Centre Emile Bernheim
Research Institute in Management Sciences

Solvay Brussels School
Economics & Management

Is Art Really a Safe Haven? Evidence from the French Art Market During WWI

Géraldine David

During crisis art is often considered as a safe haven both by the scientific literature and the financial advisors. For example, during WWII art markets encountered a massive boom in occupied countries This paper questions this vision of art as a safe investment providing evidence that art has not always supplied a safe investing way during crisis. To do so it constructs, on basis of an original database of 22,000 entries, an art price index for the French art market during WWI and the postwar period in France (1911-1925). . The results show that the WWII boom mostly reflected the specificities of the occupation economy imposed by the Nazis. Indeed during WWI artworks underperformed gold, real-estate, bonds and stocks in terms of risk-return performances. This underperformance can be explained by several peculiarities of the market. Investors tended to prefer cheap artworks and old masters during WWI as these were less volatile at the time.

Keywords: Art markets, Art investment, WWI, France, War, Postwar.

JEL Classifications: N14, N24, N44, Z11.

CEB Working Paper N° 14/025
October 2014

Université Libre de Bruxelles - Solvay Brussels School of Economics and Management
Centre Emile Bernheim
ULB CP114/03 50, avenue F.D. Roosevelt 1050 Brussels BELGIUM
e-mail: ceb@admin.ulb.ac.be Tel. : +32 (0)2/650.48.64 Fax: +32 (0)2/650.41.88

ULB

IS ART REALLY A SAFE HAVEN?
EVIDENCE FROM THE FRENCH ART MARKET DURING WWI

Géraldine David

Université Libre de Bruxelles, CEB & Tilburg University, CentER

October 2014

During crisis art is often considered as a safe haven both by the scientific literature and the financial advisors. For example, during WWII art markets encountered a massive boom in occupied countries This paper questions this vision of art as a safe investment providing evidence that art has not always supplied a safe investing way during crisis. To do so it constructs, on basis of an original database of 22,000 entries, an art price index for the French art market during WWI and the postwar period in France (1911-1925). . The results show that the WWII boom mostly reflected the specificities of the occupation economy imposed by the Nazis. Indeed during WWI artworks underperformed gold, real-estate, bonds and stocks in terms of risk-return performances. This underperformance can be explained by several peculiarities of the market. Investors tended to prefer cheap artworks and old masters during WWI as these were less volatile at the time.

JEL classifications: N14, N24, N44, Z11

Keywords: Art markets, Art investment, WWI, France, War, Postwar

Introduction

The last financial crisis aroused the interest for art as an investment. Among the numerous newspapers articles, the ftadviser (Sept. 9th, 2012) describes a very bullish art market since the last financial crisis and writes that "fine art investments have not only survived the recent global economic crisis, but have gained impetus from various disappointments in financial assets"[1]. Art is definitely not perfectly similar to other more traditional asset classes being a real asset, a hedge against inflation and a physical value that can provide the owner with an aesthetic dividend. The literature that deals with art markets also reports a massive boom encountered by the art market during the Second World War. At this time, among occupied countries, the demand for art increased tremendously and lead to an outstanding rise in prices of art. Moulin (1967) reports that « à côté de l'or, des devises étrangères, des valeurs boursières, des autres catégories d'objets rares, la peinture a servi à placer un avoir qu'il fallait protéger contre l'inflation et dérober au contrôle de l'Etat ». Oosterlinck (2011) builds a price index for the the WWII French art market and reports an increase of 300% of the prices levels in 1943 compared to their prewar levels. Eeuwe (2007) reports the same situation in the Netherlands, where even from the beginning of the German occupation, the art market prices rose substantially.

As art is often considered as a safe-haven investment during crisis times, this paper challenges and refines this vision of art by studying the prices reactions during another troubled time, namely the First World War and the postwar period (1911-1925). At that time, the art market experienced an important crash, both in volumes and in prices. The situation was very different from the WWII situation as art was not considered at all as a safe-haven for almost the entire war period. The last year of war, 1918, saw the art market prices rise again before meeting the lowest levels for the remainder of the years of our sample (from 1919 to 1925). Both investing situations are compared in order to identify the determining events and factors that make out of art a safe-haven.

Wars are indubitably periods during which the functioning of stock markets, monetary policies or real-estate are markedly modified. These periods, studied from an ex-post perspective, provide us with interesting but different situations from regular periods. Investments during war time

[1] http://www.ftadviser.com/2012/09/10/our-publications/special-reports/investing-in-fine-art-september-uDSYtMSFQOgHZITZLYovLO/article.html

have long been neglected among financial studies. Lerner (1954) already pointed out that economists have left out these war periods because they considered them as abnormal. During war periods, prices, wages and the stock of money are considerably modified. Among others, these factors encourage investors to diversify or rebalance their portfolios as additional risks, such as political risk, play a role in investment decisions. Despite these particularities, war time have lately been subject to investigation. The American Civil war has been studied from several perspectives (Lerner (1954); Willard, Guinanne & Rosen (1996); Weidenmier (2002)). Frey and Kucher (2002) examine the prices of five government bonds traded on the Swiss bourse during the Second World War and observe the events that impacted the bonds prices. They observe that most events considered as crucial are reflected in bond prices excepted for the German capitulation in 1945. Hall (2004) derives a common factor that reflects contemporaries' expectations about the war's resolution from exchange rates of different currencies traded on the Swiss market. This factor proves to be correlated with time series on soldiers killed, wounded and taken prisoner. Since Lerner (1954) wars have generated much interest among the literature[2].
Regarding art as an investment, the studies focus on the Second World War. No paper deals with the First World War itself. Papers dealing with art returns construct long-term price indices (Goetzmann (1993); Mei and Moses (2002); Renneboog and Spaenjers (2013)) and derive risk-return characteristics of art as an investment. Usually art is proved to be a poor investment. On the long run, returns are low and volatility is high. Mandel (2009) explains these bad performances by the compensation that art owners derive from "conspicuous" consumption, namely one's utility to show off its artworks. Despite these very poor performances on a long term perspective, art is seen as a safe-haven in times of wars and crisis. It provides investors with a hedge against inflation and is possible to resell abroad (Oosterlinck (2011)).
If the prices of art boomed during the Second World War, no study has focused on the First World War. This paper fills the gap in the literature by providing an empirical study on the French art market during WWI and the postwar period. At that time, France was a warring country but Paris was not occupied. To set these results into perspective, the movements on the art markets are compared with other investments. The situation is very different during the First World War compared with the Second World War. During the First World War, art is not the most demanded real asset. It underperformed all other assets types both in terms of returns.

[2] Cite more

Except at the end of the war, the art market was not seen as a safe-haven as confirmed by the major drop in volumes sold and prices.

This paper also tracks the reaction of the art market during the postwar period. France did not recover its prewar GDP rate before 1922. The period from 1919 until 1925 is characterized by a strong political and monetary crisis. Despite the latest, art did not outperform other assets. This goes again against the hedging role attributed to art. The remainder of the paper is organized as follows: Section I presents the dataset and the method used to build the art index, Section II establishes a comparison with other investments and with WWII and Section IV concludes.

Data and Descriptive statistics

DATA

Our dataset has been collected from the *Gazette de l'Hotel Drouot* from January 1911 to December 1925. The gazette was a publication of the Hotel Drouot and was issued two or three times a week. It tracked all prices realized at auctions and gave useful information to potential art investors. It summarized the market situation and the latest news of the auction house. The most important part of the Gazette was dedicated to the auctions results. For each artwork sold at auction, the Gazette mentioned the name of the artist, the title of the artwork, the size of the artwork, the medium and its price. Different type of artworks were traded at Drouot such as paintings, drawings, watercolors but also jewelries, sculptures, etchings, tapestries and furniture. For consistency matters, this papers only focus on works on paper (drawings and watercolors) and on paintings (canvasses and wooden supports). The name of the sale is also mentioned (*e.g. Sequestre Kanhweiler*) as well as the date of the sale[3].

The dataset constructed for this paper is unique in several ways. The importance of the *Hotel Drouot* as a major transaction house the time studied in this paper renders the dataset representative of a large fraction of the French art market. It was advertised in several foreign newspapers such as the Herald Tribune and the New York Times[4]. As a major player on the art

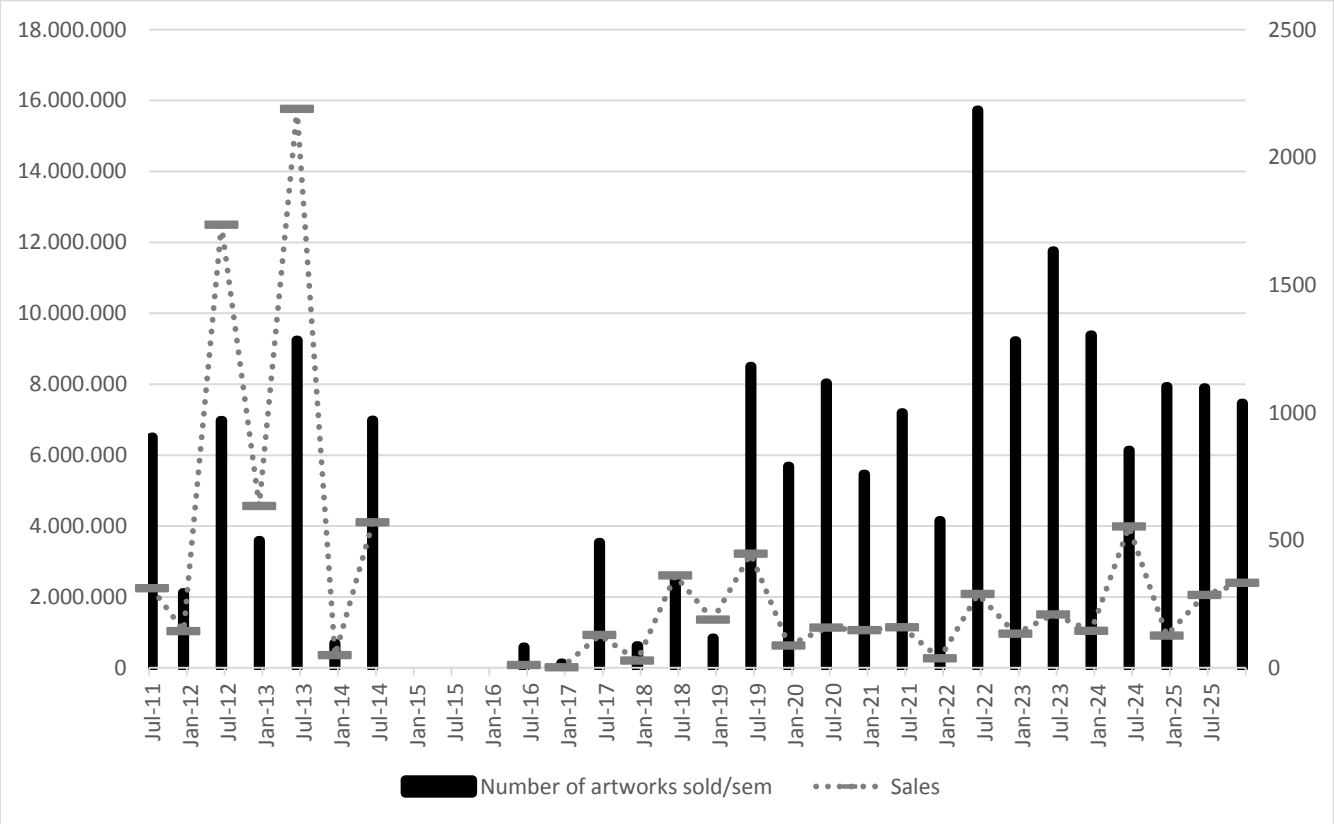
[3] Appendix I displays an example of results sheet as it can be found in the Gazette.
[4] Appendix I displays examples of advertisements for the Hotel Drouot found in the New York Times.

market, different products were traded at Drouot*:* from Degas' masterpieces to low quality copies, everything was traded at the *Hotel Drouot*. Rather than following the usual way of constructing indices by first selecting a group of blue chip artists, our index is based on all sales occurring at Drouot. Usually the art market literature displays a large selection bias towards high end artworks. Given the heterogeneity of our sample, the large spectrum of artworks' quality into Drouots' supply and the fact that we do not preselect the artists we include in our prices analysis, we claim that our index is largely less biased than other indices in the literature.

For some artworks, the size or the price is not displayed. We decided to not take these into account in our database. Furthermore we decided not to include artists that have not sold more than five artworks on the whole period. Our final sample is composed of around 22100 sales. Figure 1 summarizes our data. We present our data on a bi-annual basis as art auctions usually occur during two periods in the year (May-June and November-December). As shown on figure 1, the number of artworks sold remains more or less stable until the outbreak of the war. On August 3rd, 1914, the Hotel Drouot was closed. It remained closed until November 1914. The Gazette mentions that "given the situation and the total mobilization of its employees" it will not be published until a change in the situation (*Gazette de l'Hotel Drouot*, August 5th 1914). It was not published until April 10th, 1915. From July 1914 until February 1917, there was a few sales but they were from little importance. The volume of artworks at stake remained very small. One should bear in mind that we only focus on paintings. The absence of paintings sold during this period does not mean that there was no activity at Drouot. There were just no (or almost no) paintings sold over that period of time. The auctions that occurred during this period mostly involved tapestries, earthenware and jewels. As a result, the Gazette mentioned that artistic circles are wondering whether they should not open a "Salon de la Guerre" that would act the same way the "Salon" acts in normal times. The Gazette deplored that the activity on the art market is quite inexistent since the beginning of the war (Gazette de l'Hotel Drouot, October 20th, 1915). In 1916, the activity in terms of volumes and prices remain scarce. Even though the sales resumed in 1917 and 1918, it is only in 1919 that the number of artworks sold reached a comparable the number of artworks sold before the war. There is a clear seasonality in the number of artworks sold as the first semester of each year systematically exhibits a higher number of sales than the second semester. The first semester of 1922 is the most important in terms of number of artworks sold (with 2,187 artworks sold).

In terms of sales (the sum of all realized sales of the semester, in real terms), the prewar period clearly exhibits higher sales. Both in terms of sales and average price per artwork (see Appendix II), the prewar period clearly fetches the highest levels. The average price per artwork was also outstanding in the second semester of 1918 due to an important sale (Collection du Vicomte de Curel).

Figure 1 Sales and number of artworks sold



PRICE INDEX

Literature about art returns

As art is a very heterogeneous type of investment, with each piece displaying features that render it unique and not directly comparable with other pieces of art, comparing average prices or sales is not the optimal measure to assess the evolution of the prices levels on the market. In order to compute the risk-returns characteristics of art as an investment, one needs to construct a price index that will reflect the market evolution on the period of interest. As a matter of fact art investments substantially differ from more traditional sources of investments. Benefits may only been reaped by prices increases (no dividend). Worthington and Higgs (2004) list these differences between financial markets and art markets. Artworks are not very liquid assets; they are almost never divisible; transaction costs are high, and there are lengthy delays between the decision to sell and the actual date of sale. The notion of risk is also different for artworks. Risk can derive from fire, theft or reattribution to a different artist. Insurance costs might thus be prohibitive.

As highlighted by Gérard-Varet (1995) artworks are very heterogeneous object, they are produced as differentiable objects and are not substitutable one to another. To cope with this heterogeneity among a same class of investment, economists use mainly two methods to produce price indices for the art market.

The first one, the most intuitive one, is the Repeat-sales regression method (RSR). It uses the purchase and sale price of an artwork to evaluate the variations in value of this artwork over a particular period. Returns are thus inferred from prices of one artwork traded at two different moments in time. This methodology was first developed to build real-estate indices. The first author that has applied this method is Anderson (1974). The three most influential studies in the field are those of Pesando (1993), Goetzmann (1993) and Mei and Moses (2002). Pesando (1993) developed an art price index based on the sales of prints. As mentioned before, art is an illiquid asset. As a result the sample used to compute a RSR often represents a small portion of the overall market. Pesando (1993) circumvents this problem by focusing on prints that are more frequently traded objects. This allows him to benefit from a much larger sample than Goetzmann (1993). Goetzmann uses Reitlinger data (extended by Enrique Mayer) that track paintings auctions and obtains a sample of 3,329 price pairs over the period 1715 to 1986. Pesando

compute the RSR index thanks to a sample of 27,961 repeat-sales over the period 1977 to 1992. Mei and Moses (2002) compute another data set from auction sales occurring at Sotheby's or Christie's, mainly in New York. They benefit from a sample of 6,114 observations over the 1973-2002 period. Risk-return characteristics vary among the different studies. Pesando (1993) computed an annualized return of 1.51% of artworks, with a standard deviation of 19.94%. Goetzmann (1993) calculated a return of 5.2% over the period 1900 – 1986 with a standard deviation of 37.2%. Mei and Moses (2002) found out that the annualized return over the period 1900-1999 is 5.2% (with a standard deviation of 35.5%).

Hedonic regression (HR) has a significant advantage compared to RSR. Since this method consists in regressing the price on various characteristics of the artworks, there is no need to reduce the data set to only artworks that have been sold twice. The model copes with quality changes by attributing implicit prices to value-adding characteristics. One or several time-dummies capture the pure time effect and are used to compute the price index. The time-dummies coefficients account for constant-quality price trends over the sample period. As said before, HR methodology use all the available data since no information is deleted prior to the estimation. This method, used also for the automobiles market or the real-estate market, has been widely used among the art market literature. Buelens and Ginsburgh (1993) use the same data set as Goetzmann. Renneboog and Spaenjers (2009) construct a larger data set of close to 1,1 million transactions. The annualized return on the period 1957 – 2007 was 3.97% with a standard deviation of 15.21%. Other studies focus either on Reitlinger's data (Chanel et al., 1996) or on national art markets (Agnello and Pierce, 1996; Renneboog and Van Houtte, 2002; Higgs and Worthington, 2005). The major drawback of this methodology is that the model is dependent on the good specification of the regression. If some characteristics are omitted it may lead to a misspecification of the model.

Goetzmann (1993) lists general biases that may be encountered in all data set constructed on auctions records. First of all, the bought-in rate is not known. If paintings failed to make the seller's reserve they are recorded at sales at the reserve price although they have not been really sold. There is an important selection bias in RSR methodology since that if an artwork needs to have been sold at least twice to be into the database. This means that the painting needs to be in broad enough demand to attract a number of competitive bidders. Auction houses have little interest in selling artworks that will not attract a large public. Both HR and RSR will fail to

capture the price fluctuations of paintings that are not broadly in demand if they focus on auctions records. RSR tend to be more biased upward because they already are a selection among an auction house's selection.

Model

In this paper, we focus on the HR approach. Since the catalogues of each sale were unavailable to the author at the time of writing, the pair of repeated sales objects would have to be inferred from the *Gazette de l'Hotel Drouot.* We would have to infer it from the artworks that present a similar title and similar dimensions. Even if it is possible, it would not guarantee us that we are considering for sure the same artwork twice (since some artworks might be given the same name and might have the same dimensions but still be different).

A HR model takes the following form:

$$\ln p_i = c + \sum_{t=1}^{T} \beta_t d_{it} + \sum_{k=1}^{K} \alpha_k X_{ik} + \varepsilon_i$$

where p_i is the price of good i, X_{ik} is the value characteristic k of artwork i and δ_t is a time dummy variable which takes one if the artwork is sold on t and zero otherwise. The antilogs of the β_t coefficients are then used to construct the hedonic price index:

$$Index_t = 100 * \exp(\beta_t)$$

Variables

Our hedonic regression includes:

Artist dummies: they capture each artist's uniqueness. In total, 776 artists are present into our database. We did not take into account in our regression artists that had not at least 5 paintings sold;

Medium dummies: they take the value 1 for each medium represented in our sample (paintings, drawings, watercolors and gouache). Appendix III displays their proportion in the sample;

Attribution dummies: according to Renneboog and Spaenjers (2013), attribution can be an important factor influencing the price of art objects, especially of older works. Different levels of attribution are used in the auction world:

ATTRIBUTED (to), SCHOOL (of), AFTER and (in the) STYLE (of);

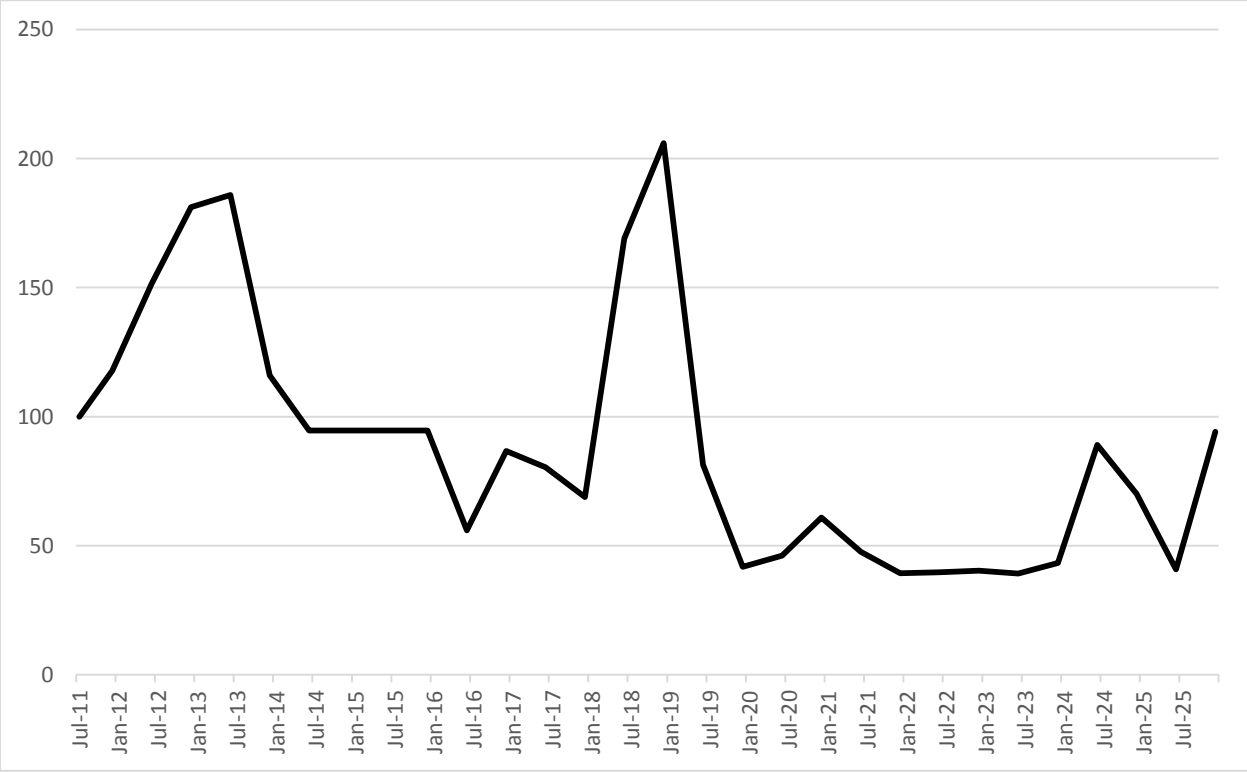
Size: The height and width in centimeters are represented by HEIGHT and WIDTH (with squared value HEIGHT_2 and WIDTH_2);

Date dummies: this dummy takes the value 1 if the artwork has been sold at time t, and 0 otherwise. We decided to focus on a semi-annual index and so, these dummies account for the semester during which the sale occurred.

The art price index

Figure 2 displays the art price index. Appendix IV displays the results of our baseline hedonic model and Appendix V displays the index values, standard deviations, t and p values.

Figure 2 Art price index (normalized at 100 for the first semester of 1911 (Jun-1911))



As expected the price index exhibits very high prices levels during the prewar period. Nothing happened on the market between August 1914 (the outbreak of the war) and June 1916. At that point in time, the market reopened and prices exhibited a discount compared to the prewar value. The very high prices levels showed by the price index in June and December 1918 were also expected due to the very high average and median price per artwork. After the war, the prices

dropped to their lowest level among the whole period and remained fluctuating around this level, without reaching the 1918 level again. It is only during the first semester of 1924 that art prices reached similar levels to the prewar period. On the whole period, art prices exhibit a decrease in value.

Quantile regressions

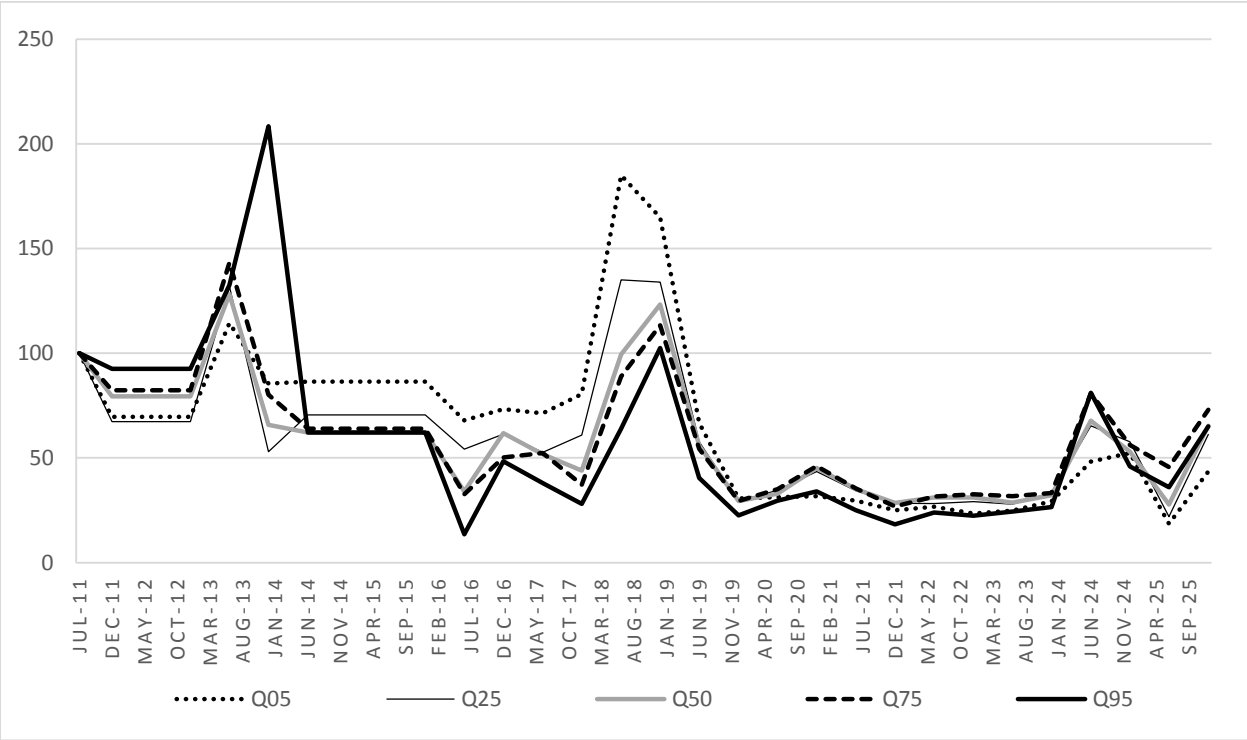
As highlighted by Renneboog and Spaenjers (2013) the art market is likely to be segmented. Literature usually focuses on the so-called "masterpiece effect", i.e. the presumption that the top works of the most established artists will outperform the market (Pesando, 1993). It is likely that there are several art markets coexisting. For example, works on papers are often more easily reproducible and hence, cheaper. Different buyers are active on these various segments: for example, wealthier individuals are more likely to buy higher end artworks as it signals their own social status (Renneboog and Spaenjers, 2013; Mandel, 2009). By regressing the different quantiles of the price distributions on the variables presented for the hedonic model, one implicitly assesses that the intrinsic characteristics used in the regression influence artworks price differently following the prices ranges. As shown in Appendix VI the cumulative distribution function of the real prices shows that many items are concentrated in the left-hand tail of the distribution and that the right-hand tail of the distribution is very long (so a few items fetch really high prices). Quantile regressions can provide us with a more robust estimation against these outliers.

Following Scorcu and Zanola (2011), quantile regressions are performed on the whole sample[5]. The values of the quantiles are displayed in Appendix VI. Figure 3 displays the art indices built from these quantile regressions.

---

[5] The standard OLS hedonic regression minimizes the sum of the squared residuals: $\min_{\{\beta_j\}_{j=0}^{k}} \sum_i \left(y_i - \sum_{j=0}^{k} \beta_j x_{j,i}\right)^2$.
In quantile regressions, it is the absolute weighted deviations that are minimized in a median-regression framework: $\min_{\{\beta_j\}_{j=0}^{k}} \sum_i \left|y_i - \sum_{j=0}^{k} \beta_j x_{j,i}\right| h_i$ where h_i is the weighting factor that is defined by $h_i = 2q$ if the residual for the ith observation is strictly positive, or is defined $h_i = 2 - 2q$ if the residual for the ith observation is equal to zero or negative, q is the quantile (0<q<1) to be estimated.

Figure 3 Art price indices using quantile regressions



During the prewar period, prices have gone up for all the price brackets, until the end of the first semester of 1913. The hedonic art index exhibit a sharp decrease in value during the second semester of 1913. During this semester of 1913, Q95 is the only index to exhibit a sharp increase. This signals that the demand for higher end artworks hold at the eve of the war. Up to the outbreak of the war, all indices went down. In 1916, when during the war, the art market resumed its activity, prices dropped more strongly for the higher-end artworks. The bust in prices in June 1918 is mainly due to lower-end artworks (Q05 and Q25) that increase more sharply than the other indices. Between the first and the second semester of 1918, we can see that the lower-end quantiles (Q05 and Q25) exhibit contrary movements to the other quantiles: they decrease in value when all the others price brackets increased. The peak in the second semester of 1918 is not due to the lower-end artworks given that both the Q05 and the Q25 exhibit a decrease in prices levels. Q95 is on the other hand increasing sharply between the first and the second

semester of 1918. Between the second semester of 1918 and the first semester of 1919, all quantiles exhibit a decrease in price levels. This drop in prices levels is even stronger for lower-end artworks (Q05 and Q95).

As we can see, during the prewar period, the demand for artworks was more focused on more expensive pieces or at least the prices levels remained higher for more expensive artworks. During the war, the demand for cheaper artworks was more sustained than for artworks from other quality until mid-1918[6]. The two peaks in our sample are clearly not due to the same class of artworks. As indicated through the hedonic regression characteristics, the price is a concave function of the size of an artwork. The Q05 average size of the artworks is 1757.2 cm^2 (median is 945 cm^2) whereas the Q95 average of an artwork is 8927.6 cm^2 (median is 6075 cm^2). The Q05 contains much more works on paper such as drawings and watercolours than the Q95. Eventually, on the 25 artists present in the Q95 sample, none of them was alive at the time of sale. For the Q05, around 31% of the artists were still alive at the time of sale. This was also expected due to the relationship between the coefficient of the "DEATH" dummy and the price.

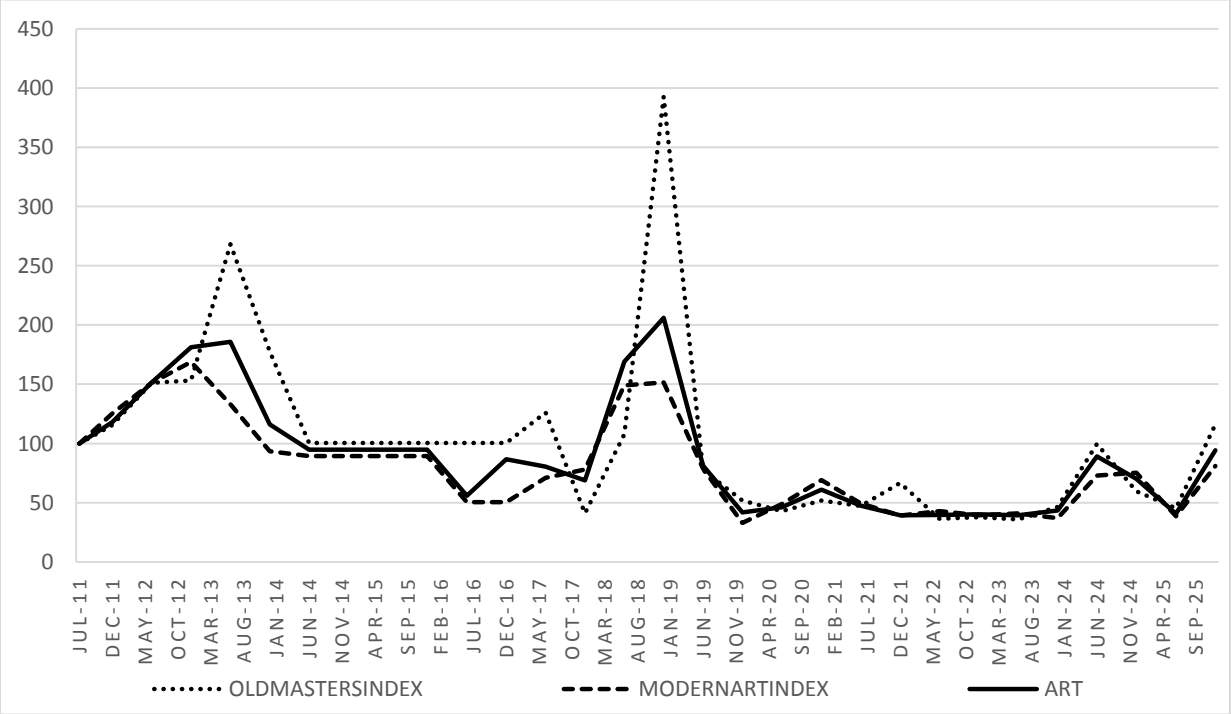
Old Masters vs. Moderns

In such a crisis time as the First World War or the postwar period, one can expect that investors would be seeking for security and rather safer investments. As mentioned before, art is a really volatile investment (see also the risk-return analysis infra). In war period, it is intuitive to think that people willing to invest were more prone to put their money in safer investments. To that matter, investing in Old masters seem a more rational investment given that these artists were more established. They also were more likely to have been sold before the period we considered. Track records for these artists were thus more likely to have come to the knowledge of investors that knew more precisely the value of these artists.

[6] One has to remind that we are not provided with the unsold items at the time of sale. This prices movements could be as well driven by the supply, especially in a time of constraints such as a war. However, compared to other studies (Renneboog and Spaenjers, 2013), the fact that the lowest quantiles fetch higher prices levels is remarkable. On their whole period, Renneboog and Spaenjers record a forever leading highest quantile (Q95), with the lowest quantile (Q05) never reaching the same prices levels as the other artworks. Nevertheless our sample is much less selection biased than the samples usually found in the literature where a group of artists is always ex-post selected and used to define the sample. This is also why our sample can be more representative of the low-end market.

Therefor we split our sample in two groups: the Old Masters, i.e. artists that died before 1850 and the Moderns. This is a conservative hypothesis since the first half of the 19th century was still dominated by academic artists. The first impressionist exhibition in 1874 is clearly the outbreak of modernity in paintings. We run the hedonic regression on both the groups. Figure 4 displays both indices and the general index. Until the second semester of 1912, both indices increased following the hedonic price index. From the second semester of 1912 to the first semester of 1913, the hedonic index is increasing, so is the Old Masters index but not the Moderns index. The peak in 1918 is mainly due to the peak in the Old Masters index (between the first semester 1918 and the second semester 1918) as the Moderns index remains flat. The demand for old masters seem to encounter an increase at the end and during the war as the index clearly outperforms the Moderns index.

Figure 4 Old Masters vs. Moderns indices



Risk-return characteristics of artworks

Table 1 displays the risk-return characteristics of our main index, of the quantiles-based indices and of the Old Masters vs. Moderns indices. Art exhibited a negative return for a very high standard deviation, and hence a negative Sharpe ratio. As it can be seen, all indices exhibit a very high volatility (between 32.12% and 67.16%). The only indices that display a positive Sharpe ratio are the indices based on the Old Masters/Moderns distinction.

Table 1 Returns, standard deviations and Sharpe ratio for the computed indices

	N	Return	S.D.	Sharpe ratio
Hedonic Index	22,074	-0.40%	39.67%	-0.0012
Quantile				
Q05	18,408	-8.13%	32.12%	-0.24199
Q25	18,408	-10.50%	40.72%	-0.24914
Q50	18,408	-6.98%	34.65%	-0.19138
Q75	18,408	-3.83%	36.18%	-0.09619
Q95	18,408	-12.32%	63.08%	-0.18975
Old Masters vs. Moderns				
Old Masters	8,953	2.79%	67.16%	0.046818
Moderns	12,080	0.83%	44.64%	0.026504

Note: the risk-free asset considered to compute the Sharpe ratio is the Rente 3% (see infra); the Old Masters sample is composed by the artworks painted by artists that died before 1850; the Moderns sample is the remainder. The difference in N between the Hedonic Index and the Old Masters vs. Moderns Indices is due to artists for which the date of death could not be found.

Figure 5 exhibits the art index compared to potential investments: stocks ("CAC 40"), bonds ("Rente" which is a perpetuity from the French state), real-estate, gold and art.

As expected, art really compares differently before and after the war. The very high prices of the prewar period outperformed all the other assets. The situation is similar for 1918. Despite these really high performances, the risk return characteristics of art are not attractive at all. Table 2 presents the risk returns characteristics and the Sharpe ratio for all the investments presented in Figure 5. The Sharpe ratio analysis suggest that real estate was the most profitable investment during this period.

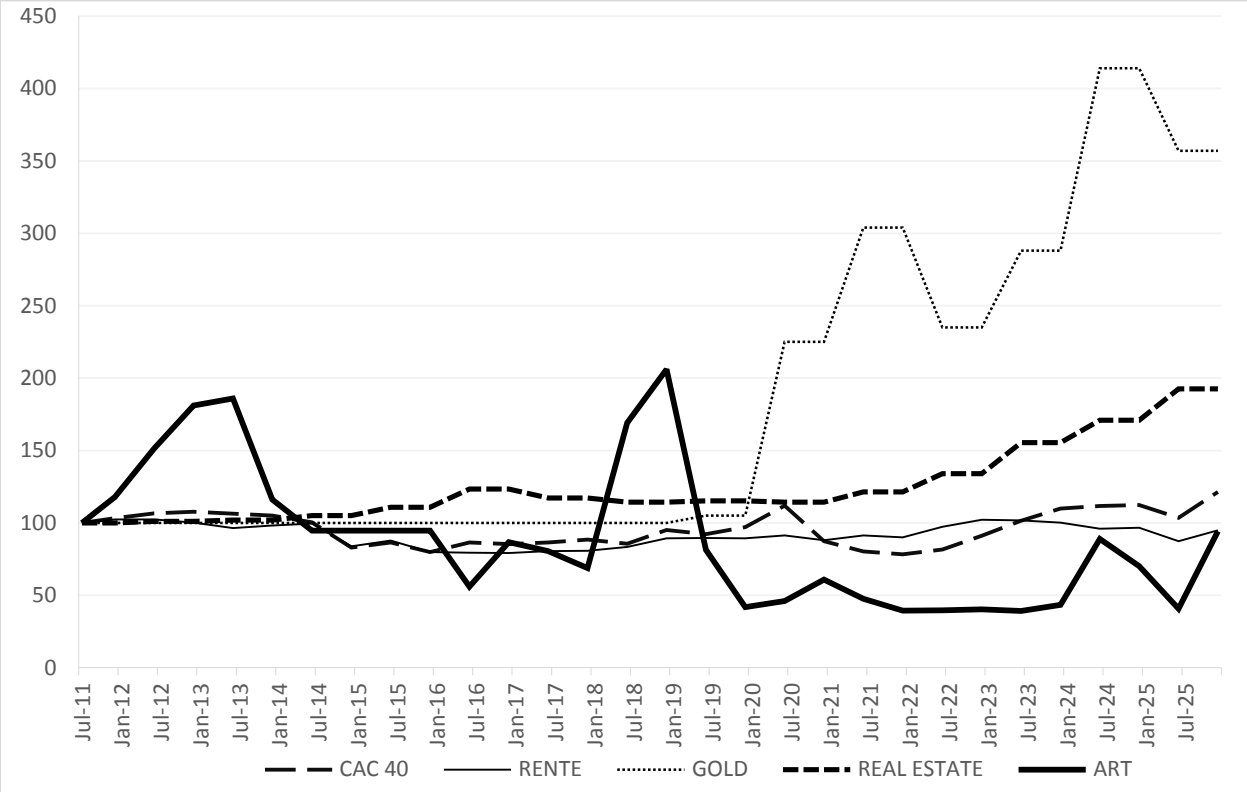
Table 2 Risk-return characteristics for stocks, bonds, gold, real estate and art 1911 - 1925 (Rente is considered as being the risk-free asset; the gold return is computed from 1919 to 1925

	Annualized return	**Standard Deviation**	**Sharpe ratio**
ART	-0.401%	39.671%	-0.00122
CAC40	1.289%	7.749%	0.2119403
RENTE	-0.353%	4.221%	0
GOLD	18.180%	25.776%	0.7189783
REAL ESTATE	4.578%	4.847%	1.0172807

During the war, the real-estate price levels compared positively with the other investments of our analysis. The price of gold remained fixed during the whole war period as the exchange rate "francs-or" was fixed and controlled by the government. The postwar period saw a real outperformance of real assets such as gold and real estate but no outperformance of art. On the contrary, the performance of art during this period is rather bad.

Stocks and bonds did not compare favorably to the other types of investments. Even if the stock markets react to war events, Le Bris and Hautcoeur (2012) argue that the key factor to influence them is the way of financing the war. WWI marked the beginning of modern monetary inflation in France. Just before the First World War, the new public debt did not exist in France as the budget were in surplus. The conviction at the beginning of the war that it would not last long lead to a financing through short-term debt through Bons du Trésor and through money creation ("avances de la Banque de France") (Hautcoeur (2009)). The Paris Stock market closed on July 31st, 1914 and reopened its doors in December 1914

Figure 5 Art compared to other sources of investments (Stocks, Gov. Bonds, Real-estate and Gold)



Comparison with the Second World War

The performance of all investments during the First World War is very different from the situation of the markets during the Second World War. Figure 6 displays the situation of both art markets during WWI and WWII. At this time, the art market experienced a massive boom during the whole war period.

Figure 6: Comparison of art market situations during WWI and WWII

Note: The graph displays the art indices (Y axis) in function of the months: from -18 months before the outbreak of the wars until +84 months after. Time 0 is the second semester of 1914 for WWI and the second semester of 1939 for WWII.

In terms of supply and demand the situation is counterintuitive. As mentioned by Le Bris and Hautcoeur (2010), none of the warring countries expected at the beginning of WWI the war to last so long. As a consequence of this, the people did not modify their consumption habits at the outbreak of the war and shortly after. We would expect the art market to continue working (or to reopen shortly after the outbreak of the war) or even to encounter an increasing of prices since the supply of artworks was decreasing because of the destructions caused by the German armies (Kott, 2002). During the Second World War, the occupation had a positive effect on the demand side as the Germans were provided with almost infinite means and were major new players on the art market. The looted art from the Jews could have also increased the supply side of the

market. All in all, a decrease was expected on the art market during WWII. The situations of the art markets were very different from these expectations. The following table summarizes the differences between WWI and WWII that can explain why the art market reacted in a significant different way between WWI and WWII.

	WWI	**WWII**
War as a surprise	War did not occur as a surprise. France has its plan ready since 1912, the *Plan de mobilization* in order to organize the war (army mobilization, stocks of guns and ammunitions, logistics and other requirements) (Hautcoeur, 2005). However, despite this relatively good preparation for a short-term war, France did not prepare itself for a long-term war and the length of the conflict occurred as a surprise.	The country was at war since Poland's invasion in September 1939. From September 1939 until May 10th, 1940, the period was called the *phoney war* since France expected an invasion that did not seem to come. When Germany invaded Belgium, on May 10th, 1940, the operation still intervened as a surprise.
Way of war financing	- ***Bons de la Défense Nationale*** (BDN) : were initially created for short-term borrowing but became the main vehicle for the War finance, yielding about 75 billion francs 1914-1919 (Mouré, 2002) ; - ***Avances de la Banque de France***: were the credits of the Central Bank to the state. In 1918, the legal limit on advances to the state had been pushed to 21,000 million of francs (compared to 3,100 on August, 5th 1914), (Mouré, 2002); - **Rente**: was the long-term bond. It was issued in 1916, when it became clear that the war would last longer than expected. Between 1919 and 1925, the *Rente* was issued for 45 billions of francs. (Le Bris and Hautcoeur, 2012)	**Money creation** in a context of closed frontiers, *politique du circuit*. ***Avances de la Banque de France***, same credits of the Central Bank to the state. In 1940, the legal limit on advances was raised to 85 billions of francs. To prevent this newly created money to fly out of the country, France emitted bonds and people were strongly encouraged to invest in them. (Occhino et al., 2008)
Occupation	Part of the territory was invaded. Ten *départements*, out of 87, were occupied. These *départements*	Larger part of the territory invaded and occupied. After France's capitulation on June

	were very important for steel, electricity, coal and iron production but also for agricultural production. As a matter of fact, this occupation seriously reduced France's productivity. Paris was not occupied. (Hautcoeur, 2005)	22nd, 1940, a large part of the North and West of the territory was occupied by the Germans.
Markets controls/ Level of capital freedom	Not a strong financial repression: the rules of free capital market were preserved and export of capital was allowed through the Bourse and the holding of gold. Stock prices could evolve without constraints and quickly adjusted downwards. (Le Bris & Hautcoeur, 2012).	**Strong financial repression** - Money is channeled to buy **public debt;** - Creation and maintenance of a **captive domestic audience** that facilitated directed credit to the government (*politique du circuit*). Only national assets can be bought. (Reinhart and Sbrancia, 2011)
Issue of the conflict	Long and painful victory, achieved after 4 years of fighting.	Combat for 2 months (10 May 1940 until 22 June 1940) and defeat; occupation by the Germans. The victory of France resulted from the US intervention in June 1944. So defeat and then a victory.
Monetary Regime	Under the gold standard until the outbreak of the war; then willingness to go back to the gold standard after the war (France will go back to the gold standard in 1928). During the war, the Banque de France strongly encouraged people to exchange their gold to banknotes, in order to increase the gold reserves.	Under the gold standard until the outbreak of the war, but strong oppositions to this monetary system before the outbreak of the war. (Mouré, 2002)

Conclusion

On basis of an original database of close to 22,000 artworks, this paper analyses the reactions of the art market during WWI in France. The market disappeared at the beginning of the war and reappeared at a loss. The safe haven character of art as an investment did not exist during WWI, whereas during WWII art was clearly a safe investment. Several structural differences can

explain the divergence in situation: the issue of the war, the freedom of the capital markets and the occupation. The safe investment character of art can be attributed to these WWII events rather than to the art itself. Art is thus the investment of last resort: if no other investment is available, investors tend to see it as a safe haven. Further findings characterize the WWI art market: Old masters tend to perform better than Moderns. During the war, the lowest price quantile proportion of artworks performed better than all other price ranges.

APPENDIX I Gazette de l'Hotel Drouot and advertisements for it in the

SUCCESSION DE M. J.-J.C...

VENTE faite salle 6, le 31 mars, par **M. LAIR-DUBREUIL** et **BAUDOIN** et MM. G. PETIT et ALLARD.

Produit : 255.180 fr.

Tableaux modernes

1. John-Lewis Brown. Chasse au faucon (81-99) (d. 5.000), à M. Allard : 3.750. — 2. John-Lewis Brown. Dans la campagne, aqua. (16-60) (d. 350), à M. Michel Pelletier : 300. — 3. Cazin. Le Champ devant la ferme (74-61) (d. 20.000), à M. Dolfus : 17.000. — 4. Chaplin. La Jeune fille aux fleurs (45-31) (d. 6.000), à M. Leciza Alvear : 9.000.

The New York Times, July 14, 1912

"Every choice aquatint that is offered for sale at the Hotel Drouot, the great art sale centre in Paris, fetches a price that only a collector of wealth can pay.

The New York Times, June 1st 1913

ANOTHER GREAT ART SALE COMING

The Collection of Marczell de Nemes of Budapest Soon to be Sold in Paris.

MANY FINE OLD MASTERS

Works by Rembrandt, Rubens, Van Dyck, Botticelli, Hals, and El Greco in the Collection.

Special Cable to THE NEW YORK TIMES.

The New York Times, April 22nd 1913

Special Cable to THE NEW YORK TIMES.

PARIS, April 21.—The dispersal by auction of the third section of the great Henri Rouart art collection was begun at the Hôtel Drouot to-day, when a two-day sale of ancient and modern pictures, water colors, and drawings was commenced.

Appendix II Number of artworks sold and average/median price per artwork

Date	Number of artworks sold	Average price/artwork	Median price/artwork
Jun-11	1085	2171.616	500
Dec-11	367	2925.621	700
Jun-12	975	13107	850
Dec-12	501	9326.986	2150
Jun-13	1286	12347.69	1750
Dec-13	96	3745.813	915
Jun-14	1165	3759.972	620
Jun-15	24	402.5222	195.9456
Dec-15	4	968.2629	683.7249
Jun-16	81	990.99	623.3032
Dec-16	55	722.2808	337.9355
Jun-17	571	1679.549	503.7742
Dec-17	86	2448.722	625.8065
Jun-18	347	7578.324	3679.867
Dec-18	117	11749.66	5132.446
Jun-19	1184	2802.675	790.224
Dec-19	790	828.6409	179.776
Jun-20	1117	1034.848	226.5693
Dec-20	758	1425.299	254.8905
Jun-21	1000	1177.567	235.0196
Dec-21	576	477.0719	146.8873
Jun-22	2187	960.1361	183.4384
Dec-22	1283	755.6367	176.7679
Jun-23	1642	945.2101	168.4737
Dec-23	1311	826.2975	214.4211
Jun-24	858	4773.335	536.1585
Dec-24	1107	856.145	187.6555
Jun-25	1098	1923.365	152.6311
Dec-25	1045	2365.634	350.3009

APPENDIX III Proportion of artworks per medium

MEDIUM	ABS. NUMBER OF ARTWORKS/MEDIUM	PROPORTION	SALES	PROPORTION
AQUARELLE	825	3.74%	577,194	0.85%
DESSIN	1,584	7.18%	1,627,897	2.39%
GOUACHE	133	0.60%	179,712	0.26%
CANVASSES	19,519	88.48%	65,789,977	96.50%
	22,061	100.00%	68,174,780	100.00%

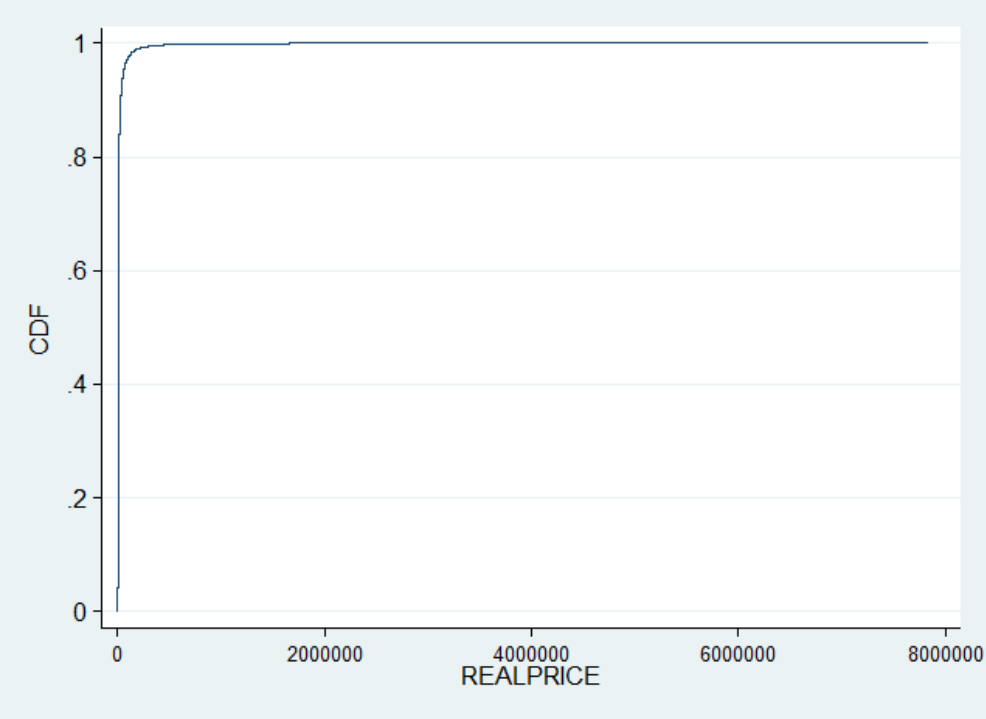
APPENDIX IV Results of the baseline regression

lnrealprice	**Coef.**	**Robust std. Err**	**t**	**P>|t|**
C	3.537487	0.357966	9.88	0
height	0.009492	0.001206	7.87	0
width	0.009101	0.000792	11.49	0
heightsq	-1.3E-05	5.49E-06	-2.43	0.015
widthsq	-1.2E-05	2.65E-06	-4.59	0
aquarelle	-0.23264	0.110536	-2.1	0.035
dessin	-0.61485	0.108841	-5.65	0
gouache	(omitted)			
toile	-0.02435	0.104507	-0.23	0.816
atelierattr	1.606843	0.208707	7.7	0
attra	1.04897	0.097637	10.74	0
dapres	0.374299	0.13653	2.74	0.006
ecolede	0.512323	0.099997	5.12	0
genrede	(omitted)			
artistself	2.320251	0.095769	24.23	0
Artists dummies	Included			
Time dummies	Included			
N observations	22,074			
N variables	809			
R^2	62.08%			

	Coefficient	Index value	SD	t value	p value
Jul-11	0	100			
Dec-11	0.164404	117.8691	0.092836	1.77	0.077
Jun-12	0.415396	151.497	0.062167	6.68	0
Dec-12	0.593963	181.1151	0.0696	8.53	0
Jun-13	0.619984	185.8898	0.056472	10.98	0
Dec-13	0.148405	115.9983	0.162527	0.91	0.361
Jun-14	-0.05502	94.64697	0.057711	-0.95	0.34
Dec-14	NA				
Jun-15	NA				
Dec-15	NA				
Jun-16	-0.58087	55.94141	0.113339	-5.13	0
Dec-16	-0.14241	86.72625	0.231153	-0.62	0.538
Jun-17	-0.21779	80.42983	0.063421	-3.43	0.001
Dec-17	-0.37282	68.87887	0.123592	-3.02	0.003
Jun-18	0.525126	169.0672	0.079378	6.62	0
Dec-18	0.722763	206.0118	0.124469	5.81	0
Jun-19	-0.20622	81.36504	0.055317	-3.73	0
Dec-19	-0.8724	41.7948	0.062203	-14.03	0
Jun-20	-0.77311	46.15757	0.055907	-13.83	0
Dec-20	-0.49564	60.91783	0.06537	-7.58	0
Jun-21	-0.74169	47.63069	0.056319	-13.17	0
Dec-21	-0.93299	39.33772	0.06019	-15.5	0
Jun-22	-0.9237	39.70485	0.049505	-18.66	0
Dec-22	-0.9088	40.30063	0.055764	-16.3	0
Jun-23	-0.93469	39.2706	0.052467	-17.82	0
Dec-23	-0.8365	43.32231	0.054277	-15.41	0
Jun-24	-0.11625	89.02489	0.062662	-1.86	0.064
Dec-24	-0.35543	70.08721	0.058889	-6.04	0
Jun-25	-0.89606	40.81744	0.063138	-14.19	0
Dec-25	-0.05997	94.17918	0.058998	-1.02	0.309

APPENDIX V Art Index

Appendix VI Cumulative distribution of the real prices



Variable	n	Mean	S.D.	Min	0.25	Mdn	0.75	Max
realprice	22062	14823.42	91482.94	14	701.89	2100	7998.28	225199.60

References

Agnello R.J., Pierce R.K. (1996): "Financial returns, price determinants, and genre effects in American art investment". *Journal of Cultural Economics*, 20, 359-383

André L., Varet G., (1995), "Pricing the priceless: Comments on the economics of the visual art market", *European Economic Review*, 39, pp. 509-518

Ashenfelter O., (1989), "How auctions work for wine and Art", *The Journal of Economic perspectives*, Vol. 3, No. 3, pp. 23-26

Baumol W. J., (1986), "Unnatural Value: Or Art Investment as Floating crap Game", *The American Economic Review*, 76, 2, pp. 10-14

Buelens N. and Ginsburgh V., (1993), "Revisiting Baumol's art as floating crap game", *European Economic Review*, No. 37, pp. 1351-1371

Campbell R., (?), "Art as a financial investment", working paper of the University of Maastricht/Erasmus University Rotterdam

Campbell R., (2005), "Art as an alternative asset class", working paper of the University of Maastricht

Chanel O., (1995), "Is art market behavior predictable?", *European Economic Review*, No. 39, pp. 519-527

Czujack C., (1997), "Picasso Paintings at Auction, 1963-1994", *Journal of Cultural Economics*, No. 21, pp. 229 – 247

David G., Oosterlinck K. (2011), "War, inflation, monetary reforms and the art market: The Belgian art market (1944-1951)", working paper of the CEB, ULB

Euwe J., (2007), De *Nederlandse kunstmarkt 1940-1945*, (Amsterdam), Editions Boom, 180p.

Fontaine A., (1926), *French industry during the war*, (New Haven), Yale University Press, 477p.

Frey B.S., Pommerehne W.W., (1989), "Art Investment: An Empirical Inquiry", *Southern Economic Journal*, Vol. 56, No. 2, pp. 396-409

Ghinsburg V., Jeanfils P., (1995) "Long-term comovements in international markets for paintings", *European Economic Review*, 39, pp. 538-548

Ginsburgh V., Mei J., Moses M., (2006), "The computation of Price Indices", in Ginsburgh V. and Throsby D. (ed.), *Handbook of the Economics of Arts and Culture*, North Holland

Goetzmann W., (1993), "Accounting for Taste: Art and the Financial Markets Over Three Centuries", *The American Economic Review*, Vol. 83, No. 5, pp. 1370-1376

Goetzmann W., Spiegel M., (1995), “Private value components, and the winner’s curse in art index”, *European Economic Review*, No. 39, pp. 549-555

Griliches Z., Aldeman I., (1961), “An index of Quality change”, *Journal of the American Statistical Association*, Vol. 56, No. 295, pp. 535-548

Hautcoeur P.C., (2005), “Was the Great War a watershed? The economics of World War I in France” in Broadberry S. and Harrison M. (eds.), “The Economics of World War I”, (Cambridge), Cambridge Univesity Press, pp. 169-205

Keegan J., (2003), La Première Guerre mondiale, (Paris), Perrin/Agnès Viénot Editions, 553p.

Kott C., (2006), *Préserver l’art de l’ennemi? Le patrimoine artistique en Belgique et en France occupées, 1914-1918*, (Bruxelles), P.I.E. Pieter Lang, 444p.

Le Bris D., (2012), “Stock returns, government and market efficiency, 1871-2008”, presented at the International Conference of the French Finance Association

Le Bris D., (2012), “Wars, inflation and stock market returns in France, 1870-1945”, *Financial History Review*, 19, 3, pp. 337-361

Le Bris D., Hautcoeur P.-C., (2010), “A challenge to triumphant optimists ? A blue chips index for the Paris stock exchange, 1854 – 2007”, *Financial History Review*, 17, 2, pp. 141-183

Mandel B. (2009), “Art as an investment and conspicuous consumption good”, *American Economic Review*, 1653 – 1663

Mei J., Moses M., (2002), “Art as an Investment and the Underperformance of Masterpieces”, *The American Economic Review*, Vol. 92, No. 5, pp. 1656-1668

Moulin R., (1967), *Le marché de la peinture en France*, (Paris), Le sens commun, Les éditions de Minuit, 616p.

Nicholas L. H., (1995), *The rape of Europa: The fate of Europe’s Treasures in the Third Reich and the Second World War*, (New York), Vintage books, 499p.

Oosterlinck K., (2011), “The Price of Degenerate Art”, Centre Emile Bernheim Working paper N°09/031

Pesando J., (1993), “Art as an Investment: The Market for Modern Prints”, *The American Economic Review*, Vol. 83, No. 5, pp. 1075-1089

Renneboog L., Spaenjers C., (2013), “Buying Beauty: on Prices and Returns in the Art Market”, *Management Science*, Vol. 59, No. 1, pp. 36-53

Renneboog L., Van Houtte T. (2002), “The Monetary appreciation for paintings, From realism to Magritte”, Working paper of Tilburg University

Worthington A. C., Higgs H. (2005), “Financial returns and price determinants in the Australian art market, 1973-2003”, *The economic record*, 81, 113-123

Worthington A. C., Higgs H., (2004), “Art as an investment: risk, return and portfolio diversification in major paintings markets”, *Accounting and Finance*, No. 44, pp. 257-271