Art as a Component in Investment Portfolios

By

Arie L. Melnik and Steven E. Plaut*

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* Arie Melnik is Professor of Economics at the University of Haifa and a Senior Fellow at ICER (Turin). Steve Plaut is Professor of Finance at the University of Haifa and a visiting scholar at the University of Antwerp.

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Abstract

This paper explores the role of art investment within an overall investment portfolio, using American financial data and an art price index. It covers a longer extended time period than previous empirical work on the subject. We find the results to be similar to previous empirical work that the optimal portfolio should not include investment in art. However, under "second-best" conditions, where the investor is constrained from investing in at least one class of assets, positive investment in art assets is in some cases optimal. When all assets (both financial and art) are present in a portfolio, the optimal holdings for art assets are close to zero. However, when some sets of assets are removed from the portfolio, the optimal proportion of holding of art assets is positive.

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I. Introduction:

The market for art has grown rapidly. The international art auction market volume was estimated at 115 million dollars in 1970 but was 2.2 billion dollars in 2000. The Wall Street Journal of May 8, 2008 reported that $1.8 billion in art works were expected to be auctioned in the following weeks.

The market is characterized by increased reliance upon public auctions, wider dissemination of catalogues, major exhibitions, globalization of major art galleries, more information about prices, etc. Ashenfelter (1989), Ashenfelter and Graddy (2002), and the related papers by Frey and Eichenberger (1995), Garet-Vanet (1995) and Graddy and Ashenfelter (2002) contain detailed institutional descriptions of museum and municipality purchases of art and contain surveys of the economics literature on art pricing and investment returns.

An example can serve to illustrate the dramatic change in the market: "Irises" by Van Gogh was purchased for $84,000 in 1948, but was sold again in November of 1987 for $53.9 million. Its owner realized 12.4 % annual real return, well above that of alternative investments. The Wall Street Journal (May 8, 2008) wrote "A new generation of collectors, dealers and financiers have come to treat art as a highly sophisticated financial instrument: tradable, globally recognizable in demand and liquid around the world." Some in the media have been hailing art investment as a natural hedge, not falling when stock markets do

poorly.[1] Art investments may also have some tax advantages not carried by other investments.[2]

A small but growing body of academic research has addressed the question of whether art should be a part of an optimal investment portfolios and, if so, to what extent. Frey and Pommerehne (1989) examine an interesting sample that stretches over 350 years and conclude that painting investments yielded on average a 1.5% real return, less than financial assets.[3] In other recent papers, such as Renneboog and Van Houtte (2002), the conclusion has been that it should be at most in very small proportions and indeed may well be absent altogether from optimal portfolios (or even shorted).

Empirically it appears that the average rate of return on objects of art (paintings, sculpture, prints, antique furniture, etc) is rather modest. Baumol (1986) is among the best-known empirical analyses of the value of art as an investment.[4] Baumol characterized art markets as random and unpredictable, largely similar in that sense to financial markets. Baumol also estimated that the real returns on paintings since the 17th century averaged 2% less than in the capital market. Baumol was then followed by number of papers on art investment returns, including Agnello and Pierce (1996), Candela and Scorcu (1997), Flores, Ginsburgh and Geanfils (1998), Frey and Eichenberger (1995), Frey and Pommerhene (1995), Guerzoni (1995), Pesando (1993), Pesando and Shum (1999), Worthington and Higgs (2003), and others. The general finding, using different datasets, has been that - on average - art is not a very good investment. Mei and Moses (2002) is an important dissenting paper.

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[1] See for example http://www.investmentu.com/IUEL/2002/20021028.html, http://www.thefreelibrary.com/Modern+Chinese+paintings%3a+an+investment+alternative%3f-a014412123 and http://www.theartstrust.com/investmentinart.aspx

[2] See http://www.investmentu.com/IUEL/2002/20021028.html

[3] Goetzmann, W N (1990) covers a period almost as long.

[4] Anderson (1974) and Stein (1977) were even earlier.

While art as investment does not produce a high rate of return, it may still play some role in asset portfolios. As noted by Ginsburg and Jeanfils (1995), the correlations between art value and other assets may make it an attractive investment. Even low correlations of returns between the art market and other markets could be exploited to produce diversification benefits.

In this paper, using the index compiled by "Art Market Research", we construct a number of portfolios using portfolio optimization algorithms by Idzorek (2002). The Art Market Research (AMR) compiles several indices of art works on a regular basis. These indices are used by those who work in the industry such as Christie's and Sotheby's as well as many galleries and art dealers. They are also used for comparison purposes, by the Internal Revenue Service (US) and the Inland Revenue Service (UK).

We find that for the 1976-2003 period, when all other assets are present in a portfolio, the optimal holdings for art assets are zero (actually, shorted if there are no restrictions on negative holdings). However, when some classes of assets are removed from the portfolio, and in particular Treasury bills and/or large-cap US stocks, the optimal proportion of holdings of art assets is positive and even fairly large.

This suggests that while art may not represent a serious alternative financial investment for holders of the entire market portfolio, it may play an important investment or hedging role for certain kinds of investors holding constrained portfolios. For example, certain sorts of institutional investors that are constrained from investment is some "speculative" classes of assets, may find that adding art assets improves the performance of their "second-best" portfolios.

II. Data and Descriptive Statistics

The Art Market Research (AMR) compiles several indices of art works on a regular basis. These indices are used by those who work in the industry such as Christie's and Sotheby's as well as many galleries and art dealers. They are also used for evaluation purposes by the Internal Revenue Service (US) and the Inland Revenue Service (UK). Major business publication such as the Wall Street Journal, Financial Times, Business Week and The Economist quote them from time to time.

There are several AMR indices for subgroups or subcategories, such as nineteenth century European paintings, French impressionists, modern US, etc. For our purposes we use the general painting index, which includes all categories. Sales prices are recorded from works by old masters such as Reynolds, Gainsbourgh, Constable, Troyon and Corot as well as impressionists such as Monet, Renoir, Degas and Van Gogh. It also includes twentieth-century masters such as Picasso, Modigliani and Utrillo and surrealists like Dali and Magritte. Nineteenth-century American painters, such as Winslow Homer, James Whistler and Thomas Eakin are included. Also included are works by modern US painters such as Jackson Pollock, Roy Lichtenstein and Andy Warhol.

In the analysis below, we use observations of the index over 316 months. The AMR assigns all sales of art works to a transaction month for each artist. Sales prices are measured in US dollars. In the period from the middle of 1976 to the end of 2003 more than 100,000 sales of paintings, produced by around 100 artists were recorded.

The general movements of the AMR index across schools and periods produce a natural diversification effect within paintings. In addition, the wide aggregation of sub-groups also has the benefit that actual sales are recorded in every month in the 1976-2003 period. On the other hand, like art indices in general, the AMR index, despite its comprehensive nature, is not a conceptual equivalent to other indices. That is, unlike conventional assets, such as stocks and bonds, the same artworks are not traded every month, so the actual composition of sales does change.[5]

In **Table 1**, descriptive statistics appear for the art index as well as for five other "classes" of US investment assets. Table 1 contains descriptive statistics for 6 types of assets. Means, medians and standard deviations, minimums and maximums are reported. A statistical dispersion measure is also included. The assets to consider are large cap US company stocks (LCUS), small cap US company stocks (SCUS), long term (over 5 years to maturity) US corporate debt of investment grade (LRCB), long run (over 5 years to maturity) US government bonds (LRGB) and US treasury bills (USTB). The index of paintings is also included and is denoted as AMRI.

The average annual returns range from 19% for small cap company stocks to 3.6% for paintings and 6.6% for treasury bills. The standard deviations are close in value to the mean and range from 16% to 3%. As portfolio candidates we note that small company stocks possess the highest return and risk combination and treasury bills the lowest combination of return and risk. The min-max range is much wider for US equity returns. The skewness parameters are all insignificant except for treasury bills. As can be seen, the art index on

[5] Several papers mentioned this deficiency and recommended to use same painting sales for a more accurate comparison. However, this would reduce the number of observations by well over 90% and there would be many months without a single transaction on record.

average rose less than any of the other five asset classes. Art also had a lower standard deviation of returns than any other class except for Treasury bills.

Table 2 presents the Jarque-Bere statistics and the p-values. They are used to test the null hypothesis that the distributions are normally distributed. All p-values are greater than the required 0.01 level of significance indicating that all the distributions fail to reject the null hypothesis. The distributions are apparently normal. The ADF unit root tests are also presented in table 2. They show that returns in four markets are stationary in the level except for painting and treasury bills which are stationary in differences.

Table 3 exhibits the correlation matrix of the six classes of assets. The pairwise correlations range from -0.33 to +0.95. As expected, the correlations between financial assets are in most cases positive. The main exceptions are those with art assets. They are negatively correlated with small stocks and long term corporate bonds. This suggests seemingly that paintings could be candidates under some circumstances to enter financial asset portfolios because of their diversification potential.

III. Portfolio Optimization with Art Assets

The role, if any, for art assets in optimized portfolios was explored by computing optimized investment portfolios using the "Portfolio Optimizer" software program by Tom Idzorek (2002). The algorithm works by choosing portfolios with maximized Sharpe ratio. In **Table 4**, the optimized portfolio selected by the program is shown. The portfolios that we construct do not include cash, they include only the six yield producing variables. We note that, following

portfolio optimization, the weight assigned by the program to art assets is zero. The weights assigned to long-term corporate bonds are also zero. This is consistent with the results reported by Ronneboog and Van Houtte (2002) and others that art cannot contribute to the performance of a well-diversified portfolio of financial assets.

As noted, the weight assigned to art assets is zero when all other assets are included in the investor's portfolio. However, constraining the investor so that at least one class of assets must be omitted changes the results. In some cases art assets are added to the portfolio, evidently loosely replacing in a sense the omitted asset class. This is seen in Table 5. There when Treasury bills are excluded, the weight assigned to art assets in the optimized portfolio jumps to 4%, and produces almost the same Sharpe ratio as in the unconstrained case. When large-cap US stocks are omitted, the weight assigned to art assets rises to 7%.

IV. Conclusions

While using a longer time line in our sample than was used in previous research, our findings concerning the inclusion of art assets in investment portfolio are similar to what was found previously. Art adds little if any diversification effect or portfolio performance improvement when added to investments. However, we also show that for constrained or abridged "second-best" asset space (where at least one set of investments is omitted from the portfolio) portfolio optimization may indeed involve investments in art assets for financial reasons. In particular, art assets seem to be able to "substitute" to an extent for Treasury bills. Hence the financial motivation for investment in art assets may still be relevant for certain special groups of investors.

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Table 1 – Descriptive statistics: Annualized market returns for paintings and several US financial assets 1976-2003

	Mean	Median	St.D.	Max	Min	Skewness	Riskadj
AMRI	0.036	0.031	0.104	0.231	-0.212	-0.311	0.345
LCUS	0.155	0.169	0.137	0.334	-0.117	-0.356	1.131
SCUS	0.186	0.216	0.162	0.428	-0.222	-0.768	1.148
LRCB	0.093	0.101	0.107	0.307	-0.081	+0.523	0.869
LRGB	0.098	0.087	0.117	0.327	-0.092	+0.325	0.838
USTB	0.066	0.058	0.028	0.139	+0.026	+0.984	2.357

Note: large cap US company stocks are noted as LCUS, small cap US company stocks are noted as SCUS, long term (over 5 years to maturity) US corporate debt of investment grade is noted as LRCB, long run (over 5 years to maturity) US government bonds are noted as LRGB and US treasury bills are noted as USTB. The index of paintings is also included and is denoted as AMRI. Risk-adjusted column contains the mean divided by the standard deviation.

Table 2 – Statistical Tests for US asset monthly return series 1976-2003

	J-B stat	J-B p	ADF (L)	ADF (D)
AMRI	0.4411	0.8034	-3.9716	-6.0335
LCUS	1.7242	0.4361	-4.9245	-
SCUS	2.4523	0.2798	-5.7849	-
LRCB	1.2131	0.5440	-4.8770	-
LRGB	1.0552	0.5906	-5.0164	-
USTB	4.0436	0.1115	-2.8846	-5.6782

Note: large cap US company stocks are noted as LCUS, small cap US company stocks are noted as SCUS, long term (over 5 years to maturity) US corporate debt of investment grade is noted as LRCB, long run (over 5 years to maturity) US government bonds are noted as LRGB and US treasury bills are noted as USTB. The index of paintings is also included and is denoted as AMRI.

Table 3 – Pearson correlation between various asset returns

	AMRI	LCUS	SCUS	LRCB	LRGB	USTB
AMRI	1.0000					
LCUS	0.1658	1.0000				
SCUS	-0.3285	0.3879	1.0000			
LRCB	-0.0842	0.3134	0.0183	1.0000		
LRGB	0.0234	0.3347	-0.0427	0.9529	1.0000	
USTB	0.3089	0.0879	0.0918	0.0314	0.0845	1.0000

Note: large cap US company stocks are noted as LCUS, small cap US company stocks are noted as SCUS, long term (over 5 years to maturity) US corporate debt of investment grade is noted as LRCB, long run (over 5 years to maturity) US government bonds are noted as LRGB and US treasury bills are noted as USTB. The index of paintings is also included and is denoted as AMRI.

Table 4 : Optimized Unrestricted Portfolio with All 6 Classes of Assets

	Portfolio with Maximized Sharpe Ratio
Portfolio summary	
Expected Return :	12.86%
Volatility :	7.35%
Sharpe Ratio :	1.0705
Portfolio weights	
Art Index	0.00%
Large Cap US Stocks	15.94%
Small Cap US Stocks	30.62%
Long-Term Corporate Bonds	0.00%
US Treasury Bills	36.60%
Long-Term Treasury Bonds	16.84%
Total	100%

Table 5 Constrained Optimization with certain Assets Deleted from Portfolio

	Without US Treasury Bills	Without LRGB	Without Small Cap US Stocks	Without Large Cap US Stocks	Without both Large Cap US Stocks and LRCB
Expected Return:	13.71%	13.09%	11.18%	12.16%	12.16%
Volatility :	8.20%	7.96%	7.27%	6.88%	6.88%
Sharpe Ratio :	1.0622	1.0165	0.8498	1.0401	1.0401
	Portfolio with Max Sharpe Ratio:	Portfolio with Max Sharpe Ratio:	Portfolio with Max Sharpe Ratio:	Portfolio with Max Sharpe Ratio:	Portfolio with Max Sharpe Ratio:
Art Index	4.03%	0.00%	0.00%	6.99%	6.99%
Large Cap Stocks	16.93%	23.27%	40.11%	--	--
Small Cap Stocks	36.26%	31.94%	--	36.36%	36.36%
LR Corp Bonds	0.00%	21.76%	0.00%	0.00%	--
LR Gov Bonds	42.78%	--	31.52%	43.94%	43.94%
US Treasury Bills	--	23.03%	28.37%	12.71%	12.71%
Total	100%	100%	100%	100%	100%