

# The investment performance of art and other collectibles

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Forthcoming in:

*Risk and Uncertainty in the Art World* (edited by Anna Dempster), Bloomsbury Publishing

## Abstract:

We assess the long-term financial returns from high-quality collectible real assets, and review the unique risks that are associated with such investments. Over the period 1900–2012, art, stamps, and musical instruments (violins) have appreciated at an average annual rate of 6.4%–6.9% in nominal terms, or 2.4%–2.8% in real terms. Despite the similarity in long-term returns, short-term trends can vary substantially across these different types of emotional assets. Collectibles have enjoyed higher average returns than government bonds, bills, and gold. However, it is important to recognize the quantitative importance of transaction costs in collectibles markets. In addition, price volatility is larger than is suggested by conventional measures of risk, and these assets are also exposed to fluctuating tastes and potential frauds. Yet, despite the large costs and many pitfalls, investment in emotional assets can pay off, because of the non-financial yield they provide.

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In 1796, the shell of a “*Carinaria Cristata*”—a type of sea snail—sold for the small fortune of 299 guilders at auction in Amsterdam. A Johannes Vermeer painting that originated from the same estate, “*Woman in Blue Reading a Letter*”, sold for roughly seven times less (Grout, 2011). The popularity of seashells was not new. Already in the early seventeenth century, shells were bought by wealthy Dutch collectors craving for aesthetically pleasing, unique, and exotic naturalia. Because of these preferences, collectors of seashells often acquired tulips—novel, strange, beautifully colored flowers—as well (Goldgar, 2007; Conniff, 2009). In the 1630s, a burst of demand even led to a strong run-up in the prices of tulips. Later generations would often ridicule “tulip mania”; after all, is it not completely irrational to pay a lot of money for something that has no intrinsic value? But tulips can be considered as the seventeenth-century equivalent of Jeff Koons’ artworks of sculptured flowers today: objects that are much-desired by an elite which moreover puts them at the center of its social life (Goldgar, 2007).

Collectibles have thus long attracted high prices—and been perceived as potentially interesting investments. Goldgar (2007) notes that at least six companies were set up in the 1630s to buy and sell tulips. Art historian David Solkin (1993) writes that in eighteenth-century England “paintings became an object of widespread capital investment”. But possibly the first, and definitely one of the most famous, business ventures designed to invest in art dates from the early twentieth century. In 1904, a French financier set up an art investment club called “*La Peau de l’Ours*” (“*The Skin of the Bear*”). The participants’ investment was used to buy paintings—about one hundred items, mainly by then-contemporary artists like Picasso and Matisse—which were sold off at auction in 1914 (Horowitz, 2011). A century later, there are not only art funds, but also investment funds specializing in musical instruments, wine, diamonds, and other collectible “emotional assets” (Pownall, Koedijk, and de Roon, 2009) or “investments of passion”.

However, the history of seashells and tulips also hints that investments in collectibles come with unique risks, over and above the price volatility that characterizes each marketplace. Although tulips (and hyacinths) continued to demand high prices until at least the early eighteenth century (Goldgar, 2007), changes in tastes and in supply slowly eroded their status. Similarly, there was a decline in seashell values in the nineteenth and twentieth century. In contrast, Vermeer’s oil paintings are today considered priceless.

In this study, we examine the historical investment performance of high-end collectibles. In Section 1, we analyze the long-run returns on three types of objects: art, stamps, and musical instruments (violins). These are collecting categories for which a lot of historical price data are available, because they have been trading at large auction houses and dealers for a long time. Art, stamps, and

instruments also share some characteristics: they are man-made and durable objects that do not diminish with consumption. We also touch upon the long-run investment performance of two different types of collectibles, namely wine and diamonds, at the end of Section 1. For most other collectibles, information on their long-run price evolutions is less widespread, and research has focused on shorter time frames—see Burton and Jacobsen (1999) for a review.

In Section 2, we compare the investment performance of collectibles to the returns on financial assets. We also briefly discuss the different costs that may impact the net returns, and collectibles' correlations with equities. In Section 3, we shed light on the risks that come with investments in emotional assets. Just as in the past, buyers of high-end collectible goods today face the danger of volatility in prices or changes in tastes, and there is of course the possibility of forgeries and frauds. We review some of these dangers and pitfalls. Finally, Section 4 offers some concluding thoughts. We argue that, even if art, stamps, or musical instruments are dominated by financial assets in their risk-return characteristics, they can still constitute rational investment choices because of the non-financial dividends reaped by the owners of emotional assets.

## 1. The long-term returns on collectible emotional assets

### *1.1. Art*

Since the first studies by Anderson (1974) and Stein (1977), an expanding literature has investigated the returns to investing in art; examples include Baumol (1986), Pesando (1993), Goetzmann (1993), Mei and Moses (2002), Campbell (2008), Goetzmann, Renneboog, and Spaenjers (2011), and Renneboog and Spaenjers (2013). We use data from Goetzmann, Renneboog, and Spaenjers (2011), who collect high-end art auction transaction data for the U.K. from 1765 until 2007 from a much-used historical resource (Reitlinger, 1961) and an online sales database (Art Sales Index). They then construct an annual art price index starting from purchase and sale prices of identical items. We chain-link the returns from Goetzmann, Renneboog, and Spaenjers (2011) to five years of returns on the U.K. art market index of Artprice.com (2013) to get an index until end-2012. The annualized (geometric mean) nominal return in British Pounds (GBP) for the period 1900–2012 is equal to 6.4%, while the geometric average real return equals 2.4%. Figure 1 displays the nominal art returns and U.K. inflation rates from Dimson, Marsh, and Staunton (2013) against the left axis, and the deflated art price index against the right axis.

[Insert Figure 1 about here]

Figure 1 shows strong price appreciations in the late 1960s and early 1970s, during the art market boom at the end of the 1980s, and in the mid-2000s. In contrast, prices dropped substantially (in real terms) during World War I, over the Great Depression, in the years after the 1973 oil crisis, during the early 1990s recession, and also at the time of the 2008 financial crisis. The negative shocks to wealth or top income levels during those periods clearly depressed high-end art prices.

## *1.2. Stamps*

Philately—stamp collecting—has been popular almost since the introduction of the Penny Black, the world’s first prepaid adhesive stamp, which was issued in the U.K. in 1840 (Johnson, 1920). The hobby’s first participants were mainly women and children who took an aesthetic interest in stamps. But trading gradually became a more important aspect of collecting, leading to an “intense market-based subculture” (Gelber, 1992). At the start of the twentieth century, a journalist and stamp collector argued that “it is impossible to get away from the necessity of regarding stamps as an investment” (Nankivell, 1902). Today, stamp dealers argue that “with stamps, you can diversify assets, and beat inflation” (Shamash, 2010). A variety of pre-packaged portfolios and structured products provide economic exposure to investment-quality postage stamps.

We are the first to examine the long-term price trends of investment-quality stamps. Stamp catalogue and price lists have been published for at least 145 years. The longest continuous series of stamp catalogues is that published by a British stamp dealer, Stanley Gibbons. We use all catalogues printed over the period 1900–2008. We start in January 1900 by identifying the 50 most valuable (regular) British stamps, whether unused or used. We then update our list of collectible stamps every nine years until end-1998. For each stamp identified, we track the prices from that point forward. We use these price data to estimate the returns in the stamp market. Full details of our data collection procedure and estimation methodology are provided in Dimson and Spaenjers (2011). To enable an analysis until end-2012, we chain-link our long-term annual index to the returns on Stanley Gibbons’ Great Britain 30 Rarities Index for the most recent years. The annualized nominal return in GBP over the period 1900–2012 is equal to 6.9%. The annualized return on the real price index is 2.8%.

Figure 2 illustrates the annual nominal returns on stamps over the period 1900–2012. The strongest price increases occur in the second half of the 1960s, throughout the 1970s, and in the 2000s. Especially in 1976 (+77.7%) and 1979 (+83.2%), the returns are impressively high. Figure 2 shows that negative nominal returns are rare. However, the return distribution shows a clustering just above zero: we find nominal returns of 0% to 1% in about a quarter of all years. This suggests downward

stickiness in nominal prices, but simultaneously implies that stamps can depreciate in real value over extended time periods.

[Insert Figure 2 about here]

Figure 2 also shows the rate of inflation per year, and the deflated stamp price index. Interestingly, in the inflationary second half of the 1970s, we record not only the highest nominal, but also the highest real returns on stamps. At the time, many tangible assets became attractive as hedges, and therefore experienced relatively high returns (Ibbotson and Brinson, 1993). In recent years, too, collectible British stamps have appreciated substantially in value in both nominal and real terms. In 2008, the real stamp price index increased by more than 30%. The largest drops in deflated stamp prices can be observed over the First World War (when stamps lost half of their value in real terms) and in the early 1980s, but there are several other time intervals over which the real price level decreased. For example, between end-1948 and end-1957, we record nominal returns on stamps of 1% or lower, and inflation rates of 3% or higher, in every year.

### *1.3. Violins*

A third collecting category for which long-run data exist are musical instruments. High-quality stringed instruments, like the violins built in the eighteenth century by Giuseppe Guarneri del Gesù and Antonio Stradivari, are admired for many related reasons: the appealing design, the exceptional craftsmanship, the long history, and the excellent sound. One very well-preserved Stradivarius violin sold for the record price of almost 10 million GBP at auction in 2011 (Majendie and Bennett, 2011). Several investment funds that specialize in musical instruments have emerged in recent years. Interestingly, such investors often lend out their investments to musicians, as a wooden instrument needs to be played regularly in order to retain its acoustic properties.

To construct a price index, we borrow data on repeated sales of violins, both at dealers and at auction houses, from Graddy and Margolis (2011). Because of the small number of observations, the authors estimate returns for decade-long intervals. In contrast, we construct a real annual price index for the period 1900–2009 by applying the same repeat-sales regression method as Goetzmann, Renneboog, and Spaenjers (2011). Most purchases and sales were recorded in GBP, and therefore an index in that currency is constructed, in line with the previous two subsections. We update the index until end-2012 with yearly returns from Graddy and Margolis (2013), converted to GBP. The deflated average price appreciation since end-1899 equals 2.5%, which is very similar to the long-run performance of stamps and art. (The nominal equivalent is 6.5%.) The results can be found in Figure 3.

[Insert Figure 3 about here]

Figure 3 shows strong increases in the price level of violins over the 1920s and after 1960, with temporary declines in the mid-1970s, the early 1990s, the early 2000s, and especially 2011–2012. Returns were generally negative for longer periods during the First World War and between 1930 and the late 1950s.

#### *1.4. Other collectibles*

Two other collectibles for which longer-run data exist are wine and diamonds. Dimson, Rousseau, and Spaenjers (2013) use auction and dealer price data on five long-established Bordeaux reds to estimate the long-term trends in the wine market. Abstracting from the impact of aging on prices, they find changes in wine valuations close to the returns on art, stamps, or musical instruments since the start of the twentieth century. The effect of aging on financial returns varies over the wine's life cycle, but is generally positive.

For diamonds, some historical data are available for the United States. In 1900, the retail price of a one-carat stone was close to 100 USD (Farrington, 1903; McCarthy, 1947); at the end of 2010, the average retail price for a nearly colorless diamond (color grade G) with very small inclusions (clarity grade VS1) was around 6,400 USD (USGS, 2012). Converted to GBP, these data points imply an annualized nominal return of almost 5%—very close to the average price appreciation of Treasury bills or gold over the same period (cf. *infra*). Renneboog and Spaenjers (2012) report that diamond prices showed a boom-bust pattern over the late 1970s and early 1980s, just like stamps (and gold).

## 2. Comparison with financial assets

Now that we have established a detailed history of the returns on art, stamps, and violins, we can compare these returns with those on U.K. Treasury bills, government bonds, and equities. The return data for these financial asset classes are from Dimson, Marsh, and Staunton (2013). We also look at gold, using prices from the World Gold Council (2013) for all years since 1978 and from Global Financial Data for the period before. The real price evolutions since year-end 1899 for all assets are shown in Figure 4.

[Insert Figure 4 about here]

Intriguingly, the geometric average returns on art, stamps, and instruments are virtually identical over the 1900–2012 period. Yet, despite the similarity in long-term returns, short-term trends can vary

substantially across the different types of collectibles. For example, violins outperformed art and stamps in the inter-war period, while stamps did best in the inflationary 1970s.

Figure 4 also shows that equities have outperformed all other asset categories, including art, stamps, and violins, over the period 1900–2012. Equities have realized a yearly average real return of 5.2%, while our collectibles have appreciated by between 2.4% and 2.8% per year in real terms. However, over the very long term, collectibles have enjoyed higher returns than bonds or bills, which record average real returns of 1.5% and 0.9%, respectively. Gold realized an average real return of 1.1%. A full overview of the distribution of the nominal and real returns on the assets included in this study can be found in Table 1.

[Insert Table 1 about here]

Of course, there are also important differences in transaction costs between assets; auction house fees and dealer mark-ups on collectibles can be high. For stamps, Dimson and Spaenjers (2011) demonstrate that a 25% transaction cost at sale has historically only been covered by the appreciation in nominal value after four years or more. Given the similarities in average returns and transaction costs, the same probably applies to many other collectibles.

Then there is the issue of illiquidity—a hidden transaction cost. Artworks and other collectibles typically cannot be sold quickly, at least not without a substantial discount. Auction houses do not hold sales continuously, and need time to authenticate an object, prepare a catalogue, etc. Also searching for potential buyers outside the auction circuit is time-consuming. So forced sales are often associated with depressed prices. This may be especially problematic if illiquidity in the art market increases in times of financial crisis, when “fire sales” of art are more likely.

Other costs that impact the returns on collectibles are the expenses related to storage, insurance, etc. But how high these costs are may depend on whether the object is bought purely as an investment (in which case it can be cost-efficiently locked away) or also a source of pleasure (in which case costs will surely be higher).

To evaluate whether emotional assets have a place in a diversified investment portfolio, one should not only consider their net-of-cost returns, but also their correlations with other asset classes. Table 2 provides an overview of real return correlations based on our data. As expected, the correlations (which pick up short-term co-movements) between the different collectibles are not very large. Also the correlations between collectibles and equities are low. However, the same-period correlations may underestimate the importance of systematic risk, as it can take time for changes in financial wealth to

have an impact on the values of our price indices. Indeed, the correlations with previous-year equity returns show that a relation exists between wealth creation in the equity market and collectibles prices.

[Insert Table 2 about here]

### 3. Investment risks

#### *3.1. Return volatility*

We could evaluate the historical riskiness of investments in collectibles by considering standard deviations. Table 1 shows standard deviations of the nominal returns on art, stamps, and violins of 13.2%, 13.5%, and 10.1%, respectively, while we record standard deviations of 11.9% for bonds and 21.6% for equities. A problem with the raw standard deviations of the art, stamp, and violin returns is that they underestimate the true volatility of collectibles values, for a number of reasons. First, appraisals of an infrequently traded item's value, such as stamp catalogue prices, are typically sticky (Geltner, 1991). Second, the regression methodology used to estimate the returns on art and violins may induce positive autocorrelation (Goetzmann, 1992). Third, as the indices are aggregating information over twelve-month periods, the variance of the returns can be expected to be underestimated (Working, 1960).

A potential remedy is to “unsmooth” the returns. Although the revised series will have an average return that lies very close to that of the original series, the standard deviation will be substantially higher. For example, Dimson and Spaenjers (2011) report that the riskiness of stamp investments, as measured by the volatility of the unsmoothed returns, is not much different from that of investments in equity markets. Renneboog and Spaenjers (2013) come to a similar conclusion for the art market.

#### *3.2. Changes in tastes*

Keeping supply constant—which is not always an innocuous assumption, as illustrated by the history of seashells and tulips—returns on collectibles ultimately depend on (expectations of future) demand. This may be hard to predict, since tastes change over time. Johannes Vermeer, for example, was completely “absent in art-historical literature prior to his ‘discovery’ during the 1850s and 1860s” (De Laet, van Dijck, and Vermeulen, 2013). As late as 1881, the painting “Girl with a Pearl Earring”, albeit in poor condition, sold for not more than two guilders in Amsterdam. A shift in fashion made Vermeer a very popular artist in the late twentieth century—and his works more valuable than nearly all other paintings produced in the seventeenth century. Of course, over time, whole collecting categories can become more or less fashionable. Reitlinger (1963) documents the astonishingly high

prices paid for silverware—some of it “inconceivably hideous”—at the end of nineteenth century, and for tapestry in the early twentieth century. At the time, prices paid for the highest-quality “objets d’art” were many times those laid out for the most expensive art works. Art only gradually became a more valuable collecting category, eventually leading to the price levels observed in recent decades.

Not only aesthetic tastes, but also wealth distributions may change, with important consequences for collectibles prices. The Japanese boom in the late 1980s caused a bubble in those kinds of art favored by Japanese collectors (Hiraki, Ito, Spieth, and Takezawa, 2009). And as the world has witnessed the emergence of several economies as global players over the last two decades, art markets have emerged as well. Renneboog and Spaenjers (2011) argue that “changing wealth patterns and the corresponding changes in demand based on the cultural and regional affinities of these new collectors may have a significant impact on changes in relative art valuation”.

The previous paragraphs point to the danger of survivorship bias in every study of emotional assets. We may inadvertently be estimating returns on the artists and types of assets that have not fallen out of fashion with wealthy western collector-investors in recent times, upwardly biasing results (Goetzmann, 1996). Over the twentieth century, the financial returns on seashells or silverware were probably lower than those on art, stamps, or musical instruments. Today, one must wonder whether all collectibles that have been important over recent decades will hold their appeal in the future. For example, it is telling that between 1982 and 2007 the average age of the members of the American Philatelic Society rose from 44 to 63 (American Philatelic Society, 2007). Moreover, although the inflow of new collectors from emerging economies can somewhat compensate for the lower interest in stamps among younger generations in developed economies, their focus may be on own-country stamps and on different types of issues (Huang, 2001).

### *3.3. Forgeries and frauds*

Although scams also exist in financial markets, investors in emotional assets need to be especially cautious. The possibility of fakes can, for example, be a worry for buyers of art. Despite their in-house expertise and advanced technology, even reputable auction houses occasionally make mistakes. In 2004, Christie’s and Sotheby’s both brought the same Gauguin painting to the market, only one of which was genuine (Bennett, 2004).

Forgeries have historically also been a danger in philately (Moens, 1862; Lewes and Pemberton, 1863; Lake, 1970). In 1961, one particular stamp type was deleted from the Stanley Gibbons catalogue “as

all copies [were] believed to be manipulated” (Stanley Gibbons, 1960). More recently, there have been examples of fraudulent stamp systems (Crawford, 2005, 2006).

Even the violins market has not been free of fraud. In 2012, a Stradivarius violin dealer was found guilty of selling fake violins; a forestry expert who examined the instruments found that they had been made from trees felled after Stradivari’s death (Paterson, 2012).

Lately, there have been concerns about counterfeit wines as well. The Economist (2011) reported that “by some estimates 5% of fine wines sold at auction or on the secondary market are not what they claim to be on the label”. Full wine bottles can be relabeled, and empty bottles are sometimes refilled with cheaper wine. One of the reasons that wine fraud is alleged to be widespread is that “many buyers wait years before opening their fraudulent bottles, if they open them at all” (Koch, 2007). And even if they do, they may not have the experience to realize that they have been duped.

#### 4. Conclusion

We have reviewed the long-term investment performance of three important categories of emotional assets—stamps, art, and musical instruments—and drawn comparisons with the returns from investing in financial assets. Even though they do not generate any financial income, the long-run returns on collectibles have been superior to the total return from government bonds and Treasury bills (and gold).

However, the transaction costs in these markets are substantial. Moreover, the price volatility of emotional assets is larger than is suggested by their raw standard deviations, and the investment risk is further augmented by their exposure to fluctuating tastes and vulnerability to frauds. When choosing an investment horizon, one needs to trade off high transaction costs and the risk of short-term, cyclical underperformance on the one hand, and the risk of longer-run shifts in the tastes of the dominant investors in the market on the other. Finally, the heterogeneity of collectibles—largely unaddressed here—may make asset selection challenging, since it is not possible to simply buy the art, stamp, or violin price indices as a portfolio. Renneboog and Spaenjers (2013) provide evidence of variation in performance across art mediums, movements, and quality categories. Cross-sectional differences in the sensitivity to changes in demand may be partially responsible, but more research on return determinants is clearly needed.

In this discussion, we have abstracted from the “non-financial dividends” that the buyers of collectibles receive while enjoying ownership of a unique and aesthetically pleasing object. It is clear that, even if art, stamps, or musical instruments are dominated by financial assets in their risk-return

properties, they can still be rational investment choices. The observation that after-cost risk-adjusted financial returns are low may even be seen as evidence that the “psychic return” of holding collectibles is indeed substantial (Mandel, 2009; Dimson, Rousseau, and Spaenjers, 2013). In other words, investors are willing to forego financial returns in exchange for pleasure. And pleasure is ultimately what collectibles are all about.

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**Table 1—Distributions of returns**

Table 1 reports the geometric and arithmetic mean returns per annum (p.a.), the standard deviation (S.D.), and the lowest and highest recorded return for different emotional and financial asset classes over the time frame 1900–2012. The data for art come from Goetzmann, Renneboog, and Spaenjers (2011) and Artprice.com (2013). The data for stamps come from Dimson and Spaenjers (2011) and Stanley Gibbons. The returns for violins are estimated from data from Graddy and Margolis (2011, 2013). The data for equities, bonds, bills, and inflation come from Dimson, Marsh, and Staunton (2013). Gold prices come from Global Financial Data and the World Gold Council (2013).

	Mean returns p.a.		Dispersion of annual returns				
	Geometric	Arithmetic	S.D.	Lowest		Highest	
<i>Nominal returns</i>							
Art	6.4%	7.2%	13.2%	-31.2%	1930	46.6%	1968
Stamps	6.9%	7.6%	13.5%	-8.8%	1982	83.2%	1979
Violins	6.5%	7.0%	10.1%	-22.4%	2011	41.0%	1974
Equities	9.4%	11.2%	21.6%	-48.8%	1974	145.6%	1975
Bonds	5.5%	6.1%	11.9%	-17.4%	1974	53.1%	1982
Bills	4.9%	5.0%	3.8%	0.3%	2012	17.2%	1980
Gold	5.1%	6.4%	18.7%	-19.0%	1990	108.3%	1979
Inflation	3.9%	4.2%	6.5%	-26.0%	1921	24.9%	1975
<i>Real returns</i>							
Art	2.4%	3.1%	12.4%	-29.7%	1915	38.4%	1968
Stamps	2.8%	3.5%	12.3%	-19.2%	1915	56.3%	1979
Violins	2.5%	2.8%	8.5%	-25.9%	2011	23.9%	1986
Equities	5.2%	7.1%	19.8%	-57.1%	1974	96.7%	1975
Bonds	1.5%	2.4%	13.7%	-30.7%	1974	59.4%	1921
Bills	0.9%	1.1%	6.3%	-15.7%	1915	43.0%	1921
Gold	1.1%	2.2%	16.6%	-30.5%	1975	77.7%	1979

## Table 2—Correlations

Table 2 reports the pairwise correlations between different emotional and financial asset classes over the time frame 1900–2012. It also shows correlations with lagged equity returns. The data for art come from Goetzmann, Renneboog, and Spaenjers (2011) and Artprice.com (2013). The data for stamps come from Dimson and Spaenjers (2011) and Stanley Gibbons. The returns for violins are estimated from data from Graddy and Margolis (2011, 2013). The data for equities, bonds, bills, and inflation come from Dimson, Marsh, and Staunton (2013). Gold prices come from Global Financial Data and the World Gold Council (2013).

	Pairwise correlations						Corr. with lagged equities
	Art	Stamps	Violins	Equities	Bonds	Bills	
<i>Real returns</i>							
Art	-						0.34
Stamps	0.14	-					0.20
Violins	0.25	0.07	-				0.14
Equities	0.22	0.00	0.02	-			-0.07
Bonds	0.08	0.24	0.03	0.51	-		-0.11
Bills	0.23	0.36	0.35	0.26	0.63	-	0.06
Gold	0.06	0.37	0.14	-0.18	-0.01	0.14	0.04

Figure 1—Nominal returns and deflated price index of art

Figure 1 shows the nominal GBP returns on art over the time frame 1900–2012, based on Goetzmann, Renneboog, and Spaenjers (2011) and Artprice.com (2013). It also presents U.K. inflation in each year, and the deflated art price index. The index is set equal to 1 at the beginning of 1900. Inflation data come from Dimson, Marsh, and Staunton (2013).

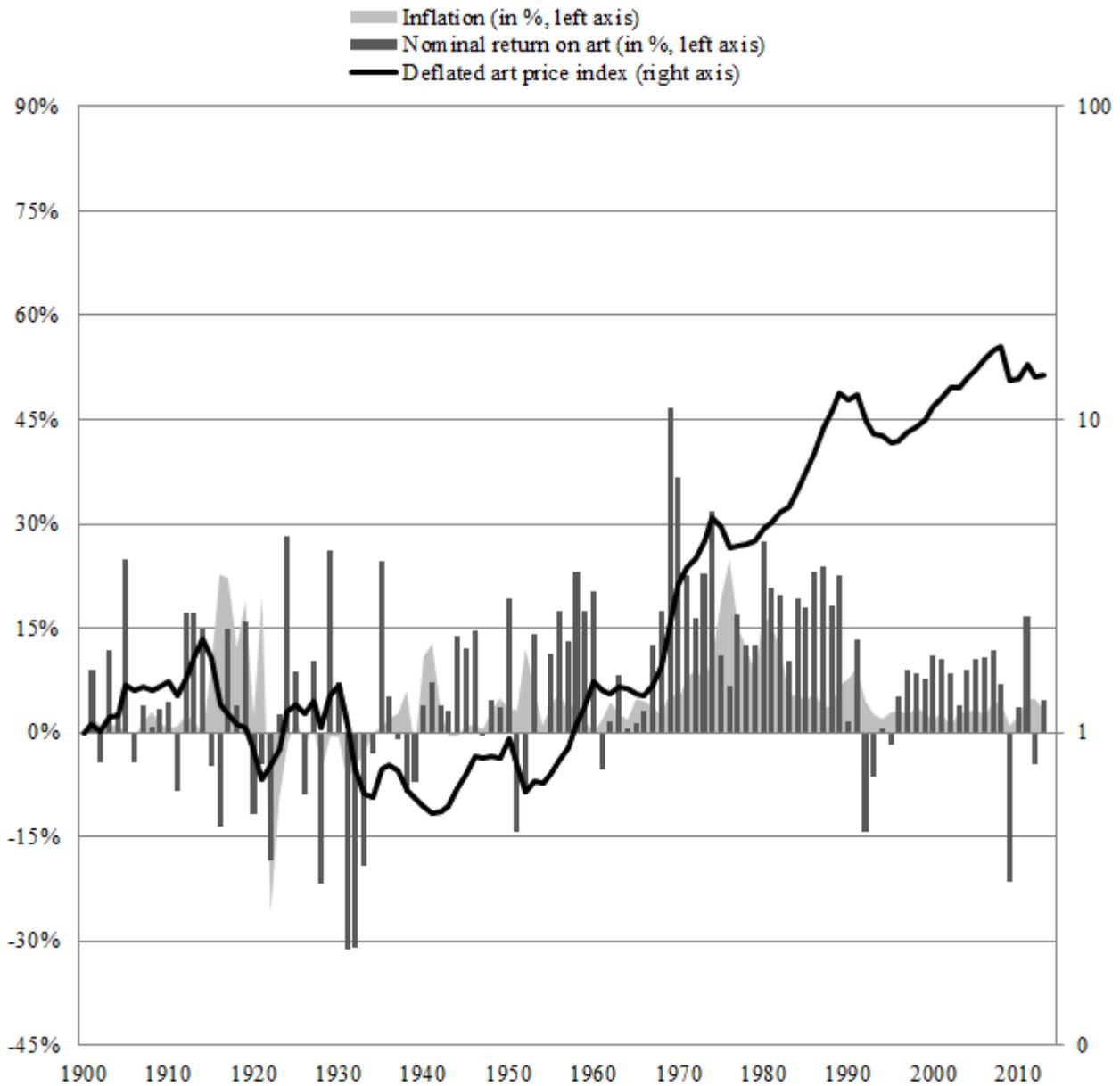


Figure 2—Nominal returns and deflated price index of stamps

Figure 2 shows the nominal GBP returns on stamps over the time frame 1900–2012, based on Dimson and Spaenjers (2011) and Stanley Gibbons. It also presents U.K. inflation in each year, and the deflated stamp price index. The index is set equal to 1 at the beginning of 1900. Inflation data come from Dimson, Marsh, and Staunton (2013).

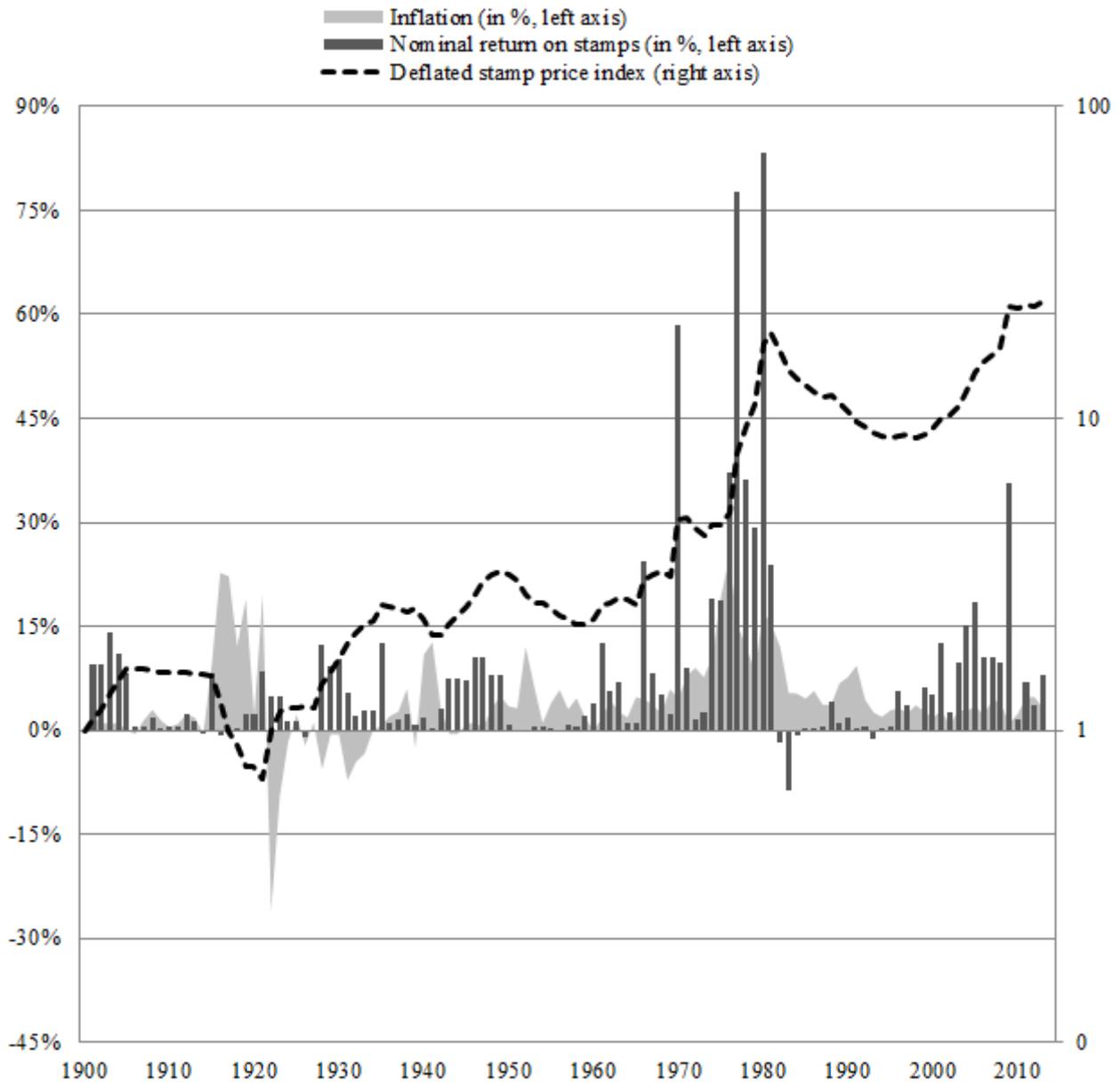


Figure 3—Nominal returns and deflated price index of violins

Figure 3 shows the nominal GBP returns on art over the time frame 1900–2012, estimated from data from Graddy and Margolis (2011, 2013). It also presents U.K. inflation in each year, and the deflated violin price index. The index is set equal to 1 at the beginning of 1900. Inflation data come from Dimson, Marsh, and Staunton (2013).

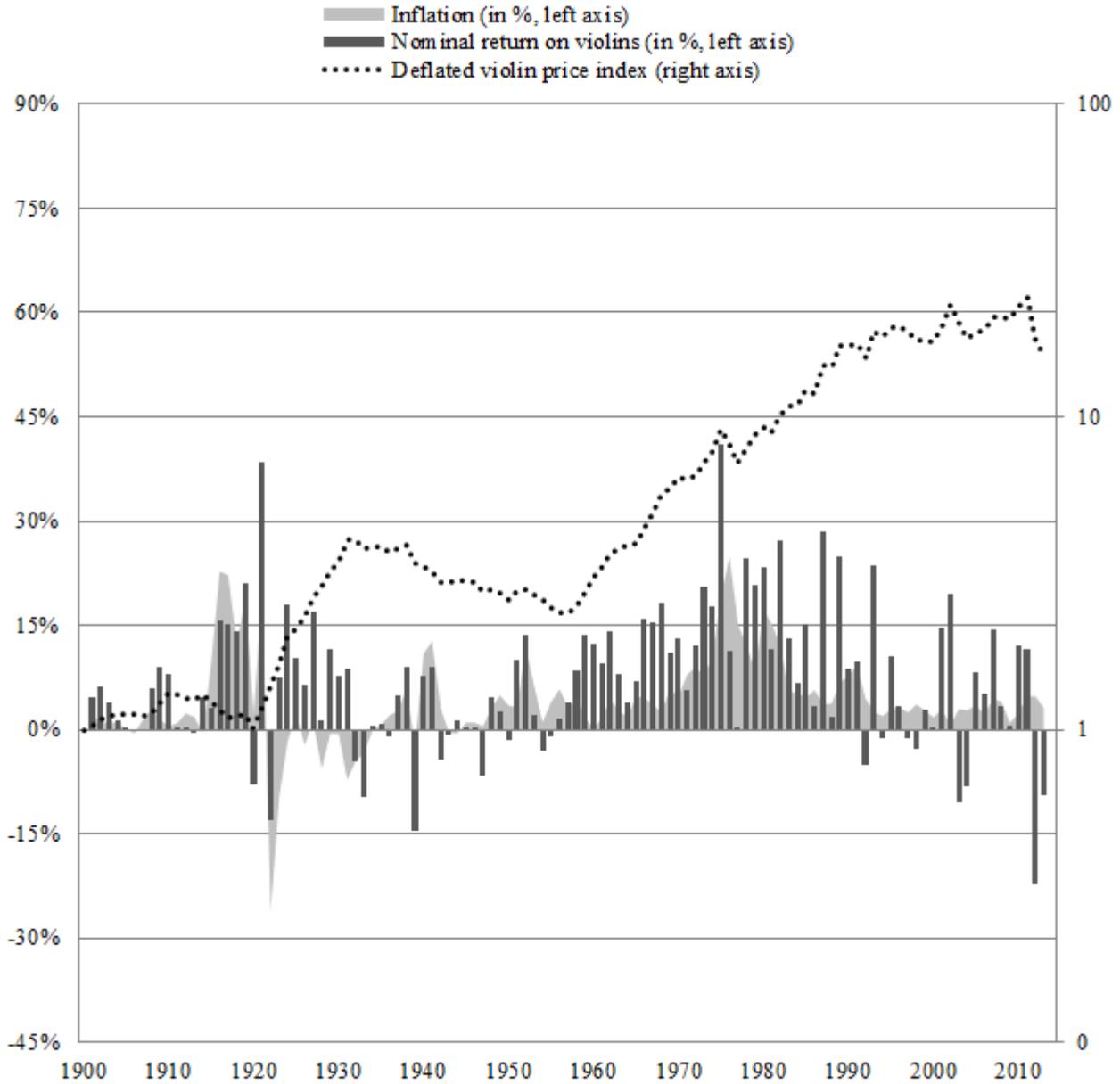


Figure 4—Comparison of returns

Figure 4 shows the deflated index values for different emotional and financial asset classes over the time frame 1900–2012. Each index is set equal to 1 at the beginning of 1900. The real price index data for stamps, art, and violins are shown in Figures 1–3. The data for equities, bonds, and bills come from Dimson, Marsh, and Staunton (2013). Gold prices come from Global Financial Data and the World Gold Council (2013).

