Collectibles as Alternative Investment

THESES

Erdős Péter
2010
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I. The background and the aim of the research

The thesis concentrates on alternative investments with particular interests in collectibles from a financial point of view. Generally, all the assets, besides those ones which belong to the traditional asset classes such as stocks, bonds and financial market instruments, are considered as alternative investments. More precisely, the work focuses on a subsegment of alternative assets, on the collectibles market. On the one hand, they exhibit similar features to commodities which are the largest fraction of alternatives investments by market value besides real estates. On the other hand, their main difference is that collectibles have no or only marginal use value, thus the convenience yield from the actual use is converging to zero; however, they also provide other non-pecuniary return from the social status and the aesthetic pleasure of the owner (see Goetzmann, 1993). Collectibles is a collective noun which may refer to paintings and prints, stamps, coins, ceramics, photography, furniture, books, wines, etc. Almost all the types of collectibles can be considered as consumer goods, thus here we consider only investment grade collectibles. For example, there are only a few fine wines that reach investment quality, mainly from Bordeaux, Burgundy, Porto, Italy and several vineyards from the New World. Collectibles are not necessary antique goods, for example, there are baseball cards, some stamps, coins, figurines which are produced in a limited quantity to attract collectors (see e.g., Burton and Jacobsen, 1999). On the other hand, new wines and primarily sold contemporary art can also be considered as alternative investments.

A dissertation, which is dealing with collectibles, has to take the two largest segments by market value and trading volume into consideration, thus paintings and fine wines are discussed in detail. According to artmarketmonitor.com the art market was 40 billion dollars in 2008 which is a 10 billion dollar drop from the previous year which had the record annual turnover (as a reference point, the sales revenue of the internet based advertising business was 30 billion dollars in 2008, which was the total aggregate revenue of Google and Yahoo together). Anthony Maxwell, who works for Liv-ex (London International Vintners Exchange), estimates the wine market to be three billion dollars in 2009. On the other hand, the dissertation besides the two most important collectibles markets, the dissertation concentrates on a special narrow segment, namely the antique Baedeker guidebooks. The Baedekers have not been investigated from an investment point of view. However, although this market has a market value which is only a tiny fraction of the other two large segments, it
could be interesting to follow the pricing of such a small market since we can gain insight into how the collectibles market works. We might state that if the smallest segment of collectibles market exhibits efficient pricing, we can assume rightly that a bigger, more liquid market with more collectors also shows efficient pricing.

To have some knowledge of how these markets actually work, it is worthwhile to analyze the principal features of the collectible markets. Traditional financial assets are mainly frequently traded on organized markets like exchanges; that is, they are considered liquid assets. In contrast, collectibles are frequently sold via dealers; however, the most prestigious pieces are traded on specialized auctions which are held worldwide several times a year, thus they are relatively illiquid, at least comparing with traditional financial assets. Perhaps the only exceptions are wines. For instance, there is the Liv-ex exchange (London International Vintners Exchange) in the UK which works exactly like a stock exchange and provides market liquidity for fine wines. However, this liquidity still cannot be comparable to that of stocks and bonds, as it usually occurs that a particular type of wine (of a given vintage from a given chateau) is not even traded once a month. The illiquidity is generally considered as a risk factor (see e.g., Amihud and Mandelson, 1986; Pástor and Stambaugh, 2003), which results in higher required return and which might challenge a single factor CAPM or the Fama-French (1996) three-factor model, which do not take liquidity into consideration as a risk factor. We will see that this is not the case though, probably because collectors are not typical investors; they do not mind holding an illiquid asset as they are compensated by other non-monetary returns.

We aim to concentrate on whether or not the alternative investments are priced efficiently based on all of the fields concerned in the dissertation.

II. Research methodology

The low level of liquidity generates a serious issue on analyzing collectibles as investments. Traditional financial assets are generally tracked by a broader or narrower index which is either based on fixed or varying basket. The latter has the advantage that it can accommodate to the changes of the market, for example, new issues can be added. An index of a liquid asset is calculated by simply assessing the value of each component periodically or even continuously. Some weighting function is usually applied for index calculation; by far
the most common are the market-value-weighted (S&P 500 or CRSP) and the equally-weighted index calculation (S&P 500 Equally Weighted Index); however, there are also price weighted indexes (Dow Jones Industrial Average). On the other hand, in the case of most collectibles, this methodology is not applicable because of the market illiquidity. Collectibles are rather traded infrequently, thus prices can be observed only at infrequent and irregular intervals. If we aim to investigate the prices of collectibles through a market index from time to time, estimation should be applied. Generally, there are two ways to estimate market indexes, one is the hedonic regression and the other is the repeat sales regression (RSR). Which one is used depends on the available data and the characteristics of the collectibles. Hedonic pricing requires a well established pricing function based on the features of the collectibles. For example, a hedonic function for paintings can include variables for the size, the medium, the technique, the artist, the age, whether the painting has been signed, whether the artist is deceased, whether it has a tracked provenance, and where it has been sold (see, e.g., Buelens and Ginsburgh, 1993). It happens that not all of the required variables are saved when a piece of art is sold and it is really difficult to collect the data after that. An arbitrary hedonic specification can be misleading since it would bias the estimates, thus the hedonic function should be carefully defined and should not depend on the available data. If data availability influences the choice of variables included in the hedonic function, it introduces bias in the estimates because of the missing variables. The hedonic method also relies on the stability of the hedonic variables; however, it is well known that the collector’s taste varies from time to time.

If hedonic specification is not applicable because there is no available data on each hedonic variable, there is another possible approach, the RSR. This method can be applied if the collectible asset is produced in quantity or there are repeated sales of the unique collectible recorded in the database. The RSR estimates the index by comparing the purchase and the sale price of the same item or those of two different items which share the same features in all aspects. It has an advantage over the hedonic method since it does not depend on any arbitrary chosen hedonic function. However, it has a main shortcoming because it includes only a subset of the executed market transactions; sale prices of an item which is recorded only once in the database are not eligible. Obviously, it can introduce an upward bias in the estimated index since collectibles which fall out fashion generally disappear from the market (see Frey and Pommerehne, 1989; Goetzmann, 1996), thus repeated sales are not recorded for them. It is worth noting that it has impact only if the given collectible falls out of
fashion during the investigated period. On the other hand, this method also excludes the sales prices of museum purchases which can moderate the upward bias. RSR is frequently applied for estimating market indexes of not unique collectibles (coins, stamps, books, prints). Either the hedonic or the RSR estimation is subject to measurement error, thus they are only an approximation of the market index, not like standard composite indexes in the cases of traditional financial assets.

If the market of a particular collectible can be tracked by an index based on one of the above methods, the usual tests of financial markets can be run noting that the mentioned measurement error can lower the power of the tests (see e.g., Roll, 1977). Efficiency tests have been in particular interest for several decades and numerous empirical studies have been made on this field. In the past two-three decades, the alternative investments are also in the focus from this point of view. Studies on the collectibles market related to the efficient market hypothesis, predominantly focus on equilibrium asset pricing, underperformance of masterpieces and the violation of the law of one price; however, the price processes have not been studied thoroughly, the dissertation is dedicated among other to the investigation of that.

The thesis is organized as follows. In Chapter II the US art auction prices are analyzed from an efficiency point of view. Weak-form efficiency is tested applying variance ratios tests. The fine wine prices and returns are investigated in Chapter III. Beveridge-Nelson (1981) is applied to detect the size of the random walk and the stationary component. Asset pricing tests are run on fine wine returns, performance of master wines is also measured with respect to their cheaper counterparts, and finally the long run relationship between the stock and the fine wine markets is tested by cointegration analysis. In Chapter IV the antique Baedeker guidebook market is analyzed. A repeat sales regression index is compiled to be able to track guidebook prices. Then asset pricing tests are applied on the returns of the compiled index, the law of one price in the case of auctions traded in different currencies and the underperformance of Baedekers are tested. Finally, Chapter V concludes the results of the dissertation.

### III. Hypotheses and scientific results

The collectibles as alternative investments are discussed in three distinct chapters.
III.1. Random walk theory and the weak-form efficiency of the US art auction prices

In this chapter we investigate the US art market from the efficiency point of view. We aim to understand the price behavior of art works; mainly paintings sold in the most prestigious US auction houses We also aim to find the most suitable methodology for this purpose. We test the random walk hypothesis applying a specially constructed US art index using the Mei Moses Fine Art Index and the US subindex of the Artprice Global Index family, which all together cover a 134-year-long period. We apply variance ratio tests on the merged index to detect the size of the random walk component. We find that the price components, that is the random walk and the temporary components are time varying.

For estimating variance ratios, estimation of spectral density has to be applied. In the dissertation we investigate the most frequently used kernel based estimators (Bartlett, Parzen, Quadratic Spectral, Tukey-Hanning) in the literature and also the non-parametric Cocharne (1988) method. Based on our results, we can argue that based on mean square errors, for estimating the variance ratio of the art market, the Cochrane (1988) method is the optimal.

We find that in our sample period of 1875-2008, the US art prices follow neither a pure random walk, nor a pure stationary process. The Cochrane (1988) variance ratio declines up to lag 12 where it takes the value of 28% which is more than two standard errors from unity and zero so we can reject either a null hypothesis of pure random walk or a null of pure stationary process. Based on the studied ARMA processes, art returns are closest to an ARMA(2,11) on which art prices would contain a 35% random walk component and a 65% stationary component.

We identify structural breakpoints in our data testing 1935, 1945 and 1973. Before 1935 the RSR estimation of Mei Moses Fine Art Index is based only on a few data points which can result in spurious negative autocorrelation (see Mei and Moses, 2002). The choice of 1945 as the starting date of the post-war era is an obviously possible structural breakpoint, which is commonly used in the literature. Finally, we choose 1973 because of the introduction of price estimates. Mei and Moses (2005) argue that these estimates are upward biased; therefore, they potentially influence the art price formation. If we exclude the first 60 years from our data, the random walk hypothesis cannot be rejected. The first 60 years of the dataset; however, exhibit similar result to the one obtained for the whole sample period. There
is no significant difference between our results, if we choose 1935, 1945 or 1973 as the starting point of our estimates. If we choose 1935 as the starting date, the random walk component is approximately 75%, on which we cannot reject the random walk hypothesis. If we start our test with 1945 or 1973, we obtain an even higher random walk component; however, the standard errors are much higher, partly because of the higher random walk component, and partly because of the smaller sample size. These estimations are statistically not different, and based on none of them can we reject the null hypothesis of random walk.

The significant difference of art price formation before and after 1935 has many possible causes. One is that the art market has experienced institutional changes since 1935. Along with globalization and the introduction of price estimates, the market expanded and, new investors appeared, so the structural change is an established explanation. The other cause can be the unreliable price estimates in the RSR regressions before 1935 which cause spurious negative autocorrelation in art returns and therefore smaller variance ratios. Summarizing the results, the below statements can be drawn:

- The US art prices have large stationary component between 1875 and 2008; this component is responsible for the 72% of the variance of the returns, on which the random walk of art prices can be rejected.

- The components of the US art prices are time varying. Since 1935 or 1945 the weak-form efficiency of the US art market cannot be rejected; however, the efficiency of periods prior to that is violated due to the sparse data and the social and economic circumstances of the pre-World War II era. The efficiency of the US art market is not violated in the period 1973-2008; nevertheless, since 1973 auction houses have published upward biased price estimates.

### III.2. Wine as an alternative investment

We investigate fine wines as traditional financial assets using the Liv-ex fine wine index family, which includes four indexes: the Liv-ex 100 and 500 (based on the 100 and 500 most sought-after fine wines, respectively), the Claret Chip (based on the top-rated Bordeaux First Growths), and the Investables (mimicking a typical fine wine portfolio). As a first step, the weak-form efficiency of the fine wine market is tested. We apply variance ratio tests estimating autoregressive moving average (ARMA) spectral density, and find that the
Investables exhibits random walk, thus the weak-form efficiency cannot be rejected. On the other hand, based on the other indexes we reject the null hypothesis; however, we have to note that the history of these series is significantly shorter than that of the Investables index. The rejection of the weak-form efficiency implies that there can be arbitrage opportunities; however asset pricing tests do not support this result. The CAPM and the Fama-French regressions show that there is no significant abnormal return and wine premium exhibits low correlations with the returns of the CRSP value-weighted index. This result shed some light on the role of wine investment in portfolio diversification; that is, adding fine wines to a pure stock portfolio can reduce overall portfolio risk. In addition, in favor of holding fine wines in a portfolio, we find that even the long run relationship between wine and stock market returns can be rejected using Johansen (1991) cointegration tests.

Similarly to other collectibles, wine market experts frequently recommend to their clients to invest in “masterpieces”; that is, in the most sought-after, First Growth wines. When considering expensive pieces of art, discerning whether or not the most costly examples under or outperform the market as a whole, is a common topic of study. Therefore, we measure the performance of the most expensive wines using the Claret Chip index. The Sharpe ratios show that the most expensive fine wines underperform the others in the period of January 2004 – February 2010. If we focus on this issue in an asset pricing setting, we can conclude that none of the wine indexes show significant abnormal performance, thus the “wine masterpieces” are not favored with respect to their cheaper counterparts. In addition, if we apply a single-factor model capturing the market movements of the fine wine market by the Liv-ex 500, which is the broadest wine index in the Liv-ex family, none of the subindexes exhibit significant performance confirming the results derived under the asset pricing frameworks. Our results concerning the “wine masters” are in accordance with the findings of Fogarty (2006) on the Australian market: the most expensive wines, rated as Exceptional or Outstanding on the Langton’s scale, have the highest rate of return with the highest risk. However, they are variance with Burton and Jacobsen (2001) who argue the most expensive Bordeaux reds have favorable risk-return characteristic over the general market, and partly at variance with Jaeger (1981) who finds the least expensive red Bordeaux and California Cabernet wines have higher returns and higher risk. I would summarize the results of our investigations in the following statements:

- The weak-form efficiency of the Liv-ex Investables index which is a benchmark portfolio of a typical wine investor, can not be rejected in the period January 1988 -
February 2010.

- “Master” wines do not outperform the broader market and the efficiency of fine wines cannot be rejected based on the equilibrium models.
- Fine wines have a role in portfolio diversification; on the one hand, since wine returns exhibit low correlation with stock market returns and on the other hand, there is no long run equilibrium between wine and stock prices.

III.3. Baedeker guidebook as alternative investment

In this chapter we analyze the price behavior of German, English and French Baedeker guidebooks issued between 1828 and 1945.

We analyze the Baedeker prices and returns based on the hammer prices of successful eBay auctions from a financial economics point of view. We investigate how much the efficient pricing, which is proved for liquid market with numerous investors and low transaction costs, characterizes this market which has a low volume, low liquidity and a small number of participants. We estimate different indexes to track the price fluctuations of Baedekers which will be used for testing the efficiency. We analyze the efficiency from different points of view (underperformance of masterpieces, the law of one price and equilibrium asset pricing models) and confirm the efficient pricing even in this not frictionless market. Our results shed some light on the pros and cons of Baedeker investments.

In this chapter we first show that there is a common factor in Baedeker guidebook prices using repeat sales regressions (the detailed methodology is described in Chapter II.2.2). Using our estimation of repeat sales Baedeker index, we compare its return with the S&P 500 and the CRSP value-weighted return index. The correlations between the Baedeker returns and the returns of stock indexes are highly significant, 47.37% and 45.57% respectively, which confirms Goetzmann’s (1993) finding on the art market; that is, the demand for antique guidebooks increases with the collectors’ wealth. This result also shows that investing in Baedeker guidebooks provides some diversification opportunity as the correlations are well below unity.

We find no evidence on the underperformance of the most expensive Baedekers. The “masters” do not underperform the returns of cheaper Baedekers. On the other hand, if we follow Mei and Moses’ (2002) procedure; that is, we estimate the weighted repeat sales
regression by adding an explanatory variable of log purchase price, whose parameter estimation is the elasticity, then this highlights the underperformance from another point of view: a 10% increase in purchase price is expected to lower quarterly returns by 0.18%. In our view; however, contrary to Mei and Moses, this result does not confirm the underperformance of masterpieces, since the estimated negative elasticity does not only refer to masterpieces but also to non-masters. It is more likely that the significant negative elasticity is evidence of the winners curse (Rock, 1986) or of the irrational exuberance (DeBondt and Thaler, 1985; Shiller, 2000). The equilibrium asset pricing models (the CAPM and the Fama-French three-factor model), in accordance with the other results, do not prove the underperformance of masterpieces.

The law of one price can be investigated in our data; however, somewhat differently from the tests in the literature which focus on the price level differences between auction houses or between countries, we investigate the possible differences between auctions denominated in different currencies. Since the USD denominated auctions are on ebay.com, while the EUR auctions are mainly on ebay.de and on ebay.fr and the GBP ones are on ebay.co.uk, this test is similar to the one which would compare the US guidebook market with the UK and the Continental European markets. Of course, everybody from all around the world can take part in all the auctions either as a seller or a buyer who has a registered eBay account. However, this does not mean there is a significant departure from traditional offline auctions.

If we measure everything in US dollars, then the returns of Baedekers sold in USD outperform by 1.1 percentage point the euro ones; however this result is only significant at 93% level. The returns of euro and British pound auctions do not alter significantly. To decide on whether or not the slightly significant outperformance measured in USD is due to the fact that the auction was in the USA not in Europe, it is worth analyzing the composition of the index. As a first step, price indexes are estimated for each language. Based on the language indexes, it can be concluded that German guidebooks are more expensive, while the French ones are cheaper and the English editions’ price level do not significantly differ from that of the whole market. The returns of language indexes explain the returns of the whole market and the returns of the EUR index, thus the composition determines the price level of the market. On the other hand, the components are not able to describe the USD and GBP returns, which is a strange fact considering that these are also part of the market and the whole market is characterized by the constituents. If the returns of the market are explained by the returns of
currency indexes, the GBP and USD factors are not significant which, in our view, means the two indexes are biased. Besides all of these, the price level of the market is determined by the composition; that is, the proportion of German, English and French Baedekers being sold. The outperformance of USD auctions also can be explained by the composition. Thus the better performance of USD auctions is likely to be partly due to the bias, and partly due to the different compositions of the markets, thus the law of one price is not violated in the investigated period.

Finally, in this chapter we apply the standard CAPM (see e.g., Sharpe, 1964) to test the efficiency of the Baedeker market as a whole by adding a constant term for measuring the Jensen (1968) alpha which, we will see, is statistically meaningless in our models. Thus we state that the efficiency of the Baedeker market cannot be rejected. Care has to be taken interpreting these results, since the market depth in contrast to the capital markets is very thin. On the other hand, similarly to Pesando (1993) who concludes investigating the Picasso print market, we state that the Baedeker market is remaining a “market for collectors”; however, this market also can be characterized by most of the theoretical and empirical findings of traditional financial markets.

Based on all of these, I draw the following statements:

- Based on the index estimated by the repeat sales regression, Baedeker guidebooks commove along with a common factor.

- We have not found any evidence which would be against the efficiency; the “master effect”; that is, the underperformance of masterpieces can be rejected and the law of one price is not breached. These results are supported by the estimates of the equilibrium models (CAPM and Fama-French model) on which the efficient pricing cannot be rejected.
References

Publications


Submitted articles which are under review

Submitted to The World Journal of Biological Psychiatry.

Submitted to the Economic Modelling.

Submitted to the Economics Bulletin.

Submitted to the Közgazdasági Szemle (Hungarian Economic Review).

Submitted to the Applied Economics.

Working papers