The Impact of the Post-War & Contemporary Art Market on Other Segments of the Art Market

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Table of Contents

Acknowledgments .................................................................................................................. 3
Abstract .................................................................................................................................... 4
Introduction ............................................................................................................................. 5
Literature Review ..................................................................................................................... 7
Data Sources ............................................................................................................................ 13
Methodology and Results ........................................................................................................ 22
Discussion .................................................................................................................................. 30
Conclusion ............................................................................................................................... 34
References ............................................................................................................................... 36
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Abstract:
This paper analyzes the correlation between the average price of a high-selling work of art in different segments of the art market to understand how the increased interest and prices in one sector, Post-War & Contemporary Art, has influenced others. The theory that there is strong positive correlation and conformity in prices across all segments of the art market is tested. The results conclude that while most prices across the various segments seem to be positively correlated to each other and to exogenous economic indicators, the Old Master Painting segment does not follow the traditional patterns that are seen in the other four segments analyzed within this paper. Lastly, a look at the top collectors demonstrates that increasing interest in collecting Post-War & Contemporary goods is detrimental to the number of top collectors interested in Impressionist & Modern Painting and Old Master Painting.
I. Introduction

The art market has consistently been a point of reference for wealth, status, taste and culture. From the Renaissance patronage model to the current galleries and auction houses, individuals have been willing to pay high prices for these goods of conspicuous consumption. Recently, the art market has seen an explosion in prices, specifically for Post-War & Contemporary art. Furthermore, art is increasingly viewed as an investment. Individuals are hoping to see returns on the art that they purchase. However, not all types of art have experienced equal increases in value.

While Impressionist and Modern art has consistently been a stable and prominent category, Post-War & Contemporary continues to rise past it. Furthermore, traditionally acclaimed art under Old Master Painting is becoming lost in the shuffle. While the November 2017 sale of Leonardo da Vinci’s Salvador Mundi for $450 million was unheard of for any painting, no less an Old Master’s Painting, this is not indicative of the rest of the Old Master Painting market, and it is unclear if it will have any long-term effects (Reyburn, 2017). Ultimately, Old Master Painting is not sharing in the same growth as other segments.

Additionally, less valuable works such as those on paper and photography are often overlooked in discussion as they are not the most prominently featured pieces, given that they are not the pieces that are selling for millions of dollars. The lower end of prices can be disregarded in totality in that it does not provide a true understanding of the demand, as there is often a surplus of supply (be it more or...
less desirable). The “tail” of lower-priced works of art is long and stable. To the extent that the lower end of the distribution has any explanatory power, that same significance will be observed in the higher end of the art market.

The reasons that individuals purchase art today are in many ways similar to the reasons that individuals were purchasing and commissioning art in ancient Greece and Rome and then during the Renaissance. Owning art has a signaling power intrinsically tied to status. The rise in global wealth since the recession has had a profound impact on the art market. With this growth of wealth, individuals continue bidding up the value of artworks in order to signal status. A baseless belief is that individuals will see a payoff from holding onto their purchases. The art market is incredibly volatile and some segments of the market show much greater volatility than others.

Within this paper, I hope to look at the impact that the increase in interest and price in the Post-War & Contemporary category has had on the success of other segments of the art market, specifically Old Master painting, Impressionist & Modern Painting, Impressionist & Modern Works on Paper, and Photography. I seek to understand how the prices of the top works in each section are correlated and how the top collectors’ behaviors have evolved as a result of this correlation.
II. Literature Review

I seek to add to the existing literature by providing a look at the interaction between different segments of the art market. There is a wealth of literature that seeks to understand the movement on investments within the art market, the relevance of taste, and the meaning behind a price on a work of art.

With the recent growth of the art market over the past 20 years, there have been more recent publications that are intended to help the everyday individual engage with the art market and make smart investments, specifically into the contemporary art market, in which individuals might be hoping to purchase something from an undiscovered artist and later resell it for a profit. *Collecting Contemporary Art* by Adam Lindman and *The Art of Buying Art: An Insider’s Guide to Collecting Contemporary Art* by Paige West are both designed as easy guides to understand the art market, hoping to make it more accessible to individuals who do not specialize in art. Books and articles such as these however are much more theoretical and anecdotal. They are not backed with sufficient data to validate the theorizing.

Along with this desire to see an expected profit, there is economic interest within the existing literature on the return on investment for a work of art. William Goetzmann presents evidence that demand for art increases with wealth of investors by looking at art purchased more than once from 1715 to 1986 in auctions. His research looked at the positive or negative return made on the subsequent sales to understand the increased demand as a function of increased wealth (Goetzmann, 1993). While Goetzmann’s data set looked at individual works of art, he looked at
the sales in totality, not segmenting them in any way. Alternatively, William Baumol argued after looking at two centuries’ worth of price data that the art market is too volatile and follows no cycle or comprehensive growth rate (such as cpi or GDP) to make a confident investment (Baumol, 1986). Within this study, however, Baumol focused exclusively on artists that were no longer living in order to only analyze cases in which the supply is fixed and cannot change. While this may have made empirical data more simplified given that there was no need to account for the possibility that an artist’s body of work was continuing to grow, this article neglects one of the most prominent segments of the art market, Contemporary Art.

Jianping Mei and Michael Moses looked at the return on sales between 1875-2000 for works bought and sold more than once (Mei and Moses, 2002). A common investment theory in art is to purchase the “best” works of art by a certain artist. Mei and Moses tested this theory and found that in fact these so-called “masterpieces”, or the “best” works created by a certain artist, often did not have the best returns when they were sold a second time. Furthermore, their study looked at this effect across different segments of the art market (American, Old Masters, Impressionist, and Modern painting) and found the same results consistently across each segment.

Beyond just the return on investment, previous literature has sought to understand the importance of aesthetics and “taste” on the price of art. Goetzmann, aside from just looking at the economic return on art, discussed the subjectivity of
aesthetic valuation and how this factor can be reflected within the price individuals are willing to pay, changing based on fluctuations in trends (Goetzmann, 1993). Furthermore, Benjamin Mandel looked at personal taste as a measure of utility that one buyer gets from viewing and owning a certain work of art over another work (Mandel, 2009). Titia Hulst’s article looks at the differences in taste of men and women as buyers, in the emergence of the Pop Art market in the 1960s (Hulst, 2017). Hulst tests the theory that women prefer abstract art and men prefer Pop art, demonstrating the power that both groups had in the emergence of these two styles. These different approaches at understanding taste and utility help to demonstrate their existence within the marketplace.

David Galenson has provided extensive literature on the economics of creativity. His methodology attempts to explain, in an economic sense, the success of an artist or work of art. Galenson tackles modern art and artists by attempting to understand what makes them “successful”. Rather than exclusively looking at auction prices, he examined how often images by certain artists appeared in art history textbooks (Galenson, 2006). Furthermore, he looks at the relative importance of artistic works from different life stages of artists (Galenson, 2006). Galenson’s literature provides a more formulaic look at the success of a work of art, beyond just the sale price. He then applied his technique to the sales prices achieved by the works of art. While Galenson notes that there are different external factors that may force the misalignment of artistic success and success in the art market (e.g., size), there is usually a strong relation between the sale price and “art
historical” importance (i.e., how often a work is depicted in a text book or number of exhibitions it has been featured in). Building upon Greenberg’s description, “taste” at both the moment of initial sale and all subsequent sales is a very key external and dynamic factor determining the quality of the art (or the value) (Galenson, 2001). Additionally, Pierre-Michel Menger discusses the economics of creativity, attempting to rationalize the risk factors that are relevant in art and the creation of art, concluding that artists may be the ones willing to take the largest amount of risk in many cases, often facing uncertainty, and how in turn risk may pay off (Menger, 2014).

As well, there exists literature on the importance and significance of the pricing of a work of art in the gallery setting. Olav Velthius combines sociology with economics in his article, “Symbolic Meaning of Prices: Constructing the Value of Contemporary Art in Amsterdam and New York Galleries,” in order to demonstrate that prices are not created on an individual basis but rather convey information beyond “value” (Velthius, 2003). Velthius notes that collectors view price as an indicator of quality. Building on this, in a purely economic sense, the expected profit of a piece of art sold at auction should be zero. However, the imperfections of the auction system, the belief in the scarcity of “quality” and buyers’ expectations tend to drive expected profit above zero. Alternatively, within the auction system, a lower estimate can yield higher prices as individuals believe that they are getting a bargain (Ekelund, 2013). Prices contain meaning and signaling factors that will in turn affect how potential buyers view the work of art.
As an aside, while my own work focuses much more on the demand side, there is some literature on the supply side of art, specifically in terms of creation of art. Leslie Singer presented a model for how artists decide what quantity of art to create based on a variety of factors such as time, leisure and income, among others (Singer, 1981).

Beyond the prevalent economic and sociological discussions of the art market, there are consistently new newspaper articles published that present questions and information on the changes taking place within this space. For example, a recent Wall Street Journal article asked if $100 million was the new threshold sale price to determine the “best” works of art (Crow, 2018). I add to the existing body of literature by understanding how the different segments within the art market interact and impact each other, further examining the current trends that are often written about.

While my research builds off the existing groundwork, I look at a more contemporary and smaller time period than any of the existing literature in order to best understand the immediate changes that have taken place with the significant increase in popularity in certain segments of the market, like Post-War & Contemporary art (including the dramatic wise in global wealth and the entrance of new segments of buyers). Furthermore, there is limited research on the collecting patterns of buyers. My inclusion of the Artnet Top 200 collectors provides a new look at the changes taking place within this group of top collectors. Lastly, I build directly upon Goetzmann’s 1993 study in regards to the tie between wealth and the
art market while further segmenting the art market to truly understand how price increases in some segments impact others (or not).
III. Data Sources

A. Art Sale Price (Artnet)

I compiled a data set that contains information on five different art segments. For each segment, the data set contains the twenty highest-selling works of art within that year for the past 15 years. Focusing exclusively at the highest-selling works is intended to provide a more comprehensive view of the highest end of the market for each segment. The data contains works sold in Sotheby’s and Christie’s auctions in the following cities: New York, London, Paris, and Hong Kong. These cities were chosen as they are representative of the most prominent countries within the art market. According to the UBS Art Market Report 2017, the United States, United Kingdom, and China were the leading countries for art sales in the prior year, 2016 (McAndrews, 2017). New York, London, and Hong Kong, respectively, are the largest auction houses within each of these countries. Paris was included given that there are important auctions annually in the Impressionist & Modern and Impressionist & Modern works on paper categories, at both Sotheby’s and Christie’s.

The five categories that are contained within this data set are Post-War & Contemporary, Old Master Painting, Impressionist & Modern Painting, Impressionist & Modern Works on Paper, and Photography. Within this dataset, the categories are defined as:

- Post-War & Contemporary: Painting created between 1960 and the present by European or American artists; excluding artists who have the majority of their work created in the Impressionist & Modern period and style
• Impressionist & Modern: Painting created between 1850-1959 by European artists; excluding artists who have the majority of their work created in the Post-War & Contemporary period

• Impressionist & Modern Works on Paper: Works on paper such as drawing, pastels, watercolors, created between 1850-1959

• Old Master Painting: Painting created between 1200-1799 by European artists

• Photography: Works of art that are created using Photography, can contain other elements such as painting and drawing

The underlying assumption is that works of art within these five categories are easily substitutable and therefore can be thought of as sharing similar characteristics, thus making it possible to group works together under these different categories. This assumes that the within-group variance in “value” is zero. While this may not be necessarily true, I feel this is a safe assumption to make given the size of the data set.

All the sales prices used are in U.S. Dollars and include the buyer’s premium. The information is all collected from Artnet, an online database of art auction information. Furthermore, all numbers were then adjusted to account for inflation. Given the format of Artnet, it was difficult to collect large quantities of information given that they only enable downloads as pdfs and put limits on queries and results. Focusing on the top results per year per segment provides a look at the highest end of the art market, providing a better understanding of the demand side as well.
B. Adjustment For Outliers

In response to the original art price data, I also created a set of prices in which I removed any clear outliers. I removed any of the top works of art that were significantly higher than the next priced works below it. In the cases where the next priced work of art was more than $10m higher (for Post-War & Contemporary and Impressionist & Modern Painting) and more than $5m higher (for photography, Old Master Painting, and Impressionist & Modern Works on Paper), these were excluded from the analysis. This helped to remove the clear cases that were not consistent with the patterns happening within each of these the segments. For example, these works may be the types of pieces that rarely go up for auction or could have somehow been tied up in some sort of bidding war. For the following tests involving price, I looked at the results using both this adjusted data set and also the original data set to understand if this would result in any significant changes.

C. Art Price Summary Statistics

The art price data set that I compiled consists of approximately 1,600 data points. Within this set there are an equal number of points from each of the five art segments and for each of the years between 2002-2017. Below is a summary of the auction houses and sale cities. There is a pretty even split between auction houses yet in terms of cities of sale, New York is the dominant city.
Furthermore, Graphs 1 and 2 provide a visualization of how the average price per segment of work of art has moved from 2002-2017. Prior to 2011, Impressionist & Modern Painting was almost always priced higher than Post-War & Contemporary. These two segments are priced the highest within the art market. Photography is priced the lowest of these five segments and its prices remain fairly stable over time. Noticeably, there is a large decline in all sectors in 2009.

Graph 1:

1 Hong Kong only has one point of sale. While it is still one of the largest cities for art sales, the segments that are sold here are predominantly Asian art. Therefore, it is not as relevant to the art segments that are being analyzed within this paper.
Graph 2, as seen below depicts the adjusted averages in which any clear outliers had been removed. A noticeable difference here is that Impressionist & Modern Painting does not have the same significant spike in 2015.

Graph 2:

![Average Price of Top Works of Art Per Segment (Adjusted to Exclude Outliers) (2002-2017)](image)

**D. Art Collector Data (Artnet Top 200 Collectors)**

I utilized the Artnet Top 200 Collectors lists for each year from 2002-2017. This is a list that contains the reported top global art collectors with the different subsections of art that each individual collects. I used this list to understand how the number of collectors of these different subsections have changed over time. This list was mostly useful for just Post-War & Contemporary, Impressionist & Modern Painting, and Old Master Painting collectors as the numbers of those collecting Photography and Impressionist & Modern works on paper were too small to make any legitimate observations. Furthermore, it is important to note that collectors can list multiple
categories of collection. Artnet has begun to report some of these statistics but prior to 2014 they had not. In order to ensure that my definition remained consistent throughout, I used my own methodology for counting the collectors for each subsection. For example, it was unclear if Artnet included contemporary Asian art within their count for Post-war & Contemporary. To keep this consistent with the previous definition I had used, I did not include contemporary Asian art.

E. Additional Data Sources

Statista was used for information on U.S. GDP, CPI, and Oil Prices.

F. Possible Challenges with Data

Auction Data:

While information on sale price from auctions is widely available, there is less publicly available data for sales that happened in galleries. This is an increasingly growing segment of the market. In 2016, art sales from auctions accounted for approximately 50% of sales (McAndrew, 2017). The majority of the remainder of sales come from art fairs, private dealers and galleries. Therefore, while the results present a view of the market they do not present the trends taking place in the market in totality, but rather just within this channel.

Time Period:

I used 2002 as a starting point, as I believe that 15 years will present an in-depth view of what has happened within this space. Furthermore, while Artnet has auction results dating back to 1985, it is not formatted in a user-friendly way. The
amount of years selected provides data leading up to the increase in Post-War & Contemporary prices. While this does not provide a full view of the changes that have happened since the larger emergence of the Post-War & Contemporary market, it is relevant in understanding the most recent increase in this segment, specifically in the period after 2009. In order to do get a more comprehensive view, it would be beneficial to start at an earlier point in which this segment was just emerging. However, with the recent resurgence, I hope that this presents a view of the relationships between these different sectors that are currently taking place. If I were to have included more years, I believe that the effects would be more significant yet it would not have a large impact on the correlation coefficients between the different art segments.

**Perfect Substitutes:**

Within my definitions, by segmenting each category, I am assuming that the different works within them are perfect substitutes for each other. Within each case, this means that the prices are dependent only on the category that they are in rather than other factors. This is not necessarily the case. We know that factors such as size may impact the price of a work of art and its value. Furthermore, for works such as Old Master Painting, certain subjects are more desirable than others. Within this framework, I make the assumption that all works within a certain segment could be considered as substitutes. This allows us to look objectively at each segment without considering the other possibilities that might influence
pricing. While this is not a perfect solution, I believe that within the context of this paper it will not cause significant detriment to the research that I have conducted. The art segment of the work of art is the most influential factor in considering price. This is because it is sold in a sale with all “like” pieces. Just the nature of being sold along with similar pieces plays a considerable role on the expected value of the work of art.

“Top Works of Art”

For the purposes of my research, I looked at the top 20 most highest-selling works sold in a given year for each segment. This in itself does not provide a full look at the marketplace. However, by looking at the top approximate 1% of lots sold in a given year, it presents a view of the demand of the upper end of buyers. These are the buyers that often appear on the Top 200 Collectors list in Artnews and will spend a considerable amount of money in auction in any given year. There is a wide range of sales that take place, and many lots may not even reach their reserve price, given that the seller expects that their piece is worth more than the buyers do. Looking at the upper end is intended to provide a look at this one sector of the marketplace and the type of buyer that exists within this space. This does not provide a comprehensive view and therefore the results I find may not be

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2 For example, in 2017, Sotheby’s and Christie’s had a combined total of 15 auctions with approximately 100 lots at each auction. This means that the top 1% of paintings sold this year would be around 15. This number varies for segment and year but it can be safe to assume that the top 1% would be anywhere from around 10-30 paintings.
demonstrative of what is happening if one were to look at the average or even lower end of any of these segments of the art market. However, beyond the top end, results appear to be more consistent over time.
IV. Methodology & Results

A. Independence Test of Art Segments

In order to determine whether or not any two art segments were correlated, I ran a bivariate analysis to calculate the Pearson correlation coefficient between each of the five previously discussed art segments. The data used was the average annual price of a “top”\(^3\) work of art within each segment for the past 15 years, all adjusted for inflation. Table 1 provides a correlation matrix of the five different art segments: Post-War & Contemporary, Impressionist & Modern Painting, Old Master Painting, Photography, and Impressionist & Modern Works on Paper. The significance is two-tailed.

Table 1: Correlation Coefficients for All Segments from 2002-2017

<table>
<thead>
<tr>
<th></th>
<th>Post-War &amp; Contemporary</th>
<th>Impressionist &amp; Modern</th>
<th>Old Master Painting</th>
<th>Photography</th>
<th>I&amp;M Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-War &amp;</td>
<td>1</td>
<td>.579*</td>
<td>-.033</td>
<td>.845**</td>
<td>.575*</td>
</tr>
<tr>
<td>Contemporary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impressionist</td>
<td>.579*</td>
<td>1</td>
<td>-.057</td>
<td>.382</td>
<td>.347</td>
</tr>
<tr>
<td>&amp; Modern</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old Master</td>
<td>-.033</td>
<td>-.057</td>
<td>1</td>
<td>-.247</td>
<td>-.143</td>
</tr>
<tr>
<td>Painting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photography</td>
<td>.845**</td>
<td>.382</td>
<td>-.247</td>
<td>1</td>
<td>.512*</td>
</tr>
<tr>
<td>I&amp;M Drawing</td>
<td>.575*</td>
<td>.347</td>
<td>-.143</td>
<td>.512*</td>
<td>1</td>
</tr>
</tbody>
</table>

*Correlation is significant at .05 level (2-tailed)
**Correlation is significant at .01 level (2-tailed)

Adjusting for Outliers:

3 “Top” here, as will continue to be used, refers to the level of most expensive works of art sold within that segment. In this case, it is the 20 top selling works for the segment. This is continually used and previously discussed in the data section.
One of the drawbacks of the data is that some segments contain large outliers. As previously discussed within the data section, I then ran the same test as above utilizing the adjusted averages that excluded the outliers. The results can be found in Table 2:

Table 2: Correlation Coefficients for All Segments from 2002-2017 where Average Price has been Adjusted

<table>
<thead>
<tr>
<th></th>
<th>Post-War &amp; Contemporary</th>
<th>Impressionist &amp; Modern</th>
<th>Old Master Painting</th>
<th>Photography</th>
<th>I&amp;M Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-War &amp; Contemporary</td>
<td>1</td>
<td>.728**</td>
<td>-.200</td>
<td>.847**</td>
<td>.458</td>
</tr>
<tr>
<td>Impressionist &amp; Modern</td>
<td>.728*</td>
<td>1</td>
<td>-.393</td>
<td>.556*</td>
<td>.532*</td>
</tr>
<tr>
<td>Old Master Painting</td>
<td>-.200</td>
<td>-.393</td>
<td>1</td>
<td>-.211</td>
<td>-.014</td>
</tr>
<tr>
<td>Photography</td>
<td>.847**</td>
<td>.556*</td>
<td>-.211</td>
<td>1</td>
<td>.530*</td>
</tr>
<tr>
<td>I&amp;M Drawing</td>
<td>.458</td>
<td>.532*</td>
<td>-.014</td>
<td>.530*</td>
<td>1</td>
</tr>
</tbody>
</table>

*Correlation is significant at .05 level (2-tailed)
**Correlation is significant at .01 level (2-tailed)

Results:

My initial hypothesis would be that certain segments (Impressionist & Modern, and Old Master Painting) would be negatively correlated to Post-War & Contemporary. This would indicate that as individuals were spending more in one sector, spending was decreasing in another sector. This follows a theory that individuals have a set amount to spend in the art sector and as they spend more in one area they must in turn spend less in another. I anticipated seeing this most evidently between Post-War & Contemporary and Impressionist & Modern, the two segments with the highest spending annually. However, in both Table 1 and Table 2, the results demonstrate that there is a strong positive
correlation between Post-War & Contemporary art with Impressionist & Modern Painting, Photography, and Impressionist & Modern Drawing. This is indicative that as one segment is growing (or decreasing) the others are as well. Old Master Painting has a negative correlation with Post-War & Contemporary, as anticipated, yet the result is not significant.

In Table 1, Impressionist & Modern Painting does not have any significant results with segments other than Post-War & Contemporary. However, once outliers were removed, this segment had a significant positive correlation with all segments except for Old Master Painting. Old Master Painting, had no significant correlations.

B. Exogenous Indicators

Given the previous results, it seems evident that there is an exogenous factor that is influencing the market. In order to better understand this relationship, I ran the same bivariate test to calculate the Pearson correlation coefficient between the annual average top price per segment and the a few different wealth indicators: U.S. GDP and Oil prices. Table 3 contains the correlation results:
Table 3: Correlation Coefficients for External Wealth Indicators and Art Segments (2002-2015)

<table>
<thead>
<tr>
<th></th>
<th>US GDP</th>
<th>Oil Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-War &amp; Contemporary</td>
<td>.808**</td>
<td>.625**</td>
</tr>
<tr>
<td>Impressionist &amp; Modern</td>
<td>.563*</td>
<td>.102</td>
</tr>
<tr>
<td>Old Master Painting</td>
<td>.088</td>
<td>-.368</td>
</tr>
<tr>
<td>Photography</td>
<td>.605*</td>
<td>.810**</td>
</tr>
<tr>
<td>I&amp;M Drawing</td>
<td>.218</td>
<td>.477</td>
</tr>
</tbody>
</table>

Correlation Coefficients Using Adjusted Averages

<table>
<thead>
<tr>
<th></th>
<th>US GDP</th>
<th>Oil Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-War &amp; Contemporary</td>
<td>.811**</td>
<td>.606*</td>
</tr>
<tr>
<td>Impressionist &amp; Modern</td>
<td>.643**</td>
<td>.245</td>
</tr>
<tr>
<td>Old Master Painting</td>
<td>-.589*</td>
<td>-.227</td>
</tr>
<tr>
<td>Photography</td>
<td>.606*</td>
<td>.814**</td>
</tr>
<tr>
<td>I&amp;M Drawing</td>
<td>.601</td>
<td>.305</td>
</tr>
</tbody>
</table>

*Correlation is significant at .05 level (2-tailed)
**Correlation is significant at .01 level (2-tailed)

From these results, it appears that the US GDP is correlated to the Post-War and Contemporary category, Impressionist and Modernism, and Photography. Oil price is correlated to Post-War & Contemporary and photography. It is not significantly correlated with any of the other categories. Furthermore, using the adjusted numbers, Old Master Painting has a significant negative correlation to the U.S. GDP. It is logical that U.S. GDP

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4 Averages in which the outliers have been removed
would play a crucial role considering that close to 60% of the data points were sold from New York auction houses.

C. **Segmentation: Pre and Post 2009**

As depicted in Graphs 1 and 2, there is a sharp decline in the prices of top works of art from 2008 to 2009. Furthermore, Post-War & Contemporary art continued to rise to surpass Impressionist & Modern art in the period following 2009. In order to understand if there is a difference in the correlations between the five segments within the two different periods, I ran the same test as previously discussed once again. Tables 4 and 5 demonstrate the correlation coefficients for before and after 2008 and Tables 6 and 7 demonstrate the correlation coefficients for the same time periods using only the adjusted averages in which any obvious outliers have been removed. The results without adjustment are as follows:

**Table 4: Correlations 2002-2008**

<table>
<thead>
<tr>
<th></th>
<th>Post-War &amp; Contemporary</th>
<th>Impressionist &amp; Modern</th>
<th>Old Master Painting</th>
<th>Photography</th>
<th>I&amp;M Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-War &amp; Contemporary</td>
<td>1</td>
<td>.485</td>
<td>-.432</td>
<td>.974**</td>
<td>.959**</td>
</tr>
<tr>
<td>Impressionist &amp; Modern</td>
<td>.485</td>
<td>1</td>
<td>-.601</td>
<td>.605</td>
<td>.430</td>
</tr>
<tr>
<td>Old Master Painting</td>
<td>-.432</td>
<td>-.601</td>
<td>1</td>
<td>-.554</td>
<td>-.365</td>
</tr>
<tr>
<td>Photography</td>
<td>.974**</td>
<td>.605</td>
<td>-.554</td>
<td>1</td>
<td>.925**</td>
</tr>
<tr>
<td>I&amp;M Drawing</td>
<td>.959**</td>
<td>.430</td>
<td>-.365</td>
<td>.925**</td>
<td>1</td>
</tr>
</tbody>
</table>

*Correlation is significant at .05 level (2-tailed)
**Correlation is significant at .01 level (2-tailed)
### Table 5: Correlations 2009-2016

<table>
<thead>
<tr>
<th></th>
<th>Post-War &amp; Contemporary</th>
<th>Impressionist &amp; Modern</th>
<th>Old Master Painting</th>
<th>Photography</th>
<th>I&amp;M Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-War &amp; Contemporary</td>
<td>1</td>
<td>.558</td>
<td>.275</td>
<td>.763</td>
<td>.531</td>
</tr>
<tr>
<td>Impressionist &amp; Modern</td>
<td>.558</td>
<td>1</td>
<td>-.262</td>
<td>-.102</td>
<td>.328</td>
</tr>
<tr>
<td>Old Master Painting</td>
<td>.275</td>
<td>-.262</td>
<td>1</td>
<td>.290</td>
<td>.048</td>
</tr>
<tr>
<td>Photography</td>
<td>.763*</td>
<td>-.102</td>
<td>.290</td>
<td>1</td>
<td>.130</td>
</tr>
<tr>
<td>I&amp;M Drawing</td>
<td>.531</td>
<td>.328</td>
<td>.048</td>
<td>.130</td>
<td>1</td>
</tr>
</tbody>
</table>

*Correlation is significant at .05 level (2-tailed)  
**Correlation is significant at .01 level (2-tailed)

The Results using the adjusted averages are as follows:

### Table 6: Correlations 2002-2008 with Adjustment

<table>
<thead>
<tr>
<th></th>
<th>Post-War &amp; Contemporary</th>
<th>Impressionist &amp; Modern</th>
<th>Old Master Painting</th>
<th>Photography</th>
<th>I&amp;M Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-War &amp; Contemporary</td>
<td>1</td>
<td>.581</td>
<td>-.521</td>
<td>.979**</td>
<td>.852*</td>
</tr>
<tr>
<td>Impressionist &amp; Modern</td>
<td>.581</td>
<td>1</td>
<td>.721</td>
<td>.708</td>
<td>.626</td>
</tr>
<tr>
<td>Old Master Painting</td>
<td>-.521</td>
<td>.721</td>
<td>1</td>
<td>.635</td>
<td>-.299</td>
</tr>
<tr>
<td>Photography</td>
<td>.979**</td>
<td>.708</td>
<td>-.635</td>
<td>1</td>
<td>.850*</td>
</tr>
<tr>
<td>I&amp;M Drawing</td>
<td>.852*</td>
<td>.626</td>
<td>-.299</td>
<td>.850*</td>
<td>1</td>
</tr>
</tbody>
</table>

*Correlation is significant at .05 level (2-tailed)  
**Correlation is significant at .01 level (2-tailed)
Table 7: Correlations 2009-2015 with Adjustment

<table>
<thead>
<tr>
<th></th>
<th>Post-War &amp; Contemporary</th>
<th>Impressionist &amp; Modern</th>
<th>Old Master Painting</th>
<th>Photography</th>
<th>I&amp;M Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-War &amp; Contemporary</td>
<td>1</td>
<td>.774*</td>
<td>.768*</td>
<td>.780*</td>
<td>.635</td>
</tr>
<tr>
<td>Impressionist &amp; Modern</td>
<td>.774*</td>
<td>1</td>
<td>.214</td>
<td>.338</td>
<td>.823*</td>
</tr>
<tr>
<td>Old Master Painting</td>
<td>.768*</td>
<td>.214</td>
<td>1</td>
<td>.883**</td>
<td>.142</td>
</tr>
<tr>
<td>Photography</td>
<td>.780*</td>
<td>.338</td>
<td>.883**</td>
<td>1</td>
<td>.143</td>
</tr>
<tr>
<td>I&amp;M Drawing</td>
<td>.635</td>
<td>.823*</td>
<td>.142</td>
<td>.143</td>
<td>1</td>
</tr>
</tbody>
</table>

*Correlation is significant at .05 level (2-tailed)  
**Correlation is significant at .01 level (2-tailed)

It can be seen in Table 7 that Post-War & Contemporary art has a significant positive correlation with all sectors except for Impressionist & Modern Drawing. Most notably, it has a positive correlation (.780) with Old Master Painting. In the period before, 2002-2009, there are no significant results except for a positive correlation between Post-War & Contemporary, Photography, and Impressionist & Modern Drawing. There were similar results when using the unadjusted numbers however, there were less significant correlations in the 2009-2015 period.

D. Artnet Top 200 Collectors

Utilizing the previously discussed Artnet Top 200 Collectors list, running the same bivariate correlation test, I received the following results in Table 8:
Table 8: Correlations Between Top Collectors Per Segment (2002-2017)

<table>
<thead>
<tr>
<th></th>
<th>Post-War &amp; Contemporary</th>
<th>Impressionist &amp; Modern</th>
<th>Old Master Painting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-War &amp; Contemporary</td>
<td>1</td>
<td>-0.819**</td>
<td>-0.930**</td>
</tr>
<tr>
<td>Impressionist &amp; Modern</td>
<td>-0.819**</td>
<td>1</td>
<td>0.700**</td>
</tr>
<tr>
<td>Old Master Painting</td>
<td>0.930**</td>
<td>0.700**</td>
<td>1</td>
</tr>
</tbody>
</table>

*Correlation is significant at .05 level (2-tailed)
**Correlation is significant at .01 level (2-tailed)

These results demonstrate that there is a strong negative correlation between the number of Post-War & Contemporary top collectors and both Impressionist & Modern and Old Master Painting top collectors. One of the drawbacks is that this list just looks at the very top end of collectors within the market. However, this list is able to provide an interesting look at the top end of the market. If these collectors are no longer as interested in certain sectors, this may in turn influence how other people buy and furthermore how other people value the sectors, given that the wealthiest art collectors are not valuing them as highly.
V. Discussion

Within this paper, I sought to analyze how changes in one sector of the art market, specifically the current rise and popularity within Post-War & Contemporary art, has impacted the prices and purchasing behavior within the other segments of the art market, looking specifically at Impressionist & Modern Painting, Impressionist & Modern Drawing, Old Master Painting, and Photography. What I found was that Post-War & Contemporary art was significantly positively correlated with all other segments except for Old Master Painting. Furthermore, when using the adjusted numbers that removed any clear outliers, all segments share positive correlations except for any involving Old Master Painting.

In response to this, I began to look at how exogenous factors such as wealth play a role within this context. The U.S. GDP has a strong positive correlation with Post-War & Contemporary as well as with all other segments except for Old Master Painting. When utilizing the adjusted numbers, Old Master Painting actually has a significant negative correlation with U.S GDP. Initially, it would seem that as wealth increases, individuals are spending less money in this segment of the market. This confirmed the possible theory that as the average price in certain segments increase, others will decrease.

Furthermore, the Top 200 Buyers interested in collected Post-War & Contemporary had a negative correlation to both the number collecting Impressionist & Modern Painting and/or also Old Master Painting. This logically follows that as Post-War & Contemporary prices increase, Old Master Prices will in
some way fall. Yet, it is contrary in that Post-War & Contemporary and Impressionist & Modern Painting average prices are positively correlated. Furthermore, they are both positively correlated to the U.S. GDP, indicating that as wealth increases, so do prices in both of these segments. It can then be inferred that it is possible that the individuals purchasing Impressionist & Modern Painting are more specialized within this segment and may no longer be the individuals on the top 200 collectors list. Impressionist & Modern art is still a popular purchase, yielding high prices, yet may not be the key focus for collectors, or collectors are not purchasing as many pieces.

Within my research, I also chose to look at two other segments that are not as popular: Photography and Impressionist & Modern Drawing. These two segments feature works created in different mediums. By including these segments, I was hoping to gain a better understanding of how smaller, less publicized areas within the art market operate. In many cases they often have a lower value, making them more widely accessible.

In looking at Photography, the prices remained fairly stable over time. This could be demonstrative of the reproducible property that photography does not share with any of these other segments. In order to understand if this is the reasoning, it would be beneficial to compare Photography to another segment such as Prints in which there is also a reproducibility aspect. Furthermore, Photography prices demonstrated a strong significant positive correlation to both Post-War & Contemporary and Impressionist & Modern Drawing yet did not have significant
correlations to Impressionist & Modern or Old Master Painting prices. While it shares positive correlations, the movements from year to year are still not that large given the smaller starting value. One possible issue that arises with Photography is that it may be more related to Post-War & Contemporary art given that while it is a different medium, it shares many qualities such as the time period, the subject matter, and in many cases represents works of living artists, especially some of the most prominent artists such as Richard Prince and Cindy Sherman.

Impressionist & Modern Drawings proved more difficult to explain. I had anticipated that it would follow the trends of Impressionist & Modern Painting but at a lower price given that drawings are often unfinished, smaller scale, or studies for a larger work. However, the prices for the top Impressionist & Modern Drawings were only significantly correlated to Impressionist & Modern Painting after outliers were removed and furthermore were correlated with Photography at about the same level (0.53). One last interesting point to note is that prior to 2009, this segment was significantly positively correlated to Post-War & Contemporary prices, yet after 2009 was no longer significantly correlated to Post-War & Contemporary prices but rather was correlated to Impressionist & Modern Painting prices. This is also the period in which Post-War & Contemporary underwent a large amount of price growth and began to take over more market share. Going forward, it would be interesting to look at how this segment compares to Old Master works on paper, especially given the volatile nature of Old Master Painting prices.
I had hoped that when looking at the changes in dependence before and after 2009, there would be more significant results, yet given the short time period, it is not surprising. However, this indicates that while Post-War & Contemporary grows in the period after 2009, Old Master Painting is fluctuating on a much longer time cycle, possibly multiple decades rather than years. This may be better demonstrated if I had looked at a longer time frame. Old Master Painting seems to move at its own whereas Post-War & Contemporary art moves pretty closely to the US GDP, thus arguing that concentrating collections in just one or two segments is a poor investment/collecting strategy, given the volatility of the market.
VI. Conclusion

I set out to understand how the growth in one sector of the art market has impacted sales within others. What I have discovered is that ultimately it is external factors, specifically the U.S. GDP, that play a large role in dictating the market, and prices within the Post-War & Contemporary segment. Secondly, While Old Master Painting has seen price decreases, in the period following 2009, there is a positive correlation between Post-War & Contemporary and Old Master Painting prices. This may be an indication that the market is beginning to look upward, assuming GDP continues to rise at a healthy pace. It seems that growth in one segment does not have a negative correlation with growth in another segment. The factor that is most impacted by the growth and popularity of Post-War & Contemporary art is the number of top 200 collectors that are interested in collecting other sectors such as Impressionist & Modern Painting and Old Master Painting.

In order to expand upon the research that I have done, I hope to look at a larger time frame of data. Furthermore, it would be interesting to put together a data set of returns that people are seeing on purchases in the Post-War & Contemporary space to build off of the research that economists such as Goetzmann and Baumol have conducted (Goetzmann, 1993) (Baumol, 1986). The Post-War & Contemporary space is fairly new and continuing to grow in prominence. Furthermore, I would like to expand on my existing tests to control for factors such as size. Lastly, I would like to include a few more segments, for example Asian art,
to understand the larger impact of China’s emergence as one of the most prominent art-collecting countries. It will be exciting to see how these different sectors grow and change in the years to come as the art market continues to expand.
References:


