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There's More Than Meets the Eye: Looking at Art as an Alternative Investment

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An abstract of
a thesis submitted to the Faculty of Emory College of Arts and Sciences
of Emory University in partial fulfillment
of the requirements of the degree of
Bachelor of Arts with Honors

Department of Economics

2011

Abstract

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This paper examines prices and returns of the paintings of the world's top 500 artists. I compared this index to other financial assets, including the S&P 500 index, ten-year government bonds, and three-month treasury bills. I use these comparisons to observe fine art as an alternative investment over the period 1960 – 2010. Based on the art index, I found that art realizes an annual return of 12%, the highest of all the financial assets. It also has a high standard deviation and low Sharpe Ratio, which indicates that art is a very risky asset. My CAPM regression results show that art has a market beta of .79 and it correlates positively with equities, having a correlation coefficient of 13.9%. These results show that art is not an attractive alternative investment to stocks. I also performed autoregression analysis and found that the art index leads the S&P 500 index and the art market has recovered quicker from the recent financial crisis than the equity market. These results show that art might be a good predictor of the future state of the world's economy. However, despite its high returns, art has a lot of risk, which makes it an unappealing investment.

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Acknowledgements

This paper was made possible by the support of my adviser, Elena Pesavento, and my committee members Hugo Mialon and Dorothy Fletcher. I would also like to thank Roman Kraeussl for letting me use his art index data.

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1. Introduction

The recent economic crisis has left a significant impact on the way people are choosing to invest their money. Faith in the stock market has dramatically decreased and investors have become more cautious with their spending and investing habits. Often in times of economic instability, people choose alternative forms of investment. Typically, alternative investments are considered to be commodities, private equity, hedge funds, and real estate. However, due to the catastrophic extent of the most recent economic crisis, investors are hesitant to even invest in those assets and are starting to consider more alternative means of investment. A possible alternative investment could be art – fine art in particular. I find it interesting how much investment in the art market has grown in recent decades. Based on the recent trends and movement of the art market and with many investors looking for other options, it would not be surprising to find art to be an appealing alternative investment.

Many historians say that the period following the Industrial Revolution was when art began to be more widely traded largely due to the emergence of the new middle class. For the first time, a large group of people had the money and time to collect art. Throughout the 19th century, the center of the art market shifted from London to Paris and then back to London due to geographic and economic circumstances, respectively. The U.S. began to dominate the art market in the 1920s and 1930s, and despite a brief Parisian revival during the 1950s and 1960s, New York and London have dominated the art market ever since. During the recessionary times of the 1960s and early 1970s, art began to be promoted as a hedge against escalating inflation. Also during this time, auctions began to attract an increasing number of attendees. In response to this, the number of art galleries throughout the world started to grow to meet the higher demand of interested buyers. During the global prosperity of the 1980s, the art market thrived and it

became more popular and acceptable to buy art. During 1987 record auctions prices were achieved, especially in the Modern and Contemporary sectors. Like any bubble, this one burst in 1990 after the Bank of Japan issued a sharp increase in interest rates. This forced many collectors to go under since the Japanese were a huge percentage of the buyers of fine art. Ever since this low, the art market has steadily increased in terms of volume and overall aggregate value. Increases in the prices and awareness of art combined with a greater interest in alternative investment has led many economists to study this fascinating and unique market in recent years.

The recent economic crisis has greatly affected the global art market. After four years of steady growth, values peaked in 2007 at a high of over $65 billion, including both dealer and auction sales of fine and decorative art and antiques. However, in late 2008 the market began to feel the trickle-down effects of the global crisis and sales started to drop. In 2008, fine art sales at auctions dropped over 10% from its 2007 value.

Just like prices in financial markets, art prices are determined by supply and demand. However, in the art market, these forces have special and unique features. Though art has a financial value, a large part of its valuation is also subjective. Both of these considerations are incorporated into the price of a work of art. Art can sell for different values at different times due to appreciation of the piece as well as external factors such as the economy and changing trends and tastes of artistic genres. Most artwork is priced by qualified appraisers since the value of art is not as apparent as most types of financial assets. Auctions are the best place to understand and forecast prices and trends in the art market since auction houses are the only places where data is readily available to the public.

This paper tests whether art can be considered an alternative financial asset. I will compare the returns and performance of art and other financial investments, correlate the returns

of the art market to the returns of these other assets, and as well as perform a Capital-Asset Pricing Model analysis. If art generates high returns and correlates negatively with the financial asset then it could be presumed that art would be a good alternative investment. That would mean that art yields higher returns when other financial assets yield low returns.

The remainder of the paper is structured as follows. Section 2 looks at previous economic literature where art is explored as an investment. Section 3 will discuss the subjectivity of art and how it differs from typical financial assets. Section 4 explains the methodology used for the art index and describes the dataset used. Section 5 describes the results from the performance analysis, CAPM regression, and correlations. In Section 6, I formulate my conclusions.

2. Economic Literature

An early paper, William Baumol (1986) showed that returns on government bonds were found to be about six times higher than returns on paintings. He estimated an annual return for art of about .55% compared to government bonds at about 3.25% annually. Nathalie Buelens and Victor Ginsburgh (1992) challenged Baumol's paper and found different results. They found that though art did not always yield higher returns than bonds, art performs better over certain time intervals. For their entire sample between 1700 and 1961, art had an annual return of 0.65%, but for other smaller time intervals, art yielded a much higher return. Between 1870 and 1913, art had an annual return of 3.57% and between 1950 and 1961, art had a remarkably high annual return of 20.3% These papers were very significant not only because they were two of the earliest published papers that explored art as an investment, but because they showed how returns on art have greatly increased in the past 50 years.

In recent years, many economists have compared art indices to equity indices to see how art performs as an alternative investment. Richard Agnello (2002) found that his art index had a

correlation of 23% with the S&P 500. He found the return from art to be lower than from equities and long- and short-term government bonds. He concludes that the lower correlation is due to the fact that art has many extra consumption costs that other financial assets do not have, which make it an unattractive to many investors. Jianping Mei and Michael Moses (2002) found their art index had a correlation of 4% with the S&P 500, which was lower than Agnello (2002). They also found that art has a lower return than equities but higher than bonds.

In the past three years, Roman Kraeussl has written multiple papers examining the art market in a very in-depth and detailed manner compared to most of the published papers on this topic. Kraeussl and Niels van Elsland (2008) use a 2-step hedonic index to examine the performance of German art. They believe this is most accurate method possible since it has a lower selection bias than traditional hedonic methodologies. They find that this genre of art yields an annual return of 3.8%, the lowest of the assets when variability is included. Using a Capital-Asset Pricing Model (CAPM), they also find that German art returns have less systematic risk than equity returns and that the German art market moves in the opposite direction of the MSCI World Equity Index which indicate that this type of art would be a good alternative investment to equities. However, they found that German art returns have a correlation of 18.91% with the world equity returns, which does not match up with their CAPM results, since one would expect the correlation coefficient between art and equities to be negative.

Kraeussl's papers typically focus on particular types of art. In 2010 he published two papers where in one he examined the top ranked artists and in the other he looked at art from the emerging markets of Russia, China and India. Kraeussl and Jonathan Lee (2010) examined the art market, only focusing on the top 500 ranked arts in the world. The motivation for using the

world's top 500 artists comes from Renneboog and Spaenjers's (2009) argument that art from a better-known artist brings higher returns than art from a less renowned artist. Using hedonic price indices Kraeussl and Lee (2010) compare returns for artists featured in all five *Gardner's Art Through the Ages* textbooks – the better-known artists – to a benchmark model with artists of all different reputations – including the lesser-known artists. They find that the index with just the well-known artists has a much sharper increase over the last few decades than the index with just the lesser-known artists. Kraeussl and Lee (2010) are interested in looking at art as an alternative investment compared to equities. Just focusing on these top artists, they find that their index could be a good alternative to investing in equities. Kraeussl and Lee (2010) found that the Top 500 Art Index correlates with the MSCI World Equity Index at a level of 25.14% and they estimate an annual return for art of 7.3%, whereas equities have an annual return of 4.6%. When performing their CAPM regression they found that their art index moves in the same direction as the equity index. Therefore, they conclude that art is not an attractive alternative asset to the global equity index, despite its high returns

Kraeussl and Logher (2010) examine the performance of the three emerging art markets in Russia, China, and India. Due to the expansion of these economies, Kraeussl and Logher (2010) believe that the art markets in these countries will bear positive effects from this growth. They estimate that India's art market has the highest annual return of 42.2% followed by Russia with 10% and China with 5.7%; all exceed the S&P 500, which has an annual return of 9.23%. They also found that the Chinese and Indian art markets have a negative market beta, which means they move in the opposite direction as the equity market. Therefore these two genres of art are considered to be good alternative investments to equities. Yet the Russian art market has a positive market beta so this type would not be a good alternative.

When examining the performance of the art market, perhaps it is useful to look at a more specific area based on different genres, artists, countries, etc. Since all these papers focus on different types of the art market and some use different methodologies, they all estimate a wide variety of results. The art market as a whole is too big and broad to be considered a viable investment, so it is best to narrow down and focus on a specific area of the market. I found Kraeussl and Lee's (2010) paper to be most reliable and interesting. Given that most people know the famous artists of the world, this is the type of art that people are interested in purchasing. In this paper I will therefore follow Kraeussl and Lee (2010) and use their index for the top ranked artists. However, I plan to look at a broader range of data, since art started to be considered as an investment opportunity in the 1960s and Kraeussl and Lee's (2010) data starts in 1985.

3. The Subjectivity of Art

Though people choose to study art as an investment, there are many factors that separate art from typical financial assets. There are some economic differences such as the illiquidity and non-transparency of the art market, the extreme variation in supply and demand, and the difficulty of a common technique for estimating prices. The most important issue is that valuation of art is extremely subjective. Even though there has been many formulas developed that have tried to accurately calculate the price of a work of art, there is no defining how someone will benefit from it. Most people that invest in a piece of art have some sort of connection to it and are influenced by many outside factors that go into the decision to purchase that work.

Public relations play a significant role in the buying and selling of artwork. Christie's and Sotheby's come out with auction catalogues that showcase different types of art and during

certain seasons; most auctions occur in the fall and spring. Evening sales, which date back to the 18th century, have always been a social event in which potential buyers experience a party like atmosphere rather than a simple auction. The media can also influence buying habits. Before sales, the press always talks about collections or specific pieces to watch. Based on these things, it is clear that social status greatly influences the decision to buy artwork. There is a great deal of factors that affect the sale of art differently than the sale of other financial assets. Due to the subjectivity, computing the right index for art is thus much more complicated than for other assets.

3.1 Approaches for Determining Returns

As with any type of asset, an investor needs to consider what the financial returns would be over time when deciding whether or not to invest. When looking at stocks or other money market instruments, investors can track returns by developing indices based on the prices of identical shares being traded in the market. Due to the heterogeneous nature of art and the infrequent trading, assessing returns for art over time is more difficult than for other assets.

There are three types of approaches to determine the returns on art: the naïve art price index, the repeat sales index, and the hedonic price index. The naïve art price index uses averaged and median auction prices. This method uses a group of representative paintings in which the price of these paintings can be re-evaluated by experts or can be replaced with close substitutes. An appropriate substitute is a painting by the same artist and of the same quality and size. Though this approach is fairly simple to calculate, it has some disadvantages. Determining substitutes is subjective and it is very unlikely that the quality of a painting is constant over time.

The repeat sales index approach estimates the average return that paintings generate from one sale to another. Though this approach does not have the problem of finding substitutes and

does not require constant quality overtime, it does have its own disadvantages. The resale of artworks is variable and infrequent – it may not even occur once in a century. This significantly reduces the number of paintings that can be incorporated into the index. Therefore, it will not represent the population accurately, which will cause a sample selection bias.

The hedonic price index takes into account the fact that many different quality characteristics of a work of art will affect its price. This can include artist name, size of the artwork, the medium and material, etc. Since paintings are heterogeneous, this approach controls for determinants of price variation by using dummy variables, including one for time. The difficulty of this approach is determining what characteristics go into the model. Different economists might choose to use different variables, which would create variation in results. In this paper, I will use the hedonic approach because it is the most accurate measure of an artwork's true value and can be applied to any piece of art. The naïve approach is a poor measure because determining the quality of a painting can be extremely subjective. The repeat sales approach produces a selection bias due to the fact that there are not many repeat sales recorded; the population would not be correctly represented in the sample. Thus, the hedonic index provides the most available data with the least amount of bias.

4. Methodology

4.1 The Hedonic Regression

Kraeussl and Lee (2010) use a hedonic price index since they believe that this methodology is the most accurate. Their hedonic regression is:

$$\ln P_{kt} = \alpha_0 + \sum \beta_j X_{nkt} + \sum \lambda_t C_t + \varepsilon_{kt}$$

where P_{kt} is the price of painting k at time t; α_0 is the regression intercept; β_j is the coefficient values of the quality characteristic x, X_{nkt} is the value of the quality characteristic n of painting k

at time t; the anti logs of λ_t are used to build a hedonic price index; C_t reflects the time dummy variable which takes the value 1 if painting k is sold in period t and takes the value 0 otherwise, and ε_{kt} is the disturbance term.

The independent variables used in the model describe eight characteristics: medium, auction house, surface, signature, estimate price, living status, artist reputation, and sale date. *Sale date*: based on the sales dates of the paintings, the time dummy variables have been created and each dummy variable cover a period of three months starting in January 1960. A value of 1 indicates that a specific painting k is sold in period t. *Medium*: previous studies show that oil paintings on canvas have the highest average prices (Valsan, 2002; Reddy & Dass, 2006; Agnello, 2002) so this will be the reference value. The medium dummy variables include: oil on canvas, oil on board, oil on paper, oil on panel, acrylic on canvas, acrylic on paper, mixed media and other media. The dummy variables will have a value of 1 if it has a certain combination of medium and material. *Auction house*: the most commonly appeared auction houses in the dataset have been used as separate dummy variables for which a value of 1 is for a painting that has been auctioned at a specific auction house. This includes Christie's Amsterdam, Christie's Milan, Christie's London, Christie's New York, Sotheby's London, Sotheby's New York, Briest Scp., Loudmer Scp., and Tajan. The remaining auction houses have been joined together under the dummy variable 'other auction houses' and this dummy variable serves as the reference variable. *Surface*: according to previous studies, the typical expectation is a larger painting should have a higher sale price, but the sale price increases with a diminished effect due to problems with displaying very large paintings (Valsan, 2002; Agnello, 2002; Renneboog & Spaenjers, 2009). *Signature*: buyers are willing to pay a higher price for a painting if it is signed or has some sort of symbol of authenticity (Agnello, 2002; Renneboog and Spaenjers, 2009). This is a dummy

variable where a value of 1 means that the painting does not have a signature. *Estimate*: this variable states whether an estimate price is available since the availability of an estimate price for an artwork has a positive effect on its sale price (Ashenfelter and Graddy, 2003). For this dummy variable, a value of 1 means that a painting does not have an available estimate. *Living status*: typically after artists die, the price of their paintings increase, so for this dummy variable, a value of 1 means that the artist is alive. *Reputation*: this final variable is used to distinguish between highly rated artists and lower rated artists, which requires the two-step hedonic approach that was developed by Kraeussl and van Elsland in 2008. This involves dividing the standard hedonic regression by an artist index.

4.2 Data

Art data are from www.artnet.com, which is a large online auction sales database. Information on all the auction records of the paintings produced by the top 500 artists of 2007 in the world are available on the site. For each auction record, the following characteristics are recorded: artist name, artist nationality, artist year of birth, artist year of death (if applicable), title of work, year of creation of the work, medium, size (in inches and centimeters), miscellaneous (containing info on whether the work is signed, stamped, etc.), auction house, date of auction, lot number, estimate (currency of estimate and estimate converted to US dollars), sale price (currency of sale price and sale price converted to US dollars), and a note of the sale indicating things like if it was withdrawn, sold at hammer price or at a premium, etc.

Kraeussl and Lee (2010) originally came up with 144,586 number of auction records. Out of the 500 artists, 28 were either not available on Artnet.com or have no artworks available. Of these records, 29.89% were either paintings that have been bought in, withdrawn, removed or that were not available, which reduced the available amount of records to 101,369. Some auction

records were missing crucial information, such as the used medium and material or the size of the painting, and were removed from the dataset. After everything was downloaded, there remained 98,545 usable auction records created by 467 artists from between 1960 and the first four months of 2010[1]. The data for the other financial assets was downloaded from the Federal Reserve Bank of St. Louis, which includes ten-year Treasury bonds, three-month Treasury bills and the S&P 500 Index. All the data is semi-annual from 1960 to the first half of 2010. From the indices, I calculated the semi-annual returns and I converted those returns into semi-annual continuously compounded returns.

5. Results

5.1 The Top 500 Art Market Index and S&P 500 Index

Figure 1 represents the Top 500 Art Market Index using end of semester index values, h1 covering the months January through June and h2 covering months July through December. For the most part, the index steadily grows from 1960 to about 1985. This is due to the development and increased prevalence of the art market in the global economy, especially in the UK and US. After 1985 the art index shoots up with a massive jump that peaks in the second half of 1989. The index then drops rapidly during the next year or so then starts to level off. During the late 1980s, the world was experiencing a very prosperous economic time along with a growing popularity of art auctions. This time was referred to as the "bubble-period" in Japan. The Japanese were powerful proponents and participants in the global art market and during this time, Japan invested heavily in the art, raising prices of paintings, especially those in the expensive class. By the end of 1990, Japanese investors had bought the top three most expensive paintings in the world. However, in 1991 the bubble burst and the Japanese economy took a hard

[1] I would like to thank Dr. Kraeussl for letting me use his data for my project.

hit bringing down the art market along with it.

The art market gained momentum again until about 2007 when the effects of the global financial crisis reached art as well. However, it started to grow again around 2009 and has since almost reached is peak from 2007. The fact that in about a year it gained back what it lost in two years shows that our economy is recovering and perhaps people are putting more money into investments like art.

Figure 2 represents the S&P 500 Index using end of semester index values, h1 covering the months January through June and h2 covering months July through December. The two graphs are pretty similar except for the peak in the 1990s occurs at different times since different things affected this market. The first peak in the S&P 500 graph occurs around 1999. This is mostly likely due to the Dot-com bubble that was present in the United States at this time. The stock market experienced rapid growth due to the thriving Internet sector. During this period, from about 1995-2000, many new web-based companies were founded. Since stock prices increased at such a fast pace, venture capitalists and entrepreneurs made less cautious decisions than they may normally would have. Like any bubble, it burst in the late 1990s; since so many companies had the same business plan to monopolize a specific sector, most of these companies failed. The index dropped until around 2002 when it started to pick up momentum again up until the recent financial crisis.

5.2 Performance Analysis

I calculated general descriptive statistics for the Top 500 Art Index, S&P 500 Index, ten-year Treasury bonds and three-month Treasury bills over the period 1960:h1 to 2010:h1. The most important statistic is the annualized returns because this can tell us how art performs as an investment in comparison to the other financial assets, in particular equities. My results are

slightly different than Kraeussl and Lee (2010). This is most likely because of the use of additional 25 years of data and the fact that my data is semi-annul rather than quarterly.

It is better to look at geometric returns rather than arithmetic for investments because for arithmetic returns, the numbers are not independent of each other and for geometric returns, they are. To calculate arithmetic mean, you just divide the sum of your results by the count of the series. The geometric mean makes the numbers in the series independent of each other by adding one to each number, multiplying all the numbers together, and raising the product to the power of one divided by the count of the numbers in the series. From Table 1, we can use geometric returns to determine annualized returns, which is what investors are most interested in. Looking at annualized returns we see that art yields the highest value of at 12% and in second is the S&P 500 with a value of 3.6%. Art has almost four times the annual return than if you invested in the S&P 500. Government bonds and Treasury bills yield negative annual returns of -8% and -17% respectively, and therefore it is not beneficial to look at them as a long-term investment like we do equities.

Figures III and IV show the trends of the Top 500 Art Index returns and S&P 500 Index returns over the past 50 years. These are the assets that have a positive annual rate of return. The art returns seem to not have as much variation as the equity returns. The returns have less frequent increases and decreases and when they do occur, they are not as sharp as for equities. Figures V and VI show the trends of the government bonds and treasury bills. These assets yield negative annual returns over this period of time so therefore they are not ideal long-term investments.

The Sharpe Ratio is a statistic used to analyze portfolio performance, specifically risk. It determines a portfolio's excess return relative to the total variability of the portfolio. It attempts

to show whether a portfolio's performance is due to good management or excessive risk. It does this by measuring the risk premium (the minimum amount of money by which the expected return on a risky asset must exceed the known return on a risk-free asset), per unit of risk in an investment. To calculate the ratio, the risk-free return (arithmetic return of three-month treasury bills) is subtracted from the return of a risky asset divided by the standard deviation of the risky return. A lower ratio means that an asset is more risky than one with a higher ratio. From Table 1 we can see that the Sharpe Ratio of the Top 500 Art Index is about .26, which is less than that of the S&P 500, which has a Sharpe Ratio of about .44. This means that art is almost twice as risky as equities over this period.

Skewness measures asymmetry from the normal distribution, and kurtosis measures the level of the peak of the distribution around the mean. The closer to zero the skewness and kurtosis values are, the more normally distributed the data set is. Looking at those values in Table 1, we see that art's skewness and kurtosis values are furthest from zero out of all of the assets, which in itself tells us that art is the least normally distributed asset. Figure III shows a histogram of the distribution of the art returns. The distribution of art returns is skewed to the left (since it is negative), so it has more higher return values and fewer lower return values. In fact, it is the most negative out of all of the assets, which means that it probably has the greatest amount of high return values in comparison to its low return values. Since art's kurtosis is a fairly high and positive value, it has the most acute peak around the mean of out all the assets. Figure IV shows a histogram of the distribution of the S&P 500 returns. Though the skewness of the S&P 500 returns is negative and the kurtosis is positive as well, its values are closer to zero than compared to art, which means that it is more normally distributed and there are fewer extreme high values.

The Jarque-Bera statistic measures the normality of a sample based on the skewness and kurtosis. It tests the null hypothesis that the data is normally distributed – meaning skewness and kurtosis equal zero. Art has a Jarque-Bera statistic of about 2520, which is extremely high compared to the other financial assets. This confirms that art returns are very far from being normally distributed. The Jarque-Bera statistic for the S&P 500 returns is about 16, which shows that the equity returns are more much close to being normally distributed. Both statistics reconfirm what the skewness and kurtosis show us as well.

I performed autocorrelation regressions to see if the returns for art and equities are serially correlated. This tests whether the returns for each index are correlated with their own lagged values. I found that the S&P 500 returns are not significantly serially correlated but the Top 500 Art Index returns are at the 1% level. This shows that predictability does not exist for the S&P 500 returns but it does for the art returns. Therefore it easier to predict trends for returns in the art market than in the equity market.

5.4 Correlation

Correlation measures the strength of the linear dependence between two variables where the values run between -1 and 1. A correlation coefficient closer to 1 signifies a positive linear relationship between the variables, a value closer to -1 signifies a negative linear relationship between the variables, and a value close to 0 signifies that no linear correlation exists between the variables. When I calculated pairwise correlation coefficients between the different assets' returns, I found that the correlation coefficient between the returns of art and equities is .139. This value indicates a small positive linear relationship between the returns. However it is close to zero, which means that the linear relationship is extremely weak. Since it is positive, it suggests that art returns and equity returns move in the same direction. This shows that art is not

an attractive alternative investment to equities In fact, none of these financial assets seem to be strongly correlated with art; the correlation coefficients are all pretty close to 0 meaning that there is a random, nonlinear relationship between the returns. This could be interpreted to mean that when investors choose to invest in these different assets, they choose to for non-related reasons.

Figure VII shows the comparison of the indices for art and the S&P 500. This graph makes it easier to see the difference in trends of the indices than in the graph of the compared returns. When looking at this graph, it is evident that during the period 1960 to about 1998 the indices are not as correlated but then from 1998 to 2010 they are extremely correlated. Due to this, I split up the returns into these two time intervals and performed two sets of correlations. Just like my prediction, the indices were much less correlated during the first period – they had a correlation 9.6%. For the latter period the returns were much more correlated with a correlation of about 46.7%. This means that the art market was more linearly correlated to the S&P 500 during times when the U.S. economy affected it. Clearly the Japanese bubble had a much stronger effect on the art market than the equity market. Thus, the art market is more influenced by global events than equities.

Another way to test the correlation of these assets is to look at whether or not one is a leading or lagging indicator of the other. From Figure XII, it looks as those the Top 500 Art Index is a leading indicator of the S&P 500 index. Table V shows the results from this regression and I see that the Top 500 Art Index is in fact a leading indicator of the S&P 500 Index since the beta is less than 1 and is significant at the 1% level. However, since I am most interested in looking at the returns on these assets, it makes sense to perform the same regression but with the returns from the indices. These results are not at all significant which shows that the art returns

are not a good leading indicator of the S&P 500 returns. Though we can use the art market to predict the direction of the equity market, it does not help with investment opportunity.

5.4 Capital Asset Pricing Model

The Capital Asset Pricing Model (CAPM) is a methodology that is used to determine the required rate of return of an asset if that asset is added to an already well-diversified portfolio, given that asset's systematic risk. Systematic risk, also known as market risk, is defined as risk inherent to the market that cannot be avoided through diversification. The beta in the model represents the asset's sensitivity to the market's systematic risk. The model defines the systematic risk as the "covariability of the security's returns with the market's returns." The calculation for the beta is:

$$ß = \frac{\text{covariance } (R_m, R_i)}{\text{variance } (R_m)}$$

where R_m is the expected returns from the market portfolio, R_i is the expected returns from a given investment and covariance (R_m, R_i) is the [correlation *j, m*] [(standard deviation of R_m) (standard deviation of R_i)]. In the CAPM, the beta for a portfolio is the weighted average of the betas for each asset; the returns are also the weighted average of the returns from the assets. The risk-free rate of return R_f is the minimum return any investor would expect to receive from any asset. For risky assets, the investor would expect the risk-free rate of return plus extra compensation for the systematic risk of the asset. CAPM says that the expected return of an asset is equal to the risk-free rate of return plus a risk premium multiplied by the asset's systematic risk. The formula is:

$$R_i = R_f + ß_i(R_m - R_f)$$

where R_i is the expected return, R_f is the risk free return rate, R_m is the market return rate, and $ß_I$ is the volatility of the asset relative to that of the market. For the average asset, the market price

of risk is the difference between the risk-free rate and the return form the market. The riskier an asset, the return would be proportionally higher; for an asset a less risky asset, the return would be proportionally lower. The systematic risk of just the market is 1.0 since:

$$ß = \frac{\text{covariance } (R_m, R_m)}{\text{variance } (R_m)}$$

$$ß = \frac{\text{variance } (R_m)}{\text{variance } (R_m)}$$

$$ß = 1.0$$

This means that assets with less systematic risk than the market would have a beta of less than 1.0 and asset would more systematic risk than the market would have a beta greater than 1.0. CAPM is a version of a group of capital market models referred to as risk-premium models and the is preferred of these models because it specifically defines risk relative to the market portfolio's returns whereas other models take into account industry, operating or financial risk, which can be subjective since the analyst estimates these risk.

In this regression the three-month Treasury bills were used for the risk-free return and the S&P 500 was used for the market return. All of the standard errors are robust so the model has no bias related to possible heteroscedastic and serially correlated residuals. My results show that art has a high and positive beta of about 0.79, which is significant at the 1% level. Since the beta is positive, this shows that the Top 500 Art Market Index tends to move in the same direction as the S&P 500 Index. Since the beta is less than 1.0 it has less systematic risk than the market, but not much less since it equals about 0.79, which is close to 1.0. Despite having less systematic risk, we saw from the Sharpe Ratio that art is still more risky of an investment than equities. Since art does not have a negative beta, it would not be considered a good alternative investment to hedge returns of the S&P 500 Index. Government bonds have a beta of about .66, which is

significant at the 1% level. It also has less systematic risk than the market and would not be considered good alternative investment since its beta is positive as well. It is also interesting to see if the beta is significantly different than 1 to determine the significance of its systematic risk. To do this, I change my null hypothesis from ß=0 to ß=1 which changes the t statistic. I find that the beta is not significantly different than 1. This shows that though the art market and equity market move in the same direction, it does not imply that the risk of each market is comparable. This result makes it difficult to properly compare these financial assets, since they have extremely different risks. Overall this shows that the art market and equity market move in the same direction so one cannot be used to hedge returns against the other.

6. Conclusion

The recent economic crisis has greatly affected how people are choosing to invest their money. Many investors have been more cautious of investment opportunities and the risks they impose, which has led to an increased interest in alternative investments. People are starting to look beyond the typical alternative investments such as hedge funds, commodities, and private equities. There have been many studies that examine the possibility of art as a new and different investment opportunity.

In order to examine the possible gain from investing in art, I studied the returns in the art market compared with returns of other types of financial investments, in particular equities. In this paper, I have used an art index that was developed by Dr. Roman Kraeussl, which was created by employing a two-step hedonic regression methodology on art prices, devised by Kraeussl and van Esland (2008). The data was in semi-annual terms from 1960 through the first half of 2010.

When computing annualized returns I found that art yields the highest return at 12%

followed by returns from the S&P 500 at 3.6%. Government bonds and treasury bills had negative annual returns of -8% and -17.5% respectfully. Since no investor would be particularly interested in an asset that yields negative returns, I am not concerned with how art relates to those government bonds and treasury bills as much as I am about equities. Another interesting statistic I calculated was the Sharpe Ratio, which determines the riskiness of an asset based on the distribution. These results suggest that art is twice as risky as equities.

I performed a CAPM regression, which showed that the Top 500 Art Index moves in the same direction as the S&P 500. Also, there is a correlation of 13.9% between these two indices. Based on these findings, I conclude that art would not be a good alternative investment to equities. If they moved in the same direction and were negatively correlated, then it would show that art could be a useful asset to hedge returns of the S&P 500. Based on these results, I conclude that art is not a good alternative investment to equities.

Not only is art an ineffective alternative investment, but also I do not think that it can really even be considered a good investment at all. Though it has monetary value and possibilities of appreciation and high returns, there is too much risk involved for any investor to be convinced that art would be a reliable investment opportunity. There are many costs, such as transaction costs, commission rates, auction premiums, etc. that greatly influence the purchase of art that are different than for most financial assets. There are also social factors that affect the decision to buy art since most people who purchase artwork have some sort of connection to the it. A great deal of uncertainty exists if you do not choose to buy art for its fiscal benefits, which increases its risk. Purchasing art for its financial incentive could be successful if the buyer is has the money, is knowledgeable about the market, and has some attachment to the work of art.

There’s a great realm of possibility for additional research about this topic. I only focused

on a select group of artists who produced paintings. However, the art market includes many different types of art such as sculpture, antiques, jewelry, prints, etc. It would be interesting to see how other types of art perform. I had some limitations to my analysis. I only had access to semi annual data, which restricted the amount of data that I was able to use. It would improve the accuracy of results to have more frequent data. As our world recovers from this horrific financial crisis, we will be able to better observe how investors have changed their investment habits. These are things that could be interesting to look at in the future, which would give us a better understanding of art as an investment.

Appendix

Figure I: Top 500 Art Market Index on a semi-annual basis (1960:h1 – 2010:h1)

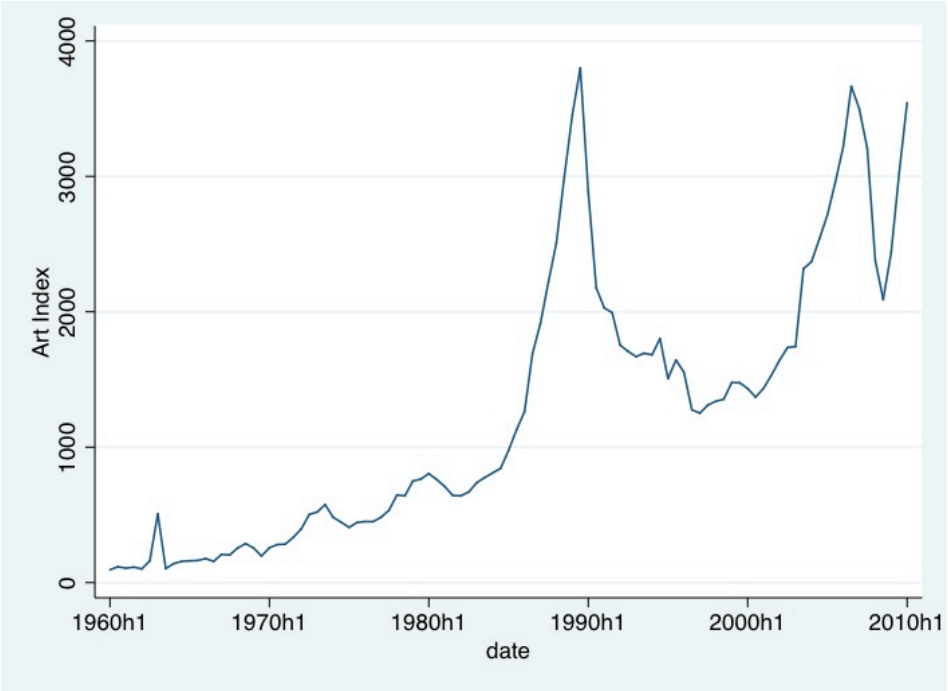

Figure II: S&P 500 Index on a semi-annual basis (1960:h1 – 2010:h1)

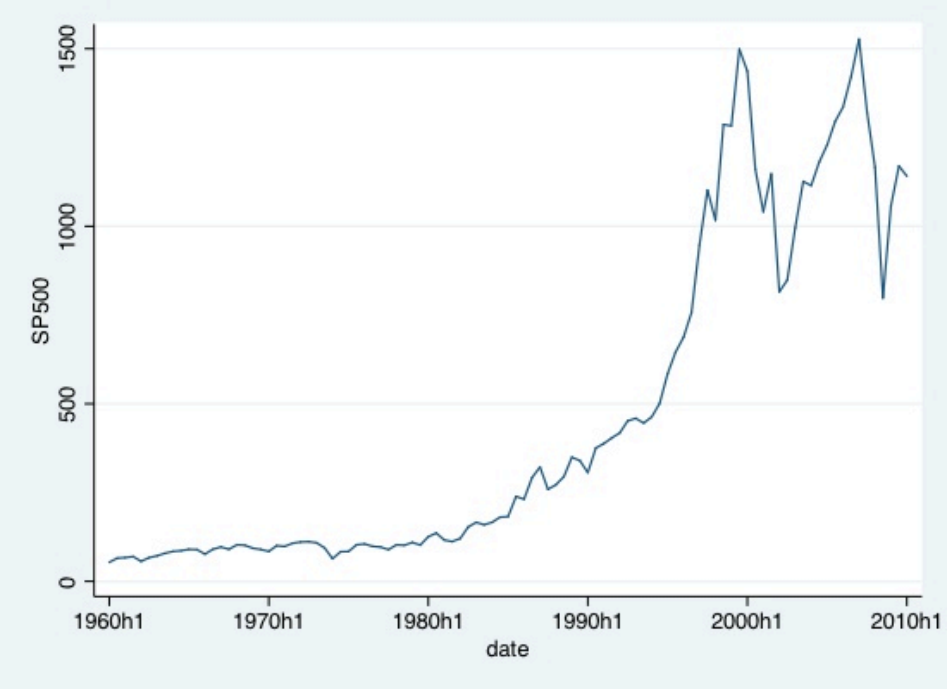

Figure III: Art index returns on a semi-annual basis (1960:h1 – 2010:h1)

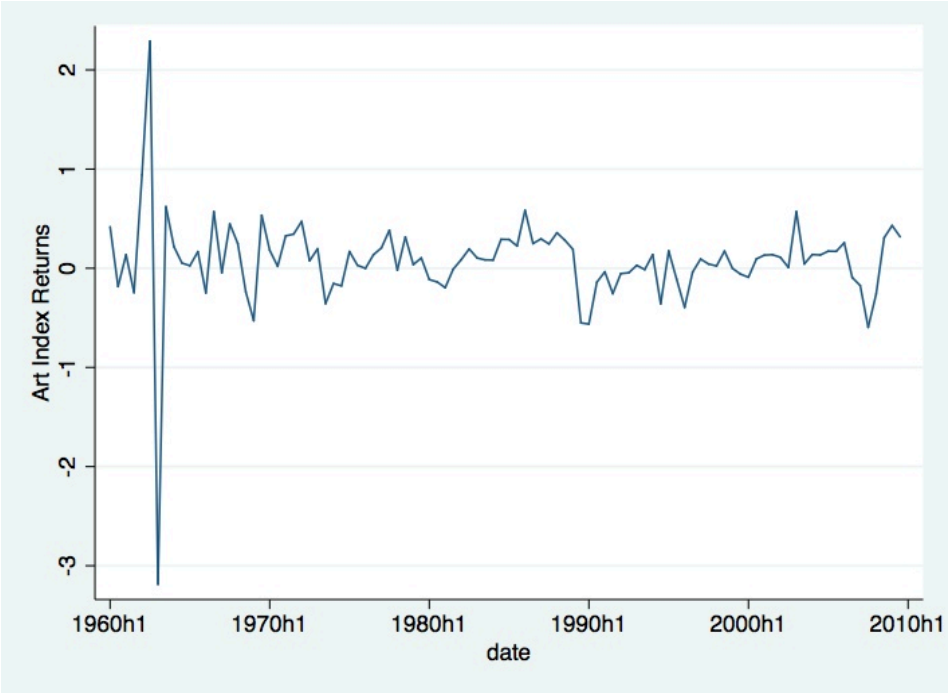

Figure IV: S&P 500 index returns on a semi-annual basis (1960:h1 – 2010:h1

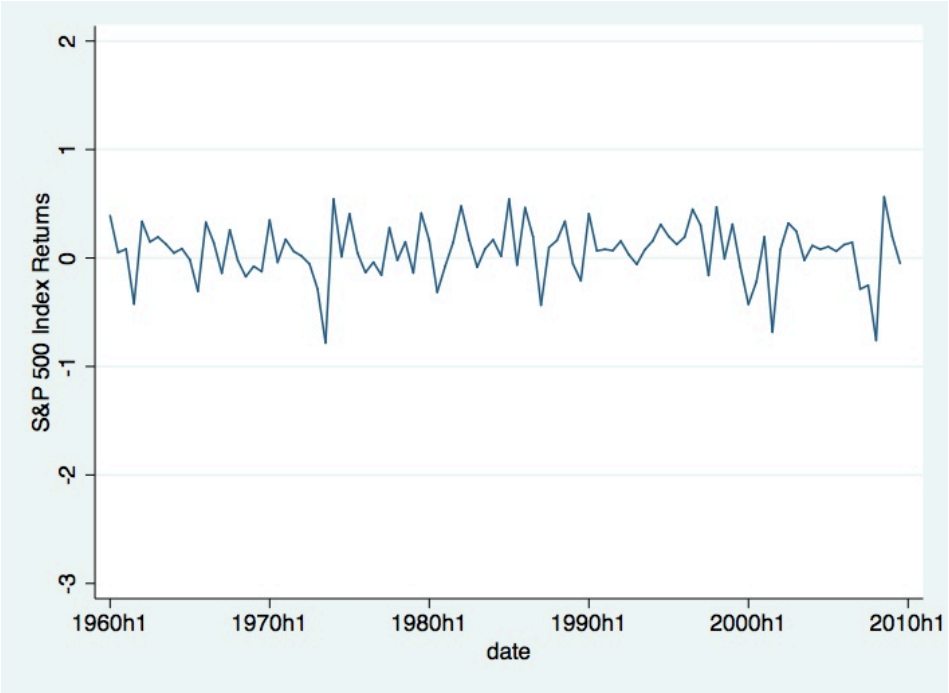

Figure V: Government bond returns on a semi-annual basis (1960:h1 – 2010:h1)

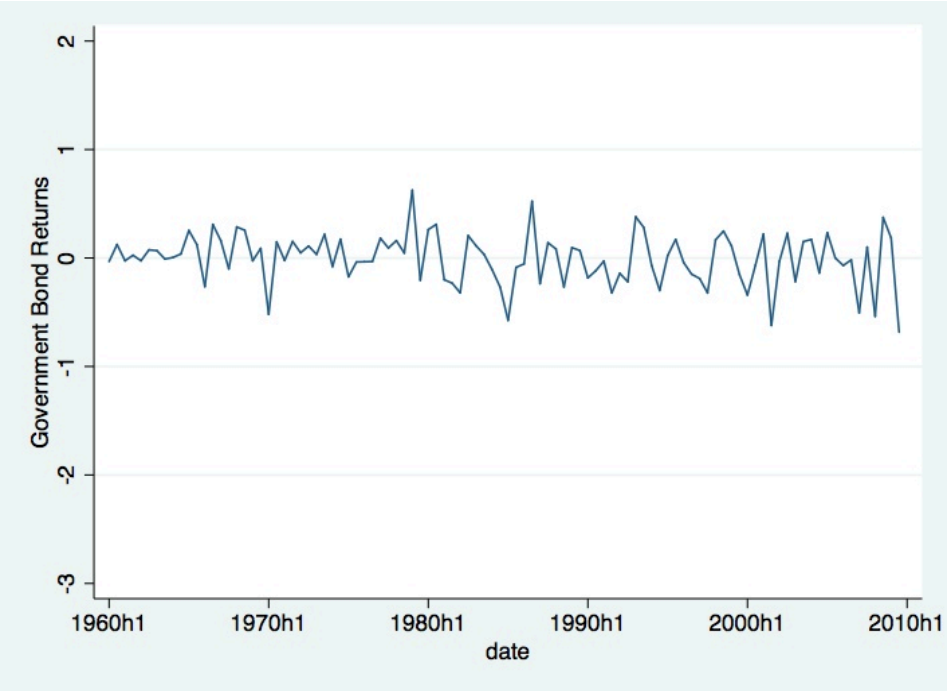

Figure VI: Treasury bills returns on a semi-annual basis (1960:h1 – 2010:h1)

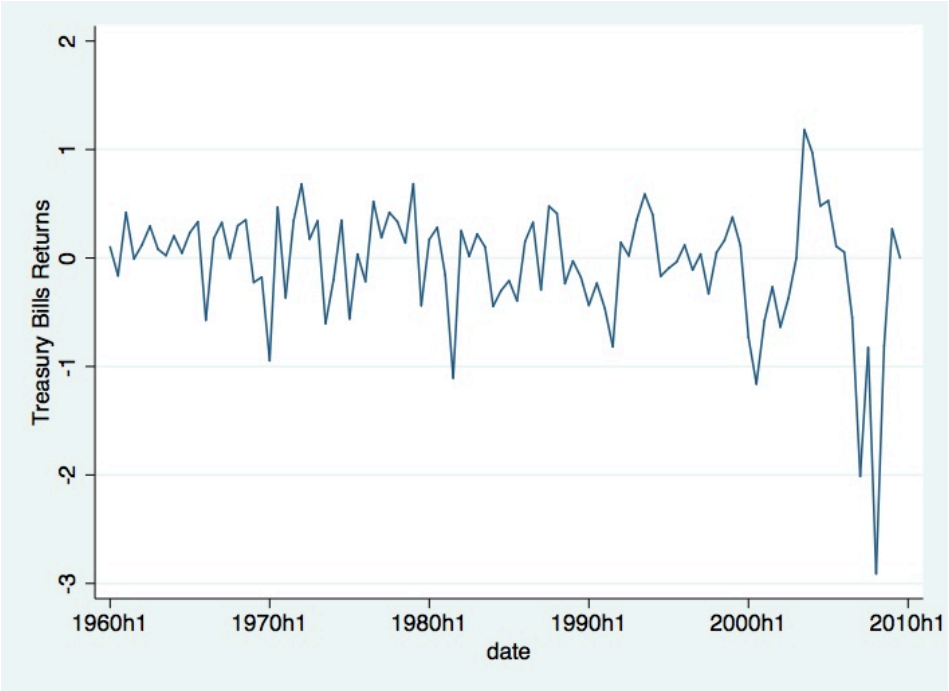

Figure VII: Distribution of Top 500 Art Index returns (1960:h1 – 2010:h1)

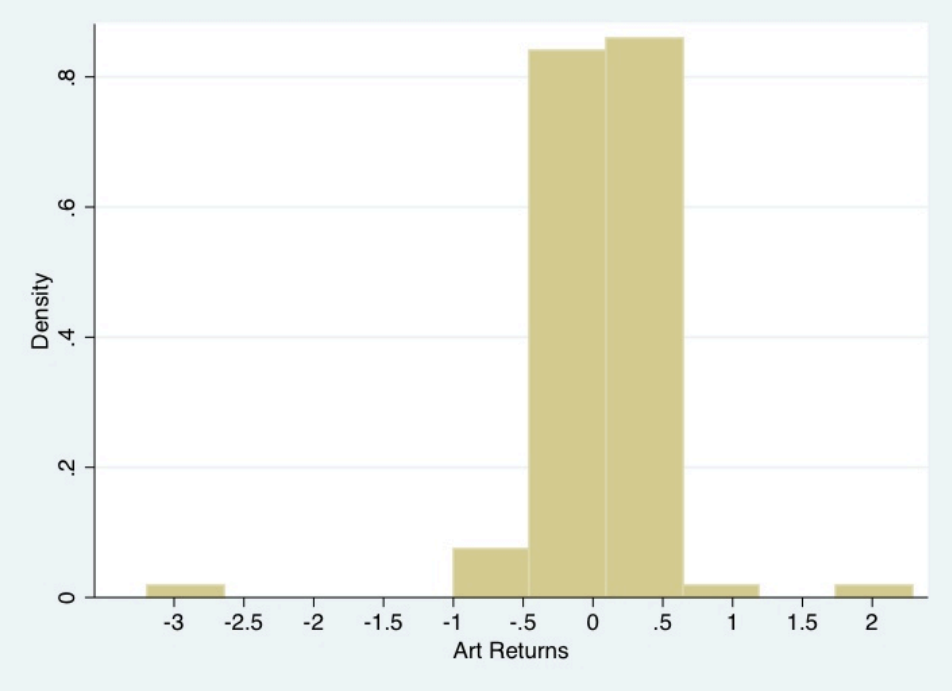

Figure VIII: Distribution of S&P 500 Index returns (1960:h1 – 2010:h1)

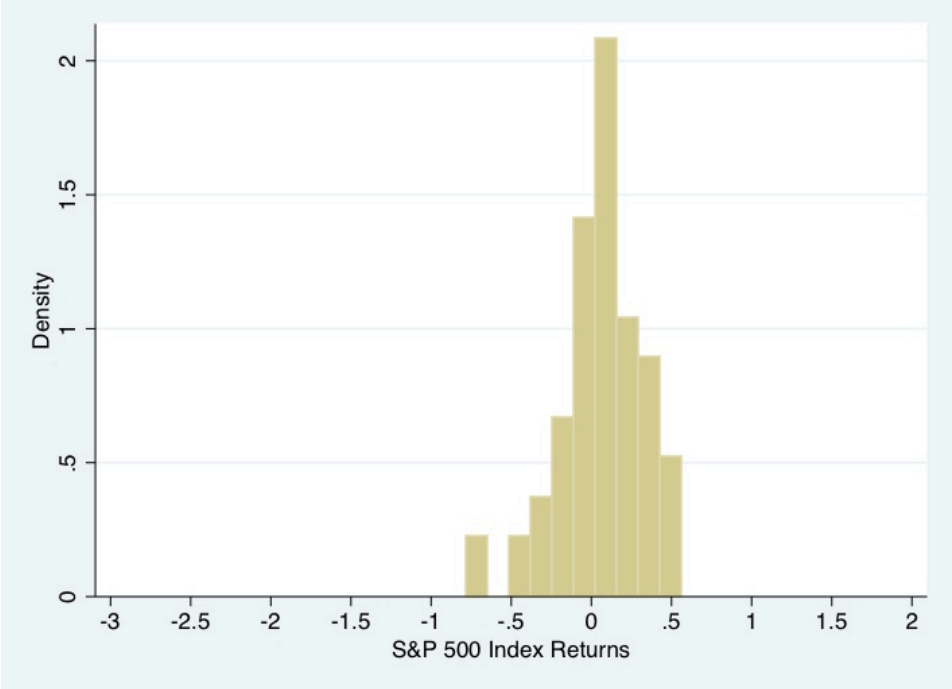

Figure IX: Comparison of returns for art index and S&P 500 Index (1960:h1 – 2010:h1)

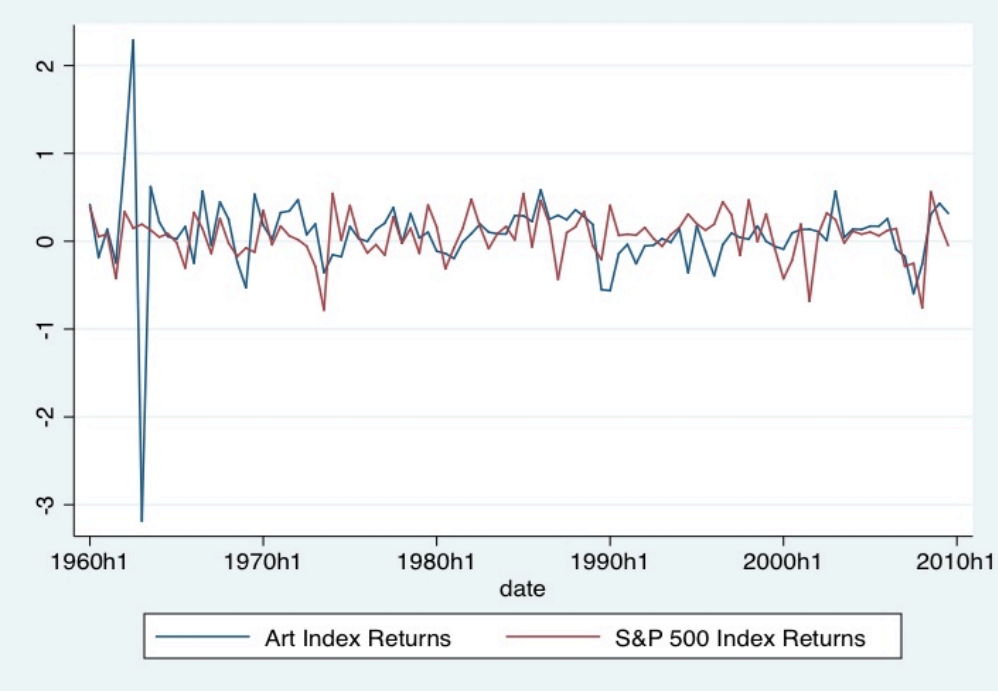

Figure X: Comparison of returns for art index and Government bonds (1960:h1 – 2010:h1)

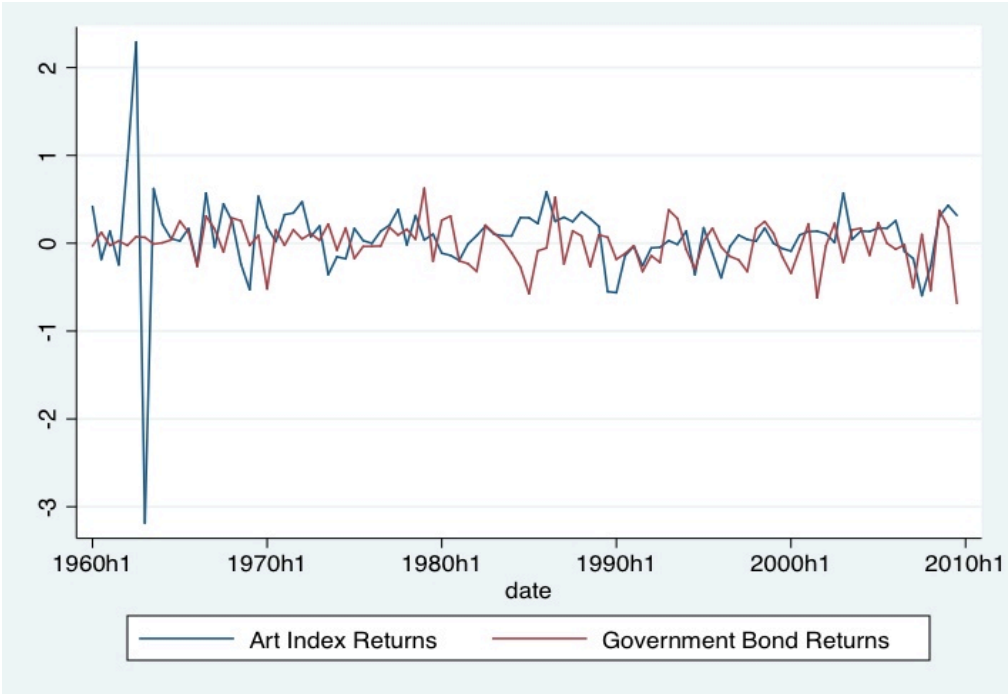

Figure XI: Comparison of returns for art index and Government bonds (1960:h1 – 2010:h1)

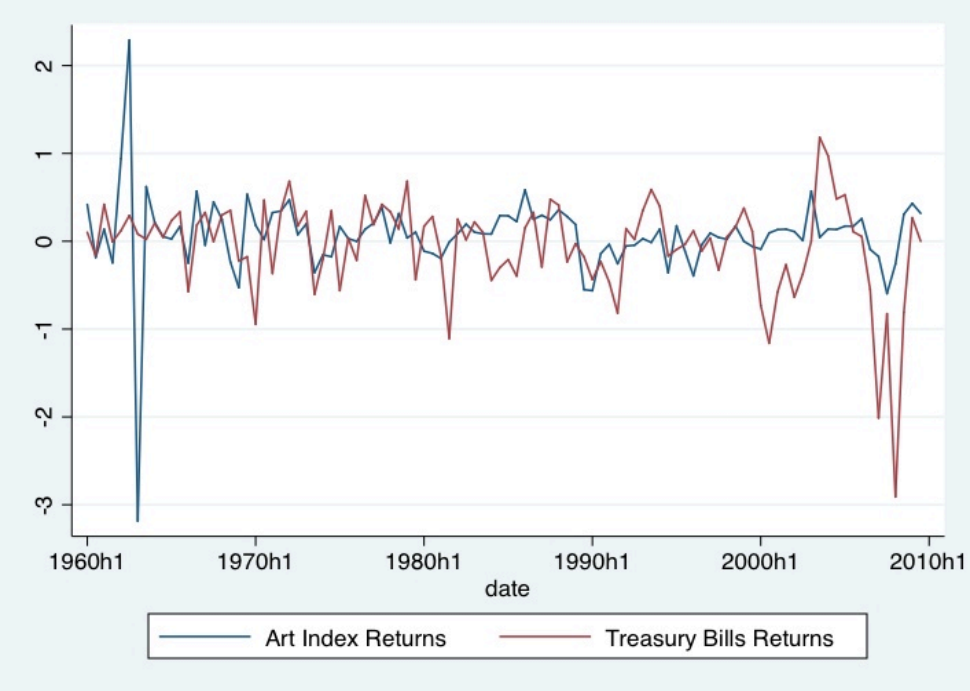

Figure IV: Comparison Top 500 Art Index and S&P 500 Index (1960:h1 – 2010:h1)

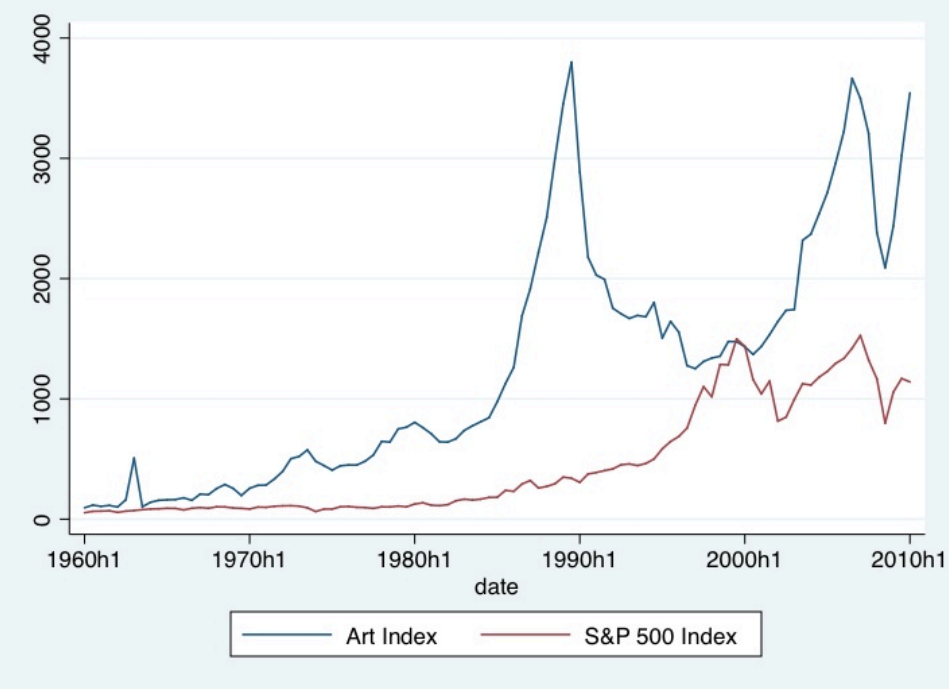

Table I
Return Statistics

This table presents results for descriptive statistics and risk and return statistics for the semi annual data of four assets over the period 1960:h1 – 2010:h1. All data is has been transformed into continuously compounded returns.

	Art	S&P 500	Gov't Bonds	3 Mo. T Bills
Observations	100	100	100	100
Arithmetic Return	0.0704	0.0611	-0.0072	-0.0533
Geometric Return	0.0583	0.0177	-0.0408	-0.0915
Annualized Return	0.1200	0.03573	-0.0800	-0.1746
Median	0.0935	0.0400	0.0012	0.0204
Maximum	2.2906	0.2813	0.3123	0.5914
Minimum	-3.1868	-0.3914	-0.3418	-1.4552
Standard Deviation	0.4756	0.1300	0.1182	0.2747
Sharpe Ratio	0.2638	0.4403	0.1949	0.0000
Skewness	-2.213943	-0.7461865	-0.4537715	-1.887331
Kurtosis	27.6576	4.2990	3.6129	10.2769
Jarque-Bera	2520.8670	16.3108	4.9967	280.0080
Prob. of Jarque-Bera	0.0000	0.0000	0.0988	0.0000

Table II
Autoregression of S&P Index returns (1960:h1 – 2010:h1)

Table II shows the autoregressive results from the model S&P 500 returns = α + S&P 500 returns$_{t-1}$ß. . Numbers in parentheses are robust standard errors.

	S&P 500 Index Returns
Intercept	.0628
	(.0268)
S&P 500 Index Returns (t-1)	-.0790
	(.0340)
R-squared	0.0063

Table III
Autoregression of the Top 500 Art Index returns (1960:h1 – 2010:h1)

Table III shows the autoregressive results from the model Top 500 Art Index returns = α + Top 500 Art Index returns$_{t-1}$ß. Numbers in parentheses are robust standard errors.

	Art Index Returns
Intercept	.0871
	(.0471)
Art Index Returns (t-1)	-.2596***
	(.0979)
R-squared	0.0676

*** Significant at the 1% level

Table IV
Correlation coefficients of returns (1960:h1 – 2010:h1)

Table IV shows the pairwise correlation coefficients for the returns of these four assets. A negative coefficient means that the assets would be good alternative investments.

	Art	S&P 500	Gov't Bonds	3 Mo. T Bills
Art	1.0000	-	-	-
S&P 500	0.1390	1.0000	-	-
Gov't Bonds	0.0245	0.0127	1.0000	-
3 Mo. T Bills	0.1695	0.1989	0.5204	1.0000

Table V
Correlation coefficients of returns (1960:h1 – 1997:h2)

Table V shows the pairwise correlation coefficients for the returns of these four asset from the period 1960:h1 – 1997:h2. A negative coefficient means that the assets would be good alternative investments.

	Art	S&P 500	Gov't Bonds	3 Mo. T Bills
Art	1.0000	-	-	-
S&P 500	0.0957	1.0000	-	-
Gov't Bonds	0.0117	-0.4516	1.0000	-
3 Mo. T Bills	0.1539	-0.1544	0.6239	1.0000

Table VI
Correlation coefficients of returns (1998:h1 – 2010:h1)

Table VI shows the pairwise correlation coefficients for the returns of these four asset from the period 1998:h1 – 2010:h1. A negative coefficient means that the assets would be good alternative investments.

	Art	S&P 500	Gov't Bonds	3 Mo. T Bills
Art	1.0000	-	-	-
S&P 500	0.4671	1.0000	-	-
Gov't Bonds	0.1138	0.7322	1.0000	-
3 Mo. T Bills	0.4585	0.5081	0.4359	1.0000

Table VII
Autoregression of S&P 500 on Lagging Art Index

Table III shows the autoregressive results from the model S&P 500 Index = α + Top 500 Art Index$_{t-1}$ß. Numbers in parentheses are robust standard errors.

	S&P 500 Index
Intercept	57.4123
	(53.7917)
Art Index (t-1)	.3265***
	(.03404)
R-squared	0.4840

*** Significant at the 1% level

Table VIII
Autoregression of S&P 500 Returns on Lagging Art Index Returns

Table III shows the autoregressive results from the model S&P 500 Index returns = α + Top 500 Art Index returns$_{t-1}$ß. Numbers in parentheses are robust standard errors.

	S&P 500 Index Returns
Intercept	.05827**
	(.0265)
Art Index Returns (t-1)	-.0058
	(.0550)
R-squared	0.0001

** Significant at the 5% level

Table IX
CAPM

Table IV shows the CAPM regression results from the model $R_i = R_f + ß_i(R_m - R_f)$. The S&P 500 Index reflects the market return and three-month Treasury bills reflect the risk-free rate of return. Numbers in parentheses are robust standard errors.

	Art	Gov't Bonds
Intercept	0.03556	-0.0296
	(.0496)	(.0275)
Beta	0.7877***	0.6610***
	(.0791)	(0.0833)
R-squared	0.4406	0.6136
F-statistic	99.08	62.97
S.E. of regression	.4988	.2948

*** Significant at the 1% level. Numbers in parentheses are robust standard errors.

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