Art Market Inefficiency

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Art is often used as an investment vehicle. Given the importance of market efficiency in finance, we use a large auction-based index to test whether the art market is weakly efficient. Evidence reveals that returns on artworks exhibit high positive auto-correlation. We attribute this result to price truncation resulting from unobservable reserve prices in auctions. We conclude that the art market is not efficient, mainly because price formation is opaque to outsiders who lack information on unsold artworks.

Keywords: Art Market, Market Efficiency, Auction, Random Walk, Reserve Price.

JEL Classifications: G14, Z1, G12, D44, D84.
Abstract

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1. Introduction

In the aftermath of the recent financial crisis, growing attention has been paid to alternative investments, including art. The development of fine art funds confirms that investors view artworks as just another asset class. In 2011, prices and volumes reached new peaks, with $11.57 billion in total revenues (Artprice Trends, 2011), a one-year increase of more than 20%. Yet, the efficiency of the art market within the meaning of Fama (1970) has hardly been investigated. Presumably, this stems from notable difficulties associated with computing relevant series of art returns. Using a unique art index released by Renneboog and Spaenjers (2013), we fill this gap and propose tests for weak efficiency of the art market based on a time-series approach. Our results show that art returns exhibit highly auto-regressive dynamics. As a consequence, weak efficiency is rejected.

The efficient market hypothesis is a cornerstone of finance. A market is said to be efficient if prices fully reflect all available information. In an efficient market, future returns are unpredictable. Fama (1970) distinguishes three forms of efficiency depending on the information set considered. In the weak efficiency form, only past and current prices are considered. In a weakly efficient market the current return is unrelated to past returns. The semi-strong form asserts that prices reflect all publicly available information. Lastly, the strong form states that prices reflect all available information, both public and private. Market efficiency is key for investors since it gives them confidence in the fairness of market valuation.

Several authors\(^1\) have investigated the financial characteristics of the art market. Financial returns are usually low, although they may prove substantial for some artistic movements or some time periods (Mei and Moses, 2002, Renneboog and Spaenjers, 2013). Overall, the art market seems plagued by numerous anomalies, which cast serious doubts on its efficiency. For example, it seems to violate the law of one price, since similar etchings can fetch dramatically different prices when sold in different places (Pesando, 1993; Mei and Moses, 2002). Frey and Eichenberger (1995) argue that art market efficiency is impossible to test because of data limitations; that said, some authors have analyzed it. Pesando (1993) investigates the prints market over the 1977-1992 period and finds that excess returns are auto-correlated, positively for the one-year lag and negatively for the two-year lag. Erdös and

\(^1\) See Renneboog and Spaenjers (2013) and the references therein.
Ormos (2010) use variance-ratio tests to reject the hypothesis that US art auction prices followed a random walk over an extended period (1875-2008). Nevertheless, the authors fail to reject the random walk hypothesis for the post World War II subsample (1945-2008).

This paper revisits these results with the help of a more exhaustive index and additional tests. We confirm that the art market is not efficient, even for the most recent period, and argue that this is mainly attributable to opaque price formation.

2. Results

Researchers rely on price indices to cope with heterogeneity in artworks. Likewise, we use the annual hedonic index built by Renneboog and Spaenjers (2013) from a database consisting of 1,088,709 sales of paintings and works on paper over the 1957-2007 period. To our knowledge, this is the largest existing index to date. In addition, the art auction market is relatively more homogenous than the art market as a whole since few artists are auctioned (Throsby, 1994). Auction markets are also less subject to the presence of fakes because auction houses act as authenticators (Bocart and Oosterlinck, 2011).

Art does not yield monetary dividends. Hence, we compute the annual net return on art by subtracting the US risk-free rate, proxied by the return on the one-year T-bill, from the first difference in prices:

$$ R_e = R_s - R_{-1} - R_{f,i} $$  \hspace{1cm} (1)

where $R_e$ is the art return, $R_s$ is the art index, and $R_{f,i}$ is the risk-free rate.\(^2\)

We use four tests to assess weak efficiency. The first (Ljung-Box, 1978) is intended to detect auto-correlation in net returns. The second is a variance-ratio test (Lo and MacKinlay, 1988). Under the null, the price process is a random walk and the variance of the price difference of order q equals q times the variance of the first difference. The test is performed for values of q between two and nine. The third and fourth, the run test (Wald and Wolowitz, 1940) and the Bartels test (Bartels, 1982), determine whether returns are independent. Table 1 summarizes the results.

\(^2\) Augmented Dickey-Fuller (1981) tests confirm that prices are integrated of order 1 and returns are stationary (results not reported here).
Table 1. Tests of weak efficiency, p-values, and conclusions

<table>
<thead>
<tr>
<th>Test</th>
<th>Ljung-Box test</th>
<th>Variance-ratio test (q = 2, …9)</th>
<th>Run test</th>
<th>Bartels test</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-value</td>
<td>0.0003</td>
<td>From 0.04 to 0.095</td>
<td>0.01627</td>
<td>1.23E-11</td>
</tr>
<tr>
<td>Conclusion</td>
<td>Significant auto-correlation of order one</td>
<td>Rejection of the random walk hypothesis</td>
<td>Rejection of return independence</td>
<td>Rejection of return independence</td>
</tr>
</tbody>
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In line with Pesando (1993), the Ljung-Box test (1978) detects significant auto-correlation of order one in net returns. The estimated auto-correlation is 0.57. This means that 57% of the net return persists until the following year, which is impressively high. In contrast, the second-order autocorrelation is not significant at the 10% level. Second, the variance-ratio test rules out the random walk hypothesis. The variance ratios are significantly different from unity for all values of q between 2 and 9, at least at the 10% level. This result contrasts with the one obtained by Erdös and Ormos (2010) for the 1945-2008 period. Ultimately, both the run test and the Bartels test reject the independence of returns at the 5% and 1% level, respectively.

4. Discussion and Conclusions

Our tests show that the auction art market is not weakly efficient. In particular, the net return of the art index exhibits an exceptionally high positive auto-correlation. Undeniably, the explanatory microstructural and psychological factors proposed by Frey and Eichenberger (1995) are relevant. But our argument is that a major source of inefficiency is the way that today’s art auction markets function. In practice, the seller fixes a confidential reserve price below which no transaction takes place. If the trade is not realized, no price is observed and the index fails to incorporate the information. The reserve-price mechanism truncates the price distribution. Observed prices are thus upwardly biased, which may explain the positive return autocorrelation. Collins et al. (2009) use the Heckman (1979) estimation method to

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3 Full results are available upon request.
4 Namely: many collectors are irrational and disregard financial valuation, short-selling is impossible, art supply is inelastic, and asymmetric information prevails largely.
5 The absence of transaction is quite common with close to 30% of the artworks remaining unsold (Ashenfelter, 1989 and Ashenfelter and Graddy, 2011).
correct for the selection bias induced by bought-in artworks. However, this procedure does not take into account the last bid made, an element which insiders, i.e. the people attending the auction, are able to record. Moreover as long as the reserve price is not reached the auctioneer has the right to make fictitious bids to keep the sale in motion (Ashenfelter, 1989).

Put differently, we argue that it is structurally impossible for auction prices to be efficient. Sellers set a minimum transaction price on the artworks for which they have a monopoly. Since hammer prices are determined solely by bidding, there is no upper limit. As a consequence, relying on realized prices is insufficient to build unbiased predictions of future prices. Market inefficiency is thus rooted in the design of the trading system currently used in the art market. In fact, the auction mechanism itself does not distort prices. Rather, the distortion comes from unreported missing sales and undisclosed reserve prices, which give informational superiority to market insiders, typically auction firm managers. Moreover, in an efficient market, where buyers and sellers can trust actual prices, there is no need to fix reserve prices. Equilibrium prices reflect the true value of the good. In contrast, art auctions currently function in a way that drags the market into a vicious circle of inefficiency. Reserve prices arise from sellers’ awareness that they cannot trust the market. In turn, reserve prices create market inefficiency.

Interestingly, in the art market, private information happens to concern past prices, so that weak and strong efficiency collapse. This situation contrasts with stock markets, where prices are public and insiders typically have private information on the underlying companies. However, unlike in mainstream financial markets, insider trading in the art market is not outlawed. Investors should be aware of this fact before entering the market.

References


