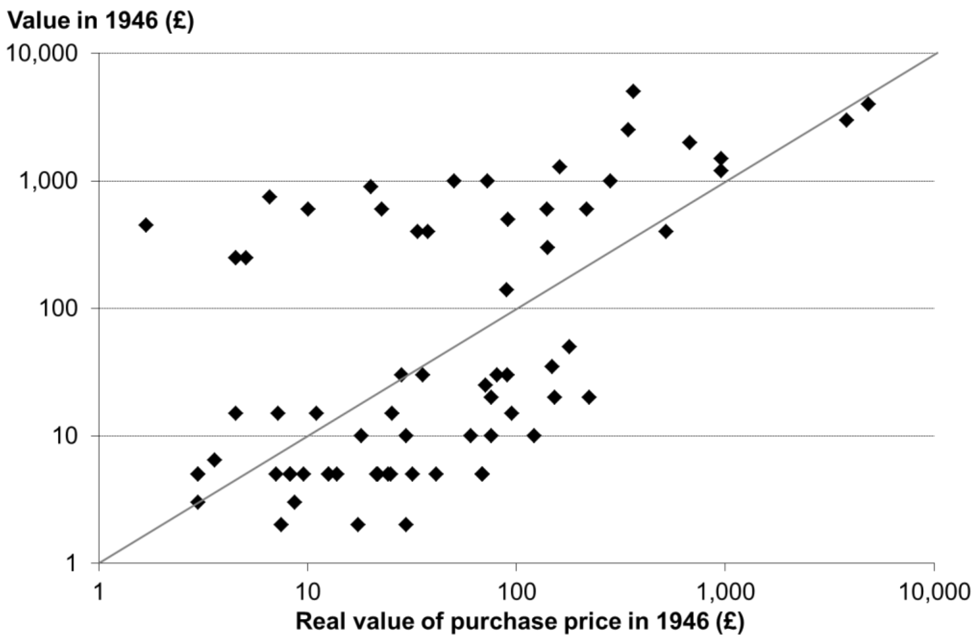


Figure 3. Comparison of nominal returns on individual artworks with inflation

Panel A of this figure shows for each artwork in the Keynes collection the real (i.e., year-1946) value of the purchase price, against the horizontal axis, and the year-1946 value, against the vertical axis. Panel B repeats the analysis using year-1946 and year-2013 valuations. All values are in nominal British pounds. Observations above the diagonal line have appreciated in real terms over the relevant period. Data on U.K. inflation come from Dimson, Marsh, and Staunton (2002, 2015).

Panel A. Between purchase and 1946



Panel B. Between 1946 and 2013

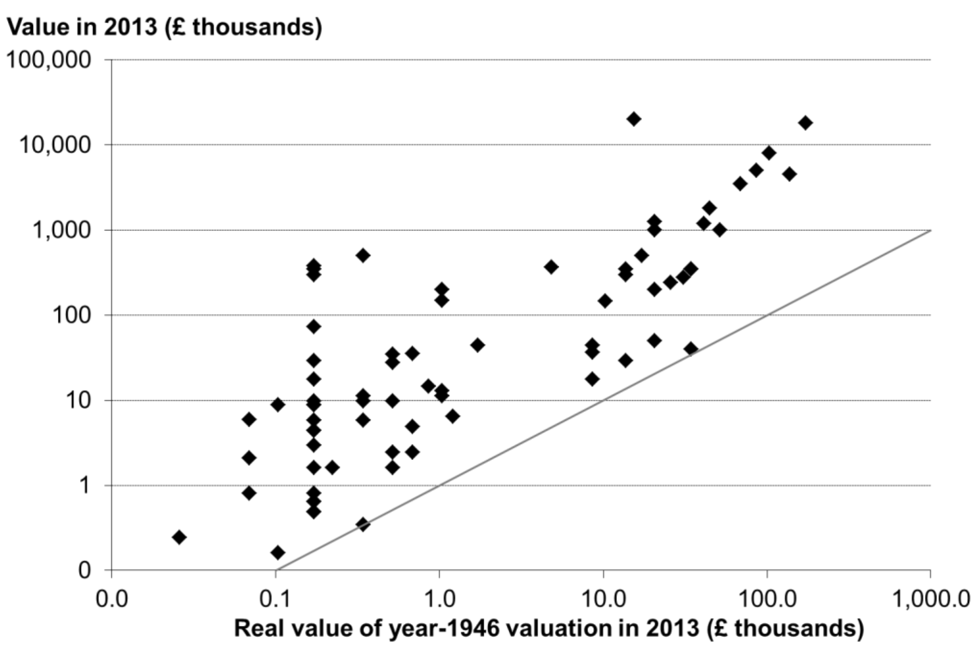


Figure 4. Rank-turnover plot for contemporary artists

This figure plots the log rank of turnover at auction against the log of the turnover at auction for the 500 best-selling contemporary artists, using data from Artprice (2014b). The line shows the power law fit. The slope coefficient equals –0.85 (with an *R*-squared of 0.99).

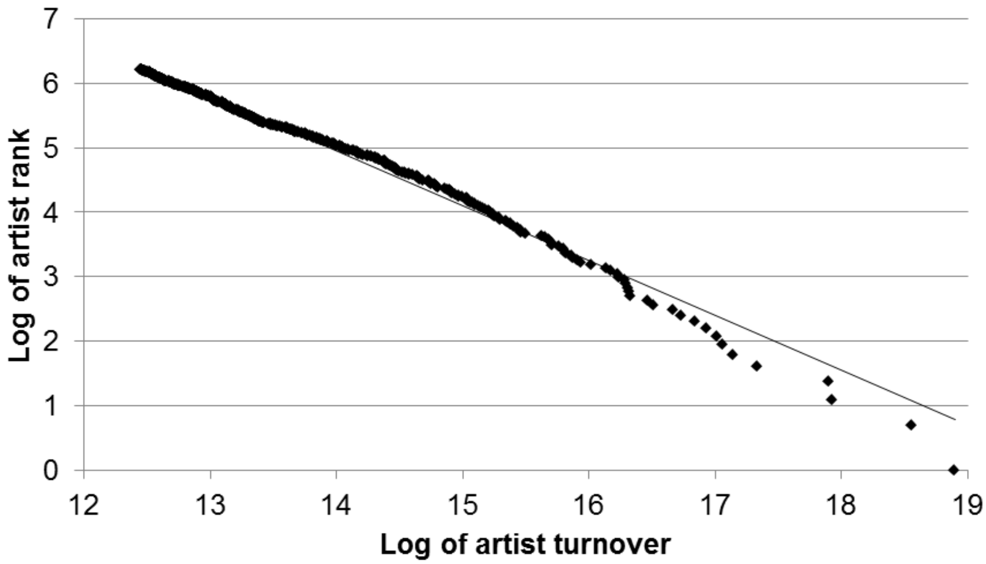


Figure 5. Histogram of annualized real returns in the art market

This figure shows the distribution of annualized returns in the art market, for the period 1982–2007, in real U.S. dollar terms. Data on repeated transactions of artworks come from Lovo and Spaenjers (2015), which is a subset of the data compiled by Renneboog and Spaenjers (2013). The analysis is limited to the top decile of real purchase prices. The line shows the normal density fit. The skewness of the annualized return distribution equals 1.04.