Journal of Environmental and Resource Economics at Colby

Volume 01
Issue 01 *Spring 2014*

Article 7

2014

The Impact of Nature in Art: A Hedonic Price Analysis of Early Twentieth Century Paintings

Jack Lundeen
Colby College, jlundeen@colby.edu

The Impact of Nature in Art: A Hedonic Price Analysis of Early Twentieth Century Paintings

Cover Page Footnote

I am very grateful to Lauren Lessing, the Mirken Curator of Education at the Colby Museum of Art for help and guidance on this research and the Colby College Museum of Art for providing the data for the hedonic analysis.

1. Introduction

Nature molds the way we think and act. At even a subconscious level, we are influenced by the power of nature. From the clothes we buy to the cars we drive, every decision is related to the ecosystems around us. With this in mind, does the environment affect the way we value the objects in our lives? Do individual spending tendencies change when the weather shifts or when trees begin to sprout flowers in the spring? This paper will focus specifically on the impact of nature in art. Thousands of paintings are sold each year at various auction houses and online auction sites and the prices that they sell for vary greatly. The artist and rarity of the work obviously influence the price to a large extent, but the factors that make the difference between two similar paintings are of particular interest. The research question that this paper addresses is, does the presence of nature in art affect the price that the paintings sell for at auction? This question is important because it reveals consumer preferences for art, which can depict historical trends, and allows for a quantitative evaluation of the subject matter of paintings. During the Industrial Revolution, paintings that depicted lush landscapes were in high demand because of the fear of losing forests and scenic areas to factories. The theory behind this research project is that people may act in a similar manner today as they did in the early 17th century as a result of expanding cities and populations and the negative implications of worldwide development. The paper is organized as follows: section 2 provides a literature review, section 3 looks at the data selection, section 4 shows the methods, section 5 displays results and discussion, and section 6 offers a conclusion.

2. Literature Review

The available literature on forecasting art prices and conducting consumer analysis highlight a few key concepts. A background of the auction process is provided to clarify the reliability of auction prices and the reasons why certain events occur. Variable choice and use in various models is addressed along with the data manipulation that follows. Lastly, the behavior of consumers and markets is focused on to reveal what other factors influence art prices besides the previous variables used. These topics will be summarized in order in this literature review.

The topic of auction history and its inner workings is found in the papers, *Auctions and the Price of Art* by Orley Ashenfelter and Kathryn Graddy, and

Auction Fever: The Effect of Opponents and Quasi-Endowment on Product Valuations by James E. Heyman, Yesim Orhun, and Dan Areiely. In art auctions, both online and in auction houses such as Sotheby's and Christies, not all items put up for auction sell. When an item does not reach a set reserve price, meaning the minimum value the auction house will allow for sale, the item is declared, "bought in" (Ashenfelter and Graddy 2003). In the dataset used for this project, "bought in" paintings were discarded, as an accurate sale price was not available. Similarly, many objects in auction are sold multiple times. "Identical objects are more likely to decline…when multiple units are sold" (Ashenfelter and Graddy 2003). If a painting is sold multiple times over a few years at the same auction house or at different auction houses, its sale price is likely to change. To deal with this pattern in the confines of this project, the second sale of a painting was discarded. When creating art auction indices, or the prices that auction houses anticipate for certain items, three models are typically used. Most auction indices employ a model where a time period is designated, the object's quality is measured, aggregate movements in prices are considered and the remaining effects are in the error term. The other models used are hedonic models and repeat-sale models (Ashenfelter and Graddy 2003). This paper uses hedonic price analysis to measure the effects of several attributes on the sale prices of a set of paintings. The last point covered in the background of auctions is potential complications within the auction process. The auction environment can "influence the process by which bidders come to understand their own valuation of the items in question and their willingness to pay for them (Heyman, Orhun, and Ariely 2004). When competing for objects, consumer choices can be different than their everyday willingness to pay. This could potentially skew the measurement of consumer's value of certain attributes. This characteristic is ignored in this paper, as the auction price is the clearest measure of the value of the paintings used.

When it comes time to choose the attributes that influence the price of art, the most commonly used are hedonic characteristics, including artist, medium, technique and dimension; market variables, which include auction house, location of sale and provenance of the object; and finally time dummies (Scorcu and Zanola 2010). These are the attributes that are universally used to measure and predict the sale price of art but this paper was unique due to its addition of the variable 'style.' Pablo Picasso had various periods throughout his career as a painter. Scorcu and Zanola set up variables accounting for what era of Picasso the paintings were from. The periods ranged from childhood or youth paintings to his Blue and Red period to the Old Picasso period. This is

particularly interesting in regards to this project because it reveals that consumers have different preferences for subject matter within an artist's works.

Given the difficult nature of some of the attributes commonly used, data manipulation is the next step in much of the literature. In many cases, paintings and objects are sold over the course of decades. To account for this, the prices are adjusted for inflation. Scorcu and Zanola deflated the US nominal prices using the US consumer price index. A similar action was taken in this project to standardize the prices. Often times the prices are then logged to deal with heteroskedasticity (Scorcu and Zanola 2010). Heteroskedasticity is when there are sub-populations in the data that have different variability.

The last topic discussed in the literature review is human and market behavior. Scorcu and Zanola point out how the "same collector might appreciate differently the characteristics in low and high price items" (Scorcu and Zanola 2010). This fact could potentially dictate the creation of two subgroups, one for paintings priced above a threshold and below a threshold, as consumer preferences and therefore the valued attributes differ between these groups. This is not conducted in this paper because for the most part, there is not a large gap in sale prices.

3. Data Selection and Manipulation

In order to determine the contributing factors of art prices, there must first be a group of works that share baseline characteristics so that the artist or year of the work do not skew the results. A group of 318 paintings were selected for this project using the art database, Art Net. These paintings are by a group of painters that collectively form "The Ashcan School." The artists that comprise this school are Robert Henri, John French Sloan, William Glackens, Everett Shinn, George Bellows, and George Benjamin Luks. These artists work well because they are American artists that painted primarily in the early twentieth century and share a similar style and prestige. No particular artist is likely to sell at auction for a greater price based solely on a name basis. Six searches were conducted on Art Net, one for each artist, with the qualifications that the paintings were made between 1902 and 1920, and sold in auction between 1985 and 2013. These sale dates are not as important but were selected because the most data was available during these years.

The database provided the artist, title, medium, year of work, auction price and year of sale. In order to test to see the impact of the presence of nature, three variables were added manually to each work through a visual inspection. The added variables were titled, trees, mountains, and ocean. These

variables were binary variables that would equal one if the painting contained the element, and zero if it did not. With these characteristics included, it is now possible to run a regression revealing the price effect that certain environmental attributes have on sale price. The last data manipulation was to adjust the sale prices for inflation. This was conducted by adjusting all prices to 2013 dollars using the US consumer price index. To account for heteroskedasticity and make the results easier to understand, the price variable was then logged. Now the binary variable coefficients reflected the percent change in price. The list of variables included in the regression is found in table 1.

Table 1. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
id	226	155.5088	91.32522	1	318
yearofwork	226	1912.69	4.973851	1902	1920
surfacearea	225	599.7708	811.6257	2	10560
saleyear	226	2000.894	7.853506	1985	2013
oilcanvas	226	0.40708	0.492381	0	1
oilpanel	226	0.053097	0.224725	0	1
christies	226	0.314159	0.465211	0	1
sothebys	226	0.50885	0.501031	0	1
doyle	226	0.048673	0.21566	0	1
ocean	226	0.283186	0.451546	0	1
trees	226	0.247788	0.432686	0	1
mountains	226	0.190266	0.393382	0	1
adjustedsa~e	226	695720.1	2866883	1000	3.89E+07

4. Methods

A hedonic model was used including the attributes, *surfacearea, sothebys, christies, saleyear, yearofwork, ocean, trees, and mountains.* These attributes were regressed against the sale price of each painting adjusted to 2013 US dollars. Several regressions were run using various versions of the attributes. The initial regression containing only a general nature variable, which equalled one if the painting was a landscape and zero if it was a portrait or an urban setting, was not included because it did not contain significant results. The first regression uses the 2013 adjusted prices and the second uses a logged version of the adjusted prices. The regression equations can be seen below.

Equation 1.

$$Adjustedsaleprice = \beta_1 Surfacearea + \beta_2 Sothebys + \beta_3 Christies + \beta_4 SaleYear + \beta_5 YearofWork + \beta_6 Trees + \beta_7 Ocean + \beta_8 Mountains + \varepsilon$$

Equation 2.

$$Ladjustedsaleprice = \beta_1 Surfacearea + \beta_2 Sothebys + \beta_3 Christies + \beta_4 SaleYear + \beta_5 YearofWork + \beta_6 Trees + \beta_7 Ocean + \beta_8 Mountains + \varepsilon$$

5. Results and Discussion

Regression 1 presented three significant variables, *surfacearea*, *sothebys* and surprisingly, *trees*. An increase in one square inch of surface area is associated with an increase in price of over $900 in this dataset. Similarly, if a painting was sold at Sotheby's in New York, it was sold for a greater price at auction compared to the paintings sold at other auction houses. This was significant at the 5 percent level. The presence of trees was actually associated with a higher auction price as well compared to the paintings that did not have trees present. This was significant at the 10 percent level. The results from this regression are given in table 2.

Table 2. Regression Results

	(1) adjustedsaleprice	(2) ladjustedprices
surfacearea	973.2***	0.000659***
	(4.24)	(5.33)
yearofwork	-28749.2	0.00398
	(-0.76)	(0.20)
saleyear	22391.7	0.0295*
	(0.86)	(2.10)
christies	522353.9	2.975***
	(0.94)	(10.02)
sothebys	1221318.5*	2.812***
	(2.22)	(9.37)
ocean	7846.3	0.585*
	(0.02)	(2.48)
trees	796144.8*	0.0427
	(1.82)	(0.18)
mountains	-53072.8	-0.278
	(-0.11)	(-1.04)
_cons	9325689.5	-57.84
	(0.11)	(-1.26)
N	225	225

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The next regression, Regression 2, used a logged price variable. These results found five significant attributes, *surfacearea, sothebys, christies, saleyear,* and *ocean.* The coefficients were all positive and reveal similar trends to the first regression. This regression controls for heteroskedasticity as some of the paintings may have grouped due to uncontrollable factors. The results for regression 2 are provided in table 3.

These regressions produced interesting results. As expected, larger paintings in this dataset correspond with higher prices. Sotheby's and Christies are the two most prominent auction houses, so the increase in sale price that is exhibited is also intuitive. The results in response to nature are most interesting. The presence of trees in the first regression and the depiction of the ocean in the second, were both associated with higher sale prices compared to paintings that did not have this imagery. This suggests that consumers pay more for these works potentially because of their subject matter. Similar to hedonic studies on housing that reveal consumer preferences for trees and proximity to water, this study offers that consumers want these attributes in their art as well. This could be purely consumer preference for the beauty of these attributes, or it could illustrate a current trend in the art market related to the degradation of ecosystems. If this is the case, it is possible to predict an emerging market for disappearing ecosystems.

6. Conclusion

When valuing and making the decision to buy art, consumers consider many attributes. This paper tests the theory that individuals value art in a similar way to the act of valuing housing. Trees and oceans corresponded to higher sale prices for this dataset suggesting that consumers do in fact desire and value nature in art. The reason for these results is unclear, however if it follows historical trends it could reflect a fear and longing for particular ecosystems and views of nature. Art can therefore act as a vessel for conservation. Portraying a landscape that has desirable attributes to consumers can raise awareness and even work as an advertising mechanism. Visiting forests or coastal regions that are pictured in paintings can bring economic stimulus to these regions and help maintain their beauty. Given the current development, population, and land use trends, there needs to be a broad tool that can stimulate conservation; this paper suggests that art can be that resource.

7. References

Ashenfelter, Orley and Graddy, Kathryn, *Auctions and the Price of Art*, Journal of Economic Literature, Vol. 41, No.3. (Sept., 2003), pp. 763-787

Heyman, James E., Orhun, Yesim, Ariely, Dan, *Auction Fever: The Effect of Opponents and Quasi-Endowment on Product Valuations*, Journal of Interactive Marketing, Vol. 14, No. 4, (Autumn 2004), pp. 7-21

Scorcu, Antonello E., Zanola, Roberto, *The "Right Price for Art Collectibles: A Quantile Hedonic Regression Investigation of Picasso Paintings*, The Journal of Alternative Investments, Vol. 14, No. 2, (Autumn 2011), pp. 89-99