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Art as a Wartime Investment: Conspicuous Consumption and Discretion

Abstract

During World War II, artworks significantly outperformed all alternative investments in Occupied France. With the surge in demand for portable and easy-to-hide (discreet) assets such as artworks and collectible stamps, prices boomed. This suggests that discreet assets may be viewed as crypto-currencies, demand for which varies depending on the environment and the need to hide value. Regarding art market valuation, this paper argues that while some economic

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actors derive significant utility from conspicuous consumption, others value the discretion offered by artworks. Motives for purchasing art may thus vary over time.

Since at least the beginning of the 20th century, people have wondered whether they could reasonably hope to make a decent financial return from their artworks, in addition to the aesthetic pleasure they derive from ownership. Baumol's (1986) seminal paper was one of the first to analyse long-term returns on the art market. Examining sales of 640 artworks over three centuries, he finds that the annual compounded real rate of return was a meagre 0.55%. Goetzmann (1993), on the basis of 3,329 price pairs for a period stretching from 1715 to 1986, finds little evidence that art is an appealing investment for risk-averse investors. Mei and Moses (2002) analyse the US art market from 1875 to 2000 and reconstruct an annual index on the basis of 4,896 price pairs. They conclude that art outperformed fixed income securities and provided diversification benefits even though it underperformed equity. Renneboog and Spaenjers (2013) reconstruct an art price index on basis of 1.1 million auction prices from several countries. They find that between 1951 and 2007 the art market appreciated on average by 4.03% per year in real USD, and thus conclude that art underperformed equity but outperformed bonds. They further show that art market returns may change significantly depending on the period analysed, and they conclude that art buyers should 'expect to reap non-pecuniary benefits rather than high financial returns, especially because the modest art returns are further diminished by substantial transaction costs'. Finally, David et al. (2013) show that the art market is inefficient, attributing this observation to price opacity.

The financial underperformance of art has been ascribed to several consumption-side factors. For Baumol (1986), the aesthetic pleasure derived from owning an artwork may be viewed as a return, in and of itself. Frey and Eichenberger (1995) attribute part of the observed returns to the fact that actors on the art market are more likely to exhibit *'behavioural anomalies'*. They suggest that:

'private collectors are strongly subject to the endowment effect (an art object owned is evaluated higher than one not owned), the opportunity cost effect (most collectors isolate themselves from considering the returns of alternative uses of the funds) and the sunk cost effect (past efforts of building up a collection play a large role)'

(Frey and Eichenberger, 1995, p.212)

Mandel (2009) goes a step further, incorporating the utility derived from conspicuous consumption into the framework of a consumption-based capital asset pricing model. In his model, the benefits of conspicuous consumption are integrated into a 'utility dividend' that is an increasing function of art prices. This utility dividend explains the low level of art market returns: the higher the incidence of conspicuous consumption, the lower the financial return. Thus Mandel's model elegantly reconciles empirical observations with theory.

Even though art investment is dominated in the long run by other asset classes in a risk-return framework, artworks may have characteristics of interest when low-probability disasters occur. This paper argues that discreet assets, defined as small and easily transportable assets that can store a large amount of value, have the rare benefit of hedging certain kinds of disasters, such as

war or occupation. Many luxury goods and collectibles (jewels, rare stamps, and artworks) have a dual nature: they can be used for conspicuous consumption but also offer discretion if needed. Obviously, other luxury goods such as stately homes, mansions and yachts, have only the conspicuous consumption aspect. Whereas economic actors derive significant utility from conspicuous consumption in most circumstances, they may also value the discretion offered by artworks when they need to hide their wealth. To test that hypothesis, this paper reconstructs an art market index for Occupied France, using an original database of more than 8,850 artworks sold between 1937 and 1947 at Drouot, the main auction house in Paris. The index is then compared with alternative investments: equities, bonds, and black-market gold and foreign currencies. The results show that artworks outperformed all other investment opportunities. To further assess the importance of discretion, the paper also reconstructs a collectible stamp index. The real value of a portfolio of stamps increased tenfold between January 1938 and April 1943, confirming the importance of discretion. Finally, we also compare price movements for both small (and thus discreet) and large artworks. Small artworks, which could easily be transported and used as a large store of value, traded at a premium during the war, thus reflecting the value assigned to portability and discretion.

Even though rare disasters are, by definition, seldom-occurring events, the results are relevant in a broader context. This paper argues that artworks may be viewed almost as a form of crypto-currency, demand for which will vary depending on the environment. The literature usually links increases in wealth and wealth inequality to higher demand for artworks, spurred by social competition at the highest levels of wealth and income (Goetzmann et al., 2011; Hitaki et al., 2009). Changes in wealth would thus affect prices because of conspicuous consumption.

Discretion provides an alternative explanation, however. Higher wealth and wealth inequality is likely to increase the value of discreet assets, which can be used to avoid taxation. In a situation where both wealth and wealth inequality increase, the price of artworks may increase because of either conspicuous consumption or discretion. In other words, part of an artwork's price would derive from the ability of its owners to choose between conspicuous consumption and discretion. To go even further, the utility from owning most artworks may switch from conspicuous consumption to discretion, and vice-versa.

To analyse the role of conspicuous consumption, this paper exploits the unique setting provided by World War II. In wartime and in an occupied country, it is reasonable to assume that few people would derive significant utility from conspicuous consumption. During World War II, some nouveaux riches who had gained from the black market were attracted by the supposed safety of art investments, but also by the ease with which paintings could be used to hide illegal profit (Feliciano, 1997, p.123; Moulin, 1967, p.41). The massive increase in German buyers from diversified horizons also had a dramatic impact on the art market. These buyers benefited from the advantageous exchange rate imposed upon defeated France (Feliciano, 1997, p.125-126). In the case of the new French 'collectors' active on the market, nothing could have been further from their motives than conspicuous consumption. If paintings were bought to hide illegal profits, then bragging about the collection would have been counterproductive. The same applied to people who bought artworks as a portable store of value that could be taken abroad should they have to flee France.

One could argue that German actors were more prone to consume art in a conspicuous way. For a substantial section of the art market, however, this was unlikely. Indeed, starting in 1937 the Nazis made a clear distinction between 'real' and 'degenerate' art. Museums were 'purged' of the degenerate artworks they owned, and the works themselves were stored, sold abroad or simply destroyed. As the war went on, importation of degenerate works into Germany was forbidden. Needless to say, conspicuous consumption of degenerate artworks by Germans was therefore highly unlikely. The paper exploits the difference in conspicuous consumption for 'degenerate' and 'non-degenerate' artworks to determine the role of conspicuous consumption in art valuation. Just before the war broke out, investors demanded a higher premium to hold 'degenerate artworks'. The same was true during the first months of the Occupation, suggesting that part of this premium compensated for the loss in conspicuous consumption.

The paper is organized as follows. Section One presents the Nazi position regarding modern art and, more precisely, regarding paintings. It then describes the French art market shortly before and during World War II. Section Two details the database, provides descriptive statistics about the art market in Occupied France and presents the econometric methodologies used to assess price changes in art markets. Section Three presents and discusses the main results: the art market index and its evolution during the war, and compares the index with alternative investments. Section Four concludes.

1. The Nazi Position on Art and the French Art Market during World War II

Nazi ideology regarding the arts took gradual shape during the 1930s. On June 30, 1937 Joseph Goebbels, the Reich Minister for Propaganda, asked the painter Adolf Ziegler to mount an exhibition to show 'works of German degenerate art since 1910 (…) which are now in

collections owned by the German Reich' (Nicholas, 1995, p.16-17). The regime purged state collections of the works of artists who did not fit into its vision, and in six months the Ziegler commission confiscated close to 17,000 artworks from 101 German museums (Petropoulos, 1996, p.56). With more than 2 million visitors, the *Entarte Kunst* (degenerate art) exhibition proved a major success. By March 1938 all museums had been cleansed of their 'degenerate work'. In March 1939 more than 4,000 'degenerate' artworks, considered unsalable, were burned for a practice exercise by the Berlin Fire Department. The most valuable works were sold abroad (Nicholas, 1995, p.23). Consistent with the low esteem in which they held the works, the Nazis let major artworks go for such ridiculous sums that they were almost given away. To increase revenues, a German dealer suggested that some of the works could be auctioned abroad, and on June 30, 1939 the international art market witnessed one of the most extraordinary auctions ever: the sale in Lucerne, Switzerland, of 126 paintings and sculptures made by major 'degenerate' modern artists such as Braque, Chagall, Gauguin, Van Gogh, Modigliani, Picasso, Nolde, Klee, Dix and Matisse. In an attempt to maximize sales revenues, the Nazi regime ended up having to market the artworks as being worth something, in direct contradiction to its claim that the art was 'degenerate' (Fleckner, 2012). As a result of the context, the atmosphere in Lucerne was extremely tense, and the sale was far from successful in view of the amounts raised and the number of unsold lots (Nicholas, 1995, p.3-5). This sale was exceptional however as buyers knew they were financially supporting the Nazi regime when bidding for one of the artworks. But how did Nazi policy on the visual arts impact the international market for 'degenerate' paintings in France, for example?

1.1. The administration of looted art in Occupied France

When war broke out, Paris was still the centre of the international art market. The Parisian market had boomed after the First World War. During the 1930's, however, French galleries and auction houses suffered from the lack of activity and from interwar financial instability (Feliciano, 1997, p.123). This phenomenon was not unique for France. In Great Britain, the art market declined sharply following the 1929 crisis (Goetzmann et al., 2011). During the Phoney War, galleries remained open even though trades were few and far between (Nicholas, 1995, p.86-87). Following the rout of the French Army in May 1940, an armistice was signed on June 22, 1940. As a result a substantial part of the country (including Paris) was occupied by German forces, and the Vichy-based collaborationist government was put in charge of the so-called free zone.

As was the case in Germany and in other occupied countries, German leaders quickly competed to control the administration of the arts in Occupied France (Euwe, 2008; Feliciano, 1997; Nicholas, 1995; Petropoulos, 1997). Alfred Rosenberg (the Nazi ideologue in charge of the party's education and Reich Minister for the Occupied Eastern Territory), Martin Bormann (Reich Minister, Private Secretary to Hitler after 1943), Hermann Göring (Reichsmarschall, Chief of the Luftwaffe and Minister President of Prussia) and Joachim von Ribbentrop (Reich Minister for Foreign Affairs) were vying with Joseph Goebbels to administer art in Occupied France. Rosenberg would eventually end up in charge of looting artworks. Hitler allowed him and his staff, the *Einsatzstab Reichsleiter Rosenberg* (ERR), to collect archives and libraries from enemies of the Reich. Artworks would come under Rosenberg's sphere of influence in

September 1940, when the ERR took charge of collecting all ‘ownerless’ cultural property (Petropoulos, 1997, p.130). By early 1941 most major Jewish-owned collections had been raided, and the looted artworks were stored at the Musée du Jeu de Paume in Paris.

In view of their respective positions, Rosenberg and Göring realized that cooperation would probably bring mutual benefits. In exchange for guaranteeing transportation and his overall support, Göring managed to get privileged access to the looted collections (Feliciano, 1997, p.36; Petropoulos, 1997, p.133). The looted pieces were identified, catalogued and evaluated. Their fate would then depend on their quality and whether they matched the Nazi view of the arts. Some works would be sent to Germany, while others were to be used for trade or to be sold (Feliciano, 1997, p.108). Compliant ‘experts’ supported the German authorities by providing price estimates that were systematically favourable for the occupying forces (Polack and Dagen, 2011). The least valuable paintings were sold to French dealers, with the proceeds going to ‘widows and children of deceased French soldiers’ (Petropoulos, 1997, p.135). For a time, the fate of the modern artworks stored in the Jeu de Paume remained uncertain. A distinction was made in July 1943: some works had to be kept for trading, others for potential future sales, while a third group was considered obviously useless. As in Berlin a few years earlier, the ‘useless’ artworks, which included masterpieces by Picasso, Picabia, Klee, Ernst, Miro, Arp, Dali and Leger, among others, were destroyed (Polack and Dagen, 2011). Paintings by more traditional painters depicting members of famous Jewish families suffered the same fate.

1.2 The French Art Market during World War II

The Occupation changed the Parisian art market dramatically. Some of the main galleries came under intense scrutiny because their owners were Jews, and Arianisation procedures started. Some dealers, such as Daniel-Henry Kahnweiler, managed to transfer their business to 'Aryan' family members. By contrast, other galleries would fall under new 'supervision' or be 'resold' during the war (Assouline, 2005, p.509-513). However, the looting and Aryanisation activities did not mean that the German artistic model had been imposed directly on Occupied France. In fact Hitler took a favourable view of French 'artistic decadence' (Bertrand-Dorléac, 1993, p.43). To be sure, the German occupation forces were monitoring the shows put on by art galleries. In some instances they would request the removal of artworks by artists deemed degenerate (Riding, 2010, p.171). But scrutiny was loose, and artworks by painters viewed as degenerate were sold at auction or privately on a regular basis. The Vichy regime was more concerned with protecting French artistic treasures than with prosecuting 'degenerate' artists. The main fear was huge exports of national treasures to Germany. To prevent this, the Vichy government passed a law in June 1941 to limit exports of artworks, but in practice it had almost no impact (le Masne de Chermont and Schulmann, 2000).

The huge Occupation indemnities imposed on defeated France provided the occupier with almost unlimited means. As a consequence, Germans became major actors on the French art market. They were buying mostly from art galleries but, as pointed out by Riding (2010, p.170), they also bought 'not infrequently at Drouot auctions'. Indeed, Wittmann (1945-1946, p.39) suggests that the Hôtel Drouot was one of the four main auction houses where Germans were buying (and the only one not located in Germany or Austria). Many of the transactions done for

the benefit of German buyers were not recorded, but evidence of the magnitude of their purchases abounds. Most notably the files of a German transportation company, Schenker, provide detailed descriptions of the artworks bought–legally or not–in Paris and transported to Germany. On basis of these files Feliciano (1997, p.129) has shown that German museums were in fact major purchasers on the Paris art market.

Surprising as it may seem, the Occupation period provided huge profit opportunities for galleries. Feliciano (1997, p.123) goes as far as saying that the war was 'a godsend for Paris's art market'. Drouot reopened on September 26, 1940. By contrast, the Paris stock exchange was reopened only very partially on October 14, 1940, and stock trading was not allowed until March 1941. In both cases, reopening was subject to some form of German supervision. In the case of Drouot, the auction house had to send the catalogues to Dr. Hermann Bunjes, to report all works valued at more than FF 100,000 and to provide a record with the name and addresses of the purchasers (Nicholas, 1995, p.153). Over the course of the war more than 450 paintings were sold for more than FF 100,000. Business quickly resumed and sales broke records during the war. During 1941-1942 alone, one million objects went under the hammer at Drouot (Nicholas, 1995, p.153). In December 1942 the sale of part of the collection of the late dentist Georges Viau brought in more than FF 53 million. During that session, nine of the ten paintings that would fetch the highest price at auction during the war were sold. [1] Drouot was not the only art seller doing exceptional business. A Parisian newspaper mentioned in 1942 the existence of 70

See Appendix A, Table A3 for the list of the paintings which were sold for more than FF 1 million during the Occupation. The most expensive painting sold, Cezanne's *La Vallée de l'Arc et la montagne Sainte-Victoire*, would eventually turn out to be a fake (Nichols, 1995, p. 154)!

galleries in Paris, most of which were enjoying better sales than in the 1920's (Riding, 2010, p.171). Success was such that many new galleries opened their doors two months before the Liberation of Paris (Le Boterf, 1974, p.85). According to Assouline (2005, p.513), besides the price fetched by some sales, the number of modern fakes on the market clearly showed a renewed interest in paintings as an investment. In the free zone the market for forged artworks and fakes was also booming (Lafaille, 1988, p.50). Fake discoveries have an impact on the art market, but more so on the timing of sales than on prices themselves (Bocart and Oosterlinck, 2011)

During the Occupation many newcomers entered the art market. According to Feliciano (1997, p.123) they did so because of the lack of alternative investment opportunities. Moulin (1967) suggests that paintings were viewed as a safe investment in view of huge wartime inflation. [2] Léon-Martin (1943) mentions about the real value of the franc as one of the buyers' main motives. According to the historian Le Boterf (1974), the main buyers at Drouot were nicknamed '*les froussards du franc'* (franc fearers) by the press because they were trying to convert their francs in anything they believed would keep its value. Fear of inflation was also pointed out by other contemporaneous actors discussing the art markets in other occupied countries such as for example The Netherlands (Vlug, 1945, p.17; Euwe, 2008). The case of France during the Occupation is not unique. In the 1970's the British Rail Pension Fund began investing in

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This belief is not actually confirmed by modern empirical studies (see Mei and Moses, 2002 and Goetzmann et al, 2011)

artworks because the prospects of other investment opportunities were lacklustre in a high-inflation environment.[3]

Moulin (1967) further attributes part of the art market's success to the fact that paintings are easy to hide and resell, internationally if needed. Anecdotal evidence has also led Moulin (1967) to suggest that the market paid a premium for smaller artworks, which were easier to conceal and take away. The desire to hide profits made during the war, on the black market for example, also explains the presence of new actors. According to Grenard (2012, p.224), finding ways to invest the funds acquired illicitly was of paramount importance for black marketers. In a review of the workings of Drouot, Léon-Martin (1943, p.191), explicitly mentions the presence of buyers enriched by the black market. Le Boterf (1974, p.36) stresses that people who made their wealth through black marketeering were investing in real goods such as jewels, artworks or antique furniture. Contemporaneous novels also stressed the link between black market activities and paintings. Marcel Aymé (2011) in *Uranus,* first published in 1948, describes the activities of Monglat, a wine merchant enriched by his black market activities who is desperate to convert as much cash as possible into real goods. Monglat's cash holdings are such that he knows that even declaring 10% of his fortune would bring the taxman to his door. To spend his money he buys artworks, even though he hates paintings. Recent academic work on the black market in Occupied France also stresses the concealment role played by artworks (Mouré and Grenard, 2008; Mouré, 2010 and 2011) and luxury goods (Grenard, 2012). Mouré and Grenard (2008, p.978) highlight that buying real goods to conceal illegal profits was common 'long before the

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The author thanks an anonymous referee for pointing out this parallel.

Liberation', suggesting that the impact of these activities may have already been visible at an early stage of the Occupation.

2. Data and Methodology

2.1 Data Series: Descriptive Statistics

Two sources have been used to construct the data series: the *Gazette de l'Hôtel Drouot*, a weekly newspaper dedicated to the French auction world, and catalogues tracking all paintings, sketches, engravings and drawings sold at Drouot between October 1940 and June 1944 (Drouot, 1942, 1943, 1944 and 1945). These comprehensive catalogues were published only during the Occupation; a further testimony to the enthusiasm for artworks during this period. Since the second source has more information than the first, the analysis will be deeper for the Occupation period. [4]

The *Gazette de l'Hôtel Drouot* was first published at the end of 19th century with the main objective of providing information related to the auctions held at the auction house. It

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The use of two different sources raises the question of sample selection bias. One could indeed believe that the Gazette would relate the results of sales of prominent collections only. However, there are good reasons to believe that the Gazette was as exhaustive as the catalogues. Indeed, in many instances the artworks being sold were coming either from anonymous collectors ("A divers amateurs") or were simply grouped by period ("Tableaux modernes)". These categories were by far the most common, and they tend to indicate that reports also covered minor sales and were exhaustive (in some instances only one or two artworks are mentioned, showing that even minor sales were reported). Paper was rationed during the Occupation, leading to a sharp decline in the number of pages of the Gazette, yet in December 1940 the information it contained was similar to that in the catalogue, with only very minor sales being omitted. This very slight difference should not be viewed as problematic. Indeed the Gazette is used before and after the Occupation. If relying on it for these years had to some extent restricted the sample to the most prominent sale, then the change in price observed during the war would be even more striking as paintings from famous collection tend to fetch higher prices (Raux, 2012).

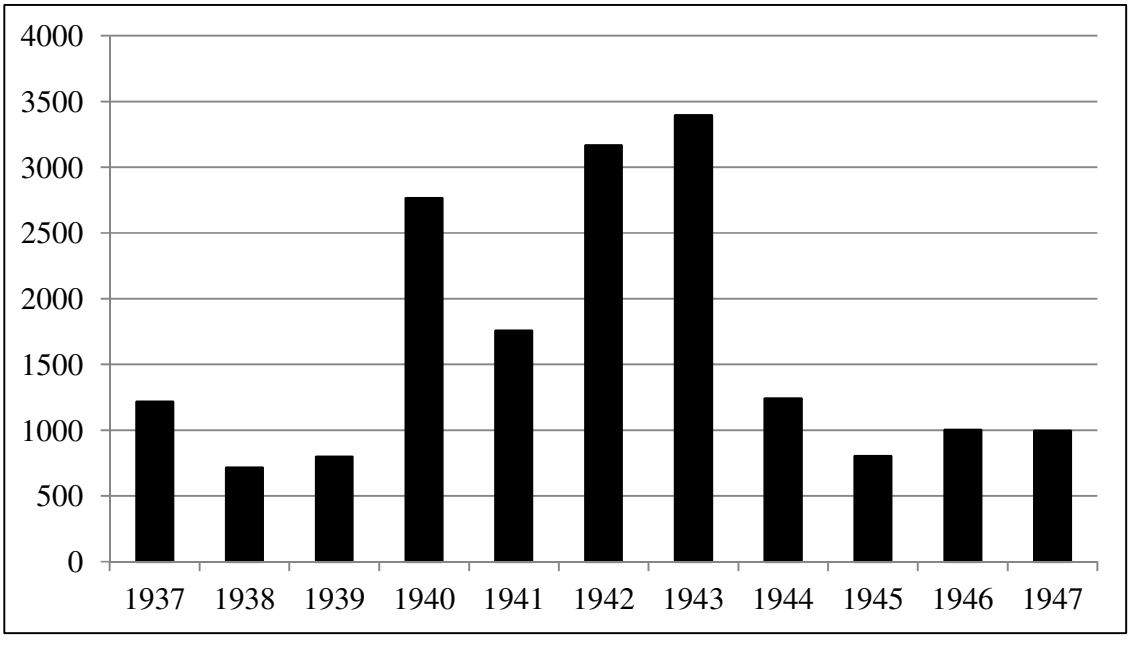
described past auctions and advertised future ones. The auctions it described were extremely diversified and included sales of furniture, jewellery or artworks. To focus on the most important form of artworks, only data related to canvasses was collected. For past sales, the *Gazette* systematically mentioned the name of the artist, and the title, dimensions and price of the artworks sold. In some instances the presence of a given artwork at a previous auction, and in some cases before the war, the name of the buyers were also reported. Descriptions of past auctions were not always published immediately. Therefore, in order to identify all sales occurring between 1937 and 1947, every issue published between January 1937 and December 1948 was checked.

For the Occupation period, the data series have been collected from the Drouot catalogues (Drouot, 1942, 1943, 1944 and 1945). Each catalogue provides descriptions of both the auctions and the artworks sold. For each auction, a general description (e.g. paintings or old furniture and artworks from the 18th century), the date of the auction and the name of the auctioneer(s) are given; sometimes the name of one or more experts is added. The catalogues provide very detailed descriptions of the artworks and mention their size as well as the presence of a date, a signature or a stamp from the artists' workshops. Appendix A provides additional information on the sales that occurred during the Occupation period and gives insights into the nature of the artworks sold. It shows that canvasses accounted for close to 50% of the sales made during the war.

A rough indication of the activity at Drouot can be seen in the number of paintings sold each year as well as in the total amount raised by the sales. For the whole period under review, 16,349 canvasses were sold. Sales per year are represented on Figure 1.

Figure 1 shows clearly that Drouot experienced a very high level of activity during the Occupation. The years 1942 and 1943 proved to be the most active, as evidenced in testimony from contemporaneous actors. This high level of activity can be confirmed by tracking the number of months during which sales occurred. The art market usually works on a seasonal basis, but in 1942 and in 1943 it was open every month apart from August and September.

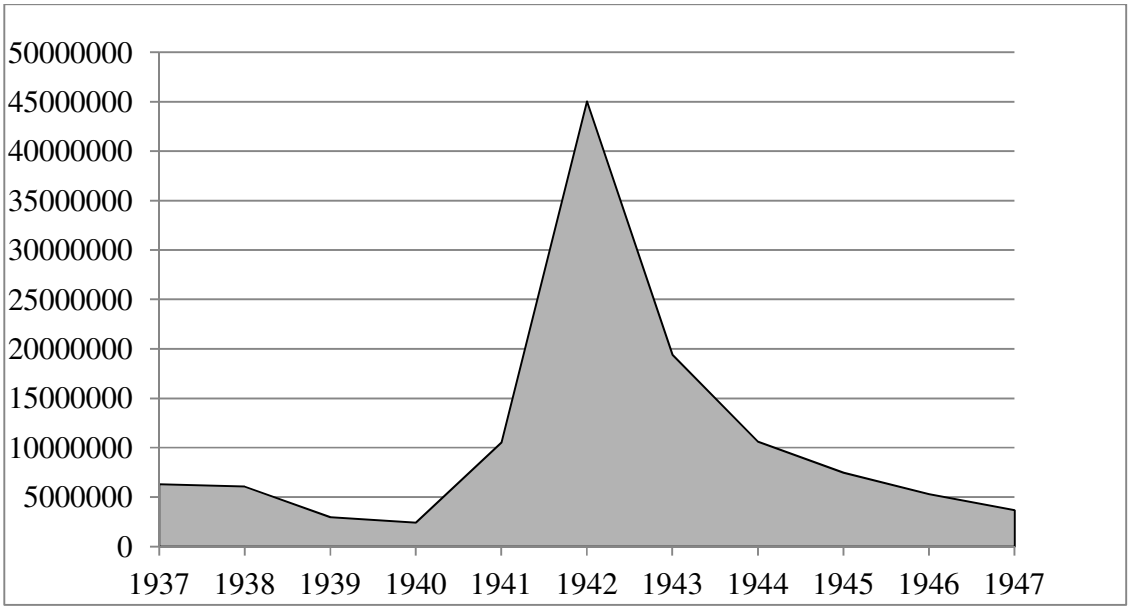
Figure 1: *Number of canvasses sold each year at Drouot (1937-1947)*



Sources: Gazette de l'Hôtel Drouot (1937-1947) and Drouot (1942, 1943, 1944 and 1945)

The number of works sold gives a first overview of the art market during the war. The yearly proceeds of the sales provide another way to gauge the market's buoyancy. Figure 3 shows the total amount raised by the sales of canvasses at Drouot between 1937 and 1947. To allow for inflation, all prices have been converted into 1938 French francs using the monthly index of retail prices published by the Institut National de la Statistique et des Etudes Economiques (INSEE, 1936-1948).

Figure 2: *Total Amounts Raised by the Sale of Canvasses at Drouot (in 1938 French Francs)*



The high value observed in 1942 may be attributed to the war, but it also reflects the sale of the famed Georges Viau collection in December 1942.

2.2 Methodology

Even though the number and price of artworks sold during the war give an indication of activity, only an art market index can provide a precise view of price movements. Artworks differ from traditional investments in many ways. Whereas bonds or equities are homogeneous goods, artworks are characterized by their uniqueness. The heterogeneous character of artworks makes it complicated to construct indexes. To overcome this problem of heterogeneity, economists have relied on two methods: repeat sales and hedonic regression.

For non-economists, the repeat sales method is probably the more intuitive. In this method, researchers track the prices of artworks sold at different moments in time. The underlying idea is that artworks remain the same, unless altered by time, so it is legitimate to use their prices to compute an index. For most collectibles, this assumption seems reasonable since collectors take care of their collections. This approach has been widely used for real-estate related analysis but also for paintings. Baumol (1986) applied it to 640 repeat sales collected in Reitlinger's (1961) book. Subsequent research (Goetzmann, 1993; Pesando, 1993, Mei and Moses, 2002 among others) relied on this approach. Depending on the sample used, the authors found evidence that the art market was or could be dominated as an investment vehicle (Pesando 1993, Goetzmann, 1993). On the basis of a slightly larger database, Mei and Moses (2002) conclude that art performed better than fixed income securities and also provided diversification benefits.

Despite its intuitive appeal, the repeat sales method suffers from a series of drawbacks. Ginsburgh, Mei and Moses (2006) stress the following:

- Use of repeat sales strongly limits the size of the database. Based on the Mei and Moses Art Index, Ginsburgh, Mei and Moses (2006) show that for a ten-year time-span, the proportion of repeat sales is a meagre 7% of the total, a figure which increases to 13% and 15% if the period is extended respectively to 20 and 30 years.
- This data limitation often prevents analysis of price movements in a particular segment of the market, be it a movement – the Impressionists for example – or an individual artist.
- Furthermore, the repeat sales approach is likely to suffer from sampling biases. Some works are quite likely resold because their price has increased, whereas others never come back onto the market because they have fallen out of fashion and no longer enjoy an active market.

In hedonic regressions, the price of the artwork is regressed on several of its attributes. All sales may thus be included in the sample. Time dummy variables are used for each period. The coefficients of these dummies are then used to construct the price index (corrected for the characteristics of the objects).

Hedonic regressions make it possible to control for the differences in the transacted goods since they give implicit values to the characteristics. The regression may then take the following standard form:

$$lnp_{it} = \sum_{k=1}^{m} \alpha_k X_{ik} + \sum_{t=0}^{T} \beta_t \delta_{it} + \sum_{t=0}^{T} \sum_{j=1}^{n} \theta_{jt} \omega_{ijt} + \varepsilon_{it} \qquad (1)$$

where p_{it} is the price of good i at time t, X_{ik} is the value of the time-invariant characteristic k of artwork i, ω_{ijt} is the value of the time-variant characteristic j of artwork i at time t and δ_{it} 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. The use of the antilogs le ds to a bias estimate. This bias is usually fairly small so it is often ignored. We correct for it by using a standard approach consisting in adding half of the coefficient's squared standard error to the estimated coefficients (Ginsburgh, Mei and Moses, 2006).

The number of characteristics used in the hedonic regressions are usually limited and most frequently include several dummies (artist, auction house, medium, signature, artist still alive when the artwork is sold) and just one continuous variable (the size of the artwork). In addition, Sagot-Duvauroux (2003) mentions the provenance and the medium. Additional variables are found in just a few instances. Lazzaro (2006), analyzing the market for Rembrandt's prints, adds the state of the prints (original, posthumous etc.), the number of posthumous states, and the existence of proofs, among other factors. Czujak (1997), also includes the presence of the artwork in the artist's *catalogue raisonné* (as proof of authenticity), the number of times a work was exhibited, pre-sales estimates and the artist's working period. Renneboog and Spaenjers (2013) also use a large number of original variables related to the artist (reputation, death at the time of the sale, nationality, presence at the Documenta exhibition in Cassel), to the work (attribution, authenticity and, medium dummies, additional print dummies (when the print is numbered), a watercolour dummy, the size, and topic dummies) or to the sale (half year and month dummies and auction house dummies)

In this paper, we focus on the hedonic approach. In two instances only, the *Répertoire* explicitly refers to a previous sale. It seems, however, that other repeat sales occurred during the war. In fact, there are 95 pairs for which the artist, title, size (height and width), signature (if present), and date (if present) are exactly the same. In addition, there are six artworks that seem to have been resold three times. This would leave a repeat sales ratio of 0.92%, which seems consistent with the above figures on repeat sales but is too low to infer the overall market trend. Furthermore, even though there is little doubt of a repeat sale in the case of certain pictures because the titles are quite explicit, in other cases the risk of error is much higher.

The hedonic regression used here focuses on canvasses only, which make up the largest segment of the art market. Results are reported for the whole sample and for a blue-chip subsample. In both cases, homonyms and paintings for which the size was not available were excluded from the sample. The complete sample includes attributed works and those listed as belonging to a specific school (for example French 19th century). The blue-chip subsample includes only the most liquid artworks (artists with at least three works sold during the Occupation) and excludes, artworks 'attributed to', 'from the school', or 'in the genre of', to avoid attribution-related issues. The rationale behind this blue-chip index is to determine whether the prices of works by blue-chip artists evolved differently. This would be the case if investors were buying the works in order to resell them abroad. More famous artists were indeed more likely to have a liquid market in a foreign country. In the end, the complete sample includes 8,853 artworks by 1,996 artists (or schools). For the blue-chip subsample, the data consists of 4,966 canvasses by a total of 339 artists. Most artists in this subsample are French and were active during the 19th and 20th centuries. As expected, the average real price (FF 13,667) and

median (FF 2,160) for the blue-chip artworks is much higher than for the general sample (FF 10,024 and FF 1,600). Appendix B details the lists of the most frequently sold artists and those with the highest overall sales during the Occupation.

The following variables were used for the regressions:

After Dummy: Takes a value of one if the artwork is presented as being after a given painter.

Attributed Dummy: Takes a value of one if the artwork is attributed to a given painter.

Copy Dummy: Takes a value of one if the artwork is presented as being a copy from a given painter

Date Dummy: Takes a value of one if the work is dated.

Degenerate: Takes a value of one if the artist would have been considered degenerate by the Nazis. In practice, the artists are abstract painters or their work belongs to one of the following movements: Cubism, Expressionism, Fauvism, Nabis, Impressionism, Post-Cubism, Post-Impressionism. In most instances the artists belonging to these groups were determined on basis of their biographical notice in Benezit (1999), if not on basis of artist-specific notices. The dummy also takes a value of one if the artist was Jewish.

Genre Dummy: Takes a value of one if the artwork is presented as being in the genre of a given painter.

Manner Dummy: Takes a value of one if the artwork is presented as being in the manner of a given painter.

Period Dummies: Takes a value of one if the artwork is sold during the period (year, semester or month) in question, zero otherwise.

School Dummy: Takes a value of one if the artwork is presented as belonging to the school of a given painter.

Signed Dummy: Takes a value of one if the work is signed.

Size: Height and width (measured in cm) as well as the works' surface area (in cm^2) capture the impact of the object's size.

Stamp Dummy: Takes a value of one if the work bears the stamp of the artist's atelier.

Study Dummy: Takes a value of one if the artwork is presented as being a study.

Style Dummy: Takes a value of one if the artwork is presented as being in the style of a given painter.

Topic Dummies: We follow the methodology developed by Renneboog and Spaenjers (2013) and categorize the canvasses on the basis of words in the titles. Since our sample is more limited, we check whether the words make sense for a given painting. [5] We distinguish eight categories: animals, landscapes, nudes, people, portraits, religion, still-life and urban. The associated search strings are listed in Appendix C.

Workshop Dummy: Takes a value of one if the artwork is presented as being from the workshop of a given painter.

Many hedonic regressions include an additional variable aimed at measuring the so-called 'death effect', a price increase following the death of an artist. In view of the limited time-span of the current study, such a variable is highly collinear with artist dummies and cannot therefore be included.

For example, the word "mer" is used as a search string for landscapes; however we do not include Theodule Ribot's *Le vieux loup de mer*, which is a French expression for a seasoned sailor.

3. Results

Regressions are conducted on two periods with different frequencies. [6] The first (1937-1947) puts the episode of the Occupation in a broader perspective. In view of the number of auctions held during the pre-war period, and to take into account the two lengthy cessations of activity (June 1939 - April 1940 and August 1944 - February 1945), regressions are conducted with semi-annual data. For the second period (the Occupation period: June 1940 – August 1944), business at Drouot was much more intense, so a monthly frequency can be used. Furthermore for this period the database is richer, making it possible to better control for the attribution of the artworks (thanks to the signed, dated and stamped dummies).

3.1 An Art Index for 1937-1947

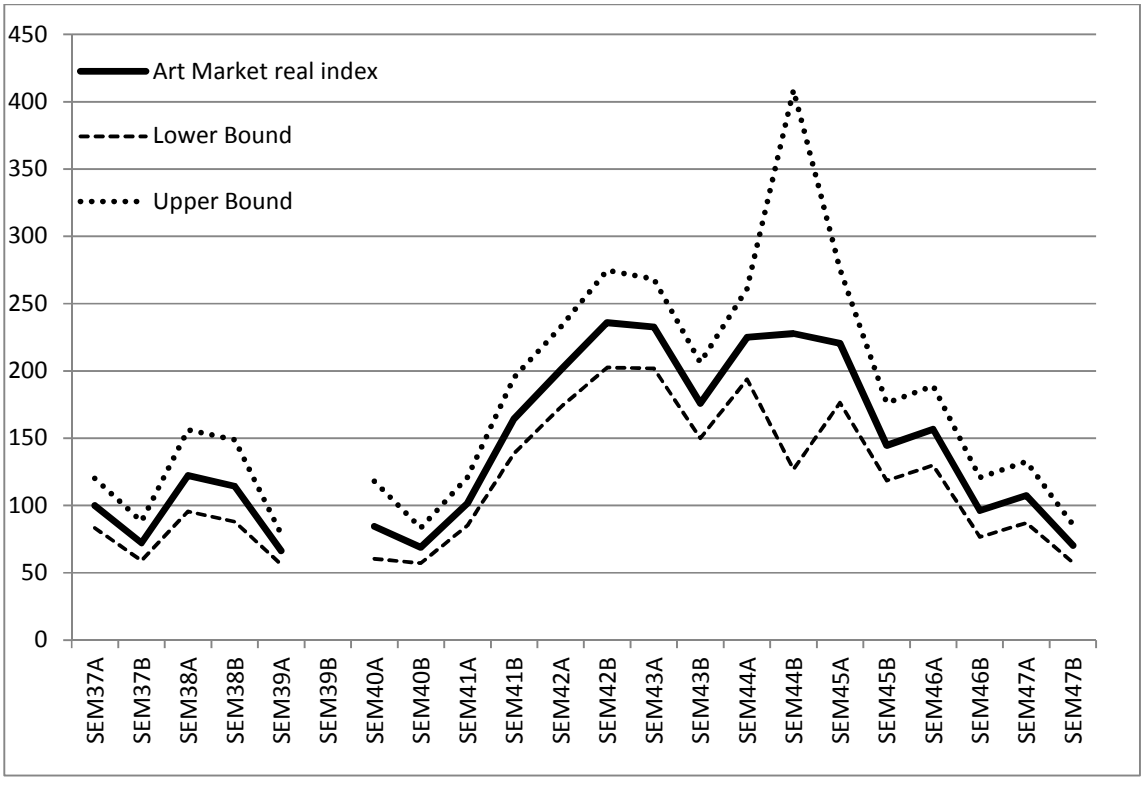
Several specifications have been used and the results of each are listed in Appendix D. In all of the models, the dependent variable is the natural logarithm of the real price. The base case (Model 1) includes size variables (height, width and area) as well as the attribution, artist, period, and topic dummies. This specification contains all the variables except the 'degenerate' dummy, which had to be removed because of collinearity issues, as well as the date, signed and stamp dummies, which were available for the Occupation period only. The adjusted R-Square of the model is slightly above 65%. As is traditional in art market studies, the bulk of the explanatory power comes from the artists' dummies. The results are consistent with most priors: as in most

[6] To improve the quality of the estimation in all hedonic regressions, we follow a general-to-specific modelling routine by gradually removing variables not significant at the 10% level of confidence.

hedonic regressions, price is a concave function of dimensions. The attribution dummies carry a negative sign, as expected.

The coefficients of the time dummies make it possible to reconstruct an art index for the Occupation. The models used here are the baseline model for the whole sample, Model (1) and for the blue-chip index, Model (3). The art index is represented on Figure 3a for the whole sample and Figure 3b for the blue-chip artworks. A clear and marked rise during the Occupation stands out. Broadly speaking, three periods may be distinguished in the art market index.

Figure 3a: *Change in the Canvas index.*



100 = first semester of 1937. Upper and lower limits based on 5% confidence intervals.

During the first part of the pre-war period (1937-1938), the index revolves around the base figure (100). The first semester of 1939 is marked by a decline, with the index falling to a low of 66. This result, as well as the absence of sales at the auction house from June 1939 to August 1940, is most likely linked to the outbreak of war. The summer months of July and August were usually not very active before the war. The mobilization in September 1939 prevented the market from reopening. In the absence of data, it is impossible to estimate the ex ent to which the market would have declined had sales occurred. If anything, the impossibility of selling artworks suggests that the declining trend would have continued. Activity on the art market resumed in April 1940 but stopped when France was invaded two months later.

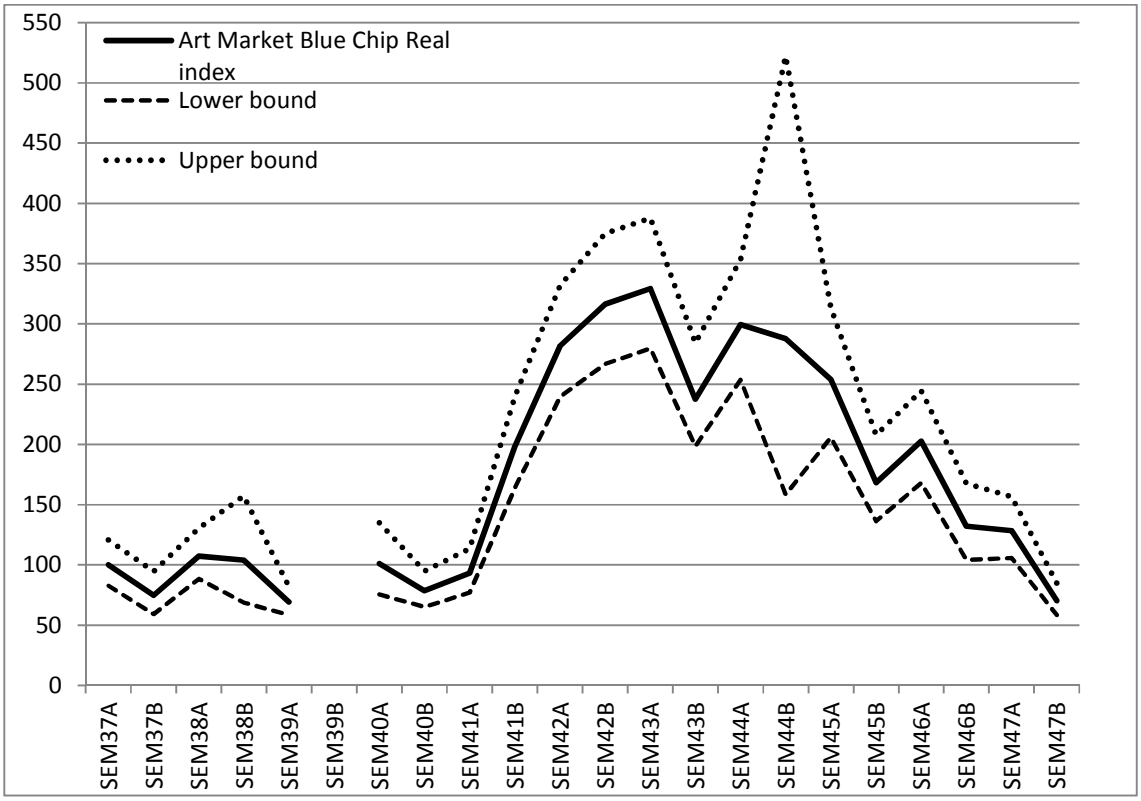
For the first part of the Occupation, the index remained close to its original value. This suggests that the market recovered in the first phase (end 1940- beginning 1941), with activity resuming at the pre-war level. The following period is in sharp contrast, with the index showing a huge increase in value. The index peaks at 235 for the first semester of 1942, representing more than a two-fold increase in value in real terms! Following a short-lived dip during the second semester of 1943, the art market index recovered to approximately the same value at end-1944, after which it goes into dramatic decline until 1947. The pattern observed for the art market index is in sharp contrast with the one in the United Kingdom. Indeed, the U.K. index moves from a value of 100 in 1937 to a low of 71.7 in 1941 and increases only gradually thereafter, reaching 105 in 1947. [7] Reitlinger (1961, p.219-220) confirms this observation: after falling sharply, prices barely had reached the levels of 1934-1939 by the summer of 1944, and this

The author thanks Christophe Spaenjers for sharing this data. For the data source, see Goetzmann et al. (2011).

despite the high inflation rate in the U.K. In New York, by contrast, sales had returned to at least their 1929 level by 1941.

The proportion of works with a mention of attribution moves from 30% before the war to close to 40% during the Occupation, falling back to nearly 14.5% after the war. As attributions were expert-dependent, there is a strong likelihood that even experts of good faith could have attributed a similar work to different artists. Furthermore, there is evidence that the variation in proportion is likely to reflect the sale of fake works on the art market. Indeed, if auctioneers had any doubt, they were more likely to sell a fake as a work 'attributed to' rather than as an original one. To get an overview untainted by changes in attribution or an increase in the number of fakes sold, Figure 3b shows the changes in the index for blue-chip artists (and for artworks which the catalogues present as being from the hand of the master).

Figure 3b: *Change in the Canvas Blue-Chip Index.*



100 = first half of 1937. Upper and lower limits based on 5% confidence intervals.

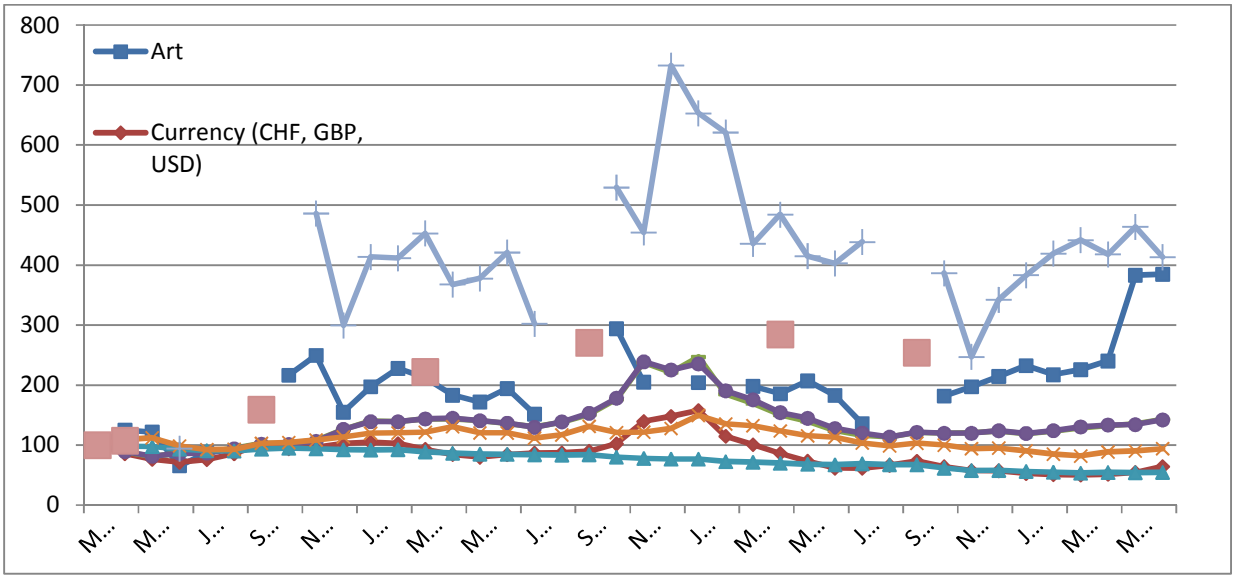
Broadly speaking, the price movement of the blue-chip index follows the same pattern as the index presented on Figure 3a, but with one striking difference: the price level during the Occupation. Instead of experiencing a two-fold increase in real terms, the index reaches a value close to 330 during the first half of 1943! This observation confirms that the price increase was much steeper for blue-chip artists than for artworks in general. This is line with the observation by Le Boterf (1974, p.125), who stresses that the prices of paintings by famous artists experienced an increasingly pronounced bullish trend in 1943.

3.2 A Monthly Art Index for the Occupation

The literature has analysed market reactions to low-probability economic disasters. Barro (2006) shows that rare economic disasters may explain many asset-pricing puzzles. In the same vein, the results shown on Figures 3a and 3b are in sharp contrast with the literature on art markets. Art is known to be procyclical, so a sharp decline during the war would have been expected. Since the database contains additional information for the war period, a monthly index is computed and then compared to alternative investment opportunities in order to better understand price changes during the Occupation.

Figure 4 presents the real-term change in eight indexes representing eight investment opportunities, five of which were traded on legal markets: art, blue-chip artworks, equity, sovereign bonds and stamps; and three on the black market: gold (Napoleon coin), gold (index made of the price of the Napoleon coin, the Sovereign coin and the Gold-dollar) and foreign currencies (an index based on price fluctuations of GBP, USD and CHF notes). The comparison starts in March 1941, since the Paris stock exchange was not allowed to trade stocks before that date and there is no reliable data before January 1941 for assets traded on the black market. An alternative approach would have been to use data from the Lyon stock exchange, which remained open and benefited from France's separation into a free and an occupied zone (Oosterlinck and Riva, 2010). To be able to take black market data into account, we preferred to keep the comparison on one city, namely Paris. Table D3 in Appendix D provides the results of the regressions used to construct the art market indexes. All indexes start with a value equal to 100 in March 1941.

Figure 4: *Real Price Movements of the Indexes from March 1941 to June 1944.*



Sources: Le Bris and Hautcoeur (2010) and Le Bris (2012) for equity, Vigreux (1948) for black market data (gold and foreign currencies), Oosterlinck (2003 and 2010) for bond prices, and Thiaude (1941-1943) for stamps

The comparison of price movements in the different indexes shows the art market in a very positive position. Table 1 details the realized returns, standard deviation and Sharpe ratio for all investments. In terms of realized returns, the art market outperforms all alternative investment opportunities. Obviously, returns should be compared by taking risk into account. The standard deviations of the returns for the art market are computed on the basis of the estimated index. Bocart and Hafner (2015) show that this approach leads to an upward bias estimate of volatility of approximately 8% compared to an alternative based on a Maximum Likelihood Estimator proposed by the authors. Even if this difference is taken into account, the standard deviation of the returns for the art market is considerably higher than for other investments. If anything, keeping the estimated standard deviation should play against art investments, as a lower standard deviation would lead to a higher Sharpe ratio. Despite this, the

Sharpe ratios suggest that blue-chip artworks were the most advantageous investment, with gold coming second. In addition, investing in gold would have been possible only if investors were ready to face the risks associated with the black market. The low realized returns for equity and French sovereign debt may be surprising at first. But these results should be interpreted bearing in mind that investors were facing extraordinary conditions. During the Occupation, investment opportunities were indeed dramatically altered (Oosterlinck, 2010).

Table 1: *Real Returns, Standard Deviation and Sharpe Ratio for Wartime Investments (March 1941 – June 1944)*

	Monthly Real Return	Standard Deviation	Sharpe Ratio
3% French Rente	-1.51%	2.37%	0.00
Equity	0.06%	6.68%	0.235
Foreign currencies (USD, GBP and CHF)	-0.46%	11.80%	0.089
Gold Napoleon	1.32%	9.51%	0.298
Gold	1.39%	9.98%	0.291
Art Market	4.79%	24.66%	0.256
Art Market (Blue Chip)	6.21%	23.17%	0.333

Sources: Le Bris and Hautcoeur (2010) and Le Bris (2012) for equity, Vigreux (1948) for black market data (gold and foreign currencies), and Oosterlinck (2003 and 2010) for bond prices. For the Sharpe ratio we consider the French rente as being the risk-free asset.

In wartime, especially in an occupied country, investors probably looked at more variables than the ones usually relevant in peacetime. Investors in Occupied France needed to take into account that their investment opportunities were in fact sharply restricted. Foreign markets were closed; and even within France, gold, foreign securities and foreign currencies had to be declared and were therefore unavailable on a legal market. Other investments, such as real estate, were certainly riskier in wartime since they faced a destruction risk. In terms of state control, real estate transactions became conditional on an official agreement from the local authorities, following a law passed on November 16, 1940. Finally, real estate investment was not very discreet.

Direct intervention by the occupying forces or the Vichy government was another fear. Indeed, for both state bonds and equity, archive sources show that interventions existed and were significant. For example, securities which used to be in a bearer form had to be registered during the Occupation, thus removing anonymity (Oosterlinck, 2010). In fact, contemporaneous observers such as Léon-Martin (1943, p.199) contrasted the supervision exercised by the occupying forces over the stock exchange with the freedom of the auction houses. Stockbrokers themselves shared this view. [8] The press also mentioned the freedom reining at Drouot, for example in an article published in September 1942. [9] The state imposed only one new regulation, which put a cap on the prices of common goods such as bicycles and radios. According to Hervé Le Boterf (1974, p.124), apart from this restriction and the state's pre-emption right at Drouot, 'anybody could buy anything'. There is no evidence of direct interventions on the art market to

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ACAC, Minutes of the annual meeting December 21[t], 1942.

Agence économique et financière, September 19, 1942 cited in Ronsin (2003, p. 171).

force prices down or to control the market. In the Netherlands, Hans Posse, the man in charge of collecting artworks for Hitler's museum, actually complained to Bormann that prices were too high because of competition from German buyers. He therefore suggested either prohibiting private German purchases or capping prices at 1,000 or 2,000 florins per item (Wittmann, 1945-1946). To the best of our knowledge, that suggestion was never applied. Fear of looting may have existed but looting was directed only at specific target groups, mostly Jews. Citizens who did not belong to these groups actually faced little risk of expropriation. Indeed, when safes belonging to gentiles were mistakenly looted, the ERR returned the contents to their owners (le Masne de Chermont and Schulmann, 2000). [10]

Wars are also known to generate inflation, and Occupied France was no exception. The Occupation costs imposed on defeated France were considerable, even by comparison with the reparations demanded of Germany after World War I (Occhino, Oosterlinck, White, 2007 and 2008). To cover these Occupation costs, the French government relied on money creation and bond issuance. Inflation was thus a factor that investors had to take into account. Investors might also have considered the resale value of their assets abroad if they had to flee. Table 2 provides some insights into the risks and benefits of each investment over five dimensions: discretion, legality, liquidity abroad, inflation and market intervention.

Of course *ex ante* investors could not know for sure that the authorities would not harm them. Erroneous looting or looting on a larger scale could have occurred. Nonetheless, in comparison to other assets, the press and the public in general were presenting Drouot as an unregulated market with no scrutiny.

Table 2: Benefits of Each Investment for Five Dimensions: Discretion, Legality, Liquidity, Inflation and Market Intervention.

	Discretion	Inflation proof	Legality	Liquidity abroad	Market intervention
3% French Rente	No	No	Yes	No	Yes
Equity	No	+/-	Yes	No	Yes
Foreign currencies (USD, GBP and CHF)	Yes	+/-	No	Yes	No?
Gold Napoleon	Yes	Yes	No	Yes	No?
Gold	Yes	Yes	No	Yes	No?
Art Market	Yes	Yes	Yes	+/-	No
Real Estate	No	Yes	Yes	No	No?

Legend: 'Yes' and 'No' indicate whether the assets had a given characteristic, +/- stands for a partial characteristic, a question mark is added when there is insufficient information to fully confirm 'Yes' or 'No'.

Gold and artworks were the two most attractive investments in Occupied France. Table 2 shows that these two asset classes shared common features: investing in them was discreet, and they provided a good hedge against inflation in markets where the occupying forces were not intervening. Compared with artworks, gold was easier to resell abroad. On the other hand, investing in gold implied a readiness to take additional risks, since undeclared gold was illegal to own (let alone buy). Empirical evidence shows that investors were ready to go to the black market to acquire assets that could easily be resold abroad. For those who preferred to remain

legal, the art market provided an interesting alternative. Artworks may have been less liquid than gold, but they could be sold if needed.

Although the analysis is concerned with artworks, the price of other goods also experienced a dramatic rise. In December 1942, in the annual report of the French stock brokers' association, the head of the Paris bourse mentioned that since purchases of land, real estate and goods faced regulatory hurdles and a lack of supply, buyers were redirecting all their money to the stock exchange and the auction house. [11] In general, therefore, it seems that all the prices of all the goods sold at Drouot rose sharply. Contemporaneous analyses tend to suggest, however, that the prices of discreet goods (stamps, jewels or diamonds) rose more than those of other goods, such as antiques and furniture. Rivet (1947, p.889) singles out the extraordinary speculation in stamps and precious stones; he attributes this speculation to the fact that these goods are small and can thus be easily hidden or exchanged. The contemporaneous press also stressed the importance of discretion. The author of an article in *Le Journal de la Bourse* in November 1942 contrasts the demand for discreet goods with that for real estate and other real goods. He mentioned that investors favoured goods that were not heavy or bulky and that had a high value. Sédillot (1979) mentions ten-fold price increases for stamps, and sharp rises for diamonds and collectible books. According to the same author (Sédillot, 1959, p.98), some Austrian stamps, as well as diamonds and Degas paintings, would have seen their prices multiplied by a factor of 50 to 80. Léon-Martin (1943, p.193-194) mentions diamonds reaching a

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ACAC, Minutes of the annual meeting December 21, 1942, “On achèterait volontiers de la terre, des immeubles, ou des marchandises mais, en cette direction, l’on se heurte au double barrage de la règlementation et de la pénurie. Les seules issues possibles au torrent de disponibilités sont offertes par l’Hôtel des Ventes et par la Bourse”.

price ten to fifteen times higher than before the war, while jewels and stamps reached incredible values. Léon Martin (1943, p. 197) lists a series of exceptional prices among others a ring with a 7.87 carat diamond fetched FF 1.6 million, a necklace with 63 pearls 1.5 million, stamps reaching FF 21,000; FF 17,500 or FF 15,000. Le Boterf (1974, p.126) also documents sharp price increases for diamonds, pearls and platinum: for instance, a 6.35 carat diamond reaching FF 545,000 and a 7.7 carat emerald fetching FF 630,000. According to the same author, pages of autograph manuscripts experienced a similar trend.

3.3 Procyclicality, Discretion and Conspicuous Consumption?

In peacetime, demand for artworks is likely to be an increasing function of wealth, with richer people willing to consume more luxury goods. A healthier economy would lead to a higher number of wealthy people driving up prices on the art market. As a result the correlation between art prices and the state of the economy (GDP) or real per capita consumption (C) should be positive in normal times. This need not always be the case, however. As shown by Goetzmann, Renneboog and Spanejers, (2011) art prices and real per capita income may actually move in opposite directions. After World War I, even though real per capita income increased, prices on the art market nosedived. The authors attribute this observation to the steep decrease in income inequality over this period.

Figure 5 plots the changes in GDP, consumption and the art market index. Data on GDP and real per capita consumption, C, come from Barro-Ursúa Macroeconomic Data. For many reasons developed in Barro and Ursúa (2008), this is currently the most reliable and comprehensive dataset. Since C and GDP are available on a yearly basis, the art market index is computed with

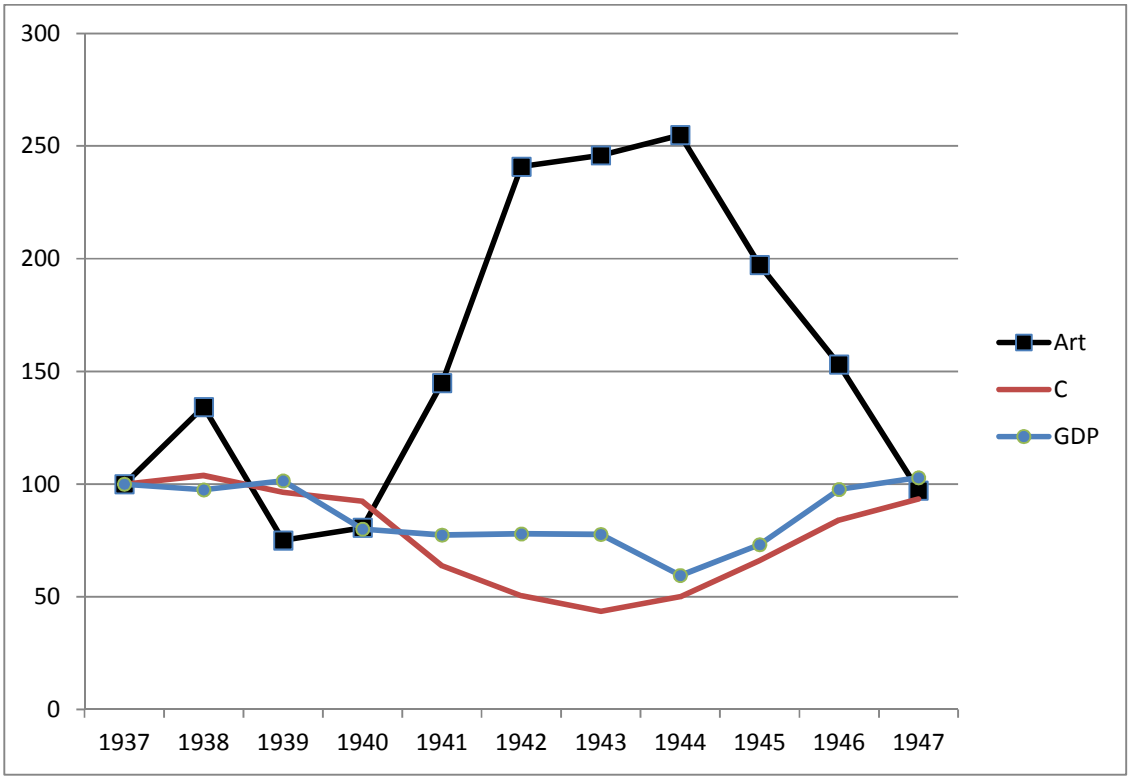
annual dummies (Model (3), Appendix D, Table D1). The art index moves in opposition to C or GDP. This observation is confirmed by the negative covariance as well as the negative coefficients of correlation between the real returns on the art index and C and GDP. [12] A Spearmann rank test confirms the negative relationship between these variables. [13] To further assess the relationship between art and GDP, the changes in these variables are tested using Fischer's exact test of independence for 2x2 tables. [14] The results, presented in Appendix D (Table D2), indicate that changes in both variables are not independent at the 5% level of confidence.

Correlation and covariance values between art and C and art and GDP are respectively worth -0.91 and -1379 and -0.75 and -735. Even though these figures should be viewed with caution because of the limited sample size, Figure 4 strongly suggests the existence of a negative relationship.

The Spearmann rank correlation provides values equal to-0.81 and -0.76.

This is similar to a χ^2 test of independence between the variables but can be applied to small samples.

Figure 5: *GDP, Real Per Capita Consumption, C, and Art Market Index (1937-1947)*



Sources for C and GDP: Barro-Ursúa Macroeconomic Data (2010), available at http://rbarro.com/data-sets/.

With a negative correlation between real art market returns and C and GDP, it seems clear that the market was countercyclical between 1937 and 1947. [15] This result may be explained by the search for safe-haven investments during troubled times. The similar movements of the gold and art market indexes would tend to confirm this explanation. Artworks had an additional advantage compared with gold or foreign currency: it was legal to buy and hold art whereas gold and foreign currency had to be purchased on the black market, with all the risks

Of course it could be argued that the period and the price change are not sizeable enough to assert that the art market was countercyclical, since there was essentially a boom followed by a bust.

this entailed. As real assets, artworks protected their owners from inflation and, in addition, could be transported and resold abroad if the holder needed to flee France.

The link between the value of artworks and consumption also changed under the Nazi boot. For much of the population, the war quite logically induced a significant reduction in consumption. Even for wealthy people, consumption patterns were altered as rationing prevented the use of additional means to consume more. Tickets were required to buy the rationed goods. For the general public, ration tickets were viewed as more valuable than money (Grenard, 2012, p.35) Thus consumption followed the general state of the economy. This explains the negative correlation between consumption and art market returns if artworks were indeed viewed as safe-haven investments.

Changes in income inequality might also have played a role in the observed pattern. Higher income inequality has been shown to increase the demand for luxury consumption (Aït-Sahalia et al., 2004, Hiraki et al., 2009, Goetzmann, Renneboog and Spanejers, 2011). During the war, income inequality is likely to have increased with the emergence of a class of war profiteers. In this case, demand for art would be disconnected from the observed state of the economy or consumption as black market revenues would escape from GDP measures. This intuition is strengthened by the fact that cultural consumption in general remained high during the war (Riding, 2010). In all likelihood, the biggest change in inequality would have come from the discrepancy between German and French buyers. Unfortunately it has been impossible so far to track the name and nationalities of buyers to test this hypothesis, as many go-betweens acted on behalf of the Germans.

3.3.1 Discretion

As suggested in Table 2, discretion may have been an additional element valued by investors during the war. Even in peacetime, discreet assets may be appealing for investors. The ability to easily store (and if need be, hide) large amounts of value is certainly appreciated if the aim is to avoid taxation. However, financial sophistication now makes it possible to transfer massive amounts through tax havens without risking too much scrutiny.

This was not the case during the Occupation, and discretion was certainly more valued then than it is today. In fact, two types of investors would have valued discreet assets: those who had earned money from illegal wartime activities, and people who feared they might have to leave at short notice and wanted to be able to transport assets that could be resold abroad. Anecdotal evidence supports the fact that black marketers were active buyers on the art market. In her description of the French art market during the war, Moulin (1967) explicitly mentions these two aspects. She even describes a mechanism by which proofs of the sale of artworks were used as guarantees for international transfers of money (Moulin, 1967, p.41). She further mentions, in line with contemporaneous accounts of the workings of the art market during World War II, the arrival of many newcomers on the market. According to Moulin (1967, p.41), these newcomers had idiosyncratic tastes and favoured small artworks, landscapes (with a preference for 18th century Italian works), and still lifes more precisely, paintings of bunches of flowers. She suggests also that Impressionist works were sought after but not more modern works belonging to Surrealism and other later artistic movements (Moulin, 1967, p.42).

As for Jewish collectors, evidence shows that those who had managed to escape the occupied zone could be found selling artworks in the free zone. Laffaille (1988) recounts his activities as an art dealer in Nice during World War II. He explicitly mentions the important role played by the Jewish population as suppliers to the art market (Laffaille, 1988, p.23). Interestingly, when mentioning the artworks sold by Jews willing to flee, the author always describes them as small. Consistent with the discretion theory, numerous reports mention that many Jews in the free zone were actively involved in the black markets for gold or gems (Kaspi, 1997, p.170). Both black marketers and the Jewish population were thus likely to seek discreet assets. But the timing of their needs was slightly different.

Before the outbreak of the war, close to 100,000 Jews had already fled to France from Germany or Eastern Europe. But far from being safe, those of German origin had a strong incentive not to remain in France and leave for another country. By January 1939, even before the onset of war, the French government had created internment camps for foreigners perceived as likely to disrupt public order. Following the declaration of war, German and Austrian citizens, many of whom were Jews fleeing their country of origin, were arrested (Poznanski, 1997, p.22-43). When German troops managed to break through the French lines, a massive exodus began. In all, close to 100,000 Jews fled, but following the armistice signed in June 1940, approximately 30,000 decided to go back to the occupied zone (Alary, 2013, p.533). Once the Occupation became a reality, many groups were targeted by the occupying forces. Goods belonging to political parties (e.g., the Communist party), some secret associations, trade union movements, war veteran associations and of course the Jewish population were plundered. The largest target was the Jewish population, estimated at 330,000 people before the war (Poznanski, 1997, p.21).

The despoliation of the Jewish population was a gradual process. On June 14, 1940 an order was passed requiring all safe deposit boxes to be opened in the presence of an officer from the *Devisenschutzkommando*, a unit specialized in looting financial assets. Foreign assets, gold, jewels and foreign currencies had then to be registered and were declared blocked. At end-September 1940 a census of the Jewish population began, followed shortly by the definition of Jewish companies and the way they would be Aryanised. Andrieu et al (2000, p.33) view the spring of 1941 as a turning point. After May 1941 the laws passed by the Occupation forces and the Vichy government made it almost impossible for the Jewish population to get to their bank accounts, and only deposits made in the free zone could be withdrawn. In July 1941 the laws regarding the Aryanisation of Jewish-owned companies were passed. As for financial securities, a series of laws passed in April and July 1941 provided that they would be sold to 'rid the economy of Jewish influence' (Andrieu et al., 2000, p.40). Archival evidence shows that these securities would afterwards be used to influence prices on the stock exchange (Oosterlinck, 2010). In December 1941 a 'fine' of FF 1 million was imposed on the Jewish population to compensate for the damage done to the German army by resistance groups. In parallel, many professions were forbidden to Jews, starting with civil service positions in June 1941. As a result, a contemporaneous survey estimates that by the summer of 1941, half the Jewish population no longer had the means needed to live (Alary 2001, p.25; Poznanski, 1997, p.70).

Naturally, these legislative changes prompted many Jews to flee. Three different phases can be identified during which escapes from the occupied zone peaked: September-October 1940, when the first anti-Semitic measures were imposed; June and July 1941, when a second wave of escapes followed because of new legislation which further restricted the professions

open to the Jewish population; and then summer 1942, following major raids leading to the imprisonment of many Jews (Mariot and Zalc, 2010). On July 16 and 17, 1942 more than 13,000 Jews were arrested and interned in the Vélodrome d'Hiver (an indoor cycling stadium), an episode known as the *Rafle du Vel' d'hiv'* (Poznanski, 1997, p.316). This episode was a turning-point; it prompted many Jews to flee Paris and led to a huge increase in the number of people attempting to enter the free zone (Alary, 1995, p.102). As early as 1933 one organization, the American Jewish Joint Distribution Committee, played a crucial role in getting Jews out of Europe. In 1933 it was already active in France, helping German Jews to get out of the country. From 1940 to 1942 it helped approximately 58% of the Jews living in the free zone to escape (Kaspi, 1997, p.172). Until 1942, however, many French Jews believed the Vichy government would not harm them (Kaspi, 1997, p.145). This belief explains why Jews in Occupied France were trying to get to the free zone until the summer of 1942 (Kaspi, 1997, p.131). Until the second half of 1941 the border between Occupied France and the free zone was relatively porous, but controls increased dramatically after this date. The second half of 1942 was the worst period in terms of numbers of arrests (Alary, 2001). After the free zone was invaded in November 1942, fleeing became almost impossible. Not only were controls harsher in France, but Switzerland also began imposing strict border controls.

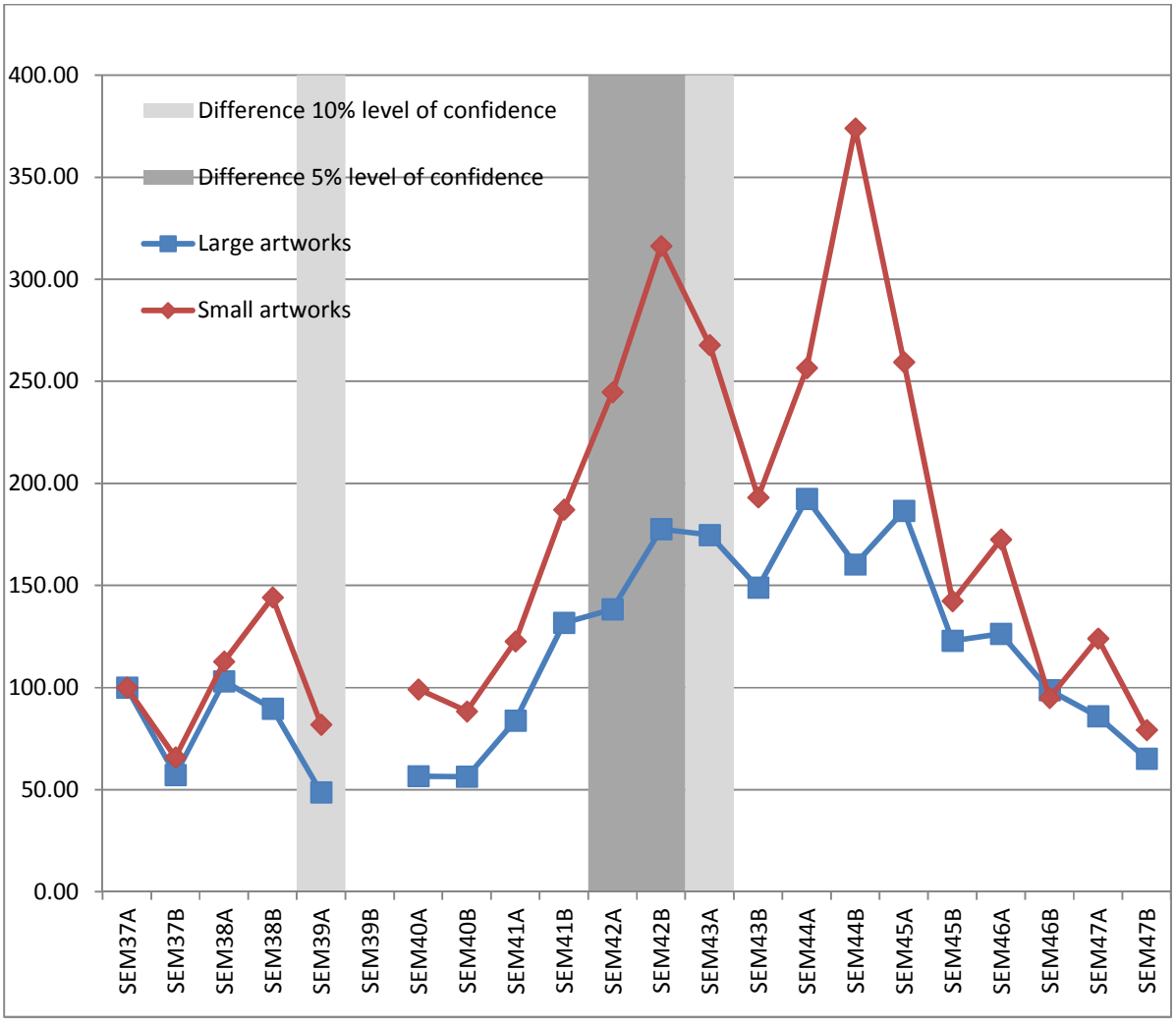
War profiteers were certainly considering artworks as a way to hide their illegal profits. The need for concealment was of course related to the importance of black market activities, which began as early as July 1940. At first only a limited number of people were involved in these illegal operations but, as the war progressed, the ranks of the black marketers swelled and by the second half of 1941 almost everybody was involved to some extent in illicit trade

(Grenard, 2012). The intensity of prosecution also changed over time. During an initial phase, a form of laissez-faire existed since Germans were active buyers on the black market. This changed during the first half of 1943 when the Occupation forces began actively to prosecute black marketers, who were suspected of helping resistance movements. As a result, prosecutions increased and new laws were passed. In the summer of 1943 Vichy launched a major propaganda campaign, followed shortly by brutal, high-profile arrests of black marketers (Grenard, 2012). This change of policy had a double impact: first, a large group of buyers quit the market, leading to a change in the scale of activities; second, the policy change also meant that the implicit protection of the German Occupation forces was finished. As a result, black marketers are likely to have changed in nature, and the extent of their activities diminished.

If discretion played an important role during the war, the impact of size variables would be expected to change during the period under consideration. Additionally, if illegal motives or the willingness to flee had been important for investors, then marked changes would likely to have been observed during the war. Since contemporaneous accounts stress the role of newcomers, it makes sense to try separating the impact of these actors from that of the others. Since newcomers were the most likely to favour small artworks, it seems legitimate to test discretion by splitting the sample into two, distinguishing small artworks (defined here for practical purposes as the smallest half in terms of surface area; in our case artworks with a surface below 1,435 cm2) and the rest. The results are presented in Table D4. Regressions are then run on both samples, and specific indexes computed on basis of the results are presented in

Figure 6. The shaded parts represent the dates during which the difference between the two indexes is statistically significant at the 5% and 10% level of confidence. [16]

Figure 6: *'Small' and 'Large' Canvas Market Index (1937-1947).*



By "statistically different" we mean that the upper bound for the large artworks falls below the lower bound for small ones. For the sake of exposition we rely on shaded areas, but Table D5 in Appendix D provides the full set of values for the two indexes and their upper and lower bounds.

The difference observed during first-half 1939 is most likely due to people who were willing to flee, since black market activities had not started on a significant scale at that time. This difference would represent a spike in demand, linked either to anticipation of war or to people knowing they could not remain safely in France. The largest difference, and the most statistically significant, is observed in 1942. This observation is perfectly consistent with expectations. Indeed, in 1942 black market activities were extremely widespread and the Jewish population still had a chance to leave France. This possibility diminished dramatically after the free zone was invaded in November 1942. Jews who had managed to withdraw part of their fortune from their accounts before the despoliation process entered its worst phase were probably in possession of French francs, which would have been hard to exchange once abroad. The major difference between small and large artworks would thus reflect the combined effects of people willing to flee and black marketers willing to hide illicit profits. During the first half of 1943 the difference is still statistically significant, most probably reflecting demand from black marketers. However, the spring and summer of 1943 were a breakpoint in terms of black market activities. As stressed above, the black market had been used as a tool to plunder France in the first years of the Occupation. The German perception of its usefulness changed in 1943 and it came to be seen as a way of diverting part of France's output from the German war effort.

Collectible stamps and jewels were other real discreet goods. Analysing price movements for jewels is extremely hard since, to the best of our knowledge, there is no historical dataset tracking these prices. Furthermore little is actually known about the financial performance of gems (Renneboog and Spaenjers, 2012). However, this is not the case for collectible stamps. The standard approach to constructing a collectible stamp index is to rely on catalogue prices.

For example, Dimson and Spaenjers (2011) use the Stanley Gibbons price catalogue to assess long-term returns. Collecting stamps was already fashionable in pre-war France. Henri Thiaude published a catalogue listing the prices of the French (and French colonial) stamps he was selling. The database starts in 1938 (12th edition) and stops in 1947 (28th edition). Interestingly, Henri Thiaude often published more than one edition a year during the Occupation. For 1941 he published three catalogues: in January (18th edition), April (19th edition) and September (20th edition). The need to publish several editions in a given year already indicates sharp changes in prices. In 1943 a competing firm, Yvert et Tellier, issued a statement shortly after publishing its catalogue, saying that all prices mentioned should be multiplied by two (Ronsin, 2003, p.174). Le Boterf (1974, p.128) goes as far as to say that stamps represent an investment that would fit with the 'prudent-person principle'. This impression is confirmed by the index created on the basis of the catalogues. To track the changes, a stamp portfolio is constructed in January 1938, made up of every fifth used French stamp issued between 1849 and 1937. Between 1849 and 1937, 350 stamps were issued by the French government, leading to a portfolio of 72 stamps. [17] The value of the portfolio is computed for all editions, and the results are used to compute the real stamp index depicted in Figure 7.

The index is based on surviving catalogues. For the period ranging from 1938 to 1947, 14 catalogues were available, with the missing editions concentrated between January 1938 and February 1940. The stamps considered in the index are number 1, 5, 10, 15 etc. Used stamps were favored because their prices were always mentioned; some values are missing for pristine stamps.

Figure 7: *Stamp Real Index (1938-1947).*

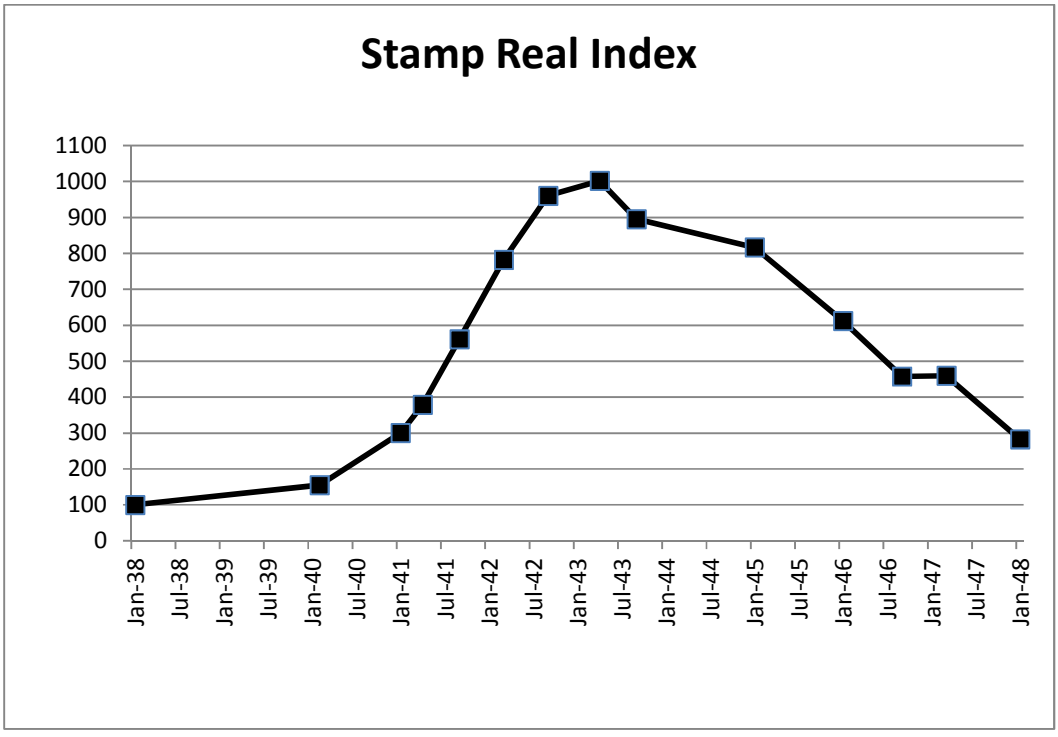


Figure 7 is in line with the results observed in Figure 6. Prices increase sharply until April 1943 and then gradually decline. If anything, the price evolution is even more striking for stamps, with the index being multiplied by a factor 10 in real terms from 1938 to April 1943! Investing in stamps guaranteed the same safety as investing in artworks. The press often mentioned the freedom enjoyed by people speculating on stamps, who were not forced to disclose their activities (Ronsin, 2003, p.128 and p.171). The price rises would thus also reflect the importance of discretion. The timing is quite similar to that observed for artworks, with the drop occurring only slightly later. This might be attributed to the fact that because stamps are extremely small, they were even more discreet than artworks and hence enjoyed higher demand for longer.

In the theoretical model proposed by Mandel (2009), conspicuous consumption limits the negative effect of art's procyclicality, leading investors to accept (and eventually realize) low returns. Both conspicuous consumption and the art market's response to overall changes in the economy explain the poor returns observed on the market. Changes in risk perception, combined with the Occupation, transformed an asset presented by Mandel (2009) as procyclical into a countercyclical one. This change may explain the sharp increase in prices observed during the Occupation. As artworks were viewed as a safe-haven investment, the required return fell during the Occupation, automatically pushing up their prices. The decline following the Liberation could then be attributed to expectations of a return to normal peacetime conditions. However, this leaves open the question of conspicuous consumption.

3.3.2 Conspicuous consumption

The sharp price increase on the art market might also be linked to changes in conspicuous consumption. In its absence, investors would require a higher premium as compensation. Intuitively, conspicuous consumption may have declined during wartime. Of course some people enriched by black market activities were tempted to mimic the way of life of the haute bourgeoisie, even though it was of paramount importance to hide this new wealth from the tax authorities (Grenard, 2012, p.224). Several authors mention the arrival of these actors on the market but stress their taste for classic paintings. In any case, during World War II and for the artworks viewed as degenerate by the Nazis, being conspicuous would definitely have been counterproductive. So how would the Mandel (2009) model change if conspicuous consumption was absent for a subset of artworks for given period of time?

To assess the role of conspicuous consumption in art market pricing, we use the arbitrary rule imposed by the Nazi regime. If conspicuous consumption plays a role in art market valuation, one would expect prices of 'degenerate' artworks to behave differently than prices of 'non-degenerate' ones. To test this hypothesis, the sample is segmented into two and regressions are run separately on each subsample (degenerate and non-degenerate). The distinction made by the Nazi regime was widely publicized in 1938 in connection with the *Entartete Kunst* exhibition. All art lovers at that time were aware of the sale of degenerate artworks in Lucerne. The German position was therefore unambiguous for French people. Any price difference observed before the war might be interpreted in several ways. It could be attributed to the realization that Nazi policy on art was detrimental to the market for degenerate artworks in general; this would be in line with the poor results of the forced sale in Lucerne of degenerate works previously held by German museums. But the difference could also be attributed to expectations of reduced conspicuous consumption and the risk of confiscation or destruction of these artworks should Germany invade France. *Ex ante* it was hard for buyers to assess these risks. Following the destruction in 1939 of artworks deemed degenerate in Germany and the confiscation of such works from German museums, it was reasonable to expect they would suffer a similar fate should France be defeated. Price differences after the start of the Occupation could reflect a further decline of the market for these works (occupied Europe now being excluded), or alternatively the impossibility of engaging in conspicuous consumption, or a specific destruction risk. In all likelihood the impact of the shrunken market would have been felt immediately, that is in October 1940. As for destruction or confiscation risks, following France's defeat, artworks were confiscated mainly on basis of the owner's identity, not the works

themselves. It is thus likely that expectations of confiscation would quickly have abated. Price differences after 1940 would thus reflect changes in expected conspicuous consumption.

For the whole period, degenerate artworks represent more than 34% of the sample. This figure changes dramatically over time, however. Artworks belonging to the 'degenerate' category represented 67% and 75% during the first and second halves of 1940. One interpretation of this striking observation would be a fire sale of degenerate artwork following the invasion of France and in the first months of the Occupation, when the policies that would apply to these works were uncertain. By contrast, during the other months of the Occupation, degenerate works represented only 28% of the sample.

The results of the regressions are presented in Table D6. Figure 8 tracks changes in the degenerate and non-degenerate art market indexes. The degenerate index drops dramatically at the end of 1937 and remains at a low value for all semesters before the Occupation. The non-degenerate index fared much better during the same period. The shaded parts represent the dates during which the difference between the two indexes is statistically significant at the 5% and 10% level of confidence. [18]

The difference between the two indexes is statistically significant during the first half of 1938 and the first half of 1939. This observation is in line with expectations and would reflect

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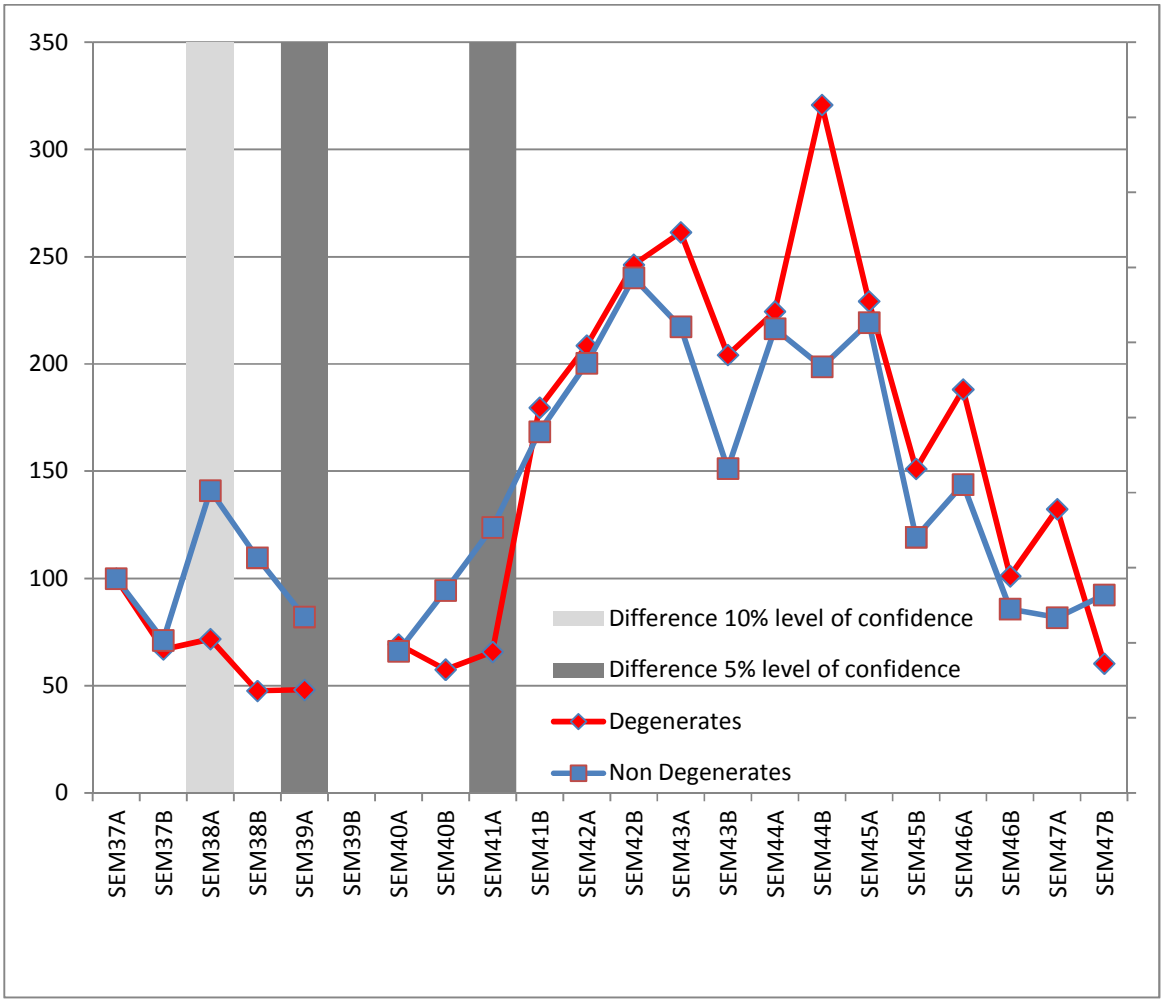
By "statistically different" we mean that the upper bound for the degenerate artworks falls below the lower bound for non-degenerate ones. For the sake of exposition we rely on shaded areas, but Table D7 in Appendix D provides the full set of values for the two indexes and their upper and lower bounds.

the fact that the Nazi policy on degenerate artworks depressed their price. But this can hardly be linked to changes in conspicuous consumption, since France was still unoccupied at the time. The difference observed during the first half of 1941 would be linked to differences in conspicuous consumption, however. The highest prices realized by non-degenerate artworks would then reflect the added utility derived by agents in terms of conspicuous consumption. This utility was absent for holders of degenerate artworks. In other terms, the absence of conspicuous consumption increased required returns for degenerate artworks. This drove down the prices of these works in comparison with their non-degenerate counterparts. Very quickly, however, prices began to converge again, suggesting that the shock was quickly absorbed. Of course if people were valuing discretion by that time, the style of the pictures would have been less relevant since they were meant to store and hide value.

Figure 8: *Degenerate and Non-Degenerate Art Market Index (1937-1947).*



4. Conclusion

The French art market during the Occupation has been the subject of numerous publications that mostly focused on the fate of looted artworks. According to most authors, the art market itself was considered as having experienced a huge boom during the Occupation. Using an original database, this paper recreates an art market price index for the period 1937-1947. The index shows that the art market in Occupied France provided one of the best available investment opportunities. In fact, in a risk-return framework, gold was the only serious

alternative to art. This observation is attributed to the characteristics of wartime investments. Discretion, the inflation-proof character of art, the absence of market intervention and the possibility of reselling works abroad played a crucial role in their valuation. Investors were ready to go to the black market to acquire assets that could easily be resold abroad. For those who preferred to stay on the side of legality, the art market provided an attractive alternative.

The paper also defines the concept of discretion as the ability to store a large amount of value in small and easily transportable goods. During wartime, illegal activities and the risk of being forced to flee the country increased the appeal of discreet assets. By comparing the price index for small and large artworks, the paper shows that investors were ready to pay a premium for smaller artworks. This premium was especially large just before the German invasion and during 1942-1943, when the black market flourished. We thus show that the respective importance of non-pecuniary and pecuniary motives varies over time and that, in extreme circumstances, artworks may prove extremely attractive investment vehicles. This point is further established by exploiting the distinction made by the Nazis between ‘degenerate’ and ‘non-degenerate’ artworks. Pricing of ‘degenerate’ works was indeed affected by the impossibility of engaging in conspicuous consumption of them.

Discretion does not concern only artworks. The paper shows that other discreet assets also experienced sharp price increases. Assets which are easy to transport and hide therefore have characteristics that are valued by some investors during troubled times. The increase in demand for discreet assets need not be limited to artworks and stamps; jewels, gold or other

precious metals would certainly be considered equally appealing. During World War II, however, gold increased less steeply in value because it was illegal to own.

The interest in discreet artworks goes beyond wartime. At any point in time, tax evaders may be willing to buy art or other discreet assets to hide illicit profits or to diminish their tax burden. As a result, when wealth and wealth inequality increase, so does demand for discreet assets. Whereas the literature traditionally attributes these price increases to social competition, this paper suggests an alternative explanation: assets that facilitate tax evasion should fetch a higher price in an environment characterized by increasing wealth inequality. The paper thus opens the door to a different interpretation of the high demand for artworks in the 1990's in Japan or in China nowadays.

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Appendix A: Breakdown of artworks sold by medium and average price per medium

During the Occupation period, close to 24,500 paintings, engravings and drawings were sold in Drouot. In some cases the date of the sale, the name of the artist, or the price are not mentioned. Once these works are excluded, 21,882 remain. Of these, 47.65% were signed, and 3.67% had a stamp from the artists' atelier. The description of the artworks themselves can be classified into four categories: Wooden artworks (panels, triptychs or paintings on wood), work on paper (mostly engravings and drawings), watercolours (gouaches included) and canvasses. Some

descriptions are however either too general ('paintings') or too specific to be included in any analysis. Finally, 21,333 artworks may be attributed to one of the four categories.

Table A1: *Proportion in Terms of Number of Works*

Year	Canvas	Paper	Watercolour	Wood
1940-41	47%	17%	23%	13%
1941-42	45%	19%	19%	17%
1942-43	47%	18%	18%	16%
1943-44	47%	16%	16%	17%

Table A2: *Proportion in Terms of Amounts*

Year	Canvas	Paper	Watercolour	Wood
1940-41	51%	7%	11%	30%
1941-42	65%	9%	8%	18%
1942-43	60%	10%	13%	18%
1943-44	62%	9%	10%	20%

Table A3: *Most Expensive Paintings Sold at Drouot during the Occupation*

Artist	Painting	Date of sale	Price (FF)
Cézanne, Paul	La Vallée de l'Arc et la montagne Sainte-Victoire	11/12/1942	5 000 000
Degas, Edgar	Après le bain. Femme s'essuyant	11/12/1942	2 230 000
Pissaro, Camille	La Route du Cœur-Volant, à Louveciennes	11/12/1942	1 610 000
Renoir, Auguste	Baigneuse lisant	11/12/1942	1 530 000
Degas, Edgar	Femme à sa coiffure	11/12/1942	1 500 000
Delacroix, Eugène	Nu assis, de profil à gauche (Mademoiselle Rose)	11/12/1942	1 500 000
Goya Francisco de	Portrait de l'Artiste	11/03/1942	1 450 000
Degas, Edgar	La Causerie	11/12/1942	1 410 000
Degas, Edgar	Portrait de Monsieur de Valerne	11/12/1942	1 400 000
Daumier, Honoré	Portrait d'un ami de l'artiste	11/12/1942	1 320 000
Degas, Edgar	La Coiffure après le bain	11/12/1942	1 300 000
Pissaro, Camille	La Route d'Ennery, 1877	11/12/1942	1 300 000
Ingres, J.-A.-Dominique	Portrait du graveur Desmarais	15/12/1941	1 240 000
Corot, Camille-Jean-Baptiste	Paysage composé. Effet gris	11/12/1942	1 210 000
Pisley, Alfred	Le Loing, à Moret	11/12/1942	1 205 000
Pisley, Alfred	Chemin de Saint-Mammès (1895)	11/12/1942	1 200 000
Ruysdael, Jacob van	Solitude	15/06/1942	1 200 000
Corot, Camille-Jean-Baptiste	Bellevue, vue prise en regardant le mont Valérien	10/02/1943	1 100 000
Gauguin, Paul	Bretagne. Deux figures sur la falaise	11/12/1942	1 100 000
Corot, Camille-Jean-Baptiste	Trois personnages conversant sous les arbres et barque au bord de l'eau	12/03/1943	1 050 000
Delacroix, Eugène	Fleurs dans un vase bleu (1849)	24/06/1942	1 040 000

Appendix B: Descriptive statistics for the Occupation

Table B1: *Artists Ranking in Terms of Number of Canvasses Sold and in Terms of Total Sales*

Artist	Number of canvasses	Artist	Amounts (FF)
Trouillebert	106	Corot	13.168.000
Lebourg	83	Monet	9.103.000
Luce	82	Pissaro	6.935.800
Valtat	79	Renoir	5.881.900
Guillaumin	72	Sisley	5.520.100
Friesz	63	Bonnard	5.273.500
Forain	58	Degas	4.631.000
Derain	52	Delacroix	4.510.100
Favory	47	Lebourg	3.608.700
Cals	41	Boudin	2.474.200
D'Espagnat	41		

Appendix C: Topics and Search Strings

ANIMALS: Biche, Bœuf, Caniche, Cerf, Cheval (chevaux), Chat, Chien, Dogue, Lion, Loulou, Mouton, Perroquet, Poules, Tigre, Vache. Animals were excluded if they were used as an attribute (fille au chien) or if they obviously referred to a still-life (lapin écorché).

LANDSCAPE: Bord(s) (when associated to a river), côte, lac, marine, mer, montagne, paysage, rivière, Seine (when associated to a landscape)

NUDE: Nu, nue, nus

PEOPLE: Dame (Notre-Dame excluded), enfant, famille, femme, fille(tte), (gentil)homme, (grand-)mère, père, personage. Items were excluded when associated with portrait, nu or when they had a religious meaning)

PORTRAIT: portrait

RELIGION : Christ, Jesus, Résurrection, religieuse, Saint (in a religious context), Vierge

STILL-LIFE: Bouquet (excluded bouquet d'arbre), Fleurs, Fruits, Nature morte, Vase. When the title contained food names or flower names, these were added.

URBAN: Avenue, Londres, Lyon, Marché, Marseille, Montmartre, New York, place, port, Paris, Rome, rue, Venise, village. When the title contained other city's names, these were added.

Appendix D: Regression results

Table D1: *Results of the hedonic regression (1937-1947)*

All models are estimated using OLS with White heteroskedasticity-consistent standard errors and covariance. The dependent variable is the natural log of the real price. Period considered 1937-1947, full sample for Model (1) and (3), blue chip sample for Model (2).

Model	Model (1)	Model (2)	Model (3)
Time Dummies[19]	Incl	Incl	Incl
Artist Dummies.	Incl	Incl	Incl
Height	0.008***	0.0087***	0.0085***
Width	0.0140***	0.0173***	0.0140***
Surface	$-7.92\ 10^{-5}$***	$-8.94\ 10^{-5}$***	$-8.03\ 10^{-5}$***
After	-1.959***		-1.976***
Attributed	-1.282***		-1.283***
Copy	-1.162***		-1.106***
Genre	-2.133***		-2.148***
Manner	-1.888***		-1.767***
School	-1.823***		-1.847***
Style	-2.698***		-2.666***
Animals	-0.200*	-0.266***	-0.216**
People		-0.1023**	
Urban	0.181***	0.1508***	0.1797***
# of observ.	8 853	4339	8 853
Number of variables	1 705	226	1 692
Adjusted R-square	65.30%	76.02%	64.87%

Semi-annual, for model 1and 2, and annual for Model (3). In all regressions significant at the 1% level of confidence

Table D2: *Changes in GDP and Art Market Index*

	Art down	Art up	Total
GDP down	0	5	5
GDP up	4	1	5
Total	4	6	10

The χ^2 test of independence between the variables rejects the null that both variables are independent (p value equal to 0.0046). Fischer's exact test of independence for 2x2 tables, which is better suited for small samples, also rejects the null (p value = 0.0476) at the 5% level of confidence.

Table D3: *Results of the Hedonic regression (Occupation Period)*

All models are estimated using OLS with White heteroskedasticity-consistent standard errors and covariance. The dependent variable is the natural log of the real price. Period considered October 1940- July 1944. Full sample for Model (1), Blue Chips Index for Model (2)

Model	Model (1)	Model (2)
Time Dummies (Monthly) [20]	Incl	Incl
Artist Dummies	Incl	Incl
Height	0.0085***	0.0090***
Width	0.0141***	0.0173***
Surface	$-7.92\ 10^{-5}$***	$-9.44\ 10^{-5}$***
Dated	0.1211**	0.1533***
Stamp	0.4033***	0.3151***
Signed	0.3655***	0.3976***
After	-2.086***	
Attributed	-1.2577***	
Genre	-2.3332***	
School	-1.912***	
Workshop	-0.606*	
Portrait	-0.217***	
Religious	-0.02736**	
Urban	0.1808**	0.1345**
# of observ.	6 492	3 057
Number of variables	1 681	348
Adjusted R-square	76.18%	79.73%

[20] All significant at the 1% level.

Table D4: *Results of the Hedonic Regression (Small versus Large*)

All models are estimated using OLS with White heteroskedasticity-consistent standard errors and covariance. The dependent variable is the natural log of the price. Period considered: 1937-1947.

Model	Large	Small
Time Dummies (Monthly)	Incl	Incl
Artist Dummies	Incl	Incl
Height	0.0033**	0.0079***
Width	0.0082***	0.0013***
Surface	$-3.15\ 10^{-5}$**	
After	-1.899***	
Attributed	-1.03***	-1.1263***
Copy	-1.451***	-2.4928***
Genre	-2.324***	-1.4720***
Manner	-2.325***	0.00319**
School	-1.678***	-1.5367***
Style		-3.1366***
Still-Life	0.2169***	
Urban	0.2119***	0.1787***
# of observ.	4 300	4 553
Number of variables	1 087	1 127
Adjusted R-square	64.04%	66.7%

Table D5: *Indexes for the small and large artworks (10% level of confidence)*

	Large Low	Large	Large Up	Small Low	Small	Small Up
SEM37A	73.14	100	136.72	79.94	100	125.09
SEM37B	41.99	57.23	77.99	51.40	65.80	84.23
SEM38A	72.27	103.10	147.10	87.13	112.76	145.93
SEM38B	62.21	89.63	129.14	107.31	144.18	193.70
SEM39A	36.45	48.63	64.88	68.14	81.86	98.33
SEM40A	29.03	56.62	110.44	71.78	99.13	136.90
SEM40B	42.25	56.32	75.09	67.89	88.32	114.91
SEM41A	62.90	83.79	111.63	99.07	122.65	151.85
SEM41B	98.47	131.77	176.34	150.59	187.17	232.64
SEM42A	106.43	138.32	179.78	207.33	244.72	288.86
SEM42B	136.45	177.70	231.42	264.22	316.34	378.75
SEM43A	134.95	174.75	226.30	226.68	267.80	316.37
SEM43B	112.33	149.03	197.71	160.92	193.19	231.93
SEM44A	147.93	192.43	250.33	214.42	256.58	307.01
SEM44B	91.78	160.32	280.04	220.58	373.99	634.07
SEM45A	129.99	186.63	267.95	200.84	259.47	335.22
SEM45B	88.54	122.91	170.63	112.51	142.43	180.31
SEM46A	92.19	126.34	173.14	139.10	172.55	214.05
SEM46B	70.38	98.71	138.44	72.73	94.95	123.97
SEM47A	62.02	85.91	119	94.81	124.02	162.24
SEM47B	45.70	65.12	92.81	65.65	79.25	95.67

Table D6: *Results of the Hedonic Regression (Degenerate versus Non-Degenerate Artworks)*

All models are estimated using OLS. The dependent variable is the natural log of the real price. Period considered: 1937-1947.

Model	Non-Degenerates	Degenerates
Time Dummies	Incl	Incl
Artist Dummies.	Incl	Incl
Height	0.0094***	0.0024***
Width	0.0147***	0.0098***
Surface	$-8.18\ 10^{-5}$***	
Animals	-0.2557**	
Still-Life	0.1924**	
Urban	0.2488**	
After	-1.973***	
Attributed	-1.191***	-2.1287***
Copy	-1.0875***	
Genre	-1.9923***	-1.8535***
Manner	-1.8028***	
School	-1.7219***	-2.0851***
Study	-0.52*	
# of observ.	5 360	2 780
Number of variables	1 195	349
Adjusted R-square	57.31%	82.35%

Table D7: *Indexes for the 'Degenerate' and 'Non-Degenerate' Artworks (10% Level of Confidence)*

	Degenerate Low	Degenerate	Degenerate Up	Non-Degenerate Low	Non-Degenerate	Non-Degenerate Up
M37A	80.91	100	123.60	82.45	100	121.29
M37B	52.53	66.93	85.27	56.31	71.21	90.04
M38A	51.31	71.79	100.46	108.11	140.98	183.83
M38B	21.42	47.62	105.87	85.77	109.72	140.36
M39A	39.47	48.07	58.55	68.44	82.12	98.53
M40A	52.28	69.26	91.76	45.54	66.11	95.97
M40B	47.65	57.52	69.45	67.34	94.38	132.29
M41A	53.83	65.82	80.49	102.94	123.82	148.94
M41B	143.98	179.63	224.11	140.43	168.48	202.13
M42A	177.62	208.58	244.93	170.31	200.34	235.68
M42B	208.99	246.28	290.22	201.44	240.15	286.31
M43A	225.40	261.40	303.15	185.30	217.32	254.87
M43B	172.22	204.19	242.09	125.91	151.25	181.67
M44A	189.58	224.46	265.77	183.13	216.42	255.76
M44B	231.15	320.76	445.11	116.56	198.67	338.65
M45A	170.76	229.20	307.64	170.43	219.27	282.11
M45B	123.80	151.08	184.39	90.91	119.27	156.49
M46A	154.68	188.11	228.77	114.27	143.87	181.13
M46B	76.48	101.08	133.58	65.33	85.73	112.49
M47A	103.99	132.35	168.45	66.39	81.75	100.66
M47B	49.43	60.32	73.61	71.94	92.40	118.67

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