

Emotional Assets and Investment Behavior^{*}

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Abstract

This paper empirically models a number of emotional assets in the optimal investment decision. Using the spanning techniques we analyze how these emotional assets add to the risk-return profile of investors. We find highly significant results for art, wine and books as a significant allocation into the emotional asset sector. Our findings firstly substantiate the current allocation of HNWI in the luxury goods sector, and secondly give rise to substantive evidence for investors choosing to maximize risk and return whilst also being prepared to give up some financial return in some sectors for emotive reasons. This gives insightful evidence that investors tend to integrate both personal and societal values into the portfolio management process and moreover helps us to separate the emotional and investment value when investing into assets in general.

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Emotional Assets

In this paper we use a broad range of indices on a number of emotional assets, such as art, wine, stamps watches, and atlases, which make up more than 50% of HNWI's investment into the luxury good sector. The reasons for investing in such emotional assets goes beyond investment value alone. They also have a consumption value and provide the owner with greater utility in the form of aesthetic value and can act as a signal of the owner's wealth. However, in the establishment of a number of funds devoted to emotional assets the indirect investor loses the consumption value which the owner receives. Just how large is this consumption value or emotive value from holding such assets? Does this render the financial return as insufficient to warrant investment into such emotional asset funds, where investors only gain from the investment value of the asset?

In this paper we attempt to answer these questions by looking at a unique time series for a wide range of emotional assets. We find evidence that investors in emotional assets, such as wine, art and books although only providing moderate financial return also offer the investor an appealing avenue with which to diversify risk. The property of low correlation with stocks and bonds provides the investor with a means of diversifying risk. Moreover we find evidence that direct investors are willing to forgo financial returns to invest in certain emotional assets, such as clocks and watches, atlases and stamps. The consumption value, or emotional values, is therefore very large. Furthermore, the high consumption value of these assets provide an alternative attribute in portfolio

optimization by their ability to transfer consumption over time, resulting in greater utility for the investor when holding a set of emotional assets in his investment portfolio.

By using a broad range of indices on a number of emotional assets, such as art, wine, stamps watches, and atlases, we are able to capture over 50% of HNWI's investment into the luxury good sector. We analyze the risk and return profile of these various emotional assets using historical data on these collected items. We see how the various assets move in line with each other and analyze if there are any diversification benefits to holding a varied portfolio of these various emotional assets. Of interest is how this diversified emotional asset portfolio can add to the risk-return profile of the private or institutional investor. To analyze this more formally we use performance evaluation tests, to test the statistical significance of the difference in Sharpe ratios between the various mean-variance portfolios. This includes the spanning tests from de Roon et al. (2008) to see if the inclusion of emotional assets in the investment set improves the Sharpe ratio of the investment portfolio. An alternative test is to look at the performance of these assets using the M2 ratio (see Modigliani & Modigliani (1997)). We are also able to directly analyze the additional emotional value (personal or societal) from investing in emotional assets over and above the financial value from improving the optimal portfolio allocation for the individual or institutional investor (on behalf of his investors).

I. Investment Behavior

Globally the number of high net worth individuals (HNWI) is increasing and their interest in investing into the luxury goods sector is increasing at a similar rate. From

exhibit 1 taken from the Merrill Lynch/ Cap Gemini World Wealth Report 2007 we see that luxury goods, such as cars, shipping and airplanes dominate the type of investment into luxury goods taking a 26% share. Art and jewelry take the next largest shares with 20% and 18% investments respectively. Investments into sports (clubs, sailing and equestrian etc) make up 6% of the share of HNWI in luxury goods. Other collectable items make up the final sector, into objects such as coins, wine, antiques and travel. Furthermore the growth in the number of HNWI's from emerging markets is striking; with for example more than a 20% rise in the number of HNWI in India alone during 2006 (see exhibit 2).

Insert Exhibits 1 & 2

Given the growth in the interest in luxury goods and the increasing number of HNWI's who spend a relatively larger proportion of their income in this sector, it is of interest to analyze whether this strategy is an optimal strategy from an investment perspective. If not, then the consumption value or emotive value from these items as collectable items may be larger than currently perceived, with investors willing to give up financial returns for emotional motives.

There is recent evidence that investors are willing to devote attention to environmental, social and corporate governance (ESG) issues into the risk-return analysis of investment strategies. [See Koedijk & Ter Horst (2008) for a survey of this SRI literature]. With approximately 10% of all money in the US under professional management in the US devoted to portfolios branded by a social responsibility tag, the relative importance of emotive values being attached to investment analysis would appear to be growing. With the 2006-9 global financial crises this is likely to become even more

prevalent, with rising attention to corporate governance issues. In the SRI industry investment professionals are pursuing both financial and non-financial goals as a response to investors wishing to integrate their personal values with the traditional risk-return framework. [See Statman (2007)]. Bollen incorporates this idea into a multi-attribute utility function, whereby investors are compensated by reduced utility from lower risk-adjusted returns by the additional utility derived from investing in financial assets which adhere to their societal or personal objectives. We extend this framework to include a number of assets, which may be invested in for emotive as well as investment purposes. We focus on art, wine, stamps, watches and atlases, which we class as emotional assets, whose attributes are likely to attain a personal or societal value over and above their financial value in the portfolio. The additional utility gained is also likely to be a function of wealth, exemplified by the larger proportion of emotional assets held by investors with greater incomes.

There are a number of reasons why people invest or collect emotional assets over and above their monetary or investment value. These types of assets can also be considered as consumption goods, which have an intrinsic value. This is clearly observed in the aesthetic pleasure of owning a collectible item. The reasons behind this vary, from being passionate about an item to the philanthropic nature of certain collectable items, to the status symbol representing being able to buy a certain collectable item. There is a large literature in wealth management on the life-cycle factors which play a role in investment behavior. The consumption value from directly owning such luxury goods can be considered a form of income stream. This is the aesthetic return from admiring a fine painting, or owning a particular edition of a rare book or atlas, or a famous stamp.

Moreover luxury goods may be bought as a collectable item, purely to obtain and own a particular piece generates utility in the form of the pleasure obtained from signaling to others that the owner has a certain level of wealth. The utility derived is therefore greater than derived from sheer monetary value alone. Indeed this emotive value for luxury goods is likely to be a function of wealth, rather than a constant, which commonly underpins much finance theory.

In a recent paper on fine art Mandel (2009) uses a simulated theoretical model to try and reconcile the observation that average financial returns for artworks are relatively low compared to other asset classes whilst volatility is high by modeling art in a consumption-based asset pricing framework. In consumption based asset pricing the risk premium of an asset is a function of the covariance of its returns with an agents' marginal utility of consumption. That is agents need to be compensated if an asset pays off in a period of already high utility.

In this paper we focus on the investable value of emotional assets within a portfolio context, this also enables us to put a value on the emotive part of holding emotional assets. To do so we look at the major collectable items in which an indirect investment may be made into the asset. Rather than own a bottle of wine or stamp collection, the investor owns an indirect share in a wine fund, or a fund of stamp collections. The aesthetic value is lost, and the income stream is zero¹.

The wine and the art market are the most sophisticated of the luxury good investment sectors. There are currently a number of funds in which investors can buy into. The most established is The Fine Art Fund, launched in 2003 in London, and since then ARTESTATE, Societe General Asset Management, and more recently the Art

¹ In some cases a rental stream can be observed, but is almost always extremely low.

Trading Fund have all raised sufficient capital to provide investors with an indirect investment into the art market. There is also a move towards more specialized funds focusing particularly on one or two markets, such as Indian Art, Chinese art and Contemporary artists. The majority of these funds actively trade their artworks, ARTESTATE being the current exception, who aims to hold a limited number of artworks for the duration of the closed end fund. This fund also has a low entry level at €2500, whereas many other funds are more focused to the wealthier investor. These funds undertake a variety of trading strategies, similar to both private equity and hedge funds, trading on the inefficiencies currently present in the art market, where low liquidity abounds, bringing immediate trading to at times a highly illiquid market. Returns made by such dynamic trading strategies are likely to lead to higher returns being able to be attained in the market. However for our purposes we would like to be able to gauge what the minimum levels of returns which can be made. We do this by focusing on the average return data collected by Art Market Research on a number of emotional assets. The emotional assets which we focus on in this paper are art and wine, collectables such as stamps, clocks and watches, atlases and books².

II. Data

For the purpose of this comparison we shall focus on the data from Art Market Research since it provides a wider and more frequent source of information. These indices show that historically, average real returns for art are moderate. Returns are

² Data for alternative forms of Emotional Assets, such as Diamonds, Violins, Coins and Jewelry were not available for the full 20 year sample period, and therefore provide us with only limited observations for testing their additional significance in the optimal portfolio of Emotional Assets. We therefore focus on the above mentioned categories for our analysis.

generally above inflation, showing a positive real return, with a general upward trend of art price increases in the market.

AMR data is available monthly starting in 1986. We have more than 200 monthly observations, which provide sufficient data to provide some basic analysis on the risk and return profile of these various emotional assets. If possible we include data for the 100% range for each sector, however for clocks and watches and books only the central 80% segment of the data is available. This can provide some difficulty with assessing correlation statistics, since some of the more extreme events in the return distribution are not included. Ideally, we would like to include the entire distribution in the indices because this takes into account the extreme price movements in the market which are vital in correlation estimation and the analysis of diversification benefits. AMR data uses average returns on a 12 month moving average. This also induces a high degree of smoothing into the data series. This can be problematic and the data is required to be unsmoothed, using techniques applied to other appraisal based series (such as real-estate, and private equity data), to find the true underlying volatility in the data. This is an extremely important issue as too smooth an index shall underestimate the amount of volatility in the return distribution and hence the degree of risk characterized by the particular emotional asset. Since we are trading off returns by the amount risk, if the risk is uncharacteristically low, the emotional asset shall look as though it has a much higher level of risk adjusted returns than is actually the case. Imperative is also the notion the risk is correctly defined by the degree of volatility in the distribution, and in choosing so we assume that the historical return distribution is correctly parameterized by the use of the normal distribution. There are a large number of other risks for these types of luxury

goods and collectable items which may not in fact be captured by the degree of volatility in the empirical distribution of returns. For example theft, fraud, liquidity risk may all find themselves appearing in large negative movements in prices, and hence extreme returns, which manifest themselves in higher moments of the return distribution in the guise of fat tailed observations. This should be an aspect which is taken into account and a draw back of the standard mean-variance optimal portfolio framework common in the financial industry.

For all indices we calculate the return of the market, i , by the continuously compounded return. This is commonplace in financial economics and more appropriate than measuring cumulative returns. The return is the natural log return of the price index at time, t , such that $\Delta p_{i,t}$ denotes the rate of change of $p_{i,t}$:

$$\Delta p_{it} = \ln\left(\frac{p_{i,t}}{p_{i,t-1}}\right) \times 100. \quad (1)$$

In exhibit 3 below we provide an overview of the data used. Exhibit 4 shows the summary statistics for the full period and a 20 year sub-period for comparison. Using at least a 20 year period means that we include the boom and bust in the art market during the 1990's. Since the risk free rate over the period has averaged 6% the average excess returns for a number of the emotional asset sectors are negative. We compute excess returns over the risk free rate, the 3 month Treasury bill for the 20 year period. We then construct annual returns using the monthly data, which have relatively higher standard deviations than the monthly volatility, and suffer much less from the high autocorrelation which the monthly data exhibits. We also think a longer time horizon is more applicable to the longer term nature of the investment horizon for emotional assets, given the high

transaction costs incurred when investing in such an asset class. We report the summary statistics for these annual overlapping excess returns in exhibit 3.

Insert Exhibit 3

The high volatility for art on an annual basis is driven in particular by the recent boom in the market. This is highlighted in exhibit 4 where the various emotional assets are graphed. An earlier boom in the art market is highly visible, occurred in the 1990's and is well documented. It was thought to be driven by the large demand for impressionist paintings by the Japanese and the occurrence of a tax advantage from buying artworks for Japanese companies.

Insert Exhibit 4

In exhibit 5 we provide the risk returns trade-off for the various asset classes using the excess returns. At first sight we can see that wine, books and art, although having large standard deviations, have a risk-return trade off roughly in line with the traditional asset classes, bonds and stocks. Other emotional assets, such as stamps, atlases and clocks and watches have much lower risk-adjusted returns. It would appear that investors are willing to give up some financial return for holding these types of emotional assets. Their consumption value would appear to be much greater than for art, wine and books, whose properties lend themselves as more suitable as investment vehicles.

Insert Exhibit 5

Exhibit 6 provides the 20 year sample correlation using the excess return data for the series. Some collectables show high correlation with each other, such as clocks and watches, books, and atlases, with figures between 82% and 92%. Whereas there is a larger differentiation in price movements between some emotional asset classes, for example art and wine, only 5% correlated or stamps and art exhibiting 12% correlation.

Insert Exhibit 6

We also find strikingly low correlation coefficients between the emotional assets and the traditional asset classes, stocks and bonds. The most highly correlated emotional asset with stocks is the series on clocks & watches, with 16% correlated, and with bonds all the emotional assets appear negatively correlated. At first glance, this would indicate that an optimal portfolio could include a sub-set of emotional assets. Obviously sub-periods would provide alternative return, risk and correlation measures, so our results are conditional on this time horizon chosen.

III. Performance Evaluation

To test whether adding new assets to a set of benchmark assets is significantly different from zero we adopt the mean-variance spanning test by de Roon et al (2008). They test whether the increase in Sharpe ratios is significantly different from zero when a new asset is added to their benchmark assets (set of country portfolios in their case).

Suppose we have a set of k benchmark (excess country returns, r_t^x , to which we can add N asset returns, r_t^n . The optimal Sharpe ratio of the portfolio is estimated using equation (1) from de Roon et al. (2008). A Wald test statistic is used to test for the

difference between the Sharpe ration from excluding and including the asset. In essence we compare the Sharpe ratios of two optimal or efficient portfolios and test their significance statistically.

Using the mean-variance spanning tests as described above for the individual emotional assets into a standard stock and bond portfolio in exhibit 8 we find a number of extremely interesting results.

Insert Exhibit 7

Firstly we find that on an individual bases art, wine and books are statistically significant. Furthermore we find that the addition of stocks to a bond portfolio is significant with a t-test of 4.16³.

Insert Exhibit 8

This represents a statistically significant difference between β_1 and β_2 in exhibit 5. Adding the emotional asset classes we find that the optimal tangency portfolio of the emotional asset classes historically would allocate 82% in wine, 15% in art and 4% in books to find the most optimal portfolio of emotional assets, denoted by the Emotional Assets (EA) in exhibit 5. Using the performance test to test the difference in the Sharpe ratios between the stock and bond portfolio, and the stock, bond and the tangency portfolio of emotional asset classes, is also statistically significant with a t-value of 5.99⁴. This represents a statistically significant difference between β_2 and β_3 in exhibit 5. Although short selling also provides statistically significant results we exclude this from

³ Due to the low number of annual observations we bootstrap the t-tests.

⁴ Also the inclusion of this tangency emotional asset portfolio with either stocks or bonds as stand alone asset classes is also significant, β_3 is statistically different from β_1 and β_2 . If an asset is added to an additional asset in the portfolio we use an simple t-test for statistical significance, otherwise if an asset is added to a portfolio of 2 or more assets we use a mean-variance spanning test.

the analysis due to the impracticality of being able to short such heterogeneous assets. In exhibit 8 we take a further step and focus on the portfolio allocation which is similar in vain to the observed portfolio into the luxury goods market as observed by the Merrill Lynch/ Cap Gemini report from exhibit 1. It also gives us an indication of how the consumption values of emotional assets which individually are not statistically significant play a role in a more diverse optimal portfolio strategy. By way of example we take the following breakdown into the luxury goods sector: 20% Art, 18% Clocks and Watches, and 4 % into Wine, Stamps, Atlases and Books respectively, which represents 52% of the total investment into luxury goods, we constrain the portfolio to include a 39.5% stake in art, a 35% allocation into clocks and watches, and a 6.7% allocation into Wine, Stamps, Atlases and Books. The spanning test results in a significant t-stat for the incision of this emotional asset allocation.

Insert Exhibit 9

We also provide both Sharpe ratios and the popular Modigliani & Modigliani (1997) M^2 measure for evaluating the performance of the single assets and optimal portfolio of emotional assets in exhibit 10.

Insert Exhibit 10

This study is a first to include emotional assets into the asset portfolio so that we can analyze the investment value and compare it to the emotional or consumption value which these types of luxury assets have. To avoid the problems of smoothing in the data we construct annual overlapping data, which when using a longer time horizon is more in

keeping with the longer investment horizon which investors in these types of assets are likely to exhibit given the high transaction costs involved when trading such assets. Using advances in evaluating portfolio optimization through the development of mean-variance spanning tests we have gained some exciting new insight into the positive nature in which an allocation into either a particular emotional asset, such as wine or books, which show the most attractive features, for a single allocation into an emotional asset or a more diverse portfolio of emotional assets to provide the investor with a positive and highly significant increase in the Sharpe ratio, which measures the risk-return profile of the investment portfolio.

There are of course a number of limiting factors which need to be mentioned and are the basis for further research. Firstly the degree to which risk in these particular asset classes is captured by the use of volatility alone. It is likely that the highly volatile nature of this market, the low level of liquidity, at times, may lead to the existence of non-normality in the data, and the importance of downside risk and more extreme events, captured as fat tailed empirical return distributions. Secondly the degree with which the data is smoothing is essential. We use annual overlapping observations to reduce the degree of autocorrelation in the series. Naturally a third point is the wider choice of investment portfolio; including for example more traditional alternative investments classes such as Private Equity, hedge funds, real-estate, and commodities.

From a practical point of view before advocating any investment into the emotional asset class arena we would suggest that a comprehensive study of the size of

the market is undertaken for each alternative emotional asset class. This is not likely to be a mainstream investment vehicle, but a more boutique vehicle for HNWI's by nature.

Moreover, we would advise only a small allocation of any investment portfolio to be held in emotional assets, which at first sight may appear sub-optimal, but given the risk of the unknown, with greater risk looming in these types of markets, we would advocate a more conservative approach. Furthermore we have assumed a conservative approach to the investment strategy taking average annual returns. Fund managers in this industry are aware of dynamic trading strategies and market inefficiencies which are likely to provide returns in excess of those generated by this study, and highly likely to also include some of the emotional assets which would at first sight not be considered.

IV. Conclusions

Using a number of broad indices for a variety of emotional asset classes, we have seen how these emotional assets prices have increased over the past 20 years. The emotional assets, art, wine, stamps, atlases and books show positive excess return over the period.

Some collectable items show a tendency to move in line with each other, with a high correlation coefficient, such as books and atlases, and clocks and watches, and stamps. However there is significant divergence in the behavior of the various price indices to enable an investor to benefit from holding a diversified portfolio of these emotional assets. The real benefits occur from minimizing risk whilst maximizing return strategy when a portfolio of stocks and bonds is held in combination with wine, art and books. We

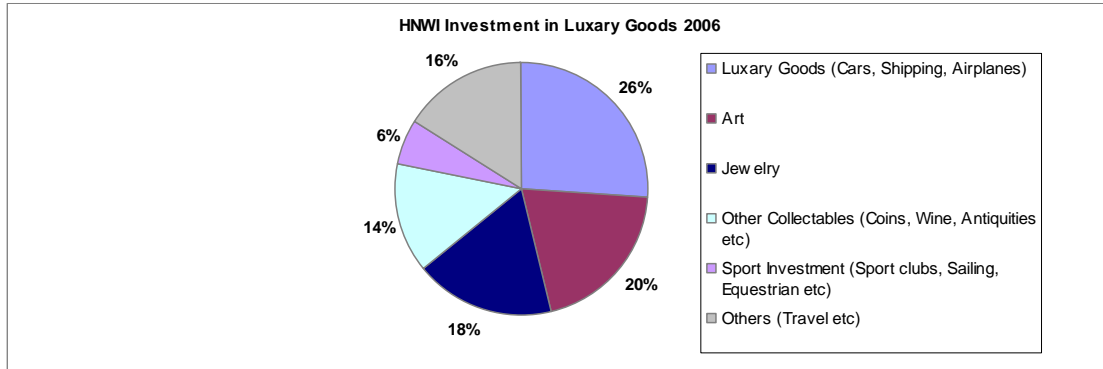
also see that the broad portfolio of a variety of emotional assets provides a significantly significant contribution to the mean-variance portfolio, with a significant increase in the Sharpe ratio. It would appear that using the raw data, that an allocation into emotional assets is certainly interesting to investors.

Since investors typically tend to hold more art than wine or books, it would appear that investors are willing to give up some risk adjusted returns in favor of some emotional value. The consumption value is therefore very important to take into account when looking at direct investments into these types of assets. When investing in an indirect manner, through the raising number of funds which offer collectibles and emotional assets to investors then a small allocation into the emotional asset space could contribute significantly to a diversified investment portfolio. Preliminary analysis into the behavior of emotional assets over the business cycle show that the diversification benefits which arise from investing into real assets of an emotional nature may provide an alternative means for portfolio diversification than previously has been suggested. Results from Mandel (2009) would allude to this in the form of art as an investment having the ability to help smooth consumption over time. Emotional assets by their very nature also have this ability and whose inclusion in an investment portfolio has attractive properties.

V. References

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Exhibit 1



Source: Merrill Lynch/CapGemini, World Wealth Report 2007

Exhibit 2



Source: Merrill Lynch/CapGemini, World Wealth Report 2007

Exhibit 3
Summary Statistics
Annual Overlapping Excess Returns

1986-12/2006			Stock s	Bond s	Art	Win e	Stamp s	Clocks & Watche s	Atlase s	Book s
Annual Returns	Av	Excess	5.9%	2.7%	7.6%	6.1%	1.4%	-1.0%	0.2%	2.8%
Annual St Dev			16.6%	10.8%	33.8%	13.5%	16.1%	11.6%	11.7%	11.5%
Skew			0.713	-0.206	0.214	0.096	0.484	0.598	0.107	-0.551
Kurt			0.330	-0.317	0.235	-0.356	-0.406	0.549	-0.563	0.174

Exhibit 4 20 Year Performance Indices

Emotional Assets
1996-2006

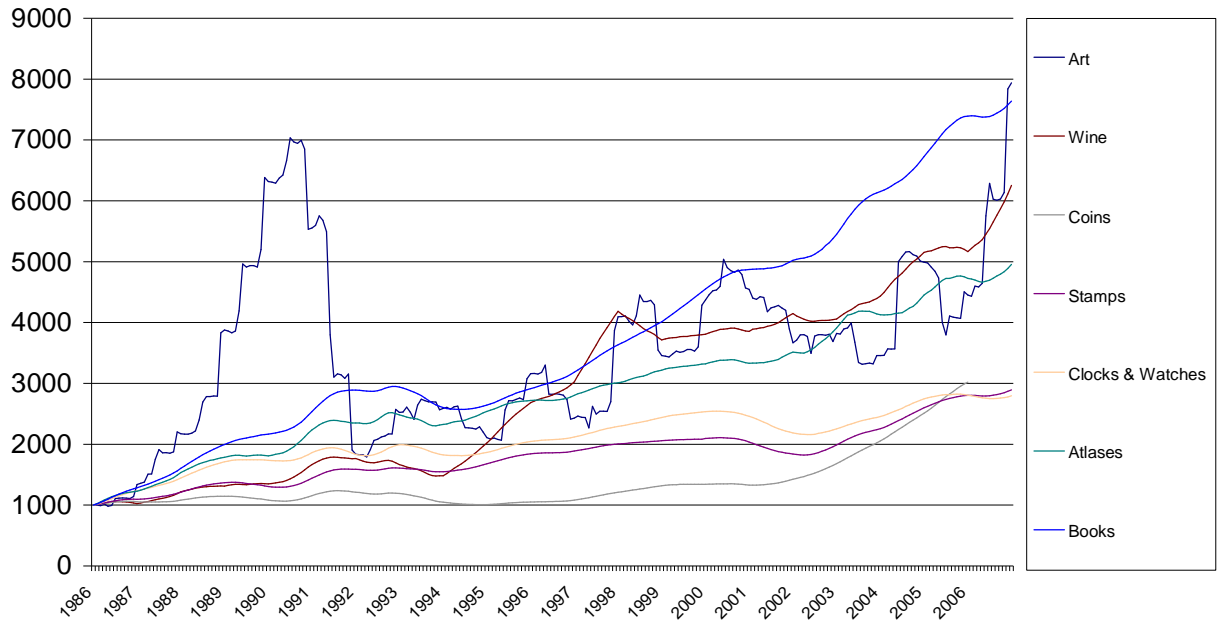


Exhibit 5 Annual Real Risk & Return Trade Off

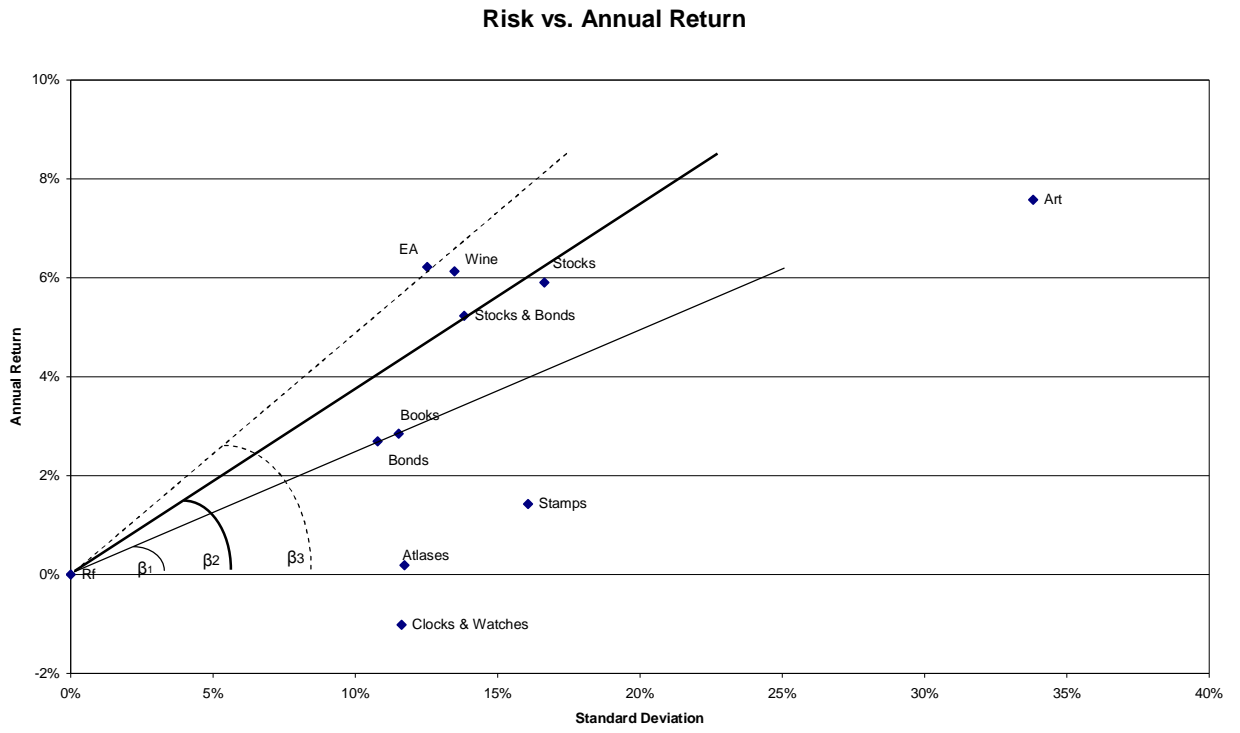


Exhibit 6
Correlation Indices
1986-2006

Annual Overlapping Data

	Stocks	Bonds	Art	Wine	Stamp s	Clocks & Watch es	Atlase s	Books
Stocks	1.000							
Bonds	0.223	1.000						
Art	0.126	-0.160	1.000					
Wine	0.128	-0.243	0.053	1.000				
Stamps	-0.010	-0.422	0.120	0.603	1.000			
Clocks & Watches	0.161	-0.282	0.376	0.484	0.810	1.000		
Atlases	0.023	-0.109	0.195	0.465	0.684	0.820	1.000	
Books	0.138	-0.211	0.308	0.426	0.674	0.866	0.916	1.000

Exhibit 7

	SB(tng)	Art	Wine	Stamps	Clocks & Watches	Atlases	Books
Sharpe	0.40	0.46	0.62	0.44	0.42	0.40	0.47
t-stat		3.98	7.34	1.99	-1.88	0.19	3.31
w(stock)		0.393	0.180	0.348	0.958	0.536	0.279
w(bond)		0.448	0.353	0.426	0.516	0.419	0.350
w(ea)		0.159	0.467	0.226	-0.475	0.044	0.371

Exhibit 8

Mean-Variance Spanning – Optimal Portfolio of Emotional Assets

	Stocks	Bonds	EA(tng)	EA(tng_ns)	EA(act)	SB(tng_ns)	All(tng)	All(tng_ns)
Sharpe	0.36	0.25	1.11	0.50	0.20	0.40	1.28	0.67
Test-matrix (t-stats)								
Stocks		2.19	3.05	2.99	3.23	1.42	4.92	7.11
Bonds			3.32	4.19	0.87	4.16	5.52	8.32
EA(tng)				2.63	3.80	2.80	0.70	1.85
EA(tng_nss)					10.26	1.76	4.26	4.73
EA(act)						3.47	5.76	10.46
SB(tng_nss)							4.77	5.99
All(tng)								3.45

Annual horizon (monthly rebalancing stocks/bonds)									
	Stocks	Bonds	Art	Wine	Stamps	Clocks Watches	&	Atlases	Books
Tangency			0.62	2.56	1.88	-9.51		-5.99	11.43
Tangency (nss)			0.16	0.84	0.00	0.00		0.00	0.00
	Stocks	Bonds	EA(tng)	EA(tng_ns)	EA(act)				
Sharpe	0.37	0.22	1.13	0.50	0.21				
Test-matrix (t-stats)									
Stocks		0.60	-2.67	-0.56	0.64				
Bonds			-2.76	-0.91	0.04				
EA(tng)				2.73	3.00				
EA(tng_nss)					1.42				

Exhibit 9
M2 Evaluation

	Bench mark	EA Portf olio	Stoc ks	Bon ds	Art	Win e	Stam ps	Clocks Watches	& Atlas es	Boo ks
Sharpe Ratio		0.50	0.35	0.25	0.22	0.45	0.09	-0.09	0.02	0.25
M squared		8.26%	5.91 %	4.15 %	3.73 %	7.57 %	1.48 %	-1.46%	0.27 %	4.11 %

Exhibit 10

Mean-Variance Spanning – Merrill Lynch Portfolio of Emotional Assets

A. No Short Selling Constraints

	Art	Wine	Stamps	Clocks & Watches	Atlases	Books	t-stat	Sharpe
Merrill Lynch	0.39	0.07	0.07	0.35	0.07	0.07		0.03
	0.05	2.13	0.85	-5.92	-4.29	8.17	8.46	0.88

B. Short Selling Constraints

	Art	Wine	Stamps	Clocks & Watches	Atlases	Books	t-stat	Sharpe
Merrill Lynch	0.39	0.07	0.07	0.35	0.07	0.07		0.03
	0.01	0.95	0.00	0.00	0.00	0.04	3.49	0.36