Measuring Returns on Investments in Collectibles

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A large number of people spend a fair amount of time thinking about, shopping for, and acquiring collectibles, including art and wine, coins and stamps, antique furniture and ceramics, baseball cards and Hummel figurines, and many other items. These markets for collectibles offer several interesting subjects for economic analysis. We concentrate herein mainly on the question of how to measure and interpret the financial return to investing in collectibles. We begin with a discussion of who collects and why—and what these motivations might imply about pricing in markets for collectibles. We then discuss different ways of creating price indexes in order to measure returns to collectibles. Finally, we discuss the ongoing debates about how to interpret the existing results on financial characteristics of collectibles, and how one might go about improving on the current state of knowledge in this area.

There is clearly room for debate over what constitutes a collectible. In our discussion, collectibles are broadly defined as items that someone collects, barring real estate, precious metals, and gems on the grounds that they can be used as inputs in production processes. Although many collectibles have the attributes of antiquity and/or rarity and often are of no productive use, others clearly violate one or more of these categorizations. Rigby and Rigby (1944), in their history of collecting, argue for the consideration of polygamy (either serial or simultaneous) as a form of collecting, drawing a direct analogy when they state (p. 225): "Henry

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VIII, specializing in wives and in tapestries, acquired six items in the first category and two thousand in the latter." For the purposes of this paper, we stick to collectibles as inanimate objects and direct interested readers to Jacoby (1995) for a discussion on how multiple wives can constitute the holding of a productive asset.

The appendix to this paper contains a table listing the studies we have been able to identify that explicitly calculate a rate of return to some set of collectibles. Some collectibles, especially the more costly items, are studied fairly exhaustively, while many other collectibles have not been studied at all, including many items that one sees advertised as collectible in Sunday magazine sections, on shopping channels, and on webpages. There is no estimate available on what percentage of total wealth is held in the form of collectibles, although Ibbotson, Siegel and Love (1985) employ heroic assumptions to calculate that art comprises 0.1 percent of the total physical and financial capital of the developed free world (as compared to, for instance, 3.4 percent in metals and 55 percent in real estate).

Who Collects, What Do They Collect, and Why?

The evidence on how many people are collectors, and what they collect, is nonsystematic but intriguing. Often a group of collectors is identified in a nonrandom way; for example, a researcher attends an antique car gathering and asks attendees questions regarding their personalities and motivations for collecting (Belk, 1995a; Danet and Katriel, 1989; Dodgen and Rapp, 1992; Formanek, 1991; Pearman et al., 1983). In these studies, there is no control group of noncollectors which is simultaneously asked to identify their motivations for *not* collecting. A common, but even less representative, data collection method is to scrutinize biographies of famous collectors for evidence as to their motivations (Olmsted, 1991, offers a review of such literature).

Few publicly available surveys ask people whether they are collectors. Belk (1995a, p. 478), a sociologist who writes often on the topic of collecting, cites the figure that one-third of individuals are collectors, along with the (potentially contradictory) statistic that two-thirds of American households have one or more collectors. The former of these figures turned out to be based on an unfootnoted lead-in sentence from a story in the *New York Times Magazine* (O'Brien, 1981, p. 25). The latter figure turned out to derive from a 1976 survey of 184 randomly selected middle-income non-Hispanic households in Tucson, Arizona, which found that 62.5 percent collect one or more item, with a mean of 2.6 collections per collecting household (Schiffer et al., 1981, p. 75). In another survey, McInish and Srivastava (1982) report results from a small mail survey of potential investors, chosen from a list of persons who were customers of various brokerage firms and who responded to financial services ads in the *Wall Street Journal.* In their survey, 31 percent of respondents indicated that they "owned an investment in art/antiques/other collectibles" (p. 126).

Evidence on what people collect is similarly limited. The survey that analyzed

collecting among Tucson households found that out of 296 reported collections, there were 61 different types (Schiffer et al., 1981, p. 75). Seven items accounted for 54 percent of the total; in order, they were books-magazines, records, plants, coins, stamps, rocks, and bottles. Thirty-eight of the collections were unique, including kitchen utensils, doilies, and insulators. The likelihood of collecting something rises with age among adults (collecting is more prevalent among children), but it does not seem to be limited to any particular income category. However, the type of object collected varies by income category. Belk (1995a, p. 485) states that most areas of popular collecting—including baseball cards, model airplanes, beer cans, and limited edition plates—are dominated by middle-income persons, while a disproportionate number of stamp and coin collectors are white-collar types, and fine art collecting is an upper-class activity. McInish and Srivastava (1982) find evidence of complementarity in their sample of "investors" between investments in collectibles and investments in other financial instruments. The amount spent on collecting rises over time: Pearman et al. (1983, p. 58) find in their survey that among those who have been collecting for five years or less, 50 percent of respondents reported spending $250 or less on their collecting annually, while among those who had been collecting for more than ten years, 50 percent were spending $1750 or more annually.

Studies have posited a range of interrelated motivations for collecting (Belk, 1995b; Pearce, 1995). From a psychological perspective, Danet and Katriel (1989) suggest that collectors collect so as to pursue closure/completion/perfection, using five strategies to attain this goal: 1) completing a series or set; 2) filling a physical space (for example, a wall in their house); 3) creating a visually pleasing, harmonious display; 4) manipulating the scale of objects (for example, collecting miniatures); and 5) aspiring to perfect objects. From a sociological perspective, others have suggested that collecting is done in part so as to achieve entry into and maintain status in a social group of similarly-minded persons (Belk, 1995a; Olmsted, 1993). Still others have pointed out the ways in which a collectible "can serve as a kind of religious object" (Dannefer, 1980, referring to antique cars).

A substantial proportion of collectors also hope for financial gains. In a survey of 154 antique and popular culture memorabilia collectors (Pearman et al., 1983), 35 percent cited investment as their primary motive for collecting, as opposed to the choices given of fun and pleasure, using collecting as a pastime, or feeling that the preservation of old things was important. In a survey of a broad range of collectors, 22 percent of respondents gave financial investment as a motivation for their collecting (Formanek, 1991).

The existence of psychological and group membership motives for investing in collectibles is what produces disparate beliefs about the likely financial rewards of this activity. Ask the proverbial person on the street about investing in collectibles and you will likely get one of two reactions. Reaction number one: "Collectibles can be a great investment, especially if you can figure out what will be the next hot market. If only I had invested in Mapplethorpe photos (or baseball cards) before the market started going up!" Reaction number two: "Collectibles as an investment

is a dumb idea! They've got to have a lower rate of return than a real investment like stocks. You buy collectibles to enjoy owning them, not to make money."

These two reactions basically sum up the economist-on-the-street's take on this topic as well. On the one hand, collectibles should provide a high rate of return to compensate the owner for the objects' relative illiquidity, high holding costs, and variability of return, including the possibility that a once-popular item might fall into disfavor. On the other hand, collectibles could provide a low rate of return because the nonpecuniary returns from their ownership will mean that investors require lower financial rewards; for example, you get to hang your Picasso on your living room wall and show it off to your friends.

Because of the nonpecuniary—perhaps even nonrational—rewards from owning collectibles, there is reason to think it may be possible to make extraordinary profits in this area. Collectibles are estranged from cost fundamentals, since production concerns are irrelevant once you are in the resale market, and the numbers of buyers and sellers involved may be relatively low. Such a market may be easy for a small number of persons to manipulate. Stoller (1984a) provides a helpful list of suggestions for market manipulation, including publishing a price guide or catalog for the category of collectibles in question, and the potentially less labor-intensive activity of hoarding.[1]

At the broader commercial level, a surefire way to make economic profits is to become the producer of a collectible that a number of people suddenly just have to have. Long and Schiffman (1997) provide a fascinating study of the Swatch collecting phenomenon (which began in the 1980s and continues today), delineating how a company can manipulate marketing and production—for example, by creating artificial scarcity through limiting runs and having different retailers carry different selections—so as to turn what some of us might have considered just another example of a commodity (namely, a wristwatch) into a "collectible." The more recent Beanie Baby phenomenon, as engineered by Ty Inc., follows almost to the letter the directives provided by the Swatch case study. The greatest rewards to understanding the economics of collectibles may come from their potential for commercial exploitation.

Methods for Measuring Returns to Collectibles

It will come as no surprise that many of the popular press sources of pricing information on collectibles, including the burgeoning set of price guides, tend to display some optimism about the future course of prices. It is not uncommon to find advice similar in tone to that in Chadwick and Peary's (1989, p. 72) guide to

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[1] One might ask whether the very act of forming a collection out of disparate items creates value, so that the whole is worth more than the sum of its parts. This is not necessarily the case: although forming and publicizing a collection may make more persons decide that the items in question are desirable as collectibles, it is also the case that a collection broken up and sold individually can often earn more than if it is sold as a unit. Audubon prints are an example of this phenomenon, where the 438-print folio is rarely sold, in part because the prints can be sold for more individually (Oppenheimer, 1999).

buying baseball cards and other collectibles, which states: " . . . we can guarantee you that people 10 or 20 years from now will offer to buy your collection at prices far greater than your initial investment." Economists writing on the subject tend to be less expansive. For example, Stoller (1984b, p. 23), writing on the baseball card industry, noted: "Many people are aware of the fact that a 1952 Topps Mickey Mantle card sold for as much as $3000 in 1980. What they are not aware of is the fact that an almost identical 1952 Mantle card failed to generate a $600 opening bid at an auction in early 1981."

To move beyond anecdotes and promises about prices, there are three basic methods for calculating returns to collectibles. The most widely used method (particularly by noneconomists) is to create a composite index by selecting sets of items whose prices will be measured and averaged. The composite index can either be based on sets that vary in composition over time—varying "market baskets," or on a fixed market basket. The obvious drawback to the varying basket approach is that since different items come up for sale in different periods, the index compiler must be relied upon to perform some sort of quality-standardization for the basket at each point in time. For example, the newsletter *Photograph Collector* has followed the same 25 prints that appear regularly at auctions since the fall of 1975, and reports a semiannual index based on whatever sales from this set appear in each time period. The market basket can instead be chosen at random, as Goetzmann (1996) does for the case of paintings, starting up a set of new portfolios at ten-year intervals from 1907 through 1977 and comparing their 1987 prices (this technique allows him to consider survivorship bias explicitly). In the fixed market basket case, different criteria have been used for selection. Often the author makes the determination; for example, Kane (1984) creates a hypothetical portfolio of 120 coins (meant to be broadly representative of the coins market) and records their prices at monthly intervals from 1970 through 1979. Alternatively, the basket can be chosen by experts; for example, Burton and Jacobsen (1998) follow the prices for two wine experts' recommended portfolios of particular châteaux (Parker, 1985; Sokolin, 1987). Art collections where the original purchase prices and dates are known and the entire collection is sold at the same time have been assessed for realized returns as well (Rush, 1961; Frey and Serna, 1990). The fixed basket approach, however the basket is chosen, bypasses the potential pitfall of varying quality over time, but has the alternative drawback that the index may become nonrepresentative of the current state of the market if it contains increasingly unfashionable items that new collectors would be unlikely to purchase.

The second method of deriving a price index for collectibles is to run a "hedonic" regression in which the price of an item is regressed on its various characteristics, including age or purchase price.[2] This method allows one to estimate the price gain over the period attributable solely to aging. For instance,

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[2] There is a literature on hedonics which generally considers pricing of items destined for relatively immediate consumption; for example, see Freccia and Kilby (1998) on cigars. These studies can be used to generate a rate of return to time only if a measure of holding time is included.

Ashenfelter et al. (1993) estimate the return to various characteristics of wine, including the holding of wine past its year of production. This approach has the advantage of allowing for quality differences in the various items comprising the index calculation, but embodies the disadvantage that in a linear regression, the rate of return is constrained to constancy over the time frame of the data.[3]

The third method of calculating returns is to pool data from repeat sales and run a "repeat sale" regression. Anderson (1974), Baumol (1986), Frey and Pommerehne (1989), and Goetzmann (1993) all utilize this method for paintings, yielding rates of return extending back to 1652; Pesando (1993) uses this method for prints; and Burton and Jacobsen (1998) undertake a similar exercise for wine. This method overcomes some of the disadvantages of the two methods discussed previously. As compared to composite indexes with varying market baskets, repeat-sale regressions control for quality by using the changes in prices for particular items.[4] As compared to hedonic regressions, this method allows returns to vary over subperiods of the full time period covered. However, this approach has the disadvantage relative to the hedonic method of systematically selecting only those items that sell at least twice during the sample period, thereby disregarding potentially relevant information from the remainder of the sales.

The choice between these calculation methods clearly depends to some extent on the type of collectible and the availability of data, in particular the similarity of the offered items and the frequency with which items come to auction. For instance, in the case of markets for coins, stamps, and wine, many similar objects come up for sale regularly. At the other extreme, prices for antique furniture and musical instruments may be quite variable due to differences in initial craftsmanship and subsequent preservation. Prints and photographs are an intermediate case, and although paintings are one-of-a-kind, they can be classified for purposes of analysis as belonging to genres and size categories (as Rush, 1961, does in his index calculations). Although all the approaches have strengths and weaknesses, it does not appear that any of these approaches will necessarily understate or overstate returns as compared to the other approaches.

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[3] One could instead use a nonlinear functional form. For example, Ladany (1975) and Schnitzel (1979) create nonlinear hedonic equations using logarithms of all variables, to calculate the (constant) elasticity of price with respect to time since issuance (for coins and stamps respectively). Both studies find elasticities well in excess of one.

[4] The econometrically-minded reader might here raise the point that the repeat-sale regression can apparently deal with time-invariant hedonic components, but what about time-varying ones? For example, a particular bottle of wine may experience greater-than-average subsidence over time, a fact that will be duly noted in a wine auction catalog when the bottle comes up for sale. Steele and Goy (1997) consider this in the case of real estate and point out that a second set of regressors may be included in the regression to control for this. However, no one in the collectibles index-creating business seems to have done this yet.

Findings Regarding Returns to Collectibles

The Appendix table lists all the studies we have been able to uncover that explicitly calculate a rate of return to some set of collectibles.[5] For each study, we provide the time period covered, the nominal and real rates of return over that period, and two measures of opportunity cost, comparing the return on the collectible to those for a U.S. equity index and a long-term bond yield.[6] Although many of the studies also report results for subsets of the data, either by more specific object type or for a shorter time period, for the sake of brevity we report only the longest holding periods available for each study and the most inclusive indexes.[7]

This evidence provides grounds for setting a plausible range of monetary returns to collectibles. The three aggregate indexes across collectible types that exist—from Sotheby's, Salomon Brothers, and the BritRail Fund (as reported in the first section of the table)—indicate returns in the range 11 to 14 percent over holding periods of 13 to 21 years, but these indexes only represent post-1967 trends and were discontinued before the 1990s. Almost no study yields a negative nominal rate of return, save for a few submarkets, like the Barbizon school of painters from 1925 to 1960 (Rush, 1961). Although there are some negative real return rates, they are not large in absolute value. The notable exception is Krasker (1979), who calculates a real annual return of negative 8 percent for red wines from 1973 to 1977, but this estimate, unlike all the other returns, is net of storage costs, and Jaeger (1981) argues that he uses too high an estimate of storage costs.

The majority of collectibles yield lower financial returns than stocks, and studies that include a measure of variability over time uniformly find that collectibles embody more risk than most other financial assets. For example, Pompe (1996), who calculates that photographs have one of the highest annual returns—30 percent *after* including buyer's fees—also finds extremely high variability, with a standard deviation of almost 300 percent in year-to-year returns. As one might expect, the narrower the collectible market segment being considered, the wider the variability in annual returns. For example, Pesando (1993) finds that variability in Picasso prints is larger than variability for prints in general, and Rush (1961) shows how particular types of paintings fall in and out of fashion. Indeed, collectibles often yield lower returns than bonds as well. These results imply that the nonpecuniary return to at least some forms of collectibles may in many cases be substantial; indeed, one can approximate the nonpecuniary returns by subtracting

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[5] We are indebted to the lead of Frey and Eichenberger (1995a, b), who have compiled prior versions of tables comparing results across studies of art.

[6] Opportunity costs calculated using inflation rates and financial instruments from other parts of the world (where Europe and Japan would be of particular relevance) would differ substantially in many cases, and many studies provide the comparison rate that they find most relevant.

[7] We will provide upon request an expanded version of the appendix table that includes results when available for subsets of the sample, either by time period or object type, and includes the variance measures from those studies where they are reported.

the return on equity or debt from the pecuniary rate of return on the object at hand.

In an attempt to uncover additional patterns across the studies relating to how they were done, we performed a meta-analysis, using each study as an observation in a regression.[8] The dependent variable was taken as either nominal or real rate of return. The independent variables included dummy variables indicating the type of methodology used (fixed-basket composite index, varying-basket composite index, hedonic regression, or repeat-sales regression), a dummy variable indicating relatively large size or fragility of the objects in question (like wine and paintings as opposed to coins and stamps), whether the sample size was large or small (with large defined as over 1000 observations), the number of years included in the study, whether the study period included major bull and/or bear markets, and whether data were taken from auctions as opposed to dealer transactions or specific port-folios. The meta-analysis showed that none of these factors affected returns system-atically, and indeed, the null hypothesis that all the variables were jointly insignif-icant was not rejected by an F-test at the 5 percent significance level. The only individual factor for which the null hypothesis of no effect was rejected at the 5 percent significance level was that nominal rates of return on collectibles tend to drop during bull markets—perhaps because investors are stampeding elsewhere.

Covariance of Returns: Are Collectibles a Hedge?

Two questions that have arisen are whether returns on various collectibles are correlated with each other, and whether they are correlated with financial asset returns. In particular, if a negative correlation exists between collectibles and the stock market, or between collectibles and inflation, then investors might be able to use collectibles as hedge investments.

Several writers have picked up on this idea for various collectibles categories. For instance, Ibbotson and Brinson (1987) assert that collectibles can provide a hedge against inflation. They correlate the Salomon indices for coins, stamps, Chinese ceramics, and Old Masters paintings against various financial assets (stocks, bonds, treasury bills) from 1970 to 1985 and find a negative correlation with returns on financial assets. Cardell et al. (1995) suggest, based on the period 1947–1988, that stamps have opposite sensitivities to stocks in regard to inflation, default, and term structure factors, and hence would be potential hedges against stock market risk (although stamps were also significantly positively correlated with small-cap stocks). Kane (1984) finds that coin returns could have provided a potential inflation hedge during the 1970s and early 1980s (perhaps unsurprising given that metals did well during this period). However, as outlined above, our own meta-

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[8] We will provide these data in computer-readable form upon request. Note that some of the studies, particularly in the area of paintings, draw at least in part upon the same underlying data sources. We do not deal with this issue of potential intercorrelation in the meta-analysis.

analysis of the available evidence on collectibles supports the notion that the return on collectibles may be negatively related to stock market rises, but does not provide evidence that collectibles are a good hedge against stock price falls, as their returns remain flat in bear markets.

If collectibles could indeed provide a useful hedge against other financial assets, some financial institutions might want to offer mutual funds that invested in these items. However, fiduciary institutions have shied away from creating collectibles funds (though Salomon did establish a collectibles index). John L. Marion, president of Sotheby Parke Bernet, reports that he was asked by many financial managers if he would help them create such funds in the late 1970s, but that he was discouraging of these schemes (as quoted in Worthy, 1984). Collectibles mutual funds have not come into being, although some limited partnerships are operating in this area. For example, the president of an antique rug gallery reports in Madden (1989) that he has formed profitable rug-buying limited partnerships that sold their rugs on consignment through his gallery.

The British Rail pension fund carried out what is apparently the only systematic institutional attempt to invest in collectibles. Sotheby's encouraged BritRail to implement a plan in 1974 whereby it invested a significant amount of assets in art (and Sotheby's acted as sole advisor) (Faith, 1985, pp. 208–218). By 1979, BritRail held about 2.9 percent of its total pension fund assets as artworks—2,423 pieces in 20 categories, with 18 percent of value represented by Old Master paintings (Brown, 1994). Yet, the investments—with the benefit of hindsight—have proven suboptimal. By 1994, at which point most of the fund had been liquidated, the return was 13.8 percent per annum during a period when British stocks averaged 21.5 percent, although the portfolio had a slight edge over the U.S. stock market during this time.

An alternative possibility that has been suggested by some studies is that collectibles markets are *positively* correlated with financial asset markets. For instance, both Goetzmann (1993) and Chanel (1995) argue that changes in stock market valuations drive changes in the art market, through the simple mechanism that stock investors become richer and spend their gains in part on art. Ginsburgh and Jeanfils (1995) find no long-run relation between art and stocks, but find that in the short run, financial markets can influence art markets. However, the performance of the art market in recent years is unsupportive of the positive correlation argument: the 1987 stock market crash did not bring a slump in the art market; and in the first part of the 1990s, a slump occurred in the art market that was apparently uncorrelated with stock movements (Bartholomew, 1991).

Characteristic Patterns to Collectible Returns

Many writers on collectibles markets have asked whether these markets exhibit significant deviations from efficient market behavior. Asymmetric information regarding valuations (including the potential of fakery), the presence of many

potentially non-profit-maximizing agents—including private collectors and muse-ums, and the relative illiquidity of these markets are three factors that might lead to this situation.[9] Indeed, Frey and Eichenberger (1995a, b) argue that the major characteristic of art markets is that behavioral anomalies matter more in these markets than in broader financial markets.

It does appear that many collectibles markets exhibit boom-bust patterns in the short run. Cardell et al. (1995) document an impressive price run-up and deflation in stamps from 1978 through 1982. Using the Salomon Brothers composite indexes from 1967 through 1988, Cutler et al. (1991) find positive serial correlation in annual returns to oriental carpets, stamps, Chinese ceramics, rare books, and Old Master paintings at high frequency, but weak negative serial correlation over long horizons. These emphatic short-run price movements raise the question as to whether those in the know can make a killing in a given collectibles market and move out before the masses stampede in. Coffman (1991, p. 83) argues that "bargains may be found in various tangible assets, most notably art and antiques," where he defines a bargain as buying an undervalued asset and (eventually) selling when everyone else catches on to its worth. He argues in particular that unorga-nized markets, such as for items sold primarily at regional auctions and yard sales, offer potential for bargains.

As markets for many items become more organized, the possibility of such bargains will likely drop. In the art market, Goetzmann (1995) finds that informa-tional efficiency has contributed to a decrease in price risk over the history of the art market, and Goetzmann and Spiegel (1995) argue that the increasing popula-tion of art collectors has led to a reduced probability of having a low return realization. Ginsburgh and Jeanfils (1995) find that various art auction markets in New York, London, and Paris move together, so that there do not appear to be large possibilities for arbitrage across geographically-separated auction markets. In wine markets, Ashenfelter (1989) documents price convergence over time between wine markets in London, Amsterdam, and the United States (along with apparent arbitrage possibilities between Geneva and the United States that he hypothesizes are unexploitable due to trade barriers).

The case of Beanie Babies (a particular brand of small stuffed animals, first marketed in 1994) offers an example of the rapid price rise enjoyed by early investors in new collectibles markets—and the subsequent subsidence in prices. Beanie Babies were a great investment if you got in on the ground floor. We calculated a return of between 159 and 176 percent per annum from January 1994 through January 1999, based on the assumptions that if you created a balanced portfolio of one of each type of beanie baby (including production error types), and that you had bought each one at the manufacturer's suggested retail price of

[9] There is an interesting literature on the phenomena of widely varying and systematically declining prices in collectibles auctions; see Ashenfelter (1989), Pesando (1993), Beggs and Graddy (1997), and Ginsburgh (1998). Pommerehne and Feld (1997) discuss the apparent upward bias on art market prices caused by the presence of large private museums as buyers.

about $6.[10] However, the market peaked in early 1998, and the price index has fallen over 25 percent in the last nine months. Interestingly, price guides for Beanie Babies have broken with a long tradition in price guides for collectibles of not listing estimated future prices (Mannix, 1998). An eight year-old lent us a Beanie Baby pricing guide (purchased through a school book fair) that listed estimated year 2008 prices for each type (Dralle and Wilson, 1998) so that we could test the hypothesis that estimated prices might be holding out the chimera of substantial future returns. However, based on these estimates, our balanced Beanie Baby portfolio was forecast to yield only 8.8 percent per annum in nominal terms over the next ten years.

Other Factors Affecting Net Returns on Collectibles

One might expect for there to be a large differential between gross and net returns on collectibles, given the need to use market makers like auction houses and dealers to buy and sell collectibles, and the fact that some of these items require storage space and/or careful handling. Studies which consider these factors find, not surprisingly, that taking account of these costs significantly lowers the rate of return. For example, in Burton and Jacobsen (1998), we calculate for a specific portfolio of wine that sales commissions, insurance, and storage costs reduce a gross return rate in the range of 9.4 to 11.8 percent by 3.7 percentage points. Ross and Zondervan (1989) calculate minuscule rates of return on Stradivarius violins net of transactions costs.

A possible offset against these holding and transactions costs is the potential tax advantage of some collectibles investments. To the extent one could donate collectibles and set them against tax liabilities at an appraised value, this consideration is not an inconsiderable for some wealthier owners. This can also lead to inflated valuations for items, since few actual sales of collectibles take place at these prices used for purposes of valuing a charitable contribution. Frey (1997) argues that taxation is a crucial issue in understanding collectibles markets, but one on which our current state of understanding is unsatisfactory.

Conclusions and Directions for Further Research

There are clearly a number of interesting directions in which further research in this area could proceed; indeed, this area is a virtual gold mine of ideas for

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[10] The lower figure was calculated using the prices for 158 models as reported in Dralle and Wilson (1998). The higher figure was calculated using an average of these prices along with another six sets of prices for 188 models as reported as of mid-July 1998 at three websites: "Beanie Babies," "Beanie Baby Price Guide," and "Beanie Value Guide." These data were subsequently updated through January 1999 using "Beanie Value Guide."

undergraduate theses. One can imagine researching a number of categories of collectibles which have been untouched by economics researchers, including cars, commemorative coins, and Hummel figurines. Students could attempt to construct indexes for specific categories and/or portfolios and grapple with the issues that arise.[11]

There are also a number of directions in which more serious research could be extended (see Frey, 1997, for additional ideas). For example, what is the difference between purchasing an equity stake in a collectibles company versus purchasing the collectibles themselves? (An obvious parallel is the question of whether to buy stock in a gold mine versus buying gold directly.) Do collectible price guides reflect the prices observed in actual trades? What difference would it make to the price indexes to go beyond auction house data, which is used by most studies of collectibles, and to use appraiser databases, which may also contain information from private or dealer transactions? New online auction sites are creating a rich lode of data on collectibles and prices, including ⟨http://www.ebay.com⟩ and ⟨http://auctions.yahoo.com⟩. These auction sites typically have low transactions costs—for example, a declining marginal percentage scale from 5 percent to 1.25 percent plus a small listing fee of $0.25 to $2.00 paid by sellers on eBay, with currently zero cost for both buyers and sellers on the Yahoo! site—and a high degree of control over bidding by both seller and buyer. For example, on eBay the seller can specify the type of auction (English or Dutch), the minimum bid allowed, the length of time over which bids will be accepted, and a reserve price which is not revealed to the bidders, while the buyer can specify the maximum acceptable bid and allow the site to increase bids automatically up to the maximum. On eBay, bid histories become available on-line after each auction closes, allowing one to see both which items did not sell and, for those that did sell, what all the losing bids were as well as the winning bid.

Our survey of the literature on returns to collectibles has proved instructive to us in several ways. We have dissuaded ourselves from making large investments in collectibles (in wine in particular) and have patted ourselves on the back for remaining invested in mutual funds over the last few years as opposed to creating a collectibles portfolio. However, for those with a yen for gambling, collectibles provide an outlet for sustained betting that is perhaps more socially acceptable than casinos or even the lottery, may offer its own sort of intrinsic joy, and in many cases, will yield returns better than even money.

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[11] If you or one of your students write such a paper, please send along a copy to Jacobsen, and we will keep track of progress in this area over the next few years.

Appendix: Returns on Collectibles

Author (Date)	Object	Period of Study	Annual Nominal Return	Annual Real Return	Nominal Return minus Equity	Nominal Return minus Debt
Aggregate Indexes						
Sotheby's (Faith, 1985)	various types; subindex	1971–1984	11.10	3.58	0.32	1.96
Salomon Brothers (Cutler et al., 1991)	values for different object types are found	1967–1988	12.75	6.03	1.41	4.35
BritRail Fund, as reported in Brown (1994)	below in the relevant sections	1974–1990	13.80	5.80	0.57	4.45
Antique Furniture						
Rush (1968)	All types	1925–1968	4.90	3.29	(7.63)	1.53
Sotheby's-Times (Stein, 1977 and Keen, 1971)	French	1950–1969	10.00	7.76	(4.33)	6.10
Sotheby's (Mahon, 1981)	American	1975–1980	11.11	2.21	(9.07)	2.05
	Continental		11.78	2.88	(8.40)	2.72
	English		15.25	6.35	(4.93)	6.19
Sotheby's (Ferris and Makhija, 1987)	American	1981–1984	0.52	(0.10)	(17.18)	(10.31)
	Continental		0.83	0.21	(16.87)	(10.00)
	English		0.57	(0.05)	(17.13)	(10.26)
Graeser (1993)	American	1967–1986	6.97	0.52	(4.69)	(1.37)
BritRail Fund (Brown, 1994)	French	1974–1988	11.60	3.50	0.04	2.06
Ceramics						
Sotheby's-Times (Stein, 1977 and Keen, 1971)	Chinese	1950–1969	18.00	15.76	3.67	14.10
Sotheby's (Mahon, 1981)	Chinese	1975–1980	24.32	15.42	4.14	15.26
	Continental		16.94	8.04	(3.24)	7.88
Sotheby's (Ferris and Makhija, 1987)	Chinese	1981–1984	0.36	(0.26)	(17.34)	(10.47)
	Continental		0.84	0.22	(16.86)	(9.99)
Salomon Brothers (Deutschman, 1991)	Chinese	1971–1991	11.60	5.34	(0.48)	2.71
BritRail Fund (Brown, 1994)	Chinese	1974–1989	16.90	8.60	2.62	7.47
Coins						
Kane (1984)	All types	1970–1979	20.58	13.37	12.62	13.19
BritRail Fund (Brown, 1994)	Ancient	1974–1987	1.40	(8.70)	(11.70)	(8.17)

Author (Date)	Object	Period of Study	Annual Nominal Return	Annual Real Return	Nominal Return minus Equity	Nominal Return minus Debt
Dickie et al. (1994)	Cent	1984–1991	0.21	(3.73)	(14.34)	(8.29)
	Nickel		0.44	(3.50)	(14.11)	(8.06)
	Dime		0.17	(3.77)	(14.38)	(8.33)
	Quarter		(0.89)	(3.05)	(15.44)	(7.61)
	Half-dollar		(0.99)	(2.95)	(15.54)	(7.51)
Drawings and Paintings						
Rush (1961)	Post-impressionist	1930–1960	13.80	11.87	2.34	10.87
	Impressionists		8.60	6.67	(2.86)	5.67
	Big moderns (Matisse, Picasso, Braque, Leger)	1945–1960	22.10	18.73	6.21	19.23
	Expressionists (Kirchner, Kokoschko, Munch, Nolde)	1950–1960	31.50	29.42	13.68	28.37
	British portrait artists (Gainsborough, Romney, Hoppner)	1925–1960	1.10	(0.41)	(11.43)	(2.02)
	Barbizon School (Corot, Daubigny, Diaz, Troyon)		(2.60)	(4.11)	(15.13)	(5.72)
	17th century Dutch artists (Hals, Ruisdael, Van Goyen)		2.50	0.99	(10.03)	(0.62)
	Italian Primitives	1926–1960	11.50	9.98	(0.57)	8.42
	Italian to 1450	1925–1960	8.90	7.39	(3.63)	5.78
	Mid-16th century Venetians (Titian, Veronese, Tintoretto)	1927–1960	8.10	6.48	(4.04)	5.05
	Italian Baroque (1550–1700)	1945–1960	11.30	7.93	(4.59)	8.43
	Goldschmidt collection: 7 Impressionist paintings	1931–1961	7.30	5.02	(5.96)	4.33
	Fisson collection: Constables	1929–1959	8.00	6.21	(2.97)	5.08
Anderson (1974)	All types	1653–1970	4.90	4.22	(4.99)	0.64
Sotheby's-Times (Stein, 1977 and Keen, 1971)	Old Masters	1950–1969	11.00	8.76	(3.33)	7.10
	Impressionists		17.00	14.76	2.67	13.10
	20th century		21.00	18.76	6.67	17.10
	Old Master drawings		19.00	16.76	4.67	15.10
Stein (1977)	Paintings painted before 1946 by artists who died prior to 1946	1946–1968	10.47	7.80	(3.28)	7.00

Author (Date)	Object	Period of Study	Annual Nominal Return	Annual Real Return	Nominal Return minus Equity	Nominal Return minus Debt
Sotheby's (Mahon, 1981)	Old Masters	1975–1980	10.33	1.43	(9.85)	1.27
	19th century European		8.41	(0.49)	(11.77)	(0.65)
	Impressionist & Post-impressionist		13.25	4.35	(6.93)	4.19
	Modern American		12.77	3.87	(7.41)	3.71
			22.92	14.02	(2.74)	13.86
Baumol (1986)	All types	1652–1961	1.25	0.55	(8.72)	(2.99)
Sotheby's (Ferris and Makhija, 1987)	Old Masters	1981–1984	0.73	0.11	(16.97)	(10.10)
	19th Century European		0.86	0.24	(16.84)	(9.97)
	Impressionist		0.68	0.06	(17.02)	(10.15)
	Modern		1.02	0.40	(16.68)	(9.81)
	American		0.95	0.33	(16.75)	(9.88)
Frey and Pommerehne (1989)	800 best-known painters of the world with holding period of more than 20 years	1635–1987	3.90	1.90	(6.10)	(0.75)
		1635–1949	1.80	1.40	(7.85)	(2.66)
		1950–1987	6.70	1.60	(6.14)	0.46
Frey and Serna (1990)	Guterman collection: Old Masters	1981–1988	10.59	3.20	(2.83)	0.42
	Mettler collection: Impressionists	1915–1979	5.93	2.80	(5.34)	1.77
Rouget et al. (1991)	Paintings from the 1950s	1960–1990	10.98	5.90	0.21	3.49
Salomon Brothers (Deutschman, 1991)	Old Masters	1971–1991	12.30	6.04	0.22	3.41
Buelens and Ginsburgh (1993)	All types (Composite Index)	1700–1961	1.49	0.65	(8.44)	(2.79)
	All types (Repeat Sale Regression)		1.71	0.87	(8.22)	(2.57)
	All types (Hedonic)	1750–1961	1.76	0.91	(8.11)	(2.46)
Goetzmann (1993)	All types	1716–1986	3.20	2.00	(6.78)	(1.25)
Holub et al. (1993)	Drawings	1950–1970	13.71	11.30	0.00	9.70
	Watercolors		18.21	15.80	4.50	14.20
Mok et al. (1993)	Modern Chinese	1980–1990	52.90	48.18	38.06	42.88
BritRail Fund (Brown, 1994)	Impressionist	1974–1989	21.00	12.90	6.72	11.57
	19th Century Victorian	1974–1990	14.00	6.60	0.77	4.65
Chanel et al. (1994)	All types (32 selected artists)	1960–1988	11.80	6.70	1.10	4.40
De la Barre et al. (1994)	"Great Masters"	1962–1974	12.00	7.83	7.80	6.49
Agnello and Pierce (1996)	Mostly 19th century American by 66 artists	1971–1992	9.30	3.25	(3.32)	0.62
Chanel et al. (1996)	Primarily Impressionists	1855–1969	6.20	4.90	(3.80)	2.40
Fase (1996)	19th Century	1946–1966	11.00	7.50	(2.16)	7.63
		1972–1992	10.60	1.10	(1.87)	1.79
Goetzmann (1996)	Randomly selected collections	1907–1987	8.24	2.42	(2.62)	3.49

Author (Date)	Object	Period of Study	Annual Nominal Return	Annual Real Return	Nominal Return minus Equity	Nominal Return minus Debt
Candela and Scorcu (1997)	modern and contemporary paintings sold in Italy	1983–1994	3.89	0.21	(9.55)	(4.41)
Czujack (1997)	Picassos	1966–1994	8.57	2.99	(2.08)	0.58
Agnello and Pierce (1998)	American	1971–1996	4.20–6.90	(1.37)–1.33	(8.95)–(6.25)	(4.11)–(1.41)
Photographs						
Pompe (1996)	All types	1980–1992	30.20	25.67	14.86	20.71
Perloff (1998)	25 prints that appear regularly at auction	1975–1998	13.84	8.75	(2.78)	5.33
Prints						
Sotheby's-Times (Stein, 1977 and Keen, 1971)	Old Master	1950–1969	20.00	17.76	5.67	16.10
Penn (1980)	Modern (1850–1950)	1954–1978	24.88	21.12	13.69	19.70
Davis (1982)	All types	1965–1980	19.60	10.40	12.60	11.60
Pesando (1993)	Modern	1977–1992	7.27	1.51	(6.72)	(2.13)
BritRail Fund (Brown, 1994)	Old Master	1974–1987	11.00	2.50	(2.10)	1.43
Pesando and Shum (1998)	Picasso	1977–1996	6.61	1.48	(7.79)	(2.17)
Oppenheimer (1999)	Audubon folios	1830–1992	5.27	0.02	(0.05)	0.01
	Audubon prints	1905–1999	6.31–9.96	0.03–0.07	(0.04)–0.00	0.02–0.05
Stamps						
Taylor (1983)	5-cent 1847, 10-cent 1847, 90-cent 1869, $3 1893 unused, $4 1893 unused	1963–1977	14.50	9.50	6.29	8.57
Salomon Brothers (Deutschman, 1991)	All types	1971–1991	10.00	3.74	(2.08)	1.11
Cardell et al. (1995)	Stamps issued between 1847 and 1930 of constant quality	1947–1988	7.60	3.45	(5.07)	1.57
Wine						
Krasker (1979)	Post-1950 Red Bordeaux and California Cabernet auvignon	1973–1977	0.38	(7.71)	(2.71)	(6.83)
Jaeger (1981)	Post-1950 Red Bordeaux and California Cabernet Sauvignon	1973–1977	11.01	2.92	7.92	3.80
		1969–1977	19.28–3.48	14.14–18.34	18.98	16.60

Author (Date)	Object	Period of Study	Annual Nominal Return	Annual Real Return	Nominal Return minus Equity	Nominal Return minus Debt
Ashenfelter et al. (1993)	Post-1960 Red Bordeaux	1952–1980	2.38	(1.76)	(9.62)	(3.35)
Byron and Ashenfelter (1995)	Post-1960 Australian Grange	1961–1993	12.00–18.00	4.30–10.30	(0.50)–6.50	4.54–10.54
	Post-1960 Red Bordeaux		10.10	2.40	(1.40)	2.40
Fase (1996)	Post-1960 Red Bordeaux	1982–1992	11.50	5.80	(3.81)	2.70
Burton and Jacobsen (1998)	Post-1960 Red Bordeaux	1986–1996	8.48	3.70	(6.23)	1.30
	Expert-selected portfolios		5.30–9.30	0.52–4.52	(9.41)–(5.41)	(1.88)–2.12
Sundry						
Sotheby's-Times (Stein, 1977 and Keen, 1971)	English glass	1950–1969	12.00	9.76	(2.33)	8.10
	Modern books		11.00	8.76	(3.33)	7.10
	Old books		14.00	11.76	(0.33)	10.10
Wellington and Gallo (1984)	Toy soldiers—infantry	1978–1982	7.20	(1.03)	(10.94)	(4.66)
	Toy soldiers—cavalry		12.75	4.52	(5.39)	0.89
Avery and Colonna (1987)	Antique firearms	1978–1984	7.07	(1.01)	(7.50)	2.37
	Reproduction firearms		7.74	(0.34)	(6.83)	3.04
Ross and Zondervan (1989)	Stradivarius violins	1803–1986	2.18	1.33	(8.02)	(2.82)
BritRail Fund (Brown, 1994)	Snuffboxes	1974–1990	11.00	3.00	(2.23)	1.65
	Books and manuscripts	1974–1988	8.70	0.90	(2.86)	(0.84)
	African art	1974–1989	6.40	(1.30)	(7.88)	(3.03)
Kelly (1994) (Frey and Eichenberger, 1995b)	Mettlach beer steins	1983–1993	2.69	(1.10)	(12.07)	(5.65)
Ginsburgh and Penders (1997)	Conceptual art	1972–1992	18.90	12.66	6.43	10.09
	Land art		20.00	13.76	7.53	11.19
	Minimal art		23.80	17.56	11.53	14.99
Burton and Jacobsen (in this paper)	Beanie Babies	1994–1999	159–176	156–173	140–157	152–169

Notes: All rates are expressed as annual average percentage returns. Where a real rate of return was not provided in the study, we calculated one. The inflation rate from 1913 to present is derived from the Consumer Price Index. Prior to 1913, data are as reported in Ibbotson and Brinson (1987), who compile Census Bureau indexes of consumer and producer prices going back to 1719. Rates prior to 1719 are assumed to be the long-run average over the entire period. The return on equity is derived from various sources, namely: 1790–1871 and 1872–1925 data are from Ibbotson and Brinson (1987), which in turn relies on other historical sources, and 1926–1998 figures are from the DRI database. The return on debt is largely derived from Homer (1963), which reports bicentennial average rates of return for British long-term bonds prior to the 18th century and decennial averages thereafter. More recent yields are derived from a 7-year constant maturity U.S. government note.

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